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20 TIPS TO
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**HOT
100**

Special issue

CREATE CUSTOM
ELEMENTS
Make a reusable module
with web components



TOOLS

TRENDS

WEBVR
WEB
COMPONENTS
FUTURE OF UX
EXPERIMENTAL
CSS
IN-DEMAND
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ES6 & 7

& TECHNIQUES

2017

PROS REVEAL WHAT'S GOING TO BE BIG



CODE A 360° IMAGE SLIDER • BUILD DYNAMIC ZOOMING BACKGROUNDS
GET STARTED WITH MOZILLA A-PAINTER • CREATE MULTIPLE MENU EFFECTS
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Future

ISSUE 257

Digital Edition

GreatDigitalMags.com



CREATE AN
INSTAGRAM
SLIDESHOW

How to combine HTML and the
Instagram API to show off images

Network security

Firewall.

Rules
(incoming)

	Name	Source IP	Destination IP	Source port	Destination port	Protocol	TCP flags	Action
#1	icmp	0.0.0.0/0	0.0.0.0/0	0-65535	0-65535	icmp	ack fin rst psh urg	accept
#2	ssh	85.10.212.62/32	0.0.0.0/0			tcp	fin rst psh urg	accept
#3	smtp	0.0.0.0/0				tcp	ack fin rst psh urg	accept
#4	http	0.0.0.0/0				tcp	fin rst psh urg	accept
#5	pop3	0.0.0.0/0				tcp	ack fin rst psh urg	accept
#6	imap	0.0.0.0/0				tcp	fin rst psh urg	accept
#7	tcp established	0.0.0.0/0				tcp	est	accept

+ Add rule



e.g. Dedicated Root Server PX61-NVMe

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Welcome to the issue

THE WEB DESIGNER MISSION

To be the most accessible and inspiring voice for the industry, offering cutting-edge features and techniques vital to building future-proof online content



Steven Jenkins

Highlight



Users are put off by maths or science and don't want to engage with anything that looks like homework

Making data interesting, Web Designer knew we had to talk to the team at After the flood. Page 32

The future is here. Get excited



Neostadamus was always looking to the future, but his predictions went well beyond the next year, and were very generic and interpreted in many different ways.

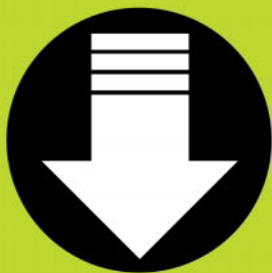
Well, you won't be seeing that in this issue of Web Designer. We get the pros to tell us what's happening now and what tools, technologies, trends and techniques that you need to be on the lookout for. So what do the experts have to say? WebVR - it's been with us for a while, but 2017 is the year that browser support will allow it to fulfil its potential, with impressive results seeping out across the

web. It will be better than ever before. Web Components have been here for a while, but lack of all-round browser support has been holding them back. That is about to change and bring forward the future of HTML into the present. 2017 will be the year you can build your own HTML. What are the trends in UX? We get the experts to choose seven you need to watch out for and the key tools you will need. What's happening with CSS? CSS grids are going to take over and we get the pros to give you an insight into how to use them. What skills will be in demand? What conferences do you need to get to? What has Google got to offer in 2017? Read on to find out more. Keeping the future company, we have 20 tips on how to make WordPress the install you want. Enjoy.

A set of acknowledged best practices is good for mobile, but also results in increased stagnation and 'sameness' across the web

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- The Maroque font



www.filesilo.co.uk/webdesigner

This issue's panel of experts

Welcome to that bit of the mag where we learn more about the featured writers and contributors...

☞ The big areas of innovation will be highly responsive components, device-specific microinteractions, and websites that are location and context aware ☞



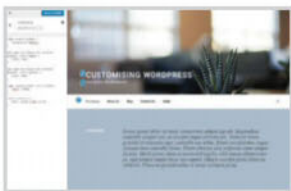
The HOT 100 panel

The first issue of 2017 asks the pros what's going to be the big hitters for the coming year. Discover the tools, trends and techniques that designers and developers need to know to move forward. WebVR, future UX, new-gen Google, Web Components and more await. **Page 40**

Sarah Maynard



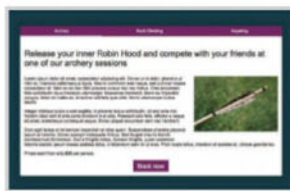
Sarah is a freelance WordPress developer with a passion for encouraging new coders to get started. In this issue she covers 20 tips to customise WordPress, make your site unique and what to keep in mind as you go. **Page 72**



Matt Crouch



Matt is a front-end developer currently based in London. In this issue he takes a closer look at JavaScript ES6 & 7 as well as demonstrating how to create a custom reusable module with the help of HTML, CSS and JS. **Page 84**



Mark Shufflebottom



Mark is a professor of Interaction Design at Sheridan College of Advanced Learning. In this issue he is designing interactive image animations using the turntable.js library. **Page 62**



Sean Tracey



Sean is a technologist and author. When he's not writing about code, he's writing code in the Labs department of one of the world's oldest newspapers. This issue he shows how to create a slideshow using the Instagram API. **Page 78**

Leon Brown



Leon is a freelance web developer and trainer who assists web developers in creating efficient code for projects. This issue he reveals a host of techniques, as seen on the top-class websites featured in our Lightbox. **Page 16**

Neil Pearce



Neil is a web designer from Essex, UK and has been contributing to the magazine for many years. This month he takes the time to introduce you to the Pug HTML templating language. **Page 66**

David Howell



David is an experienced writer, author and journalist who runs his own company, Nexus Publishing. This issue he gets the lowdown on After the Flood, an agency which makes sense of the data that is all around us every day. **Page 32**

Mark Billen



Mark is a freelance technology journalist with a background in web design and development. This issue he jumps on the Lightbox pages and selects some of the best-looking and best-built sites on the web. **Page 14**

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contents

Cutting-edge features, techniques and inspiration for web creatives

Chat with the team and other readers and discuss the latest tech, trends and techniques. Here's how to stay in touch...

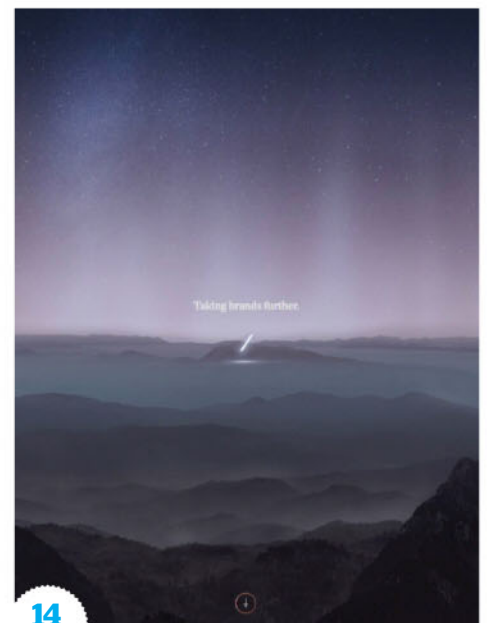
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Carl Bateman

The Founder of the WebGL Workshop discusses the current state of WebGL and what 2.0 will bring



The ubiquity of WebGL across platforms as well as browsers makes for an unparalleled delivery system

Carl Bateman

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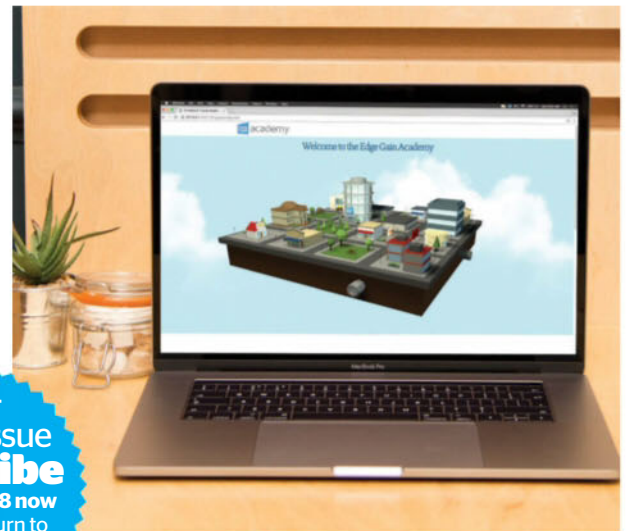
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www.jennyjohannesson.com

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The tools, trends and news to inspire your web projects.

What front-end tools are you using?

What's trending in the world of front-end tools? Web Designer takes a closer look

HTML, CSS and JavaScript are kings of the web, but the tools and methodologies that a designer/developer uses can be a very different matter. There will always be the popular tools, but there will also be the lesser known. Just because a tool is the most popular, it doesn't mean that it is the best tool for you. But, it does mean that the tool is tried and tested and serves a purpose for a large number of users. There may be an equivalent that works just as well and fits in with your psyche. An example is the Bootstrap and Foundation frameworks. Both are extremely good, but which one suits you best? We have always been big fans of the Foundation framework, but this is very much a personal choice. Bootstrap simply doesn't suit the way we work as well as Foundation, but this article isn't a debate about Bootstrap vs Foundation – it's a look at a survey that Ashley Nolan, a senior UI

engineer at JUST EAT, put together called The State of Front-End Tooling 2016 (ashleynolan.co.uk/blog/frontend-tooling-survey-2016-results). The survey asks 19 questions gauging what are the preferred tools, libraries and frameworks of developers. It has had over 4,700 replies at the time of writing and is still available to those who wish to participate. Add your voice and opinion at www.surveymonkey.com/r/7QNSVX8. The survey should only take around five minutes and the more who enter, the more conclusive the results will be.

So, which tools and methodologies are winning the hearts and minds of front-end developers? Interestingly, there seems to have been a shift away from jQuery recently with more developers looking to use vanilla JavaScript for their projects. There are plenty of plus points for going down the plain JS route, but there are plenty of pluses for using jQuery. The

survey suggests, "Although there has been a lot of talk about front-end developers moving away from using jQuery, the results show that usage and knowledge levels are still unrivalled in comparison with any other JavaScript tool of its kind."

So, what else is a hit with developers? When it comes to CSS processors, Sass is still the number one choice in the survey, getting over 63%. Less dropped off to just over 10% while newcomer PostCSS managed a very respectable 8%. CSS Linting is very much a 50/50 split between those who said they do use a tool to lint their code and those who don't. When asked which CSS tool did developers use in their projects, the most commonly used was Autoprefixer. Modernizr was another popular choice. The least used was SUIT CSS – a new one for **Web Designer**, so we learnt something.

Getting back to JavaScript, the majority of respondents considered themselves between Intermediate and Advanced. It seems they like Gulp over Grunt, with Gulp getting 43% while Grunt was on 11%. NPM scripts was the big winner, up nearly 23% on last year. Looking at knowledge of JavaScript libraries and frameworks, there was a clear winner as we have already mentioned – jQuery. Underscore, Angular 1 and React were well represented while Angular 2 still has a lot of catching up to do.

Gleaning the trends that are happening in front-end tools demonstrates what tools you should consider when building a new project (if not already using them). But it also helps indicate what new skills you should be thinking of adding to your skillset. If something is popular with developers then it will be popular with employers, which ultimately leads to getting a better job, or even a well-deserved pay rise.

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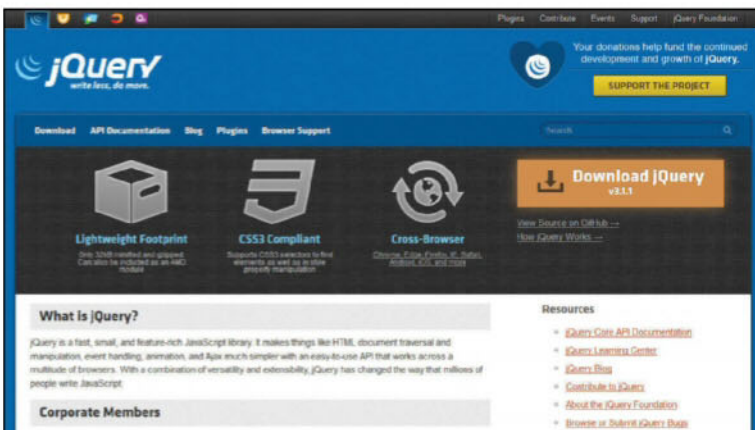
Get your hands on a collection of the best contemporary techniques

Check out the latest digital additions to **Web Designer's** burgeoning collection. **Amazing Websites and How to Build Them Vol 04** brings together another collection of great-looking sites and picks out quick techniques to learn. **The Web Apps Handbook Volume 2** and **The Developer's Guide to JS** select the best tools and methods to build apps with web technologies and show how to get started with ES6 and NPM.

Don't forget **Animate with HTML & CSS** and **3D and the Web**. We cherry-pick the best animation and 3D-related techniques to add interest to any project.

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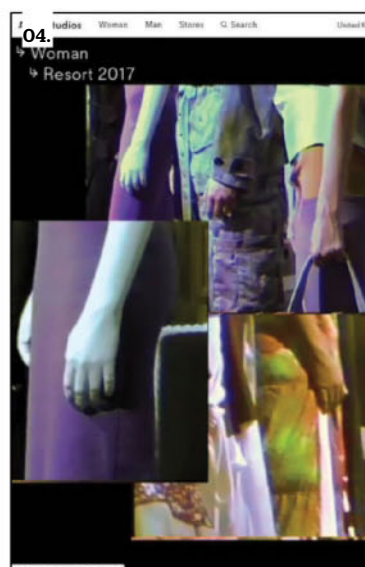
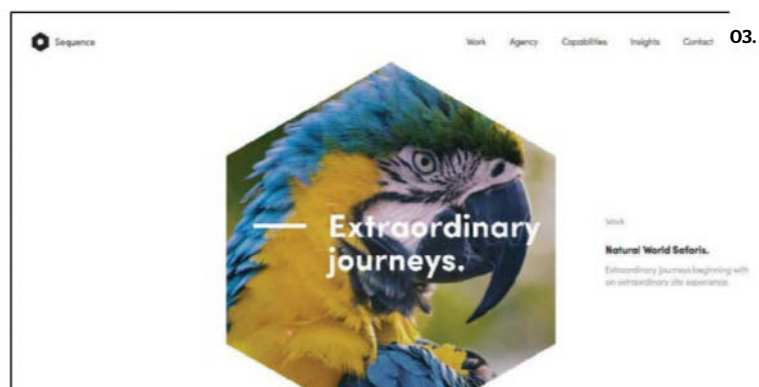
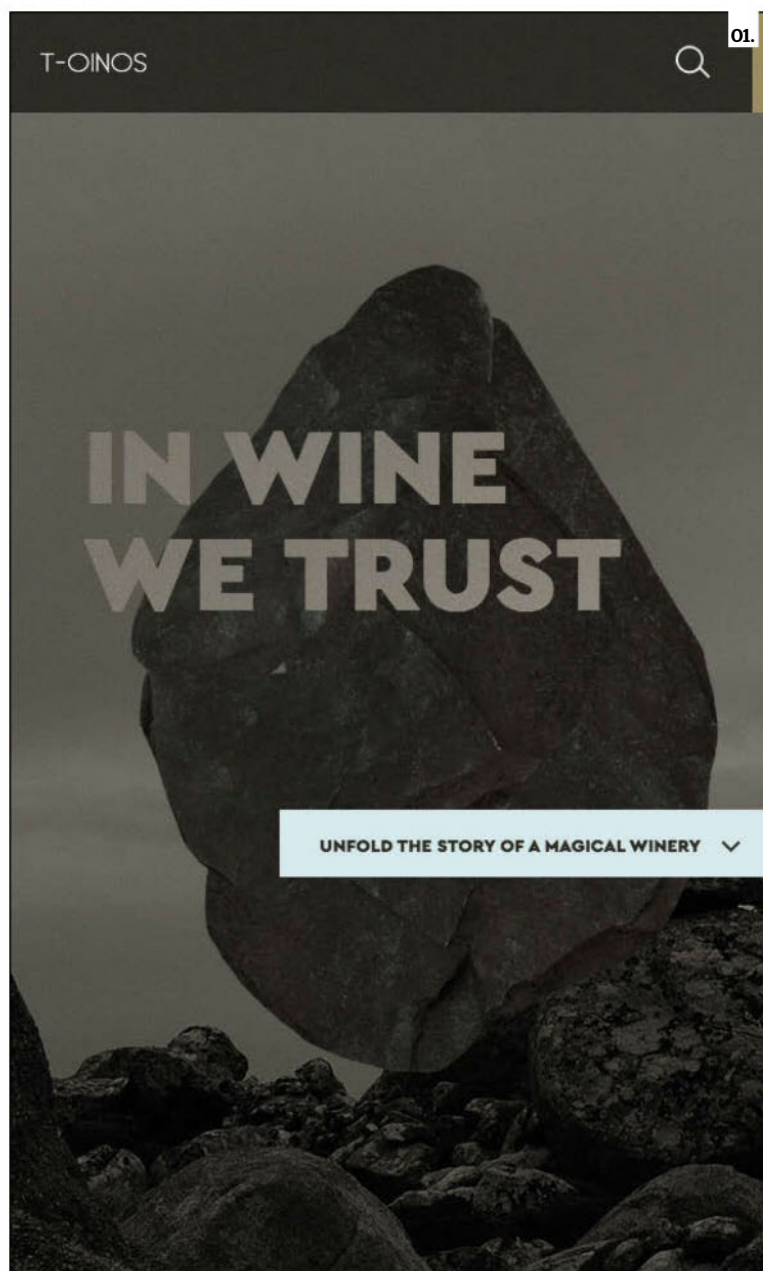
“Sass is still the number one choice in the survey”



Is jQuery still one of the most popular JS libraries? It is according to the results of the The State of Front-End Tooling 2016 survey



Sites of the month



01. T-oinos

www.toinos.com

Smart graphics, style and animation that unfold to tell a story

02. HeadOffice

headoffice.com

Bright in-your-face yellow coupled with retro computer UI styling to engage

03. Sequence

sequence.co.uk

Hexagons, 3D and animation combine to make the user want more

04. Acne Studios

acnestudios.com

Convincing, confusing, clever and contemporary. Take a look yourself

Graphics Fill & Stroke II

behance.net/susanapazlm

Digital designer Susana Paz uses gorgeous geometric shapes and shadows for a striking 3D illustration



Colour picker Free The Nobodies by

bit.ly/2gx2fXP

#2BAEE4

#3FC4DF

#55C7DE

#1AA0DA

#4CC2BF

Typesetter Papelli

bit.ly/2gx8Cu8

An informal sans-serif font with a soft, feminine touch, making it ideal for corporate logos and suchlike

ABCabc
01234

WordPress Lucky

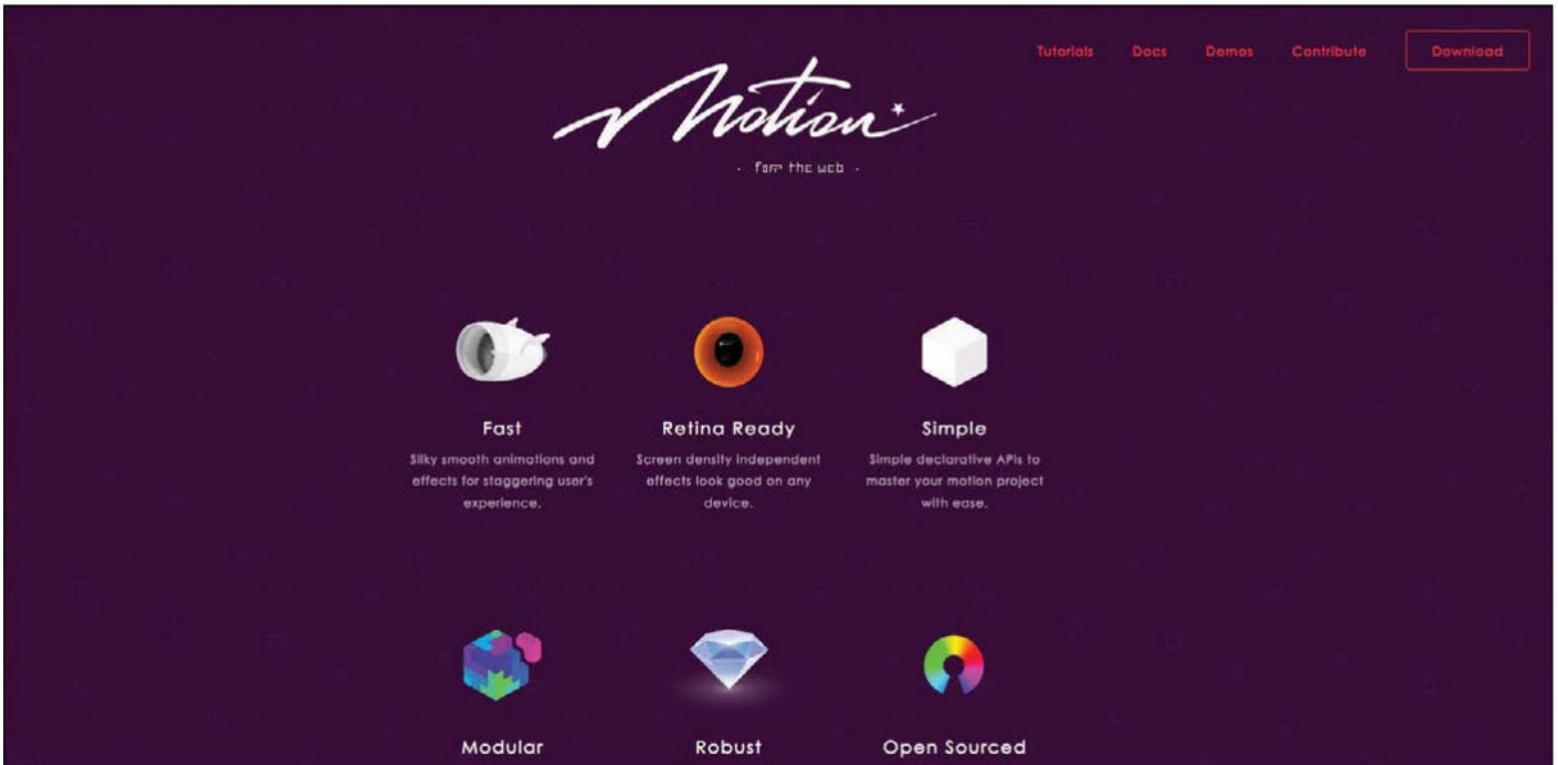
7uptheme.com/wordpress/lucky

Simple, clean and uncluttered eCommerce theme that sells the product and entices the user



webkit

Discover the must-try resources that will make your site a better place



Mo.js

mojs.io

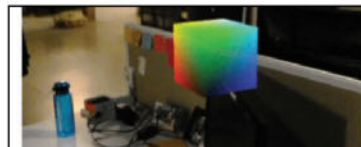
This little JavaScript library will help you to create silky smooth animation. Improve the user experience with judder-free animations, be ready for retina, and do this quickly and simply with a selection of declarative APIs. Delve into the tutorials and learn to build modularly and say goodbye to large file sizes. Check out the demos and tutorials.



Choreographer JS

bit.ly/2gZccOZ

A simple library for creating complex CSS animations. Head to the GitHub repository to find out how to get started and see some examples in action.



HolographicJS

bit.ly/2gK667p

A C++ Windows Runtime Component for hosting Windows Holographic apps built with JavaScript and WebGL. Can you help out this experimental project?



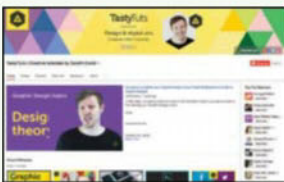
Riot

riotjs.com

A simple and elegant component-based UI library. They are looking to get rid of unneeded complexity, offering a small, powerful API and concise syntax.

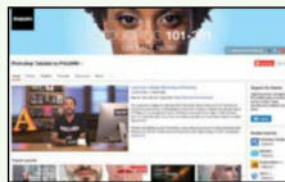
TOP 5 Photoshop YouTube channels

Want to sharpen your Photoshop skills? Then check out this collection



TastyTuts

youtube.com/user/TastyTuts
Hundreds of Photoshop and graphic design tutorials conveniently split into different categories and courses



PHLEARN

youtube.com/user/PhlearnLLC
Get started with Photoshop, retouch photos, enhance images, create text & graphics and work with Lightroom



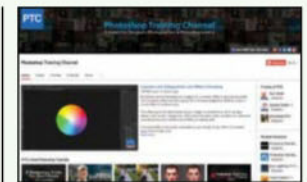
Photoshop Tutorials

bit.ly/2hkN5ZU
Techniques and tutorials include double exposure, easy 3D effects and much more



Adobe Photoshop

youtube.com/user/Photoshop
The official channel offers details on the latest features and how they can be used



Photoshop Training Channel

bit.ly/2hurThe
'Just show me how you did that' is this channel's mantra.

CX and UX: best of friends

What is customer experience, and how is it different to user experience?

Chris Wright

Founder at Fifty five and Five

fiftyfiveandfive.com

Customer loyalty has changed significantly in the last decade. Businesses exist in an increasingly customer-led environment: the rapid evolution of technology, along with a coming-of-age of millennial consumers has had a transformative effect on customer expectations. And one of the biggest components of this expectation is the idea of customer experience.

Customer experience (CX) is the sum of all interactions a customer has with your business, and should be distinguished from user experience (UX), which is the experience that the user (your customer) has with a specific product or service of yours.

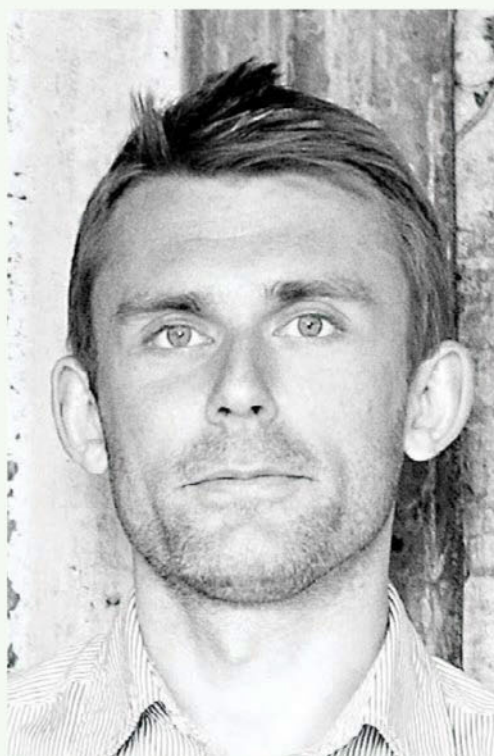
When we talk about user experience (UX) – using our tech startup in Manchester as the example – we're talking about desktop software, mobile apps and the website browser that your customer encounters and interacts with. We need to ask the following questions: How intuitive is the interface? Is it easy to use and navigate? Is it clear in its information architecture? Does it solve the correct problem? Does it provide the right service?

Any business that wishes to remain competitive in this new landscape needs to understand the difference between customer experience (CX) and user experience (UX), and be able to adapt their business practices accordingly.

So, why is customer experience more important than ever? Research from former Gartner analyst Esteban Kolsky has suggested that 55 per cent

of customers are willing to pay more for a guaranteed good experience. Only 1 out of 26 unhappy customers complain. The rest churn. Absence of feedback or complaints doesn't necessarily mean satisfaction – indifference really is the opposite of love. Sixty-seven per cent of customers cite bad experiences as reason for churn and it is six to seven times more expensive for companies to attract new customers than to keep existing customers.

Whatever your business, be it a burger joint in Manhattan or a small tech firm in Manchester, you need to provide value and differentiation. That's how you



“ CX takes into account the entire experience that your customer has when they deal with you and your brand ”

stand out in any market – even the most crowded. And today, it seems that customer experience is the last source of differentiation. So, be outstanding.

Let's look in more detail at how CX differs from UX and why that matters to you, and more importantly, to your customers.

As stated previously, CX takes into account the entire experience that your customer has when they deal with you and your brand, not solely the product. Yes, in the old days that meant walking into your burger place and rating the food, the service and the price. This would be the whole of the customer experience, right? It's the same basic

principle, but now what a customer can rate you on is much broader, and crucially they can decide not to walk into your business way before they even see the restaurant or the menu. Points to consider are: What is the first point of contact for your potential customers? How easy is it for customers to find answers to their questions? How pleasant and professional is the interaction process? Do they feel positive about their overall experience and everything associated with your organisation? What role is new media, like Facebook and Twitter, having on your customer points of contact?

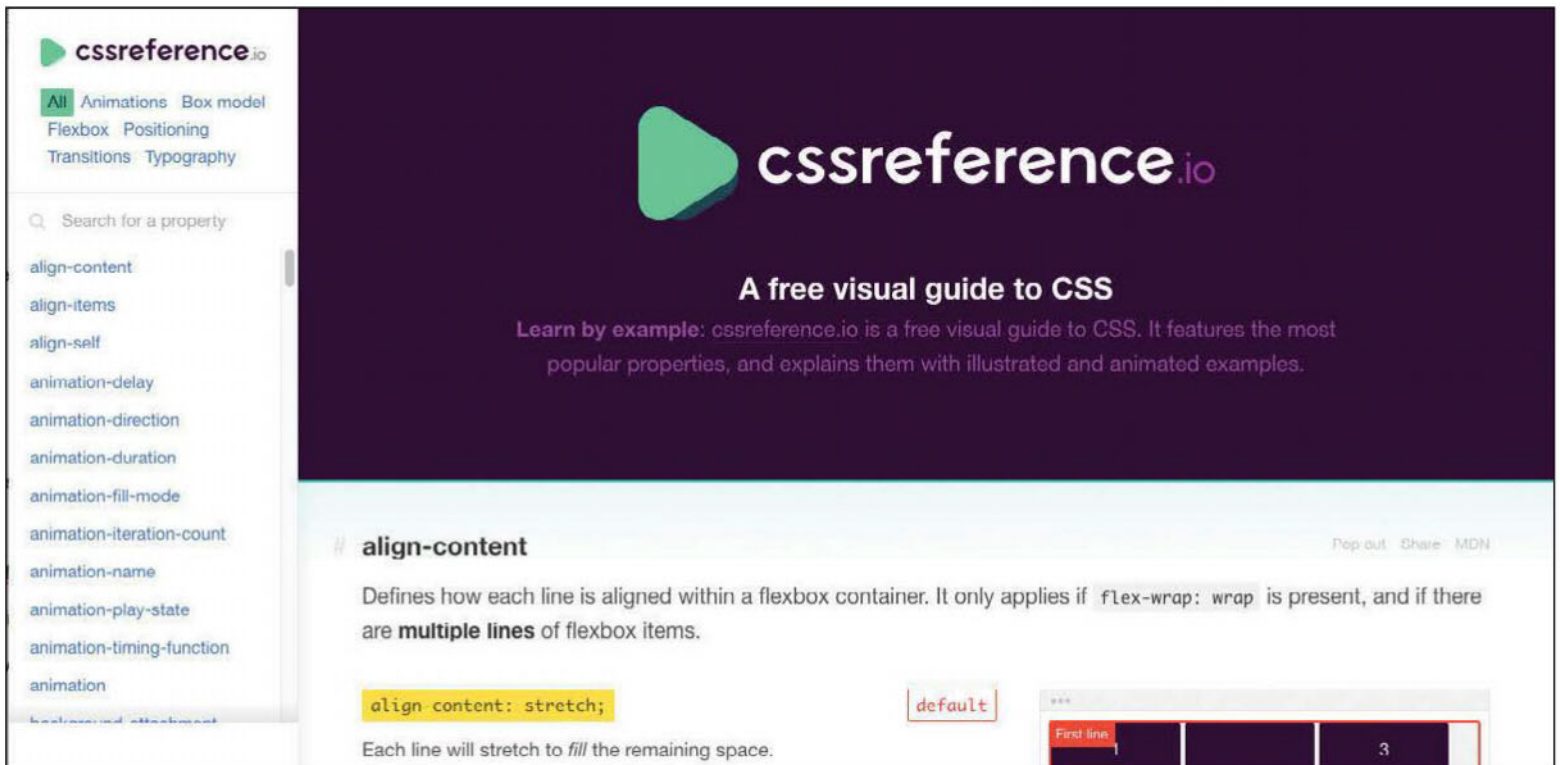
What makes your users 'users' (or the person eating at the burger restaurant) is that they are involved in using your product. What makes them customers has to do with everything else.

What's important to keep in mind is your customers' entire journey with your organisation. In fact, your customer may not even use your service before they are turned off. CX takes in potential customers and their experiences before they put hands near wallets. The customer journey now begins much sooner than it might have even five years ago. Thanks to things like social media and the digital transformation at large, customers can now encounter your business in a wider variety of ways and can be delighted or put off before they even get near your product.

If UX is one important pillar under the roof of CX, then both are very important. If your UX is poor, then people will think twice about your services. However, even if your

website is fast and well signposted, your app convenient to use, your burger the best in town, if you have an ill-tempered or unprofessional customer service team at the helm when someone calls to enquire or complain, you are going to struggle to attract the numbers your product deserves, or to cement such loyalty as we mentioned above.

So, like any complicated relationship, UX and CX need each other in more ways than we might at first realise. Both are vital parts of your business's growth, so don't mix them up: treat them with the attention that they deserve, and you'll reap the benefits.



CSS Reference

cssreference.io

As CSS gets more advanced, there are more properties to remember, or discover. This neat single-page resource provides a visual reference to the more contemporary animation and layout properties. Search for a property and you'll get a brief description and an illustration or animation to explain how it works. Bookmark this page.



Font style matcher

meowni.ca/font-style-matcher

This tool is looking to help remove or minimise the FOUT (flash of unstyled text) that occurs when using web fonts, by matching the fallback font's size.



date-fns

date-fns.org

Need help with dates in JavaScript? This is a modern JS date utility library that offers a simple and consistent toolset for manipulating dates.



PulltoRefresh.js

boxfactura.com/pulltorefresh.js

There is a clue in the name of this JavaScript library. It is crafted to power an app's pull-to-refresh feature with no markup needed.

TOP 5 CSS grid and layout tools

Need to quickly create a responsive grid and layout for your new project? These options will help...



Responsive Grid

bit.ly/2gzQqA6

A quick and easy way to create a straightforward responsive grid. Set number of columns and margin; collect your code.



Gridinator

gridinator.com

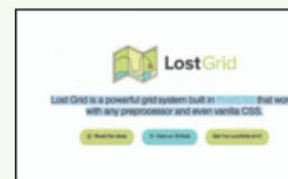
Add your columns number, set margins, font size and the widths measurement to use. Get a HTML and CSS template.



Responsify

app.responsify.it

Choose number of columns needed, gutter width and add in breakpoints. Apply changes and download the template.



LostGrid

lostgrid.org

Lost Grid is a grid system that is built in PostCSS (postcss.org). It works with any preprocessor and vanilla CSS.



Divtable

divtable.com/generator

Quickly generate any size grid you like. This tool uses table or div tags (you choose). Then select columns and rows.

WebGL: the coming year

What is in store for WebGL, the heir presumptive of Flash?

Carl Bateman

Founder, WebGL Workshop

WebGLworkshop.com



WebGL – fast, plug-in free 2D, 3D, AR, VR and GPGPU, all in the browser – has been around for several years. Finally gaining

'respectability' this year after being adopted by Apple and Microsoft, it has long since moved on from Chrome experiments and obscure albeit impressive tech demos and made inroads into the mainstream.

So, what does the coming year hold?

While the biggest news is almost undoubtedly the upcoming WebGL 2.0 standard (more on that later), there is a lot going on.

On the surface, at least, and despite much media coverage, WebGL may appear quite niche, hidden among the never-ending slew of new frameworks, APIs and libraries. However, WebGL enjoys its own lively, healthy community with just as many frameworks, APIs and

libraries popping up as any other part of the JavaScript ecosystem. The WebGL community is particularly active in the US with frequent meet-ups on both

coasts. The UK has its own centres of activity, most notably with projects like PlayCanvas, AwayJS, Pex and my own WebGL Workshop.

In particular, with the demise of Flash, WebGL fills the need for a flexible, powerful replacement. Certainly, agencies are reporting an increased requirement for WebGL from their clients.

Adobe's Animate CC is supposed to provide a replacement for, and next iteration of, Flash. However, WebGL is one of several export targets and there are grumblings that it still has a way to go to achieve better performance and download size.

Since WebGL is open source, there are a number of alternatives. For many, Three.js has become the de facto replacement, with Babylon.js being an equally strong contender with a less fractured release cycle and a vibrant community.

Indeed, there are many, many projects out there, of all sizes and complexity, enough to satiate the needs of a developer, both gross and subtle.



“ With the demise of Flash, WebGL fills the need for a flexible, powerful replacement ”

Markup tools like x3dom, jQuery Three and glam are a boon for those inclined more to web design than coding.

