UNIVERSITY OF ASIA PACIFIC

Department of Computer Science & Engineering

LAB ASSIGNMENT-02

Course Title : Microprocessors and Assembly Language Lab

Course Code : CSE 312

Date of Submission: 29/08/2022

Submitted by:

Name : Sheikh Nafez Sadnan

Reg. No. : 20101106

Roll No. : 106

Section : B (2)

Submitted To:

Faria Zarin Subah

Lecturer

Department of CSE

University of Asia Pacific

Problem Statement 1:

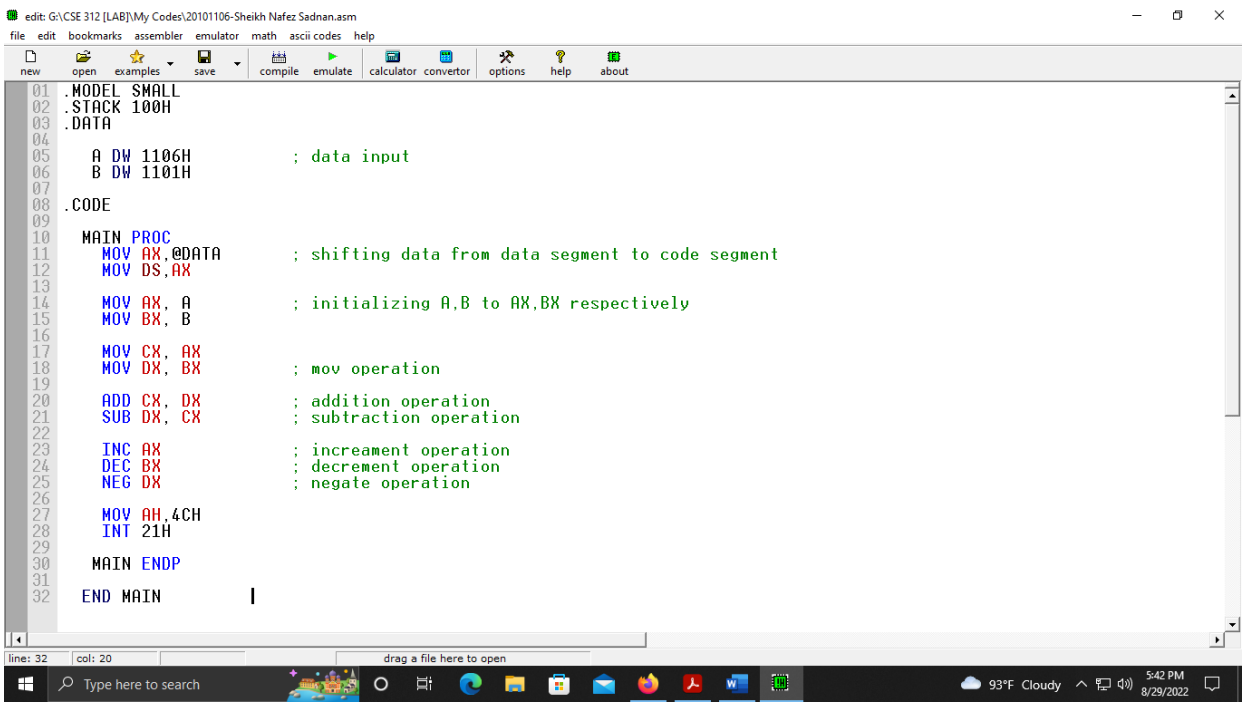
Perform the following operations using emu8086:

