Name: Id#

COE 301/ICS 233, Term 171

Computer Architecture & Assembly Language

Quiz# 1 Solution

Date: Thursday, Oct. 5, 2017

# **Q1.** Fill the blanks in the following questions:

## Assuming 8-bit unsigned representation, the hexadecimal number 3A is equal to the decimal number 58.

## Assuming 16-bit signed 2`s complement representation, the hexadecimal number FE00 is equal to the decimal number -512.

## The instruction pointer is a register that holds the address of the next instruction to be fetched from memory.

## Program portability is an advantage of programming in high-level language.

## Having faster executing programs is an advantage of programming in assembly language.

## With a 24-bit address bus and 128-bit data bus, the maximum memory size (assuming byte addressable memory) that can be accessed by a processor is 224=16 MByte and the maximum number of bytes that can be read or written in a single cycle is 16.

## A typical memory hierarchy is composed of registers, cache memory (could be several levels), main memory, hard disk, tape.

## Dynamic RAM is slower than static RAM because it requires refreshing.

## Assuming that the CPU has just read a 32-bit MIPS instruction from the address 0x004001FC, then, the address of the next instruction that this CPU is going to read is0x004001FC+4=0x00400200.

## Given a magnetic disk with the following properties:

* Rotation speed is 7200 RPM (rotations per minute)
* Average seek = 8 ms, Sector = 512 bytes, Track = 200 sectors

The average time to access a block of 100 consecutive sectors is 16.33 ms.

Average access time = Seek Time + Rotation Latency + Transfer Time

Rotations per second = 7200/60 =120 RPS

Rotation time in milliseconds = 1000/120 = 8.33 ms

Rotation Latency = 8.33/2 = 4.17 ms

Time to transfer 200 sectors = (100/200)\* 8.33 = 4.17 ms

Average access time = 8 + 4.17 + 4.17 = 16.33 ms.

## Thebinary number 1110 0111 represents character 'g'and uses an even parity bit. Note that the ASCII code of character **A** is 41H and that of character **a** is 61H.