CSCI 1730 Assignment 04

Pointers, Strings, Arrays, Vectors, and Memory Maps

Last Updated: October 6, 2020

Due 10/11/2020 by 11:55pm

For this assignment you will want to reference the "right-left" rule slides posted on eLC. In addition you will want to read the notes found at `http://cseweb.ucsd.edu/~ricko/rt_lt.rule.html`. For the programming part of this assignment you **must not** use a `bitset` nor an `array` (built-in nor array class).

Problem / Exercise

There are three parts to this assignment:

- `bitsum.cpp`: Let the user input a single unsigned integer n where $0 \leq n \leq 18446744073709551615$ (*thought: what data type would be appropriate?*). Write a function which returns the number of '1' bits in the binary representation of n. You do not need, nor may you use, an array nor a bitset to solve this problem.

  HINT: You may want to look at the *displayBits(unsigned)* function in Deitel §22.5.

  You must implement these function prototypes **exactly** as entered below. Your code must match the return type, argument types, and function name exactly (case-sensitive):

  Examples:

Input n (decimal)	Return value (number of ones)
0	0
1	1
115	5
127	7

  Your program should implement the following method:

  - `int numberOfOnes(unsigned long int value);`

- For each of the following declarations, write its interpretation in english.

  1. `int var;`
  2. `int & var;`
  3. `int * var;`
  4. `char c;`
  5. `char * message;`
  6. `char message[];`
  7. `char message[30];`
  8. `void foo(char c);`
  9. `int (* minus)(int, int);`
  10. `void op(int, int, void (*func)(int, int));`

- For each of the following descriptions, write an appropriate declaration statement.
    1. *var* is a pointer to a double.
    2. *var* is a string object (of the standard library)
    3. *values* is an integer array of length 50
    4. *var* is a pointer to a pointer to a float;
    5. *foo* is a function taking no parameters and returning nothing
    6. *foo* is a function which takes a char and an int as parameters and returns a void
    7. *funcptr* is a pointer to a function taking no parameters and returning void
    8. *funcptr* is a pointer to a function taking an integer reference and returning an integer
    9. *funcptr* is a pointer to a function taking as arguments one int and a pointer to a char array and returning void
    10. *foo* is a function which returns an int and takes as an argument a pointer to a function taking an int as a parameter and returning a void

Submission

For this assignment, you should place your code into a file called *bitsum.cpp* and for the second two parts should put your answers into a plain text document named *assn04answers.txt*.

Note: It is imperative that all of your assignment files reside directly inside your assignment folder (e.g. `LastName-FirstName-lab04`). Do not put any subdirectories inside this folder.

Before the due date, you need to submit your assignment. You will still be submitting your project via `odin`. Make sure your work is on `odin.cs.uga.edu` in a directory called `LastName-FirstName-lab04`. From within the parent directory, execute the following command:

```
$ submit LastName-FirstName-lab04 csci-1730
```