PlayCanvas, in particular, seems to be going from strength-to-strength and looks set for continued expansion and adoption. It provides online, drag-and-drop tools to develop games, advertising and more. Being native to the browser and having behaviour coded in JavaScript, it has the advantage over Unity or Unreal as there is no conversion process.

Unity and Unreal support export to WebGL but, like Animate CC, currently suffer from performance issues and code bloat. The presence of the likes of PlayCanvas and Goo Create will pressure them to continue to improve support.

WebVR may well be the killer app of 2017, but for now most implementations rely on WebGL as a polyfill; A-Frame is built on Three.js, for example.

WebGL 2.0 is currently under development and available in experimental builds of Chrome and Firefox. It is a long-awaited update adding many features which will

further reduce the load on the CPU (for instance, the matrix operations 'transpose' and 'inverse' can now be performed on the GPU and not in JavaScript), helping performance. Other additions will make some features much easier to implement, such as the addition of 3D textures will greatly simplify volumetric rendering.

While much of this will probably be hidden from all but the most hardcore WebGL and shader developers who work directly with WebGL, library users will certainly feel the benefit as these new features are adopted by the libraries' developers.

One common complaint against JavaScript as a 'serious' language is that it's slow. WebGL shader programs are compiled and run on the GPU, running many times faster and giving comparable speed to native apps, but without the download and install. Still, any processing done in JavaScript is relatively tortoise-like. Currently, tools like Web Monkey provide

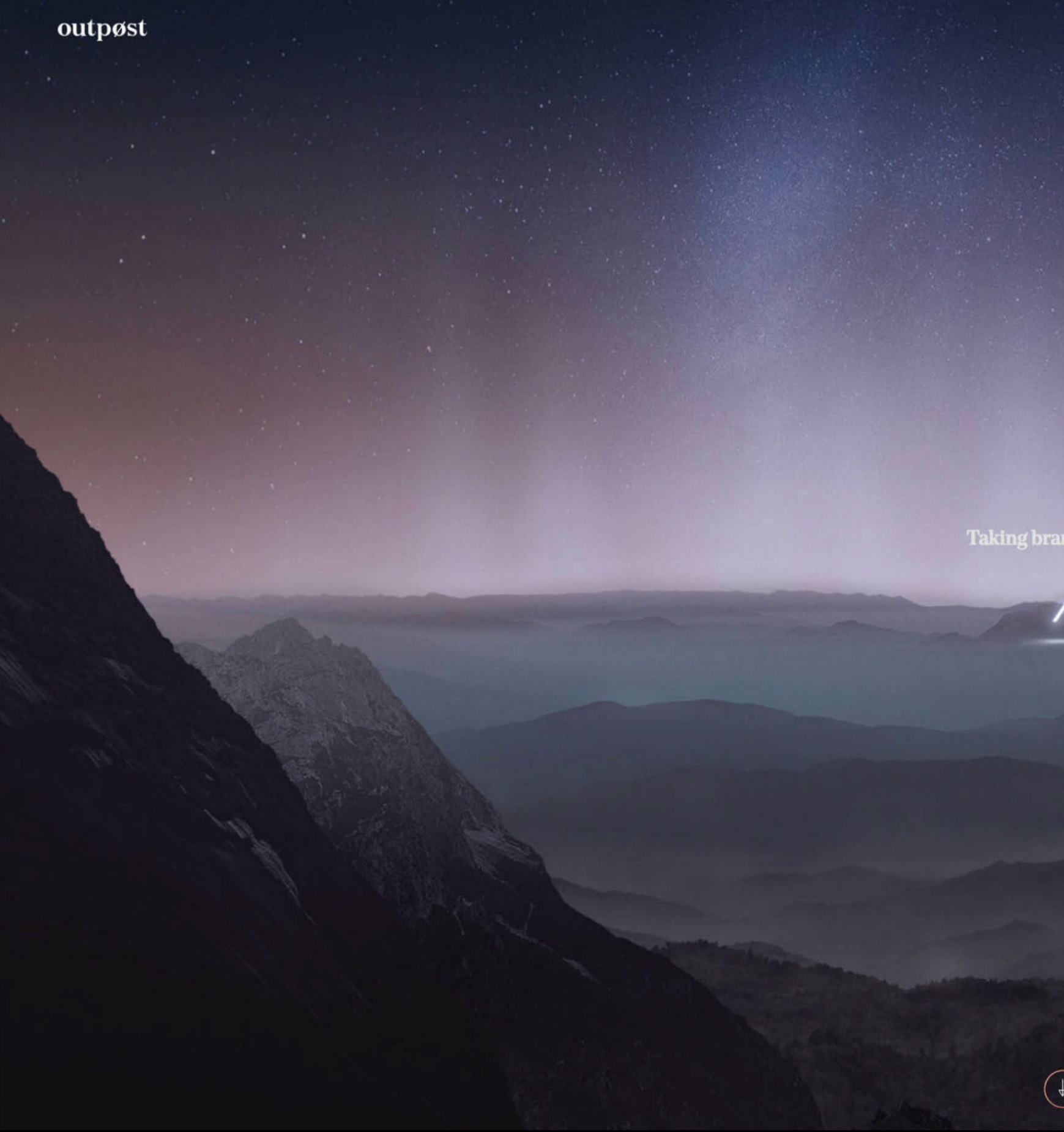
limited access to non-graphical processing on the GPU, moving some of the load away from JavaScript and the CPU. With the addition of compute shaders as an extension, true

GPGPU will become available in the browser.

While most websites may not require the unbridled power of the GPU, applied judiciously it can empower creativity. And while WebGL may seem to mostly lend itself to web game development, it opens the doors to ever more web apps that do need the power.

The ubiquity of WebGL across platforms as well as browsers makes for an unparalleled delivery system; simply having access to a browser makes powerful apps immediately available. Bitcoin mining, encryption, installations, kiosks, real-time FX, image processing, medical imaging, digital signage, data processing and data visualisation are just some of the things that can benefit from WebGL's new features

In summary: the need and demand for WebGL will continue to increase, adoption will continue to spread and widen, WebGL 2.0 will arrive, and there will be ongoing improvements to existing tools although older orphan projects will fade away. WebGL projects will certainly continue to proliferate.



Taking bran

Outpost

<http://discoveroutpost.com>

Designer: ToyFight Ltd. - <http://toyfight.is>

Development technologies jQuery, GSAP, CSS

“This business portfolio site uses scrolling animations and slider transitions to highlight project case studies”

ends further.



#A99CB0



#373F64



#545E6E



#1F1D27

abcABC

Above

Larsseit, by Type Dynamic, styles the subsequent paragraph text in Light, Regular and Bold forms

abcABC

Above

Noe Display, from foundry Schick Toikka, appears in Medium weight, styling the text for the main headings

Create eye-catching mousewheel zooming images

Create image components that can be dynamically resized using the user's mousewheel interactions.

1. Page document

Start the project with the standard HTML document template. The body section is used to store the visible content elements, while the head section is used to store the descriptive and additional page resources. In this case, the head section is used to contain a set of JavaScript code that controls the zoom effect.

```
<!DOCTYPE html>
<html>
<head>
<title>Mouse Zoom</title>
<script>
*** STEP 3
</script>
</head>
<body>
*** STEP 2
</body>
</html>
```

2. Zoomable image components

The body section contains the page content, which in this case is two images. A 'zoom' class is applied to these images so that JavaScript knows to apply the zooming functionality to them. This allows you to be selective with which images have this functionality by applying the class to just the images you want to have it.

```


```

3. Zoom function

With the HTML now in place, the next step is to start the definition of the JavaScript. The first part of this code defines the functionality to perform the element zooming. This has event detection for the mousewheel 'delta' value, which is used to apply a calculated width to the image's style attribute. Additionally, speed and minWidth variables are set for you to change the speed and minimum width of the resizing.

```
var zoom = function(e){
var speed = 15, minWidth = 50;
var delta = Math.max(-1, Math.min(1, (e.
wheelDelta || -e.detail)));
```

```
this.style.width = Math.max(minWidth,
Math.min(this.maxWidth, this.width +
(speed * delta))) + "px";
}
*** STEP 4
```

4. Window load event

The next step of the JavaScript code is to find the image elements to apply the previously defined zoom function to. However, these images will load onto the page after the head section's JavaScript has been executed - because the head section is read first. To get around this, we put the required code inside an event listener that waits until the page has completed loading.

```
window.addEventListener("load", function(){
*** STEP 5
});
```

5. Find zoomable images

The next step is to find the images that are to have the zoom functionality. This is achieved by using the document's 'querySelectorAll' method that allows us to search the web page for anything that matches a defined CSS rule. In this case, we will search for images with the

zoom class and store them in the 'nodes' reference. We then do a loop through the returned nodes array using 'i' as the index reference.

```
var nodes = document.
querySelectorAll("img.zoom");
for(var i=0; i<nodes.length; i++){
*** STEP 6
}
```

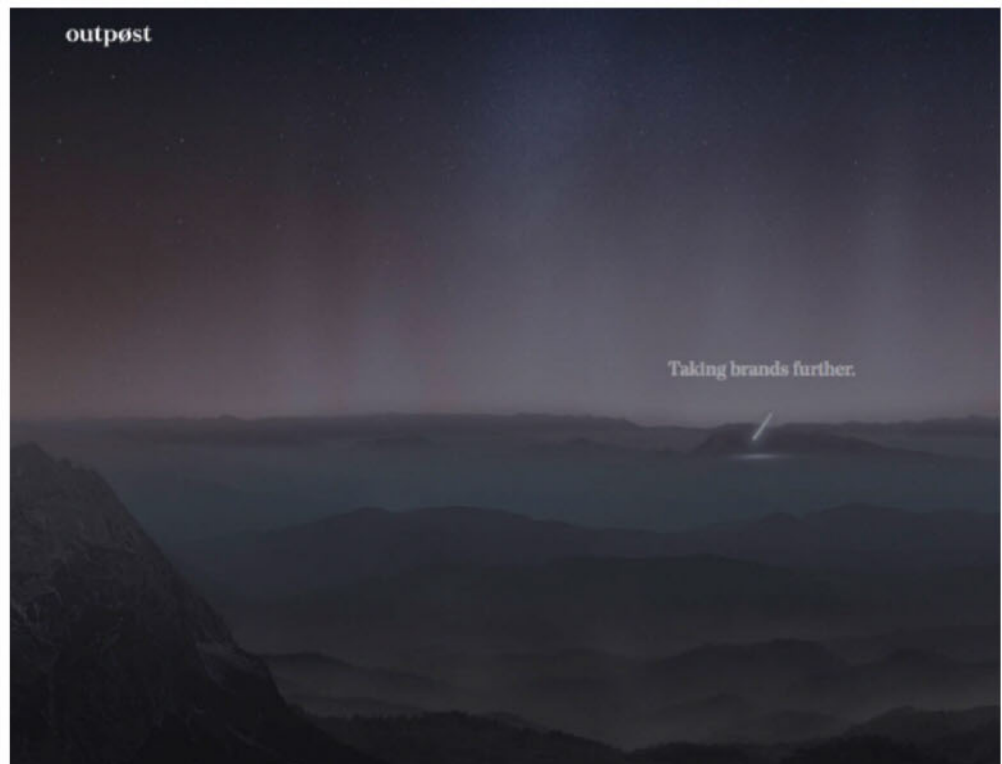
6. Apply attribute and listener

The zoom function is activated through the application of an event listener on the page items found. Firefox uses the nonstandard 'DOMMouseScroll', hence the need to attempt to apply both this and the standard 'mousewheel' listener for cross browser compatibility. Both versions call the same zoom function in response to the mousewheel. A maxWidth attribute is also applied to each node so that zoom can identify not to resize larger than the original size.

```
nodes[i].maxWidth = nodes[i].width;
nodes[i].addEventListener("mousewheel", zo
om);
nodes[i].addEventListener("DOMMouseScroll"
, zoom);
```

Usability feature

This feature could be used to incorporate usability features for people who are visually impaired as well as for general user experience.



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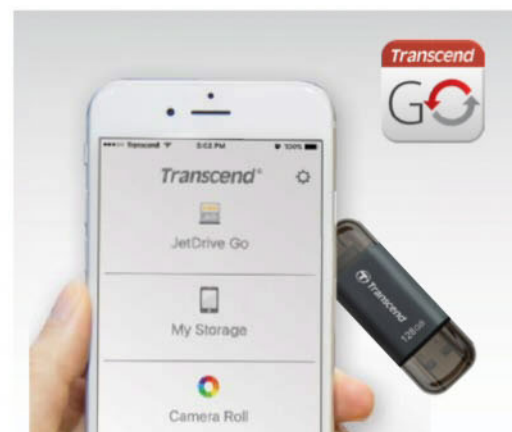
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Camper.com

www.camper.com/en_--/content/fall-winter-16

Designer: Convoy - www.convoy.me

Development technologies SVG, JavaScript, HTML5/CSS, jQuery

“This colourful catalogue site features unsettlingly cool shape-shifting transitions between models and featured shoes”



DISCOVER KINGS



#4700B3



#B98231



#977460



#F2C6BA

abcABC 123456

Above

Futura BT Medium, by Paul Renner for Bitstream, is the only font style used throughout the site, mainly for menu links.

Create a more creative text rollover effect in minutes

Use CSS selectors to create new types of rollover effects without increasing your code complexity

1. Page document

Start the project by defining the HTML page template. This contains the head section that includes the page description and link to the CSS stylesheet, as well as body section for containing the visible content. Keeping components that are not page contents inside the head section, such as the CSS, keeps the project clean for future maintainability. It's good for SEO too!

```
<!DOCTYPE html>
<html>
<head>
<title>Hover Effect</title>
<link rel="stylesheet" type="text/css"
href="styles.css" />
</head>
<body>
*** STEP 2
</body>
</html>
```

2. Navigation component

The navigation is made from a nav container, which contains a series of links. We use HTML to define what this content is, but not how it appears. As a result, we only write the 'a' tags with the text that is to appear inside them. Keeping HTML markup to a minimum like this is good for SEO.

```
<nav>
<a href="#">Alpha</a>
<a href="#">Bravo</a>
<a href="#">Charlie</a>
</nav>
```

3. Stylesheet initiation

The HTML markup is now complete, so create a new file called 'styles.css' in which you will write the visual styling rules - the CSS. Start this document with a definition rule for the HTML and body containers that will ensure they are displayed to cover the full page without any margin or padding border. We also set the default background colour and font.

```
html, body{
display: block;
```

```
width: 100%;
height: 100%;
margin: 0;
padding: 0;
font-family: Helvetica, sans-serif;
background: rgb(21, 34, 47);
}
```

4. Navigation container

The navigation container is defined to appear with a visible border and padding to separate it from its inner links. A margin is set to zero so that it can appear with no spacing at the top of the web page. To allow future resizing, we also specify that this element uses a block display.

```
nav{
display: block;
padding: 1em;
border: 3px solid #fff;
margin: 0;
}
```

5. Navigation links

The navigation links are to appear as buttons, hence the need to be set with appropriate padding, margin, colours and border settings. Most importantly for the effect to work, the links must use relative positioning to allow the animation to appear relative to where the link is placed on the web page.

```
nav a{
position: relative;
display: inline-block;
padding: 1em;
margin-left: 1em;
font-size: 1.5em;
border: 3px solid #fff;
```

```
background: #333;
color: #fff;
}
```

6. Effect component

The important component of the effect is made using the `::before` selector, which is a CSS feature for inserting an item before the HTML element. It's important that the 'content' attribute is defined for this to work. We set this element ready to be animated - full height and no width makes it initially invisible. We use a transparent red background for this example, but you can change it to have a loaded background image.

```
nav a::before{
content: "";
position: absolute;
top: 0;
left: 0;
width: 0;
height: 100%;
opacity: 0.5;
background: red;
transition: width 1s;
}
```

7. Activate the effect

The previous step's `::before` element also had a transition applied to the width attribute, meaning that it will be easy to activate the animation. All we do is select the link using the `:hover` selector and apply rules to the `::before`. In this case we change the width to 100%, which will animate the `::before` node into view.

```
nav a:hover::before{
width: 100%;
}
```

Interactivity indicator

Consider how the use of animated text rollovers can be used to indicate the type of interactivity a link offers.



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<http://mtcubacenter.org>

Designer: Drexler - www.drxmlr.com

Development technologies WordPress, jQuery, GSAP, Modernizr

“This eye-catching visitor site blends stunning natural photography with an immersive virtual tour”

ing on a r Level

TUAL TOUR >



#8A74B2



#89744C



#92B259



#DF917D

abcABC

Above

Austin Light font, by designer Paul Barnes, provides the classic typeface used across headings and paragraphs

abcABC

Above

Founders Grotesk, by Klim's Kris Sowersby, appears across the subsequent subheadings in both Regular and Bold

Create an interactive background navigation

Offer visitors a way to access additional design content through an interactive background component

1. Page document

Create the page document using the standard HTML framework setup. This defines the HTML document, which contains the head and body section. The head section is used to include descriptive information and any resources required. In this case, the CSS stylesheet and some JavaScript are contained in the head section. The body is used to contain any visual content components.

```
<!DOCTYPE html>
<html>
<head>
<title>Background Change</title>
<link rel="stylesheet" type="text/css"
href="styles.css" />
<script>
*** STEP 3
</script>
</head>
<body>
*** STEP 2
</body>
</html>
```

2. Navigation content

The background options are presented through a navigation container holding a series of links. These links use a "#" for their href attribute to avoid the browser loading another page. The important part in these links is the data-body-class attribute, which is used by JavaScript in the next step to modify the document body.

```
<nav>
<a href="#" data-body-
class="alpha">Alpha</a>
<a href="#" data-body-
class="bravo">Bravo</a>
<a href="#" data-body-
class="charlie">Charlie</a>
</nav>
```

3. Body change

JavaScript is used to detect when a link with a 'data-body-class' attribute has been clicked. When this happens, the document 'body' is selected and has its class attribute overwritten to be the same value as the

selected link's 'data-body-class' attribute value. It's important to note that this can only work when the page has fully loaded - hence it all being contained inside the 'load' event of the main 'window'.

```
window.addEventListener("load",function(){
var nodes = document.
querySelectorAll("[data-body-class]");
for(var i=0; i<nodes.length; i++){
nodes[i].addEventListener("click",functi
on(){
document.querySelector("body").className =
this.getAttribute("data-body-class");
}
);
}
});
```

4. Initiate CSS file

The HTML and JavaScript components are now complete, so now it's time to define the visual presentation rules. Create a new document called 'styles.css' and enter this step's rules to define how the document HTML container and body should appear. The important parts here are making sure that they cover the full screen and also that their background size should be set to 'cover', allowing the background to be resized to fit the window.

```
html,body
{
display: block;
width: 100%;
height: 100%;
margin: 0;
padding: 0;
font-family: Helvetica, sans-serif;
background: rgb(21, 34, 47);
background-size: cover;
transition: background 1s;
}
```

5. Navigation presentation

The navigation container is to be presented with a visible border, while its links are to appear as buttons. This is achieved by setting padding, margins and colours for both the background and text colours of the links. Displaying the links as inline-blocks helps to make sure that the navigation container wraps around them.

```
nav
{
display: block;
```

```
padding: 1em;
border: 3px solid #000;
margin: 0;
}
nav a
{
display: inline-block;
padding: 1em;
margin-left: 1em;
font-size: 1.5em;
border: 3px solid #fff;
background: #333;
color: #fff;
}
```

6. Navigation hover

It's important to indicate to the user that the navigation links are interactive. This can be achieved by changing the link colours when the mouse pointer hovers over them. CSS offers the :hover selector, allowing us to define new presentation rules when this is the case. We invert the colours to have a grey border, white background and grey text.

```
nav a:hover
{
border-color: #333;
background: #fff;
color: #333;
}
```

7. Background images

The JavaScript we previously created changes the class attribute applied to the document body. This means we can specify unique background images within the CSS rules. Using this approach gives us the flexibility to add as many different background images through HTML and CSS without the need to modify any JavaScript.

```
.alpha {
background-image: url(img/background1.
jpg);
}
.bravo
{
background-image: url(img/background2.
jpg);
}
.charlie{
background-image: url(img/background3.
jpg);
}
```

Maximise space

One way that this feature can be useful is in presenting visual content without requiring the use of extra space.

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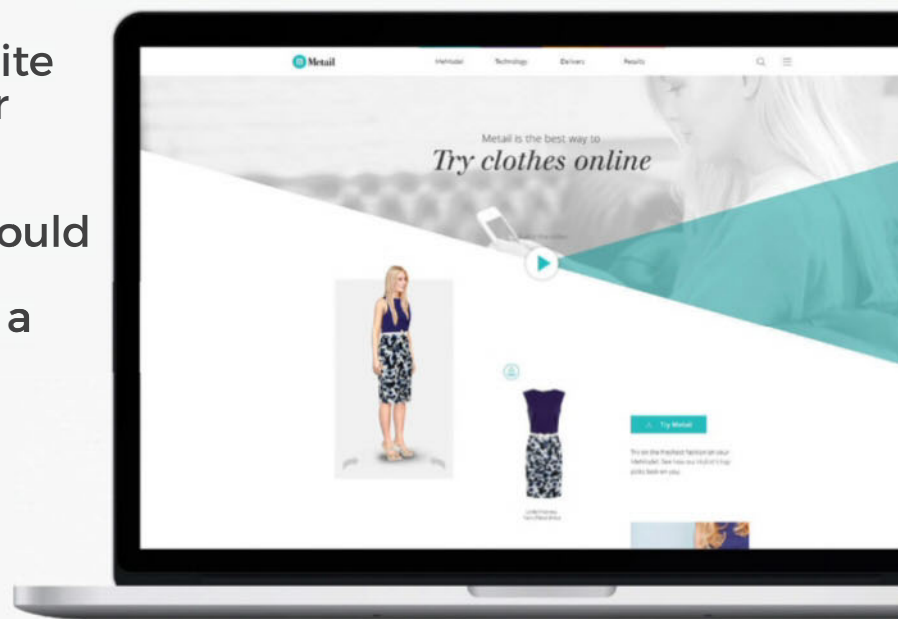
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Dressed for *Success*

When eRetail pioneers Metal demanded a website to stylishly sell its browser to buyer technology, the challenge landed on Propeller's runway. Would fashion disasters be averted to provide a perfect fit?



When it comes to buying goods online, it's safe to say the market for fashion is certainly booming. Style-conscious shoppers who once flocked to the high street for new outfits are moving more and more towards a more virtual dose of retail therapy. In the UK alone it is estimated that internet sales of jeans, shirts, tops and skirts will be worth a staggering £19 billion by 2019, offering a mere hint at what the global value could rise to.

All this of course defies any initial fears that the very personal requirements inherent to purchasing new clothes would see the trade struggle to find a home within eCommerce. The obvious benefit to buying in-store has always been the tactility associated with seeing, touching and crucially trying garments on in person. Any alternative would always seem like a leap of faith, no matter how good the returns policies might be. So with retailers looking to develop more effective ways of engaging customers, solutions such as Metail's MeModel are using algorithm-powered technology to bring the fitting room to browsers and smartphones.

By processing measurements and certain physical characteristics, this futuristic service for allowing shoppers to try before they buy already claims to convert visitor sales by 22% and reduce order returns by 5%. So with Metail clearly going places, the company approached UK agency Propeller to give its web marketing a makeover with a brand-new promotional website. Boasting over 15 years of online branding experience within a multi-disciplinary team of 70-plus digital experts, Propeller is no stranger to partnering with leading eCommerce, hospitality and luxury brands. "Frustrated with their previous website and two separate blogs, for fashion and tech, Metail were in need of a unifying website that could bring together all these elements," explains Propeller's Digital Brand Strategy Director, Stephanie Niven. "The site had to be easy to update and manage by their in-house team so the brand could continue to evolve and grow over time." Keen to translate the client's mission "to create and empower everyone's online body identity" into a

Project Metail Web metail.com

Agency

Propeller

Web

propeller.co.uk

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Personnel



Stephanie Niven
Digital Brand
Strategy Director



Simon Shahrivari
Head of Front-End
Development



Callum Williams
Senior Front-End
Developer



Lara Berra
Project Manager



Darren Barrett
Digital Designer

Project duration
5 months

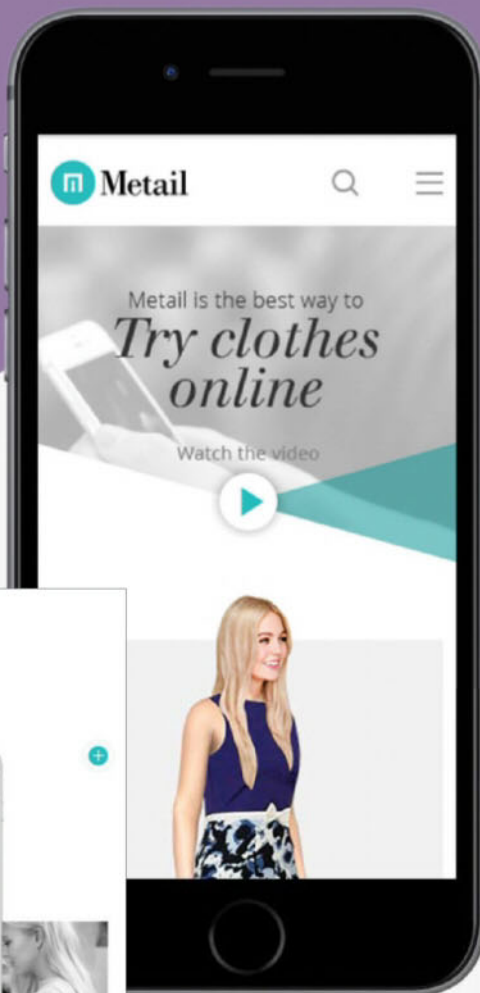
No. of
people involved
5

Total man hours
250

“Solutions such as Metail's MeModel are using algorithm-powered technology to bring the fitting room to browsers and smartphones”



Getting the Metail experience right on mobile was crucial



user-friendly and interactive experience, it was time to strike a pose...

First impressions

As you might expect from two teams with a shared appreciation of online innovation, the project began with mutual excitement. Propeller were understandably pleased to be partnering with a client that was driven by design, technology and this desire to merge the gap between the online and offline experience. "The MeModel product that Metail has created instantly inspired us, tapping into our own drive to innovate and push the boundaries within the digital space," begins Niven. "Our design and development team really embraced the project and the brand to create something with the same level of creativity and ingenuity as Metail's MeModel."

During initial conversations about how this would be achieved, the tone was set for open dialogue and a collaborative way of working that would begin with a workshop. "The Metail team visited our Design and Development hub in Warwickshire where Propeller were able to introduce them to the broader team and specifically those who would play a part in the design and development of the new website," adds Simon Shahrivari, Head of Front-End Development. "The workshop gave both teams the opportunity to run through the initial user flows that the Metail team had proposed and the user interactions they wanted to achieve. Refining and giving clarity to the website from the offset, ensuring the customer experience was at the forefront of the project." These early sessions would elaborate on Metail's desire to replace its out-dated dotcom with a mobile-first, B2B site that focused the user journey with information rich content and imagery for generating sales and new partners. "We chose Basecamp to manage our communications and we used this for daily queries, checklists and in some cases content delivery," explains Lara Berra, Digital Project Manager. "We also reviewed the project progress in our weekly calls where we had the space to address bigger questions about the site and discuss content delivery."

browser do the hard work for us."

This method took an animated GIF from 9MB down to a 200kb jpg and still allowed enough control with only a single asset being uploaded in the CMS. With each of the animation blocks being editable in WordPress, the developers needed to provide the ability to set how many frames would appear and the duration for each animation, in case the folks at Metail ever wanted to update an image. "This was as simple as adding a couple of editable text fields letting them set the required information, and detailing what it was doing. We output this information onto data fields placed on the div, and targeted those with CSS generated with a SCSS mixing."

Optimising animations

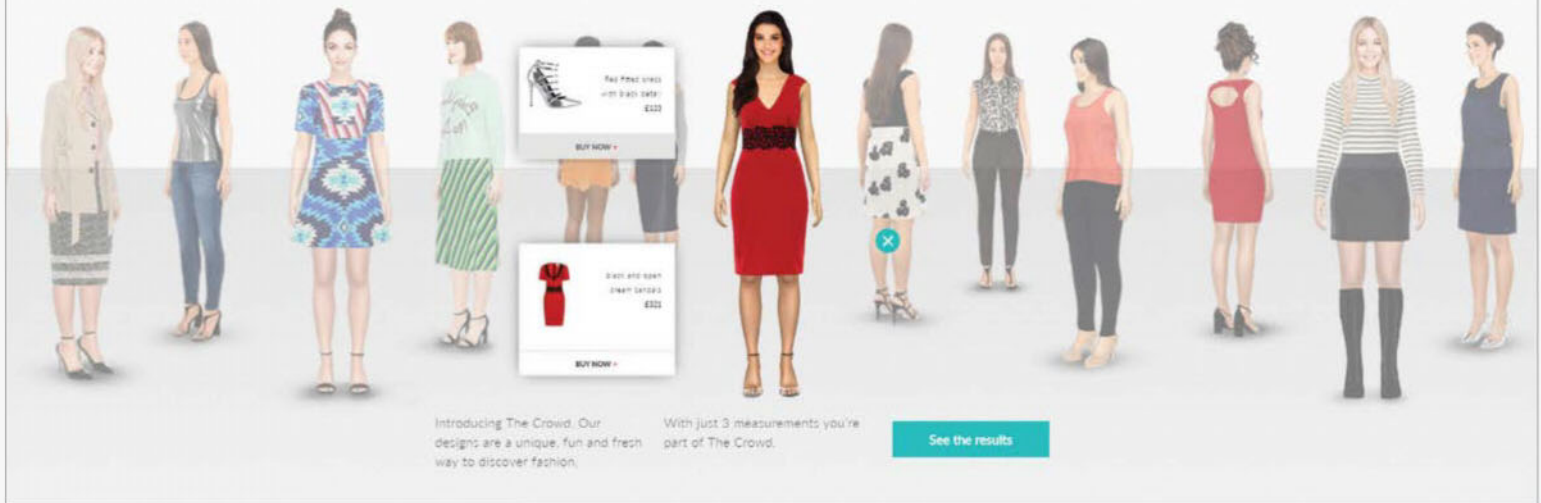
A big back-end challenge on the project, according to Senior Front-End Developer Callum Williams, was the animation work. The coders needed to find a way to make them more lightweight than images or video would permit, so how was this potential front-end headache alleviated? "After some investigation into animation and putting together example demos (<http://bit.ly/2fqglnR>) we identified CSS keyframe step animation as the obvious technique. For each sequence, we would create a horizontal

filmstrip-style image and hide the overflow within a fixed viewport. We would then animate the position of the image using CSS frame-by-frame step animation, creating the illusion of a moving image. This is fairly straightforward until you consider the site has to be responsive. Resizing the image based on screensize became difficult, as the overflow would have to be explicitly set at each resolution. The solution was to make the image vertical, meaning we could set image width to 100% and have the

Styling inspiration

With Metail's own in-house design team already strong and digitally savvy, they had a very clear vision of how their brand and message needed to be conveyed online, providing the initial concept. This was then moved across to the Propeller team for refining ideas and working on the site interactivity and user experience. "We were responsible for creating the low-fidelity wireframes for a bulk of the additional areas of the website and this allowed us to gain a complete understanding of how Metail wanted to deliver their content in strategic sections with clear call-to-actions and engaging data analysis," Shahrivari says. "It was

A new way to
Discover fashion



Site Highlight

Senior Front-End Developer Callum Williams reveals what fills the team with pride



“A stand out feature for the site would be the parallax animation at the foot of the MeModel page. It was an interesting challenge to tackle and I think the final result brings something extra to the site. The combination of animations and interactivity site-wide, really drive user interaction and increases the average session time”

important that we also began detailing the interaction ideas for the overall user journey and how we intended to present the content to the user in the most engaging way possible without overwhelming them. The site would be split into four key areas: MeModel, Technology, Delivers and Results. Each of these areas would tell their own story about the Metail experience and we would look to bring information lead graphics, video and team narrative in a deep scrolling, interactive showcase that would entice users to keep discovering more about the Metail brand.”

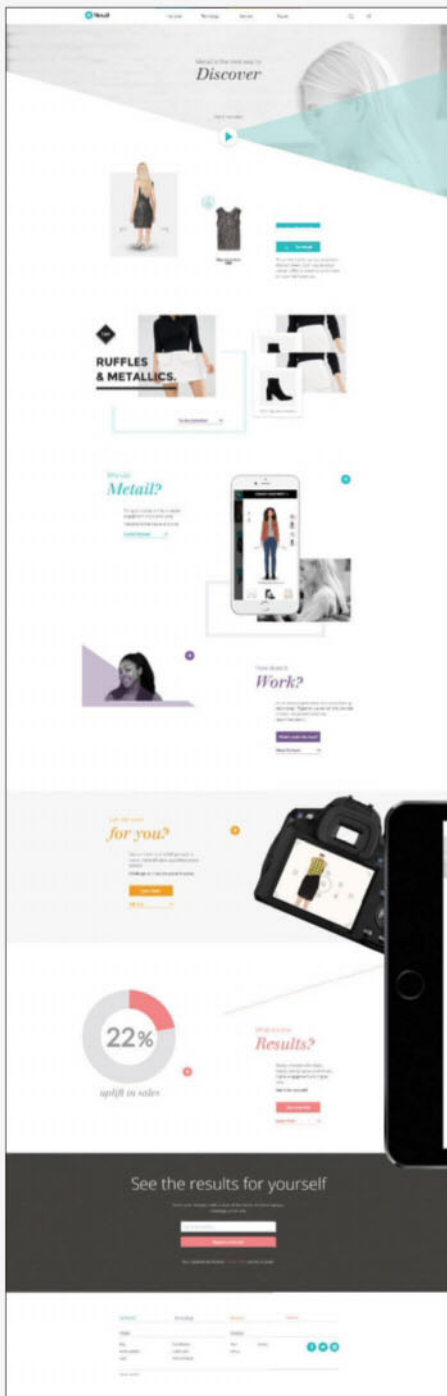
Just as important was ensuring the additional pages followed Metail's design direction from those four key areas and were also executed to Propeller's own high standards. Their design and development teams would work hard to create a build that pushed the boundaries and complemented the design execution. “Once we

had the initial site concept and theme from Metail, we ran through the high-fidelity assets and adapted them to fit within a 12-column grid. This enables the front-end developer to rapidly prototype page layouts that in turn saves on development time. We then looked at pages on the site without a design and designed some of our own concepts based upon Metail's base themes. The team page is a particular highlight of our design.”

Fitting problems

A key requirement from Metail was a backend system capable of a high level of customisation. It was decided that WordPress was an ideal platform in terms of providing the necessary flexibility but also because of the prior experience both parties had using it. “Once we had decided on the platform, the next step was to break

down each page into two groups - bespoke and re-usable modules - and then abstract any core modifiers for each,” explains Senior Front-End Developer Callum Williams. “For example, the Hero banner region has three different layouts across the site, yet the core information displayed is the same. By adding a modifier class to the root of the banner we could change streamline layout changes quickly and easily, enabling the same code to be recycled for all. A similar method to define the colour theming used in each module, adding a colour modifier data-attr on the root element would mean all of the titles, buttons, borders etc inside would take on the colour theme. Identifying these steps early on in development meant the focus could shift primarily on outputting the content, and prototyping the layout.” Propeller's own development experience with WordPress told them



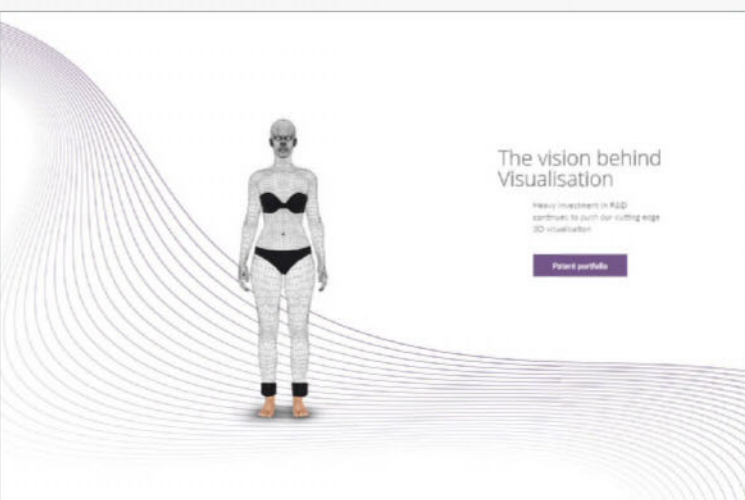
“With experimentation and testing, animated GIFs would be ingeniously replaced with CSS keyframes to significantly slim things down”

that out of the box it can be lacking as an advanced and feature-rich Content Management System, at least to the level they required. Thankfully though, the team had settled on a workaround successfully deployed across other projects that mitigates such limitations. “This can easily be improved by utilising the Advanced Custom Fields Plugin to extend the default capabilities and capture data. At Propeller, we’ve adopted this method of developing WordPress sites over the past couple of years, as it helps us create a quick and simple to use page builder, tailored from scratch, for each client.” A much tougher challenge to solve, however,

was developing the high-level animation sequences dotted throughout the site in a way that wouldn’t compromise page performance. Certain main animation sequences would require storyboarding to better understand how they could be realised within the front-end, before settling on an efficient technical method. “To ensure we can still manage the assets for the sequences from the CMS we identified some options. Animated GIFs and HTML5 video seemed the logical choices but after testing both these methods we felt they weren’t a strong enough solution for performance. Some of the animated GIF sequences

were weighing in at 9MB, which obviously is not acceptable.” With experimentation and testing, animated GIFs would be ingeniously replaced with CSS keyframes to significantly slim things down.

