



# CMP1130M Web Authoring

## Lab (7)

### Brief

The aim of this workshop is to get familiar with the JavaScript <canvas> and accessing context(2d) to draw and animate shapes.

By the end of this workshop, you should be able to:

1. Add a remote Javascript and CSS files.
2. Access <canvas> elements (by ID, Tag, Class, Selector,...).
3. Add multiple shapes.
4. Use the setInterval function (requestAnimationFrame preferred) to animate.
5. Utilise loops and arrays to store data.
6. Create interface to change the speed, colour and size of particles

### Task 1

1. Review the Lecture slides.
2. Download samples.
3. Make sure your html and documents are set up correctly.
4. Use remote CSS and JS instead of inline.

HTML

```
<canvas id="canvas" width="500" height="500"></canvas>
```

JS

```
// Traverse the DOM to find and element with a particular ID.
```

```
var canvas = document.getElementById("canvas");
```

```
var my_context = canvas.getContext('2d');
```

## Task 2

**Look up rect(), arc(),moveTo and LineTo:**  
[http://www.w3schools.com/html/html5\\_canvas.asp](http://www.w3schools.com/html/html5_canvas.asp)

```
canvas.clearRect(0,0,500,500);  
my_context.fillRect;
```

```
my_context.beginPath();  
my_context.arc(400,250,100, 0, 2 * Math.PI, false);  
my_context.fill();
```

1. Draw a 50 px square centre to the canvas element.
2. Draw a 50 px circle centre to the canvas element.
3. Draw a 2 lines cutting your canvas into equal quarters.  
Can you add text?

## Task 3

### Mouse events

1. Using a mouse click event listener can you get the x and y of the mouse a draw a circle or square in that position
2. Using the same mouse event can you draw a line from 2 points. i.e first click to second click

```
var clicks = 0;  
// store clicks in array  
var lastClick = [0, 0];
```

```
window.onload = function() {  
  canvas .addEventListener('click', drawLine, false);  
}
```

```
function drawLine(e) {  
  // get mouse x and y  
  x = e.pageX - this.offsetLeft;  
  y = ??
```

```
//if its the first click just get the xy pos no line otherwise will go from 0,0
```

```
if (clicks == 0) {  
  clicks++;  
  lastClick = [x, y];  
} else {  
  //draw line using lineTo  
  //colour  
  //stroke  
}  
// save last x and y for later  
lastClick = [x, y]; };
```

## Task 4

### For Loop

Use a for loop to:

```
for(var i=0; condition ;i++) {  
}
```

1. Create a grid of 10 x 10 squares . Sized 20px and spaced by 20px;
2. Output each x and y position in the console.

Why would incrementing up (i++) from 0 – 20 or down (i--) from 20 – 0 could make a difference?

## Task 5

### Set Interval function

Look up setInterval() / requestAnimationFrame

<http://creativejs.com/resources/requestanimationframe/>

1. Using setInterval(draw,30). Create a draw function that animates a shape from left to right.  
You will need to create variables for x and y positions. Try with  
.clearRect(0,0,500,500) and without, notice what happens when you do not clear.

2. Write a condition that checks the position of the shape and resets its position

## Project 1

Utilising a for loop and requestAnimationFrame(), create a Larson scanner styled loader animation (cylon / nightrider – you can see a theme here)

[https://www.youtube.com/watch?v=faukADr0\\_6g](https://www.youtube.com/watch?v=faukADr0_6g);

