Make a Mobile Game

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- Most kids think of making a game when they first start learning a programming language.

- Making games is a great way to learn programming. It's fun, and quite simple if using a good platform.

- Mobile phones are great for playing games.

The platform that we use

- Easy to learn to program

- Easy to use sensor data from the phone

  - Accelerometer

  - Touch screen

  - Gyroscope and compass, geolocation...

- Cross-platform: works on all kinds of of phones

  - Android, iOS, Windows, ….

- This awesome platform is called...

The Web Browsers!

In other words, we will develop a **web app**.

Programing a web app

You will be using three languages:

● HTML
  ○ Define the elements in the page
● CSS
  ○ Define the style of the elements
● JavaScript
  ○ Define the behaviours of the elements

In this demo, we are not assuming any web programming background from you.

We focus more on demoing the workflow rather the language details.

Basic examples

```
HTML:
<div id="stuff">inner content</div>
```

```
CSS:
#stuff {
    width:100px;
    height:100px;
    background-color: red;
}
```

```
JavaScript:
var w = 100;
w = w + 200;
var haha = document.getElementById("stuff");
haha.style.width = w + "px";
```

```
1  <!DOCTYPE html>
2  <html>
3      <head>
4          <title>Mobile Game Demo</title>
5          <meta http-equiv="Conte          ; charset=UTF-8" />
6          <meta name="viewport" c          user-scalable=no" />
7
8
9          <style>
10
11         </style>
12
13
14         <script>
15
16         </script>
17     </head>
18
19     <body>
20         <div id="content">
21
22
23         </div> <!-- end of content -->
24     </body>
25 </html>
26
```

CSS

JavaScript

HTML

Let's start working on a real game!

Open the following link on your phone
https://mcs.utm.utoronto.ca/~zhangy33/mobile/game.html

https://mcs.utm.utoronto.ca/~zhangy33/mobile/game.html

Step 1: Game Design

https://mcs.utm.utoronto.ca/~zhangy33/mobile/game.html
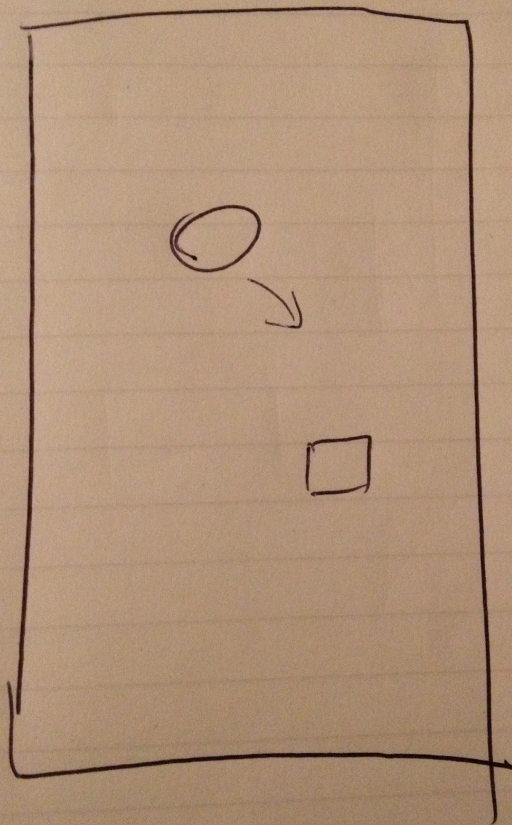
Step 2: Implement the Design

Steps of the implementation

1. Draw the ball, and the target, with style

2. Create the animation of the ball moving

3. Control the ball movement using accelerometer.

4. Detect ball hitting the target, and do something

5. Additional features

1. Draw the ball and the target (demo)

https://mcs.utm.utoronto.ca/~zhangy33/mobile/game.html

2. Create the animation

https://mcs.utm.utoronto.ca/~zhangy33/mobile/game.html

How to create animation

- Similar to how movies are made
- Frequently refresh the whole picture, and incrementally change the position of the moving part.

```
setInterval(function () { update position }, 10);

// update position every 10 milliseconds

// demo
```

3. Use accelerometer

Use accelerometer

The mobile API provides **window.ondevicemotion** which includes accelerometer information.

```
window.ondevicemotion = function(event) {
    ax = event.accelerationIncludingGravity.x;
    ay = event.accelerationIncludingGravity.y;
    az = event.accelerationIncludingGravity.z;
}
```

demo

4. Hitting the target

When catching a monster

1. Flash some message.

2. Spawn a new monster at random location.

Demo

5. Use the touch screen

Touch Event Types

- Touch Start

- Touch Move

- Touch End

- Touch Cancel

Listen to touch events

```
someElement.addEventListener ('touchstart', function (event) {
        // some callback action
});
```

- event.touches: a list of touch event

    ○ why a list?

- usually call event.preventDefault() to prevent mouse

    event from happening at the same time
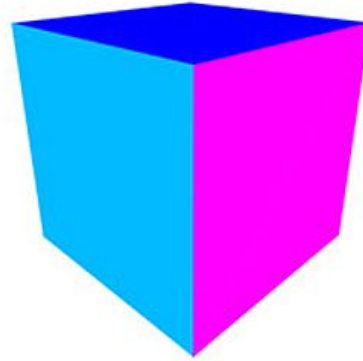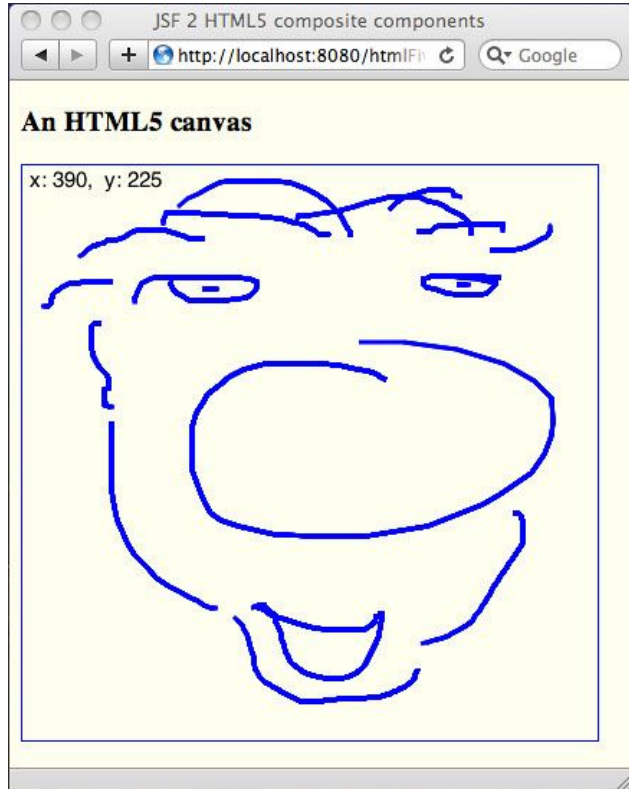
- demo

Other useful things for mobile games

Device Orientation

Geolocation

`navigator.geolocation.getCurrentPosition()`

HTML5 Canvas

JQuery

Makes writing JavaScript much easier.

```
JavaScript:

document.getElementById("stuff").innerHTML = "something";

JQuery:

$("#stuff").html("something");
```

Useful Google terms

- W3School HTML

- W3School CSS

- W3school JavaScript

- Web API orientation and motion

- Web API touch events

- HTML5 Canvas

- JQuery

THE END