a) MOV CX, AX
b) MOV DX, BX
c) ADD CX, DX
d) SUB DX, CX
e) INC AX
f) DEC BX
g) NEG DX

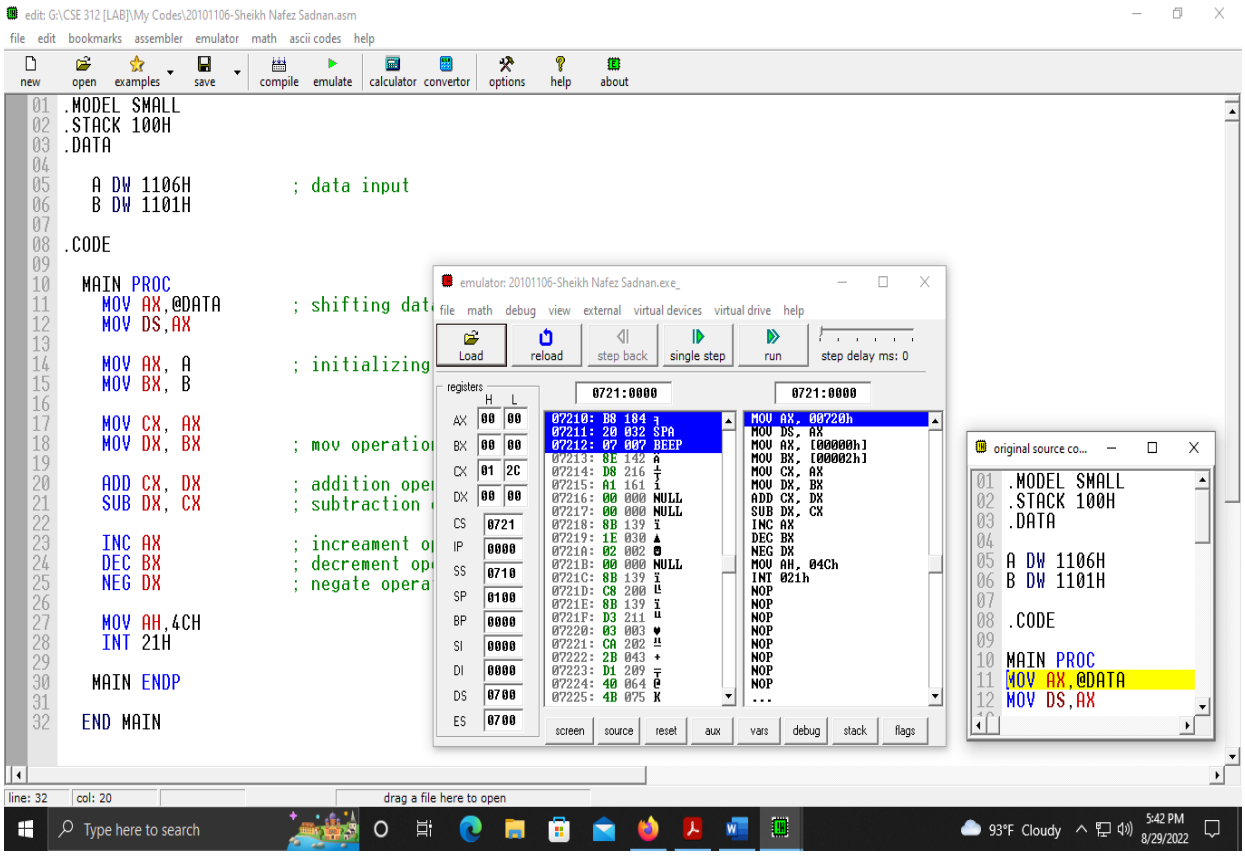
Initially, AX = last 4 digits of your ID
And, BX = last 4 digits of your best friend's ID

According to this,
AX= 1106 (My UAP ID- 20101106)
BX= 1101 (Md. Asadujjaman Noor's UAP ID- 20101101)

Assembly Code Screenshot:



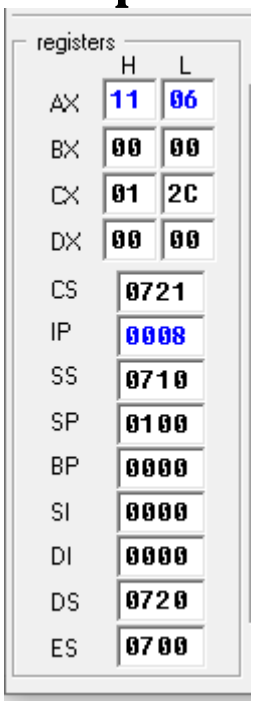
Assembly Code Screen Shot (While Emulating):



Analysis of changes to the Register:

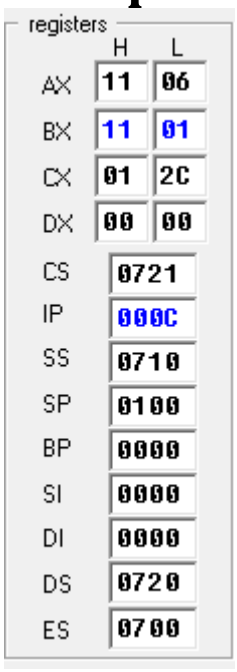
Analysis of changes in the register can be found after emulating the code. Here, step by step operation and changes has been shown in the below figures as screen shots-

