COMS/SE 319: Software Construction and User Interface
Fall 2018

LAB Activity 4 – JavaScript

Task 1: Functions as First-Class Objects

Learning Objectives:

- **learn what is meant by first class objects**
- **learn that functions are first-class objects in javascript.**

Resource:

https://en.wikipedia.org/wiki/First-class_function

Useful Blog: https://hackernoon.com/effective-functional-javascript-first-class-and-higher-order-functions-713fde8df50a

Step 1:

READ https://en.wikipedia.org/wiki/First-class_function

When are functions said to be first class objects?

Step 2:

READ 07_funcs_firstClass.html (provided)

On which line is

a) a function being assigned to a variable?
b) a function being passed as a parameter? [Please answer it in Canvas Quiz]
c) a function being declared inside a function?
d) a function being returned from a function?

Step 3:

double click on 07_funcs_firstClass.html

Make sure you understand the results!

Task 2: CLOSURES

Learning Objectives:

- **Students will:**
  Play with functions in order to see examples of closures.

Step 1:

- READ
  https://www.w3schools.com/js/js_function_closures.asp
  and
  http://javascriptissexy.com/understand-javascript-closures-with-ease/

- What is a javascript closure?

Step 2:

- READ 08_funcs_closures.html (provided)
- READ 09_1_funcs_useOfClosures.html
- READ 09_2_funcs_useOfClosures.html

Step 3:

- READ 10_0_funcs_closures3.html
- READ 10_1_funcs_closures3.html
- READ 10_2_funcs_closures3.html

If you uncomment these lines below in 10_2_funcs_closures3.html file, what is the output? [Please answer it in Canvas Quiz]

```
//document.write(x[0]() + "<br>");
//document.write(x[1]() + "<br>");
```

Step 4:

- READ 11_funcs_closuresReuseCode.html

- Note how we are able to use "higher order functions" (functions that take other functions as parameters) to abstract out common functionality.

- Makes the codes much easier to write (and read).

Task 3: THIS

Learning Objective:

- Students will:
  - learn about simple js objects.
  - understand "this" usage in js

Step 1:

- READ 12_1_funcs_objectsThis.html

- Run the code (by double clicking the file) and then explain what happens.

Step 2:

- READ 13_objectsAsArrays.html

- Run the code (by double clicking the file) and then explain what happens..

Step 3:

- Read the SampleProgram (match.js and lab.html).

- Run the code (by double clicking the html) and then explain what happens..

- NOTE: you will have to create a similar program later on for HW– so pay attention.

Step 4:

- NOTE that there are some other js files in the folder. You can play with them. As they include some concepts/tools we haven't gone over --- you can also ignore them for now.

Task 4: EVENT HANDLING

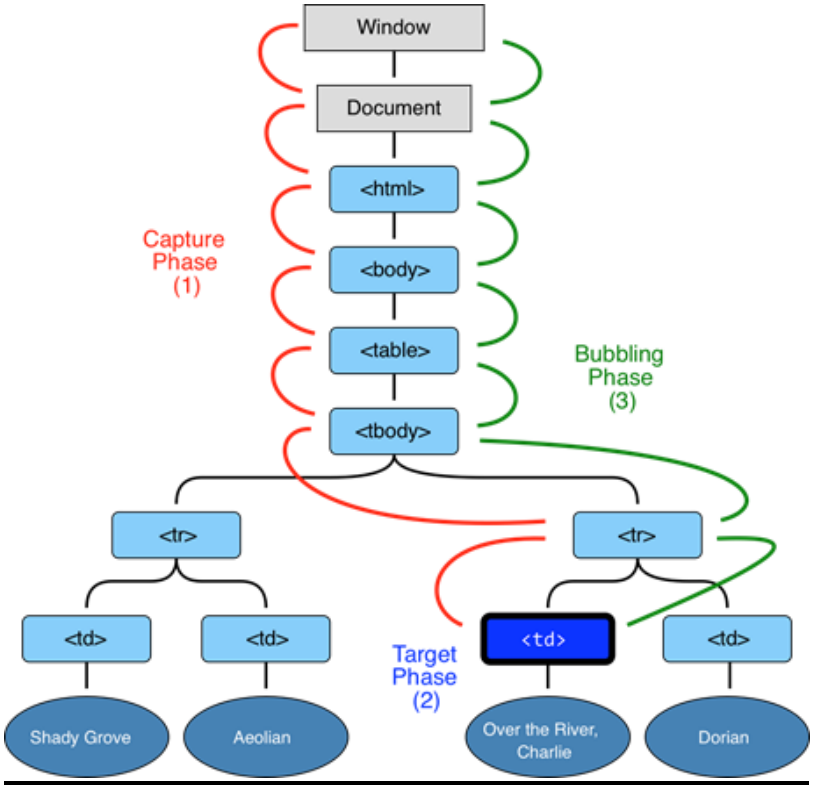
Learning Objective:

- Students will:
  - Learn more about event handling (https://javascript.info/bubbling-and-capturing)

- how events bubble up
- how capture of events work
- how to stop event propagation

Step 1:

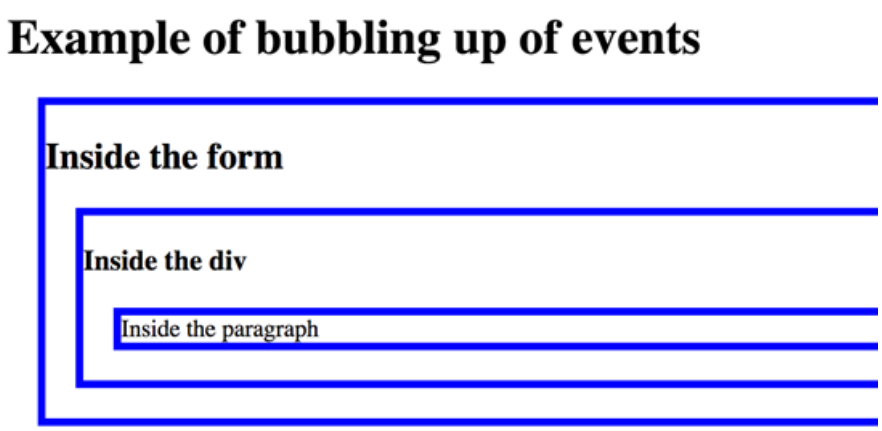
- SCAN (i.e. read lightly and quickly) https://javascript.info/bubbling-and-capturing



Step 2 (bubbling):

- Events bubble up from target DOM element and can be handled at each element.
- Read events01.html

- Click inside the div and other parts of the screen



Step 3 (capture):

- Events go downwards in capture phase from top to target DOM element and can be handled at each element.
- Read events02.html
- Click inside the div and other parts of the screen

When you clicked inside the paragraph, what is color of the selected region? [Please answer it in Canvas Quiz]

*If you have finished this lab activity and submitted **Lab Attendance Quiz** in **Canvas**, you can work on HW3.*