

15-104 Introduction to Computing for Creative Practice

Fall 2020

35 Document Object Model (DOM)

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Document Object Model

- The DOM stands for Document Object Model.
- The idea is that the entire web page is processed to create nested objects: Every heading, paragraph, table, image, and list, originally in HTML, is accessible as an object via p5.js and JavaScript programming.
- To access “the DOM” from p5.js, you need the “all” template, which includes p5.dom.js, an extension of the core p5.js functions that includes new functions to access DOM objects.

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Example: Moving Canvas

```

var myCanvas;

function setup() {
  myCanvas = createCanvas(100, 100);
}


function draw() {
  background(200);
  myCanvas.position(noise(millis() / 2000) * 200,
    noise(10 + millis() / 2000) * 200);

  fill("red");
  rect(25, 25, 50, 50);
}

```

A reference to the canvas object can be stored in a variable and then it can be manipulated!

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Example: Rotating Box


```

var myCanvas;
function setup() {
  myCanvas = createCanvas(80, 80);
}
function draw() {
  background(200);
  myCanvas.position(noise(millis() / 2000) * 200,
    noise(10 + millis() / 2000) * 200);

  fill("red");
  push();
  translate(40, 40);
  rotate(millis() / 1000);
  rect(-25, -25, 50, 50);
  pop();
}

```

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Example: Rotating Box (cont'd)

```


<!DOCTYPE html>
<html>
  <head>
    <meta charset="UTF-8">
    <title>15104 35-2</title>
    <script src="https://cdnjs.cloudflare.com/ajax/libs/p5.js/0.9.0/p5.js"></script>
    <script src="https://cdnjs.cloudflare.com/ajax/libs/p5.js/0.9.0/addons/p5.dom.js">
    </script>
    <script src="sketch.js" type="text/javascript"></script>
  </head>
  <body>
    Mankind has always been fascinated by mechanical simulations of human activity.
    A characteristic of Western thought is to understand our minds, bodies, and our
    world in mechanistic terms. Music especially has been viewed as a mathematical
    and mechanical process. As a result, musicians, scientists, and engineers have
    ...
  </body>
</html>

```

A look at the [index.html file](#).

Note the nesting of the HTML tags!
Content is nested inside a tag and end tag (e.g. <body> </body>)

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Example: Animated Banner

In the `index.html` file:

```

<div align="center" id="aPlaceForCanvas"></div>

```

The `<div>` tag is used as a container for **HTML** elements which is then can be manipulated with JavaScript.

In `sketch.js`:


```

var myCanvas;
function setup() {
  myCanvas = createCanvas(400, 10);
  myCanvas.parent('aPlaceForCanvas');
}
function draw() {
  background(255);
  stroke("red");
  strokeWeight(2);
  var offset = int(millis() / 100) % 15;
  for (var i = -15; i < width; i = i + 15) {
    line(i + offset, 0, i + height + offset, height);
  }
}

```

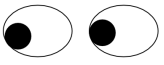
parent: Attaches the canvas as a child to the parent at `aPlaceForCanvas`.

millis: Returns the number of milliseconds (thousandths of a second) since starting the sketch (when `setup()` is called).



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Example: Eyes on the Mouse



```
function draw() {
  background(255);
  drawEye(0);      // Draw (left) eye, x offset = 0
  drawEye(100);   // Draw (right) eye, x offset = 100
}
function drawEye(ex) {
  fill(255);
  var x = 45 + ex; // eye center x
  var y = 50;      // eye center y
  ellipse(x, y, 80, 60);
  var dx = mouseX - x; // dx, dy goes from eye to mouse
  var dy = mouseY - y;
  var d = dist(x, y, mouseX, mouseY); // distance to mouse
  d = max(30, d); // avoid divide by zero
  dx = dx / d;  dy = dy / d; // now dx, dy goes from 0 to 1 in direction of mouse
  dx = dx * 25; dy = dy * 15; // scale dx, dy roughly to size of eye
  fill(0);      // draw the pupil
  ellipse(x + dx, y + dy, 30, 30);
}
```

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Example: Creating a new DIV

```
function setup() {
  myText = createDiv("<img src='http://fla.fg-a.com/aliens/flying-alien.gif'></img>
  <h2>Take me to your leader!</h2>");
}
function draw() {
  myText.position(noise(millis() / 2000) * 400 - 200,
  noise(10 + millis() / 2000) * 600 - 200);
}
```

createDiv: create a free-floating `<div>` element on the webpage.
 The content string is just HTML, so it can be text, images, tables, whatever. You can position this div with the `position` method or using the `parent(tagID)` method where some tag in the HTML has the given tagID.

