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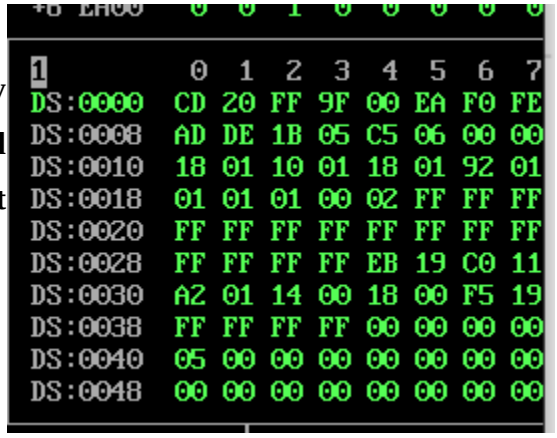
Section: BAI-4A

Coal-lab-task-2

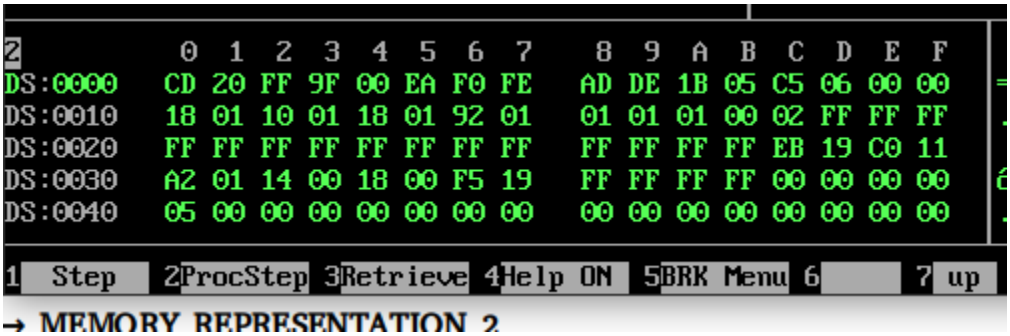
MEMORY:

M1→ MEMORY REPRESENTATION 1:

Memory Representation 1 (M1) typically refers to the memory layout of the emulated environment,here rows represent different segments or areas of memory.

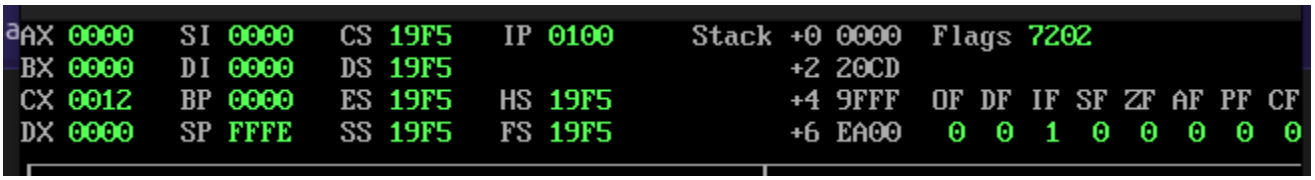


M2 → MEMORY REPRESENTATION 2



→ MEMORY REPRESENTATION 2

REGISTERS:



general purpose registers

- AX - the accumulator register (divided into AH / AL).
- BX - the base address register (divided into BH / BL).
- CX - the count register (divided into CH / CL).

- **DX - the data register (divided into DH / DL).**

4 general purpose registers (AX, BX, CX, DX) are made of two separate 8 bit registers, for example if AX= 0011000000111001b, then AH=00110000b and AL=00111001b. therefore, when you modify any of the 8 bit registers 16 bit register is also updated, and vice-versa."H" is for high and "L" is for low part.

SP - stack pointer. Stack Pointer register points to the top of the stack.

IP - the instruction pointer. Instruction Pointer register holds the memory address of the next instruction to be executed.

FLAGS: Flags register contains various status flags such as zero, carry, and overflow.

Decimal: 7202
Binary: 1110000010010

converting the flag value to binary allows you to examine individual bits and extract information about various settings or states represented by the flag.

