19ITT202 – COMPUTER ORGANIZATION AND ARCHITECTURE

UNIT-I

BASIC STRUCTURE OF COMPUTERS

PART A

1.Define Computer Architecture

Computer Architecture Is Defined As The Functional Operation Of The Individual H/W Unit In A Computer System And The Flow Of Information Among The Control Of Those Units.

2.Define Computer H/W

Computer H/W Is The Electronic Circuit And Electro Mechanical Equipment that Constitutes the Computer

3. What are the functions of control unit ?

The memory arithmetic and logic ,and input and output units store and process information and perform i/p and o/p operation, the operation of these unit must be co ordinate in some way this is the task of control unit the cu is effectively the nerve center that sends the control signal to other units and sence their states.

4.What is an interrupt?

An interrupt is an event that causes the execution of one program to be suspended and

another program to be executed.

5. What are the uses of interrupts?

• Recovery from errors

• Debugging

• Communication between programs

• Use of interrupts in operating system

6.What is the need for reduced instruction chip?

• Relatively few instruction types and addressing modes.

• Fixed and easily decoded instruction formats.

• Fast single-cycle instruction execution.

• Hardwired rather than microprogrammed control.

7. Name any three of the standard I/O interface.

• SCSI (small computer system interface),bus standards

• Back plane bus standards

• IEEE 796 bus (multibus signals)

• NUBUS

• IEEE 488 bus standard

8. Differentiate between RISC and CISC

RISC	CISC
Reduced Instruction Set Computer	1. Complex Instruction set computer
Simple instructions take one cycle per Operation	Complex instruction take multiple Cycles per operation.
*Few instructions and address modes are*Used.	Many instruction and address Modes.
Fixed format instructions are used.	Variable format instructions are used
Instructions are compiled and then executed by hardware.	Instructions are interpreted by the Microprogram and then executed.
RISC machines are multiple registerset.	CISC machines use single registerSet.

Complexity in the compiler	Complexity in the microprogram
RISC machines are higly piplined	CISC machines are not piplined.

9. Explain the various classifications of parallel structures.

• SISD (single instruction stream single data stream

• SIMD(single instruction stream multiple data stream

• MIMD(multiple instruction stream multiple data stream

• MISD(multiple instruction stream single data stream

10. What is absolute addressing mode?

The address of the location of the operand is given explicitly as a part of the instruction.

Eg. Move a , 2000

11. Specify three types of data transfer techniques.

• Arithmetic data transfer

• Logical data transfer

• Programmed control data transfer

12. What is the role of MAR and MDR?

The MAR (memory address register) is used to hold the address of the location to or from which data are to be transferred and the MDR(memory data register) contains the data to be written into or read out of the addressed location.

13. What are the various types of operations required for instructions?

• Data transfers between the main memory and the CPU registers

• Arithmetic and logic operation on data

• Program sequencing and control

• I/O transfers

14. What is the role of IR and PC?

Instruction Register (IR) contains the instruction being executed. Its output is availableto the control circuits, which generate the timing signals for controlling the processing circuitsneeded to execute the instructions.The Program Counter (PC) register keeps track of the execution of the program. It contains the memory address of the instruction currently being executed . During the execution of the current instruction, the contents of the PC are updated to correspond to the address of the next instructions to be executed.

15. What are the various units in the computer?

• Input unit

• Output unit

• Control unit

• Memory unit

• Arithmetic and logical unit

16. What is an I/O channel?

An I/O channel is actually a special purpose processor, also called peripheral processor. The main processor initiates a transfer by passing the required information in the input output channel. The channel then takes over and controls the actual transfer of data.

17. What is a bus?

A collection of wires that connects several devices is called a bus.

18. Define word length?

Each group of n bits is referred to as a word of information and n is called the word

length.

19. Explain the following the address instruction?

• Three-address instruction-it can be represented as add a,b,c

Operands a,b are called source operand and c is called destination operand.

• Two-address instruction-it can be represented as Add a,b

• One address instruction-it can be represented as add a

20. Zero address instruction.

It is also possible to use instruction where the location s of all operand are defined implicitly. This operand of the use of the method for storing the operand in which called push down stack. Such instructions are sometimes referred to us zero address instruction.

21. What is the straight-line sequencing?

The CPU control circuitry automatically proceed to fetch and execute instruction, one at

a time in the order of the increasing addresses. This is called straight line sequencing.

22. What is the role of PC?

The CPU contains a register called the program counter, which holds the address of instruction to be executed next to begin the execution of the program the address of its First instruction must be placed into the pc.

23. Define Signal

Signal - The binary information is represented in digital computers by physical quantities

called signals.

24. Define Gates

Gates – The manipulation of binary information is done by logic circuits called gates.

Gates are blocks of hardware that produce signals of binary 1 or 0 where input logic

requirements are satisfied.

25. Flip flop

Flip flop – The storage elements employed in clocked sequential circuits are called flip

flops. A flip flop is a binary cell capable of storing 1 bit of information.

26. State and explain the performance equation?

Suppose that the average number of basic steps needed to execute one machine instruction is S, where each basic step is completed in one clock cycle. If the clock cycle rate is R cycles per second, the program execution time is given by

$T = (N \times S) / R$ This is often referred to as the basic performance equation.

27. Define CPI

The term ClockCyclesPerInstructionWhich is the average number of clock cycles each

instruction takes to execute, is often abbreviated as CPI.

CPI= CPU clock cycles/Instruction count.

30. Define Throughput and Throughput rate.

Throughput -The total amount of work done in a given time.

Throughput rate-The rate at which the total amount of work done at a given time.

PART B

1. Explain the basic functional units

2. Discuss in detail the basic concepts of instructions and its executions

3. Deduce the concept of performance and factors projecting the performance

4. What are addressing modes and enhance the types of addressing modes

5. Design logical and control unit using its instructions