What’s more, the ability to lean on Metail’s own inherent expertise would overcome any additional complexity associated with stipulating animation data when updating images through the CMS. “Metail being a technically minded client meant they would understand the principles of animation. With another client, we may have struggled to explain this functionality.”



Smooth changeovers

Given a project of this magnitude and the high-level of CMS control that was given to the client, a successful transition phase was crucial to familiarise Metail with their new website. "We organised training workshops with the marketing team at Metail and gave them a comprehensive session on how they would be able to manage content delivery in the backend," explains Head of Front-End Development Simon Shahriveri. "With the Metail team already having experience with the WordPress platform and their

technical experience and knowledge, we could really go into detail and explore the exciting features." It was clearly advantageous for Propeller to be working with a Metail team who already appreciated all the technology that goes behind a website. However, Propeller's commitment to every client means that post-live monitoring and follow-up are as important as the delivery of the project itself. "Once the project management team has completed a project, this then moves over to our dedicated

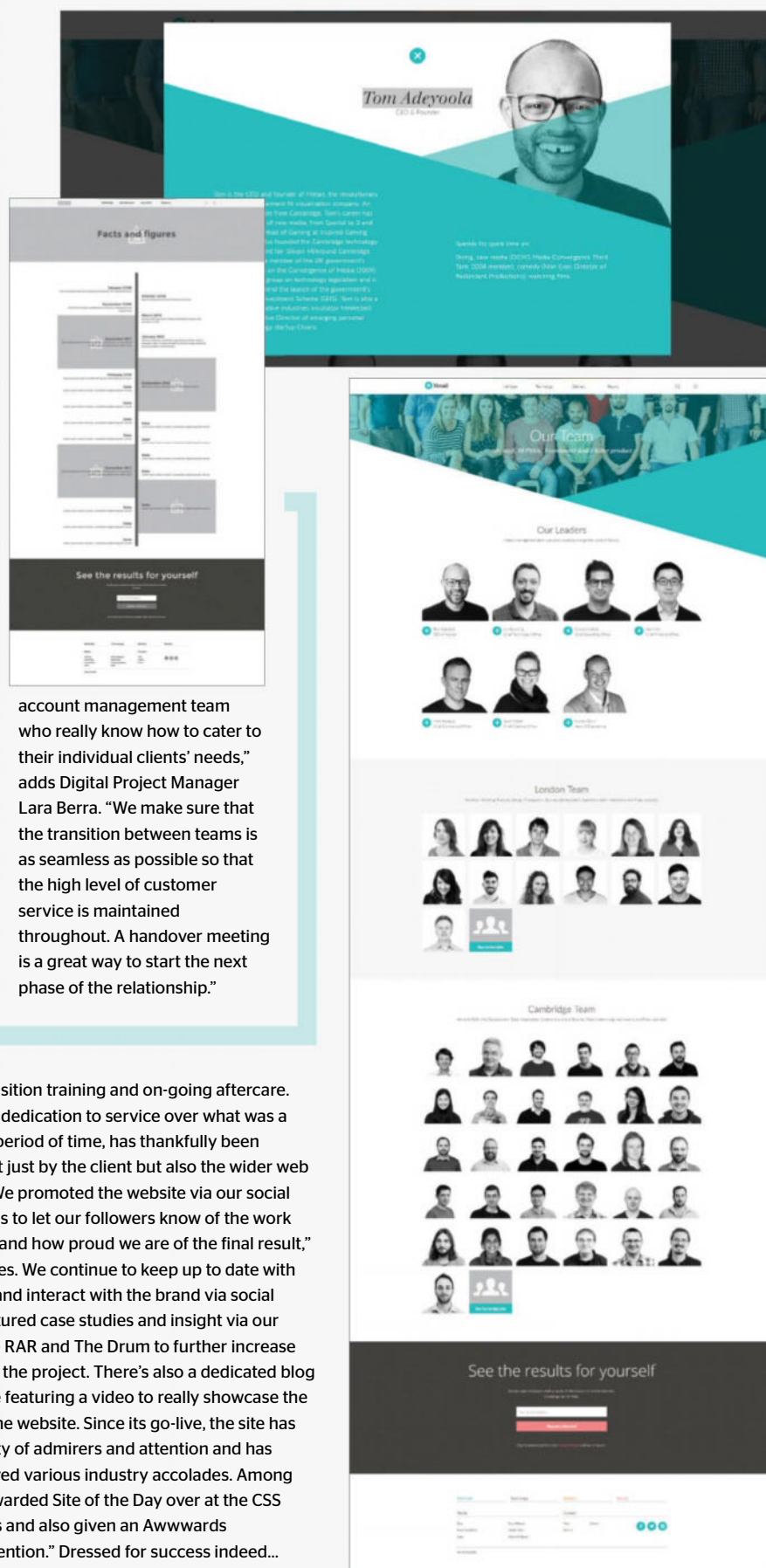
account management team who really know how to cater to their individual clients' needs," adds Digital Project Manager Lara Berra. "We make sure that the transition between teams is as seamless as possible so that the high level of customer service is maintained throughout. A handover meeting is a great way to start the next phase of the relationship."

Wearing it well

From the very beginning of the project, Metail stipulated a tight deadline to meet a proposed launch for the end of March 2016. This would suggest a three-and-a-half week development timeline, which saw Propeller pull out all the stops to achieve it. "In order to ensure we did not fail to deliver a finished product by our initial deadline, the development team worked tirelessly in the evenings and weekends to reach the deadline," admits Niven. "For a site of this scale, it was definitely a challenging objective to achieve in this timeframe but we continued in our endeavour and never sacrificed on quality. With the initial March release pushed back due to content issues and general tweaks and tuning, the July release was successfully delivered pretty seamlessly."

Upon launch, Propeller would do its own promotions to highlight the project, while continuing to follow Metail's activities and indeed support the client with the

necessary transition training and on-going aftercare. Such a level of dedication to service over what was a concentrated period of time, has thankfully been recognised not just by the client but also the wider web community. "We promoted the website via our social media channels to let our followers know of the work we undertook and how proud we are of the final result," Niven concludes. We continue to keep up to date with Metail's news and interact with the brand via social media. We featured case studies and insight via our partners at the RAR and The Drum to further increase the visibility of the project. There's also a dedicated blog on our website featuring a video to really showcase the animation of the website. Since its go-live, the site has attracted plenty of admirers and attention and has recently received various industry accolades. Among those being awarded Site of the Day over at the CSS Design Awards and also given an Awwwards honourable mention." Dressed for success indeed...



After the flood

The beauty of data

After the flood make sense of the data that is all around us. Merging visualisation and practical application makes this agency a focal point for businesses that need to find value within the information they collect every day

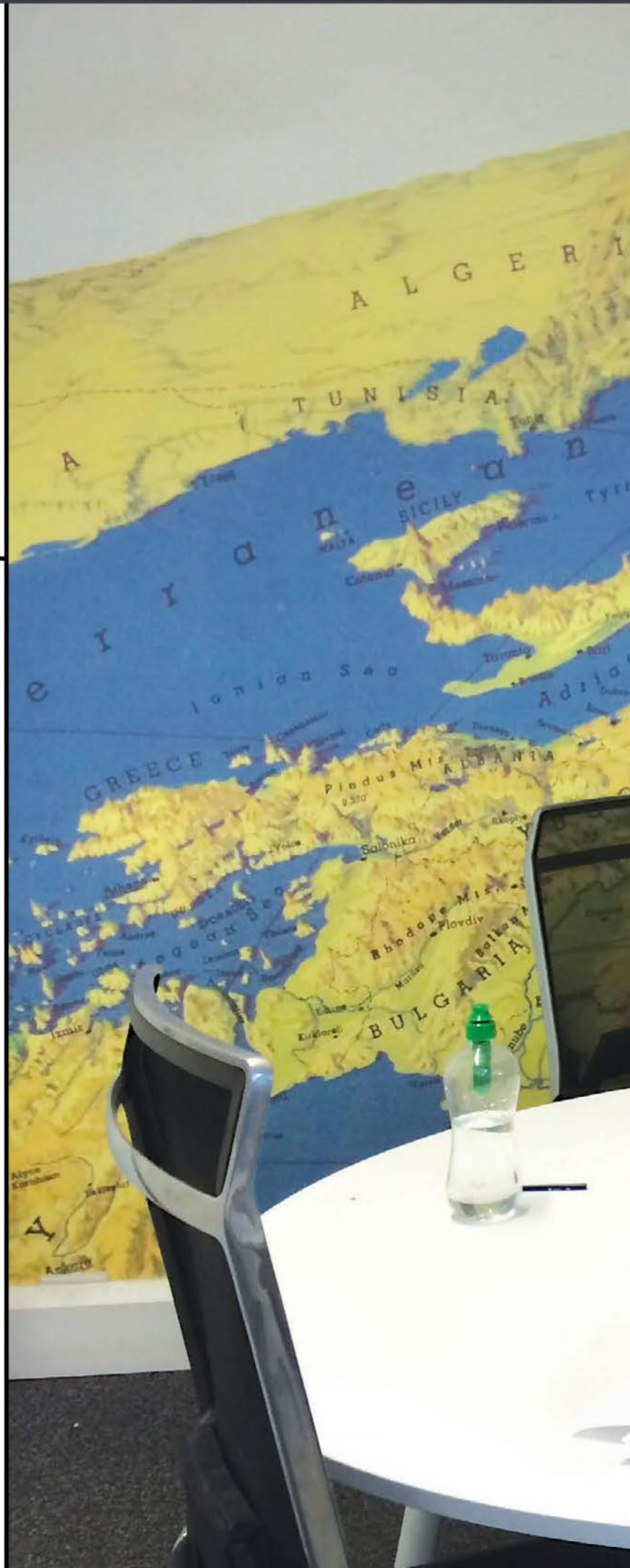
Information is all around us. Torrents of data can be overwhelming and confusing. After the flood is a new kind of design company. Immersed in our data-driven world they help their clients make sense of that information finding meaning and value in the data that underpins their creativity.

An agency born out of the data environment, After the flood helps a diverse range of clients harness the information they have that results in leading strategic thinking across media, government and a range of commercial spaces.

Founder Max Gadney explains how his company came into being: "I've always been interested in information design. When I was seven I had posters in my room created by the great Peter Sullivan at the Sunday Times in London. I did a GCSE geography project on plotting six months of crime data from the local paper on Cambridge, UK. Then I studied Graphic Design at Middlesex and was lucky to get a summer job at the BBC answering phones."

Max continues: "After 12 years at the BBC - which included leading the design team on News Online - it made sense to start my own business focusing on data design. Since then, I've found the business side really interesting. Anyone spending longer than seven hours a week playing RTS games should just start a business. It's more real."

All new businesses need a name. Mike Gallagher, Lead Designer outlined their approach: "We wanted an emotionally resonant name. After the flood refers to the crisp feeling when complexity has subsided and there is calm. It was that or Data Decisions which sounds rather dull. The .com URL is still owned by someone who won't budge. Our .co address is OK - but the key thing is marketing and networks will just Google it anyway. The whole focus





who After the flood
what Data Visualisation, Product Development, Service Design, Software Development
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Key clients

NHS
 Google
 UEFA
 Tesco
 BBC

After the flood



INDUSTRY INSIGHT

**Max Gadney,
Founder**

"Pitching in the old sense is just the best bad guess winning. Given the complexity of some of our work, we couldn't take a guess and throw in some dummy copy. Dummy copy is a sickness. You need to be able to discuss the client's problem as equals or they'll treat you like some cretin with a colouring book. On the other hand, if you can discuss their industry they'll respect you."



of agency is important. We do lots of work that is not just the data apps but more of the apps and services around them too."

After naming, creating an online presence is now more important than it has ever been. How does After the flood approach its website? Mike continues: "It needs to show your best and most recent work. We try to sell the benefits of the work done, but clients don't always share figures. Our work looks good - we take that as seriously as the planning and we have a good eye for visual design. This is often forgotten or just made to look Californian by many others, so we can compete here too."

As a relatively new agency (After the flood was founded in 2011) gaining new clients is always a challenge. Agencies approach this in many different ways. What is clear to Max is that traditional pitching isn't for his agency: "We try not to pitch. Pitching in the old sense is just the best bad guess winning. Given the complexity of some of our work, we couldn't take a guess and throw in some dummy copy. Dummy copy is a sickness. You need to be able to discuss the client's problem as equals or they'll treat you like some cretin with a colouring book. On the other hand, if you can discuss their industry they'll respect you."

Max continues: "We do a fair amount of reconnaissance on who we want to work with. We also get quite a lot of designers referring us because they recognise we have a specialism that, while they find interesting, don't want to or cannot do themselves, such as finance, data analytics and so on."

Agencies can become known within a particular market sector. Which clients are chosen can also have a profound impact on the perception of an agency within the wider commercial marketplace. For After the flood, being distinctive is all important, as Max explains: "We wouldn't do generic e-commerce stuff - eg Sainsbury's website or responsive design. It doesn't push our story of data design forward. You need to live your brand and distinction, but it's always interesting weighing those things up. Most agencies doing some cool stuff will need to do some bill-paying work - it's part of the contract of being a free commercial entity, able to make choices. We need to pay our costs and bank enough to let us speculate on projects like London Squared or 1-to-1 - but we are never bored by our projects. They are never easy, but we are never bored."

Mike adds: "There are two important design principles to consider when working with data in web design. The first is data as material. They say that data is the new oil. It both powers industries, but also makes things blow up! Designers need to be

Founder Max Gadney plans After the flood's next groundbreaking information product, while a triffid waits ominously





High levels of concentration at work in the offices of After the flood leads to unique approaches to information design

careful how they use it when constructing attention-grabbing sites: a designer needs to get into the data to see what its characteristics are as soon as possible. The data is more predictable with 'bought-in data' from a financial or sports feed - you can assume that the APIs and database are in decent order and will support basic use.

"Research we did at the BBC shows that many normal users are put off by maths or science at school and don't want to engage with anything that looks like homework. You need to understand the end users of the data. How expert are they? What do they regularly look at and read easily? What is new to them? What are their aims and who might they need to share this with? Rest assured that most stuff that wins prizes for data vis will baffle most people. You need to think differently about its uses when you're approaching a website.

"If you're looking at old databases or NGO data, for instance, you need a technologist to look at the data and its structure to tell you how fit for use it is. The client will have many expectations and you need to manage them with what is possible from the data and its structure and how it will flow or power a product.

"The technologist will need to go in with a hypothesis from you - or from them. In a way, this is

data journalism: having a hunch and seeing if the data bears out your story. Likewise, a good technologist, knowing what you wish to achieve with the product can point to ways the data is structured to suggest new product opportunities.

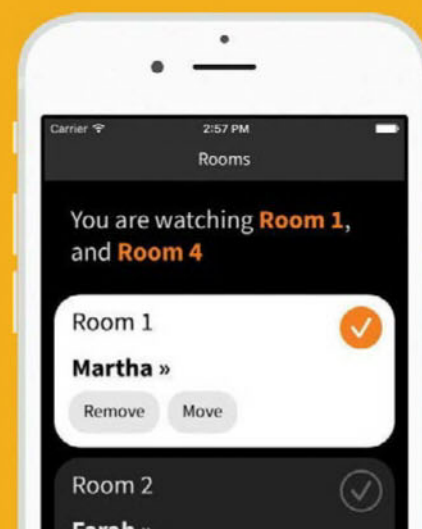
"Once you understand the data you are going to use you need to consider data as output. The field of data visualisation assumes that there will be some representation of actual visual data to look at, reason with or interact with."

"Users are put off by maths or science and don't want to engage with anything that looks like homework"

Defining an agency's brand can take many forms, but is important for the wider recognition that this brings. Mike outlines the ethos that After the flood strives to develop with each new project.

"Our new healthcare project with St Thomas' hospital contains a lot of elements that typify what we are getting very good at. We helped the client build the proposition - we are good at the invention and development of a new service. We built and tested an MVP in the field."

Mike continues: "We are very good at working with diverse and tough stakeholder environments,



1-TO-1 APP

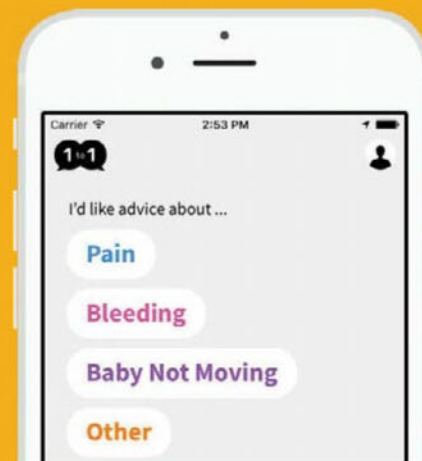
1-to-1 is a patient feedback smartphone app that connects women with carers on a labour ward. It allows women to message their midwives with feedback on things like pain and anxiety. Key to this was getting a Minimum Viable Product out that we could test with real people.

The initial research and design/coding stage was about two months. We then went into field testing as soon as we could. This involved creating the whole service around the app - a training programme for midwives, handouts, posters, and even T-shirts that helped us announce the start of the pilot.

1-to-1 is a service and not just a single app. It is a variety of touchpoints, including apps for women and midwives, training scripts and publicity material, as well as launch plans and product feedback loops.

We developed a web-based dashboard so the Ward Clerks could have a live, system-wide view of what was happening. The dashboard helps them stay on top of what kind of messages are being sent. It also allows them to allocate rooms or carers in case workloads peak.

On launching a service, we need to pay attention to all the factors beyond just the UI design. Network capability, and internal comms releases were vital to getting this off the ground. As we receive feedback, we are changing the UI and prioritising our feedback (we use Trello for that) for the next stage of development.



Using the app paradigm gives women on the labour ward a close connection with their medical staff about their changing condition



UEFA PLAYER BAROMETER

<http://uefa.to/2gCaZjJ>

The UEFA Player Barometer was a new system that enabled fans to follow the stories and statistics of their favourite players across Euro 2016. This project began by working with UEFA's product teams to understand their user segments and develop a set of strategies that would meet their diverse needs, while making full use of the wealth of data (collected by DeltaTre).

Product R&D began by developing visualisations that explored player actions, stats and events. Many had a 'reconstructive' feel that, despite having editorial merit, were not instantly engaging. A change of tack was in order. One alternative we explored was how to verbalise the data - creating a set of simple sentence structures that could provide a variety of outputs.

To create the Barometer, we first needed to make sense of how fans talk about players, particularly how fans identify and group players for comparison. This is an important principle of information design at After the flood - mediating metadata creates a more resonant message. Designing metadata can solve a large part of the visualisation problem.

Once we established the player categories and a model for ranking players, we were able to build prototypes of how to use the output content. We developed a library of card modules that could be used across the Euro 2016 website and be integrated with the wider effort to bring Euro 2016 to life online.

be it launching a pilot with busy midwives, working with ex-military air-traffic people or even working with chess grandmasters. We quickly get into the space here - that's why we need designers who go beyond dummy copy. We also pay a lot of attention to how the data is used for reporting and in the case of health apps, its security and resilience."

After the flood is not your typical digital design agency. But does this mean a different way of working? "Timelines vary from a few weeks' intense brainstorming for Google to 24 weeks on a financial application - with everything else in between," says Max. "Most projects are lead by myself as principal. We involve other design staff or freelancers as appropriate.

"Lots of our work is different so we have a smaller standing staff and a really diverse network of smart freelancers. They are expensive but excellent and because we all know each other, there are no nutters sat about with headphones going down blind alleyways. It is the principal's job to liaise with the client. The client will have precise feedback that requires a deep understanding of the problem set. This is owned by the Senior Designer. Our Senior Designers are given a lot of responsibility - starting just after project commercials are agreed all the way up to launch. We have all-round designers - not individual UX, UI, etc people. More gets done in a smarter way."

With a specialist approach to the work that After the flood completes for their clients, does this mean a diverse toolset? The agency uses Adobe, CSS, Trello and Google Docs but also Confluence and Axure for interactive prototyping. Max also notes: "Much of the heavier stuff we do will have some Python and Ruby too - but to be honest, the main thing is that it works and the developers can work with us regularly. That's the picture now. I have always been an SVG fan so I'd like to see more of that."

Mike also comments: "We also use ideation and rapid sketching with clients - people love seeing people drawing so we make sure there are whiteboards aplenty in the studio. This helps visualise nebulous ideas quickly. Lots of students don't draw while they talk; they need to.

We hear of many corporate design teams who aren't allowed large whiteboard sketching areas - this disables the ability for ideas to be shown, to

remain in the air as visual culture. That kind of thematic anchoring is key.

"Also, we have a variety of grey marker pens! When making data sketches, it's really important to get a sense of the hierarchy of elements, like on a map. Using colour too early distracts the designer and certainly the client. You only apply the key colour when you know what the accent notes are.

"Collaboration is also very important to us. We work quickly and so sharing tools are important. Everyone is in ordered Dropbox files. We put more immediate project back and forth work on Slack (otherwise things get lost in mail). We are also fans of Google Docs. We put together presentations and pitches collaboratively, building and editing in real time. Nothing is ever lost and seeing the progress of many encourages everyone. As with any agency, we need to be ready to work with



INDUSTRY INSIGHT

Mike Gallagher,
Lead Designer

"We look for clever designers who can communicate clearly. They need to work well in front of clients and be structural thinkers, as well as delivering visually. These people are rare, and at some point we'll need to think about training them ourselves. Any graduates need to build a network as soon as possible. Get out there. Meet people."

TIMELINE

Year 2012 No. of employees 2	Year 2012 No. of employees 3	Year 2013 No. of employees 6	Year 2014 No. of employees 6	Year 2015 No. of employees 7	Year 2016 No. of employees 7
The first major project for After the flood was the Pitch View for UEFA.	GOV.UK generates massive site data that needs to be communicated.	This was our first financial digital product brief for investment bank Liberum.	Redburn was a major design completed of a financial services platform.	Work with AIG and BBC World News was After the flood's first branded content.	Designed ranking systems as well as front end for the UEFA Euro 2016 Player Barometer.

ENCODE EXPLORER nature.com/encode

The first important papers to build on the release of the human genome data are now being published. Nature Publishing Group wanted to show the thematic connections between these papers beyond the common subject and contributors.

They wanted an interface that would allow users to navigate papers by this system of editorial subject 'threads.' Nature has a lot of experience in science visualisations for print, but this was their most ambitious digital visualisation to date.

Crucial to this particular application were the concerns of different stakeholders. The planning phase required editorial teams to both understand the threads concept as well as test our prototypes for scientific integrity. Alongside this, we wanted it to work across browsers and on tablets too, so the visualisation would need to be robust and usable as well as innovative. The Encode Explorer received a lot of plaudits in the science community due to its simplicity and ease of use.

This application is mainly steered by the sensitive colour hierarchies. We were fortunate that

there were enough threads to allow colour coding with enough difference between colours. The main accent colour was reserved not for a key data points as usual but for key functional elements such as buttons and call outs.

This is the crux of what we do - it's not just the visualisation we need to design but the whole context of the visualisation too; the controls, links with other sites or apps, all putting the user at the heart of the interface design process.



clients' systems too. Everyone has their own foibles but you just get on with it.

"And - swearing! It's a weird one but we try not to swear in the studio - even funny swearing. This is definitely the case in brainstorming. The theory is that the creative mind needs to be open to many possibilities and lateral streams of thought. You need a literally open mind. If someone drops an f-c-s bomb, your mind sharpens, like when someone drops something in a pub. The brain is then not open, it has closed, like an anemone, no longer ready for absorption or accepting anything contrary. That's the theory. It doesn't totally stop swearing -

but the swear box in brainstorming always buys a coffee or two."

The approach that After the flood takes with its projects can be manifold. The ubiquity of mobile and the pervasive impact that social media networks have had are colouring the approach that all digital designers are taking towards their work. The explosion of tools and frameworks has continued to accelerate, but Max remains focused: "I think we are more about designing a business that can work with good clients while leaving enough time to try out our own stuff. Any time worrying about spanners is time off those priorities."

AGENCY BREAKDOWN

Chairman

Design Director

Senior Designer

Designer x 2

Technologist

Film Maker

Mike also comments: "If attention is required as in most B2C projects, everything focuses on social publishing or amplification. All our work does that, or is based around it to some degree."

After the flood are a core of developers and designers, but when they do go looking for new people, what the criteria do they use when choosing who to employ or offer freelance work to?

Mike explains: "We look for clever designers who can communicate clearly. They need to work well in front of clients and be structural thinkers, as well as delivering visually. These people are rare, and at some point we'll need to think about training them ourselves. Any graduates need to build a network as soon as possible. Get out there. Meet people."

And what does the future hold for After the flood? "In our own work, the 1-to-1 health product is our own IP and we're looking to push that as a business," concludes Max. "We also have some amazing and beautiful posters coming out before Christmas. Mainly the focus is on project work; continuing to develop with our current clients and building more relationships based around great product design. We don't need to get bigger, we have excellent freelancers and profitability is more important than burns on seats. We enjoy working in the health industry, however - there is interesting and important work to do there, and certainly huge gains to be made there."

Understanding how data can underpin the creative process has enabled After the flood to offer a very different service to their clients. As information becomes even more important, this agency will clearly be in great demand, as clients bring increasingly complex problems to them that require unique and creative solutions.

After the flood www.aftertheflood.co

Founders

Max Gadney

Year founded

2011

Current employees

7

Location

Clerkenwell, London

Services

- Digital Product Design
- Service Design
- Data Visualisation
- Digital Product Strategy
- Filmmaking



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2017

PROS REVEAL WHAT'S GOING TO BE BIG

THE FUTURE OF WEB DESIGN

Foundation lead Kevin Ball gets excited about how web design and 'responsiveness' is evolving

Kevin Ball Foundation lead at ZURB

With a proliferation of devices and screen sizes, and a steady drumbeat of increasing mobile web traffic, designing 'mobile first' has gone from a crazy idea floated by Luke Wroblewski to a standard implemented across all major front-end frameworks. Patterns like flatter navigation structures, avoiding hovers, and stacking content on mobile are becoming standard. In some sense, responsiveness has 'won', with mobile-first designs becoming increasingly templated and a heightened focus on mobile performance via things like AMP and Facebook instant pages. This movement towards a set of acknowledged best practices is good for mobile users, but is also resulting in increased stagnation and 'sameness' across the web.

Reacting against that stagnation, there is a counterculture that rejects the idea that responsiveness means just cutting things out and stacking content. The future of responsiveness is embracing the multitude of technologies that are increasingly available to the web to tune the experience on each device to itself. According to the SimilarWeb 2015 State of The Mobile Web, over 50 per cent of traffic to a majority of the top 10,000 websites is coming from mobile devices. The economic imperative is there to create experiences truly tuned to these devices, taking advantage of their unique capabilities.

What would that look like? At ZURB we are incredibly excited about the future of the responsive web, and what it will contain. We believe that some of the big areas of innovation moving forward will be in highly responsive components, device-specific microinteractions, and websites that are location and context aware.

Highly responsive components are on the horizon that will make today's responsive sites look simplistic and naive. There are a slew of technical

A slew of technical improvements will enable us to dramatically simplify the writing of responsive elements and improve the level of customisation of components for different screen sizes

improvements that will enable us to dramatically simplify the writing of responsive elements and improve the level of customisation of components for different screen sizes. The first of these is taking advantage of the nature of SVG graphics - that they are in fact responsive to CSS and JavaScript - to enable images that not only scale but change and morph based on screen size. This capability already exists in browsers today, and we see better tooling



for generating these sorts of SVGs coming in the very short term. Further technology advances such as element queries and the upcoming CSS-grid spec will dramatically lower the barrier to creating responsive components, allowing web designers and developers to create experiences that are truly tuned to every device size. Element queries will allow creating components that are responsive based on the space allotted to them rather than the full screen size, while CSS-grid allows you to dramatically change layouts based on media queries. Between the two, we believe we will see an immense rise in the diversity of responsive patterns easily available to designers and front-end developers.

Device-specific microinteractions are another area previously relegated to native applications that we see coming to the web. Possibly because most web designers and developers do their work on large screen devices, many websites have treated mobile as simply

a 'cut down' version of their website, designing layouts from mobile up, but then focusing on complex interactions only on the desktop screen size. Things like touch gestures and mobile-scaled animations have been largely neglected. With mobile traffic now passing 50 per cent of web traffic, and increasing maturity of JavaScript-based gesture libraries, we believe this is about to change, with mobile-specific microinteractions on the rise as a way

to make websites not only look but also feel native to each device they are viewed on.

Location and context awareness is the final big area of innovation in responsive design that we see coming. One of the things that sets mobile devices apart is the way that they travel with users - and their ability to understand the location and context around them. With these capabilities increasingly exposed to websites, and the rise of the Internet of Things, we believe that a huge area of coming innovation will be in making websites increasingly responsive to the environments around them. Imagine looking at a website on a phone while you're shopping and seeing immediate reviews and price comparisons for the internet-enabled devices nearest you, without ever having to search or install an application. You could even imagine a website that serves an augmented version of the reality around you. The true power of mobile is in being able to respond to the context of the user, and that capability is slowly but surely coming to the web. We expect to see designers taking greater and greater advantage.

In short, while the immediate future of responsive design is towards increased standardisation of existing patterns, the medium and long term hold immense potential. As CPU, RAM, and even bandwidth limitations on mobile devices drop down, and more and more native device capabilities are exposed to websites and applications, we expect to see a flowering of innovation. At ZURB, we are actively experimenting in all of these areas, and will continue to publish tools and inspiration that help push us forward.

WEBVR - THE FUTURE WEB

WebVR is starting to come into its own. Take a look at how it's advancing and how you can get involved

An entry from OTOY's 'Render the Metaverse' contest. This is an example of using a cubemap to create a 360° view of a rendering. Find it at bit.ly/2hCm42c



WebVR is evolving at a rapid pace with big players such as the W3C, Google, Mozilla, Facebook and Samsung pushing it forward. We're seeing better hardware integration, better performance, and a new WebVR API specification, which vendors are working hard to implement. There's a new web framework called A-Frame - and coming soon, ReactVR.

Jerad Bitner

Technical project manager for Lullabot

5 TOOLS & LIBRARIES TO BUILD WEBVR

The essential resources you will need to start creating

CHROMIUM AND FIREFOX NIGHTLY BROWSERS

bit.ly/1Yj98hx mzl.la/2hMrcR6

These browsers are pretty much required for working with WebVR since they are where the latest and greatest WebVR specifications are being implemented right now. You can download these from the links you'll find on WebVR.info.

THREE.JS

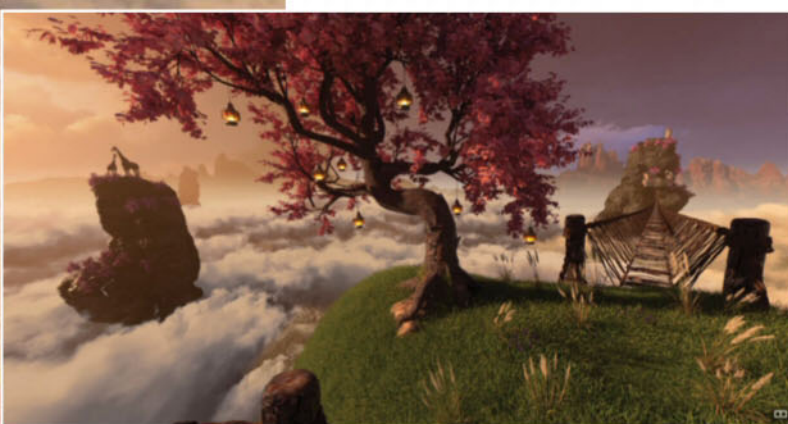
threejs.org

A JavaScript library making it easier to work with WebGL, which is the base API for working with 3D graphics and utilising the GPU in the browser. There's a lot of documentation and examples to help you get started in working with 3D on the web here.

WEBVR.INFO

webvr.info

The definitive source for all things WebVR. You can find the most up-to-date information about WebVR here, with links to specifications, browser downloads, and instructions on how to install and run hardware and software for multiple systems.



GET STARTED WITH A-PAINTER

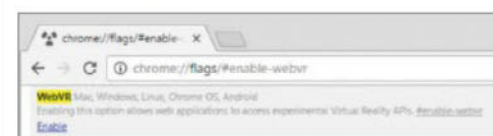
Check out how to use the new Mozilla WebVR paint tool A-Painter

01. GET A WEBVR BROWSER

First, you need to grab a WebVR-enabled browser. Download the experimental Chromium build on Windows, which supports WebVR and the Vive controllers. You can download Chromium from here: webvr.info/get-chrome

02. ENABLE WEBVR

In order to enable the experimental Virtual Reality API features in Chromium, open up Chromium and type **chrome://flags#enable-webvr** in the address bar. In the subsequent screen, click the Enable link.

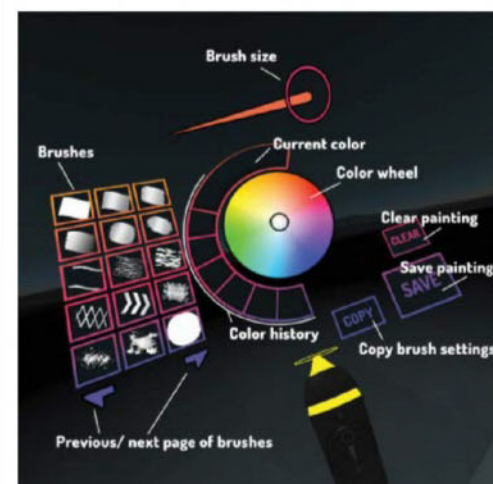


03. ENABLE CONTROLLER SUPPORT

In order to enable the experimental extension for the Gamepad APIs, type **chrome://flags#enable-gamepad-extensions** in the address bar, click on the dropdown and choose Enabled. This allows access to the Vive controllers.

04. START PAINTING

Restart Chromium, head to aframe.io/a-painter, don your headset and controllers, and start painting! Here's a quick guide on how to use the brushes. As you can see, it's not as comprehensive as Tilt Brush, but it's pretty impressive for WebVR!



05. SHARE YOUR WORK

If you make sure to save your painting, you'll be given a unique URL which you can copy and paste to share with others. They can even view this without a WebVR-enabled browser. Email us your drawing and show us what you've made!

A-FRAME INSPECTOR

bit.ly/2hNWikT

A visual inspector tool for and tweaking A-Frame scenes. This allows you to visually drag, rotate and scale entities, tweak an entity's components and their properties, as well as immediately see results from changing values without having to go back and forth between code and browser.

A-FRAME

aframe.io

If you would like to skip learning Three.js and WebGL directly, then check out A-Frame. This is a web framework for building virtual reality experiences with HTML using an entity-component ecosystem - it's easy to learn, allowing you to quickly prototype patterns and experiences. A-Frame works on Vive, Rift, desktop and mobile platforms.



WEB COMPONENTS - BUILD YOUR OWN HTML

After six years in development, 2017 will be the year we finally get to put Web Components through their paces!



Web Components bring an exciting new dimension to component libraries and design systems. They will allow fully encapsulated components, with reusable HTML to be delivered more easily across many different architectures. In Origami we're excited to be trying out Web Components and hoping to be integrating them into our design system soon.

Adam Onishi

FRONT-END DEVELOPER WORKING ON THE ORIGAMI TEAM
AT THE FINANCIAL TIMES

Developers have been striving to bring modularity to the web for many years. Take for example jQuery's plug-ins, or more modern frameworks and libraries like Angular or React. All of these have their foundation in modularity. For years the web has struggled with this due to the limitation of the global scope of HTML and CSS.

To solve this, Web Components enable the creation of reusable, modular and encapsulated components to the web natively, through web standards. Imagine instead of having to write out markup several lines long and many levels deep just

to create a single feature for your site, you could simply insert a single HTML tag. After several years in development, 2017 is the year we'll finally see these features come to the web.

This year, we'll be able to create these custom HTML elements, along with an encapsulated DOM that won't leak styles to the rest of the document. There will also be the ability to import and include HTML from separate files. Best of all, we'll be able to share all these new components with developers across the web, with no need for custom frameworks, because it's all based on the web.