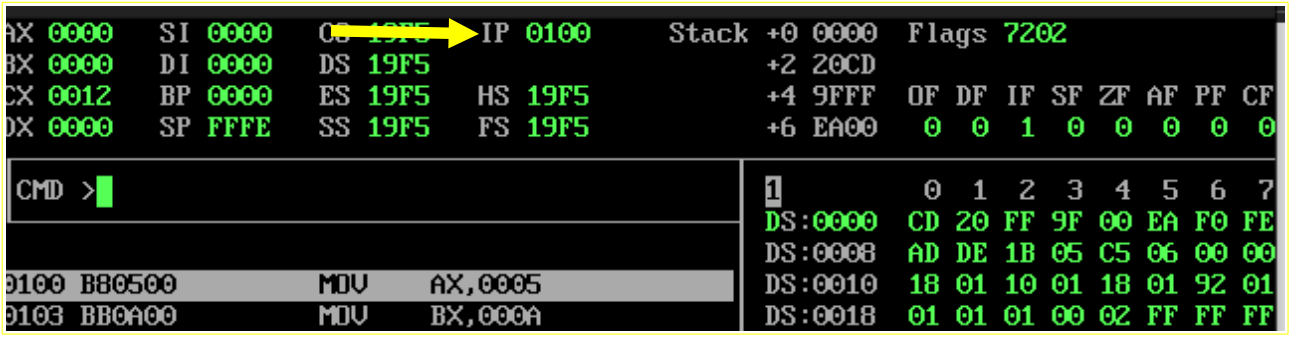
Command to watch the memory <memory> <address>

CODE EXPLANATION:

[org 0x0100]

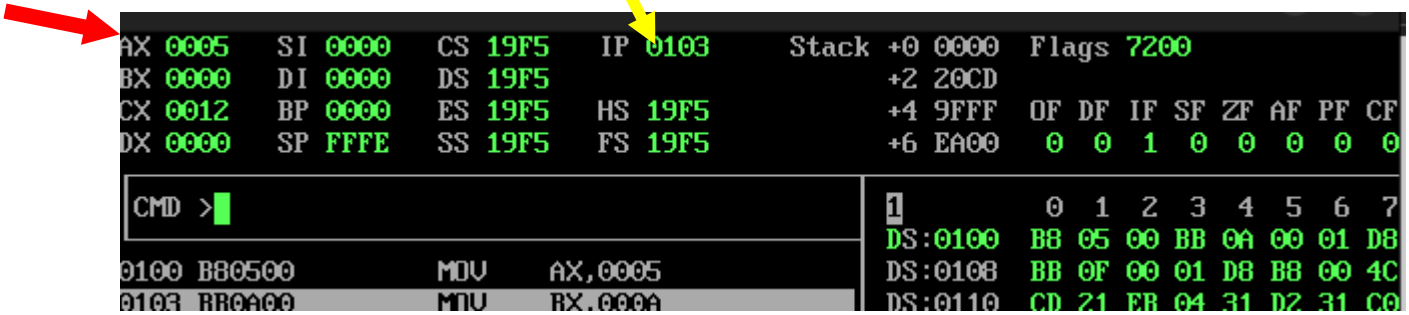
The org command tells the program where to load itself into in memory (ram). In particular this command says to start the program at 100 bytes.

m1 use to view the memory at specific address in memory 1 representation.



IP → Instruction pointer stores the address of the next instruction to be executed by the CPU which is 0100 here mov ax ,5.

mov ax, 5: This line moves the constant value 5 into the 16-bit register ax. Here, ax is being used as a general-purpose register to hold a value.



By pressing F1 first line executes see in AX now 0005 is stored.

IP stores the address of the next instruction to be executed by the CPU which is here 0103 which is mov bx, 10.

In this case, MOV instructions typically take up 3 bytes

- 1 for the opcode and 2 for the operand),

the next instruction would be stored at the next memory address after the current instruction.

MOV AX, 5 is stored at memory address 0x00, then MOV BX, 10 would be stored at memory address 0x03 (MOV AX, 5 takes up bytes 0x00, 0x01, and 0x02).

