Name: KEY Id#

COE 205, Term 092

Computer Organization & Assembly Programming

Quiz# 3

Date: Saturday, March 18, 2010

# 

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

# The address bus of the 8086 processor is 20 bits while the data bus is 16 bits.

# The address bus of the Pentium IV processor is 36 bits while the data bus is 64 bits.

# A 3-way superscalar processor can execute 3 instructions per clock cycle.

# The Pentium IV processor has 8 general purpose registers, 6 segment registers and EIP EFLAGS registers.

# Characteristics of RISC processors include small and simple instruction set, all instructions have the same width and decoded and executed directly by hardware.

# The address of the instruction to be fetched from memory is stored in the instruction pointer register (EIP).

# Assuming that EIP=00000010, after fetching the instruction MOV AX, 1 (machine code: B80001) EIP= 00000010+3=00000013.

# Assuming one clock cycle per pipeline stage, executing 1000 instructions in a 5 stage pipeline without any pipeline interruptions will take 5+999=1004 cycles.

# Assuming real mode and that IP=0010,SI=0050, DI=3000, SP=2000 CS=00FF, DS=1010, SS=011F, the linear address of the next instruction to be fetched from memory is 00FF0+ 00010=01000.

# Suppose that all segments from seg#0 until seg#200 are used. The segment number that will be allocated for an 8Kbyte code segment is 201 and for a 2Kbyte data segment is 401.

Segment #201 starts at location 02010. A code segment of 8Kbytes requires offset in the range 00000 to 01FFF. Thus all the addresses from 00201 to (02010+01FFF=0400F). Thus, the next available address is 04010. Hence the data segment will be allocated segment#401.

# In real mode, the logical address consists of segment number and offset address.

# In protected mode, the linear address is computed based on adding a 32-bit offset with a 32-bit base address obtained from descriptor table indexed by segment selector.

# A segment descriptor table stores for each segment 32-bit base address, 20-bit segment size and access rights.

# Paging divides the linear address space into fixed-sized blocks called pages.

# The operating system uses page tables to map the pages in the linear virtual address space onto main memory.