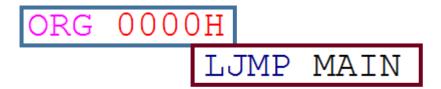# Microprocessor Systems

Lab9 – External Interrupt Assembly Code Example

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# External Interrupt Example

- Instruction memory address starts at ORG 0000H

```
ORG 0000H
            LJMP MAIN
```

```
      00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000 : 02 00 30 FF FF FF FF FF FF FF FF FF FF FF FF FF
0010 : FF FF FF C2 90 7C 0A 32 FF FF FF FF FF FF FF FF
0020 : FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0030 : D2 90 D2 8A 75 A8 84 BC 00 02 D2 90 12 00 43 DC
0040 : FB 80 F4 7D 64 7E 02 7F E6 DF FE DE FA DD F6 22
```

# External Interrupt Example

- Instruction memory address starts at ORG 0013H

```
ORG 0013H  ;INT1 ISR
           CLR P1.0 ;turn on the LED
           MOV R4,#10

           RETI ;return from ISR
```

```
        00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000 :  02 00 30 FF FF FF FF FF FF FF FF FF FF FF FF FF
0010 :  FF FF FF C2 90 7C 0A 32 FF FF FF FF FF FF FF FF
0020 :  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0030 :  D2 90 D2 8A 75 A8 84 BC 00 02 D2 90 12 00 43 DC
0040 :  FB 80 F4 7D 64 7E 02 7F E6 DF FE DE FA DD F6 22
```

# External Interrupt Example

- Instruction memory address starts at ORG 0030H

```
ORG 0030H
MAIN:
        SETB P1.0 ;turn off the LED
        SETB TCON.2 ;make INT1 edge-trigger interrupt
        MOV IE,#10000100B ;enable External INT1

LOOP:
        CJNE R4,#0, START_DELAY
        SETB P1.0 ;turn off the LED when R4 count down to zero
```

```
       00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

0000 : 02 00 30 FF FF FF FF FF FF FF FF FF FF FF FF FF
0010 : FF FF FF C2 90 7C 0A 32 FF FF FF FF FF FF FF FF
0020 : FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0030 : D2 90 D2 8A 75 A8 84 BC 00 02 D2 90 12 00 43 DC
0040 : FB 80 F4 7D 64 7E 02 7F E6 DF FE DE FA DD F6 22
```

# Interrupt Vector Table of 8051

| Interrupt Source | Vector Address |
|---|---|
| Reset | 0000H |
| External Interrupt 0 | 0003H |
| Timer 0 Overflow | 000BH |
| External Interrupt 1 | 0013H |
| Timer 1 Overflow | 001BH |
| Serial Interface | 0023H |

# Reference

- Instruction Set Manual
- [https://developer.arm.com/documentation/101655/0961/8051-Instruction-Set-Manual/Opcodes](https://developer.arm.com/documentation/101655/0961/8051-Instruction-Set-Manual/Opcodes)


- Interrupt Vector Table
- [https://www.electronicwings.com/8051/8051-interrupts](https://www.electronicwings.com/8051/8051-interrupts)