- Data Storage in Memory:

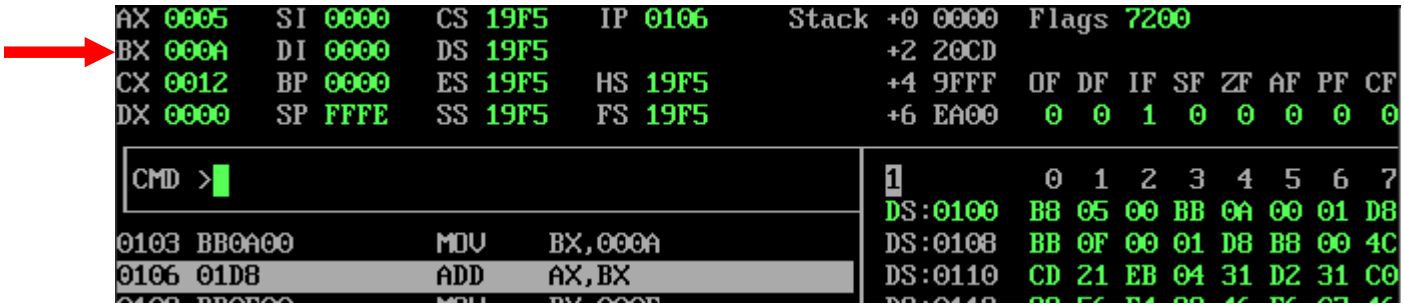
- According to Intel's convention, when storing data like `AX` with a value of `0005h`:

- The LSB (Least Significant Byte) `05` occupies the lower memory address.

- The MSB (Most Significant Byte) `00` occupies the higher memory address.

- Hence, in memory, `AX` with the value `0005h` would be stored as `0500h`.

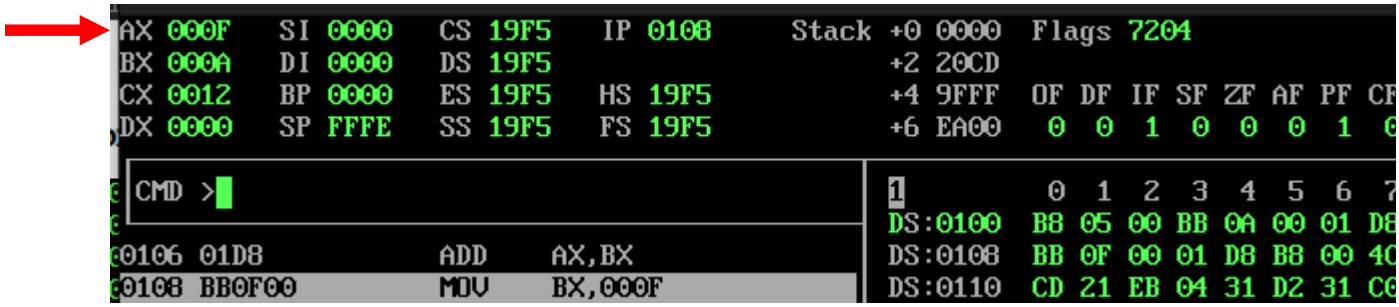
mov bx, 10: Similarly, this line moves the constant value 10 into the 16-bit register bx.



Now here 0A00 is stored in the BX register.

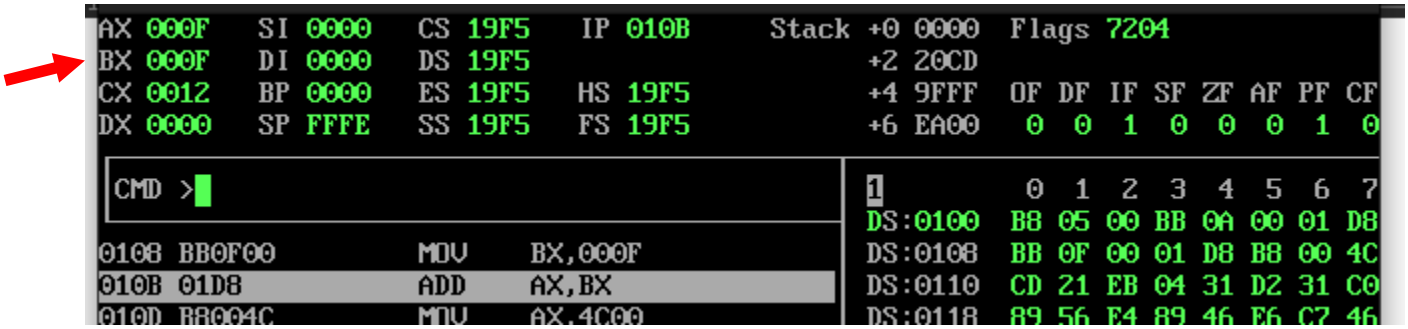
add ax, bx: This line adds the value stored in register bx to the value stored in register ax and stores the result back in register ax. This instruction effectively performs

ax = ax + bx.



