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Dept # BS(CS) 4th Semester

Assignment No :- 1

Subject :- Computer Architecture

Sumbitted to:- Sir Amin.

Give answer to each of the following :-

Q.1 (a) What are the four main function of a computer?

Ans:- 1) Data processing:- Data may take a wide variety of forms and the range of processing requirements is board.

2) Data Storage:- The computer perform a long term data storage function files of data are stored on the computer for subsequent retrived and update.

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3) Data Movement :- When data are moved over longer distance to or from a remote device The process is known as data communication.

(ii) Control :- Within the computer a control unit manages the computer's resource and orchestrates the performance of its functional parts in response to instructions.

(B) Figure at show the IBM. Enterprise EC12 core cou/out. Briefly explain the function of each sub-area.

Ans :- ISU (Instruction sequence unit) Determine the sequence in which instructions are executed in what is referred to as a superscalar architecture.

* IFU (Instruction fetch unit) Logic for fetching instructions.

* IDU (Instruction decode unit) The IDU is full form IFU buffer and is responsible.

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* LSU (Load-Store unit) it is responsible for handling all types of operand access of all lengths modes and formated as defined in the z1 Architecture.

* XU (Translaction unit) The unit translates logical address from instructions into physical address in main memory. it contain TLB used to speed up memory.

* FXU (Fixed-point-unit) The FXU executes fixed point arithmetic operations.

* BFU (Binary floating-point unit) The BFU handles all binary and hexadecimal floating point operation as well as fixed point multiplication operation

* DFU (Decimal floating-point unit) The DFU handles Both fixed point and floating point operation on number that are stored as decimal digits.

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* RU (Recovery unit) The RU keep a copy of the complete state of the system that includes all registers. collects hardware fault signals.

* CoP (Decided co-processor) The cop is responsible for data comparison and encryption function for each core.

* I-cache :- This is a 64-KB L1 instruction cache. allowing the IFU to prefetch instruction before they are needed.

* L2 Control :- This is the control logic that manages the traffic through the two L2 caches.

* Data L2 :- A 10 MB data cache for all memory traffic other than instructions.

* inst-L2 :- A 1-MB L2 instruction cache.

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(c) Discuss the IAS operation using the flow chart in.

Ans:- The IAS operation by respectively performing an instruction cycle. Fetch instruction cycle consists of two sub-cycle.

1) Fetch cycle:- The operand of next instruction is loaded into the IR and the address portion is loaded into the MAR this instruction perhaps taken from the IBR.

2) Execute cycle:- The control circuitry interprets the opcode execute the instruction by sending out the appropriate control signal to cause data to be moved as can operation to be performed by the ALU.

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(D) For each of the following examples determine whether this is an embedded system. explaining why or why not.

a) Are program that understand physics and for hardware. embedded? For example one that uses finite element methods to predict fluid flow over airplane why?

Ans:- No. These programs are never considered to be embedde because they are not an integral components of a larger system.

(b) Is the internal microprocessor controlling a disk drive an example of an embedded systems.

Ans:- Yes regardless of what the disk drive is used for. The software (firmware actually) within the disk drive controls the HDA (hard disk assembly) hardware and

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(c) I/O drivers control hardware as does the presence of I/O driver imply that the computer executing the driver is embedded?

Ans:- No, input output drivers do not represent embedded system.

(d) Is a PDA (Personal Digital Assistant) an embedded system.

Ans:- Yes PDA is an embedded system Because it is just like a personal computer in hand.

(e) is the microprocessor controlling all phase an embedded systems?

Ans:- Yes the firmware in the cell phone is controlling the radio hardware.

(f) Is a Traditional flight management system (FMS) built into an airplane.

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Ans: if the FMS is not connected to the avionics and is used only for logistic computerization a function readily performed on a laptop then the FMS is clearly not embedded.

(9) Are the computer in a hardware in the loop (HIL) simulator embedded?

Ans: Yes both in the simulator and in the thing being tested the HIL simulator Hardware is being controlled on both sides.

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(Q.2)
(Ans)
(a).

Main structural component of a computer.
There are four main structural components.

1) CPU:- Controls the operation of computer and perform its data processing function, often simply refered to as processor.

2) Main memory:- Stores data.

3) I/O:- Moves data b/w the computer and external environment.

4) System interconnection:- Some mechanism that provide for communication among CPU, main memory and I/O.

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(Ans)
(b).

The characteristic of a family are as follows

* Similar or indentical instruction set:-

In some cases the lower end of family has an instruction set that is a subset of that of the top end of the family. This means that program can move up but not down.

* Similar or indentical operating system:-

The same basic operating system is available for all family members.

* Increasing speed:- The rate of instruction execution increase in going from lower to higher family members.

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* Increasing I/o parts:- The number of I/o parts increases in going from lower to higher family members.

* Increasing memory size:- The size of memory increasing in going lower to higher family member.

* Increasing Cost:- At a given point time cost of a system increase in going lower to higher family member.

(c)

(Ans).

Stored program computer:-

A fundamental design approach first implemented in the IAS computer is known as the stored program concept. This idea is usually attributed to the mathematician John von Neuman.

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The first publication of the idea was in 1945 proposed by Von Neuman for a new computer The EDVAC in 1946, Von Neuman and his collegues began the design of a new stored program computer. referred to as the IAS computer at the princeton Institute for Advanced studies.

- A main memory which stores both data and institution.
- An arithmetic and logical unit (ALU) capable of operating on binary-data.

(d)
(Ans)

. Moore's Law:-

= The Famous Moore's law which was propounded by Gordan Moore Co-founder of intel in 1965 [MooR[5]. Moore observed that the number of transistor that could be put on a single chip was doubling every year. The pace showed to a doubling every 18 months in the 1970's

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but has sustained that rate ever since.

1) The Moore's law was profound. The cost of computer logic and memory circuitry has fallen at a dramatic rate.

2) Because logic and memory elements are placed closer together on more densely packed chips the electrical path length is short in a variety increasing operating.

3) The computer becomes smaller making it more convenient to place.

4) There is a reduction in power requirement.

5) With more circuitry on each chip, there are fewer interchip connections.

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(Q.3)
(Ans)
(A)

Computer Organization and Architecture

* Computer Architecture:- refer to those attributes of a system visible to a programmer or put another way. Those attributes that have a direct impact on the logical execution of a program. A term that is often used interchangable with computer architecture is instruction set architecture (ISA)

* Computer organization:- Refer to the operational unit and their interconnection that realize the architectural specification. Examples:- of architectural attributes include the instruction set the no of bits used to represent various data types e.g (numbers, characters) I/O mechanism and techniques for

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(B)
(Ans)

RISC and CISC

* The current x86 offering represent the result of decade of design effort on complex instruction set computer (CISC). The x86 incorporate the sophisticated design principles once found only on mainframe and supercomputer and serve as an excellent example of CISC design.

* An alternative approach to processor design is the reduced instruction set computer (RISC). The ARM architecture is used in a wide variety of embedded system. and is one of the most powerful and best designed RISC based system on the market in the section an the next we provide a brief overview of these two systems.