

COMPUTER PERIPHERALS & INTERFACES

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1. Why do we need memory? Explain memory hierarchy in detail

Ans. Before data is sent for processing to CPU, it needs to be stored. So, Memory is needed to hold temporary data. It sends data to CPU much faster than a secondary storage with lower response times due to which CPU doesn’t needs to wait for secondary store to seek for data.

There are different levels in a computer memory which work together. The reason to have different levels of memory is to reduce response time for data to reach CPU but also to have more capacity.

There are 4 levels of Memory:

1. Processor registers: These are inside CPU and have little capacity, Registers are fastest memory on a system with least response times. They ensure fast system performance and snappiness.
2. Processor Cache: Cache is similar to RAM, but these are also embedded in CPU and are much faster than RAM.   
   Cache have 3 levels:   
   Level 1 (Fastest, Smallest Capacity)  
   Level 2 (Fast, Little bigger capacity)  
   Level 3 (Slow, Bigger capacity)

Data first passes through Level 3 Cache then it is sent to Level 2 then Level 1

1. RAM: These are outside CPU and connected through motherboard. These are slower but still much faster than secondary storage. These have medium capacity and used to store whole programs and processes. RAM also has different configuration of speeds and capacity depending on system.

Data is passed in order: RAM > Cache (L3>L2>L1) > Registers

1. Explain ROM in detail? How ROM is classified?

Ans. ROM (Read only memory) is non-volatile memory used to store data permanently. ROM is used to store software, firmware which are little to not changed throughout device’s lifetime. Common example of ROM is BIOS, Firmware in computers. There are different iterations of ROM made with time:

PROM (Programmable ROM): It is memory chip which can be programmed but the data cannot be erased or deleted.

EPROM (Erasable and programmable ROM): It is memory chip which can be programmed but it can be erased later using exposure to strong UV light source. It replaced PROM over time as it can be repaired easily.

EEPROM (Electronic Erasable and programmable ROM): It is memory chip which can be programmed but it can be erased later by applying electrical current.  
Flash Memory: Flash memory is also a memory chip which can be programmed but it can be erased later by applying electrical current. But it is much faster than EEPROM. It has much higher capacity of storage that is the reason. It is so commonly used in USB Pen Drive, Solid State Drives, Smartphones…

3. Explain various Memory Modules: SIMM, DIMM and SO-DIMM.

Ans. **SIMM:** It stands for Single Inline Memory Module. It is A SIMM is a small circuit board with a bunch of memory chips on it. It is an older type of memory module which used 32-bit bus. SIMM were available in 2 types: 30-pin (8 bits + 1 parity bit) and 72-pin (32 bits + optional for 4 parity bits) with various capacities and specifications.

**DIMM:** It stands for Double Inline Memory Module. It is A SIMM is a small circuit board with a bunch of memory chips on it. It is an older type of memory module which used 64-bit bus. It came in different number of pins with different configuration: SDRAM with 100-pin, SDR SDRAM with 168-pin, DDR RAM with 184-pin, DDR2 and DDR 3 with 240 pins and currently DDR4 with 288-pins.

**SO-DIMM:** It stands for Small-Outline Dual Inline Memory Module. It is a small computer expansion card used for RAM. It is a smaller version of DIMM usually half the size, and is commonly used in laptop and small form factor devices. Its pin varied depending on the type of RAM. It came from 100 pin with two notches to 260 pins now a days.

1. Explain motherboard? What is the utility of motherboard in a computer system explain?

Ans. A motherboard is one of major components in a computer. It is the PCB (Printed Circuit Board) which allows different hardware and peripherals like CPU, RAM, Keyboard & Mouse to connect with each other and work.   
  
Motherboard doesn’t only allow to connect hardware and peripherals with each other but it also manages current supply from SMPS to components. Better quality motherboards have more accessible ports which allows to connect more peripherals with system and better-quality motherboards have high quality VRM which saves CPU, RAM and other parts when current overloads or fluctuates.

1. Write difference between PCI & AGP, AT & ALX

Ans. These are following differences between PCI and AGP slot:

|  |  |  |
| --- | --- | --- |
| SN | PCI | AGP |
| 1 | It is predecessor of AGP | It is successor of PCI |
| 2 | It doesn’t pass new request until data of last request is transferred | It takes multiple requests while data is being transferred |
| 3 | It had peak speed of 133 MB/s in 32 bits | It had peak speed of 533 MB/s in 32 bits |
| 4 | It could be link to any device from video cards to sound cards, Ports extension card | It can only be linked for Memory read/write. No other input/output operations can be performed |
| 5 | It didn’t have any priority queue. | It had High/Low priority queues |

|  |  |  |
| --- | --- | --- |
| SN | AT | ATX |
| 1 | This port was used in older motherboards | This port is used in modern motherboards and form factors |
| 2 | It uses two 12-pin plugs to supply power | It uses one 20-pin plugs to supply power |
| 3 | Power Consumption is more due to un availability of sleep mode | Power Consumption is less due to availability of sleep mode |
| 4 | It can only connect with AT switch mode power supply | It can only connect with ATX switch mode power supply |
| 5 | It has only 2 other connectors: 1 DIN connector for keyboard | It has more connectors: Video card connector, Network card, Modem |

1. What is IDE explain in detail?

Ans. IDE stands for Integrated Drive Electronics. IDE is also called as [ATA](https://www.computerhope.com/jargon/a/ata.htm) or Parallel ATA interface. Is standard interface for computers. It was first developed by [Western digital](https://www.computerhope.com/comp/wd.htm) and [Compaq](https://www.computerhope.com/comp/compaq.htm) in [1986](https://www.computerhope.com/history/1986.htm). IDE is an interface to connect several computer hardware to connect with each other. IDE is far cheaper to implement than other standards like SCSI. But it has demerits of only supporting up to 2 devices per channel and slower speeds of data transfer. IDE is most commonly used in home computers.

Over years, there are different variations of IDE which came along:  
1. ATA: First version of IDE

2. ATA-2: Enhanced version of ATA with faster speeds

3. ATAPI: ATA Packet interface added support for removable media devices

4. Ultra ATA: It is currently used IDE interface which supports high speeds (up to 100 MB/s)

1. What is SCSI? Explain how it is different from IDE?

Ans. SCSI stands for Small Computer System Interface. It is a set of parallel interface standard. It allows different peripherals like printers, disk drives, scanners… to connect with computer. SCSI is widely adopted across several kinds of computers and devices.

Compared to IDE, SCSI is expensive to implement and support. While IDE allows only 2 devices / channel, SCSI can support from 7 up to 15 devices. Though configuring SCSI is difficult. SCSI is also much faster than IDE allows wider bandwidth and more data transfer speed. It also requires an interface expansion card to add more devices.

1. Explain ATA standard in detail?

Ans. ATA stands for Advanced technology attachment. It is a physical interface for connecting storage devices with a computer. ATA allows hard disks, CDROM to be internally connected to the motherboard and perform different operations. ATA was designed to connect integrated and portable storage devices without need for an external controller. The ATA interface is a set of thin wires merged within a cable bus that are used to transfer data from hard drives. ATA was initially connected in parallel which is why it was called Parallel-ATA (PATA). It consisted 40-pin controller cable and data transfer speed of 1-32 bits at a time.

It was later replaced by Serial ATA (SATA) – which has much faster IO speed. Initially, SATA revision 1.0 has speeds up to 150 MB/s which received several revisions over years. Currently modern-day SATA revision 3.0+ has transfer speed of 3 GB/s to 6 GB/s