Chapter 1 Problem Set

Each question is worth 5 points for a total of 35 points.

1. Explain how von Neumann’s machine model represented an advance in computing?

The Von Neumann model provided a major advance in computing because of the hardwired operators which did most of the computing work. Instead of having people pull switches the computers did it themselves. This lead to creating Machine code and later assembly.

1. Explain whether Java is limited by the von Neumann model of a machine? Why or why not?

Java is not limited by the Von Neumann Model because Java can run multi-threaded processes, message passing through threads, and is object oriented so it is not required to read a program line by line.

1. Explain the difference between a data structure, a data type and an abstract data type.

Data structure- A way of storing data which are set by the programmer

Data type- The type of data that is being used in a process

Abstract data type- Data type which is defined by the user of the data instead of the programmer.

1. Discuss the role of abstraction when using procedures and functions. How does recursion build in another layer of abstraction?

The role of abstraction in functions and procedures is to hide all subroutines inside of the function to make the method easier to use. Recursion will build another layer because it hides all previous values until the final output result. Recursion also simplifies code.

1. Discuss higher-ordered functions. How does abstraction play a role in these functions?

Higher ordered functions can take in other functions as parameters. They can also return functions as values. Abstraction is about the same for higher-ordered functions as it is for procedures. The names of the functions and the recurring code are abstractions.

1. Discuss the role of semantics in programming.

Semantics is the meaning behind the syntax of a programming language. Within programming if the semantics of the program itself are wrong then the logic behind the program is also wrong. Therefore, having proper semantics and syntax are key to building a proper program.

1. What are the advantages and disadvantages of the use of a virtual machine and translation of the code into byte code?

An advantage of using a VM is that translation is a bit faster because it uses benefits from Interpretation as well as JIT compilation. VM’s are also more secure than running off a host machine. A disadvantage of using a VM is that the code can be more easily un-compiled.