A WEB COMPONENTS FRAMEWORK

www.polymer-project.org/1.0/

Polymer from Google is a framework heavily based around the world of Web Components. Coupled with a polyfill for native implementations, Polymer abstracts some of the complexity away from the early Web Components specifications. At the moment it's one of the most heavily used frameworks for working with Web Components, and comes with a suite of ready-made components, including a UI library based on Google's Material Design. Version 2 is due for release in 2017, moving to support the v1 specs of Web Components, with the aim of providing convenience utilities to help with the native web standards.

GET STARTED WITH WEB COMPONENTS

In this quick tutorial, find out how to create your own Web Component using some of the new specifications by making a simple image gallery

01. DEFINE A NEW CLASS

The first step is to define a new class for your component to use. This will contain your element's API and define attributes the element can use. When created with a constructor, the first statement must call `super()` to ensure the component extends correctly from the `HTMLElement` class.

```
class ImageGallery extends HTMLElement {
  constructor() {
    super();
  }
}
```

02. CREATE A TEMPLATE OF HTML

The template will define what HTML goes into your Shadow DOM and how that interacts with the HTML

added to the custom element created. Shadow DOM brings a new concept called slots, which allow you to essentially name buckets for HTML to be placed in when adding them to the Shadow DOM.

```
<template id="image-gallery-markup">
  <div id="frame">
    <slot name="photo"></slot>
    <div id="caption">
      <slot name="caption">Image caption</slot>
    </div>
  </div>
</template>
```

03. ADD SOME STYLES

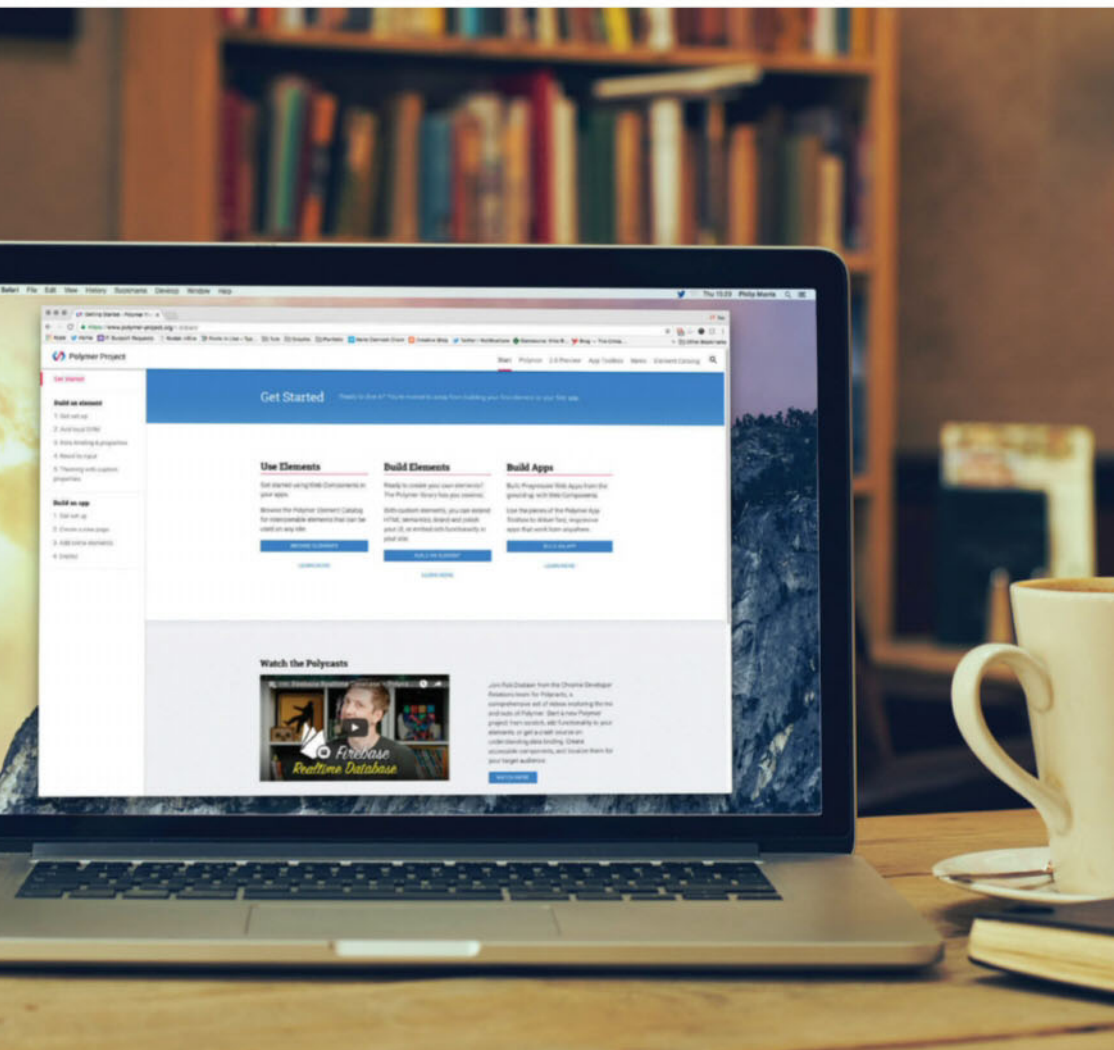
This should be the most familiar step of this tutorial. However, Shadow DOM does add a couple of new

selectors. The `:host` selector allows you to add styles to the element the Shadow Root is attached to, and `::slotted()` enables you to style elements with simple selectors when they are added to slots.

```
<style>
:host { [...] }
#frame { [...] }
#caption { [...] }
::slotted(img) { [...] }
</style>
```

04. ADD A SHADOW DOM

Going back into the JavaScript class, you need to add the Shadow DOM to the custom element. In the constructor, use the `attachShadow` function, setting the mode to either open or closed. Then, in the



4 SPECS OF WEB COMPONENTS

Each brings its own benefits and they be used separately or combined

CUSTOM ELEMENTS

w3.org/TR/custom-elements/

The Custom Elements specification is the crux of Web Components. This allows developers to create their own HTML element and register it with the DOM. This creates the ability to build reusable and extendable elements with native HTML and JavaScript. Defining a custom element is done by creating a JavaScript class, allowing developers to create a custom API for each new element. The API can be triggered through a series of lifecycle events also known as custom element reactions, which react to an element being added to the DOM and event when element attributes are updated.

SHADOW DOM

w3.org/TR/shadow-dom/

The Shadow DOM specification provides the most useful part of Web Components in terms of modularity. It enables developers to add a barrier between their element and the rest of the DOM, allowing for scoped styles and the ability to hide away the complexity of their component. The Shadow DOM specification also introduces comparability of new elements with the concept of slots – named placeholders that users can fill with their own markup.

HTML TEMPLATES

bit.ly/2gKxTo9

While HTML Templates is one of the four parts of Web Components, it is no longer its own separate specification – instead it has moved to the HTML5 standard. The template element allows you to define HTML content for use as fragments to be cloned and inserted to the DOM at a later point with JavaScript. The HTML defined inside a template is inert and will never be rendered by the browser.

HTML IMPORTS

w3.org/TR/html-imports/

The HTML Imports specification enables developers to import separate HTML files into the current file using a link tag. However, the final specification is the most unclear one. HTML Imports has been already implemented and backed by Google for some time. However, other browsers aren't so keen and are waiting to see how JavaScript modules will work out for Web Components. In terms of using Web Components today, however, Chrome is the only browser with everything shipped, which means you can use HTML Imports for now, but be prepared to potentially change tack once JavaScript modules support has been implemented.

`connectedCallback` (one of many lifecycle events), we add our template HTML into the shadow DOM.

```
constructor() {
  this._shadowRoot = this.attachShadow({mode:
    'open'});
}
connectedCallback()
{
  const imageTemplate = document.
    getElementById('image-gallery-markup');
  this._shadowRoot.innerHTML = imageTemplate.
    innerHTML;
}
```

05. REGISTER YOUR COMPONENT

In the penultimate step, we need to register the new custom element with the DOM by calling `customElements.define`. Here, pass in the name of the element as well as the class created to define its

prototype. Custom element names must always contain a `-`, to ensure the browser can correctly identify it as a custom element.

```
window.customElements.define('image-
  gallery', ImageGallery);
```

06. USE YOUR COMPONENT

The final step is to add the component to your HTML. To add content to your component, you need to add the `slot` attribute to the elements you want to appear in the Shadow DOM and give them the name of the slot you created.

Congratulations, you have just created your first Web Component!

```
<image-gallery>
  
  <p slot="caption">Photo by Adam Onishi</p>
</image-gallery>
```


WEB APPS - WHAT LIES IN WAIT?

With web apps gaining momentum in 2017, stay in the game and 'cache' in with service workers

WHAT IS THE FUTURE?

With increasing browser adoption and success of progressive web apps (PWAs) launched by household names such as *The Washington Post*, the scene is set for 2017 to be the year the web app comes into its own. With the performance and re-engagement of native apps but the maintainability and cross-platform agility of mobile web, it's easy to see the appeal of the PWA for firms that lack the resources to invest in native platform development. Now that pioneers are yielding tangible results, fast followers will be right behind.

An important consideration for an app developer is that web apps won't be indexed and discoverable via the native app store. However, with Google announcing this year the removal of its Chrome app store in favour of web apps, encouraging developers to migrate to web, the allure of native apps could decline.

Up to this year, there were two main disincentives to pursuing the web app

The Financial Times progressive web app includes a settings menu with toggles for 'Update content on startup' and 'Download Images for offline'



over native: perceived lack of availability on iOS due to lack of service worker availability in Safari, and the failings of the now superseded appcache. However, developers are finding that web apps

do fine on iOS and there are whispers of in-construction service worker implementation at Safari. Similarly, testimonies show that service workers reliably overcome issues faced with appcache. While slightly more

complicated to understand and implement, you are less likely to end up with a terrible user experience. We've reached a tipping point and in 2017 we will likely see web apps rapidly consume the native share.

SERVICE WORKERS

Why you need them and how to use

Service workers are the key to the progressive web app. They aren't new - they already facilitate push notifications in native apps. They're JavaScript files that act as a proxy for an associated website, enabling the web app to open immediately, presenting the user with the app shell regardless of network state. Some even provide a limited amount of offline functionality, but importantly, will never throw a downasaur. In the browser, conversely, load times are slower for even the most basic features of a site. More than three seconds load time and bounce rates sky-rocket.

Service workers enable a certain amount of the resources required to display the app shell to be cached locally on the device, to be displayed immediately next time from a home-screen icon while the rest of the content is downloaded, providing the user with a native-like launch experience. Once loaded, certain requests can also be handled by the local proxy, improving online performance.

HOW TO GET STARTED WITH SERVICE WORKERS

This simple step-by-step shows you how to modify your existing app to work offline with service workers

01. GETTING STARTED

Before we start, we need to ensure our web server is configured to HTTPS - intercepting and manipulating requests is a powerful ability and service workers require HTTPS for security.

02. REGISTER THE SERVICE WORKER

First, we need to check that the browser supports service workers. For more info on which browsers currently support them, head over to caniuse.com/#feat=serviceworkers. If it does, we can create a blank JavaScript file, `myserviceworker.js`. This is registered as the service worker in the app or site's JavaScript.

```
// First check whether we have browser support
if ('serviceWorker' in navigator) {
  // If so, register the service worker
  navigator.serviceWorker.
    register('myserviceworker.js').
```

```
then(function() {
  //Then use a promise to log the result if
  successful
  console.log('Service worker has been
  registered.');
```

03. INSTALL & CACHE ASSETS

Once a service worker is registered, the browser will install and activate it. An install event is fired when this is completed. This can be used to populate a cache of assets to enable the app to run offline. Let's modify `myserviceworker.js` to respond to the install event.

```
// Add a listener for the install event
this.addEventListener('install',function(ev
ent) {
  // Create a new cache called my cache
  event.waitUntil(caches.open('my cache').
```


2017 will likely see rapid closure of the remaining gaps between web and native apps. The only viable alternative to native apps until now has been hybrid, which companies love due to reduced development overhead. Users prefer native for the richer, more responsive user experience. Web apps give them both what they want.



Jemmima Knight
Scrum team leader at
American Express

Maturity of APIs for accessing device hardware such as Bluetooth and NFC is improving. However, given their share of the market, without Apple's support for service workers in iOS we won't see native apps losing that much ground next year. Apple are making the right noises and Microsoft are almost there.

```
then(function(cache) {
  // Once it has been created, add a set of
  assets to it
  return cache.addAll([
    'index.html'
    'image1.jpg'
    'image2.jpg'
  ]);
});
```

04. INTERCEPT REQUESTS

A fetch event is fired every time a request is made to retrieve a resource on our page. We now need to add another event listener to catch the fetch events. The simplest response would be to take the opportunity to retrieve corresponding resources from the cache.

```
// Add a listener for fetch events
this.addEventListener('fetch',
function(event) {
  // evaluate the response of the event
  event.respondWith(
  // If there is an appropriate resource
  available in the cache,
```

```
// retrieve it instead of the network
request
caches.match(event.request) ); });
```

05. RECOVER FAILED REQUESTS

Finally, we need failure handling for when there is no match in the service worker cache and our promise is rejected. Where the requested resource doesn't currently exist in the cache, the request is passed to the remote server.

```
// Add a listener for fetch events
this.addEventListener('fetch',
function(event) {
  // evaluate the response of the event
  event.respondWith(
  // If there is an appropriate resource
  available in the cache,
  // retrieve it instead of the network
  request
  caches.match(event.request).
  then(function(response) {
  // When the asset is not found in the
  cache, request from network
  return response || fetch(event.request);
  }) ); });
```

WEB APPS ESSENTIAL TOOLKIT

5 things you'll need to build progressive web apps in 2017

CHROME SERVICE WORKER TOOLBOX

github.com/GoogleChrome/sw-toolbox

This is the essential service worker developer toolkit. It contains what you need to get started, with some basic request routing and resource caching patterns. There are also in-built handlers enabling you to favour either your cache or the network to route requests in different situations. For instance, `networkTimeoutSeconds[Number]` allows fallback to the local cache after specified period.

PUSH API

bit.ly/2gJdu4u

An important feature for ensuring your web app is successful is providing opportunities and prompts for the user to open it again and again. A great way of increasing this kind of re-engagement is by enabling push notifications. This is standard on native apps, but is now available with Chrome for web apps too (apart from iOS). Other browsers are in development.

APP SHELL

bit.ly/2gJdtNR

Ultimately, app shell is nothing more than a design model, but there are basic app shell designs available in open source to get you started. Think carefully about whether to go with a hamburger menu or navigation bar – this will largely depend on your users; for example, the over-45s are probably less likely to know what the hamburger does.

LIGHTHOUSE

github.com/GoogleChrome/lighthouse

Running in Node.js or as a Chrome plug-in, Lighthouse makes evaluating progressive web apps much easier. Test outcomes are like audits and can be viewed in the command line, assessing your web app for key features such as offline functionality and registered service workers. It can also run page load performance tests and check if the site is progressively enhanced.

WEBVR API

developers.google.com/web/fundamentals/vr

In the wake of *Pokémon Go*, AR and VR are being given serious attention. Although in its infancy, VR device compatibility is available in Chrome Beta, Firefox Nightly and Samsung Internet Browser. It's in these experimental spaces that progressive enhancement is important. Luckily, the WebVR API is ready for this and allows you to adapt to changes in input from a VR device.

GOOGLE - A NEW GENERATION OF TOOLS

Be it due to intelligent management or the sheer amount of talent, few companies have the innovative prowess of the Big G



Google's culture of innovation and its sizeable cache of data enables the company to perform efficient data mining. This leads to the permanent emergence of new, highly interesting services relevant to both web designers and advertising professionals.

Dr. Doris Maria Kohrs
CEO of abctexte

THE NEW GOOGLE DESIGN

Apple's success with the iPhone introduced Google to the importance of a corporate identity. Material Design is the Big G's take on this concept

Even though Material Design has been around for quite some time, Google has not stopped refining its offerings. In particular, these services – currently in the preview program – deserve additional attention.

SHARE YOUR WORK

Designers often like to work with pen and paper. While very few things can beat the homely feel of a Parker 45 scratching across a sheet of paper, sharing such sketches with your co-conspirators can become difficult at times.

The Gallery tool solves this by providing an easy way to share designs with developers. In addition to that, designers working on mobile apps can use native applications on Android and iOS which allow them to get a feel of how sketches will look when on a device.

DESIGN SMARTLY

Speeding up the prototyping process, the Stage tool enables you to preview animations without much coding. This can prove a godsend when creating

mobile apps. Find out more about the latest additions to Material Design at <https://material.io>. Click on the Learn More links and request an invite to the Material Design early access program. If accepted you get access to materials and the chance to offer feedback.

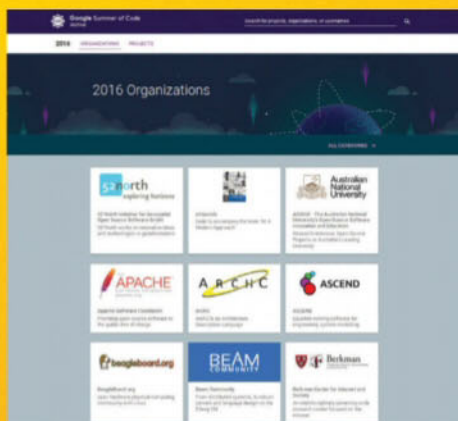
THERE'S MORE!

In addition to these invite-only features, Material Design provides developers with a variety of other interesting tools. For example, various frameworks make creating Material-styled web apps really easy.

SUMMER OF CODE

bit.ly/2gFpX4s

Google's Summer of Code list reads like a who's who of IT. Should you find yourself short of something to do over summer, and be a student in information technologies, Google's Summer of Code might just be the project for you. The search engine provides stipends for students who work on a variety of open source projects: more than one of these developers has since been able to use this as a springboard to permanent employment. In addition to that, keep in mind that you can make use of \$5,500 and have something which will look great on your résumé when applying for future jobs.



GOOGLE DAYDREAM

vr.google.com/daydream

Initial defeat with the Glass spectacles has not discouraged the company: the Daydream feature combines Google's Cardboard with a more refined set of hardware. The phone+headset combination allows users to experience a variety of alternate-reality content: for developers working on news/video applications or games, implementing Daydream support is a sure-fire way to stand out from the competition. Be aware that Daydream is currently supported on but a small subset of devices - as of this writing, it is by no means a mass-market technology.

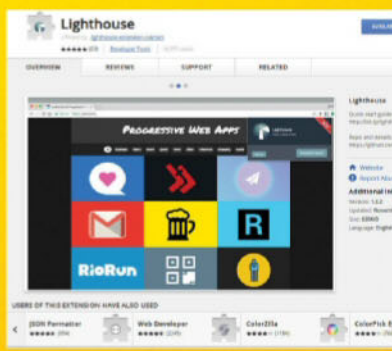
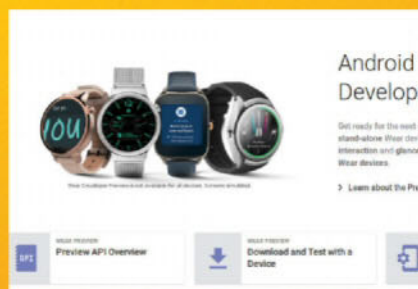


GOOGLE 2017

ANDROID WEAR 2.0

bit.ly/2hA9wlo

Even though Wear 2.0 is not yet available to end customers, developers find themselves well supported. Android Wear devices so far have acted as mere tentacles to the handset or tablet of their owner. The second version permits devices to stand alone: for developers, this is relevant for a variety of reasons. First of all, applications can now be used without a phone nearby. In addition to that, the watches can now connect to Wi-Fi directly, thereby accessing the internet without needing help from their host smartphone. This lets you create a wide variety of new usage scenarios - the sky's the limit with Android Wear 2.0!



GOOGLE LIGHTHOUSE

bit.ly/2hSgjwm

Google LightHouse takes the form of a Chrome plug-in. What Lint is to a JavaScript programmer, Lighthouse is to the web designer. The program allows you to pass in the URL of any web application, which is then confronted with a variety of tests. Even though we cannot deny that quite a few of them are very Google-centric - think about things like Chrome- and Android-specific features - using Lighthouse nevertheless is an easy and convenient way to find a variety of usability-related issues which might also be penalised by Google in future updates of its search algorithm.

TEN NEW LIBRARIES AND TOOLS YOU NEED

REMIXER

bit.ly/2hKmQgy

Simply change the behaviour of applications in a cross-platform fashion.

WEB PAYMENTS

bit.ly/2gPmmnm

Making users cough up is tricky: a standardised API simplifies the UI flow.

ENHANCED ASSISTANT

bit.ly/2heEvZU

Actions let you build for the Google Assistant.

CHROMECAST IN 4K

bit.ly/1YMF7G1

2017 might be the year of apps on TV. Chromecast Ultra allows 4K streaming.

GOOGLE DART

dartlang.org

Dart can live in a JavaScript runtime or in a C compiler - code reuse ahoy!

MATERIAL FOUNDATION

bit.ly/2gPmmnm

The Foundation provides open source tools.

ICON LIBRARY

material.io/icons

Save time and money by using Google's well-known Material icons!

RESIZER

material.io/resizer

Bliss: seeing your website in multiple screen sizes with one click...

OFFICE INTEGRATION

bit.ly/2el3HAA

VBA is legend. Google's online Office now has an API of its own.

CERTIFIED ANDROID DEVELOPER

bit.ly/2hAco8s

Boost your CV with some official Google certification.

UX - NEW EXPERIENCES

Potential breakthroughs in technology will influence how brands design their customer experience



The field of UX is bound to be influenced by creative design trends in 2017, as flat design did in 2016. But, it's the advancement of alternative interfaces like VR, voice control and minimalistic design patterns that'll be the key influencers in user experience design as we head into the new year.

Chris Cherrett
USER EXPERIENCE DESIGNER

7 TRENDS TO WATCH OUT FOR IN 2017

ALTERNATIVE USER INTERFACES

There was once a time when UX design was constrained by the limits of technology. This isn't the case any more. VR will be huge in 2017, and with it comes a whole new challenge that's going to change our interpretation of what UI design really is. Today we're primarily concerned with designing for screens, but virtual reality is a completely different ball game, as are voice command services like Amazon's Alexa, or messaging bots, which are an entirely different (but important) form of interface.

SUPER-INTERACTIVE PROTOTYPING

The requirement to put together a working prototype really quickly is becoming ever more commonplace, and this will continue throughout 2017. It's becoming easier now to demonstrate and experiment with the inner workings of a design without excessive overheads. The barrier to entry for designers learning to effectively communicate their ideas to clients using really powerful tools is rapidly declining (and we'll touch on some of those tools in a little bit).

CONVERSATIONAL UX

This buzz phrase refers to a user experience where your interaction with a company, product or service is automated based on previous behaviours – a method of design that is personalised to the extreme. Unlike the name suggests, we're not talking about a literal conversation, but rather the back and forth interaction between parties. For example, in a conversational experience you'll never need to interpret the controversial hamburger menu because there won't be a need for one. The application or service itself will simply adapt to best suit your habits.



HANDLING ERRORS BETTER

After years of closely designing user journeys that travel along a linear path, 2017 will see more user experience designers explore what happens when things don't go according to plan, and what those experiences will look like. Creating a user journey that pays close attention to the branches along that path, based on conditions and events, and better handling those scenarios will prove to be a vital.

USE OF ANIMATION

As devices become more powerful, we'll experience problems around speed and performance on mobile platforms less and less. As a result, we'll likely notice a greater use of micro-animation to compliment user interfaces and feedback. These rich experiences will become ever more commonplace, meaning that traditional transitions between different application states will be deemed harsh and old-fashioned. It's definitely worth keeping an eye on the capability of browsers and the increased adoption of CSS transitions over the next 12 months.

DESIGN THINKING

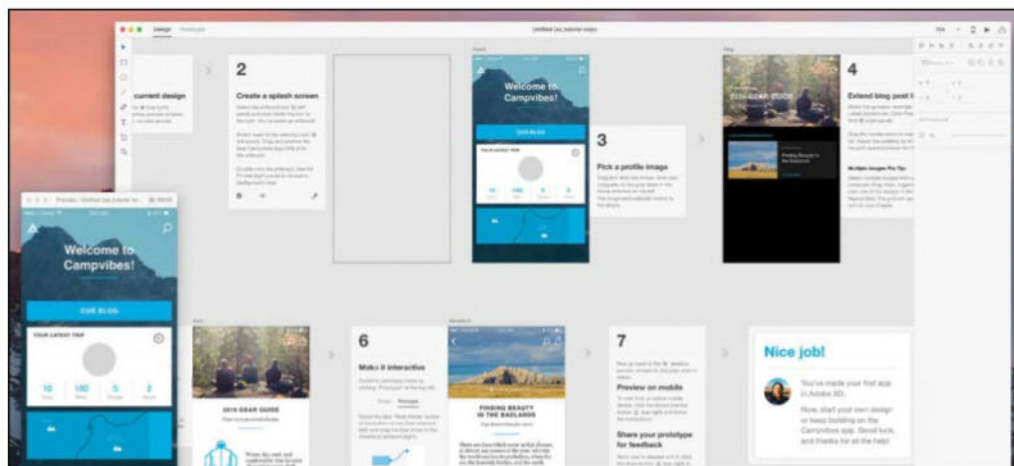
Paying more attention to the logic, reasons and rationale behind a design (called 'Design Thinking') will embed itself as the standard model as well-researched and thought out experiences outperform those that are simply pretty designs. Compared to traditional practices, this methodology helps you think outside the box, delivering services or products that genuinely solve problems, are empathetic and add value – an essential skill for every designer.

EXTREME MINIMALISM

Minimalistic design is seen as the pinnacle of clear and concise communication, and monochromatic design that strips away distracting elements will be an even bigger hit in 2017 than it has been in the past. This, in part, will be due to the increasing number of ways and methods in which users can interact with a service. And, so in order to unify that experience, some of those elements that are considered less valuable will ultimately be replaced with bigger, bolder and braver design patterns.

TOP TOOLS TO BUILD BETTER

Rapid prototyping tools that help UX designers quickly communicate ideas at very little cost



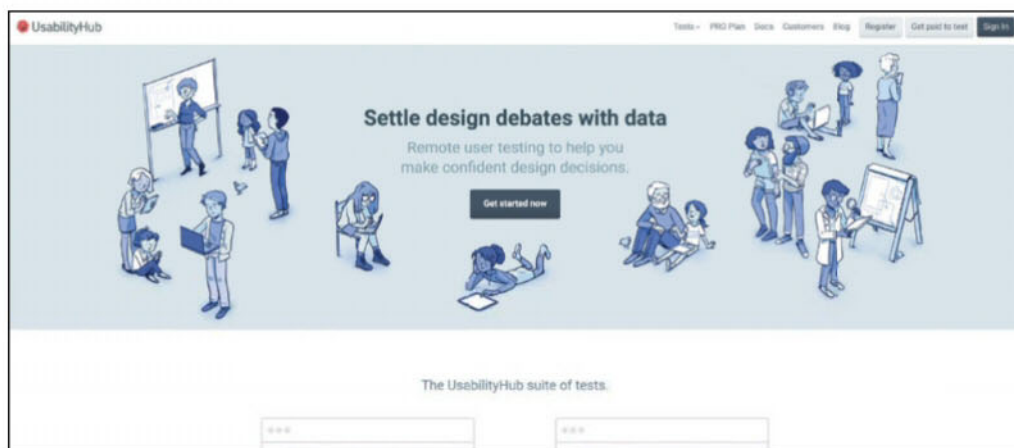
ADOBE XD
www.adobe.com/uk/products/experience-design.html

Tom Krcha, senior product manager at Adobe XD, explains that "the things we design today are more than just static visuals. Today, designers are challenged by how things actually behave". This is why the firm released Adobe XD, to remove the barrier between designers who are want to quickly express their thoughts and vision.

One of the killer features of XD is the ability to reuse and remix elements to quickly create wireframes and visually rich prototypes. In just a few minutes

you can go from a blank canvas to a working prototype illustrating the prioritisation of content, features and functions, and the overall user journey.

This is great to see on the big screen, but what about mobile devices? XD has this covered by giving you a live preview of your mobile designs on your phone or tablet, including all the subtle interactions you've chosen to include. Feel and touch your designs as if they were real applications to clearly describe what you're thinking.



USABILITY HUB
usabilityhub.com

To inform a great user experience, it's essential that designers set up research activities and tests to validate any assumptions made about the suitability of a design, and settle design debates with data. Remote testing is huge right now, so expect tools like those provided by Usability Hub to become even more important in 2017, as design teams aim to deliver minimalistic UIs that work well for their users. Usability Hub's simple Five Second, Click, Navigation

and Preference Tests are becoming an essential part of the user experience design process, and as increasing demand is put on designers to produce interfaces that are both clear and easily understood, tools like Usability Hub's are a quick way of getting those answers. Expect them to release new and interesting way of testing your site in 2017, because not testing a design before it goes live is quickly becoming a thing of the past.

DRAG, CLICK AND SCROLL

Here's how you use XD to make your first prototype app

01. EASY COPY & PASTE

Let's say you've added a grouped rectangle to the canvas which represents a single blog article - with an image, a title and publish date. Rather than manually copying and pasting that element, you can drag the list down the artboard using the Repeat Grid tool.

A pink space will appear between each item in the list. This allows the padding between rows to be adjusted.



02. DEFINE THE JOURNEY

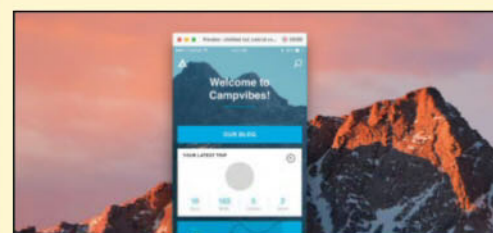
Switch to prototype mode by clicking the Prototype option. This switches away from the Design mode and allows you to define the journey between artboards. Select a button or image on one of your artboards and drag the blue arrow to the target, joining the two artboards together with a single blue line. A pop-up will appear where you can set the transition, easing and duration of the transition.

03. PREVIEW THE APP

It's at this point that you'll want to get out your mobile phone to preview the app - and the interactions you defined above - on the device itself. Plug your Android or iOS device into your PC or Mac and XD will automatically detect it (you'll need to download the XD app from your respective app store for the two to work together).

Once that's done, you'll find your phone listed under the mobile icon in the top-right corner of the window, and the designs will be pushed to your mobile phone. Alternatively, click the play icon and XD will give you a preview of the app in a phone-sized window.

Now let's say you want to share these interactions with other designers or stakeholders. You can click on the small 'record' button in the top-right corner of the pop-up and start interacting with the app. As soon as you're done, click 'record' again and you'll be prompted to save a MOV file, ready for sending.



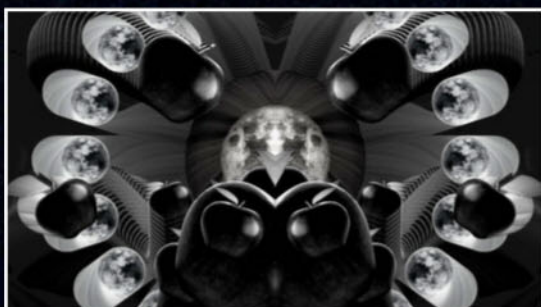
RESN - DESIGNING FOR 2017

The Resn (resn.co.nz) website was designed to infect a user's subconscious and then resurface in their dreams. Or their nightmares

SETTING THE STAGE

The centerpiece of the website is the Resn Gem. This interactive WebGL object serves as the entry point for the site and was designed to 'wow' users from the first moment. Resn used WebGL for its superior performance, versatility and its ability to make use of shaders to produce visual effects.

About Work Co



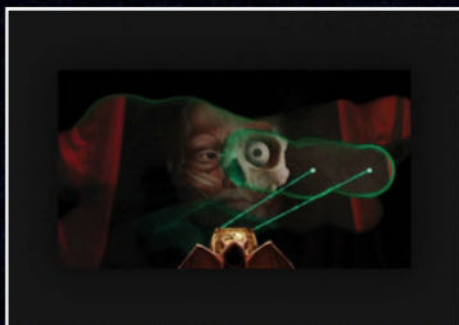
AN IDEAS LABORATORY

Resn's creative choices and the use of a wide variety of digital technologies, from HTML5 Canvas and 3D Transforms to SVG animation, represents an unconventional drive to experiment. Resn used the opportunity to explore and invent, without having to think about conventions or trends.

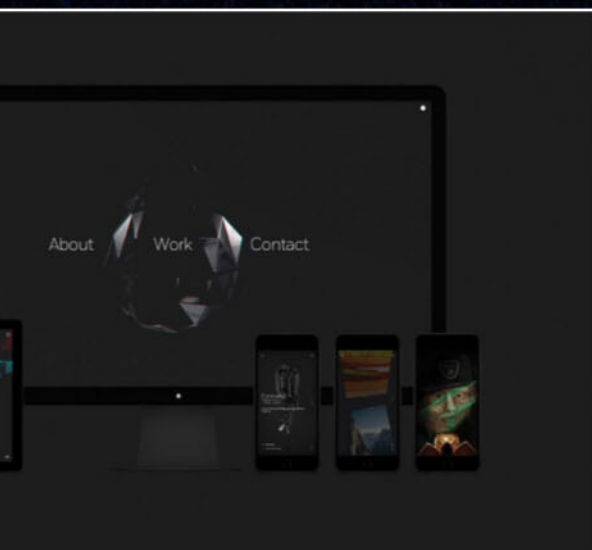


CABINET OF CURIOSITIES

The site redesign allowed Resn to play with expectations of what their brand is. Unlike the previous Resn website, the homepage is strikingly minimal. Where's the surprise? It's there. Scratch below the surface to find the mesmerising interactive WebGL experiments.



contact



Marcus Brown
Design director &
design lead at Resn

The design approach for the new Resn site was all about contrast and surprise. From the very minimal homepage Gem, to the suddenly weird and wonderful interactives hiding just below its surface, to the accordion player seen when testing the site's responsiveness, we played with user expectations at every turn.

SMOOTHLY SCROLLING CONTENT WITH NAVIGATION BUTTONS

The up and down content-scrolling navigation buttons on the project pages of Resn's website are instructional, elegant and functional

01. STORING REFERENCES TO THE HTML ELEMENTS

Start by storing references to buttons and views in your class with jQuery in order to be able to easily add listeners and set and get properties. Ideally, this is within a class for the specific view that you are scrolling.

```
this.scrollContainer = $('.  
scrollContainer');  
this.downButton = $('.  
downButton');  
this.upButton = $('.  
upButton');
```

TIP: Make sure you scope your selector clearly and unambiguously. If you are using Views extended from the Backbone framework, you can easily do this using the handy `this.$()` method on the view itself to only select within the current view element, eg:

```
■ this.$('.scrollContainer')
```

02. LISTENING TO THE CLICKS

Add your listener functions to the 'click' event on your target up and down buttons.

```
this.downButton.on('click', this.  
onDownButtonClick.bind(this));  
this.upButton.on('click', this.  
onUpButtonClick.bind(this));
```

03. UPDATE THE SCROLL POSITION OF YOUR CONTENT REGION

Within your button click event handles, you can update the scroll position of the target element by calling the `scrollTop` jQuery function on the element that you want to scroll. This will snap to that scroll position straight away without animation for now.

```
this.onDownButtonClick = function () {  
this.scrollContent(1); //scroll positive  
(down) direction };  
this.onUpButtonClick = function () {  
this.scrollContent(-1); //scroll negative  
(up) direction };  
this.scrollContent = function  
(directionMultiplier) {  
var scrollAmount = $(window).height() *
```

```
0.65 * directionMultiplier;  
var scrollTarget = this.scrollContainer.  
scrollTop() + scrollAmount;  
this.scrollToPosition(scrollTarget); };  
this.scrollToPosition = function  
(scrollTarget) {  
this.scrollContainer.scrollTop  
(scrollTarget); //snap to scroll };
```

04. STORING A VALUE TO SMOOTHLY SCROLL THE VIEW POSITION

Using TweenLite, you are able to smoothly and pleasantly tween the position of the scroll rather than it having a hard snap.

