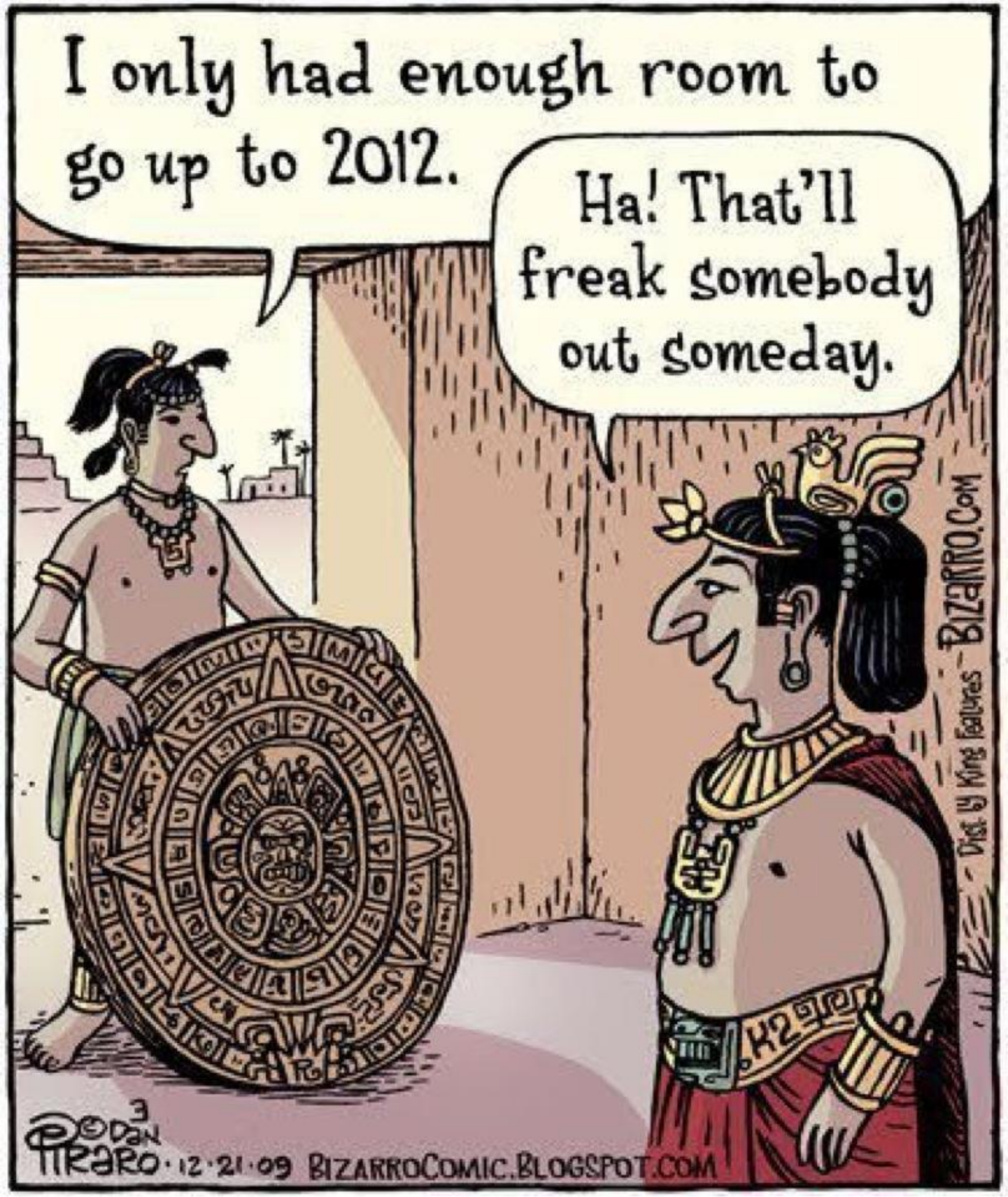
CSc 337

LECTURE 19: CANVAS


I only had enough room to go up to 2012.
Ha! That'll freak somebody out someday.
Dist. by King Features – BIZARRO.COM
© DAN PIRARO · 12·21·09 BIZARROCOMIC.BLOGSPOT.COM

Canvas and Events

You can attach an event listener to a canvas just like you can anything else

Activity: Make a line of 10 circles follow your mouse when it moves over a canvas

Moving the Canvas

What happens if the canvas isn't in the upper left hand corner of the page?

Incorrect `clientX` and `clientY` solution

You can get the location of the canvas using the following code:

```
let rect = canvas.getBoundingClientRect();
```

This contains data about the left and top. You can find the actual location of the mouse using the following:

X position: `event.clientX - rect.left`

Y position: `event.clientY - rect.top`

Other Canvas Context Methods

Full list: https://www.w3schools.com/tags/ref_canvas.asp

moveTo(**x**, **y**)	Moves the path to the specified point in the canvas, without creating a line
lineTo(**x**, **y**)	Adds a new point and creates a line to that point from the last specified point in the canvas

Drawing a line with the mouse

How can you draw a line with the mouse?

Where should you begin the path?

```
context.beginPath();
context.lineTo(x, y);
context.stroke()
```

Activity: Drawing a line

Create a web page that draws a line under the mouse as it moves across the canvas.

Gradients

createLinearGradient()	Creates a linear gradient (to use on canvas content)
createPattern()	Repeats a specified element in the specified direction
createRadialGradient()	Creates a radial/circular gradient (to use on canvas content)
addColorStop()	Specifies the colors and stop positions in a gradient object

All called on the context.

Linear Gradient

Linear gradient takes 4 parameters: start x, start y, stop x, stop y

Example:

```
let context = canvas.getContext("2d");
let gradient = context.createLinearGradient(0, 0, 100, 0);
```

Linear Gradient

Add colors to the gradient using `addColorStop`.

Code to create a black -> white gradient:

```
var gradient = context.createLinearGradient(0,0,170,0);
gradient.addColorStop(0, "black");
gradient.addColorStop(1, "white");

context.fillStyle = gradient;
context.fillRect(20,20,150,100);
```

Note that you must set the `fillStyle` to the gradient you created and actually draw the shape with it.

Activity: create a gradient

Create a horizontal gradient that goes from red to green to blue.
Create a vertical gradient over the top of it that goes from 0 opacity to black total opacity.

Getting a canvas pixel

You can get the value of pixels on a canvas using `getImageData`. It takes an x location, a y location, a width and a height as parameters.

```
let context = canvas.getContext("2d");

let data = context.getImageData(50, 50, 1, 1);

console.log("red:  " + data.data[0] + "green: " +

             data.data[1] + "blue: " + data.data[2]);
```

Activity

Get the color of your canvas (the one that you drew a gradient on) when the user clicks on it. Turn the background of your page that color.