Operating Systems

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Reference Books

1. Operating System Concepts 10th Edition By Abraham Silberschats, Galvin and Gagne

2. Modern Operating Systems 4th Edition By Andrew S Tenenbaum and Herbert Bos

3. Operating Systems in Depth By Thomas W Doeppner

4. Operating Systems Three Easy Pieces   Remzi H. Arpaci-dusseau and Andrea C. Arpaci-dusseau

5. Understanding the Linux Kernel 3rd Edition By Daniel P Bovet and Macro Cesati

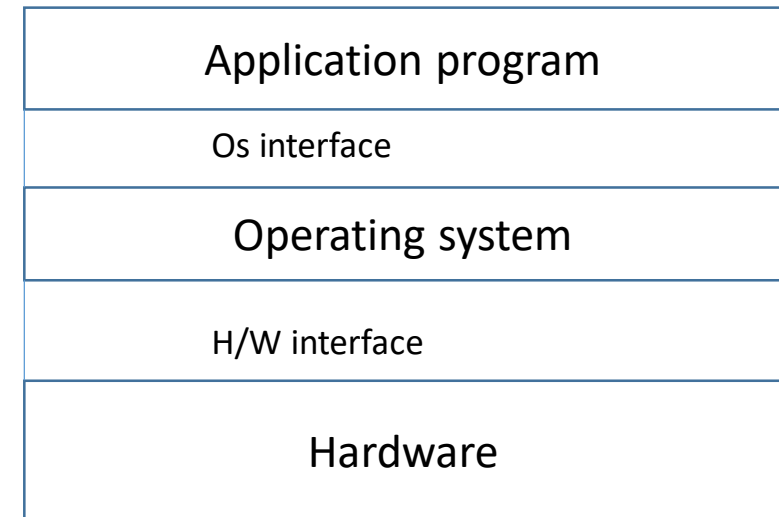# What is an Operating system

- Manages Hardware
- Middle ware between the user program and the hardware

* Operating system
     interface

* Hardware interface

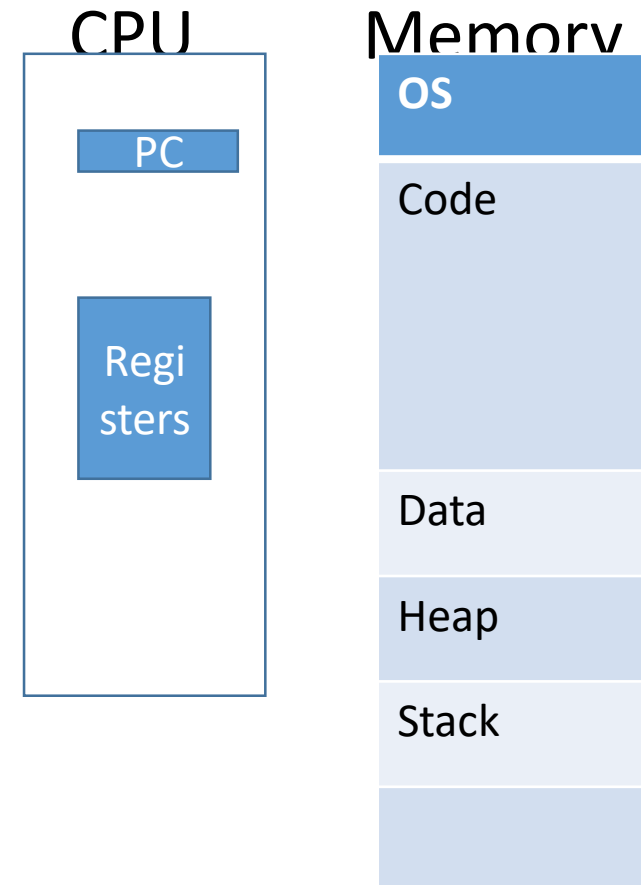Hardware interface: ISA of the machine

Operating Interface : System calls

Application program
Os interface
Operating system
H/W interface
Hardware

Program Execution

main(){

    int a,b,c;

    a=10;

    b=20;

    c=a+b;

    printf(" %d",C);

}

Compiler generate the m/c code.

CPU

PC

Regi sters

Memory

OS

Code

Data

Heap

Stack

Interrupts

- Hardware Interrupt
  NMI , INTR and INTA

  Exceptions

- Software Interrupt
  Interrupt instruction
  INT 00H to INT FFH

Interrupts and exceptions

- INT 00H to INT FFH instructions and CALL instruction

- Int f1(....){.... }
- Int main(){

    ....

    ....

    f1();

    ......

    write(fd, buffer, n);

    .....

    }

Interrupts and exceptions
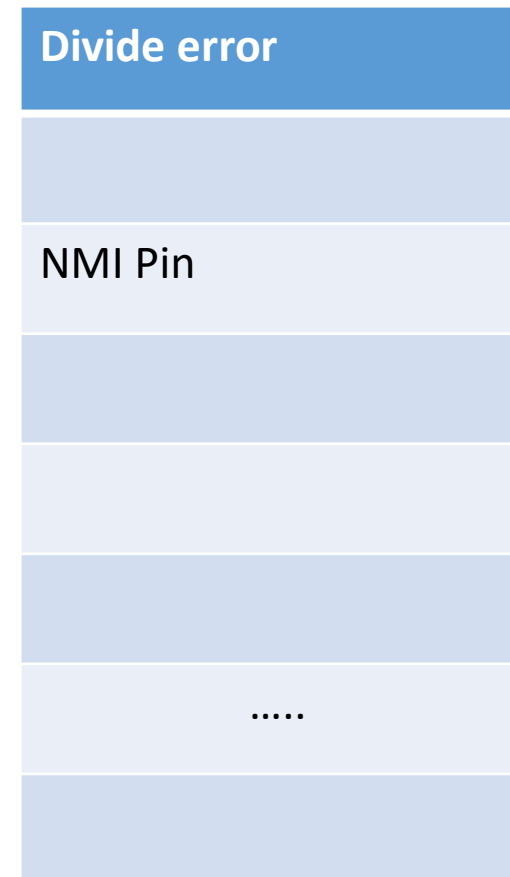
- INT 00H to INT FFH instructions and CALL instruction

- CALL procedure name- pushes the address of the next instruction after
                                   the call on to the stack
- RET- Pop the return address from the stack to PC/IP
- Interrupts- Hardware interrupts and software interrupts(INT, INTO,
              INT3 and BOUND)
- Flags-   IF(Interrupt flag)and TF(trapflag)
- IRET – (interrupt return instruction)

Interrupts and exceptions

- Interrupt Vectors-Interrupt vectors and the vector table
- The interrupt vector table is located in the first 1024 bytes of memory at addresses 000000H–0003FFH. –contains 256 different four-byte interrupt vectors
- An interrupt vector contains the address (segment and offset) of the ISR

Interrupts and exceptions

- Interrupt vector and Vector table:
  - 256, 4 byte vectors
  - First 32 are reserved in Intel processors.
- Interrupt Handling
  - i)Push flag register
  - ii) Clear IF and TF flags
  - iii) Push CS register
  - iV) Push IP register
  - v)Fetch Interrupt vector content, Load CS &IP

Divide error
NMI Pin
…..

Interrupts and exceptions

- IRET

    POP IP

    POP CS

    POP flags

Interrpt Vector
ISR
IRET
User Processes

OS Area

User Area