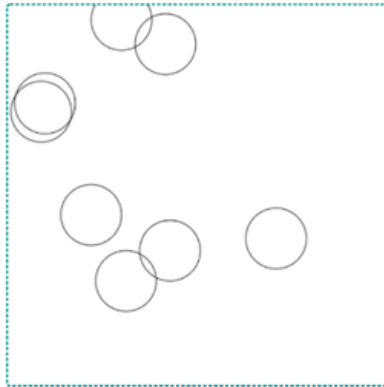


Teddywaddy Code Club

Activity 4a

Coding with JavaScript



<http://www.teddywaddy.com.au/canvas02.html>

Javascript Coding

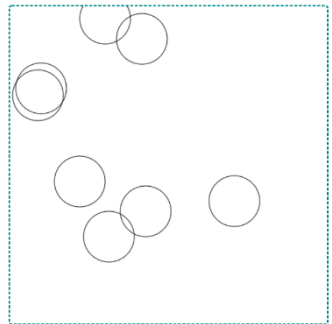
Coding, or computer programming is simply the process of writing instructions for a computer in a human readable format (the coding language). These instructions must be converted to a computer format before they can be carried out by the computer.

JavaScript is one of the primary coding languages of the Internet. It can be used to code everything from dynamic web pages to complex server-side functionality. Everything from games to business applications can be coded using Javascript.

Much coding is learnt through examples. Most programmers keep lots and lots of example code for things they've done before, or they seek examples online.

Here's some example code that draws random circles.

```
function createRandomCircle() {  
    const x = Math.floor(Math.random() * 400);  
    const y = Math.floor(Math.random() * 400);  
    drawCircle(x,y);  
}
```

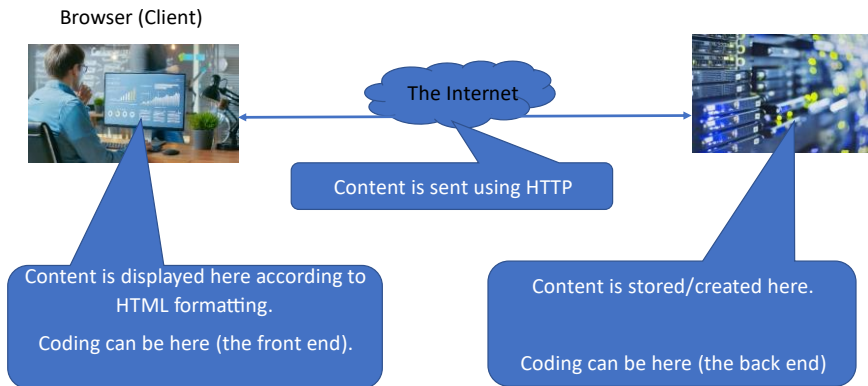


To see it working go to <http://www.teddywaddy.com.au/canvas02.html>

You can also download and examine the full code to see how it works. (Three files - canvas02.html, canvas02.css and canvas02.js.)

Client versus Server Coding

Although the JavaScript language can be used on both the client (browser) and server side, various JavaScript web development platforms/libraries specialise in one or the other. For instance, NodeJS is dedicated to server-side coding, while React is dedicated to the browser side.



At this stage, all the coding will be at the client side.

Why is coding needed?

There are two main reasons for coding within a web page.

1. While HTML and CSS contain the content and styling for a web page, they are not very dynamic or interactive. HTML and CSS are great for presentation of information, including images and sound.

Many, many applications are now accessed via the Internet – or more specifically the World Wide Web (WWW). You can access games, business applications, all sorts of social media and so on via the WWW. None of these would be possible without coding. You cannot create applications using only HTML and CSS.

While many applications use both front-end and back-end coding the principles are the same.

2. Graphics over the WWW. HTML and CSS cannot access the graphics capability of the web browser. Any kind of graphics application must be coded – usually in JavaScript.

The sample program linked at the start of these notes uses graphics coded in JavaScript.

Here's another example of what can be done with JavaScript and graphics. <https://webglsamples.org/aquarium/aquarium.html>

First JavaScript Code

The most common way to write JavaScript code is to use an editor on your computer, such as VS Code. For these first couple of simple exercises, the code can be completed in an online coding platform called trinket.io. However, they can also be coded in VS Code if you know how.

Firstly, open the trinket reference shown below.

<https://trinket.io/html/40c74100ed>

Now modify the code as shown below.

```
<html>
<head>
  <title>Javascript Test Page</title>
</head>
<body>
  <h1>JavaScript Code Test</h1>
  <h3 id="txt">Sample text</h3>
  <button onclick="btnClickFn()">Click me</button>
  <script>
    function btnClickFn() {
      alert("Mouse click");
    }
  </script>
</body>
</html>
```

Clicking the button should result in a browser alert box being displayed. Try changing the “Mouse click” message to make sure you understand what is happening.

Modifications.

Here are three small but significant activity extensions you might not fully understand, but illustrate that coding can suddenly bring a very dynamic aspect to a web page.


1. Replace the `alert("Mouse click");` line with:

```
document.write("<h1>Hello World<h1><p>My first JavaScript</p>");
```

Then click the button.

In this case the word *document* in the JavaScript actually refers to the whole web page, as stored by the browser behind the scenes. So this line writes to, or adds to, or in this case it replaces the whole web page. Behind the scenes, the browser stores the web page in what is called the Document Object Model (DOM).



Hit the refresh  if you want to get the display back to how it was before the button was clicked.

2. Now replace the same line with:

```
document.getElementById("txt").innerHTML = "JavaScript DOM access";
```

Then click the button.

Instead of adding to the web page, this code can change an existing element within the web page. In this case the element being changed is the one referred to by its ID, which is like a name for an element. Check out the code and you should be able to see how the ID links the element with the code.



3. Once again, replace the same line with:

```
console.log("Mouse activity!");
```

Then click the button.

Nothing will appear to happen when you click the button. This is a line not used to form part of the web page, but to help the person coding, sometimes called debugging. The console information can be read in the developer tools.

Developer tools

To access the developer tools, click on the three dots, usually near the top right of the web browser. In Google Chrome they are three vertical dots and in Microsoft Edge they are horizontal.  or 

Then in both cases, go to More tools | Developer tools

This will open a narrow window down the right hand side. Then click on the word console, but if it is not visible in the developer tools, click on the More tabs button to see *Console*. After changing to the console, click the button.

Developers (coders) often put these lines in multiple places throughout the code to be able to follow the progress of the code or diagnose issues. Try adding some additional console code.

If you intend to continue coding it is worthwhile installing VS Code. This can be done for free at <https://code.visualstudio.com/>

Some recommended YouTube channels for learning JavaScript are:

Traversy Media <https://www.youtube.com/@TraversyMedia>

Web Dev Simplified <https://www.youtube.com/@WebDevSimplified>