ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD

(Department of Computer Science)

WARNING

1. **PLAGIARISM OR HIRING OF GHOST WRITER(S) FOR SOLVING THE ASSIGNMENT(S) WILL DEBAR THE STUDENT FROM AWARD OF DEGREE/CERTIFICATE, IF FOUND AT ANY STAGE.**
2. **SUBMITTING ASSIGNMENTS BORROWED OR STOLEN FROM OTHER(S) AS ONE'S OWN WILL BE PENALIZED AS DEFINED IN "AIOU PLAGIARISM POLICY".**

Course: Computer Architecture (3416) **Semester: Spring, 2014**
Level: BS (CS) **Total Marks: 100**
Pass Marks: 50

ASSIGNMENT No. 1

(Units: 1 – 4)

Note: All questions are compulsory. Each question carries equal marks.

Q. 1 a) Describe the functional view of a computer with the help of a diagram. Also briefly describe the data processing, data storage, data movement and control functions of a computer.

b) Distinguish between computer architecture and computer organization.

Q. 2 a) Briefly describe the generations of computer. Discuss the features of Von Neumann Machine. Also describe the structure of the IAS computer.

b) Discuss the advantages and disadvantages of storing programs and data in the same memory.

Q. 3 Write note on the following:

a) Internal and external memory

b) Designing for Performance

Q. 4 a) Explain the computer memory hierarchy with the help of a diagram. Discuss the key characteristics of computer memory systems.

b) What is cache memory? How it improves the speed of a computer system? Discuss the elements of cache design.

Q. 5 a) Describe the basic components of a computer system and their interface requirements.

b) What is interconnection structure in a computer system? Describe the design of this structure.

ASSIGNMENT No. 2

(Units: 5 – 8)

Total Marks: 100 **Pass Marks: 50**

Q. 1 a) Describe the elements of a machine instruction. How a machine instruction is represented in a computer system?

b) How expressions are evaluted in a computer system? Discuss the advantages and disadvantages of using postfix notation.

Q. 2 Discuss the advantages and disadvantages of the following addressing techniques:

a) Immediate

b) Direct

c) Indirect

d) Stack

Q. 3 a) What is the role of Arithmetic and Logic Unit (ALU) in a computer System? Discuss the integer and floating point representation in a computer system.

b) Discuss the arithmetic operations; addition, subtraction, multiplication and divisions on floating point numbers in a computer system.

Q. 4 a) Which component within a computer is responsible for the control of external devices and the exchange of data between them? Discuss the characteristics of I/O module.

b) Differentiate between programmed I/O and interrupt driven I/O. Also describe the design issues raised in implementing interrupt driven I/O.

Q. 5 a) What is the function of Direct Memory Access (DMA) in a computer system? Discuss the advantages and disadvantages of using DMA.

b) For vectored interrupts, why does the I/O module place the vector on the data lines rather than the address lines?

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

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

Course Outline:

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