Mankind has always been fascinated by mechanical simulations of human activity. A characteristic result of this fascination has been the development of music as a branch of mathematics closely related to Arithmetic. As a result, musicians, scientists, and engineers have devised all sorts of mechanisms and systems that simulate human activity. The audience relates to humanoid robot performers and how music can be composed by computers.

1. Music was considered to be a branch of mathematics closely related to Arithmetic.
2. Described by Pythagoras as the four arts: Arithmetic, Music, Geometry, Astronomy.
3. Later formalized as the four arts: Arithmetic, Music, Geometry, Astronomy.
4. Music theory developed as a branch of mathematics.
5. Today, music composition, recording, synthesizers ... all based on digital information.

Take me to your leader!

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Example: Displaying Computed Text

In index.html:
`<div align="center" id="aPlaceForText"></div>`

In sketch.js:

```
function setup() {
  myText = createDiv("Some Text");
  myText.parent("aPlaceForText");
  myText.style("font-size", "18pt");
}

function draw() {
  var s = "The mouse is at location " + int(mouseX) + ", " + int(mouseY);
  myText.elt.innerHTML = s; // replaces "Some Text"
}
```

elt: the HTML element
innerHTML: the text of the HTML element

of Western thought is to understand our minds, bodies, and our world in n
 for composing and performing music. I will review some or these activit

The mouse is at location 710, 400

netic
 by
 n processing

Where is the origin?
 Where did it place the new DIV element?

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Example: Processing Events

```
<html>
<head>
  <meta charset="UTF-8">
  <title>15104 35-7</title>
  <script src="https://cdnjs.cloudflare.com/ajax/libs/p5.js/0.5.2/p5.js"></script>
  <script src="https://cdnjs.cloudflare.com/ajax/libs/p5.js/0.5.2/addons/p5.dom.js">
  </script>
  <script src="sketch.js" type="text/javascript"></script>
</head>
<body>
  <big><big><big>
  <!-- other events are onchange, onclick, onkeypress -->
  <b onmouseover="charlotte()">Charlotte</b> -
  <b onmouseover="benjamin()">Benjamin</b> -
  <b onmouseover="porter()">Porter</b>
  </big></big></big><br>
  <div id="picture-here"></div>
</body>
</html>
```

When the mouse is over one of
 these words, the corresponding
 function in our sketch is run.

picture will appear here, below choices

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Example: Processing Events (cont'd)

```

var myCanvas;
var charImg;
var benjImg;
var portImg;

function preload() {
  charImg = loadImage("charlotte.jpg");
  benjImg = loadImage("benjamin.jpg");
  portImg = loadImage("porter.jpg");
}

function setup() {
  myCanvas = createCanvas(400, 300);
  myCanvas.parent("picture-here");
  noLoop();
}

function draw() {
  background(255);
}

function charlotte() {
  background(255);
  image(charImg, 0, 0, 400, 300);
}

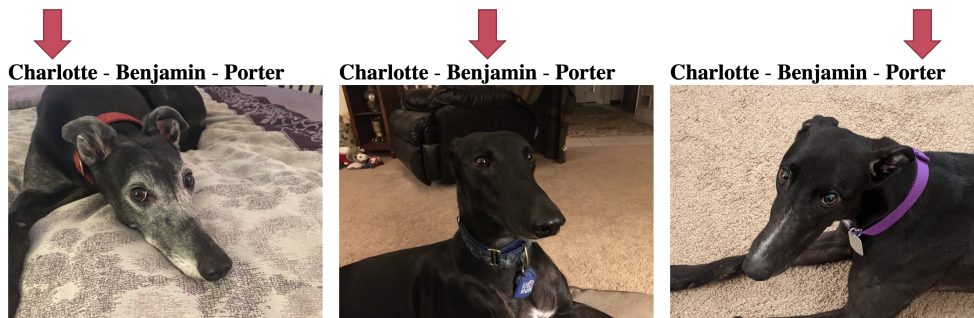
function benjamin() {
  background(255);
  image(benjImg, 0, 0, 400, 300);
}

function porter() {
  background(255);
  image(portImg, 0, 0, 400, 300);
}

```

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Good dogs!



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