INTERRUPT MECHANISM

Interrupt is a mechanism by which Computer Components, like memory or I/O modules, may Interrupt the normal processing of the processor and request the processor to perform other specific action.

According to the source where they are generated, interrupts may be Categorized into four classes:-

1) **program :** Generated by some Condition that occurs as a result of an instruction execution, Such as

- Arithmetic Overflow
- Division by zero
- Page fault
- Invalid instruction
- Out side memory space Reference

2) **Timer :** Generated by a timer with in the processor. This allow operating System to perform Certain functions on a regular basis

3) **External or I/o :** by an I/o Controller, I/o devices tells the CPU that an I/o request has Completed by sending an interrupt signal to the processor.

4) **Hardware failure :** Generated by a failure, such as power failure or memory parity error.

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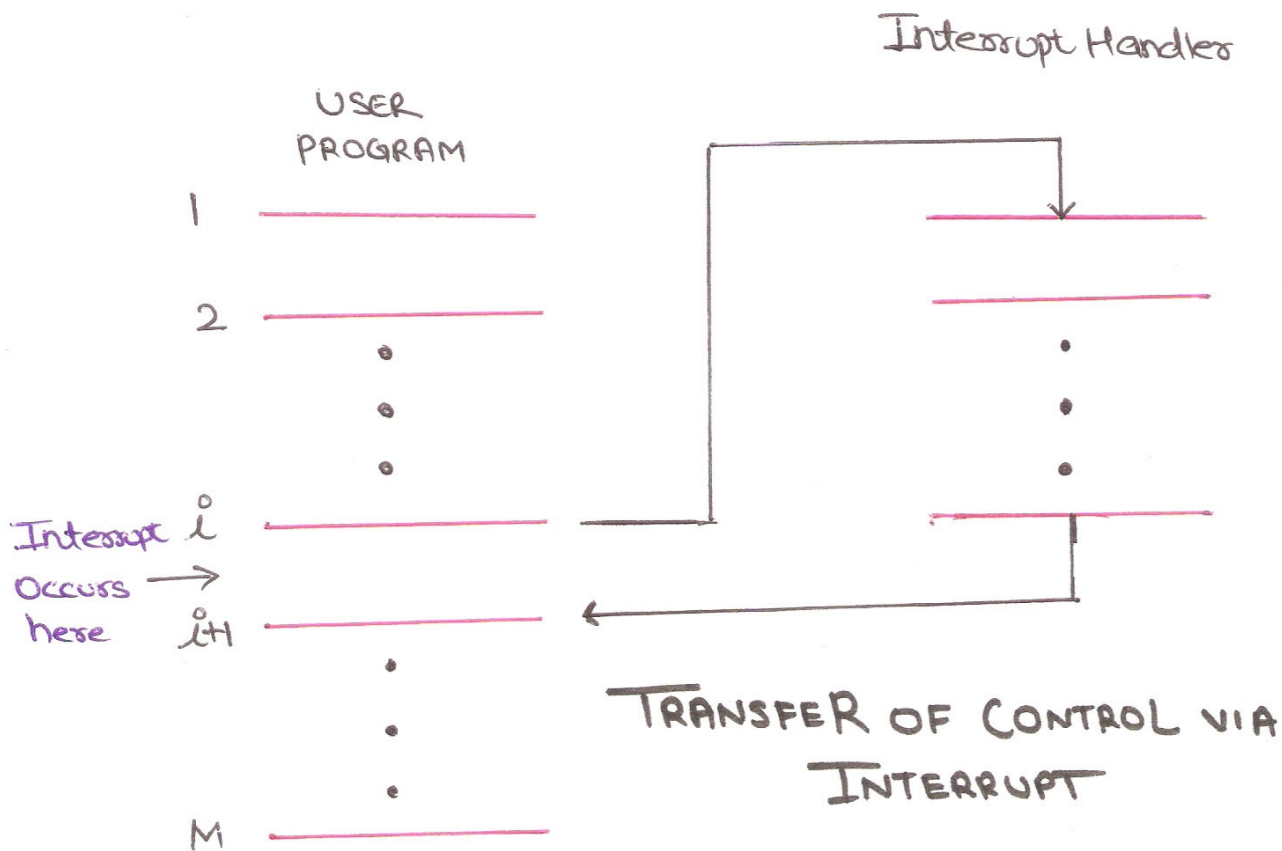
For the user program, an interrupt suspends the normal sequence of execution. When the interrupt processing is completed, execution resumes. Thus the user program does not have to contain any special code to accommodate interrupts.

Interrupt Handler

USER PROGRAM

1

2

Interrupt i
Occurs →
here   i+1

M

TRANSFER OF CONTROL VIA INTERRUPT

To accomodate interrupts, an interrupt stage is added to the Instruction Cycle. In the interrupt stage, the processors checks to see if any interrupts have occurred, indicated by the presence of an interrupt signal.

If no interrupts are pending, the processor proceeds to the fetch stage and fetches the next instruction of the current program.

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→ If an interrupt is pending, the processor suspends execution of the current program and executes an 'interrupt-handler' routine.
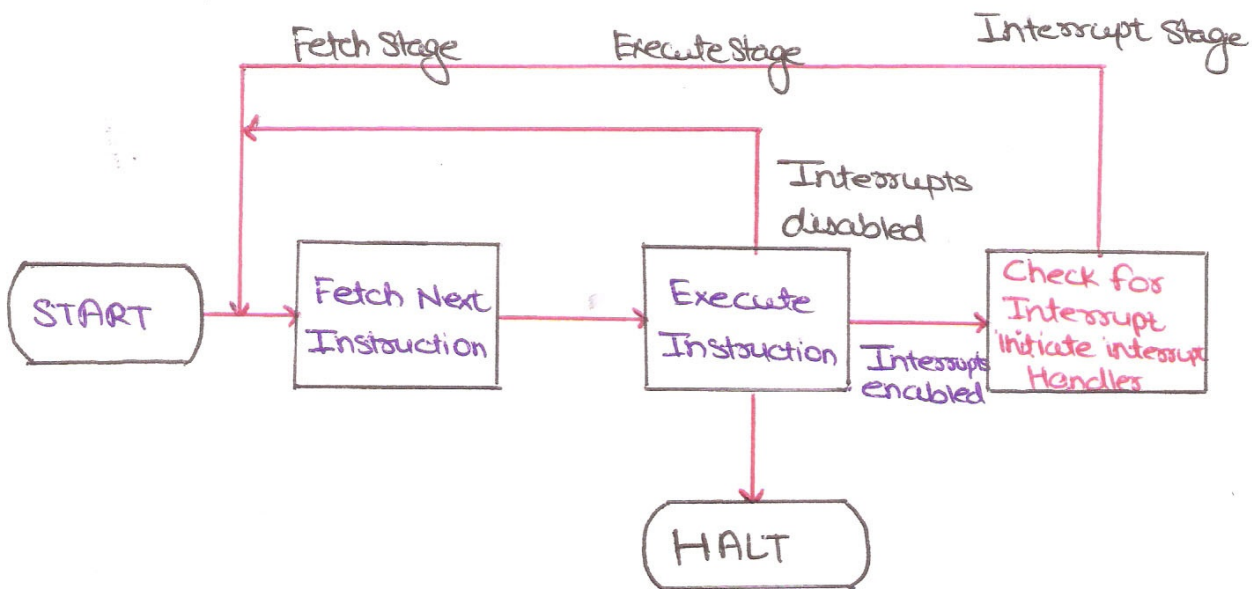
Instruction Cycle with Interrupts

This routine determines the nature of the interrupts and performs what ever actions are needed.