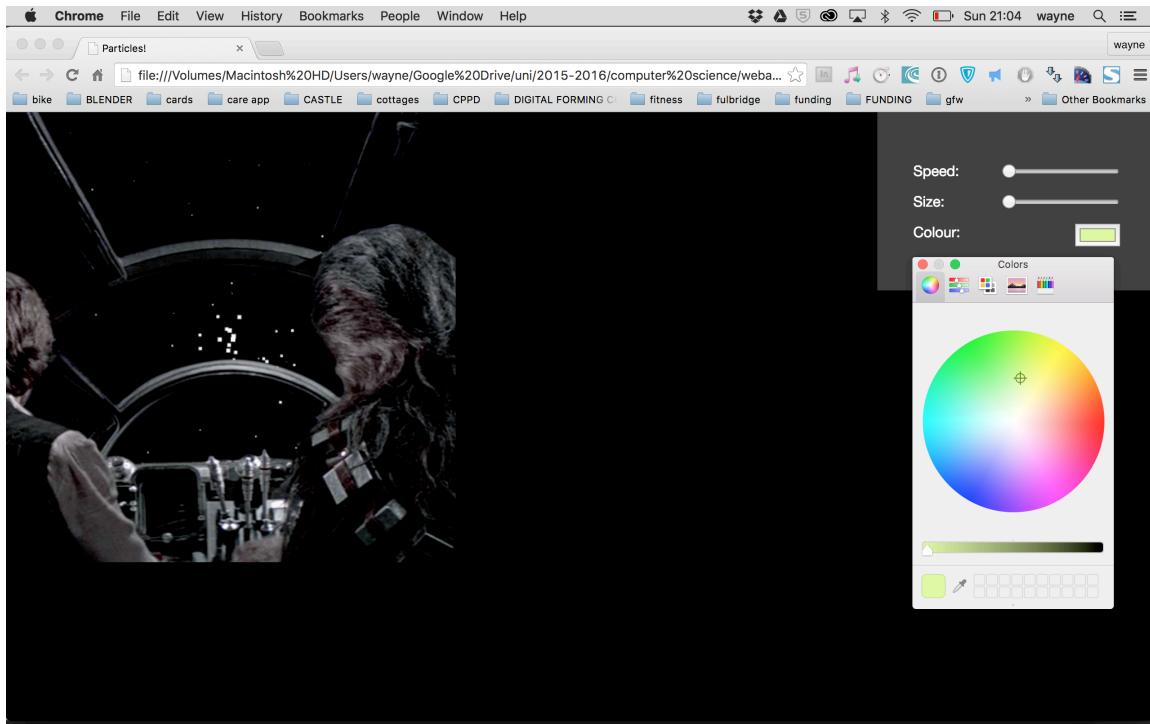


Consider opacity/number of squares

```
canvas2d.fillStyle = "rgba(255, 255, 255, 0.9)";
```

## Project 2

Using your Cylon scanner eye or the advanced sample provided add an interface which allows you to utilise html 5 range and colour inputs, and use them to effect the speed, size and colour of your shapes



### Further work 1

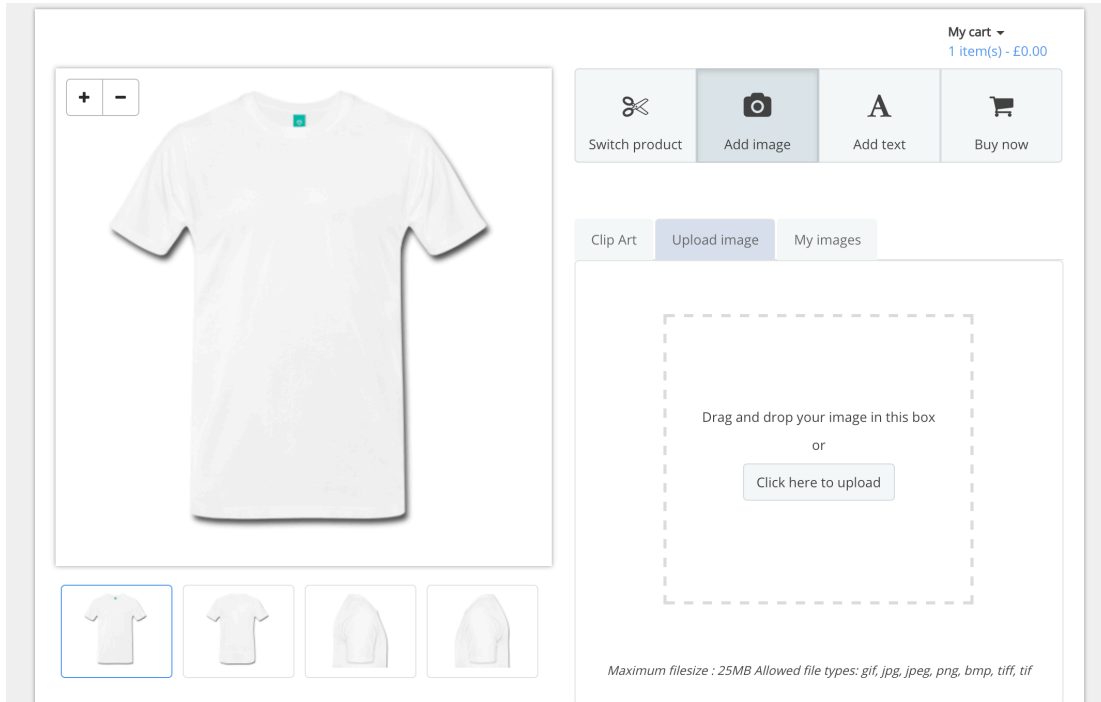
Draw a T-shirt image to a canvas and add an image upload form and use this image data to copy to the existing T-shirt image on that canvas.

Starting Direction to draw an image, drag and drop etc you will have to find out

```
<canvas id="myCanvas" width="578" height="400"></canvas>
<script>
  var canvas = document.getElementById('myCanvas');
  var context = canvas.getContext('2d');
  var imageObj = new Image();

  imageObj.onload = function() {
    context.drawImage(imageObj, 69, 50);
  };
  imageObj.src = /img_src.png;
</script>
```

PNG VS JPG what are the differences.



## Further work 2

Use a range input to clear canvas and rotate image up to 360 degrees.

Can you utilise blend modes to improve the look?

