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Course Title : Computer peripheral  
and Interfacing

Course code : CSE-333

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Answer to the Question No-1

① \* Keyboard : A keyboard is a bank of switches whose individual states can be detected by the computer system. It is an input device and is the most basic way for the user to communicate with a computer. This device is patterned after its predecessor, the typewriter, from which the keyboard inherited its layout. Although the keys on letters are arranged to function as electric switches.

\* Contact type keyboard switch :

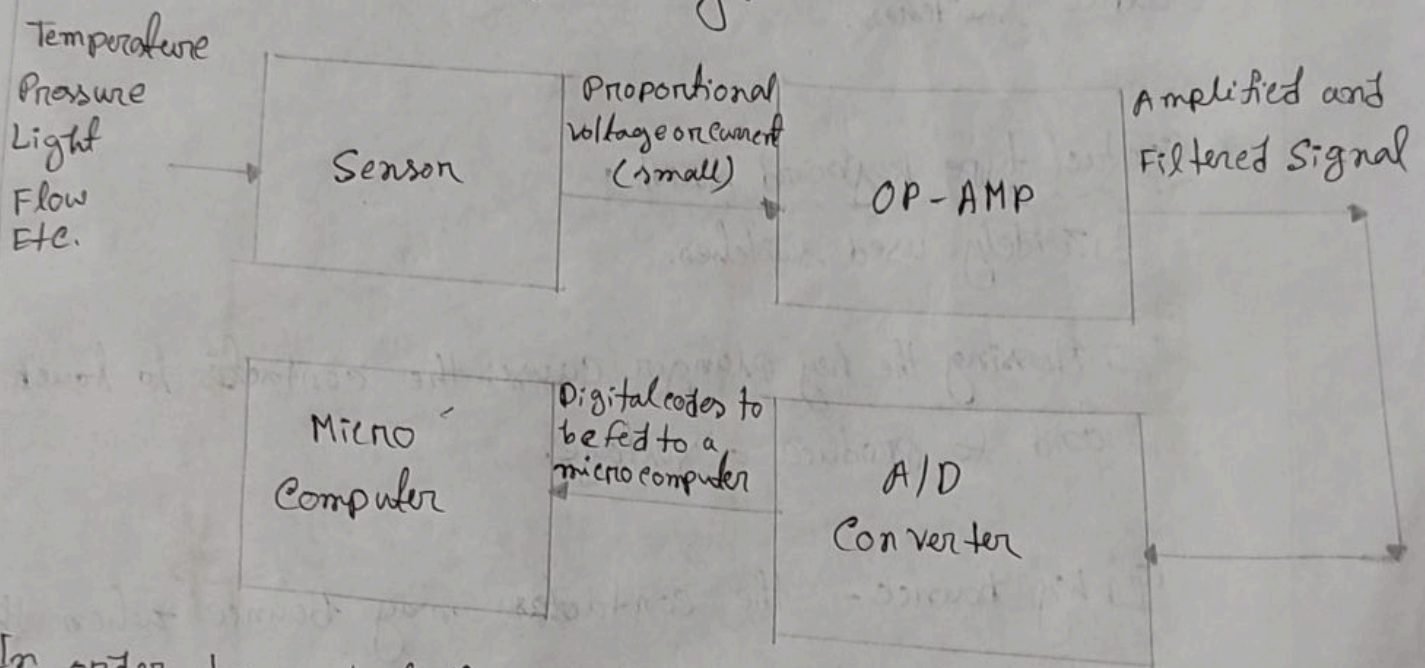
☐ Widely used switches.

☐ Pressing the key plunger causes the contacts to touch and to produce a voltage.

☐ Key bounce --- the contacts may bounce when the plunger is depressed giving the appearance of several rapid key depressions. This effect is known as key bounce. This must be eliminated by special

② circuitry which effectively ignores the lag after its first depression for a very short period of time.

③ The basic concept of Analog Interfacing: An analog interface is an electrical connection that forwards analog electric signals to downstream electric and electronic devices or components for further processing.



In order to control the machines in --- Electronics Factory, Medical instruments, Automobiles etc, we need to determine the values of some variables like pressure, temperature,

② light, flow etc. Since current signals are not sensitive to electromagnetic interference and loss of voltage, they are preferred over voltage signals. The maximum length of a signal cable for the power source is only limited by the maximum load. The load is the load resistance of an electrical transducer/converter with current output signal, whereby the cable resistance defined by the cable cross-section must be taken into account.

### Answer to the Question NO-2

①\* Sensor: A sensor is a device which converts the physical quantity into corresponding electrical output.

