Intro #1: Numbers

Getting Started

You should have `you-win` running, with:

- a text editor, with a new game file open (e.g. a file called `game.js`).
- a Chrome window open (probably on `http://localhost:8000/`)
- (optional) a phone running Chrome or Safari, with your computer opened.

Put your text editor and Chrome window side-by-side, if you can (and/or keep your phone open in front of you!). Whenever save in your text editor, `you-win` will automatically refresh the page.

Make sure you have line numbers turned on in your text editor.

Your Chrome window should have a white screen. This is a blank canvas in which we can start making mobile games!

Have a look at the template that's open in your text editor. It should look like this:

```
const uw = require('you-win')
const {Phone, World, Sprite, Text, Polygon} = uw

// var phone = new Phone

// Load everything we need
await uw.begin()

// Make the world
var world = new World
world.title = ''
world.background = 'white'

// Now we can start making Sprites!
```

Look closely at these parts:

1. ```
   // var phone = new Phone
   ```

   This is a comment! Lines starting with `//` are ignored by JavaScript.

   You can use comments to write messages for yourself, to remind yourself what different bits of your code do.

2. ```
   await uw.begin()
   ```

   This is where we can load in any extra sounds or images for our game.

3. ```
   var world = new World
   ```

   This is where we make the `World`. The world represents the screen. We can set its `width` and `height` to change the size of the screen. (It's like the *Stage* in Scratch.)

Let's do that now!

- Set the `width` and `height` of the world.

  ```
  world.width = 300
  world.height = 460
  ```
  ```

Add this at the bottom of your program.

To change the attributes of an object in JavaScript, we write the name of the object, followed by a dot, and then `=`, and then the new value.

Save, and your world should change shape. It's now a white box, roughly the shape of a mobile phone in portrait, with black bars around the edges.

Sprites

First, we need to know how to add things to the world, so they appear on the screen.

In JavaScript, you create new things using the `new` keyword, followed by the kind of thing you want to make (such as `World`, `Sprite`, or `Text`).

We can add images to the World by creating `Sprites`. A Sprite is an image on the screen, which we can move about, rotate, flip, scale, make transparent, and so on. Let's make our first sprite.

- Add this code, after the block which makes the World.

```
var poop = new Sprite
poop.costume = '💩'
```

Save. Have a look at Chrome—now there should be a tiny poop in the middle of the screen!

We use the `var` keyword so we have a name to refer to our Sprite with.

As before, we can set object attributes using "dot notation", and giving it the new value.

Here are some kinds of values: *(These are just examples, don't type them in!)*

- **Boolean**: either `true` or `false`.

Example: the `poop.flipped` attibute is a Boolean. When set to true, it makes the Sprite face the other way.

- **Number**: e.g. `123` or `3.14`.
- **String**: some text. Strings are written with quotes around them, e.g. `'birb'` or `"potato"`. You can use either single or double quotes.

Now try this.

- **Challenge**: Set the `scale` attribute of your sprite to make it twice as big. (The scale is a number, starting at `1.0`).

  Remember that you have to include the name of your Sprite, so it should be `poop.scale` rather than `scale`. It won't work to write `scale` by itself, since the computer won't know which sprite you're talking about.

When we make a sprite, we get to specify its initial values. We can change any of them later, too (more on that in the next chapter).

Here are some other properties you can try:

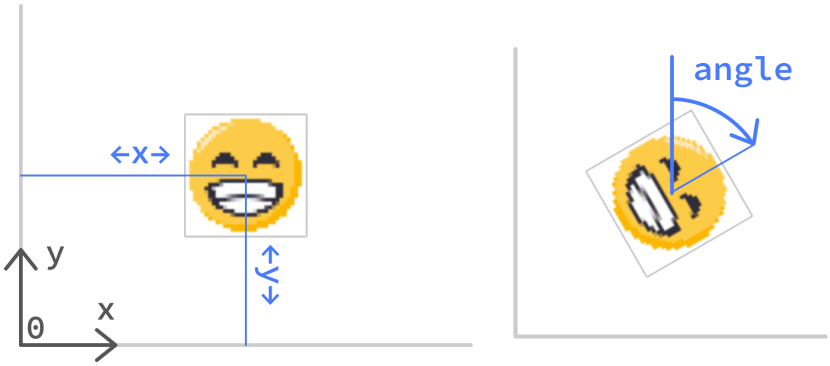
- `opacity` (a number between 0 and 1, starting at `1.0`)
- `angle` (a number, in degrees, starting at `0`)
- `flipped` (a boolean, initially `false`)

Coordinates

Let's move our sprite about. We can do this using the attributes `poop.posX` and `poop.posY`.

These are the co-ordinates of the center of the sprite, starting from the bottom-left corner of the screen.

Here's a quick diagram introducing coordinates:



- Move your poop to the position `(100, 200)`.

```
poop.posX = 100
poop.posY = 200
```

We can add other Sprites, too!

- Add a second sprite, called `cow`.

```
var cow = new Sprite
cow.costume = '🐄'
```

Edges

We just used the `.posX` and `.posY` attributes to set the **center** of the sprite.

We can also set the **edges** of the sprite, using the attributes `.top`, `.bottom`, `.left`, and `.right`.

- Move the cow to touch the left side of the screen.

```
cow.left = 0
```

- Move the poop to be to the right of the cow.

```
~~poop.posY = 100~~
```

Delete this line.

```
poop.left = cow.right
```

*Add this line. Make sure it's after **both** of the `poop` and `cow` variables have been created.*

Notice that you can't use the name of a Sprite before you create it. If you write `cow` in your program above the `var cow = new Sprite` line, it won't work.

- Now move the cow.

```
cow.left = 200
```

Add this line at the bottom of your program.

Notice that the poop doesn't move, even though we've moved the cow. This is important: when you set an attribute using `=`, it only happens once.

Randomness

Let's introduce some uncertainty into our creation.

We can use `uw.randomInt(1, 10)` to pick a random number between `1` and `10`. (This is just like `pick random _ to _` from Scratch.)

- Move your poop to a random `posX` position.

```
poop.posX = uw.randomInt(0, world.width)
```

- **Challenge:** Move your poop to a random `posY` position.

Refresh the page. Every time you refresh, the position of the poop should change!

Now try copy/pasting the code for the poop, to make a couple more random ones.

- Make two more poops.

Text

We've seen how to do images; now let's add some text to the screen.

When someone starts programming, it's traditional to for them to introduce themselves by saying "Hello world!". Let's do that now.

- Create a `Text` object.

```
var label = new Text
label.text = "Hello world!"
```

- Change it to red.

```
label.fill = 'red'
```

You can use any of the color names which are supported by HTML. If you give a color name that it doesn't recognise, you'll proabably just get black.

If you want other colors, instead of named colors you can use colors like `'#007de0'`. There are called a "hex code", short for hexadecimal. You can choose your own hex code color with an online color picker.

- Change it to your favourite color.

```
label.fill = '#007de0' // whatever you fancy really
```

The End

Good job! Now you know how to:

- Make JavaScript objects with the **`new` keyword**
- Use **`var` to name them**, so you can refer to them later
- **Set their attributes**, using dot notation and `=`
- Create `Sprites` and `Text`

- Set the **position** of objects inside the world
- How to **pick random numbers** using `uw.randomInt`

Let's continue on to chapter two!