Computer science 8,9,10

Quiz 1-answer key

1. What are three ways you can run more than one operating system?

   You can switch between operating systems by using BIOS.

   You can run a virtual machine that will run a second operating system in a window.

   You can have two computers running different OS.

2. Convert the following from binary to base 10 (decimal):

a. 10010

2^4	2^3	2^2	2^1	2^0
16	8	4	2	1
1	0	0	1	0
16	0	0	2	0
				18

b. 101011

2^5	2^4	2^3	2^2	2^1	2^0
32	16	8	4	2	1
1	0	1	0	1	1
32	0	8	0	2	1
					43

c. 111101

2^5	2^4	2^3	2^2	2^1	2^0
32	16	8	4	2	1
1	1	1	1	0	1
32	16	8	4	0	1
					61

3. Convert the following from base 10 (decimal to binary):

a. 19

	1	R	0
2	2	R	0
2	4	R	1
2	9	R	1
2	19		

10011

b. 55

	1	R	1
2	3	R	0
2	6	R	1
2	13	R	1
2	27	R	1
2	55		

110111

c. 130

	1	R	0
2	2	R	0
2	4	R	0
2	8	R	0
2	16	R	0
2	32	R	1
2	65	R	0
2	130		

10000010

4. Why is it important that computer instructions are converted to machine code (binary)?
   Computer instructions will always eventually be converted into machine code (binary) because the transistors of computer's CPU have two states (like a light switch) and in order to tell which state each transistor should be in, you need to communicate in a language with two states- binary.

5. The Android operating system is based on Linux. Explain how Linux being open source could result in the development of something like the Android operating system.
   In open source software, anyone can copy and edit the codebase. The Android OS is a copied and edited version of Linux.

6. What is contained within the motherboard?
   The motherboard is a circuit containing the CPU and RAM (often the audio and video cards as well).

7. What is Turing completeness?
   Turing completeness is a concept that applies to a system that can simulate any single taped Turing machine. A Turing machine is an abstract machine that manipulates symbols on a strip according to a table of rules.

8. The word "free" has two meanings when one is speaking about software. What are they?
   Free as in speech- with little or no restriction.
   Free as in beer- for zero price.

9. What is different about a compiler and an interpreter?
   A compiler translates from programming language to another (can be to any language, to binary for the purpose of execution). This translated program can be executed at a later time. Interpreters translate and execute a program at the same time.

10. How is Java compiled differently from most compiled languages? Why is this useful?
    Instead of being compiled to binary, Java is compiled into Java bytecode. This bytecode can then be executed on the Java Virtual Machine (JVM) which uses a Java interpreter to convert the bytecode into binary and run on the actual processor. The same bytecode can therefore be run on any JVM as it does not talk to the processor directly. This means that any computer with a JVM can run the same code.