

Name: KEY

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**COE 205, Term 071**  
**Computer Organization & Assembly Programming**

**Quiz# 1**

Date: Monday, Sep. 24, 2007

**Q1.** Fill the blank in each of the following questions:

1. The program that translates assembly language into machine language is called **assembler**.
2. There is a one-to-one mapping between assembly language and **Machine Language**.
3. Two of the reasons for why it is important to program in Assembly Language are **accessibility to system hardware** and **space and time efficiency**.
4. Two advantages of programming in high-level language are **program development is faster and maintenance is easier** and **programs are portable**.
5. The **Instruction Pointer (IP)** register holds the address of the next instruction to be fetched from memory.
6. The Instruction Set Architecture (ISA) of a computer consists of **instruction set, memory, and programmer-accessible registers**.
7. The **Instruction Set Architecture** provides an interface between hardware and software.
8. The CPU is divided into two main units called **Data Path unit** and **Control unit**.
9. With an address bus size equal to 36 bits, the memory address space is  $2^{36}=64$  **G Bytes**.
10. With a data bus size equal to 64 bits, the maximum number of bytes that is transferred between the CPU and memory per a read/write cycle is **8 Bytes**.

11. In **Volatile** memory, data is lost when device is powered off while **Non-Volatile** memory stores information permanently.
12. In **static** RAM, each cell is made up of 6 transistors and it is faster but less dense than **dynamic** RAM.
13. The need for memory hierarchy is due to **Processor-Memory Performance Gap**.
14. The Cache memory is faster than **RAM** and slower than **registers**.
15. Given a magnetic disk with the following properties:
- ✧ Rotation speed = 7200 RPM (rotations per minute)
  - ✧ Average seek = 8 ms, Sector = 512 bytes, Track = 200 sectors
- Then, **Time of one rotation (in milliseconds) =  $1000/(7200/60)=1000/120 = 8.33$  ms**
- Average time to access a block of 64 consecutive sectors =  $8 + 0.5*8.33 + (64/200) * 8.33 = 8 + 4.17+2.66=14.83$  ms**
16. The 6-bit binary number 110100 in sign-magnitude representation represents the decimal value **-20** while in 1's complement representation it represents the decimal value **-11** and in 2's complement representation it represents the decimal value **-12**.
17. Assuming 8-bit 2's complement representation, the largest positive number that can be stored in decimal is **+127** and in binary it is **0111 1111** while the smallest number that can be stored in decimal is **-128** and in binary is **1000 0000**.
18. Assuming 8-bit 2's complement representation, the following operation  $A9 - 70$  produces the results  **$A9+90=39$**  and the overflow flag will be equal to **1**.