Start by creating a custom `scrollTweenObject` to store the tweenable value of the scroll position. You will then be able to tween this value independently of user interactions.

```
this.scrollTweenObject =  
{ 'scrollPositionY': 0};
```

05. SMOOTHLY UPDATING THE SCROLL POSITION

Update the code in the `scrollToPosition` function to tween the scroll position from the current value to the new value using TweenLite or your favourite Tweening library. The `onUpdate` parameter in TweenLite enables you to dynamically update the jQuery `scrollTop` as the value animates, creating a seamless and elegant scrolling motion when the user selects one of the buttons.

```
this.scrollToPosition = function  
(scrollTarget) {  
TweenLite.fromTo(this.scrollTweenObject,  
0.3, {  
'scrollPositionY': this.scrollContainer.  
scrollTop() }, {  
'scrollPositionY': scrollTarget,  
onUpdate: this.onScrollTweenUpdate.  
bind(this) }); };  
this.onScrollTweenUpdate = function () {  
this.scrollContainer.scrollTop(this.  
scrollTweenObject.scrollPositionY) };
```


CSS 2017 - GRIDS & ANIMATION

Get ready for the CSS developments that will be making waves

Variables are already available in CSS pre-processors and are very useful. However, the power of CSS variables is that they can be updated using JavaScript, Media Queries, CSS cascading, as well as being able to use calc() on them. This make them hugely more useful than the static pre-processor kind and so far supported by everyone - other than IE/Edge (of course)!

Keir Moffatt

Freelance front-end developer

**6 TOOLS YOU
NEED FOR 2017**

CAN I USE
caniuse.com

CSS TRICKS
css-tricks.com

**WEB
PLATFORM
DAILY**
webplatformdaily.org

SASS
sass-lang.com

POSTCSS
postcss.org

CUBIC BEZIER
cubic-bezier.com

CSS4 SELECTORS

Seemingly innocuous, selectors wield a huge amount of power. The most exciting of these powers has got to be 'relational' or 'has', which allows us to style elements based on what they contain and the state of those elements. This feature is only in Editor's Draft, but there's plenty of people hoping it comes to browsers.

In Working Draft there are simplified versions of the `:not()` and `:matches()` selectors, so we can now write `:not(.class-1, .class-2)` or `matches(active, :hover, :selected)`, for example.

We've already got HTML5 form validation, but now we can style them using `:valid` and `:invalid`. There's also the `:default` selector to highlight the default state, such as the default `<option>`. These are supported by most browsers today, so get using them now!

See <http://css4.rocks> for a more comprehensive breakdown of what's available and currently supported.

FLEXBOX

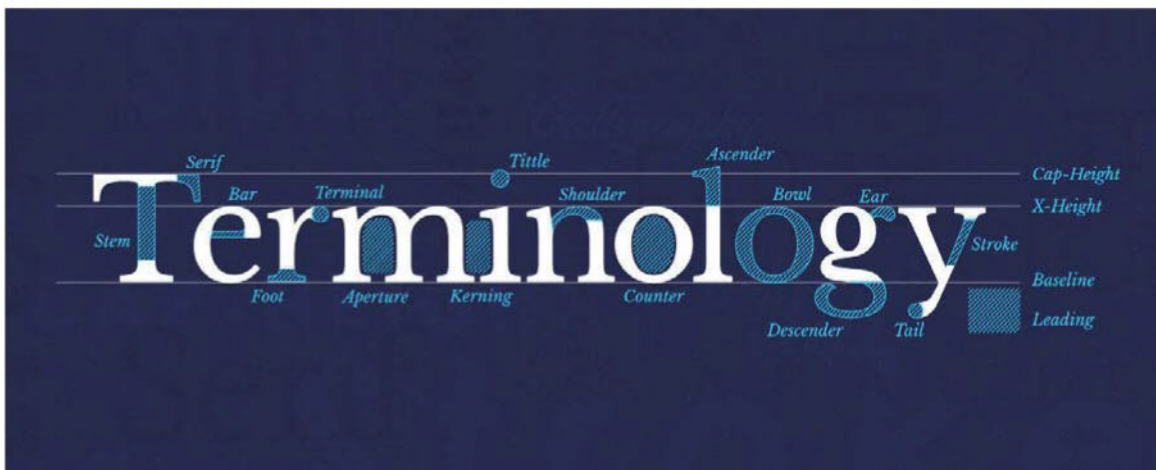
Flexbox has been around a while now and so you may have already used it - if not, now really is the

time, and with support in all modern browsers (and IE11) there really is no excuse not to be. Flexbox greatly aids the alignment and layout of one directional content.

CSS GRID LAYOUT

Grid Layout is a hot topic. It's not supported by any browsers yet, but start using it now by activating experimental flags in Chrome and Firefox. Due to ship as standard in the first half of 2017.

Flexbox is great in a single direction, but if you want complicated layouts then use Grid Layout.



WHAT'S GOING ON WITH CSS ANIMATION

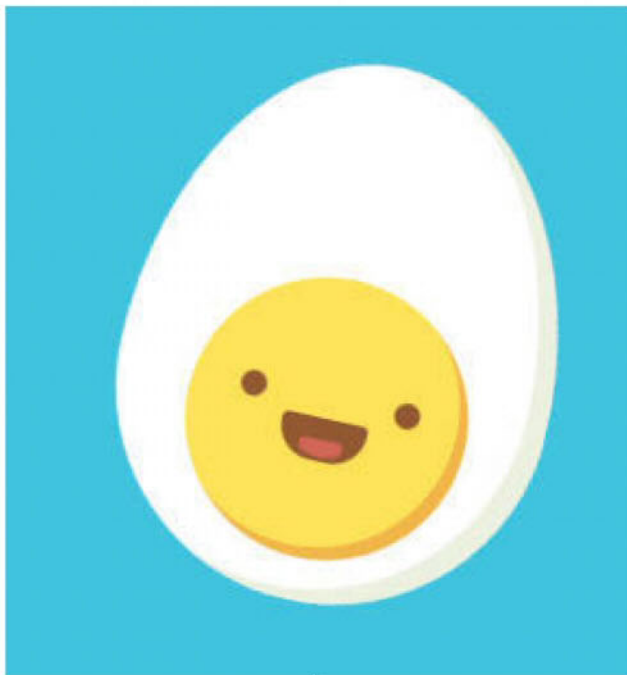
You'd be forgiven for thinking that the TypeTerms website uses JavaScript for its complex-looking-yet-smooth, engaging animations but it's CSS animation that's at work here. Inspecting the code reveals a masterclass in getting your animations dialled.

Left

The wonderfully (CSS) executed TypeTerms explores type terminology with expertly-crafted animations. supremo.tv/typeterms/

CUTTING-EDGE CSS TECHNIQUES

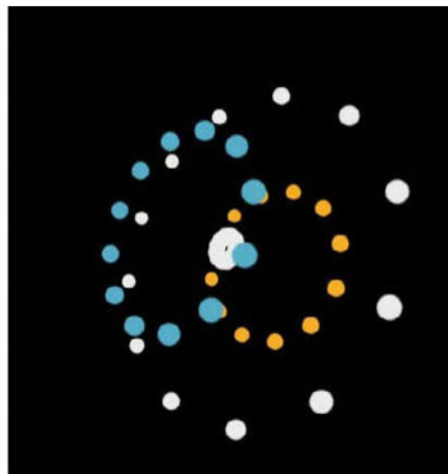
Take a look at these ingenious methods of creating impressive animations and effects using just CSS



CSS HAPPY EGG

codepen.io/cassidoo/pen/ObmgmP

This happy chap is built and animated purely in CSS with clever use of border-radius, inner box shadows and transform animations.



CRAZY DOTS

codepen.io/thebabydino/pen/XXwKoj

You'd think this was done with a JavaScript library, but it's just CSS at play; it's quite complex CSS, but the effect is worth the effort.



SQUISHY TOGGLE BUTTONS

codepen.io/soulwire/pen/bKens

These lifelike buttons feel good enough to be real! Brilliant execution using little more than well-applied shadows and transform animations.

GET GOING WITH CSS GRID LAYOUT

There's been a huge amount of talk on CSS Grid Layout in 2016, but in 2017 you can finally start using it. Here we'll take a look at the fundamental steps.

01. MAKE SURE YOU CAN SEE IT

CSS Grids is only available as "experimental Web Platform features" flag in Chrome (<chrome://flags>) and "layout.css.grid.enabled" in Firefox (<about:config>), so enable those first.

02. MAKE SURE IT'S SUPPORTED

You don't need Modernizr for this (although you could use it) as CSS has its own @support syntax. Use this to make sure the rules only get applied to browsers that can handle it. If you did Step 01 right, you should get the green background.

```
/// Fallback method goes here (floats &
flexbox perhaps)
body {
background: red;
}
// Our grid layout code goes in here
@supports (display: grid) {
body {
background: green;
}
main {
```

```
display: grid;
} }
```

03. GET SOME BASIC LAYOUT

We still need to make sure that unsupported browsers display content in a logical order and in an acceptable manner. Set the basic styling up and get it looking acceptable. - see the codepen for details.

04. BASIC GRID

With just 3 lines of code we can get our layout into a 2 x 2 grid: we're simply setting each column to be 50% of the available width.

```
main {
display: grid;
grid-template-columns: 50fr 50fr;
grid-gap: 1.5em; }
```

05. GET RESPONSIVE

The real power of grid is realised when you want to change your layout at a particular screen size. Here, at a larger screen size, we've made the first and third

cells occupy the full width of the screen with the third cell appearing at the bottom. The second and fourth cells are split 50-50 in the center row.

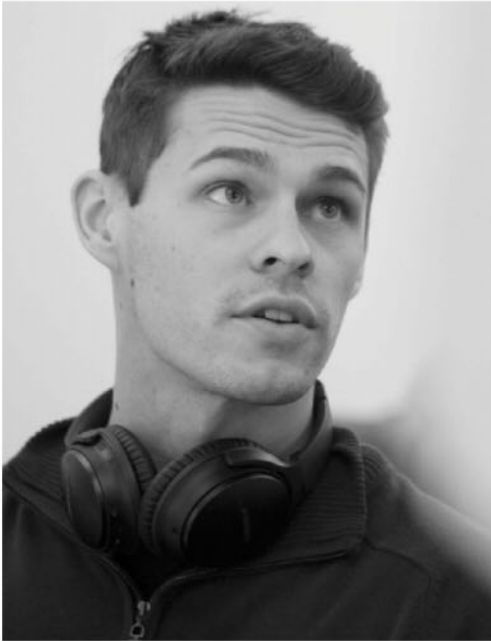
```
@media screen and (min-width: 1000px) {
.section-1 {
grid-column: 1 / 3;
grid-row: 1;
}
.section-3 {
grid-column: 1 / 3;
grid-row: 3;
}
}
```

06. GO FURTHER

These are the very basic examples and there's so much more you can do. I found the following resources extremely helpful in getting up to speed: Grid by Example by Rachel Andrew - <http://gridbyexample.com>. A Complete Guide to Grid by Chris House - <https://css-tricks.com/snippets/css/complete-guide-grid>. Check them out.

JS 2017 - APIS & ES7

The tools, techniques and changes that you should keep an eye on for the year ahead



The JavaScript ecosystem will continue to evolve in 2017, accommodating the different ways people interact with it, and as a community, pushing it to do more and more. "You can learn the basics of JS and follow the same core language and concepts all the way to building robust applications. That's what makes it so popular and important today."

Ashley Firth

Front-end developer at Octopus Energy

PROGRESS TOWARDS ES2017

More than just a standard

Much of 2016 was spent getting browsers to support the large syntax changes ES6 - more formally 'ES2015' - brought to the table. Now we're at the point where the latest browsers all but fully support it, what's next for the specification?

Changes to the specification now occur yearly and as a result are much smaller. ES2016 included just two new features: an `***` operator for exponentials and the ability to search arrays using

an `'includes'` method. ES2017 will be finalised in June, but looks set to include async functions alongside some smaller Object methods.

Features are included in a specification when they reach Stage 4. A requirement for Stage 4 is successful implementation in two compilers, so future updates are likely to arrive when ready, not when the spec is finalised. Rapid browser releases mean devs will be able to utilise new syntax quicker.

4 KEY FUNCTIONS TO USE

Groundbreaking new features to keep an eye on

WEB PAYMENTS API

Taking payments on the web has been notoriously tricky. With many different methods of payment available, lots of information needs to be captured at once, which can end up being frustrating for users. The Web Payments API allows visitors to use a simple, native user experience to quickly fill out their details for a variety of payment methods and send them to your site in a standardised format.

ASYNC FUNCTIONS

ES2015 brought with it generator functions that could be exited and re-entered later without losing the context. ES2017 brings with it async functions, which uses Promises in a similar manner. They allow you to write asynchronous code in a more synchronous way. Any value an async function 'awaits' will need to be settled before moving on, removing the need for most callbacks altogether.

PROGRESSIVE WEB APPS

The web in 2017 will reach more people than ever. They won't necessarily have fast devices or a steady internet connection. Progressive web apps focus on snappy, reliable user experiences that rival a native application. Users can add them to their home screens, receive push notifications and more. With improvements happening all the time, now is the time to see what they can bring to your projects.

CUSTOM ELEMENTS

Frameworks such as Angular and React have pushed web development to a more component-based architecture. Code becomes reusable across projects in many different situations. Web Components replicate this behaviour by defining a custom element in JavaScript for use on the page. It can then be used like a regular element, which consumes data and abstracts complex behaviour away from those using it.

10 MORE TOOLS TO TRY OUT

Check out these APIs and frameworks

WEB ANIMATIONS API

mzl.la/2h7nVLD
Compose and display element animations with the flexibility of JavaScript.

SHAPE DETECTION API

<http://bit.ly/2hOp3r1>
Detect faces, barcodes and more in image and video content natively using device hardware.

GENERIC SENSOR API

w3c.github.io/sensors
A future-friendly standardised interface for accessing the sensors available on a device.

WEB BLUETOOTH API

<http://bit.ly/2gG0dp7>
Communicate with user-selected Bluetooth devices locally with browser technologies.

WEB MIDI

webaudio.github.io/web-midi-api
An interface for the MIDI protocol, to allow browsers to send and receive musical data.

WEB SHARE API

<http://bit.ly/2hrGzQT>
Have web apps communicate with other applications on a device with a standardised syntax.

POLYMER 2.0

www.polymer-project.org
A small library designed to make custom element creation more approachable and accessible.

ELECTRON

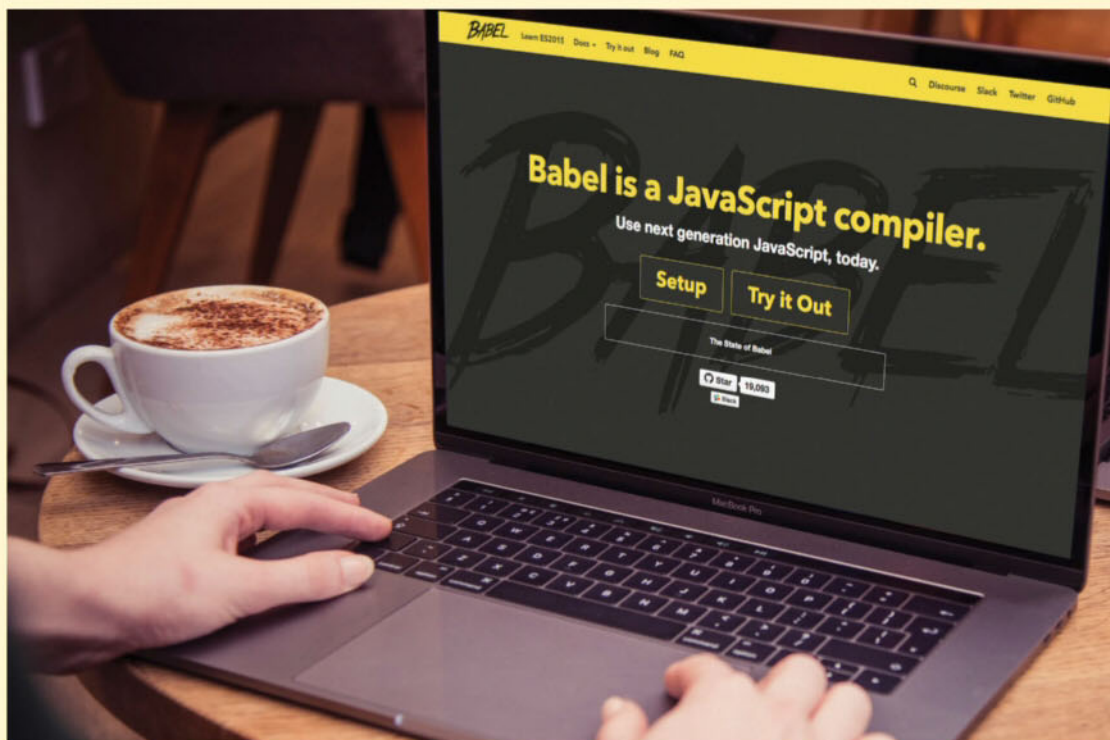
electron.atom.io
Build cross-platform desktop applications using the web technologies you already know.

IONIC

ionicframework.com
Develop native mobile and PWAs while using familiar frameworks like Angular and TypeScript.

PREACT

preactjs.com
A lightweight, 3kB alternative to React featuring almost identical functionality.



3 ES2015 FEATURES YOU CAN USE TODAY Start using these in your next project

ARROW FUNCTIONS

While not the most groundbreaking of additions to the specification, arrow functions allow small functions with few lines to be written more succinctly by using a new 'fat arrow' syntax.

They become ideal for basic callbacks or in applications where a simple transform needs to be done to a value. They also alleviate any difficulty with the value of 'this' as it always mirrors the context it is ran in - there's no more need to use `bind()`, `call()` or `apply()`. They particularly come in handy when used when responding to Promises as they are designed to pass data through.

```
let colours = ["red", "green", "blue"];
let upper = colours.map(c => c.toUpperCase());
```

TEMPLATE LITERALS

A lot of development requires adding values into templates, whether that's a simple personalisation message or a whole section of HTML. Previously you may have been using libraries like Handlebars or Moustache to process this for you, but template literals may work as a native solution.

Templates are held inside back-ticks, and placeholder values are inside curly brackets. Things between those curly brackets get evaluated like JavaScript, which can be anything from a straight variable to the return value of a function. They can be made as simple or complex as necessary.

```
console.log(`Good afternoon,
${ user.getFirstName()
}`);
```

GENERATORS

These are just like regular function definitions, but can be suspended at any point - so when one restarts, it picks up exactly where it left off.

You can define a generator similar to a normal function but with an asterisk. Any time it needs to pause to send out a value, it can 'yield' that value to whatever called it that can then in turn call `next()` to start it back up again.

Generators have multiple use-cases, but would mostly be used for long-running functionality like a data stream.

```
function* myGenerator() {
  let i = 0;
  while(true) {
    yield ++i; }
  let gen = myGenerator();
  gen.next();
```

BROWSER SUPPORT FOR ES2015 Well on our way to full support

A lot has changed in the past year. With ES2015 being the largest standards update to the language in quite some time, 2016 started with only a handful of browsers supporting the simpler aspects such as 'const' or arrow functions. Fast-forward 12 months and much

has changed. The major desktop browsers are well on their way to fully supporting ES2015 in their latest versions, save for a few complex and minor features. The latest version of Node too has almost 100% coverage.

Mobile browser support, however, is still somewhat patchy. Android is

notoriously tricky to update, with the built-in WebView browser missing many key syntax changes. Chrome for Android and Safari in iOS 10, however, both boast near complete support, which bodes well for 2017.

See full browser support at kangax.github.io/compat-table/es6

FUTUREPROOF YOUR CODE WITH BABEL

Build with new standards, convert for older browsers

01. DOWNLOAD DEPENDENCIES

On the command line, initialise a new npm project and install the Babel CLI as a dependency.

02. CREATE A COMPILE SCRIPT

Open up package.json and inside the 'scripts' section, add a 'compile' script for Babel. This passes every file in the src directory to Babel and outputs them to the build directory.

03. SPECIFY PLUG-INS

Babel requires extra plug-ins to do any conversions. For common actions they provides 'presets', which group multiple plug-ins together. Install the 'latest' package and amend the compile script to use it. The 'latest' preset includes plug-ins for ES2015 onwards.

04. THE .BABELRC CONFIG FILE

As a project becomes more complex, adding extra parameters to our Babel command can become unwieldy. A special .babelrc file in the root of our project can express these parameters as JSON.

Remove the `--presets` flag from our compile script and replace it with the following in a newly created .babelrc file.

05. MINIFY THE OUTPUT

It's always a good idea to shrink the amount of data we send to the user. Babel has some options that can remove unnecessary elements like line breaks or comments from the output automatically.

Inside .babelrc, add a couple of settings to remove comments and minify any remaining code.

06. CREATE SOURCE MAPS

Since the output is different to our input, any bugs will show up on different lines to where they were written. Babel provides an option to generate source maps to help. Add the "sourceMaps" option to the .babelrc file. The "inline" value creates the source map at the end of the output file.

SKILLS - WHAT YOU NEED

What are going to be the must-need skills for the coming year and where are the best conferences to sharpen them



In line with the prominent trend of the last few years, I believe that 2017 will continue to place projects involving animation and interactive design techniques at the forefront.

Due to the way technology has progressed, the term 'web design' is no longer a singular skill – the introduction of performant animation and heightened interactivity on the web has opened up a whole world of opportunities. Those that possess skills that bridge the gap between design and development, with an in-depth understanding of interaction design techniques, will be the ones pushing the boundaries in 2017.

Nathan Riley

Design director, Green Chameleon

2017 CALENDAR

Discover the big events and conferences happening in 2017. Get yourself there and learn some new skills

JANUARY

NDC London 2017
ndc-london.com

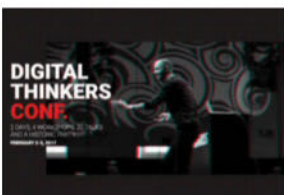
BuzzJS
buzzjs.com



Front
www.frontutah.com

FEBRUARY

Awwwards London
Conference 2017
bit.ly/2eA1c9H



Sustainable UX (16 February)
www.sustainableux.com

Social Media Strategies Summit
bit.ly/2dGgus8

MARCH

Render Conf 2017
2017.render-conf.com



QCon London 2017
qconlondon.com

Mobile+Web DevCon
bit.ly/2hDirGw

APRIL

Smashing Conference
smashingconf.com

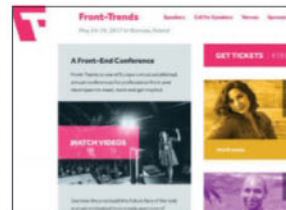
Generate New York 2017
www.generateconf.com

Squares Conference
squaresconference.com



MAY

Front-Trends
2017.front-trends.com



CSSconf EU 2017
2017.cssconf.eu

DEVit Conference
devitconf.org

JUNE

ConvergeSE 2017
converges.com

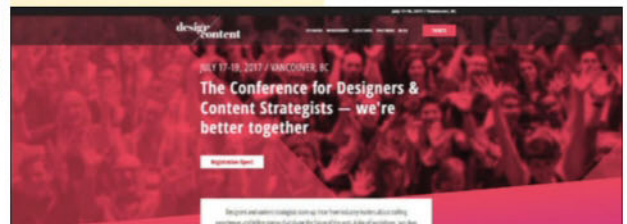


Confab Central 2017
bit.ly/2hFX9KM

O'Reilly Fluent
oreil.ly/2hVOn0e

JULY

Design & Content Conference
designcontentconf.com



An Event Apart Washington DC
bit.ly/2hCtOyP

FullStack 2017
bit.ly/2hWJoXt

AUGUST

UX and Digital Design Week
bit.ly/1oiNLIJ



7 IN-DEMAND SKILLS FOR 2017

We take a closer look at the web design skills, topics and technologies that all of us should be familiar with over the coming year

MOBILE-FIRST RESPONSIVE DESIGN

There is nothing new about responsive web design, but it's true that dotcom brands will continue to prioritise it in 2017. A mobile-first approach actually starts with small screens to work upwards towards a responsive experience on desktop computers and all those in between. Since Google began boosting rankings for mobile-friendly URLs (see search.google.com/search-console/mobile-friendly), the incentive for online business is clear and with no sign of mobile access waning, responsiveness remains a valuable commodity.

GRAPHICAL AND TYPOGRAPHIC DESIGN

Imagery, photography and indeed typography are becoming more and more central to the unique appeal of the best websites. Realising this, clients and designers are more inclined to demand originality over stock assets or the same popular web fonts used by everyone else. Production teams therefore see huge benefit in having graphic artists, illustrators and typeface makers on board, or at least web professionals who can boast the necessary creative instincts.

JQUERY AND JQUERY MOBILE

While some of its current capabilities may eventually find a home in HTML6, jQuery will remain a standard

for cross-browser dynamism. The powerful JavaScript library, now beyond its third revision milestone, will only become more ubiquitous for adding front-end sheen and undoubtedly underpin the next big UI trends. Developers will also want to add jQuery Mobile's touch-optimised framework to the repertoire, extending jQuery and jQuery UI foundations with progressive, responsive enhancements.

INTELLIGENT (PARALLAX) SCROLLING

The art of scroll made a big return this year, going beyond merely a passive 'effect' to become a useful technique for economising screen real estate. Big dotcoms like Apple famously use it beautifully to add subtle energy to product photography, while others add a 3D feel to shifting layers of background images and typography. Expect these techniques to remain staple in 2017, albeit with more thought to how they impact the wider user experience.

GSAP AND ANIMATION ABILITIES

Something we definitely noticed throughout 2016 was a broader use of the GSAP animation framework on commercial projects. This has been triggered by a tangible move to more sophisticated timeline-based UI animations that move page elements beyond the capabilities of CSS3.

Animated content of this kind is largely motivated by a desire for app-like interfaces, greatly impacting user flow and navigation, so skills for designing, coding and synchronising animations will come in handy.

STORAGE AND DATA MANAGEMENT

Beyond user interface design, a big demand within web development would be in the back-end data processing side. The eye-watering amount of data gleaned from users these days is spiralling, making the efficient manipulation of that information and indeed the storage increasingly important. For web services and apps this is an exponential problem, making expertise within this specific field incredibly sought after as time goes on - here for the long term, folks!

AUGMENTED AND VIRTUAL REALITY

OK, so this is very new, old territory and not something set to find a home necessarily in mainstream web design this year. But we know AR and Google Cardboard has a place already, so virtual reality is an exciting area given the range of headset peripherals and development communities hitting both PC and console markets. If you're ahead of the curve and can study the possibilities for web design, then great!

UX Australia 2017
bit.ly/2hsi7zc

Frontend Conference Zurich
frontendconf.ch

SEPTEMBER

EuroIA 2017
euroia.org



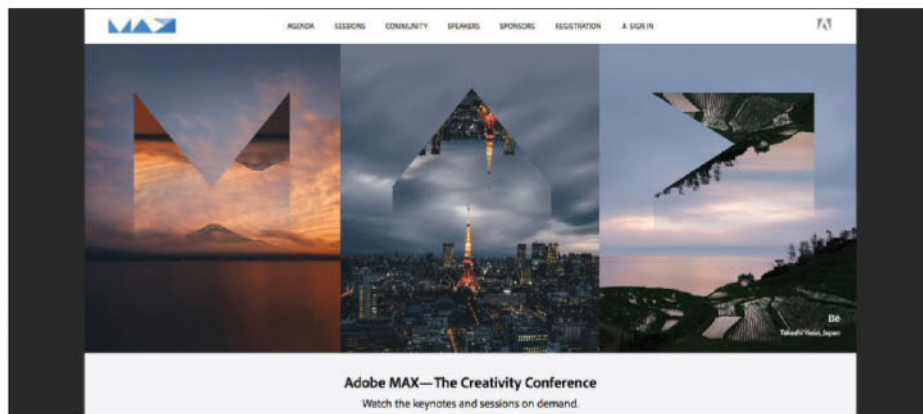
Confab Intensive 2017
bit.ly/2hDIFN6

Nordic.js 2017
nordicjs.com

OCTOBER

Push.conference
push-conference.com/2017

World Usability Congress
bit.ly/1eFbSLT



Adobe MAX 2017
max.adobe.com

NOVEMBER

AngularConnect
angularconnect.com



Confab Higher Ed 2017
bit.ly/2hlmdks

Thunder Plains Developer Conference
thunderplainsconf.com

DECEMBER

Influitive Advocamp 2017
www.advocamp.com



An Event Apart Denver
bit.ly/2gSzie0
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DESIGN JOBS
designjobs.uk

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www.designjobsboard.com

web workshop

Code multiple animated menu effects

As seen on www.jennyjohannesson.com

Last update

It's important the users know how fresh the site content is, and Jenny communicates this by giving the date of the last update so users know it isn't work from five years ago!

Might Morphin'

The main headline starts its life as a numerical preloader that shape-tweens between numbers as it loads, then finally into the main title shown here.

Sliding text

As the site loads, the main text informing users of who Jenny is slides upwards and fades in.

Jenny

I'M A DIGITAL DESIGNER from Sweden living in San Francisco, where I work as a Senior Designer at Vinn. With a background in advertising, my strength lies in website and app design.

If you want to know more about me, my work or if you're a Nigerian prince who wants to offer me a lot of money, feel free to contact me on jennykines@gmail.com.

More content hidden

Other content on the site is hidden below this page and is accessed by clicking on the thin line at the bottom of the screen.

Rollover menu

The square that contains the burger menu is filled in with a gradient that slides up from the bottom as the user rolls over the menu icon. The menu itself has many rollover effects, as shown in the tutorial steps.

Code multiple animated menu effects

↓ **DOWNLOAD TUTORIAL FILES** www.filesilo.co.uk/webdesigner

EXPERT ADVICE

Foreground/background

Often images used on pages interfere with the text content over the top. Notice how faded the image of Jenny is in the background. This helps the image load much faster because the file size will be smaller and aesthetically it helps clearly define the foreground and background with subtlety.



portfolios are a classic way for any web designer to show off their skills, but there can be a tension between the design of the site taking over and detracting from the work you are trying to show. The designer wants their site to show that they are a cutting-edge designer, but without that interfering with their work. In the 'pre-digital' age, most portfolios were carried in satchels and had very plain black panels with the designer's work mounted, allowing it to stand out.

Taking inspiration from a classic portfolio, Jenny Johannesson is a digital designer from Sweden who

currently lives in San Francisco. The site has so many interesting features that show off her design skills that we simply couldn't mention them all. What is impressive is that the site clearly shows technical authority over technologies such as CSS and JavaScript. The design of the site remains quite plain in regards to colour schemes, allowing the work to stand out, but the flourishes that make this site shine happen with animations and rollover effects. In the tutorial, the rollover effects in the menu will be recreated so that there is a sliding background colour to the text and animated background images that fade and scale into place.



<comment>
What our
experts think
of the site

Adding personality to the site

"My portfolio was crafted to show personality with a unique colour palette, bold typography and real smooth animations. Starting off with the morphing preloader, my website takes the user through seamless transitions between well-detailed sections and case pages. It was developed with Aristide Benoist, a freelance creative developer in France."

Jenny Johannesson, senior designer at Ueno in San Francisco

Technique

1. Creating the menu rollover

To create the rollover menu text and image effects in www.jennyjohannesson.com, add the following HTML structure (see FileSilo) to the body of your page. This places a menu link element and an image on the page. These will be styled appropriately in CSS and the effects will all be produced with CSS hover effects.

2. Starting the CSS

Either create a separate CSS file or add style tags to your head section. This CSS imports the font that will be used and then makes the background the correct dark blue colour. The default page margins are just reset to zero.

```
@import url('https://fonts.googleapis.com/
css?family=Abril+Fatface');
html,body {
height: 100%;
background: #0e1422;
margin: 0;}
```

3. Wrapping up

The wrapper is made to hold the image, so it matches the images width and height. The wrapper is centred horizontally. The back id will have the image behind the link, so this is given a transition and made invisible by reducing its opacity to zero.

```
.wrapper {
width: 512px;
height: 512px;
margin: 5em auto;
position: relative;}
#back {
transition: 1s ease all;
opacity: 0;
transform: scale(1.0);}
```

4. The main text

The main text will have an image behind the text using the background clip effect. The image is placed in the centre of the 'wrapper' div vertically and given the correct typeface so that it looks similar to that used in www.jennyjohannesson.com.

```
.clip-text {
font-size: 4em;
font-family: 'Abril Fatface', cursive;
text-align: center;
position: absolute;
top: 50%;
transform: translateY(-50%);
display: block;
width: 512px;}
```

5. Finishing the text

The CSS here continues that from the last step (see FileSilo). The image is placed in the background to cover the div and the text is made transparent so that the background image is clipped and can be seen through it. A transition is applied and it is placed higher on the z index than other elements.

6. Rolling over

Here the rollover effect is applied to the text. The background image is moved and so what happens is a sliding gradient appears behind the text. The image is scaled down and faded in slightly so that it appears behind the text. Save this and view in the browser to see the effect working.

```
.clip-text:hover {
background-position: bottom;}
.clip-text:hover ~ #back {
opacity: 0.3;
transform: scale(0.5);}
```


Create user-animated image carousels

Use turntable.js to animate different shots of the same image through 360-degrees based on the user's movements



Many websites have featured product shots that the user can spin in order to see the product from all sides.

Apple is a famous example of a brand using this effect, as it has used this technique to be able to show off its laptops and phones from all angles. Having the ability for the user to control the rotation enables the user to get a better feel for the product, particularly if you want this product to appear desirable and if you are trying to sell it.

This tutorial focuses on a library called turntable.js which is an extension for jQuery. It gives the ability to quickly set up these carousels of user-controlled images but no click is required, these images automatically start to move as the mouse or finger, on touch devices, moves over the top of them. Not only that but it gives control of the direction of interaction, so the user can move from left to right which makes sense when moving content that way, but they can also move from top to bottom too. On occasion it might be that as the designer you want users to see the rotation without 'rolling over' the image, in this case, attach the movement to the scroll. The good part about this is that the image only starts moving when the image is scrolling in the browser viewport. In this tutorial all of these techniques are going to be explored, you probably wouldn't want all of these on a single page, but it shows off nicely the techniques that you can apply.

1. Start the project

Open the start folder in your code editor and open the 'index.html' file ready for editing. The first stage will be to set up the CSS needed for the project. Here the code is added to the head section of the page and this uses Eric Meyer's CSS reset which ensures all browsers default to the same settings. Following that the link is to the Turntable CSS to style the images.

```
<link rel="stylesheet" type="text/css"
href="
https://cdnjs.cloudflare.com/ajax/libs/
```

```
meyer-reset/2.0/reset.css">
<link rel="stylesheet" type="text/css"
href="css/turntable.min.css">
```

2. Add our own style

Now the links are added to the Slabo typeface that will be used in the project from Google Fonts. Finally in this section there is a link to an empty CSS file, named 'design.css'. This file will contain all the styling necessary for the page as the page is designed.

```
<link href="https://fonts.googleapis.com/
css?family=Slabo+27px" rel="stylesheet">
<link rel="stylesheet" type="text/css"
href="css/design.css">
```

3. Set up the page

The initial content is now being added in the body section of the page. The first part of this is simply to add some site branding to the top of the page and as expected this will be styled with CSS to give this the appropriate look. The alt tag enables accessibility on this image for screen readers.

```
<div class="container">

</div>
```

4. Spin the decks

Now the first turntable spinning image is being added to the page. Repeat the list line with the tag and increment the image number used until you reach city0027.png. These images are cycled through depending where the image is horizontally on the page. It won't work yet as it needs initialising through JavaScript and our own CSS styling here.

```
<div class="header">
<h2>Welcome to the Edge Gain Academy</h2>
<div class="h-wrapper">
<div id="turntable" class="turntable">
```

```
<ul>
<li data-img-src="img/city0000.png"></li>
</ul>
</div>
</div>
</div>
```

5. Switch to CSS

Now open the 'design.css' from the CSS folder in your code editor. Here the body tag is being styled up, this is mostly to ensure the correct font is being used with the right colour and with a slightly increased size and line height to aid readability of the text on the page.

```
body {
margin: 0;
overflow-x: hidden;
font-size: 1.2em;
line-height: 1.6em;
font-family: "HelveticaNeue-Light",
"Helvetica Neue Light", "Helvetica Neue",
Helvetica, Arial, "Lucida Grande", sans-
serif;
font-weight: 300;
color: #555;
}
```

6. Contain the design

The container class is defined here and this will wrap content blocks on the screen to give them a width of 1200 pixels and centre them horizontally on the page. This effect will be used initially for the site branding but

Class vs ID

A simple guide for assigning CSS class is that it can be used over and over again on the page whereas an ID is for a unique one-off element. An ID can only appear once in a HTML page.



