SC-T-213-VEFF - Web Programming I

JavaScript and Testing Exercises

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1   Introduction

This document lists a number of mixed JavaScript exercises, most of which have their own testing part.
Note: Some of these exercises are not very specific. That means you can solve them in many different ways, doing your own design decisions (e.g., in P4, we do not specify how you should represent a matrix, or what exactly should happen in the case where you don't pass a matrix in).

2   P1 - Array reverse

Exercise: Write a JavaScript function that reverses a given array and returns the result (additional: can you do it in-place? That is, without creating a new array).
Testing: Write a unit test for the function (you choose a sample array) that tests that it indeed returns the right thing.

3   P2 - Input Processing

Exercise: Write JavaScript function that takes an input text and returns an array of all words in the text
Testing: Write a unit test testing the functionality.

4   P3 - Numbers

Exercise: Write JavaScript function that takes three numbers and a boolean flag as parameters. If the flag is true, the function shall check whether the numbers increase strictly (first param < second param < third param). If the flag is false, check whether the numbers increase (softly) - allowing also equality.
Testing: Write two unit test each for both the strict and the soft case. One test shall check the case in which the numbers ARE increasing, and one test shall check the case in which they are not.

5   P4- Matrix

Exercise: Write JavaScript function that takes a matrix as a parameter. It returns true if the matrix is diagonal (it has only entries on the main diagonal), false otherwise.
Testing: Write three unit tests: One testing the success case, one the failure case, and one the case in which the input is not a matrix.

6   P5 - Objects

Testing: Write this test before the function (TDD)! Test both the case where the point lies within the circle and the case where it lies outside.

Exercise: Write JavaScript function that takes as an input the following two objects:

- An object called circle that has attributes radius and center (an object with x and y attributes)

- An object called point that has attributes a and b

The function shall return true if the point lies within the circle, false otherwise.

7   P6 - Guesswork

Exercise: Write an HTML file which has an input field and a button. The page shall be enhanced with JavaScript functionality, so that whenever the user enters a number between 0 and 8 and clicks the then button, a random number between 0 and 8 is generated and compared to the input value. If the values are identical, display "You guessed right" in a div. Otherwise, display "Wrong guess - try again".
Testing: Write a unit test testing your comparison function.

8   P7 - Style Change

Exercise: Write an HTML file with a button and a paragraph with some text (chosen by you). Whenever the button is clicked, cause the background color and the text color of the paragraph to invert (if the background was white and text black, change the background to black and the text to white. Otherwise, do the opposite).

9   P8 - Image Change

Exercise: Write an HTML file that displays an image. Whenever the user hovers over the image, it should change into a random image (selected from a number of images). The new image shall stay until the next hover event.