# CPE 323
# Intro to Embedded Computer Systems
# Interrupts (Exceptions)

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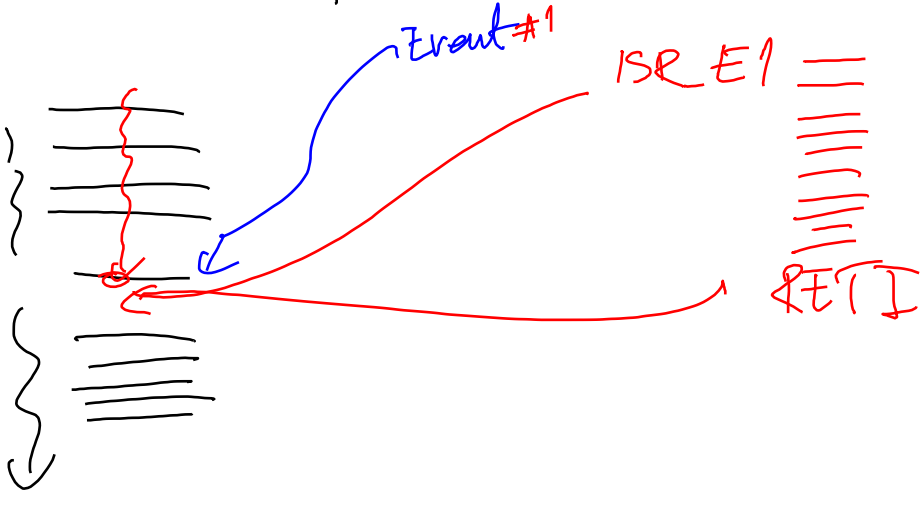
# Admin

# Instruction Execution Stages

- 1. Instruction Fetch
- 2. Decode
- 3. Operand Fetch
- 4. Execute
- 5. Store Results
- 6. Exception Processing

# What are Interrupts?

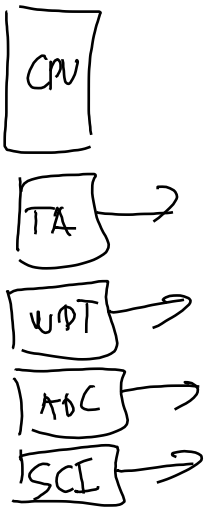
→ Events (asynchronous) triggered in hardware



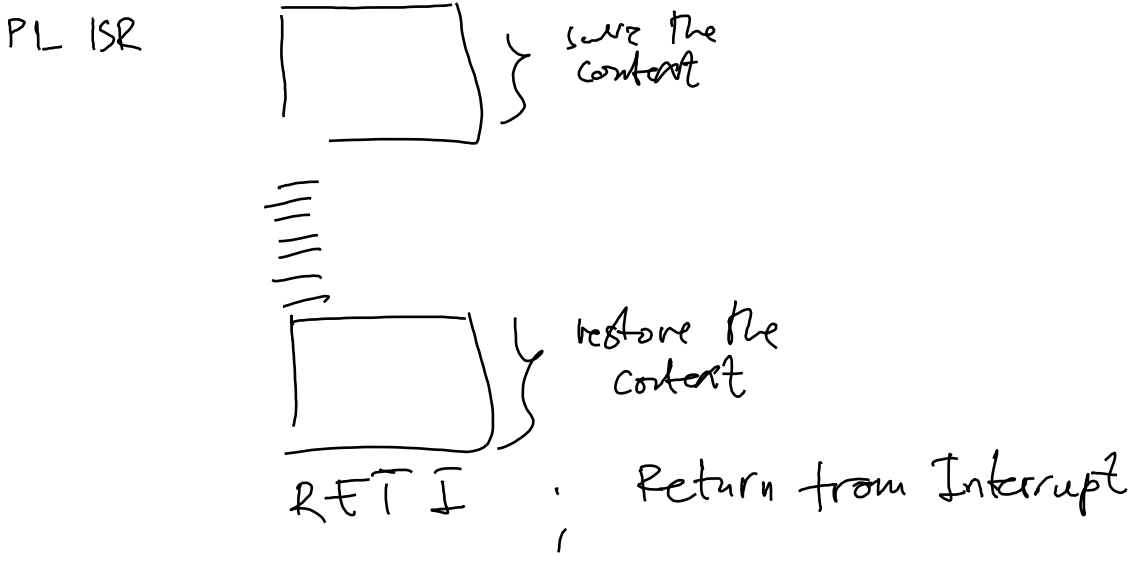
# Sources of Interrupts

→ internal to CPU

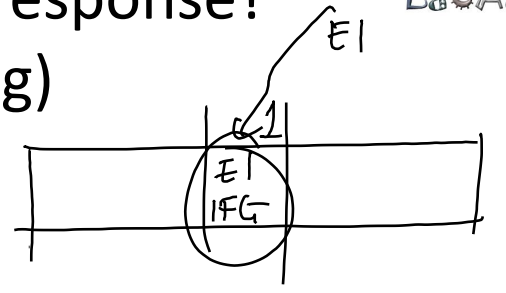
→ external (peripherals) → polling
→ interrupt



