

# CPSC 1045: Lab 7 – Input and Event-Driven Programming

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## *Events and Event-Driven Programming*

### Introduction

In this lab we will build on our knowledge of functions and introduce event-driven programming. Organizing our code into functions allows us to introduce a second model of programming called **event-driven** programming.

So far, all of our JavaScript programs have executed immediately, that is, the moment the script was loaded it instantly ran from the first statement to the last statement, with the conditional statements allowing us to selectively run certain blocks of code and loops allowing us to repeat blocks of code. More specifically, the webpage is loaded and the browser begins to parse the code for the page. It builds an internal model of the webpage, starting from the top of the file and going down line by line until it reaches the end. After the browser finishes loading the page, it begins running our script until the script is finished.

Most modern websites don't usually run all their scripts immediately; rather they usually follow the principles of **event-driven programming**.

An **event** is any interactive thing that can happen on the page, for example, a button press, a key pressed, a timer expiring, the page finishes loading etc. In an event-driven program, code executes in response to a particular event occurring.

In this lab we will change the focus of our input output model from alert/prompt/confirm to using elements in the web page itself. We will continue to place our code in functions so that they will execute when an event occurs.

### References

#### Events:

[http://www.w3schools.com/js/js\\_events.asp](http://www.w3schools.com/js/js_events.asp)

#### Event videos:

<http://www.lynda.com/JavaScript-tutorials/Introduction-JavaScript-event-handling/81266/87543-4.html>

<http://www.lynda.com/JavaScript-tutorials/Working-onClick-onLoad-events/81266/87544-4.html>

#### Input:

[http://www.w3schools.com/tags/tag\\_input.asp](http://www.w3schools.com/tags/tag_input.asp)

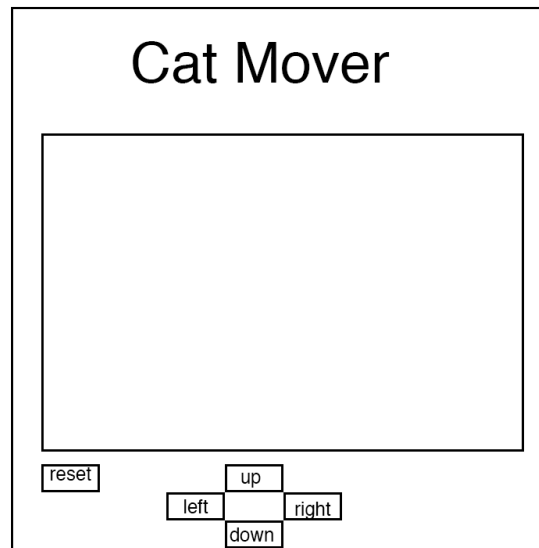
<https://developer.mozilla.org/en/docs/Web/HTML/Element/Input>

<http://mdn.beonex.com/en/HTML/Element/input.html>

## Part A: Object mover

Write an app that moves an object around the canvas using up, down, left and right buttons. An example can be found at the link below:

<http://mylinux.langara.bc.ca/~kimlam/lab7/lab7a.html>



- For this lab, you should re-use the function you developed in lab 6 to draw the object.
- Create the above HTML page with 5 buttons (4 for direction and 1 for reset) and a canvas. Don't worry too much about the alignment of the buttons.
- Initially draw the object at the center of the canvas.
- When the reset button is pressed, draw an object in the center of the canvas.
- When a direction button is pressed, move the cat a little bit in the desired direction.
  - This can be accomplished by erasing the entire canvas and redrawing the cat in its new location.
  - The drawing context method, `ctx.clearRect(x,y,width,height)`, can be used to erase the canvas.
  - Ensure the object remains within the canvas at all times.
    - You will need to check the x and y coordinates of your drawing to make sure it is not off the canvas.

## Part B: Parabola Plotter

Example of the lab can be found here:

<http://mylinux.langara.bc.ca/~kimlam/lab7/lab7b.html>

Write a web app to plot a parabola. The formula parabola is given by

$$y = ax^2 + bx + c.$$

Your application should have inputs for the coefficients **a**, **b** and **c**. Your application should have a plot button, which will plot the parabola on a canvas. You should also display on the HTML page the root of the quadratic equation. If the roots are imaginary, simply display imaginary root. The equation for the roots is given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

A sample of how your page should look is below, a sample of how the page should work can be found in the link above. If  $b^2 - 4ac$  is negative, then the roots are imaginary.

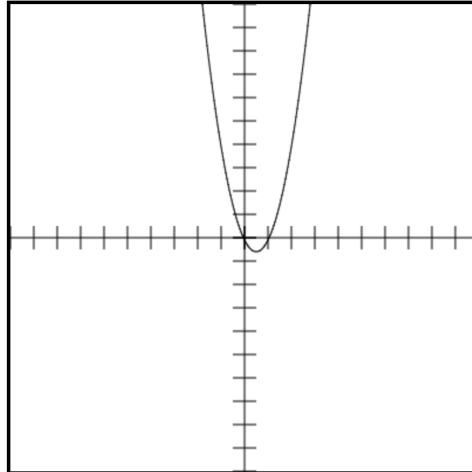
### Summary:

Your page should contain:

1. 3 input elements for the quadratic coefficients
2. 1 button to plot the equation
3. 1 canvas element
4. 1 or 2 text elements to display the roots

## Lab 7b: Parabola Plotter

A parabola is defined by the equation  $y = ax^2 + bx + c$ .  
The following app will plot the parabola given the coefficients a, b and c  
a: -0.1  
b: 2  
c: 2  
  
Root1: -13.999999999999998  
Root2: 34



## Submissions

- Zip all your files for part A and B into a single zip file and submit to drop box.
- This lab will be graded in lab, so be prepared to demonstrate your lab and answer questions.

- Note that Lab 7 is due later than normal, because it's likely that people will take longer to finish this lab.