Interrupts

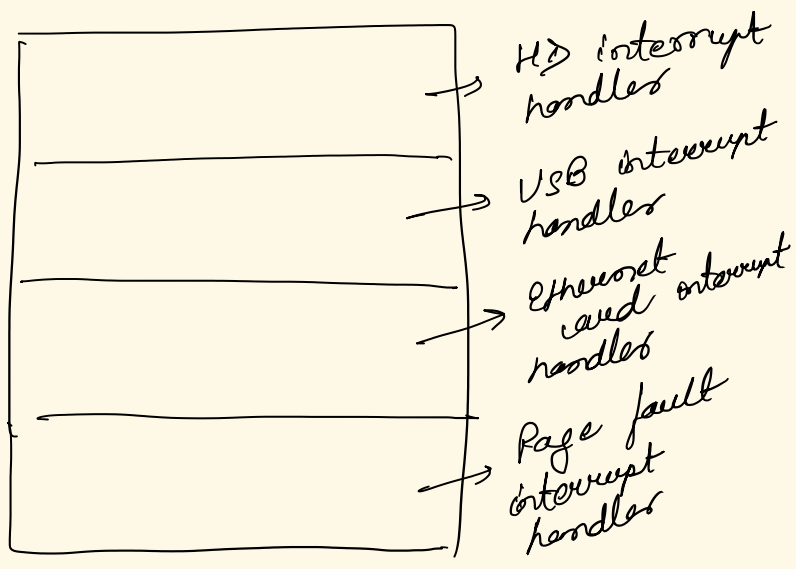
Friday, March 1, 2019 2:30 AM

- An interrupt is an event that requires immediate attention.
- When any device needs attention, it sets its interrupt flag to high.
- When an interrupt is raised, CPU stops whatever it is doing and it jumps to the interrupt handler for specific interrupt.
- When CPU finishes executing the interrupt handler, it returns back to the same place where interrupt happened and processor continues.
- Example :- Key press, mouse etc.

Steps to handle interrupts

(1) When an interrupt is raised, CPU leaves its task and calls the interrupt handler for that particular interrupt.
(2) Before calling the interrupt handler, CPU saves the program counter and registers in the executing state.
(3) Then it finds the specific interrupt handler by looking in the interrupt vector.
(4) Once interrupt handler is found, CPU jumps to interrupt handler and runs it.
(5) Then CPU restores the registers and returns back to the address at which it was previously executing.
(6) Interrupts allow CPU and device to run in parallel without waiting for each other.

Interrupt vector



* Device interrupts

Interrupts raised by devices when it needs CPU attention or when a request is complete. Example :- Mouse is moved, key is pressed etc.

* Application interrupts

Interrupts raised by applications. like exceptions. For example suppose in the application program, we are doing an operation like dividing by zero. It will raise an exception. This exception is called Math exceptions.

* Page faults

This interrupt is generated by the Memory Management Unit (MMU). The job of MMU is to convert virtual memory address to physical memory address.

- Invalid address :- Interrupt sends a SEGV signal to the process when process is trying to address invalid address.
- If process is trying to access a valid address and there is no corresponding page in the memory.
- If process is trying to access a address but that address has invalid permission

* So there are interrupts like device interrupts, application interrupts, math interrupts, page faults, software interrupts

* Software interrupts

It is generated by software when it is trying to request any operating system services.