

⊛ There are total of 14 Register. Divided into three group

i. Data register

- Accumulator (AX = AH, AL)
- Base (BX = BH, BL)
- Counter (CX = CH, CL)
- Data (DX = DH, DL)

ii. Address Register

- Segment
  - Code (CS)
  - Data (DS)
  - Stack (SS)
  - Extra (ES)
- Pointer
  - Instruction (IP)
  - Base (BP)
  - Stack (SP)
- Index
  - Source (SI)
  - Destination (DI)

iii. Status Register → Flag register (16 bit)

- 6 status flag
- 3 control flag

 } 9 bit

⊛ Special Purpose Register

— CS, DS, SS, ES, IP, SP, Flag register

⊛ Slide - 17. Diagram need to draw exactly as shown.

⊛ IP will be used with CS only.

⊗ Physical Address =  $\underbrace{CS \times 10H}_{\text{Base Address}} + \overset{\text{displacement}}{\text{Offset}}$

⇒ Range of IP = 0000H .... FFFFH

↪  $2^{16} = \frac{65536}{1024} = 64$

= 64k

⇒ 64k, individual address value

⊗ if offset is 0000H, then  $(CS \times 10H)$  will be base address.  
Start of Code segment

if offset is FFFFH, then the address will be Top of Code segment

⇒ Per segment size is 64k.

⊗ Given,

DS = 1000H

Offset = 00A0H

Phy. Add. = ? = 1000A0H

Top Add. = ? = 10FFFFH

Base Add = ? = 10000H

⊗

DS = 1000H

Phy. Add. = 100A0H

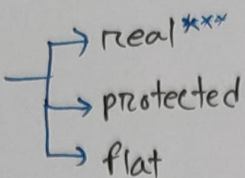
Offset = ? = 00A0H

Top. Add = ? = 1FFFFH

Base. Add. = ? = 10000H



# ⊛ Intel Microprocessor & Architecture

⊛ Addressing modes 

⊛ Program visible

- registers are used during programming and are specified by the instructions.

⊛ Program invisible

- not addressable directly during applications programming

⊛

8086  $\Rightarrow$  16 bit  $\Rightarrow$  AX

80386  $\Rightarrow$  32 bit  $\Rightarrow$  EAX

CORE 2  $\Rightarrow$  64 bit  $\Rightarrow$  RAX

Extended

⊛ Multipurpose Register:

- RAX  $\Rightarrow$  64 bit
- EAX  $\Rightarrow$  32 bit
- AX  $\Rightarrow$  16 bit
- AH, AL  $\Rightarrow$  8 bit each

- The accumulator is used for instructions.

⊛ RBX  $\Rightarrow$  EBX  $\Rightarrow$  BX  $\Rightarrow$  BH, BL

- BX register sometimes holds offset address of a location in the memory system.

⊛ RCX  $\Rightarrow$  general purpose - holds the count for various instructions

\* RDX  $\Rightarrow$  general purpose data register

- holds a part of the result from a multiplication or part of dividend before division.

\* RBP - points a memory (base pointer) location for memory data transfer

\* RDI - addresses string destination data for the string instruction.

\* RSI - addresses source string data

- Both RDI & RSI are general purpose register

\* IP  $\leftrightarrow$  CS

SP  $\leftrightarrow$  SS

$\curvearrowright$  Code Segment

\* RIP - addresses the next instruction in a section of memory

\* RSP - addresses an area of memory called the stack

\* Flag register (16 bit)

used 9 bit

$\curvearrowright$  0, 2, 4, 6, 11

C = Carry	T = Trap	} Control flag
P = <del>predicate</del> parity	Z = Zero	
A = Auxiliary	D = Direction	} other are status flag
Z = Zero	O = Overflow	
S = Sign		

- flag never change for any data transfer or control operation

- used to control features found in the microprocessor