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CSCI 3731

CSCI 3731 C++ Homework 2

This homework includes short answer questions and a programming assignment. The short answer questions are worth 5 points each. The programming assignment is worth 30 points. The short answer questions may cover topics that are in the text, but were not covered in the lectures. Push a preliminary version of the programming assignment to Github before Wednesday's class. Push the final version of your source code, Makefile, and a text file with your short answer questions to Github before 5PM Friday.

1. What is the difference between int and const int?

    In general, int is used in C/C++ similar to how it is used in Java, with same data size of 4 bytes. On the other hand, const int is in fact similar to final int being used in Java. Once initialized, the compiler will not allow the value of that particular const int variable to be changed.

2. What is the difference between a function declaration and a function definition?

    Unlike Java, C/C++ only makes one pass through the code. Thus, the order of the methods is important for the program to compile. A method will not be compiled if C/C++ tries to use it before it being defined. A function declaration can be used to tell the compiler that such function exists and describe its arguments and return types. Then, the function definition can be defined elsewhere later in the code by providing its detailing code to be executed.

3. Why would you use an unsigned integer?

    Unlike in Java, int can be either signed or unsigned in C/C++; thus, allow the initialized variable to hold larger numbers or to use them in places where a negative value would be invalid.

4. What is wrong with the following C++ code? How would you fix it?

int sum;

for(int i=0; i<1000; ++i) {

sum += i;

}

printf("Sum of 0 to 999 is %d\n", sum);

    The problem with above code is that sum variable is not assigned with a particular value (should be zero in this case). As a result, some random arbitrary garbage with 4 bytes length may be assigned to sum variable (most of the time maybe zero). If that random arbitrary garbage is an integer other than zero, the code will result with a wrong answer.

    The fix would be to assign

int sum = 0;

5. What is wrong with the following code and how would you fix it?

int n = 1;

if(n = 0) {

print("n is zero\n");

}

In the if statement, you assign n variable as zero, which is also recognized as False by C/C++. On the other hand, the if statement will only execute whatever inside its body when condition is True. Thus, there print statement will not be executed as n is False.

To fix the problem, change

If(n == 0)

6. How do you find out how many bytes are used to store a particular datatype in C++? How many bytes are used to store char, short, int, and long variables on your system?

What operating system are you using?

To find out the number of bytes are used to store a particular datatype in C++, we can use sizeof() with the particular datatype or variable is inside the parentheses.

There are 1 byte stored in char, 2 bytes stored in short, 4 bytes stored in int and long variables can store either 4 or 8 bytes. If you want to declare 8 bytes long, we can use long long.

7. Write a C++ program that does something interesting or useful. The requirements are that it should be significantly more complicated than "Hello World", and it should have at least one function other than main. Put main in a different file from the rest of your functions. And declare your functions in a header file. You should have a Makefile.