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Dept #   BS(CS)   4th semester

Assignment No   : 2nd

Subject   computer Architecture

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Q1
↓
(A)

Give answer to each of the following?

what are the four main function of a computer?

Ans
↓

1) Data Processing :- Data may be take a wide variety of forms and the range of processing requirements is borad.

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

3 Data Movement :- when data are moved over longer distance to or form 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 of show the IBM. Enterprise Eiz core layout. Briefly explain the function of each sub-area.

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

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

* IDU (Instruction decode unit) The IDU is feed from IFU buffer and is responsible

* LSU (load- store unit) it is responsible for handling all type of operand access of all lengths modes and formats as defined in the z/Architecture.

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

* 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.

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

→ COP (Dedicated co-processor) The COP is responsible for data compression and encryption function for each core.

* I-cache — This is a 64-KB 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 1-MB data cache for all
  memory Traffic other than instructions.

* instr-L2 ⟶ A 1-MB L2 instruction cache

(c) Discuss the IAS operation using the flowcard
    in.

Ans ⟶ The IAS operation by respectively
$\frac{}{S}$ performing an instruction cycle. Each
instruction cycle consists of Two sub-cycles.

1) fetch cycle ⟶ The operand of next instruction
   is loaded into the IR and the address
   portion is loaded in to the MAR this instructor
   perhaps taken from the IBR.

2) Execute cycle ⟶ The control circuitry
   interprets the op code & executes the
   instruction by sending out the appropriate control
   & signal to cause data to be moved or
   an operation to be performed by the
   ALU.

(5) 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/or hardware embedded ? For example one that uses finite-element methods to predict fluid flow over airplane wings?

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

(b) Is the internal micro processor controlling a disk drive an example of an embedded system .

Ans is Yes, regardless of what the disk drive is used for. The software (firmware actually) within the disk drive controls the HDA (head disk assembly) hardware and is hard time as well.

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

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

④ I) 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.

ⓔ Is the microprocessor controlling a cell phone
an embedded system?

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

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

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

ⓖ 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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Q2

Ans a,

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

1) CPU or controls the operation of computer and perform its data processing functions; often simply referred to as Processor.

2) Main memory or stores data

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

4) system interconnection or some mechanism that provides for communication.
                                    among CPU, main memory and I/O.

Ans b,

The characteristic of a family are as follow

* Similar or identical instruction set or 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 identical operating system or The same basic operating system is available for all family members.

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

* Increasing I/O ports or The number of I/O ports increases in going from lower to higher family member.

* Increasing memory size or The size of memory increase in going lower to higher family member.

* Increasing cost or At a given point Time, cost of a system increase in going lower to higher family member.

Ans 'c'   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 Neumann

The first publication of the idea was in 1945 proposal by von Neumann for a new computer the EDVAC in 1946, von Neumann and his colleques 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 instruction

-- An arithmatic and logical unit (AU) capable of operating on binary data.

Ans 'd'   Moore's law :

The Famous Moore's law which was propounded by Gordon Moore cofounder of intel in 1965 [MOOR65]. Moore observed that the number of Transistor that could be put on a single chip was doubling every year. The pace slowed to a doubling every 18 months in the 1970s but has sustained that rate ever since.

Moore's law are profund.

1) The cost of computer logic and memory circuity 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 shorter increasing operating.

3) The computer becomes smaller making more convenient to place in a variety

4) There is a reduction in power requirement.

5) with more circuity on each chip, there are fewer interchip connections.

Q3
5

ns 'A,
5

Compuker 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 interchangeble with computer
architecture is instrution set architecture (ISA).

→ Computer organization w Refer to The operational
unit and Their interconnection That realize The
architectural specification Examples of architectural
attributes include The instrution set The no. of bits
used To represent various dato Types (e.g, number
characters) I/o mechanism and Techniques for
addressing memory.

Ans'B,
?
RISC and CISC

* The current x86 offering represent The result
of decade of design effort on Complex
instrution set computer (CISC). The x86 incorpab
The sophisticated design principles once found only
on mainframes and super computer and serves as
an excellent example of CISC design.

* An alternative approach To processor design is The
reduced instrution set computer (RISC). The ARM
architecture is used in a wide variety of embeleled
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.