Artificial Intelligence

Lecture 1
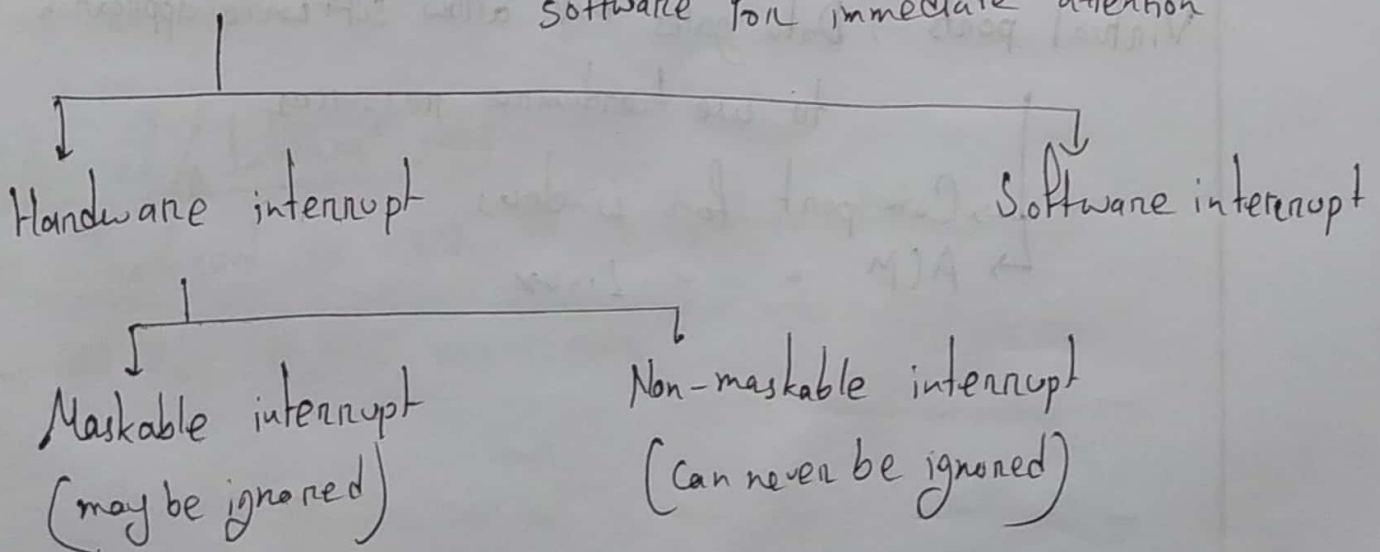
Peripheral → devices connected to the host computer

- Input (mouse, keyboard)
- Output (monitor, printer)
- Storage (hand drive, flash drive)
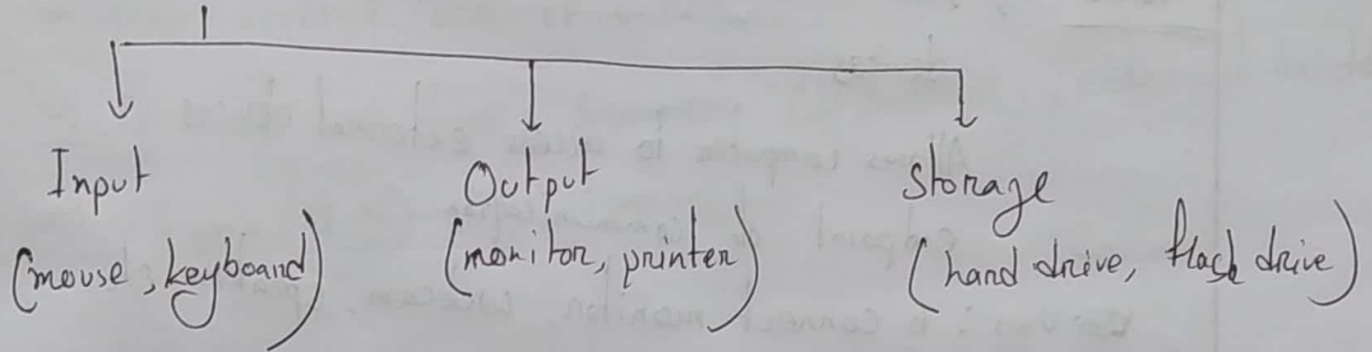
Interface → Point of interaction