- \* List of sensors:
- ① Accelerometer.
  - ② Ambient temperature
  - ③ Magnetic field sensor
  - ④ Gyro scope
  - ⑤ Light

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\* Transducers: A transducer device that converts energy from one form to another usually a transducer. Converts a signal one form of energy to signal in another transducer one often employed at the boundaries of automation, measurement and control system, where electrical signals convert to and from other physical quantities. The process of converting one form of energy to another is known as transducer.

\* Mechanical transducer: So called as they convert physical quantities into mechanical output or vice versa.

\* Electrical transducer: However convert physical quantities into electrical output signal.

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(B) \* Thermocouple sensor: A thermocouple is a sensor that measures temperature. It consists of two different types of metals, joined together at one end. When the junction of the two metals is heated or cooled, a voltage is created that can be correlated back to the temperature.

\* Advantages and disadvantages of thermocouple sensors:

#### Advantages

- Simple, Rugged
- High temperature operation
- Low cost
- No resistance lead wire problems
- Point temperature changes

#### Disadvantages

- Least stable, least repeatable
- Low sensitivity for small temperature changes
- Extension wire must be the same thermocouple type
- Lowest accuracy.

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Answer to the Question No-4

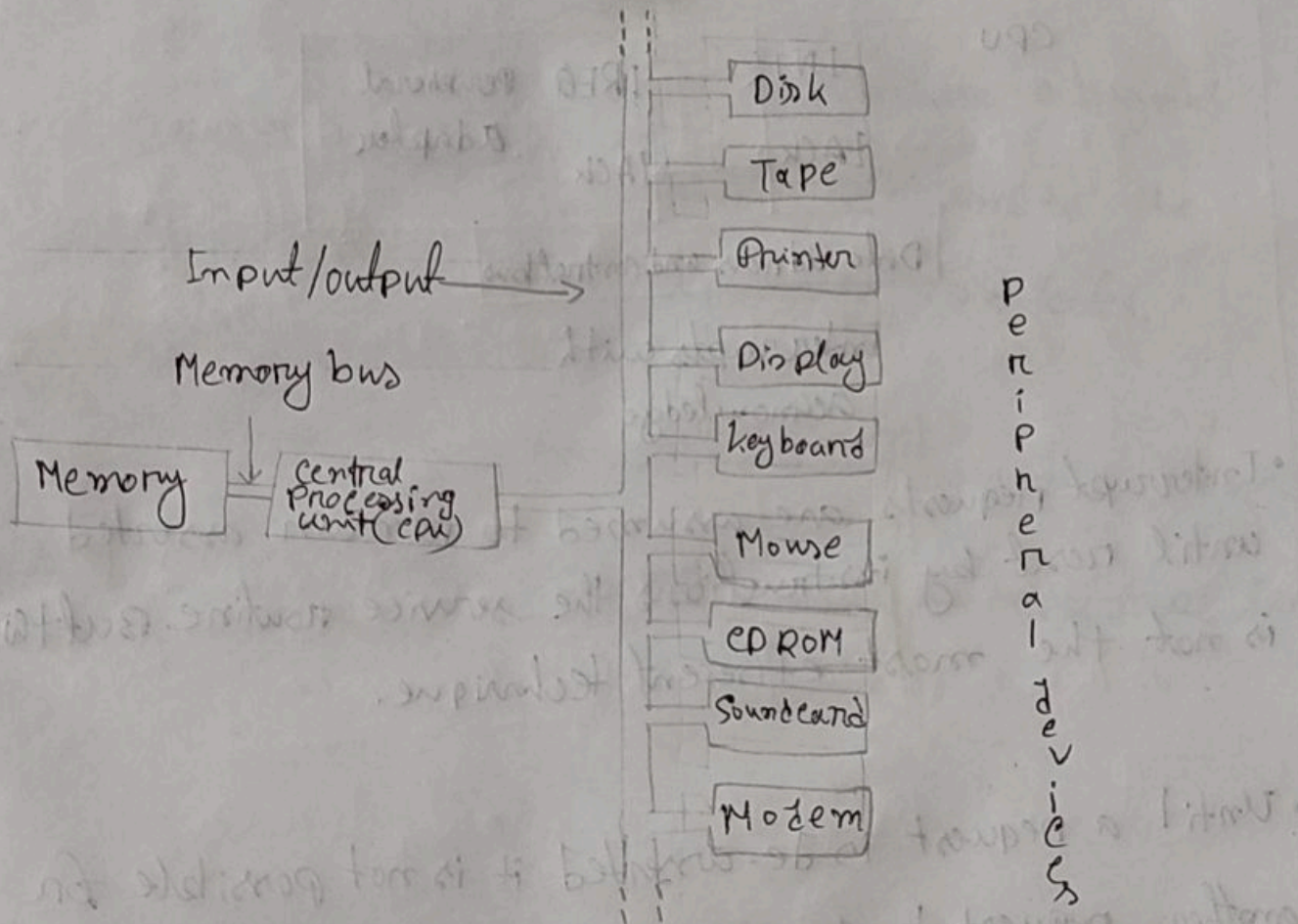
① \* List of D/A application: A D/A converter is a system that converts a digital signal into an analog signal. It performs the reverse function. It converts digital audio samples into the analog waveforms to audio amplifiers and speakers.

