**CS173: Intermediate Computer Science**

**Reading 2**

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Read the assigned pages below from our course textbook. Complete the responses to the questions in this document and then save as a docx or pdf file. Submit your work by the assigned deadline on the Canvas course page or in class. Responses may be neatly handwritten or typed. **Put your name at the top!**

Readings: From the course textbook please read Chapter 2. Watch the youtube videos on base number systems.

You should come away with understanding:

* the basic structure of a C/C++ program
* the use of identifiers as variables
* the fact that all variables have a fixed datatype
* how to print things to the screen

**1) Define syntax and semantics.**

Syntax is a formal rule governing how valid instructions are written in a programming language.

Semantics are a set of rules that determine the meaning of instructions written in a programming language.

**2) Explain why there must always be a main() function in every C/C++ program. Explain the purpose of the return 0 statement at the end of main().**

In every C/C++ program, there must always be a main() function because execution of the program always begins with the main function and it coordinates the actions of the other functions.

The purpose of the return 0 statement at the end of main() is that the operating system expects main() to return a value when main() finishes executing and by convention, a return value of 0 means everything went okay so we usually conclude execution of main() by returning 0.

**3) What are the rules for valid C identifiers?**

Valid C identifiers should be made up of letters (A–Z, a–z), digits (0–9), and the underscore character ( \_ ), but must begin with a letter or underscore.

**4) What is a C variable declaration? What purpose does it serve? Why don't we have type declarations for variables in python?**

A C variable declaration is a statement that associates an identifier with a data object, a function, or a data type. The purpose of a C variable declaration is to refer to a specific item by name. I think the reason why we don’t have type declarations for variables in python is because python is translated by an interpreter and interpreter translates and executes each instruction in the source program, one at a time, so we don’t need to declare types for variables in python.

**5) Give an example or two of some data that might be stored in each datatype:**

**(a) int** 2, 12

**(b) float** 3.141592, 0.001

**(c) char** ‘a’, ‘b’

**(d) string “**apple”, “bear”

**6) What does the C++ preprocessor do?**

The C++ preprocessor acts as a filter during the compilation phase by handling an #include directive by inserting the contents of the named file into the source code.

**7) How do we signify “special characters” for output? Give three examples of special characters.**

We signify "special characters” for output by making the special character preceded by a backslash prefix. Three examples of special characters are \”, \n, and \’.

**8) What is the difference between a reserved word and a constant in C++?**

A reserved word in C++ is a word that has specific uses and special meaning in C++; it cannot be used as a programmer-defined identifier. On the other hand, a constant in C++ is something whose value never changes such as all single characters and strings.

**9) What is the purpose of the #include <iostream> statement?**

The purpose of the #include <iostream> statement is to instruct the C++ system to insert the contents of files named iostream that contains C++ code for functions and data objects that are necessary for us to output values to a stream such as cout into our program.

**10) What is the purpose of a namespace?**

The purpose of a namespace is to declare that the header file’s identifiers have a prefix that distinguishes them from others.

**11) Convert the following binary values to decimal representation:**

(a) 101012 (b) 101011012

21 173

**12) Convert the following decimal numbers to binary representation:**

(a) 77710 (b) 10110

1100001001 1100101