

# Microcontroller and Embedded Systems

## **Interrupts**

**Interrupts are just *special subroutines that may (or may not)* be called explicitly.**

**If conditions are “right”, when an interrupt occurs, then the processor will stop what it is doing, and jump to a specific place in memory (decided by the Intel 8051 designers) hooked by that particular interrupt.**

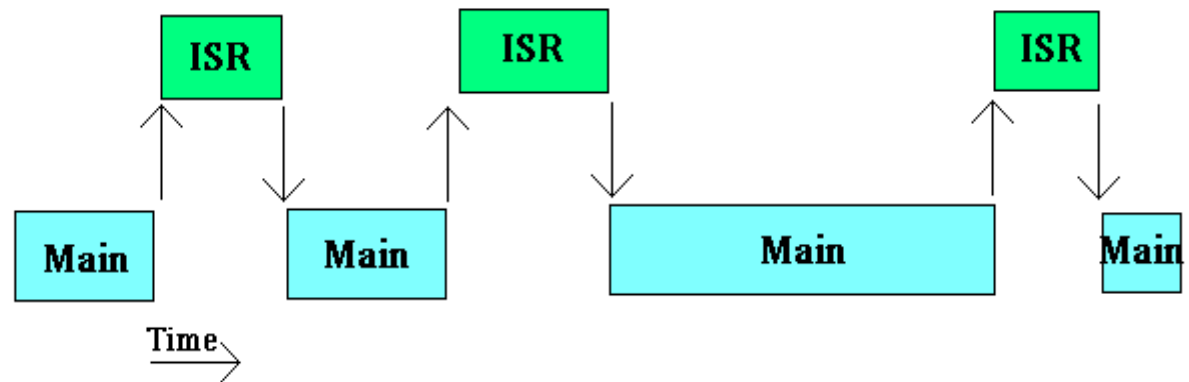
**It is up to the programmer to make sure that you supply a sensible further course of action. This is called the interrupt handler routine or *interrupt service routine , ISR.***

# Interrupt :

Program execution without intrrupts :



Program execution with intrrupts :



ISR : Intrrupt Service Routin

## **INTERRUPTS**

**All interrupt functions are under the control of the program. The programmer can alter the bits of IE, IP and TCON register.**

**Each interrupt forces the processor to jump at the interrupt location in the memory.**

**The interrupted program must resume operation at the instruction where the interrupt took place. Program resumption is done by storing the interrupted PC address on to stack. RETI instruction at the end of ISR will restore the PC address.**

## Types of Interrupts

**Five interrupts are provided on 8051.**

**3 are generated by internal operations.**

**Generated by internal timer/counter**

**Timer flag 0 – TF0**

**Timer flag 1 – TF1**

**Indicates that a character has been received or the buffer is empty and a character can be transmitted**

**Serial port interrupt (RI or TI)**

**2 are triggered by external signals**

**INT0~**

**INT1~**

**IN 8052 ONE MORE INTERRUPT IS THERE FOR  
TIMER 2.**

# INTERRUPTS

INTERRUPT SOURCE	VECTOR ADDRESS
IE0	0003H
TFO	000BH
IE1	0013H
TF1	001BH
R1&T1(SERIAL INT.)	0023H
TF2 & EXF2	002BH

# INTERRUPT ENABLE REGISTER

EA	-*	ET2	ES	ET1	EX1	ET0	EX0
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- EA- ENABLE/DISABLES THE INTERRUPTS
- -\* - RESERVE FOR FUTURE USE.
- ET2- ENABLE OR DISABLE THE TIMER 2 OVERFLOW.
- ES- ENABLE OR DISABLE THE SERIAL PORT INTERRUPT.
- ET1- ENABLE OR DISABLE THE TIMER 1 OVERFLOW
- EX1- ENABLE OR DISABLE EXTERNAL INTERRUPT 1.
- ET0- ENABLE OR DISABLE THE TIMER 0 OVERFLOW
- EX0- ENABLE OR DISABLE EXTERNAL INTERRUPT 0.