CS 1100: Web Development: Client-Side Coding / Fall 2016
Assignment 7: The Travelling Hobbit

Due: Friday, October 28, 2016, by 11:59 p.m.

Assignment Description

The purpose of this assignment is to practice the following:

- functions
- conditional statements
- comparison and logical operators
- the DOM API

Setup

Download the hw7.zip file and extract it. Inside you will find four files: a web page, a stylesheet, and a JavaScript file.

Description

As you may have guessed, your homework is based on the work we did in our last lab. Your task is to write a program that will display a particular message whenever you move your mouse.

A mouse movement, like a keystroke or a mouse click, is an event. Much of JavaScript programming is event-driven (i.e., something happens in response to an event). We haven't covered events yet, so the necessary code is provided for you: your JavaScript file contains the code to get you started (do not delete it).

You have a function defined for you: showMessage. It is called every time your mouse pointer moves. The function provides you access to the mouse pointer's coordinates; variables mouseX and mouseY. Think of the screen as a coordinate plane where the top left corner has coordinates x = 0; y = 0. Thus, if you move your mouse 500 pixels to the left, your coordinates would be x = 500; y = 0. If you then moved your mouse 300 pixels down, your coordinates would x = 500, y = 300.

Your Task

Open the hw7.html webpage. Your mouse pointer represents a hobbit, who is travelling in Middle-earth. The four key locations in this assignment are marked with rectangles (the Mordor rectangle, of course, is red).

When you move the mouse, the message box at the top of the screen displays a message depending on where your mouse pointer is. Here are the specific requirements:

1. When your mouse pointer is inside the Gray Havens rectangle, the message says "You are in Grey Havens"
2. When your mouse pointer is inside the Rivendell rectangle, the message says "You are in Rivendell"
3. When your mouse pointer is inside the Rohan rectangle, the message says "You are in Rohan"
4. When your mouse pointer is inside the Mordor rectangle, the message says "Oh no! You are in Mordor"
5. In all other cases, the message says "You are in Middle-earth at x = ***N*** y = ***M***" (where ***N*** is the current x-coordinate of your mouse pointer, and ***M*** is the current y-coordinate of your mouse pointer.

Implementation Guidelines

Step 0. Don't panic!

Step 1. During the lab you have implemented similar functionality (and even more!) to display your current coordinates and recognize one location (Lothlorien). Use some of that code to implement ONE location (for example, Gray Havens). At this point you are adding code to the showMessage function.

Make sure your program works for Grey Havens: it displays the message correctly in both cases: when you are inside the town walls, and when you are exploring the rest of Middle-earth.

Step 2. STOP HERE. Think. Your program needs to recognize three more locations. If you use the same code you used for Grey Havens you will have (a) lots of duplicated code; and (b) a very poor solution.

Instead, let's use a function so we can reuse the code we have already written. Think about this: the four locations require almost exactly the same programming logic:

1. we get the rectangle object from the DOM tree and store it in a variable
2. we get its x and y coordinates, then its width and height
3. we compare the x and y coordinates of the current location of our mouse pointer to the values we've obtained in the previous step to determine whether the pointer is within the rectangle.

Step 3. Create a function **contains(element, x, y)** that takes 3 arguments:

- an HTMLElement object (i.e., the object you get when you use document.querySelector)
- the x-coordinate of your mouse pointer (which is a number)
- the y-coordinate of your mouse pointer (which is a number)

The function checks if the element contains the coordinates.
If so, it returns the value ***true***. If not, it returns the value ***false***.

Call the contains function from your showMessage function, replacing all the code that did all the hard work checking if a rectangle contained the mouse pointer. Thus, your showMessage function should contain code that would read something like this:

> if contains(mordor-rectangle, mouse-x, mouse-y), then do something. If not - do something else
> ...and so on - for all 4 locations.
> And don't forget the default case - when the mouse pointer is not inside any of the locations.

Keep in mind: a function call (i.e., when you call a function) is an expression - so you can use it anywhere you use an expression, including the test condition inside a conditional statement!

Step 4. Make sure your program works correctly: move around your mouse, try all locations, make sure the messages are correct and are displayed whenever you move inside a rectangle.

Submit your work

Submit your **hw7.js** file to eLearning. You do not need to submit anything else.

Grading

This assignment is worth **35 points** (which accounts for approximately **2.7% of your grade**).

1. Your program works at least for one location **(5 points)**
2. Function showMessage implemented correctly **(10 points)**
3. Function contains implemented correctly **(10 points)**
4. Function contains correctly called from the showMessage function for each location **(8 points)**
5. Use of good variable names **(2 points)**

To earn partial credit, your program should work without causing JavaScript errors.

May the light of Eärendil be with you!