# Interrupt Service Routine (ISRs)



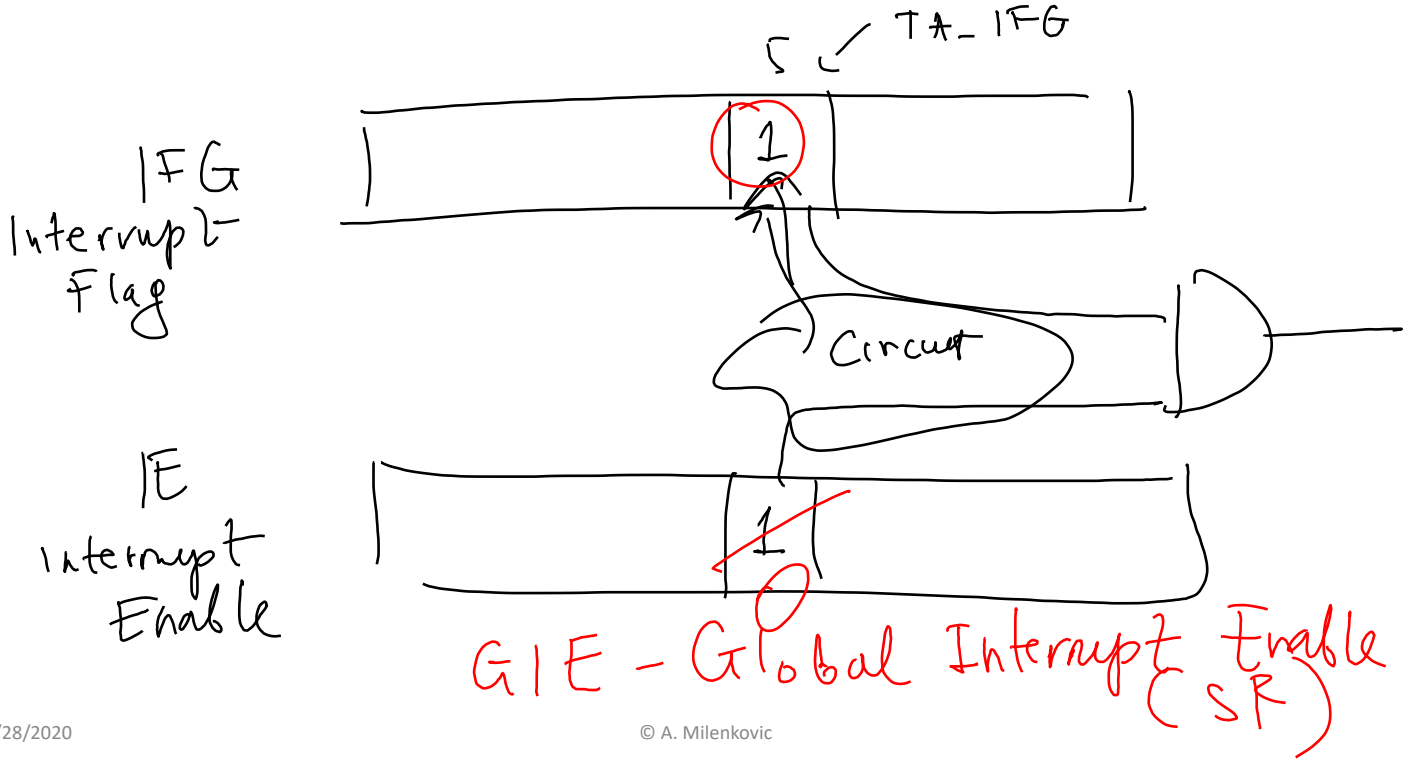
# What does MSP430 do as a response? (Exception Processing)




IFG

1. Finish instruction execution
2. Push PC + SR
3. Clear SR
4. Select highest prority interrupt
5. Clear IFG bit for single-source interrupts
6. Read the starting address of the corresponding ISR from the IVT (interrupt vector table)
7. Move into PC

