Computer Organization

Architecture

2.1.1 Outline the architecture of the central processing unit (CPU) and the functions of the arithmetic logic unit (ALU) and the control unit (CU) and the registers within the CPU.

1. Draw a diagram of a CPU include the Control Unit(CU), Arithmetic Logic Unit(ALU), Memory Address Register(MAR), Memory Buffer Register (MBR), Control Bus, Address Bus, Data Bus, and Memory, then describe each devices role within the CPU.

2. Compare and contrast RAM and ROM.

3. Describe the difference between SRAM and DRAM.

4. Explain the use of cache memory.

5. Draw a diagram of the machine instruction cycle then explain the four steps: fetch, decode, execute, and store.

Secondary Memory

6. Why does a computer need persistent storage?

Operating Systems

7. Describe the main functions of an operating system.

8. What role does application software play in a computer system?

9. List some common features of application software.

Binary Representation

10. Define bit, byte, binary, decimal, and hexadecimal.

11. How does a computer represent positive integers?

12. Suppose a computer has a 16 bit (2 byte) system, how would the number 5 be represented?

13. How does a computer represent negative integers?

14. Suppose a computer has a 16 bit (2 byte) system, how would the number - 5 be represented using two's complement format?

15. How does a computer represent characters and words?

16. How does a computer represent pictures and graphics?

Logic Gates

17. Define the Boolean operators: AND, OR, NOT, NAND, NOR AND XOR.

18. Construct a truth table for the following scenario: In order to go on the field trip John will need to pass all of his classes and bring a parent permission slip.

19. Construct a truth table for the following scenario: To play on the computer Paul must clean his room, make his bed, and not complain about having to do chores.

20. Construct a truth table for the following Boolean expression then select the option that best describes the output of the expression.

(A OR B) AND B

is true

A. whenever A is true.
B. whenever B is true.
C. whenever either A is true or B is true.
D. whenever both A is true and B is true.
E. in all cases

21. Construct a truth table for the following Boolean expression then select the option that best describes the output of the expression.

A AND B AND A

is true

A. whenever A is true.
B. whenever B is true.
C. whenever either A is true or B is true.
D. whenever both A is true and B is true.
E. in all cases.

22. Construct a truth table for the following Boolean expression then select the option that best describes the output of the expression.

(A AND B) AND (NOT A OR NOT B)

evaluates to

A. true in all cases.
B. false in all cases.
C. true, whenever both A is true and B is true.
D. true, whenever either A is true or B is true.
E. false only, whenever either A is true of B is true.

23. Construct a truth table for the following Boolean expression then determine how many of the eight possible conditions evaluate to true.

    (A OR B) and NOT C

24. Construct a logic diagram for the following scenario: Kristi can go to the dance if she gets permission from her mom or dad and she finds a ride.

25. Construct a logic diagram for the following scenario: Dave will buy the car if it has low mileage and it is not black or red.

26. Construct a logic diagram for the following scenario: Lisa will ride the horse if it is not tall and wild and she can use a saddle.

27. Construct a logic diagram for the following scenario: If the baseball game is not rained out Devon will either play second base or short stop.