Top left

Here the clouds are in the default position in the background behind the turntable carousel image

Top right

Once the keyframes are added the image of the clouds slowly scrolls from right to left and will continue to loop through this subtle background animation

Bottom left

Here the mouse position is on the left of the screen and the image is rotated towards that side of the screen

Bottom right

Now with the mouse positioned over towards the right hand edge of the screen, the image is rotated towards the opposite side of the screen



Tutorials

Create user-animated image carousels

will be used again on other sections of the page later on in the tutorial.

```
.container {  
  margin: 0 auto;  
  width: 1200px;  
  clear: both;  
}
```

7. Head forward

The headings on the page will all use the same typeface, Slabo, which we linked from Google Fonts in Step 1. It will be a slightly larger typeface than default and a slate grey/blue colour is used. There is a 20 pixel padding added below the typeface to lift it from content that follows.

```
h2 {  
  font-size: 2em;  
  font-family: 'Slabo 27px', serif;  
  color: #1f6a91;  
  padding: 0 0 20px 0;  
}
```

8. Add rolling clouds

The header section wraps around the first turntable carousel. This is given a sky background colour and an image of a cloud is added. The image is going to be animated using the cloudroll keyframes in the next step. This is set to move across the screen in a linear timing of 40 seconds, while repeating.

```
.header {  
  width: 100%;  
  background: #bbffff;  
  position: relative;  
  background-image: url(../img/cloud2.png);
```

```
background-position: 0px 0px;  
background-repeat: repeat-x;  
animation: cloudroll 40s linear infinite;  
}
```

9. Animate the clouds

The clouds are animated using the two keyframes defined here in the cloudroll. The background image position simply starts at a position 0 from the top and left and animates to -1600 pixels off the left of the screen. The background image is 1600 pixels wide, so this gives the continuous movement.

```
@keyframes cloudroll {  
  from {  
    background-position: 0 0;  
  }  
  to {  
    background-position: -1600px 0;  
  }  
}
```

10. Increase the header

The heading that will sit above the first turntable carousel needs to be slightly larger than the rest. Here the code for that targets the h2 tag inside the header class. This just gives it a little extra space above it with a padding and increases the font size.

```
.header h2 {  
  padding-top: 30px;  
  text-align: center;  
  font-size: 2.5em;  
  letter-spacing: -0.05em;  
}
```

11. Centre the turntable

The purpose of the next CSS code is simply to horizontally centre the first turntable so that it is centred on the sky blue background with the cloud animation behind it. A little extra padding is added to it and the z-index is also increased, and this is to ensure that it remains in front of the cloud.

```
.h-wrapper {  
  position: relative;  
  padding: 100px 0 50px 0;  
  width: 1400px;  
  margin: 0 auto;  
  z-index: 200;  
}
```

12. Add the functionality

Save the design.css file now and move back to index.html. At the bottom of the document before the closing body tag add the link to jQuery, which is required in order to enable the turntable library to work. This is linked to an online content delivery network, but the turntable library is locally linked.

```
<script src="https://code.jquery.com/  
jquery-2.2.2.min.js"></script>  
<script src="js/turntable.min.js"></script>
```

13. Enable the turntable

Below the library open the following script tags and here the page content with the ID of turntable is enabled to work. It will rotate through the images as the user moves their mouse left and right. Save this page now and preview it in the browser to see it working and to see the clouds animating behind the image.

```
<script>  
$( '#turntable' ).turntable({  
  axis: 'x'  
});  
</script>
```

14. Create a different turntable

Now below your previous content in the body, add this, which will create another turntable element. This time it will be controlled by scrolling. For the list element, repeat the line, increasing the image numbers until you get to eg0015.png, as this adds all images to the turntable.

```
<div class="container spaced">  
  <div id="turntable2" class="turntable
```

Individual turntables

The different images are given unique IDs so that each one of the rotating images can be given their own unique controls and behaviour.



Top left

The next carousel image is controlled by the scrolling of the page so as the user scrolls down this image rotates around on the screen

Top right

With further content added to the screen the carousel of the logo spins around further because there is more screen to scroll down to

Right

The final turntable image works with the user movement from top to bottom on the page and it moves the image up and down depending on where the user's mouse or touch is





Creative use of images

The library turntable.js library gets its name from the way that photographers put objects to be photographed on turntables and move that turntable in increments in order to be able to see the content from all sides. This is traditionally used to show off products such as computers and phones or any well designed product, but with some imagination this can be a creative way to bring content to any site.

In the example here, the content hasn't come from photographs but from images rendered out from Cinema 4D a popular 3D app. This enables the designer to think of ways in which photography or artistic ideas can be combined and rotated through giving unique ways to design for the web.

```
imgLeft">
<ul>
<li data-img-src="img/eg0000.png"></li>
</ul>
</div>
```

15. Input text information

Now over to the right of the last turntable, the text will be added. These two areas will be floated left and thus they will sit side by side in the design, with the turntable to the left and the text located over to the right. Feel free to add more descriptive text here as in the final version in the project folder.

```
<div class="pullLeft">
<h2>Give your career the Edge</h2>
<p>Descriptive text here</p>
</div>
</div>
```

16. Style this content

Move back to the design.css file now and continue adding the CSS. The spaced class is used to space content vertically on the screen by adding 100 pixels padding to any object that contains this. The pullLeft floats any text content to the left. This will be reused for more content shortly.

```
.spaced {
padding: 100px 0 0 0;
}
.pullLeft
{
float: left;
width: 540px;
padding: 200px 30px 0 30px;
}
```

17. Float image left

The turntable image is floated to the left also and this ensures that both text and image sit side by side and can be switched if necessary. Here the footer styling is also added just so that the design.css file is finished with. Save this file now and return to the HTML.

```
.imgLeft {
float: left;
width: 600px;
}
footer {
clear: both;
padding: 20px 0;
background: #bbffff;
text-align: center;
}
```

18. Scrolling movement

In the script tag at the bottom of the index.html file add the code for this step. This targets the div with the id turntable2 and makes this move as the page scrolls. Save the page and open it in your browser to see this content area below the initial header image. Notice as you scroll that it rotates through the images.

```
$('#turntable2').turntable({
axis: 'scroll'
});
```

19. Add another content section

Here another content section is being added to the body of the page. The container class is added to centre the content horizontally and a text section is added using all the same classes as we have used previously. The text can have more descriptive text added in here.

```
<div class="container">
```

```
<div class="pullLeft">
<h2>Take control of your learning</h2>
<p>Descriptive text here</p>
</div>
```

20. Final turntable

Here the last turntable and footer is added. As before copy and paste the list element increasing the image number until you reach comp0014.png. The container class is reused again for the footer and this is included just to finish the page off on the screen.

```
<div id="turntable3" class="turntable
imgLeft">
<ul>
<li data-img-src="img/comp0000.png"></li>
</ul>
</div>
<footer>
<div class="container">
<p>&copy; 2017 Your copyright message</p>
</div>
</footer>
```

21. Final functionality

Now add the last code to the script tag. This targets the last turntable and makes this respond the user's mouse on the y axis. Save the page and open in the browser to see all the examples working on the page. This last example will work when the user moves their mouse up or down.

```
$('#turntable3').turntable({
axis: 'y'
});
```


Get started with the Pug template engine

Learn how to use Pug (previously known as Jade) and Bootstrap to build webpages faster and more efficiently.





ver the past 20 years the internet has dramatically changed. We went from very basic and fully static websites to advanced web-based apps, with beautiful designs and intuitive UI.

HTML has been the foundation for the web since day one, even though it went through multiple revisions, the basic structure remains the same. However, with the emergence of CSS preprocessors that makes our CSS more readable and manageable, HTML has also been given much-needed attention on this issue. Let's face it, HTML can be very messy and ugly. Do we really need to see all those opening and closing tags with those less than and greater than symbols? If there were a way we could make our HTML cleaner and more readable, would you be interested? Well step forward Jade (now called Pug due to naming issues). Note that the name has changed to Pug but code references can be still jade. Throughout this tutorial Pug is still referred to as Jade to avoid confusion. Beyond just being a tool for isolating your view markup from the rest of your application, Jade (a modified version of Haml) aims to allow for more rapid development by reducing the tedious nature of writing HTML-compliant markup. It automatically generates compliant markup based on a nested hierarchy of tag names that are extremely easy to understand and very minimal in nature. Using something like this in conjunction with a CSS engine like Sass will revolutionise the way you write your front-end code. So in this tutorial we will be building a simple webpage using both Bootstrap and Jade. Are you ready? Then let's learn Jade!

1. Get set up

Before we begin writing Jade we need to set up a way we can see our Jade convert into normal HTML. There's a few ways to do this, but we will use a really handy online tool called html2jade.org. This online convertor is used to convert HTML to Jade, but we will use it to convert the other way, which is Jade to HTML.

2. Take a look at Jade

So once in HTML2jade, delete all the default Jade code (located on the right) but leave the top two lines, which will be the doctype and language attribute. Then take a look at the HTML and you'll see how minimal and readable the Jade code is compared to the HTML.

```
doctype html
html(lang='en')
```

3. Indentation

Jade uses indentation to determine nesting. So under the HTML tag we need to add in the head tag and you'll notice how this is indented by one space for it to be nested within the HTML tag. This indentation may take some getting used to at first though, but it makes Jade nice and readable.

```
doctype html
html(lang='en')
  head
```

4. Understand multiline text

Over the next few steps we will take a look at Jade in slow and simple steps before building our full webpage. One of the things we can look at it how to add multiple lines of text. To do this we can add in the pipe symbol on a paragraph tag.

```
p
  | This is a multiline text
  | so we can break up a text block
  | for readability
```

5. Add inline tags

Now that we understand about adding a multiline paragraph, we can take advantage of the way the pipe symbol splits up your text by adding in an inline tag such as the `<strong>` tag as we've shown. This will make the words 'text block' bold.

```
p
  | This is a multiline text
```

```
| so we can break up a
strong text block
| for readability
```

6. Add class names

In this step you're going to learn how to add class names with Jade. The first line shows how to add a class name to a line of text within a div tag. But if it's a div you need, then you can actually leave that off and just begin with the class name and its content, as shown with the bottom line.

```
div.my-class This is some text
.my-class This is another line of text
```

7. Parent and child elements

What if we wanted to nest a few classes within an ID tag. Well that's easy enough and really gives you a better idea of how indentation is used in Jade. So to practise this we will add a parent ID called wrapper and add in a class called row as its child, which also contains some text.

```
#wrapper
  .row
    p Some text with the row class
```

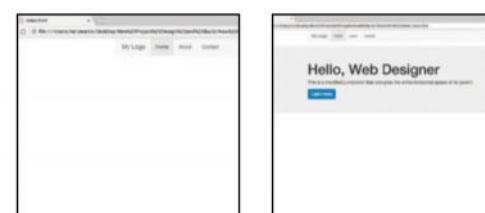
8. Classes and ID chaining

Chaining classes and ID's is also possible with Jade. So what if you needed a couple of classes that are nested within an ID? You can chain them together starting with the ID name, but no matter where in the chain the ID is, it will always output at the beginning as the parent and you can only include the one ID.

```
.container.col-lg-12#top-section
```

Indentation

Indentation is very important when using Jade. So remember to check and compile as you write, otherwise your nesting will become very messy.



Left

The html2jade online application is a great way of getting started using Jade

Top left

Bootstrap's default navigation has now been added so we can take full advantage of the default styling

Top right

The jumbotron is a Bootstrap component used as a hero unit that can display an image or other content

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9. Add attributes

Adding attributes such as an anchor tag is nice and easy with Jade. If we had a line of text that needed to be a link, we need to first add the anchor tag, then open and closing parenthesis and then the href attribute inside that with our required link wrapped in quotes.

```
a( href="index.html" ) this is a link
```

10. Basic bootstrap template

Now that we know quite a bit about Jade, we can begin by creating a basic webpage with Bootstrap. So still using html2jade.org, clear everything out and begin by adding in the doctype in the Jade section. Our doctype will also include all the necessary meta information too.

```
doctype html
head
  meta(charset='UTF-8')
  meta(http-equiv='X-UA-Compatible',
    content='IE=Edge')
  meta(name='viewport', content='width=device-
    width, initial-scale=1, maximum-scale=1')
```

11. Add page title and body

Underneath the last meta tag we can add in the page title and body tags. Remember we need to make sure the body tag is indented by one space (tab) and that there's a space in-between the title tag and title text, otherwise they will wrap together.

```
  title Basic Bootstrap Template
  body
```

12. Include the CSS

In-between the title and body tags, we can include the links to our CSS. We can also include comments using

the // symbols instead of the normal HTML comments. So create a new CSS file called 'custom.css' and then head over to the Bootstrap CDN and add that underneath our custom CSS link.

```
// Include custom CSS
link(rel='stylesheet', type='text/css',
  href='css/custom.css')
// Bootstrap: Latest compiled and minified CSS
link(rel='stylesheet', href='https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.css')
```

13. Use Bootstrap navigation

Adding the navigation will be the next step. We will use the default Bootstrap navigation menu so we can take advantage of all the things Bootstrap has to offer with regards to it being mobile responsive.

```
// Main content wrapper
.container
  nav.navbar.navbar-default(role='navigation')
  .navbar-header
    button.navbar-toggle.
      collapsed(type='button', data-
        toggle='collapse', data-target='#navbar-
        inverse', aria-expanded='false', aria-
        controls='navbar')
    span.sr-only Toggle navigation
    span.icon-bar
    span.icon-bar
    span.icon-bar
    a.navbar-brand(href='#') My Logo
```

14. Add the menu buttons

To finish up our navigation menu we can add in our menu buttons which are added straight underneath the logo. We will use the inverse menu style, which is a light grey and then create an unordered list as normal.

```
a.navbar-brand(href='#') My Logo
// Add in the menu buttons
#navbar-inverse.collapse.navbar-collapse
```

```
ul.nav.navbar-nav
  li.active
    a(href='#') Home
  li
    a(href='#about') About
  li
    a(href='#contact') Contact
```

15. Utilise jumbotron

Bootstrap comes with a component called jumbotron. This is a simple hero unit, that's good for calling extra attention to a featured piece of content or information. So place the jumbotron Jade code directly under the nav menu but making sure the jumbotron class is inline with the main container wrapper (see Step 13)

```
.jumbotron.jumbotron-fluid
  .container
    h1.display-3 Hello, Web Designer
    p.lead
      | This is a modified jumbotron that
      | occupies
      | the entire horizontal space of its
      | parent.
    p
      a.btn.btn-primary.btn-lg(href='#',
        role='button') Learn more
  // END Jumbotron
```

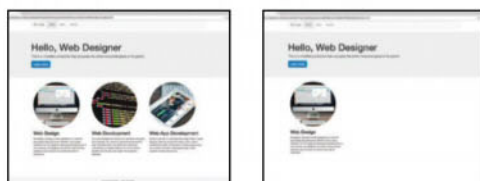
16. Input services sections

Underneath our jumbotron we can add in one of three services that our fictional web design agency has to offer. The first service to mention is on web design. We created an image that is 300x300 pixels and included that within a class called col-sm-4. We then added some content, and used the pipe symbol to help with readability.

```
// END Jumbotron
// Services Section
.row
  .container
    .col-sm-4
      img.img-circle.img-responsive.img-
```

Line spacing

One of the advantages of using Jade is its readability. So to make this more apparent, make sure you use plenty of line spacing.



Top left

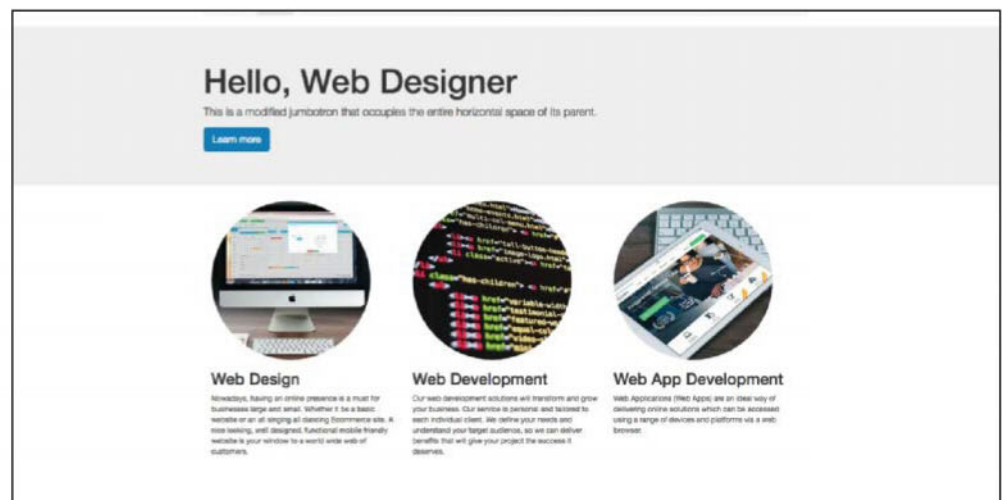
The first service image and its content has now been added. And using the pipe symbol allows us to keep the text readable

Top right

The services section has now been completed with another two images added to our Jade document

Right

With the footer now added, our basic Bootstrap webpage is now finally complete. It's responsive and the HTML is still nice and clean





Templating with Jade

As mentioned in the tutorial, Jade is a templating language at its core. In other words we can separate any of our content into reusable templates that allows us to create our own boilerplates using the .jade file extension. If you've used PHP at any level, then this should make sense to you, as the way we pull in our templates is by using the include keyword.

include maincontent

In this example maincontent is an external file called maincontent.jade that has whatever content you would like to be included in Jade format that is pulled into your index.jade file.

Even though this is a nice flexible and powerful way of working with Jade, there is an even more powerful way of using templating. Instead of index.jade being a file we

pull bits of content into, we can use the index.jade as a base file to pull all of our content into, and we do this by using the keyword extends and then the template name.

extends layout

By putting this keyword at the very top of the index.jade file, it allows a template to extend a layout or parent template. This can then override certain predefined blocks of content such as the page title.

```
// index.jade
extends layout
block title
title New Title
// layout.jade
doctype html
html
head
block title
title Default title
body
```

```
center(src='imgs/01.jpg', alt='')
h2 Web Design
p
| Nowadays, having an online presence is a
| must for businesses large and small.
| Whether it be a basic website or an all
| singing
| all dancing Ecommerce site. A nice
| looking, well
| designed, functional mobile friendly
| website is
| your window to a world wide web of
| customers.
// END Web Design Service
```

17. Finish up the services section

Now that we have added the first services, which will be a round image with some information underneath, we can include the last two. Again taking advantage of the pipe symbol, we can make the text clean and readable without affecting the HTML.

```
.col-sm-4
img.img-circle.img-responsive.img-
center(src='imgs/02.jpg', alt='')
h2 Web Development
p
| Our web development solutions will
| transform and
| grow your business. Our service is
| personal and
```

```
| tailored to each individual client.
.col-sm-4
img.img-circle.img-responsive.img-
center(src='imgs/03.jpg', alt='')
h2 Web App Development
p
| Web Applications (Web Apps) are an ideal
| way
| of delivering online solutions which can
| be
| accessed using devices and platforms
| via a web browser.
// END Web Design Service
```

18. Add the footer

To finish up our basic webpage, we will need to add in the footer, and this should be pretty straightforward for you now. Again Bootstrap does a great job of styling our footer and we will use a class called text-muted to give the text a grey colour.

```
// END Web Design Service
// Footer
footer.footer
.container
p.text-muted © Copyright 2016 - Jade
Template
```

19. Add scripts

The very last thing we need to do is to add in the scripts to the bottom of our page, just above the body tag.

Bootstrap relies on jQuery so we need to add the jQuery CDN link first and then the Bootstrap JS CDN link.

```
// jQuery: Latest compiled and minified
script(src='https://code.jquery.com/
jquery-3.1.1.min.js')
// Bootstrap: Latest compiled and minified
JavaScript
script(src='https://maxcdn.bootstrapcdn.com/
bootstrap/3.3.7/js/bootstrap.min.js')
```

20. Create Jade templates

As mentioned in the title to this tutorial, Jade is a templating language. That means we can take any of the code that we've written and turn it into our own boilerplate system. To do this we need to create a separate file which we can call 'main-content.jade' and then populate that with content. Then wherever you want that content to appear, you can use the include keyword as shown.

```
h2 Web App Development
include main-content
```

21. Use Prepros and Codepen

Throughout this tutorial we used an online application called html2jade. However you can also make use of other apps such as Codepen or Prepros. Codepen is much easier to get started with, but if you really want to take Jade seriously then we would highly recommend using Prepros (prepros.io).

web workshop

Create a dynamic background effect

As seen on toyfight.co

Move down

The background image moves down when the user's mouse pointer moves towards the top of the screen.

Move to the left

The page background image moves to the right when the user's mouse pointer moves to the left of the screen.

Foreground content

The main page content is placed in a separate container unaffected by the JavaScript. This gives the illusion of it hovering over the background.

Upward movement

The background moves up when the user moves the pointer towards the bottom of the screen.

Move to the right

The background image will move to the left when the user's mouse pointer moves to the right of the screen.

Create a dynamic background effect

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EXPERT ADVICE

Making a useful effect

Instead of using this effect primarily to enhance your website design, why not use it as a feature that offers the ability to interactively preview useful imagery in the background? This would be perfect for a website providing tourism information or hotel room bookings.



Webpage backgrounds are often kept untouched when it comes to the majority of designs for websites. It's not always a good idea to obstruct

webpage content with a visual background, but there are always some exceptions to the rule. In this tutorial, we look at how webpage backgrounds can be made to interact with mouse cursor movement. This may sound like a fancy but useless effect to begin with, but there are situations where this can be a useful feature. One example would be for websites involved with leisure and tourism that are required to generate interest from

potential tourists. The effect could be used with webpages that allow visitors to interactively view the location described in the foreground content. Similarly, hotels can use the effect to allow their website visitors to see highly detailed previews of each room in a way that doesn't require additional content space. The use of a content container background is important with this effect so that the webpage content doesn't become obstructed by the background movement. This example uses a semi-transparent background colour, but you could opt to go for something more fully visible. You can also limit the effect to a specific segment of the page.



<comment>
What our experts think of the site

Target selection

"The target element for the moving background is defined by the document query selector in the JavaScript. This example looks for the main container, but you could easily replace this with another CSS reference rule to apply the effect elsewhere on your page – such as a header section or content banner."

Leon Brown, web developer and e-learning content creator at Nextpoint

Technique

1. Initiate the document

The first step is to define the HTML document framework, which consists of the head and body section. The head section is used to contain the document title and links to the external resources – in other words the JavaScript and CSS. The body will contain the visible content elements.

2. Add main article content

The visible content is placed inside the main container, allowing for the page article and other design features to be placed. In this example, we just have the article content defined as and in an article container.

3. JavaScript Listener

Create a document called 'background.js'. Importantly, we must wait until the page has fully loaded before applying the JavaScript – hence the event listener on the window. Inside this, we use the document query selector to search for the main container, in which we apply a listener for mouse movement over it. When this happens, the background position is calculated and applied to the main container in the style attribute.

```
window.addEventListener("load", function(){
  document.querySelector("main").
  addEventListener("mousemove", function(e){
    var x = (e.clientX/this.clientWidth)*100;
    var y = (e.clientY/this.clientHeight)*100;
    this.style.backgroundColor = x+"% "+y+"%";
  });
});
```

4. Initiate the CSS

With the JavaScript and HTML now in place, create another document called 'styles.css'. This step defines the default HTML and body containers to cover the full

visibility of the screen without border spacing. A default font and background is also set.

```
html,body{
  display: block;
  width: 100%;
  height: 100%;
  margin: 0;
  padding: 0;
  font-family: Helvetica, sans-serif;
  background: rgb(21, 34, 47); }
```

5. Get a background

Main is used as a container for the page content. This is to be set to cover the previously defined space set for the HTML and body containers. This main container must have a background image set at co-ordinates 0,0. The background position is altered through interactions handled by the JavaScript listener.

```
main{
  display: block;
  width: 100%;
  height: 100%;
  background: url('img/background.jpg') #000
  no-repeat 0 0;
  overflow: hidden; }
```

6. Set the article to foreground

With everything in place for the moving background, the final step is to set the content article to be visible in the foreground. We set the width, height and colours in this step. A semi-transparent white background is set to make sure the content stands out.

```
article{
  width: 50%;
  height: 100%;
  background: rgba(255,255,255,.5);
  color: black;
  margin: 0 auto 0 auto; }
```




CUSTOMISE WordPress

Twenty top tips to help you customise your WordPress
frontend and backend

01: WordPress Theme Customiser

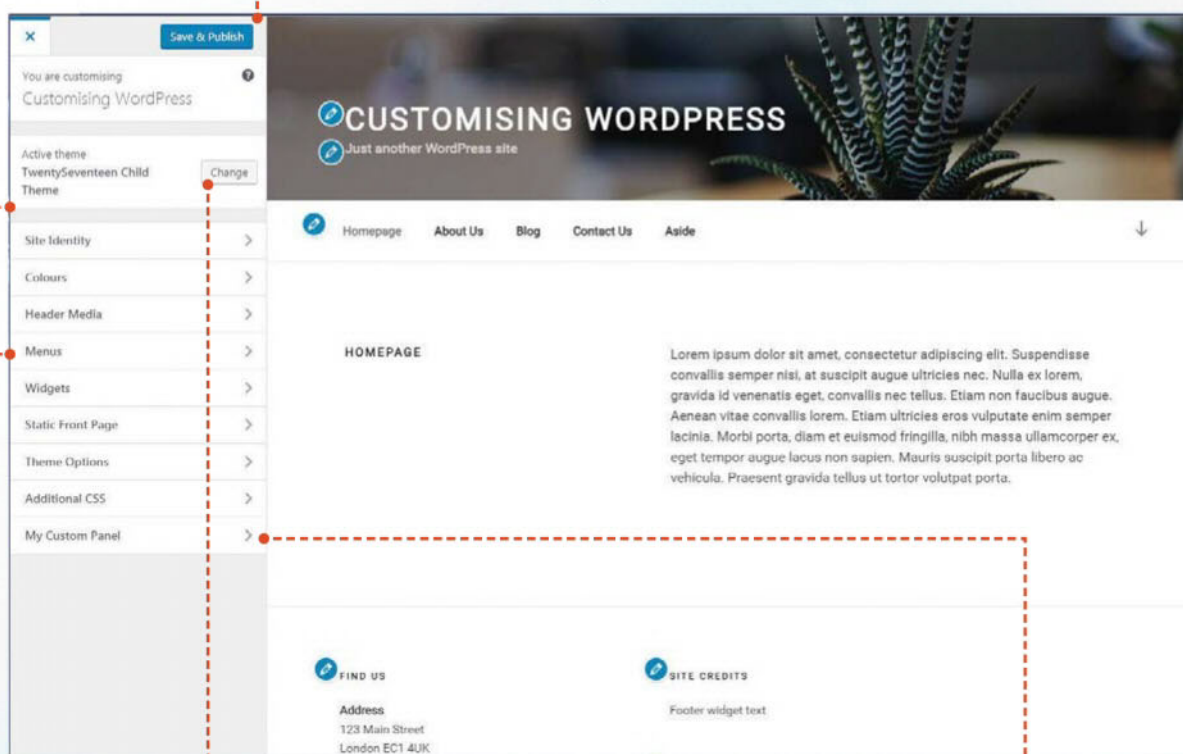
The built-in Customiser is one of the most powerful tools to personalise WordPress for developers and end users alike

Open the Customiser

The Customiser can be opened from the admin panel under Appearance > Customise, or via the admin bar Customise link at the top when viewing your site. Any changes you make won't go live until you save.

Customise the options and save

Alter the options under each panel to customise your WordPress site and watch as the live preview updates instantly with your changes. Don't forget to save once you're done! Alternatively, closing the previewer discards your changes.



Select the panel

Most themes will have a few constant panels like Site Identity, Static Front Page and Additional CSS, but the rest will depend on your chosen theme. In each panel will be a group of sections with settings and control options.

Change the theme

You can swap between installed themes direct from the Customiser and preview the look before making a decision. To install a new theme, add it via the admin panel in the Appearance > Themes menu or upload it manually to your themes folder.

Add your own panels and more

Theme developers can add their own panels to the theme customiser by hooking into the WordPress Customizer API, remove default panels such as Additional CSS, or expand Customiser access to other non-administrator roles by editing the functions.php file.

02: Child themes

Create a child theme so you can alter your parent theme without the danger of overwriting your changes later when the parent theme is updated

A child theme uses all the files of the original parent theme except the ones which you duplicate into the child theme's folder. WordPress identifies a theme as a child theme when you start your style.css off similarly to this:

```
/*
```

```
Theme Name: TwentySeventeen Child Theme
Description: A Child Theme for
TwentySeventeen
```

Author: Sarah Maynard

Author URI: <http://www.sarahmaynard.net/>

Template: twentyseventeen

Version: 1.0.0

```
*/
```

Change 'Template' to the folder name of an installed theme and WordPress will automatically use this as the parent for your child theme. Don't forget: add a functions.php file to the child theme;

anything you add here will be registered after the parent functions, so you'll have to unregister any unwanted inherited functions.

To expand on the parent theme's CSS, import it into your child theme style.css or enqueue it in the functions.php file.

For an uncluttered child theme, only copy files from the parent theme that you'll be editing - the others will be served from the parent theme directly.

03: Page templates

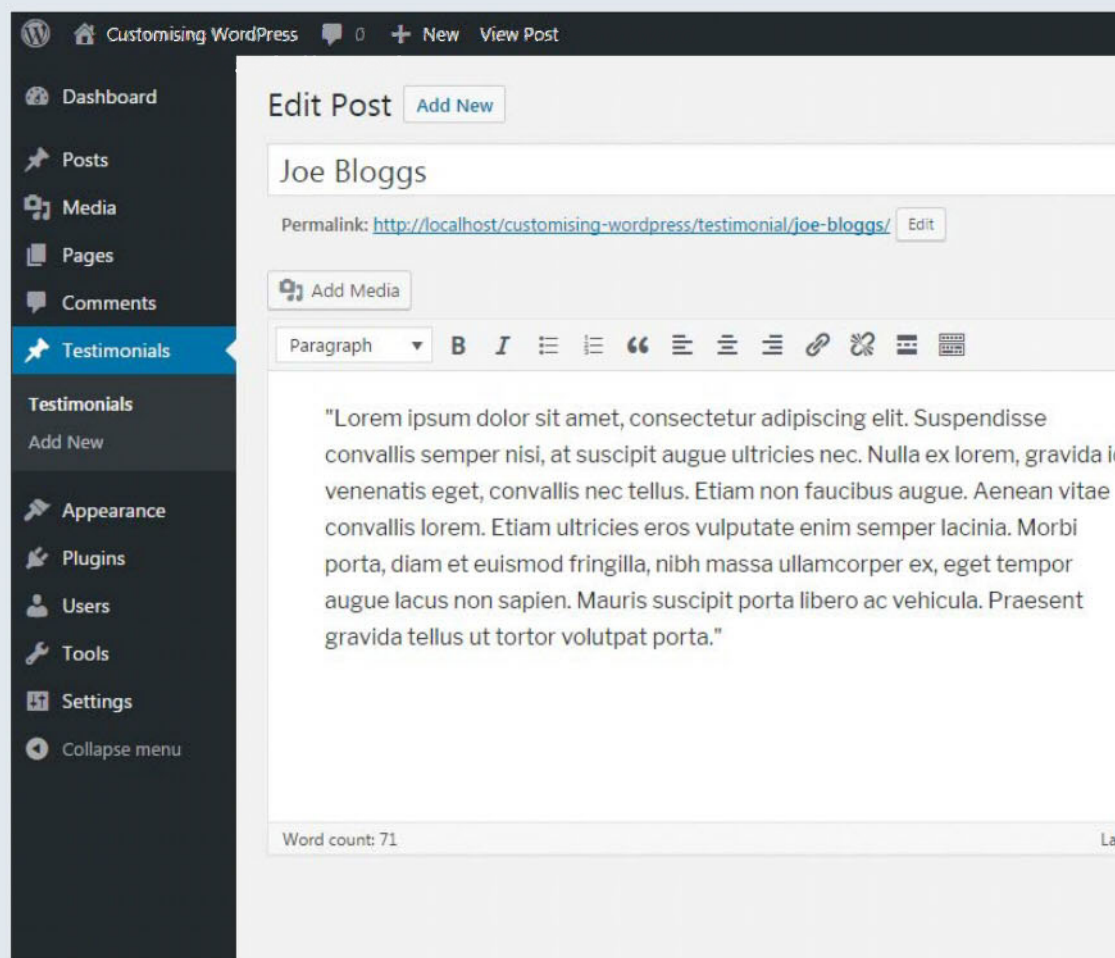
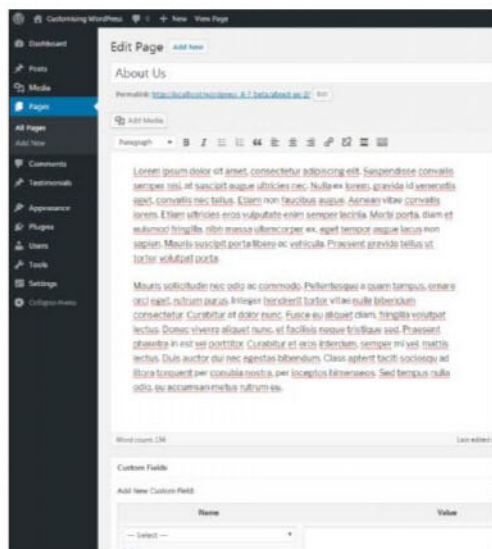
Using page templates, you can predefine the layout of a page

Developers create page templates to display content differently between pages; eg the homepage, a portfolio or the about page. Different templates can change columns, sidebars, menus, styles and more. Using `index.php` or `page.php` as a template, edit and save as `page_{templatename}.php`, changing the opening line to name your template for the front end:

```
<?php /* Template Name: Example Template */
?>
```

The template will then be available in the template dropdown when you create or edit a page. Edit your template file in your theme as you wish in order to lay out your page. Every page you set with this template will use the same layout. You can make as many templates as you like; saving them inside a theme subfolder called `page-templates` will make for a more organised theme.

Naming a page template `page-{templatename}.php` with a hyphen instead of an underscore will make a template specifically for one page; for example, `page-home.php` will apply automatically to a page named 'Home'. By default, WordPress will use a custom template if it is set in the editor, then continue down the hierarchy of `page-{slug}.php`, `page-{id}.php`, `page.php`, `index.php` if no template is found matching each case.



04: Custom post types

Use a custom post type when you have content that is semantically different to the rest, beyond using categories and tags to separate it

Custom post types are a powerful function to utilise when customising your WordPress. Normal posts and pages are 'post types' that can be manipulated in a number of ways to display and organise your content, but a 'custom post type' is something you can define that gives you a level of segregation and customisation that's useful for both developer and user. They can be used for a wide range of items including but not limited to testimonials, products, glossaries, FAQs, etc. They are usually items that are

granulated in nature but aren't necessarily in chronological order like blog posts.

For example, testimonials are typically the same in their layout, with a name and a quote. To display a random testimonial in the sidebar on every page load, you could create it as a normal post, assign it a category and then use `WP_Query()` to pick out a random post from that category and display it. However a user might not find 'Posts' to be the natural place to go to add a new testimonial and

06: Use default WordPress options

Change titles, subtitles, permalinks, homepage setup, comment options, image sizes and more under Admin>Settings. Other themes may expand the number of options you can change. Using the options in the Admin Panel will reduce the amount of theme-editing you have to do, and make it easier to change later.

07: Avoid editing installed themes directly

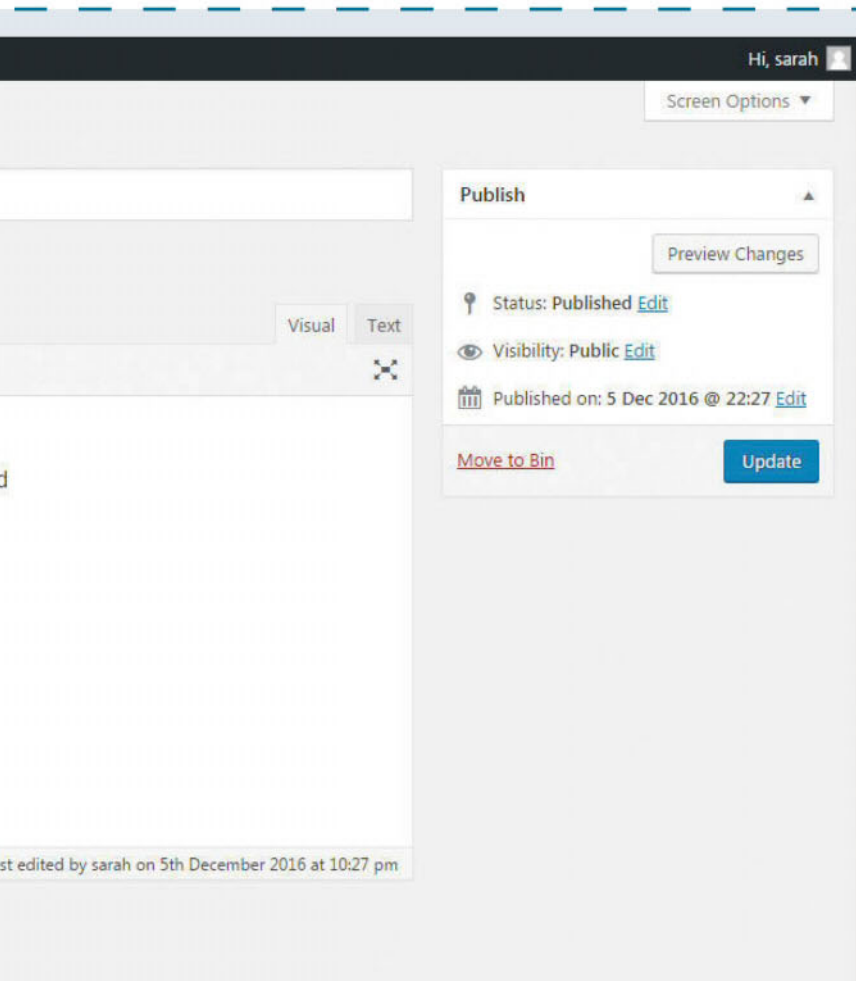
Editing a parent theme, especially a pre-bought one, can lead to disaster when the theme later updates. An update will replace all the files in a theme folder and overwrite any changes you have made. Avoid this by creating a child theme and editing there instead (see tip #2).

