

CPSC 1045 – Lab #5

Objective(s):

1. Learn JavaScript functions' concepts and terms
2. Evaluate JavaScript functions
3. Write JavaScript functions
4. Create a Webapp that is coded with JavaScript functions

Resource(s):

- <http://www.w3schools.com/html/default.asp>
- <http://www.w3schools.com/js/default.asp>
- <http://www.w3schools.com/canvas/default.asp>
- Web Browser and a computing device (campus or personal)
- Lecture and Lab notes
- Prior Labs and Worksheets
- Background Color options – you can use the following to change the background color as the fun is fading:
 - `ctx.canvas.style.backgroundColor = "blue";`
 - `ctx.canvas.style.backgroundColor = "rgb(" + r + "," + g + "," + b + ")";`
where r, g, b are numbers that range from 0 to 255
example: "rgb(10,50,125)" will represent a color – search the website for RGB colors

Grade Value:

- Tasks I, II, and III - **25 Points**
- Task IV – **75 Points**

Assigned Task(s):

- I. JavaScript Functions Concepts and Terms (8 Points)
 - a. When a function call finishes execution and returns, where does execution resume in the calling function?
 - b. How do you pick a function name?
 - c. Give two examples of how to define and name a function?
 - d. What is meant by the scope of a variable?
 - e. What is meant by a local variable?
 - f. What category of functions do not return a value?
 - g. What is meant when a function is called a "pure" function?
 - h. What is the purpose of the Call Stack?
 - i. Give two motivations for writing functions?
 - j. What is meant by a recursive call?
 - k. What is a function's parameter?
 - l. What is meant by stack overflow?
 - m. What happens when a function is passed too many arguments?
 - n. What happens when a function is passed too few arguments?
 - o. Functions should return at most how many values?
 - p. How many return statements can a function have?

II. Evaluating code fragments (10 Points)

- a. Given the following code, answer the questions below: (4 Points)

```
function doubleOrTriple(x) {  
  
  if (typeof(x) !== "number") {  
    return NaN;  
  }  
  if (50 <= x) {  
    return x*2;  
  } else {  
    return x*3;  
  }  
}
```

What is the name of the function?

What is/are the arguments, and what type should they need to be?

What is/are the possible return values?

What does the following call to the function return?

```
doubleOrTriple(doubleOrTriple(40));
```

- b. Given the following code, what is the output to the console after execution: (2 Points)

```
window.onload = function() {  
  
  function fnx(i, j) {  
    j = j * 2;  
    var k = i;  
    return (i + j / 2);  
  }  
  
  var i = 6;  
  var j = 4;  
  var k = j / i;  
  console.log("i = ",i, " j = ",j, " k = ",k);  
  k = fnx(i, j);  
  console.log("i = ",i, " j = ",j, " k = ",k);  
}
```

- c. Given the following code, answer the questions below: **(4 Points)**

```
function drawSomething(ctx,x,y,N,r1,r2){  
  
    if(isNaN(x) || isNaN(y) || isNaN(r1) ||  
       isNaN(r2) || isNaN(N) ){  
        console.log("Error in one of the parameters.");  
        return;  
    }  
  
    ctx.save();  
    ctx.translate(x,y);  
    ctx.beginPath();  
    for(var i = 0; i <= N; i += 1){  
        ctx.rotate(Math.PI/N);  
        ctx.lineTo(r1,0);  
        ctx.rotate(Math.PI/N);  
        ctx.lineTo(r2,0);  
    }  
    ctx.stroke();  
    ctx.restore();  
}
```

What does the above code draw, and where does it draw it?

What is the purpose of each parameter, and what condition do they need to satisfy for them to be valid?

What is the benefit of using parameters?

Give an example of a call to this function?

**** Test the above code with a canvas of size of 500+ by 500+; and start at the center.**

III. Write JavaScript Functions **(7 Points)**

- a. Write a JavaScript function that will accept three arguments (unique integers), and return the middle value the three integers. **(2 Points)**
- b. **Problem Definition:** There are N people in a room, where N is an integer greater than or equal to 2. Each person shakes hands once with every other person. What is the total number of handshakes in the room? **(5 Points)**

Task: Write a recursive function that will return the total number of handshakes when passed the value of N. To get you started, if there are only one or two people in the room, then:

handshake(1) = 0
handshake(2) = 1

Test your function with the following results for N:

Number of Handshakes for 5 person(s) in a room is 10
Number of Handshakes for 8 person(s) in a room is 28

IV. Write a Webapp **(75 Points)**

Start your webapp with a page that is similar to the following:

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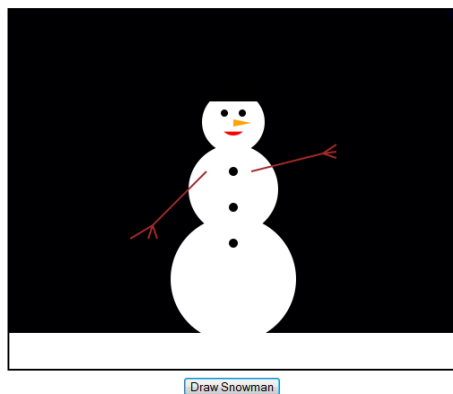
When the button “Draw Snowman” is pressed, your webapp, will draw a snowman similar to the following:

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And then, your webapp will slowly fade away the sun and change the background from a light blue to black (simulating a sun going down). When the sun completely “fades” off your canvas, your page should look like the following:

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Download CPSC-1045-Lab5-Video.mp4 to see an example of the fading sun.

Complete the following requirements for this webapp:

- a. Add a button at the bottom of your canvas with the caption "Draw Snowman". (5 Points)
- b. Set your canvas size to 500 by 400, with a border. (5 Points)
- c. Write functions for the following: (30 Points - 5 Points for each function)
 - i. Draw Snowman body – arguments will be the size of the circle, and the center point of the circle, x and y. Your program will call this function three times to draw the body.
 - ii. Draw Snowman eyes and buttons (use one function for both eyes and buttons) – arguments will be the size of the circle, and the center point of the circle, x and y. Your program will call this function five times to draw the two eyes and three buttons.
 - iii. Draw Snowman's hat.
 - iv. Draw layer of snow under the Snowman – arguments will be the starting x and starting y position.
 - v. Draw background – argument will be a shade of blue.
 - vi. Draw the Sun.
- d. Fade the Sun gradually after the Snowman has been draw. (35 Points)

Deliverable(s):

- I. Submit one zipped file called **FirstName-LastName-SID- LAB5.zip** to D2L under the folder called Lab #5. This zip file will contain the following files:

FirstName-LastName-SID- LAB5.docx

This document will contain your answers to Tasks I, II, and III above.

FirstName-LastName-SID- LAB5.HTML

This document will contain the webapp for Task IV above.

Due Date:

See D2L. No late submissions accepted/graded.