- Hardware interface
- Software interface

Interna Interrupt → signal to the processor to from hardware or software for immediate attention

- Hardware interrupt
  - Maskable interrupt (may be ignored)
  - Non-maskable interrupt (Can never be ignored)
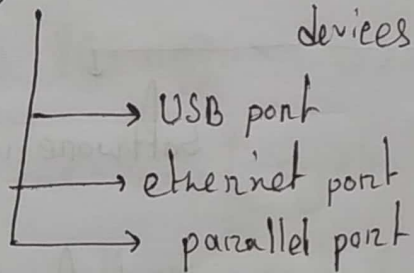- Software interrupt

Lecture - 2

__Ports__ → An interface between computer and peripheral
devices
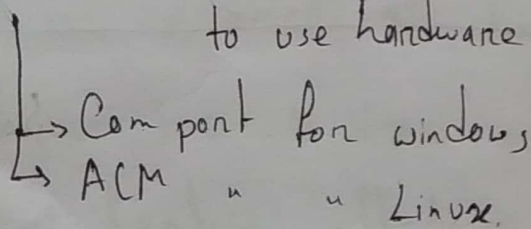
Allows computer to access external devices

endpoint of communication

▷ Uses : to connect monitor, webcam, speaker etc.

Physical ports → used to connect computer with peripheral
devices through a cable

→ USB port
→ ethernet port
→ parallel port

Virtual ports → Data gates that allow software application
to use hardware resources

↳ Com port for windows
↳ ACM " " Linux.

Parallel ports:

- ~~Use~~ Send multiple bits at the sate time
- Use several sets of wires.
- → Connect - Printers, Scanners, CD burners., external harddriv
- → 25 pins (13+12) → female pins

Serial ports:

- Send and receive single bit at a time.
- Use a single wire
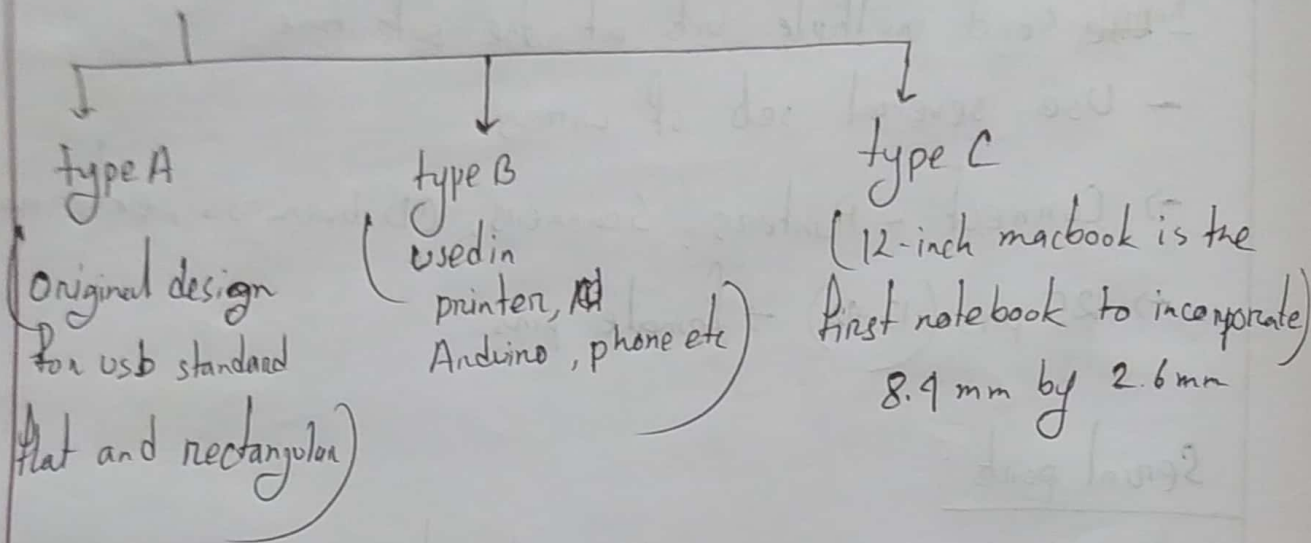- Example: PS/2 port, USB port