1st Operation: MOV AX, A (Where, A=1106H)



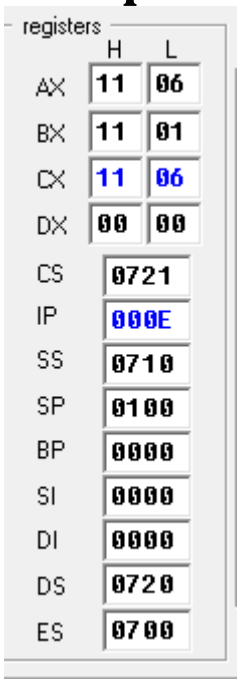
After the operation, value of A (1106H) is transferred from source (A) to destination(AX).

2nd Operation: MOV BX, B (Where, B=1101H)



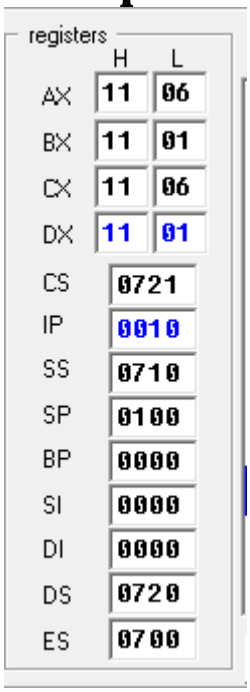
After the operation, value of B (1101H) is transferred from source (B) to destination(BX).

3rd Operation: MOV CX, AX (Where, AX=1106H)



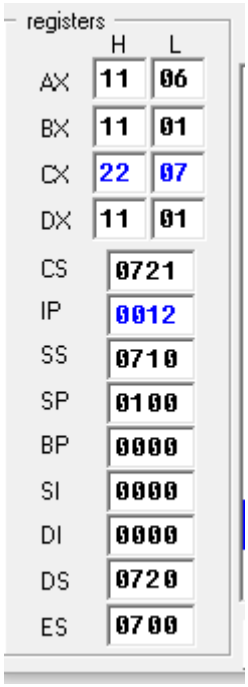
After the operation, value of AX (1106H) is transferred from source (AX) to destination(CX).

4th Operation: MOV DX, BX (Where, BX=1101H)



After the operation, value of BX (1101H) is transferred from source (BX) to destination(DX).

5th Operation: ADD CX, DX (Where, CX=1106H, DX=1101H)



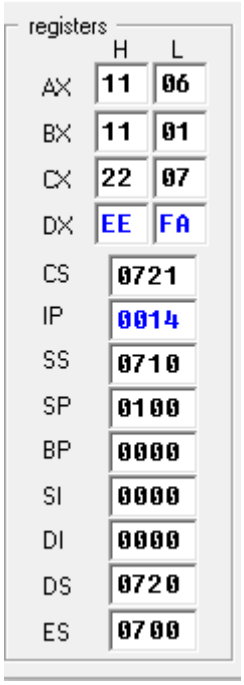
After the operation, value of DX (1101H) is added with CX (1106H)
Sum is stored in CX

Analyzing the above screen shot,
We know,
DX=1101H
CX=1106H

(DX+CX)
=(1101H+1106H)
=2207H

So, CX=2207H

6th Operation: SUB DX, CX (Where, DX=1101H, CX=2207H)



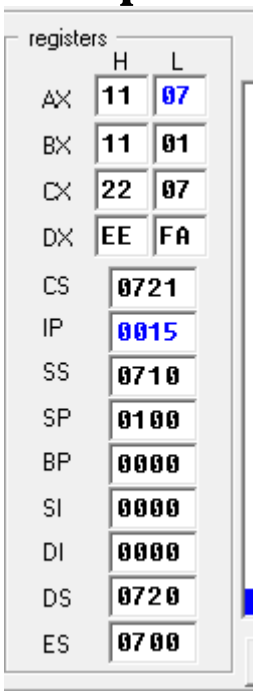
After the operation, value of CX (2207H) is subtracted from DX (1101H)
Subtracted value is stored in DX