08: Use widgets to add sidebar and footer content

Rather than writing content into the sidebars and footer directly, use widgets to save the content to the database, and sidebars to group and display the widgets in the theme. Register new sidebars in `functions.php`, call them in your template, and add widgets via the admin panel.

09: Test your theme on all device sizes

With mobile compatibility being more important than ever, testing your site across different device sizes is crucial. The WP Customiser can test your theme across three major viewports - mobile, tablet and desktop - which will give you a good overview, but nothing beats testing on the actual devices themselves.



would have to remember to categorise it correctly, opening up the administration process to troubleshooting problems. Using a custom post type instead would partition all the testimonials into their own section, and give you as a developer an easier time extracting the data again later. In its simplest form, a custom post type is much like a normal post. Using the following code in a custom plugin or in your `functions.php` will create a new menu item for your custom post type and assign it a name:

```
<?php
function testimonials_posttype_init()
{
$args = array(
```

```
'public' => true,  
'label' => 'Testimonials'  
);  
register_post_type( 'testimonial', $args  
);  
}  
add_action( 'init', 'testimonials_posttype_  
init' );  
?>
```

WordPress needs no more than that to start utilising a custom post type to store data for developers to extract later, but there are many more ways to customise this feature using the `register_post_type()` \$args.

QUICK TIPS

01. Setting the \$args for register_post_type()

register_post_type()
Change the behaviour of your custom post types; choose their labels, whether they are public or private, if they have an admin UI and more.

02. Extract data using WP_Query()

Start a new loop in your templates by using `WP_Query()` and filter by `post_type` to get your new data to display on the front-end.

03. Create a plugin

33. Create a plugin
To persist between themes, you should initiate your custom post type using a plugin rather than add them to the functions.php.

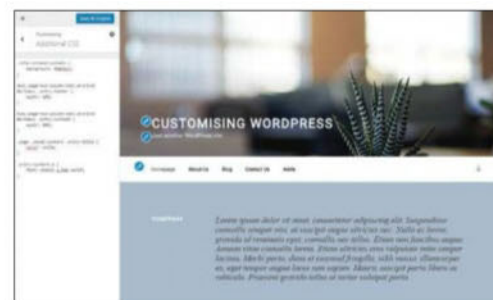
05: Custom CSS

Personalise your theme with bespoke CSS

Changing your theme's CSS is a sure-fire way to make your WordPress site unique. The Customiser will allow you to edit items that the theme developer has specified, but for everything else you can add rules to your child theme's `style.css`.

As of WordPress 4.7, the Customiser now includes an 'Additional CSS' panel by default (some theme developers may remove it depending on their preference). Adding CSS here will add in your custom rules in the header after the enqueued stylesheets. For quick changes or just to test new styles on the go, you can add CSS here.

Use your browser's developer tools to see what rules are already being applied to an element and make sure your declarations match up to overwrite them. Test all your pages after making a change; a CSS class might be used in multiple instances and a change could cascade unexpectedly.



In most themes, every page has a unique class in the body element allowing you to target styles on single pages or on particular templates.

Update the TinyMCE editor styles to match by initialising `add_editor_styles()` in your `functions.php`, and create a new stylesheet in your theme.

functions.php

```
function custom_tinymce_styles () {
    add_editor_style( 'custom-editor-style.css' );
}
add_action( 'admin_init', 'custom_tinymce_
styles');
```

custom-editor-style.css

```
body#tinymce.wp-editor a {
color: #FF0000;
}
```

10: Be mindful of accessibility

Some of your users may have visual or motor impairments that make navigating a website trickier. Look out for the #accessibility-ready tag when searching for themes; these are officially WP-audited to meet standard accessibility criteria that ensure your content is better formatted for disabled users' browsing technology.

11: Use post formats

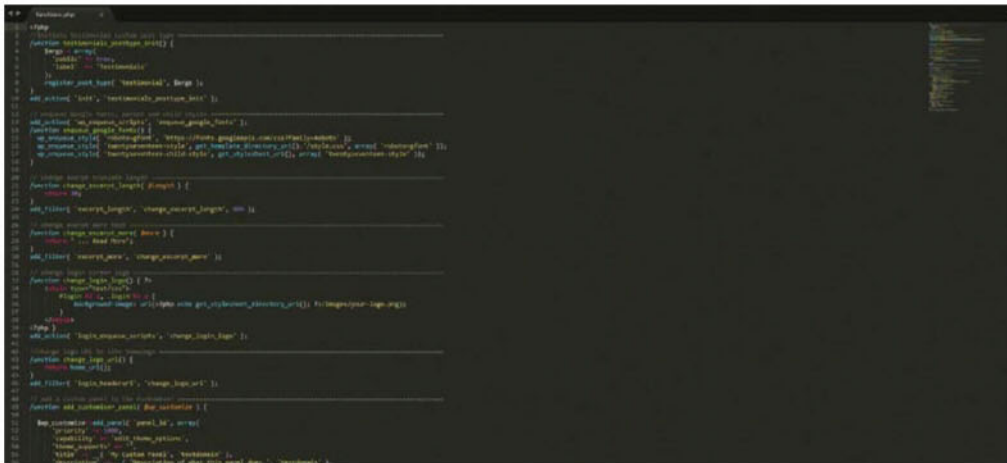
On the post editing page in supported WordPress themes, you will find a selection of 'Post Format' options that display your published posts in different ways. For instance, if your blog features a collection of quotes, articles and videos, you could use formats to accentuate the different content types in your feed.

12: Use the additional menu options

On the menu settings page in the top right, use the 'Screen Options' dropdown to turn on additional menu options such as CSS class and description. You can hook into this Metadata in your theme and use it to customise your menus without needing to hard-code any content into them - a very useful feature.

13: Add custom Metadata to pages and posts

Custom fields add extra Metadata to your posts and pages that can be used in or outside of the loop. Eg you could use Metadata to display mood, rankings, current location and more. A plugin such as Advanced Custom Fields utilises custom fields and adds even more powerful functionality.



14: Use hooks – actions and filters

Hooks and filters allow you to tweak WordPress core functions and powerfully alter how your content is displayed

Hooks – actions and filters – offer diverse ways to change default behaviours in WordPress Core, plugins and themes. Broadly speaking, an action adds function and a filter changes function, and both are hung onto existing functions by the hooks that WordPress core provides. Most plugins use them to link functions into the site at a particular stage, or alter the way an existing function works.

There are hundreds of hooks in WordPress, but some of the most common include enqueueing styles and scripts, registering custom menus and sidebars, altering menu displays, adding containing spans and

divs for display reasons, and cropping content for excerpts. A list of hooks can be found in the WordPress Codex, often with examples of how to use them. If not, a swift internet search will bring back an article on how to alter the behaviour you want to change.

Using hooks involves editing your functions.php file or creating a plugin to house the hook separately. If you are working with a child theme, you might also need to unhook functions from a parent theme if they are not required, or hook another function to replace the original.

Enqueue a Google Font
Be sure to enqueue it before your parent and child stylesheets load to use the font family in your style.

```
<?php
add_action( 'wp_enqueue_scripts', 'enqueue_styles' );
function enqueue_styles()
{
    wp_enqueue_style( 'roboto-
    font', 'https://fonts.googleapis.
    com/css?family=Roboto' );
    wp_enqueue_style( 'theme-style',
    get_template_directory_uri() . '/'
    style.css' );
    wp_enqueue_style( 'theme-child-
    style', get_stylesheet_uri() );
} ?>
```

Add a custom menu
This action adds a new menu to the admin panel; display it in the theme by using wp_nav_menu().

```
<?php
add_action(
    'after_setup_theme',
    'register_new_menu'
);
function register_
new_menu()
{
    register_nav_menu(
    'new-menu', 'New
    Menu' );
} ?>
```

Customise the excerpt
Change the length of the excerpt length to 30 words and add '... Read More' after it truncates.

```
<?php
function change_excerpt_
length( $length ) {
    return 30;
}
add_filter( 'excerpt_
length', 'change_excerpt_
length', 999 );
function change_excerpt_
more( $more ) {
    return ' ... Read More';
}
add_filter( 'excerpt_more',
'change_excerpt_more' ); ?>
```

Personalise the login page
Alter the site logo and link on the login page to your own to make the login process look sleeker.

```
<?php
function change_login_logo() { ?>
<style type="text/css">
#login h1 a, .login h1 a {
background-image: url(<?php echo get_
stylesheet_directory_uri(); ?>/images/
your-logo.png); }
</style>
<?php }
add_action( 'login_enqueue_scripts',
'change_login_logo' );
function change_logo_url() {
return home_url(); }
add_filter( 'login_headerurl',
'change_logo_url' ); ?>
```

15: Avoid plugin bloat

There are thousands of useful plugins, but be careful how many you use: too many can lead to conflicts and slow processing times. Be selective with what you need, and if you can do something with a custom hook rather than a whole plugin, try that first.

16: Choose reliable plugins

When you do need a plugin and you're trying to choose which, take into account the star rating, feedback and when it was last updated. These can give you a good idea of the quality, how well the plugin has been supported and how likely it is to be continued.

17: Take advantage of archive pages

The menu settings include the option to add links to archives in the menu, making linking to certain categories, tags and even post formats quick and easy. Simply use the dropdowns on the left-hand side to select the grouping you want to add.

18: Other uses for featured images

You can use featured images for more than just thumbnails. For instance, you can use them in a post list, tile gallery or carousel, a header image for the post, a background image for the header or even for the whole page – you don't have to just use it in the content!

19: Move the login URL

A good plugin such as iThemes Security has the option to move the admin login URL, meaning bots are less likely to find your admin panel. This will also create a more personalised experience for your users. Just don't forget where you moved it to!



20: Personalise your error pages

Add a 404.php file to your theme to make a custom 'not found' page. For those brief seconds when WordPress is updating, by default it displays a style-less message; adding a maintenance.php to the wp-content folder will serve that instead of the default.

FOR THE GNU GENERATION

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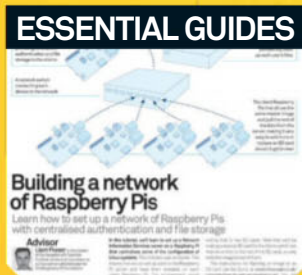


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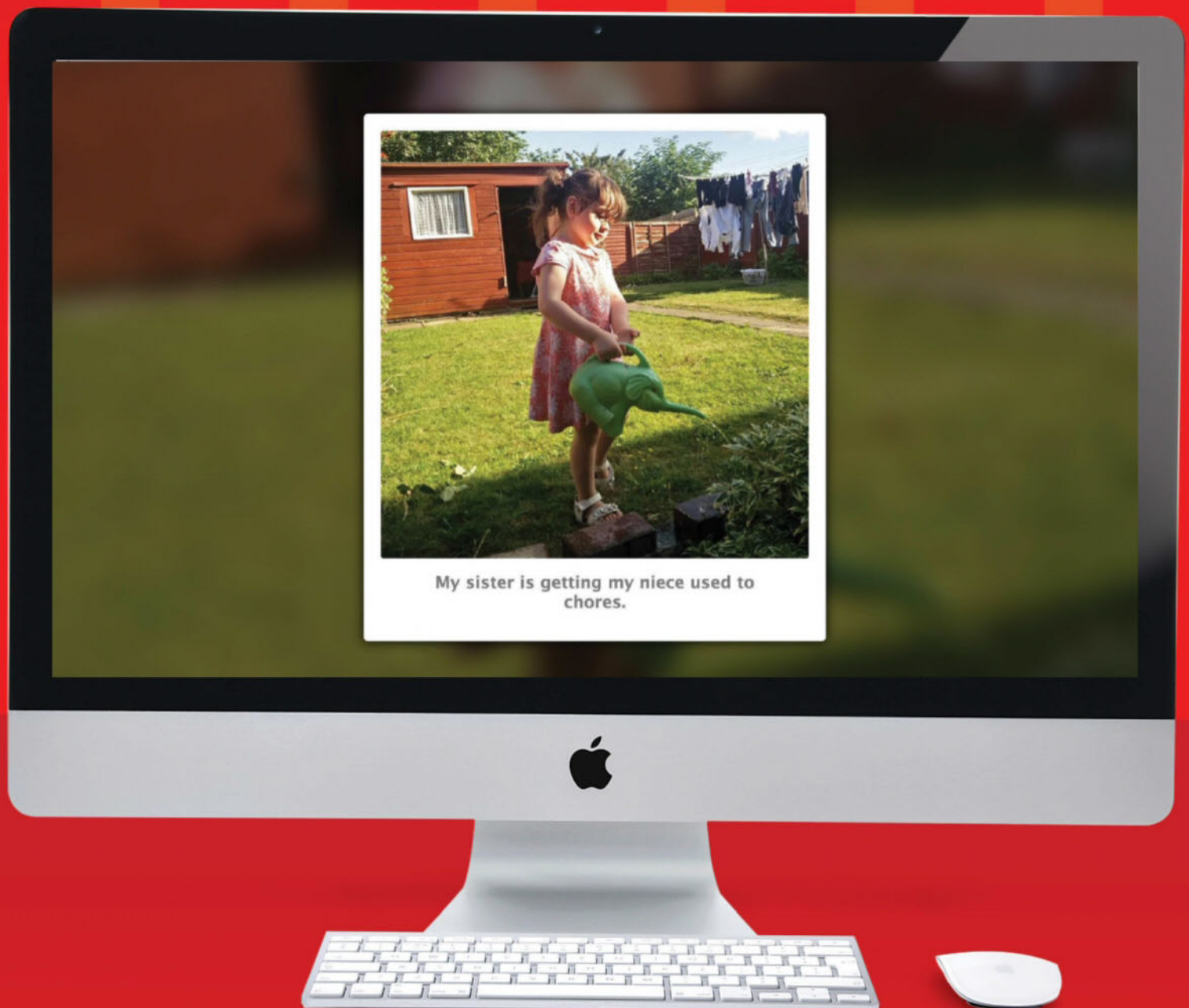
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twitter.com/LinuxUserMag

Build a slideshow with Instagram API

Use the Instagram API with JavaScript and CSS to create a polished image and video slideshows



Fun fact: the first image ever published on the world wide web was of an all-female parody pop group, 'Les Horribles Cernettes'. That was way back in 1992. At the dawn of the world wide web, digital photography lived in the long shadow of film-based photography – and why wouldn't it have? Digital photography was horrendously expensive, had terrible resolution, and despite that could only store a handful of photographs. Sure, digital photography is instant, but so what? Film gets processed in 24 hours! Why would anybody ever choose digital over cheaper, sharper film?

Of course, we all know how that's worked out; in the 25 years since Les Horribles Cernettes made their cyberspace debut, digital photography has become sharp, cheap and really easy to store. The internet and the world wide web have naturally followed suit – millions of images live on the web, seconds away from dazzling you with their beauty.

One of the most plentiful sources of beautiful images is Instagram and in this tutorial we're going to learn how to build a simple slideshow, powered by the Instagram API + JavaScript + CSS, that we can use to show off how great we've become at personal photography.

1. Registering an app

Let's get started! In order to access the Instagram API, we need to register an app and obtain a client ID that we can use to authenticate requests made from our domain. Log in to the Instagram website with your ordinary account and then head to www.instagram.com/developer/clients/manage/. Once there, click on the 'Register your application' button. This will take you through to the 'Manage Clients' view. Unless you've made an app before, this display should be empty. Click the 'Register a new client' button.

2. Creating your client

Once you've clicked the 'Register a new client' button, you'll be presented with a form to fill out. Enter the details as you see fit, but make sure that the entry for the 'Valid

Redirect URI' field is `http://localhost:3000/bounce`. This is where Instagram will pass a request with a token that we can use to make requests when we've completed the authorisation process. When you've entered all of the required values in the form, enter the required CAPTCHA values and click the register button.

3. Getting the client ID

Validation of the values you submitted to create your app will now occur, and, if valid, you'll now be sent back to the 'Manage Clients' view. This time it isn't empty! Our newly created app will be sitting in the interface with a few key details. The most important one to take note of right now is the client ID. We'll use this client ID to associate users with our client a little bit later, so jot it down somewhere safe for the time-being (or come back here later when we need the token).

4. It's the Node Express!

Even though the code for our slideshow will be entirely client-side, we still need to handle a little bit of routing around our app. For this, we'll use the Express framework for Node.js. As well as flexible routing, it comes with the Handlebars templating engine built-in, making it a super-handly piece of kit for quickly getting started. Create a directory for working in and then run the following command...

```
> npm i express-generator && express --hbs
&& npm i
```

This will create a ready-to-go Express server (with Handlebars) and all of its dependencies.

5. Cleaning up

As with most frameworks, we don't need absolutely everything that is created for us, so before we go any further, we're going to delete a few files and lines of code. In `app.js`, delete lines 9 and 26 and then delete the file `users.js` in the `/routes` folder of your project.

6. Defining our new routes

Once we authenticate our client with Instagram, we need

to define some routes in our Node.js server – both `/` and `/bounce`. Open the `index.js` file in the `'routes'` folder of your project and adjust it to look like the following:

```
var express = require('express');
var router = express.Router();
router.get('/', function(req, res, next) {
  res.render('index', { title: 'Express' });
});
router.get('/bounce', function(req, res, next){
  res.render('bounce', {
    title : 'Redirecting...'
  });
});
module.exports = router;
```

Now we have a new route, `'bounce'`, to handle Instagram sending us a token after the authentication process has been completed.

7. Authenticating our user

Understandably, before Instagram let us anywhere near its resources, we need to have our users authenticate with the Instagram servers. Thanks to OAuth, this is a doddle. All we need to do is point our users at a specific URL with our client ID and redirect URL. Replace the content of the `index.hbs` file of the `'views'` folder with the following:

```
<h1>{{title}}</h1>
<p><a href="https://api.instagram.com/oauth/
authorize/?scope=public_content&client_
```

HTTPS, plz

These days, it goes without saying that whenever we're handling user data or credentials of any kind, we should do so only over HTTPS. To not do so leaves our users vulnerable to the possibility of account coercion. It doesn't look good on us when our apps are responsible for compromising our users' social media accounts. So don't take a chance, use HTTPS in your apps – even if they're entirely client-side.



Left

Here, we see an example of the information required by Instagram when creating a new client

Top left

Once we have successfully created a new client, we find ourselves back on the 'manage clients' page. Here, we can see all of the details we need at a glance for each app. Take note of the client ID – it's integral to the clients operation

Top right

Our slideshow before we write any of the logic to retrieve images from Instagram. Though we are not bound to these styles, it helps to have everything in place when we're trying to learn a new interface

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Build a HTML slideshow with Instagram API

```
id={{CLIENT_ID}}&redirect_uri={{REDIRECT_URL}}&response_type=token">Authenticate with instagram</a></p>
```

And in the `/` router of the `index.js` file in your `'routes'` folder, change the `/` route to the following:

```
const CLIENT_ID = "[YOUR_CLIENT_ID]"; // Get this from the 'Manage Clients' dashboard
router.get('/', function(req, res, next) {
  res.render('index', {
    title: 'Authenticate',
    CLIENT_ID : CLIENT_ID,
    REDIRECT_URL : 'http://localhost:3000/bounce'
  });
});
```

8. It's time to bounce

If we run our Express server with `npm run start` and head to <http://localhost:3000>, we'll now be presented with a friendly HTML link that will authenticate us with Instagram. Clicking it now, however, will result in a server error. Even though Instagram's authentication process was successful, our server isn't able to handle the result! This is because we've told Instagram to send our `/bounce` endpoint, which we have defined in the `index.js`

file of our routes folder, but we haven't created the Handlebars file yet! In the views folder, create a new file called `bounce.hbs`.

9. Let's make bounce.hbs, bounce!

Now that we've created `bounce.hbs`, it's time to make it work for us. Handlebar files can consist of anything we like, so in `bounce.hbs` we're going to add a little bit of JavaScript which parses the URL for the hash value that contains our key, and then 'bounces' us to the route of our server with the token passed as a query parameter so we can use it in our app. Enter the following code to `bounce.hbs`:

```
<script>
const access_token = window.location.hash.
  replace('#access_token=', '');
window.location.href = '/?token=' + access_
  token;
</script>
```

10. Handling the bounce

If you go back to <http://localhost:3000/> and attempt to authenticate again, you'll find that you're sent from `/` to Instagram's authentication endpoint, to `/bounce` and then back to `/`. With the exception of a new query parameter, nothing has changed! Well, the lovely thing about Handlebars is that we can change how a template renders depending on a number of factors – in this case, the query parameter! First, we'll adjust the `index.hbs` template to handle a token having been received on the `/` route. Edit your code to look like the following:

```
{{#if token}}
<div> slideshow </div>
{{else}}
<h1>{{title}}</h1>
<p><a href="https://api.instagram.com/oauth/
  authorize/?scope=public_content&client_
```

```
id={{CLIENT_ID}}&redirect_uri={{REDIRECT_URL}}&response_type=token">Authenticate with
instagram</a></p>
{{/if}}
```

11. Affecting the template

Now that we have our Handlebars template in place to show our slideshow (which we'll be putting together in the next few steps), we need to handle whether or not we do or don't have a token in the request to `/`. Open `/routes/index.js` and adjust the `/` route to look like this:

```
router.get('/', function(req, res, next) {
  const templateVariables = {
    title: 'Home',
    CLIENT_ID : CLIENT_ID
  };
  if(req.query.token !== undefined){
    templateVariables.token = req.query.token;
    templateVariables.title = 'Lovely Slideshow';
  } else {
    templateVariables.REDIRECT_URL = "http://
      localhost:3000/bounce";
    res.render('index', templateVariables);
  }
});
```

Now, when we hit the `/` route of our application, we check if there is a token query parameter on the request. If there isn't, then everything will behave as it already has done and we'll ask our user to authenticate; if there is a token, however, we adjust the `templateVariables` variable to contain the token which, when passed through to our `index` Handlebars template, will cause it to render our slideshow partial instead of the authentication code we've seen so far.

12. Registering the slideshow

In order to use our slideshow partial, we must first register it with our Express app. In `app.js`, in the root of our project, add the following lines of code just beneath

jQuery?!?

Yes, jQuery. We know, it's been around forever, and isn't exactly the lightest or coolest thing to have in our projects these days. But, jQuery still succeeds in one area where many other frameworks fail: AJAX. The range of options and capabilities afforded to us by jQuery in making AJAX is unmatched, so even though it's no longer the favoured son of the modern JavaScript developer, it still has a place in the hacker's toolbox for getting things that work everywhere together quickly.



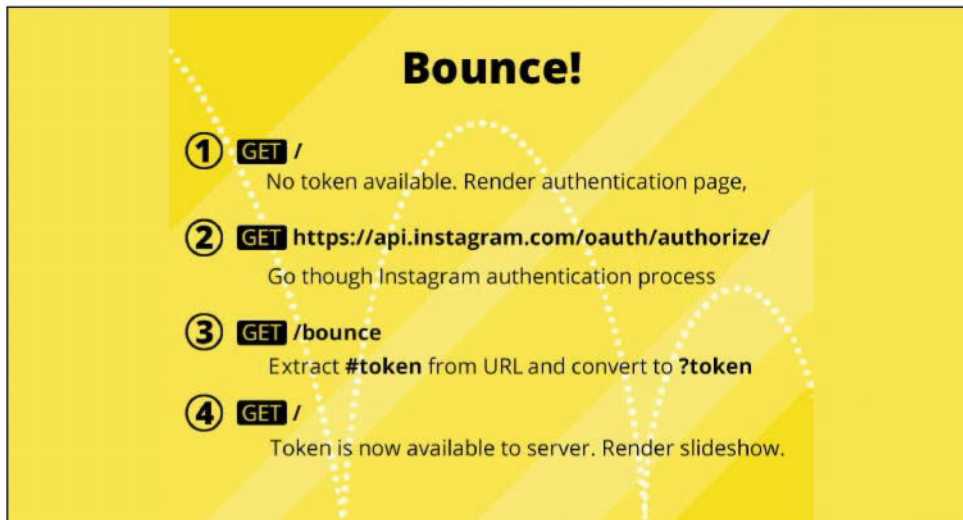
Top

The appearance of our slideshow before we set the blurred background image. At this point, we're receiving data, but short of loading the images into the page, we have very little interaction

Right

An almost finished version of our slideshow. Here we have a gallery that can animate, and a background image that adds a little extra detail to our gallery. All we're missing now is a caption





Why do we bounce?

In this tutorial, we defined an endpoint, `/bounce`, that Instagram would redirect our browser to when authentication had completed. Ideally, we would normally have a third-party service deliver our user to the destination that needed the token passed to operate, and yet, we've added this extra 'bounce' step which further redirects our user to their ultimate destination. So, why did we do this? When Instagram returned our token to us, it did so in the URL, but as a hash value. This is only accessible to the client and never gets sent to the server; normally, this would be fine, but we want to render a different Handlebar template depending on whether or not we have a token. The code in the bounce template converts the token in the URL from a hash value to a query parameter that our server can read, then it renders the slideshow template while passing the token through to that template.

the `app.set('view engine', 'hbs');`line...

```
const hbs = require('hbs');
hbs.registerPartial('slideshow', require('./views/slideshow.hbs'));
```

This creates a reference to the Handlebars templating software (that we're already using, but couldn't directly access until now) which we can use to register our new slideshow template. Next, create a new file, `slideshow.hbs`, in the `views` folder of your project.

13. We got style.css

While we'll be coding the HTML and JavaScript for our slideshow, there's quite a lot of CSS that needs doing - too much to include here. Instead, now's a good time to grab `style.css` from the FileSilo for this tutorial. Once it's downloaded, place it in the `/public/stylesheets` folder of your project - let it overwrite the existing stylesheet the Express generator created for us.

14. Markup for slideshow.hbs

While we'll be generating most of the elements for our slideshow dynamically, there are some elements we can explicitly define in the HTML of `slideshow.hbs`. Add the following code to `slideshow.hbs`:

```
<div class="backgroundImage" data-active="true"></div>
<div id="tint"></div>
<div id="slideshowHolder">
  <div id="slideshowImages"></div></div>
<script></script>
```

And then add the following code to just beneath the CSS `<link>` tag in `layout.hbs`:

```
<script src="https://code.jquery.com/jquery-3.1.1.min.js"></script>
```

15. Getting data from Instagram

We now have everything we need to get data out of the Instagram API! Using our old friend jQuery, we're going to make a request to Instagram to get the 20 most recent images from the authenticated account.

Before we make the request, we're going to store our Instagram token locally so we could use it across our site if we wanted to. Inside the empty `<script>` tags of `slideshow.hbs`, add the following:

```
<script>
const slideshowHolder = document.querySelector('#slideshowHolder');
const imageContainer = document.querySelector('#slideshowImages');
const backgroundContainers = document.querySelectorAll('backgroundImage');
const localStorageKey = 'insta-access-token';
var token = !localStorage.getItem(localStorageKey) ? "{{token}}" :
  localStorage.getItem(localStorageKey);
localStorage.setItem(localStorageKey, token);
var numberOfSlides = undefined;
var currentPos = 0;
var slideshowItems = undefined;
jQuery.ajax({
  url : 'https://api.instagram.com/v1/users/self/media/recent?access_token=' + token,
  type: "GET",
  crossDomain: true,
  dataType: "json",
  success: function(response){
    console.log(response); } });
</script>
```

With `jQuery.ajax`, we make a request to the Instagram API to get the most recent images from our user's account. We're asking for a JSONP response, which is a neat little trick to get at data without having to respect CORS. When Instagram returns the data, we log it out in the function we've defined as the value of `'success'`.

16. From Instagram, with love

Now, if we reload our page, jQuery fires off a request to Instagram, and we get back an object in the response. This object has three properties: pagination, meta and data. Data is where we'll find all of the information we

need to create a slideshow from our images. Our slideshow is going to be made up of `<li>`s inside a `<ul>` that will animate with CSS transitions when we press the left or right arrow keys on our keyboard. Inside the success function of our AJAX call, add the following:

```
const ul = document.createElement('ul');
numberOfSlides = response.data.length - 1;
response.data.forEach(datum => {
  const li = document.createElement('li');
  var mediaType = datum.videos ? 'videos' : 'images';
  var imageContainer = mediaType === 'images' ?
    document.createElement('img') : document.createElement('video');
  imageContainer.setAttribute('src', datum[mediaType]['standard_resolution'].url);
  li.dataset.mediatype = mediaType;
  li.dataset.caption = datum.caption === null ? "" : datum.caption.text;
  if(mediaType === "videos"){
    imageContainer.setAttribute('loop', 'true');
    imageContainer.setAttribute('muted', 'true');
  }
  li.appendChild(imageContainer);
  ul.appendChild(li); });
slideshowImages.appendChild(ul);
```

First, we create the `<ul>` that each `<li>` with an image in will sit inside, then we iterate over the `response.data` object and create an `<li>` for each image. If the media type is an image, we create an `<img>` tag, if it's a video, we create a `<video>` element. If it's a video, we set some attributes to mute the sound and loop the video. Finally, we append the `<img>` to the `<li>` and then we append the `<li>` to the `<ul>`. After all of this, we have a `<ul>` that is full of all of our images for displaying, which we append to the `#slideshowImages <div>`.

17. Display captions

For each image we also receive a caption, and it would be a shame to not use it. Therefore, just after

Permission Scopes

- basic**
Limited access to a users profile and image
- public_content**
Full access to a users public images and info
- comments**
Create new and delete old comments for an authenticated user
- follower_list**
Access a list of followers and users that an account follows
- likes**
Access all users likes and like/unlike images for that user
- relationships**
Ability to follow and unfollow other accounts for the user

JSONP and CORS

When accessing data from a service with a server, we don't have to worry about cross-origin resource sharing (CORS). When we request resources client-side, unless an access-control-allow-origin header matches our domain, we become subject to the HTTP access control policy, which will stop us from reading the content of any response made. If we're requesting an audio file, say, this isn't so much of a problem: we don't need to examine the body of the response of a request made, we can just assign the path as the source of an `<audio>` element and let the browser do all of the heavy lifting, and if we don't need to handle a response from the service, an opaque request will

do too. But, how do we request data from a service that doesn't have an access-control-allow-origin header set without a server component? With JSONP, of course! JSONP is a neat little workaround of the CORS HTTP access control policy that instead of returning text that we're not allowed to read, injects the data (in JSON format) as a script into our page, which is then passed to a function we (or our framework) declare, effectively passing the data as an argument to the function that handles the response! This enables us to run dynamic, static web apps without any need of a server sitting between our app and the services we wish to use to request the data for us.

`slideshowImages.appendChild(ul);`, we'll add the code to create a `<div>` that we'll use to display the caption for the currently visible image.

18. What slideshow events?

The last line of the code we just wrote was `bindSlideshowEvents()` – we haven't done it yet, but that's where we're going to write the code that controls the animations of our slideshow. Create a the function 'bindSlideshowEvents' just before the `jQuery.ajax` call and add the following:

```
function bindSlideshowEvents(){
  window.addEventListener('keydown', function(e)
  {
    e.preventDefault();
    if(e.keyCode === 37)
    {
      if(currentPos > 0){ currentPos -- 1; } else
      { currentPos = numberOfSlides; }
    } else if(e.keyCode === 39){
      if(currentPos < numberOfSlides){ currentPos
      += 1; } else { currentPos = 0; }
    } else {
      return;
    }
  }, false);
}
```

This logic will enable us to keep track of which picture we're viewing, and which one we should show next depending on user interaction.

19. Animating the slideshow

Now that we have a way of knowing which image we should be showing in our slideshow, we can animate it accordingly. We're going to do this the old-fashioned way, with CSS transitions and margin offsets. It's crude but effective! Add the following line of code just after the last `else` statement of `bindSlideshowEvents`, but still within

the event listener:

```
imageContainer.querySelector('ul').style.
marginLeft = -(currentPos * 500) + "px";
document.querySelector('.caption').textContent
= slideshowItems[currentPos].dataset.caption;
```

Now, when we press the left or right arrow key, the slideshow will animate and the caption for each image will appear!

20. Adding a little panache

Now, this is all very pretty, but we're not quite done yet! We have both images and videos that can be displayed. When we are viewing an image, we're going to set a blurred version of it as the background. When we're viewing a video, we'll make it play from the beginning and pause any other videos that are in our slideshow. First, let's handle the media type being an image. Add the following code just after the code we wrote in the last step:

```
if(slideshowItems[currentPos].dataset.
mediatype === "images")
{
  Array.from(imageContainer.
  querySelectorAll('video')).forEach(video => {
    video.pause();
  });
  const blurredBackground = document.
  querySelector('.backgroundImage[data-
  active="true"]');
  blurredBackground.style.backgroundImage =
  "url('" + slideshowItems[currentPos].
  querySelector('img').src + "')";
}
```

First, we get an array of all of the videos in the slideshow, and then iterate through and pause each one. We don't want to hear audio for videos we can't see! Next, we get the element that contains the larger, blurred version of our current image and set its background source as the

current image URL. The blur is applied through the CSS filter property.

21. Handling a video

If the current item in our slideshow isn't an image, it's a video. When a video becomes the current item viewed in our slideshow, it should start playing from the start and loop when it's finished (as has become a common trend on social media in recent years). Add an `else` statement to the last `if` statement, and insert the following:

```
...
blurredBackground.style.backgroundImage =
"url('" + slideshowItems[currentPos].
querySelector('img').src + "')";
} else
{
  const vidEl = slideshowItems[currentPos].
  querySelector('video');
  vidEl.currentTime = 0;
  Array.from(imageContainer.
  querySelectorAll('video')).forEach(video =>
  {
    video.pause();
  });
  vidEl.play();
}
```

First, we get the current video element, set its `currentTime` property to 0 (to restart it), then we iterate through every video in the slideshow and pause it before starting the one we're currently viewing.

22. That's all, folks!

And that's it: we now have a fully functional Instagram powered video/image slideshow! We've only used one of the many, many endpoints made available by the Instagram API. If you'd like to explore the other endpoints further, you can find a full list of API calls at www.instagram.com/developer/endpoints/.