VGA Port:

- → 15 pins in three rows
- → connects monitor with video adapter from computer mother-
board.

Ethernet / Internet port:

- → introduced in 1980 to standardize LAN
- → ~~US~~ Uses RJ45 connectors.

USB Port → Universal Serial Bus

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                    |
    ┌───────────────┼───────────────────┐
    ↓               ↓                    ↓
```

type A   type B   type C
(Original design   (used in   (12-inch macbook is the
for usb standard   printer,   first notebook to incorporate)
                      Arduino, phone etc)   8.4 mm by 2.6 mm
Flat and rectangular)

Lecture 3
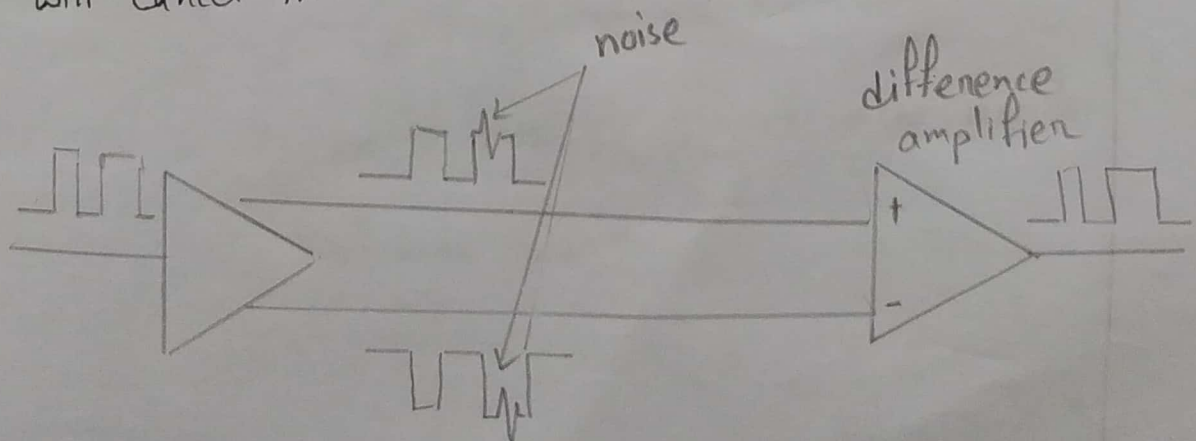
Features of USB:

- Host : Computer
- up to 127 devices can connect ~~directly~~ either
  directly or by USB hubs
- Individual USB cable can run as long as 5 meters
- with hubs, devices can be up to 30 meters away
  from host
- ~~USB 2.0 maximum data rate : 480 Mbps (10x speed than USB 1.0)~~
- twisted pain wires carry data.
- Many USB devices can be put to sleep by the
  host computer when it enters power-saving mode

⇒ Features / Difference between USB 2.0 & USB 3.0

USB 2.0	USB 3.0
Maximum datarate 480Mbps 10x speed than USB 1.0	
2 power wires (+5volt and ground)	4 more wires for data transmission
power wires supply up to 500 milliamps at 5 volts	power wires supply up to 900 milliamp

*** Why D+ and D- ?

⊛ ⇒ Data is sent over a differential line, which means tha D- is a mirror image of D+, so both Data lines carry the signal. The receiver subtracts D- from D+. If some noise signal would be picked up by both wires, the subtraction will cancel it.

noise