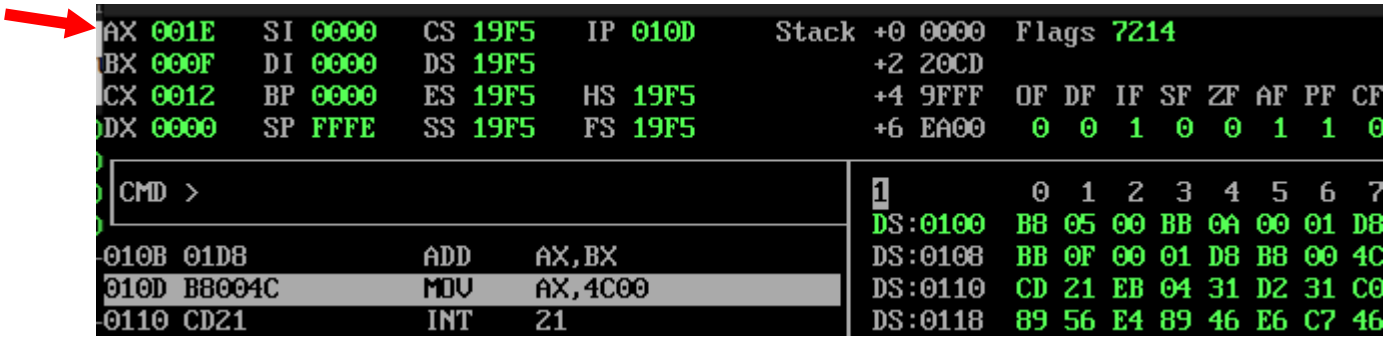
Now the value of ax+ bx stored in ax which is 15.15 in hex is F so 000F is stored in AX.

mov bx, 15: This line moves the constant value 15 into register bx, overwriting the previous value.



Now value 15 (000F) is stored in the BX register.

add ax, bx: Again, this line adds the value stored in register bx (which is now 15) to the value stored in register ax and stores the result back in register ax.(30)

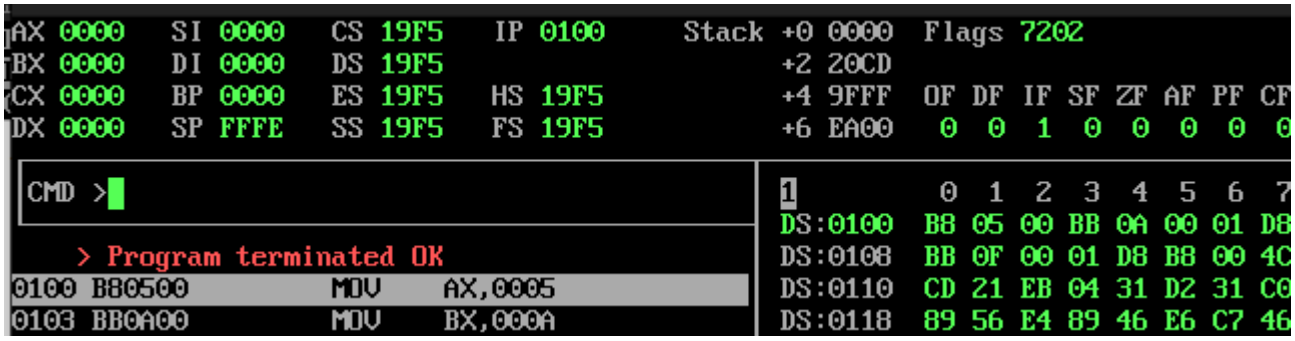


Now the value of ax+ bx stored in ax which is 30.30 in hex is 1E so 001E is stored in AX.

Our application relies on the operating system for all tasks. Occasionally, the OS interrupts our execution and assigns CPU tasks.

- Interrupt 0x21: This interruption prompts the CPU to perform specific work.

- Exit Operation:- Tasked with the work code 4C00, which signifies program termination.



Program Terminated.