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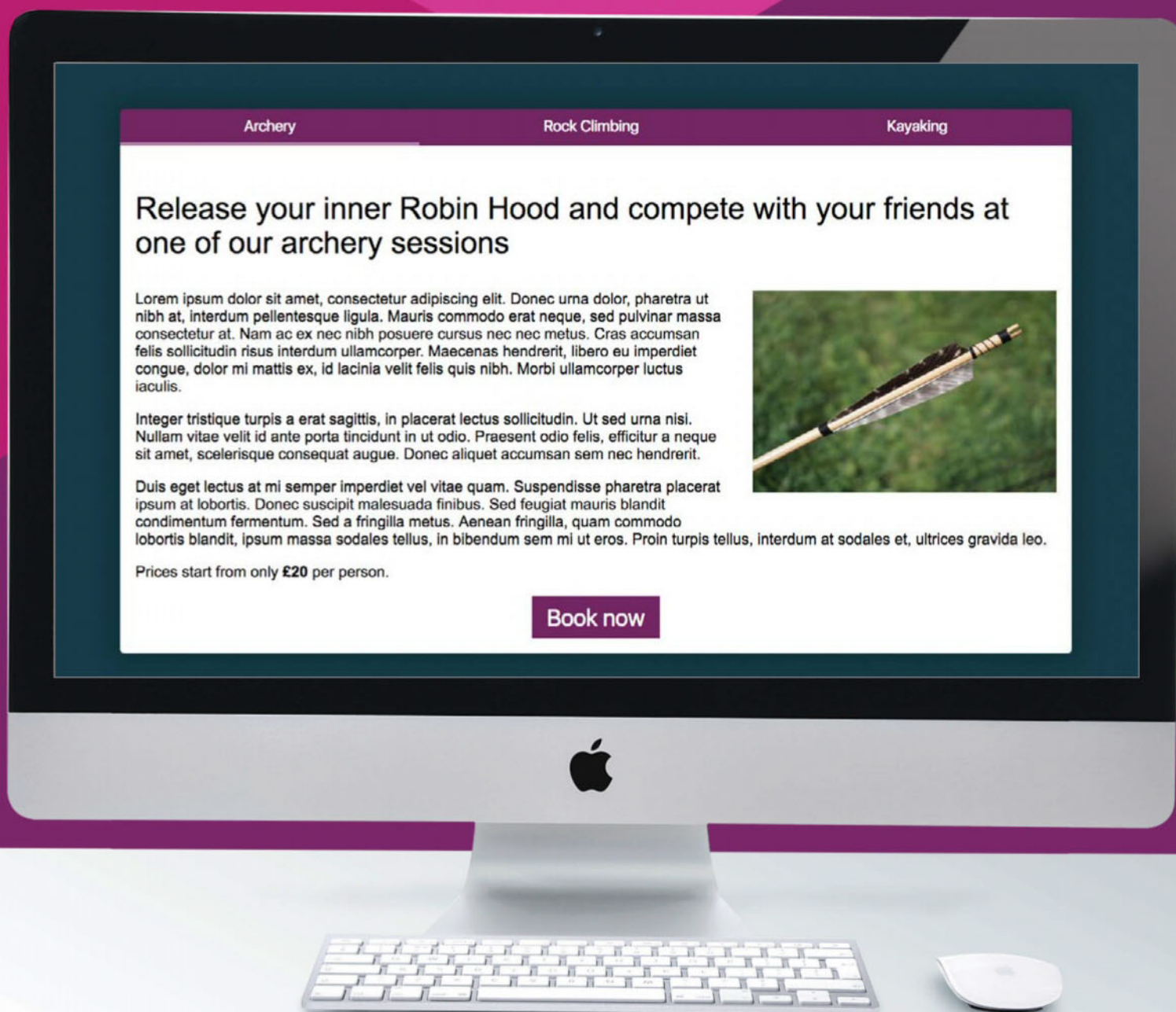
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Create a reusable custom tab module

Re-create a classic design pattern using the latest technology that you can utilise across projects





While native elements like `<select>` and `<input>` are great at what they do, we often need them to work or behave slightly differently. To create

complex interfaces we frequently resort to messy, non-semantic stacks of `<div>`s that are not fit for purpose.

Custom Elements are part of a broader concept known as Web Components that let us create complex interfaces as if they were native elements. All the scripts and styles used to display it get hidden away behind the tag. It's then a case of using it like a normal element.

While they have been in development for a few years now, the specifications for Custom Elements and its Web Components sibling Shadow DOM have recently been updated to v1. As a result, older browsers may not understand some of the new syntax. We can also take advantage of ES2015 classes, for which any browser that implements Custom Elements v1 will understand.

We will be exploring the basics of custom element creation to produce a reusable tab interface seen on many sites across the web. We will be able to interact with it like any other element by setting attributes and modifying children. By working in accessibility features from the start, the finished product will work for everyone that uses it.

1. Add element to the page

If we add an element to a page that the browser cannot understand yet it will treat it just like a `<div>`. We can use this to our advantage later on when supporting older browsers with progressive enhancement. Open up index.html in an up-to-date copy of Chrome or Opera and within the container add the following tag. The tag will remain unresolved, but it will appear in the code inspector to use later on.

```
<tabbed-display>
</tabbed-display>
```

2. Check for browser support

The Custom Elements v1 spec is quite new and not many browsers currently support it. The problem is an earlier

version of the spec has been around in more browsers for a few years. We need to avoid picking up those browsers too. A new addition is the Custom Elements global variable, which we use to define our new elements. Its presence means this browser meets our requirements. Now open up tabbed-display.js and add this detection in at the top:

```
const supportsCustomElementsV1 =
  'customElements' in window;
```

3. Construct the element

Custom Elements should use ES2015 class syntax. These allow us to extend existing elements and avoid lots of legwork. Each class needs a constructor to run when it gets created and call `super()` - its parent's constructor - inside it. After the feature detection, add in a class for our `TabbedDisplay` class that inherits from `HTMLElement` - a basic class to represent a normal element we can use. Immediately inside, add a constructor method.

```
class TabbedDisplay
  extends HTMLElement {
  constructor() {
    super();
  }
}
```

4. Add in Shadow DOM

Another part of the Web Components movement is Shadow DOM. We can use this to create markup that is separate from the rest of the page. People using our new element do not need to worry about how the element gets created internally. Attach a Shadow DOM to our element inside the constructor and add in some basic structure for our tabs and content display.

```
let shadowRoot =
  this.attachShadow({mode: "open"});
shadowRoot.innerHTML = `
<div id="tabs-container">
  <slot name="tab"></slot>
```

```
</div>
<div id="content-container">
  <slot></slot>
</div>
`;
```

5. Register our new element

There is one more thing left to do before we can use our new element - we need to tell the browser it exists! Once an element is defined, its definition is resolved and it gets upgraded to a known element. Just after the class definition you should register the element. This can be done at any point, but it makes sense to do it after we have created it.

```
customElements.define(
  "tabbed-display", TabbedDisplay);
```

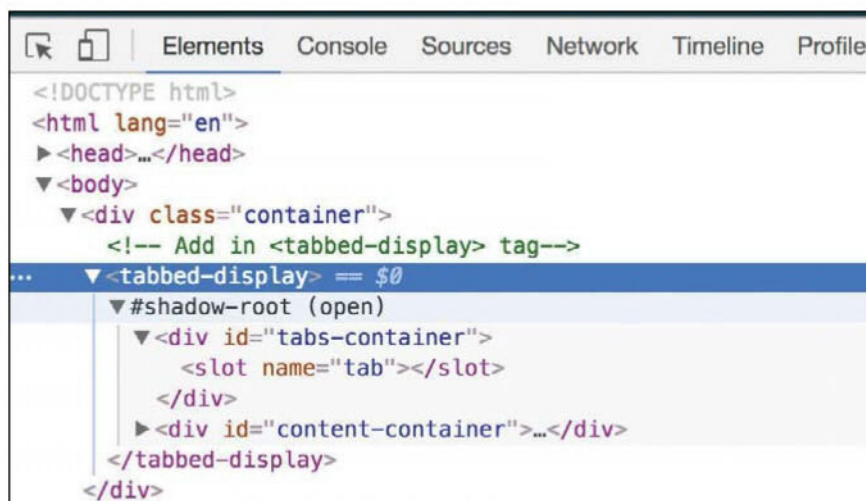
6. Slotting in other elements

When we add content inside our element, the browser will place it wherever it sees a `<slot>` element in the Shadow DOM. We can tell content to use a certain slot by adding the `slot` attribute to it. Any content without a defined slot will go into an unnamed slot. Back in index.html, add some content to the slots and see it show up in our new element.

```
<a href="#archery" slot="tab">
Archery</a>
<a href="#rock-climbing" slot="tab">
Rock Climbing</a>
<a href="#kayaking" slot="tab">
Kayaking</a>
<section id="archery"></section>
```

Reference the host

With Shadow DOM, the main element is referred to as the host and can be styled with the `:host` pseudo-class. Additional identifiers can be added in brackets such as `:host([collapsed])`.



Left

Developer tools will allow us to inspect Shadow DOM. In Chrome and Opera we will be able to find a `#shadow-root` option as a child of our custom element

Top left

By using flexbox to display the tabs, they will always expand to fit the element, regardless of size or number of tabs within the element

Top right

Always aim to make reusable components that are readily accessible. The ARIA Authoring Practices define what is needed for common patterns

Developer tutorials

Create a reusable custom tab module

```
<section id="rock-climbing"></section>
<section id="kayaking"></section>
```

7. Style the Shadow DOM

The Shadow DOM works as an encapsulated version of the regular DOM. As such we can add styles that affect this element and nothing else. Inside the innerHTML within `tabbed-display.js`, add a normal `<style>` tag and add some basic styles to flesh out our interface.

```
<style>
:host { box-sizing: border-box;
display: block;}
#tabs-container { display: flex;
justify-content: space-between;
flex-wrap: wrap;}
#content-container {
overflow: hidden;
}
</style>
```

8. The slotted selector

Not only can we target the slots, but we can target the content inside them with `::slotted`. This also supports a selector on itself so we can be specific about what gets picked up, but this can only be one descendant deep. Add some styling to the tab slot content. By using a wildcard selector, we can select whatever someone may add in that slot, and that's even if they want to use `<button>` for their tab.

No self-closing tags

Some tags like `<img>` or `<input>` are self-closing with no internal content - known as void elements. It's not possible to create a custom void element, so they must all be closed like normal.

```
#tabs-container ::slotted(*) {
flex-grow: 1;
text-align: center;
border: none;
text-decoration: none;
padding: 0.5em;
border-bottom:
0.25em solid transparent;
[...other styles...]
}
```

9. Set up event listeners

Our element can react to many points in its lifecycle. One of the most important is when it is inserted into the DOM and for that we use `connectedCallback`. We want to do a lot of setup here, including listening for clicks on our tabs. Inside `connectedCallback`, find the slot content and listen for clicks and key presses on the tab container. We use `bind` to have this refer to our element, rather than the target of the event.

```
this.tabSlot = this.shadowRoot
.querySelector("#tabs-container slot");
this.contentSlot = this.shadowRoot
.querySelector
("#content-container slot");
this.boundTabClick =
this.onTabSlotClick.bind(this);
this.boundKeyDown =
this.onTabSlotKeyDown.bind(this);
this.tabSlot.addEventListener(
"click", this.boundTabClick);
this.tabSlot.addEventListener(
"keydown", this.boundKeyDown);
```

10. Add ARIA roles to elements

Accessibility is very important on the web. If we are making an element we will use across projects, it needs

to be accessible to all who need to use it just like standardised elements. To start that process, we should add the appropriate roles to our elements for their responsibility in this component. Now simply add this at the end of `connectedCallback`.

```
let tabs = this.getTabs();
let contents = this.getContents();
this.setAttribute("role", "tablist");
for(let i=0; i<tabs.length; i++) {
  tabs[i].setAttribute("role", "tab");
}
for(let i=0; i<contents.length; i++) {
  contents[i].setAttribute
("role", "tabpanel");}
```

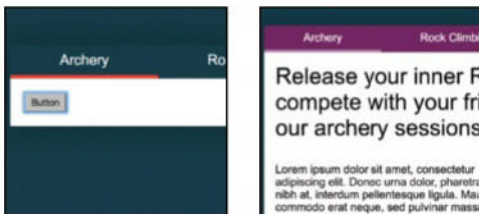
11. Show an initial tab

The final part of our `connectedCallback` is showing an initial tab. By default, the first tab should show, but if someone decides they want a specific tab open first they can add an `active` attribute to it. Cycle through the tabs and see if any have the `active` attribute. Keep a note of the tab index and run `selectTab()` to select it.

```
let defaultSelection = 0;
for(let i = 0; i < tabs.length; i++) {
  if(tabs[i].hasAttribute("active")) {
    defaultSelection = i;
  }
}
this.selectTab(defaultSelection);
```

12. Act on tab click

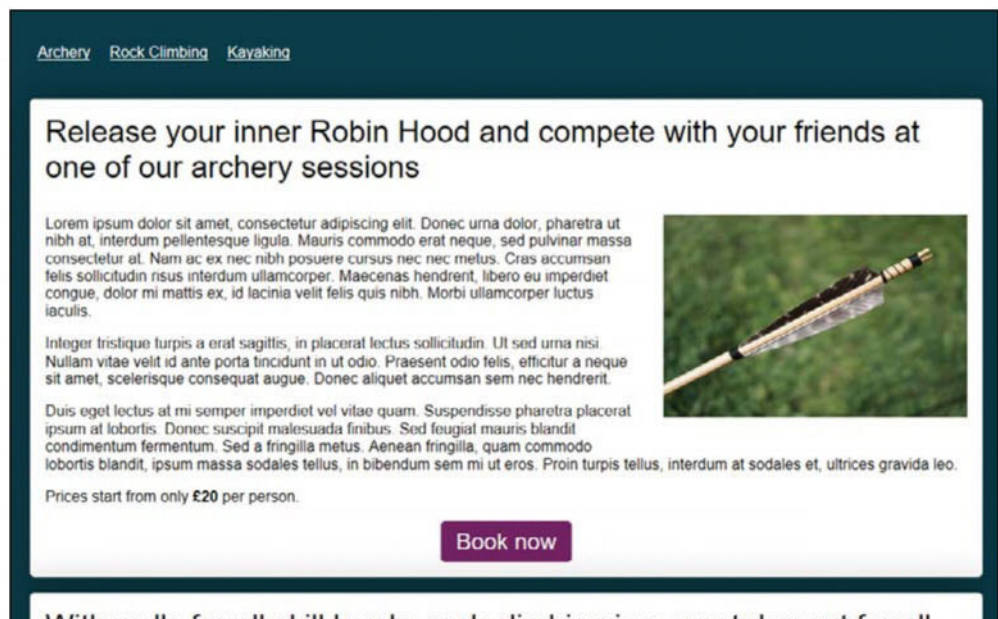
Now the element gets set up properly, we can start work on the interaction. As our tab listener is on the container, it will pick up clicks on any of its content. We will need to filter this to only listen for tab clicks, then find the index of

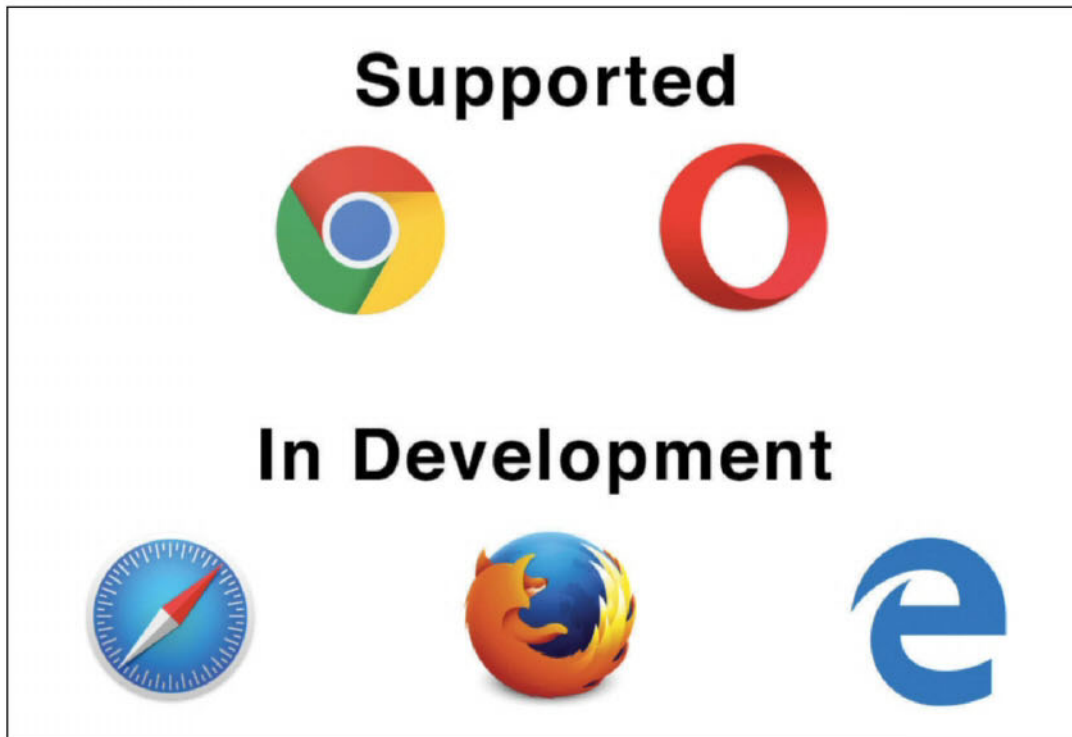


Right
Unsupported browsers should still get the content presented to them. When viewing this component in Edge for example, all tabs are shown as a list

Top left
When elements are set to display: none, any focusable content will be inert, meaning that focus will not be lost in content they cannot see

Top right
In addition to custom properties, it's also possible to use `@apply` syntax to supply many properties at once, which may be useful for element theming





Custom Elements v1 support

The journey to a finished specification has been a long one. Thankfully, September 2016 saw the first browser implementations of Custom Elements v1.

Prior versions have been in most browsers since 2014, but v1 introduces a few breaking changes that vendors will need to accommodate for. As a result the latest version has only made it to Chrome and Opera, with Safari Technology Preview including it in November 2016 and Firefox and Edge prioritising its development.

Custom Elements with Shadow DOM can be tricky to polyfill for the time being, particularly when scoping styles. The site webcomponents.org has created `webcomponents.js` – a collection of polyfills for Web Components that are in the process of including v1. You can find out more at webcomponents.org/polyfills.

that tab. If we find one switch to that tab. Add the following to `onTabSlotClick()`:

```
if(e.target.slot == "tab") {
  e.preventDefault();
  let index = [].indexOf.call(e.target
    .parentNode.children, e.target);
  if(index >= 0) {
    this.selectTab(index);
  }
}
```

13. Add keyboard support

Some users prefer navigating interfaces with the keyboard, so we should be supporting them too. Following ARIA best practices we should move one tab left if the left or up arrow is pressed, or right if right or down is pressed while focus is on a tab. Inside `onTabSlotKeyDown()` add the following:

```
if([37,38].indexOf(e.keyCode)!=-1) {
  e.preventDefault();
  let newIndex = this.selected-1;
  if(newIndex < 0) {
    newIndex = this.getTabs().length-1;
  }
  this.selectTab(newIndex);
}else if([39,40].indexOf(e.keyCode)!=-1){
  e.preventDefault();
  let newIndex = this.selected+1;
  if(newIndex>this.getTabs().length) {
    newIndex = 0;
  }
  this.selectTab(newIndex);
}
```

14. The `selectTab` function

We have been using the `selectTab()` function in a few places and now we need to define it. To be kind to keyboard users, we want to keep only the active tab in the tab order. Focusing other tabs will be done using the arrow keys. We also need to move the active attribute to the right tab to keep it up to date. Add the following to the end of the `selectTab()` function:

```
for(let i = 0; i < tabs.length; i++) {
  if(i == index) {
    tabs[i].setAttribute("active", "");
    tabs[i].setAttribute("tabindex", "0");
    tabs[i].focus();
  } else {
    tabs[i].removeAttribute("active");
    tabs[i].setAttribute("tabindex", "-1");
  }
}
```

15. Hide with `aria-hidden`

Right now we will select the tabs but all the content still remains visible. To keep things accessible we should apply the semantic ARIA attribute `aria-hidden` and set it to true for those that are not visible. While this will not hide the tabs themselves, we can style it with CSS. Now let's add the following just below what we added in the previous step:

```
for(let i=0; i<contents.length; i++) {
  if(i == index) {
    contents[i].setAttribute(
      "aria-hidden", false);
  } else {
    contents[i].setAttribute
```

```
("aria-hidden", true);
  }
}
```

16. Visually hide the tabs

We need to display which tab is active, but more importantly we need to hide the contents of the tabs that are not. We can use the `::slotted` selector from before here too, but selecting by attribute. In the CSS of our custom element, let's now add some styles to visually distinguish these states.

```
#tabs-container ::slotted([active]) {
  border-bottom-color: red;
}
#content-container ::slotted(
  [aria-hidden=true]) {
  display: none;}
```

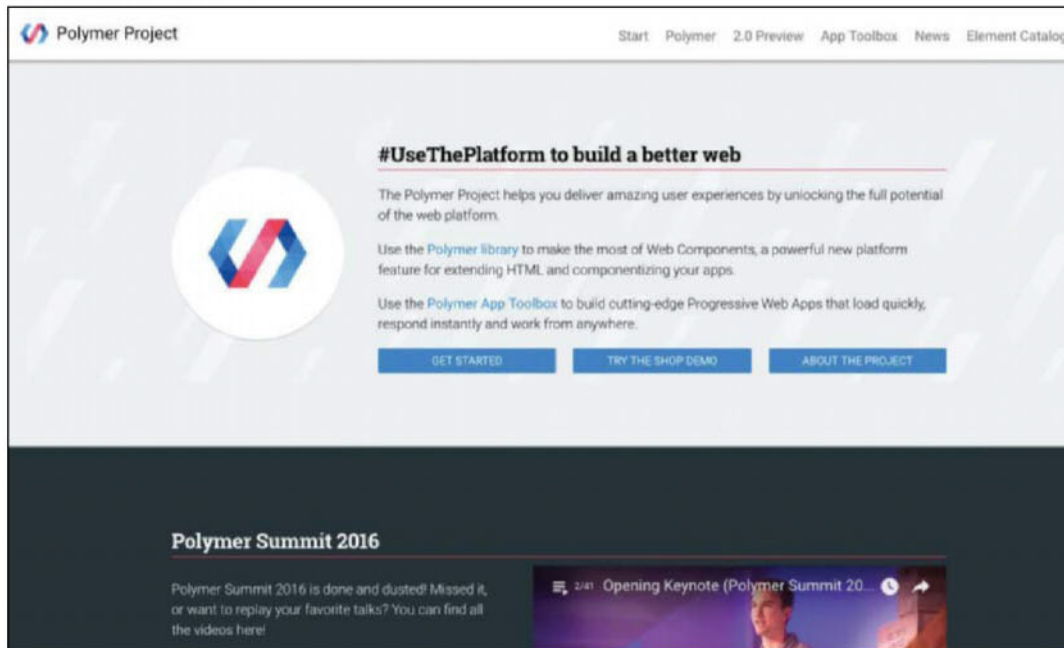
17. Observe attribute changes

A common way of initialising an element's state is through attributes and Custom Elements are no exception. With ours, a collapsed attribute will not show any tab by default. To pick up any attributes they need to go into an `observedAttributes` array on our element. The `attributeChangedCallback` then gets called whenever that value updates.

```
static get observedAttributes() {
  return ["collapsed"];
}
attributeChangedCallback(
  name, oldValue, newValue) {
  if(name == "collapsed") {
    this.collapsed = newValue;
```


Developer tutorials

Create a reusable custom tab module



Web Components vs. Polymer

Polymer is a front-end framework created by Google. Similar to Web Components, Polymer allows you to create custom components represented like regular HTML tags. They also encapsulate all the scripts and styles relevant to them inside each component that needs it. So what's the difference?

While Web Components exist on the platform already, Polymer is a small wrapper around these to simplify common use-cases and include other features, such as data binding, more easily. The aim is for Polymer to be a helper library, rather than working as a full framework.

Over time Polymer will shrink its size as Web Components become easier to work with natively. Its next version will have its methods mirror native components more closely to allow for better interoperability.

```
<doctype html>
<html lang="en">
  <head>...</head>
  <body>
    <div class="container">
      <!-- Add in <tabbed-display> tag-->
      <tabbed-display role="tablist" collapsed> == $0
        <#shadow-root (open)>
          <a href="#archery" slot="tab" role="tab" tabindex="-1">Archery</a>
          <a href="#rock-climbing" slot="tab" role="tab" tabindex="-1">Rock Climbi
          <a href="#kayaking" slot="tab" role="tab" tabindex="-1">Kayaking</a>
          <section id="archery" role="tabpanel" aria-hidden="true">...</section>
          <section id="rock-climbing" role="tabpanel" aria-hidden="true">...</section>
          <section id="kayaking" role="tabpanel" aria-hidden="true">...</section>
        </tabbed-display>
      </div>
      <script src="tabbed-display.js"></script>
    </body>
  </html>
```

```
this.removeAttribute("collapsed");
this.selectTab(this.selected);
}}
```

20. Add CSS custom properties

One of the benefits of using Custom Elements is that any complex layout elements are hidden from the developer. Unfortunately that makes customisation difficult, especially with CSS. Custom properties will also allow us to add values to named sections. Set one for the active tab colour.

```
/* tabbed-display.js */
#tabs-container ::slotted([active]) {
  border-bottom-color:var(
    --tab-selected-color, transparent);
}

/* style.css */
tabbed-display {
  --tab-selected-color: #B281A9;
}
```

21. Remove listeners for detached

Finally, if a developer decides they no longer need the tabbed display, there is no need to keep listening for any interaction on it. Similar to when it gets added, there is a disconnectedCallback() method that runs when an element is removed from the DOM. Inside disconnectedCallback() remove the event listeners we added in connectedCallback().

```
this.tabSlot.removeEventListener(
  "click",
  this.boundTabClick);
this.tabSlot.removeEventListener(
  "keydown",
  this.boundKeyDown);
```

```
}
}
```

18. Hide tabs when collapsed

When the custom element initialises, attributeChangedCallback is called before connectedCallback. We can detect when collapsed is true and if it is, don't show anything. Remove selectTab from connectedCallback and replace it to check for collapsed.

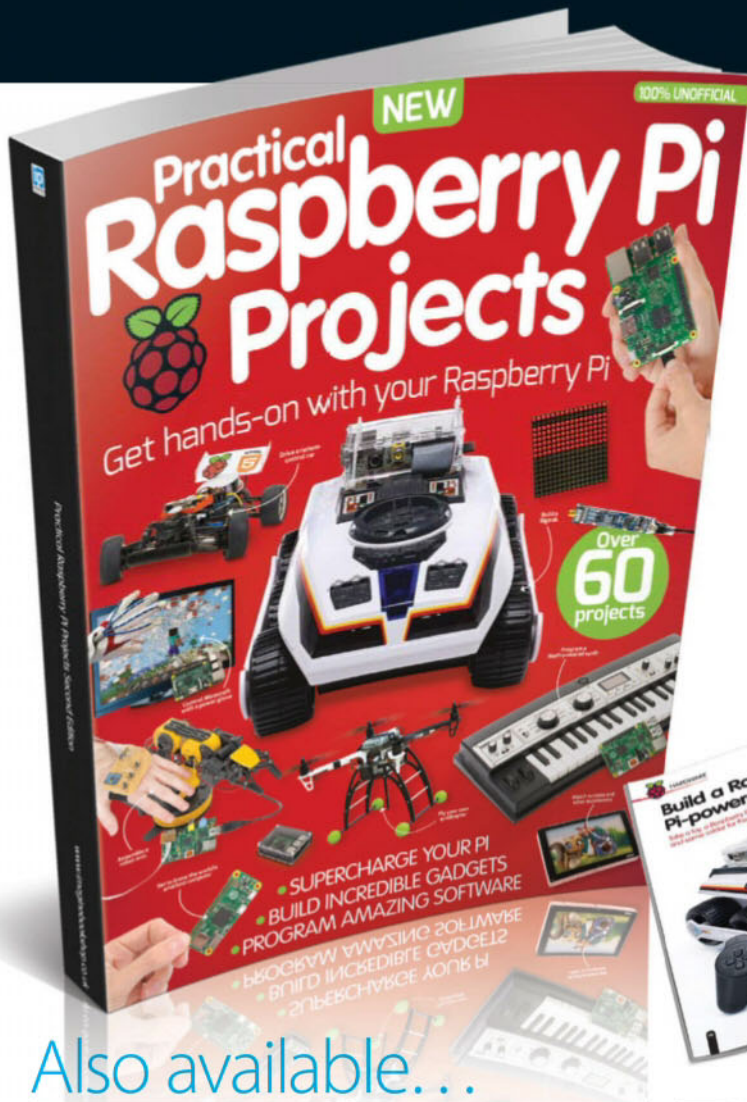
```
if(this.collapsed) {
  this.selected = defaultSelection;
  this.hideAllTabs();
} else {
  this.selectTab(defaultSelection);
}
```

19. Update the getter and setter

If manipulating an element through JavaScript, it's often the case that attributes are mirrored as properties on the object. To do this, we need to alter the getter and setter methods to pick up and manipulate the attribute as well. When collapsed equates to false, hide all the tabs.

```
get collapsed() {
  return this.hasAttribute(
    "collapsed") &&
    [null,"","true"].indexOf(
      this.getAttribute("collapsed"))!==-1;
}
set collapsed(val) {
  if([null,"","true"].indexOf(val)!==-1) {
    this.setAttribute("collapsed", val);
    this.hideAllTabs();} else {
```


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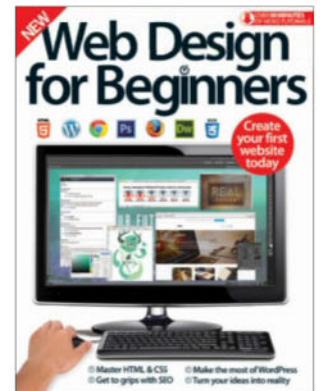
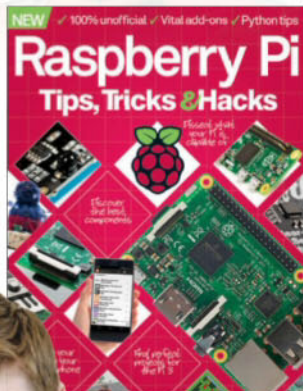
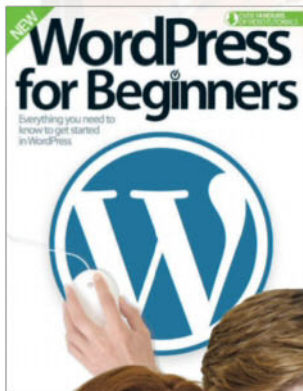


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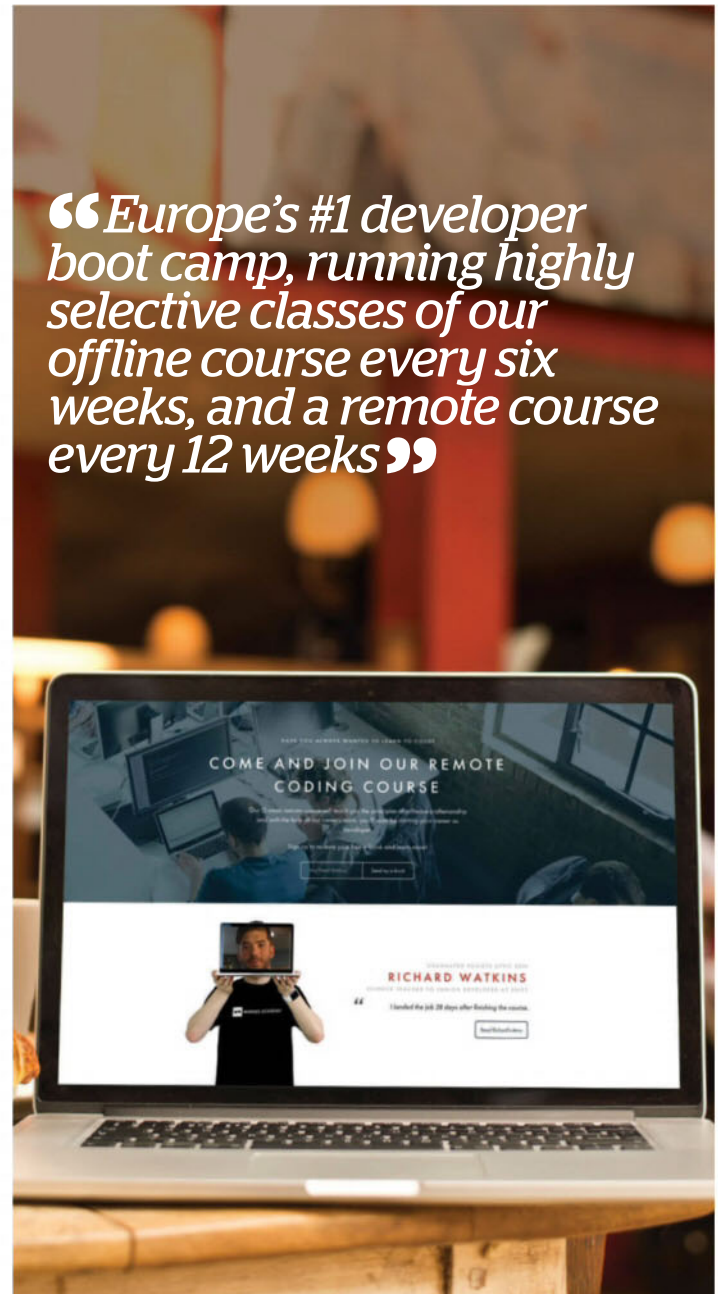
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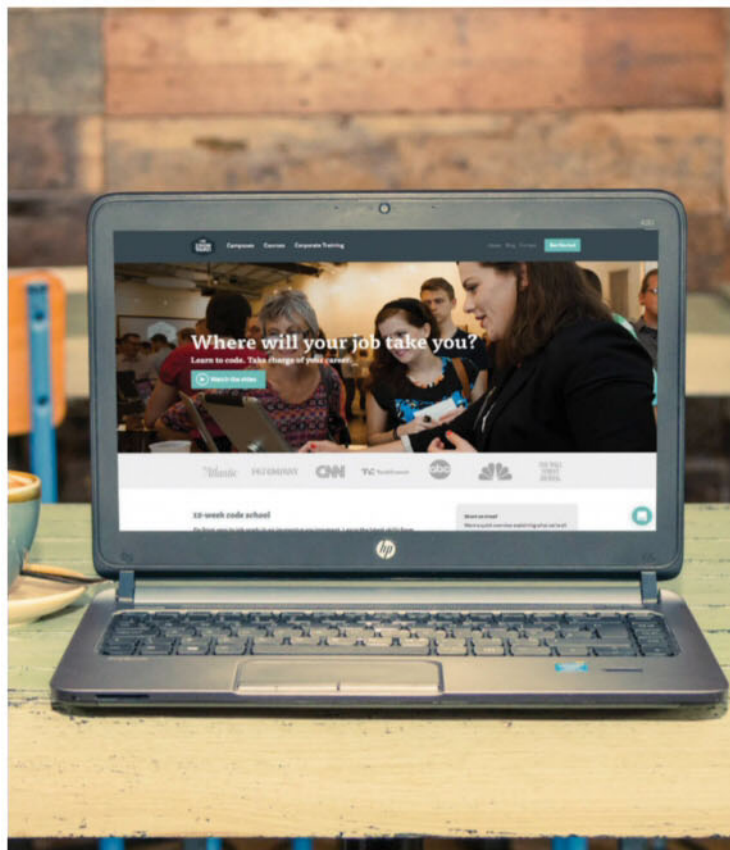
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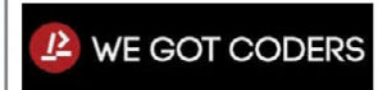
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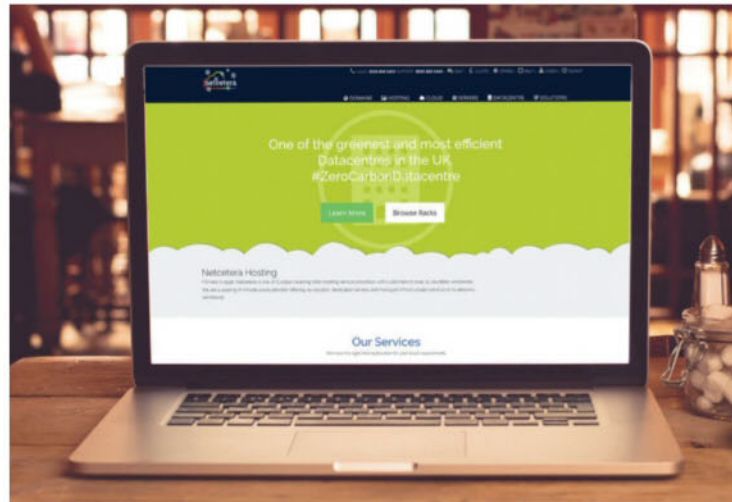
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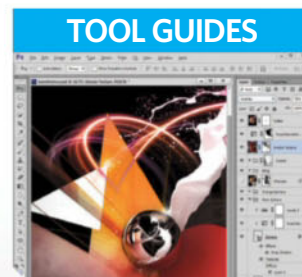
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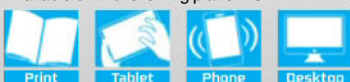


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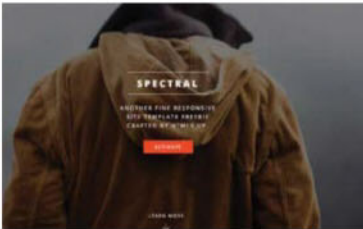
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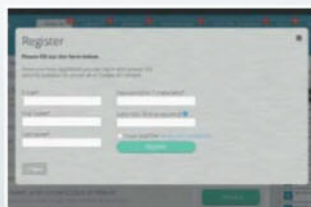


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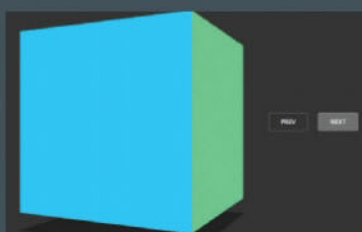
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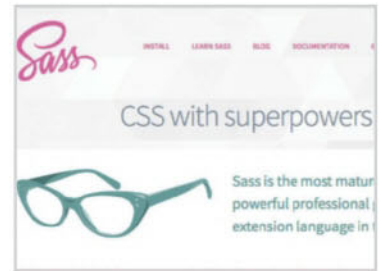
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