difference amplifier

Pinout

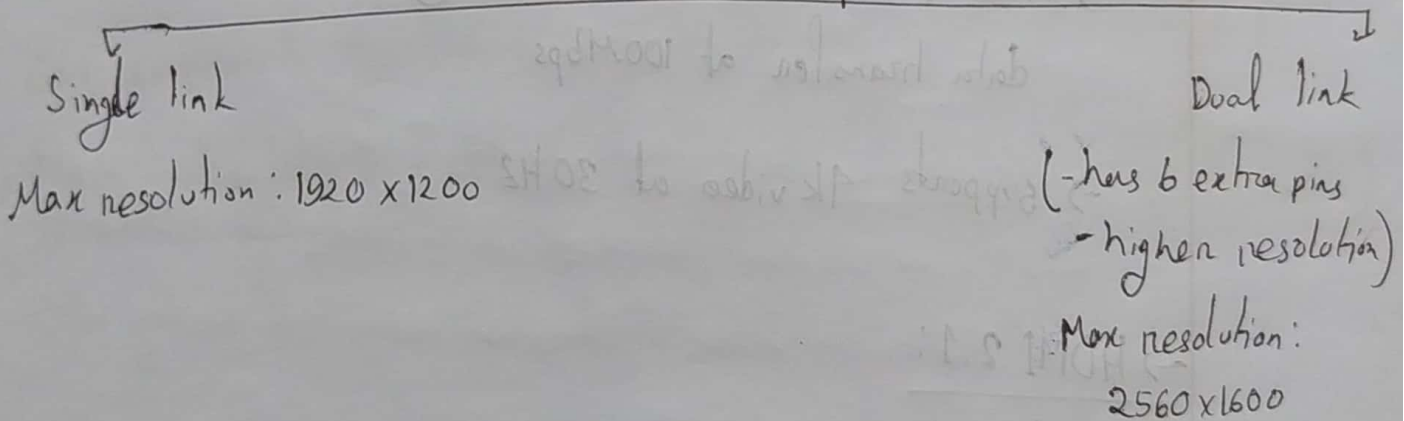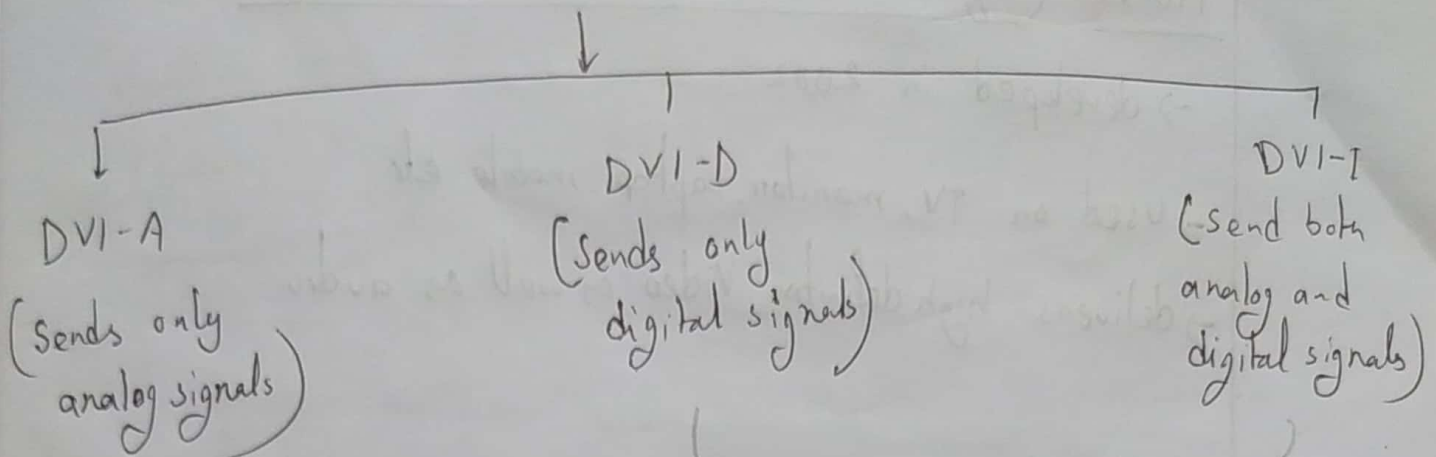| USB 2.0 (4)	USB 3.0. (9)
→ +5V → power	VBus → +5V (power)
→ Data − ⎤ → Data → Data + ⎦	D − ⎤ → 2.0 Data D+ ⎦
→ GND → ground	GND → ground
	StdA_SSRX− ⎤ → Superspeed StdA_SSRX+ ⎦ receiver
	~~GND DRain~~ GND_DRAIN → Ground signal return
	StdA_SSTX− ⎤ Super speed StdA_SSTX+ ⎦ transmitter.

VGA (Video graphics Array) :

→ developed in 1987 by IBM

→ 15 pin ~~img~~ → has screw locks

→ 15 pin divided in 3 rows , D-sub connector

→ Blue ~~color~~ coloured end Adapter.

→ Support resolution 1080p (and higher)

→ ~~tos~~ Uses analog signals to ~~cang~~ carry video.

→ ~~b~~ Was used in CRT monitors

• can be seen in new LCD monitors

DVI (Digital Visual Interface):

→ developed in 1999 by the digital display working group.

→ Succeeded VGA ports

→ 29-pin connector and has screw locks

→ Can provide uncompressed high-quality video streams
   to LCD monitors

→ White coloured end Adapter

DVI Versions

↓

DVI-A
(Sends only
analog signals)

DVI-D
(Sends only
digital signals)

DVI-I
(-send both
analog and
digital signals)

ports that send only digital signals
have two different options

Single link

Max resolution : 1920 × 1200

Dual link

(-has 6 extra pins
- higher resolution)

Max resolution :
2560 × 1600

DVI-K

→ DVI also supports analog video outputs which makes it
backwards compatible (using an adapter) with the VGA interface.

HDMI (high definition multimedia interface):

→ developed in 2002

→ Used on TV, monitor, laptop, mobile etc.

→ delivers high definition video, as well as audio.

→ HDMI 1.4:

