COMP 110 — INTRODUCTION TO PROGRAMMING WWW

http://comp110www.web.unc.edu

Fall 2011

Homework 5

Submission Deadline: 10:59 AM, Nov 16

This homework is designed to give you practice on arrays and functions. It involves 9 written exercises --- you are to answer the questions on paper (type-set) and submit.

About 10% of the grade is still reserved for a good programming style. So do remember to indent your code properly (for every block of code) and do remember to add sufficient comments.

Submission Instructions

• Your submission should include the following at the top

  Your name
  COMP 110
  Assignment number 5
  Total time taken to complete this assignment
  Pledge: I have neither given nor received unauthorized aid on this assignment

  (signed) __________________

  Sign the pledge by typing your full name.

• Turn in a paper copy of your submission. Please type-set (do not hand-write). Hand this to either the instructor or the TAs by the submission deadline.

• Submit on blackboard the full solution as an attachment.

A Reminder on the Honor Code

Please review the honor code for this course. It is ok to:

• Discussing the assigned homework problem to understand its meaning.

• Discuss about specific HTML and Javascript features
In all cases you must explicitly acknowledge any and all substantive help received from other individuals. That is, if you collaborate in any of the above ways with other individuals then you must include an explicit acknowledgment in your homework solution of the persons from whom you received aid. Acknowledging others, if done properly, will not adversely affect your grade.

Unacceptable collaboration on written homework includes:

- Copying HTML or Javascript code (or any portion of your homework solution) from other students, or from the web.

Should questions arise during the course of working on a problem please feel free to contact the instructor. In principle, if you work with others in good faith and are honest and generous with your attributions of credit you will have no problems.

**Homework Exercises (1-9)**

1. Write code to put 10 random integers in the range 0 ... 100 into an array.

2. Write code that prompts the user to enter positive numbers (> 0), and keeps prompting till the user enters a number less than or equal to 0. Store all of the positive numbers entered in an array. Then display (in a single HTML text line) only those elements of the array that are even.

3. Write code that takes the array created in the exercise above and creates another array containing only those elements of the original array that are in the range 25 ... 75. Display the elements of this second derived array in a single HTML line. Then compute and display the average of the numbers in this derived array (using an alert box).

For the following four exercises, assume you are given a function p(x) that takes a parameter x and returns **true** if x has property p, and **false** if x does not have property p. It doesn't matter what property p is. Assume that the function p works for any x.

4. Write a function allP(a) that takes the array a as its parameter and returns **true** if all of the elements of a have property p. It returns **false** if not all the elements of a have the property. If an array has zero elements, then allP(a) is **true**. (Think about why this is the case. For example, if you turned in no assignments in a course, would it be truthful to tell your parents, "Every assignment I turned in got an A."?)

5. Write a function someP(a) that takes the array a as its parameter and returns **true** if some (one or more) of the elements of a have property p. It returns **false** if none of the elements of a have property p. What should someP(a) be if a has no elements?

6. Write a function countP(a) that takes the array a as its parameter and returns the number of elements of a that have property p. What should be returned if the array has no elements?
7. Write a function subP(a) that takes the array a as its parameter and returns another array containing only those elements of a that have property p. What should allP(subP(a)) return? Will this work properly even if none of the elements of a have property p?

8. Fill in the code to complete the following function which determines if an array contains three or more consecutive ones.

   function threeOnesInARow(list)
   {
     
     
   }

9. Write a recursive function power(x,n), that returns the value of x^n and relies on the following relations:

   \[ x^0 = 1, \text{ if } n \text{ is 0}, \]
   \[ x^n = x \cdot x^{n-1}, \text{ if } n \geq 1 \]
   \[ x^n = \frac{1}{x} \cdot x^{n+1}, \text{ if } n \leq -1 \]

   The function should display an appropriate error message (and should return a value of 0) if either x is 0, or if n is not an integer.