\* D/A application: D/A converters have many applications -

- In compact disk audio player
- In speech synthesizer ICs
- To build micro computer controlled testers.
- To control small resistive heaters.
- Motor speed control.

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\* Typical Computer system: A computer system is a programmable electronic device that can accept input; store data; and retrieve, process and output information. A typical computer system consists of both hardware and software.



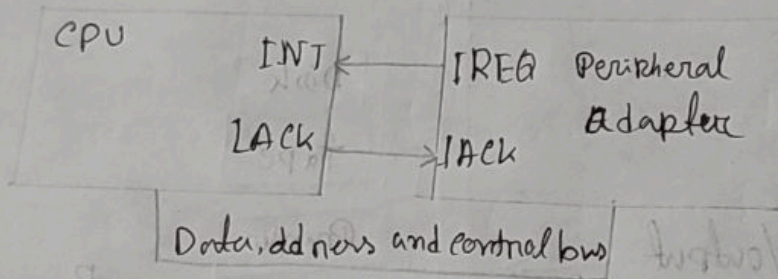
Typical computer system



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© \* Interrupt acknowledgement: An interrupt

acknowledge signal is generated by the CPU when the current instruction has finished execution and CPU has detected the IRQ.



Interrupts with  
acknowledge

- Interrupt requests are assumed to remain asserted until reset by instructions the service routine. But this is not the most efficient technique.
- Until a request is de-asserted it is not possible for another request to be seen, this may result in data

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from a fast peripheral being lost while service routine is getting around to clearing a low priority interrupt.

- It could be better if the request could be cleared quickly after the request is noticed.
- To assist in this most computers have a signal generated by the CPU that is returned to the peripheral as soon as the interrupt is detected.
- This clears the interrupt request from that device and allows other devices to use the interrupt line.

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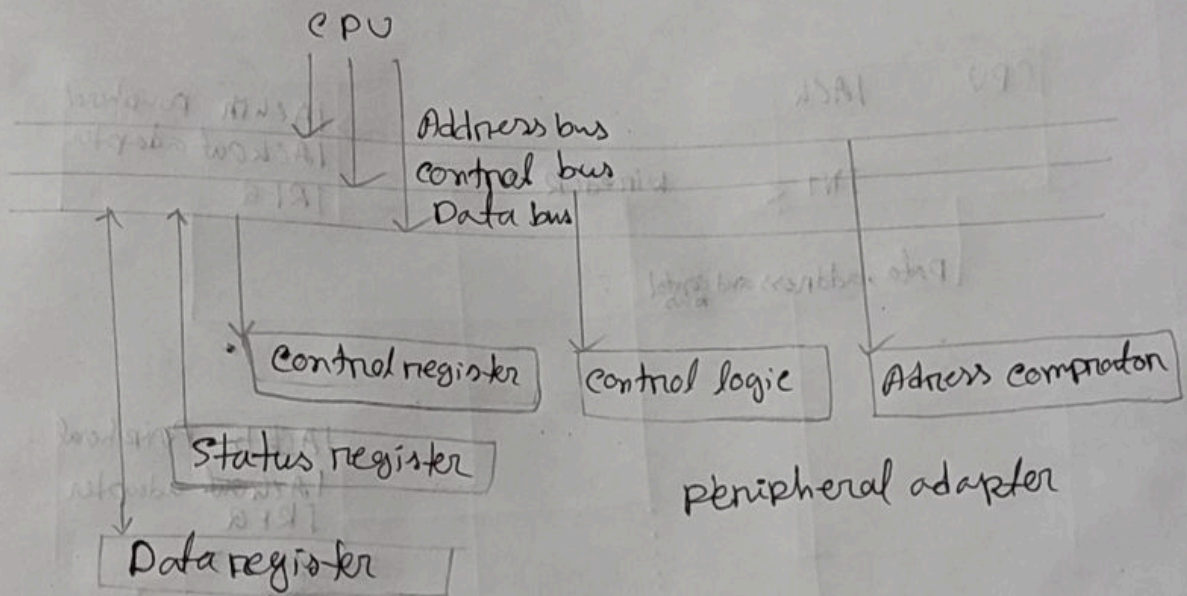
Answer to the Question No - 5

A Peripheral Adapter:

- ❑ Modern computers perform operations very much faster than most peripherals can generate or accept data.
- ❑ Programs and data are moved between memory and the CPU at such a speed that it would be inappropriate to connect peripherals directly to the CPU.
- ❑ Some form of interface is required to convert between that fast internal communications and the relatively slow external devices.
- ❑ A peripheral adaptor works as an interface between CPU and a peripheral device for data communication.