→ released in 2009 and added capability of network communication

→ video + audio + ethernet networking data transfer at 100Mbps

→ supports 4k video at 30 Hz

→ HDMI 2.1:

→ released in 2017

→ Supports 4k video at 120 Hz

   8k " at 60 Hz

→ An HDMI hub or splitter can be used to deliver video output to multiple monitors. Daisy chaining is not easy in comparison to Display port.

=) Notable feature : ARC (Audio Return Channel)
enables audio transfer from source (TV etc) to receiver
(connected speakers). Earlier, it was done using a
separate audio cable.

Display Port:

-) ~~Dele~~ Developed in 2006.

-) Was designed to carry video, in addition can carry USB and
audio data.

-) Can connect by using adapter to DVI, VGA and HDMI ports

-) Main advantage :- multimonitor capability : (uses daisy chain
configuration)
        - has locking mechanism.

-) In March 2016, Display port 1·4 was released which has a
    max resolution of 8k at 60Hz.

Thunderbolt:

-) Developed in 2011. (~~mainly a va~~

-> Mainly was used for apple product but now is available for computers as well.

-> Intel-designed multipurpose interface, intended for video output + connecting storage devices (harddrives and SSDs)

-> Thunderbolt (1 & 2) interface utilized mini Display Port connector.

-) <u>Thunderbolt 3 connector</u>: USB Type-C
  └> Supports max theoretical bandwidth of 40Gbit/s
   · Can push video streams on two 4k display at the same time

-> A single thunderbolt port can connect up to 6 devices via daisy chaining on hub.

By using Type-c connection, it can also leverage USB Power Delivery feature which can be used to charge a connected device using up to 100 watts of power.