ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD
(Department of Computer Science)

Course: Computer Architecture (3416) **Semester: Spring, 2013**
Level: BS (CS) **Total Marks: 100**
Pass Marks: 40

ASSIGNMENT No. 1

Note: All questions carry equal marks.

Q. 1 What, in general terms, is the distinction between:
  a) Computer organization and computer architecture
  b) Computer structure and computer function

Q. 2 Describe the evolution of computers form Pentium to i-series.

Q. 3 What are the four main components of any general-purpose computer? At the integrated circuit level, what are the three principal constituents of a computer system? Use diagram to support your answer.

Q. 4 What are the differences among sequential access direct access, and random access? What is the general relationship among access time, memory cost, and capacity?

Q. 5 What is the difference between DRAM and SRAM in terms of application and characteristics?

Q. 6 Compare and contrast the features of external memory including Magnetic Disk, RAID, Optical Memory and Magnetic Tape.

ASSIGNMENT No. 2

Total Marks: 100   **Pass Marks: 40**

Note: All questions carry equal marks.

Q. 1 What are the major functions of an I/O module? List and briefly define three techniques for performing I/O.

Q. 2 When a DMA module takes control of a bus, and while it retains control of the bus, what does the processor do?

Q. 3 Another representation of binary integers that is sometimes encountered is ones complement. Positive integers are represented in the same way as sign magnitude. A negative integer is represented by taking the Boolean complement of each bit of the corresponding positive number.
   a)   Provide a definition of ones complement numbers using a weighted sum of bits,
   b)   What is the range of numbers that can be represented in ones complement?
   c)   Define an algorithm for performing addition in ones complement arithmetic.

Q. 4   Let the address stored in the program counter be designated by the symbol X1. The instruction stored in X1 has an address part (operand reference) X2. The operand needed to execute the instruction is stored in the memory word with address X3. An index register contains the value X4. What is the relationship between these various quantities if the addressing mode of the instruction is (a) direct; (b) indirect; (c) PC relative; (d) indexed?

Q. 5 An address field in an instruction contains decimal value 14. Where is the corresponding operand located for immediate addressing?
   a)   direct addressing?
   b)   indirect addressing?
   c)   register addressing?
   d)   register indirect addressing?

3416 Computer Architecture   Credit Hours: 4 (4, 0)

Recommended Book:
Computer Organization & Architecture by WILLIAM SALLINGS 4th Edition

Course Outlines:

Unit No. 1 Computer Architecture Introduction
Introduction to Computer Organization & Architecture, Structure and Functions, Brief History of Computers, Designing for Performance, Pentium & Power PC Evolution

Unit No. 2 Basics of Computer Architecture
Computer Components, Computer Functions, Interconnection Structure, Bus Interconnection, PCI

Unit No. 3 Memory Organization
Internal Memory (Computer Memory system Overview, Semiconductor Main Memory, Cache Memory, Advance DRAM Organization), External Memory (Magnetic Disk, RAID, Optical memory, Magnetic Tape)

Unit No. 4 Input Output Design & Operating System Support
External Devices, I/O Modules, Programmed I/O, Interrupt Driven I/O, DMA, I/O Channels and Processors, External Interface, Operating System Overview, Scheduling, Memory Management

Unit No. 5 Computer Arithmetic
ALU, Integer Representation, Integer Arithmetic, Floating Point Representation, Floating-Point Arithmetic

Unit No. 6 Instruction Sets: Characteristics and Functions
Machine Instruction Characteristics, Types of Operands and Types of Operations, Assembly Language

Unit No.7 Instruction Sets: Addressing Modes and Formats
Addressing, Instruction

Unit No. 8 CPU Instruction and Function
Processor Organization, Register Organization, Instruction Cycle, Instruction Pipelining, Pentium Processor, Power PC Processor

Unit No. 9 Control Unit Operation
Micro Operations, Control of the CPU