CSI 116 91 – Introduction to Programming
Spring 2017
Homework 4
220 points

1. **[10pts]** Write a prototype for a function `sum_n_avg` that has three type `double` input parameters and two output parameters. The function computes the sum and the average of its three input arguments and relays its results through the output parameters.

2. **[30pts]** Determine the following information about a value passed in as a parameter.

   (a) Is the value a multiple of 7, 11 or 13?
   (b) The sign of the value (-1 if it is negative, 0 if it is 0 and 1 if the value is positive).

   You should write a function with three type `int` parameters, one input parameter (the value) and two other output parameters. The function should send back the answers to the two questions above in the output parameters of the function. Some sample input data might be:

   104 3773 13 121 77 30751.

3. **[10pts]** What is the difference in meaning between `x3` and `x[3]`?

4. **[30pts - 10pts each item]** For the declaration

   `int array[12];`

   (a) How many memory cells are allocated for data storage?
   (b) What type of data can be stored there?
   (c) How does one refer to the initial array element? To the final array element?

5. **[30pts]** Write a C function `multiply` that computes and returns the product of an arrays elements. The array should contain elements of type `int`. Also, the function should have a second input argument that specifies the number of array elements in the array.

6. **[10pts]** What is a string in C?

7. **[10pts]** What is the null character `'\0'`?

8. **[30pts - 10pts each item]** Declare and/or initialize the following variables in C:

   (a) Declare a string of length 25
   (b) Declare a string of length 45 and initialize it to `'Hello world!'`.
   (c) Declare a string and initialize it to `'I can't believe I am a string!'`.

9. **[30pts - 10pts each item]** Given a string variable named `myString`:

   (a) How can you access the first character of this string?
   (b) How can I compute the the length of this string?
   (c) Knowing the length of the string, how can I retrieve the last character?

10. **[30pts]** Write a C function that computes the length of a string. Use the following function declaration `int length(const char *str)`. Do not use the library function `strlen` to compute the length, I want you to write your own function!