# Tracking Interrupts? (IFG bits)



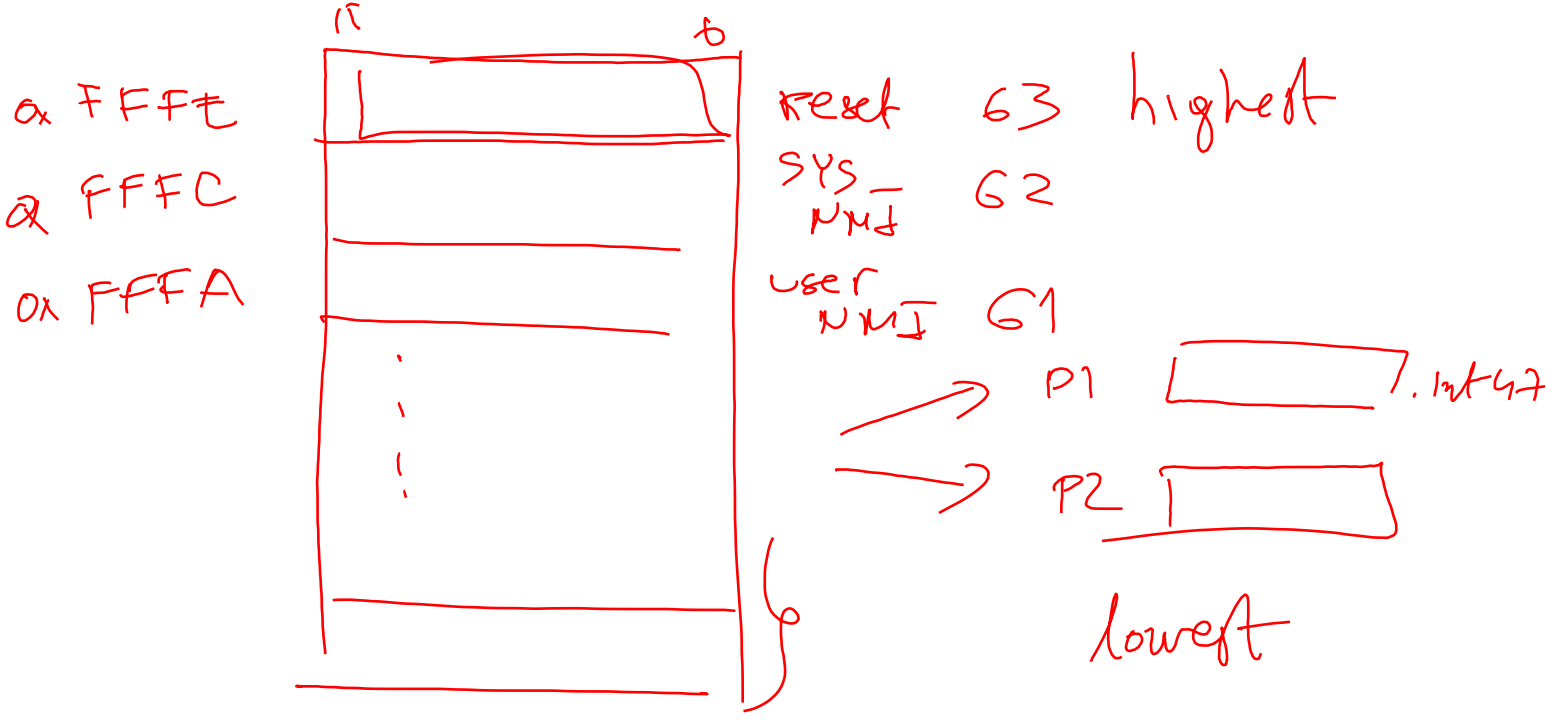
# Masking Interrupts (IE Bits)

→ Selective masking

→ Global masking (GIE)

→ NMI – Non-Maskable Interrupt

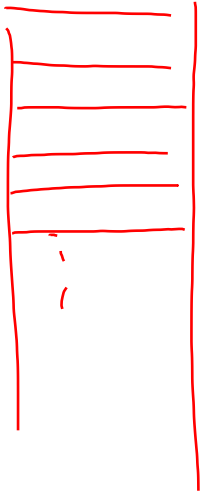
# Interrupt Vector Table



# Interrupt Priorities

→ Vectored

→ Fixed priorities



# Parallel Ports and Interrupts

- P1 and P2 have interrupt capability
- P1IFG
- P1IE
- P1IES
- P2IFG
- P2IE
- P2IES