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\* Data Highways Bus: Data are moved around the computer on a set of wires forming a data highway.

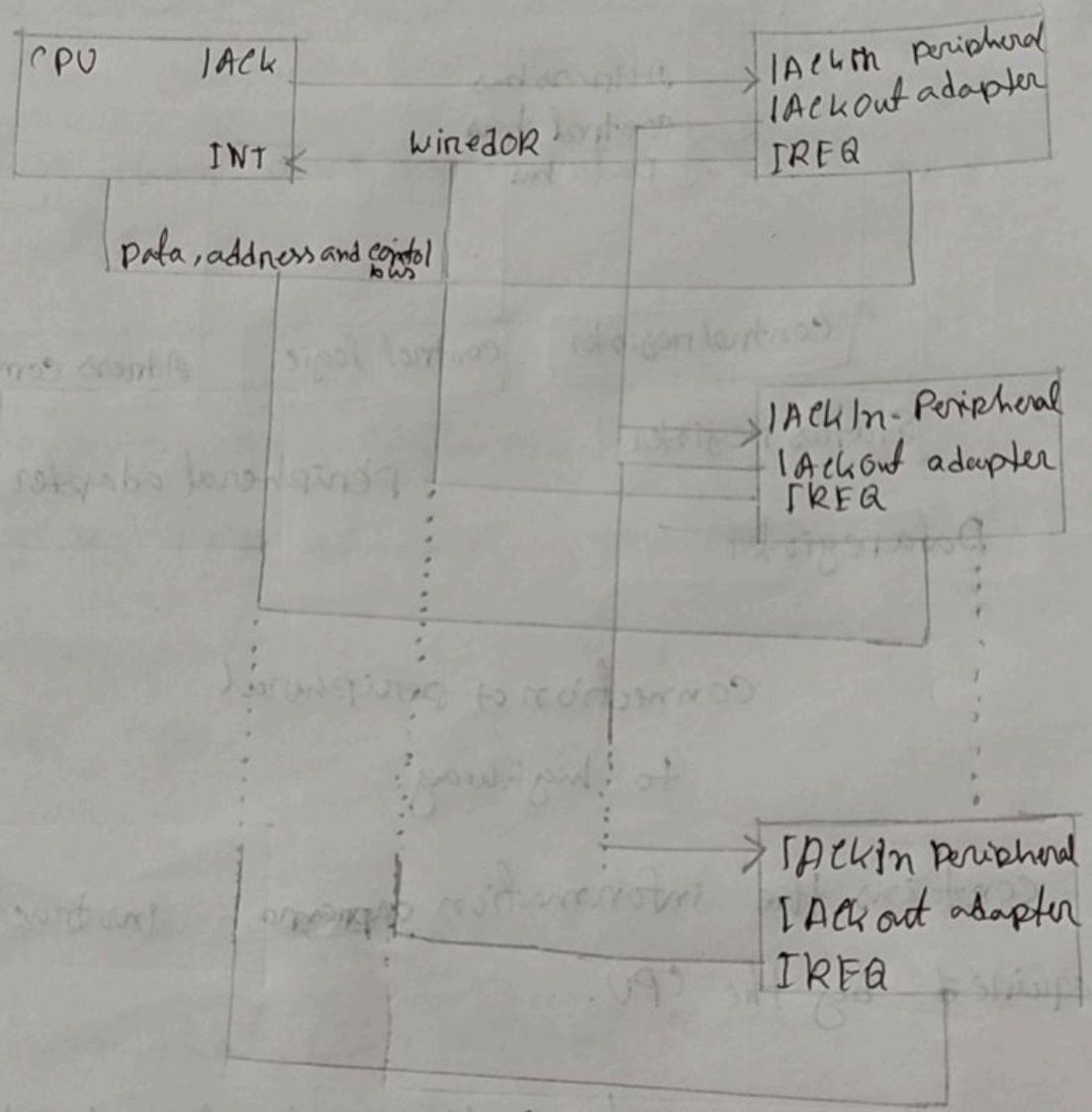


connection of peripheral  
to highway.

- It contains the information program instructions required by the CPU.
- The speed of a computer is the rate at which data can be made available.
- Small systems use 8-bit data bus which are relatively slow but of low cost.
- 8086 uses 16-bit and 80386 uses 32-bit bus.

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Priority Interrupts using Daisy Chain:



priority interrupts using  
a daisy chain.