Analyzing the above screen shot,
We know,
DX=1101H
CX=2207H

(DX-CX)
=(1101H-2207H)
=EEFAH

So, DX=EEFAH

7th Operation: INC AX (Where, AX=1106H)



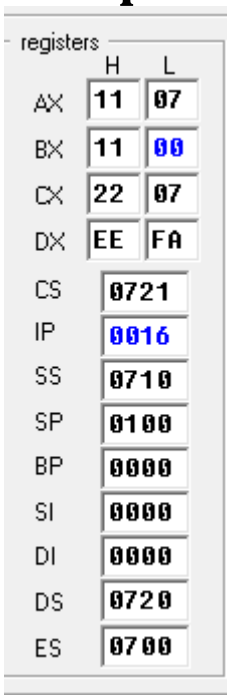
After the operation, value of AX (1106) is incremented to 1107H

Analyzing the above screen shot,
We know,
AX=1106H
Increment Value=0001H

(AX+ Increment Value)
=(1106H-0001H)
=1107H

So, AX=1107H

8th Operation: DEC BX (Where, BX=1101H)



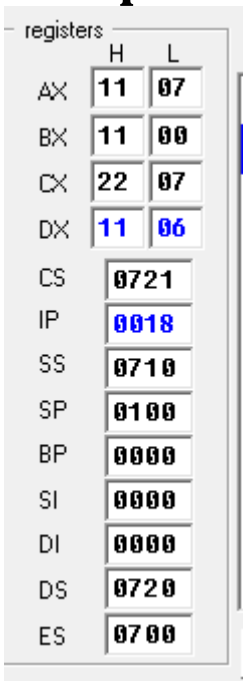
After the operation, value of BX (1101) is decremented to 1100H

Analyzing the above screen shot,
We know,
BX=1101H
Decrement Value=0001H

(BX- Decrement Value)
=(1101H-0001H)
=1100H

So, BX=1100H

9th Operation: NEG DX (Where, DX=EEFAH)



After the operation, value of DX (EEFAH) has formed a negative value.

Analyzing the above screen shot,
Here,
15's complement = FFFFH - EEFAH = 1105H
16's complement =1105H + 0001H = 1106H

So,
DX = 1106H.

Tabular Form:

Instructions	Opcode	Decimal Equivalent	Logical Address	Physical Address
MOV AX, A	A1 00 00	161 000 000	0721:0005	07215
MOV BX, B	8B 1E 02 00	139 030 002 000	0721:0008	07218
MOV CX, AX	8B C8	139 200	0721:000C	0721D
MOV DX, BX	8B D3	139 211	0721:000E	0721F
ADD CX, DX	03 CA	003 202	0721:0010	07721
SUB DX, CX	2B D1	043 209	0721:0012	07223
INC AX	40	064	0721:0014	07224
DEC BX	4B	075	0721:0015	07225
NEG DX	F7 DA	247 218	0721:0016	07227

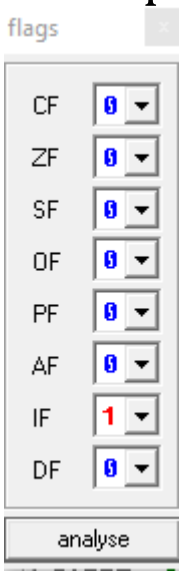
Formula of Physical Address:

*Physical Address = Segment Address*10 + Offset Address*

Flag Status

For "ADD" Operation:

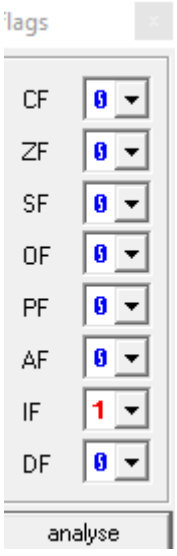
Example- ADD CX, DX



Here, after performing ADD operation, the value of IF flag is 1 and all other flags are 0.

For "SUB" Operation:

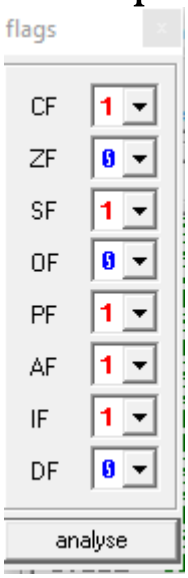
Example- SUB DX, CX



Here, after performing SUB operation, the value of IF flag is 1 and all other flags are 0.

For “INC” Operation:

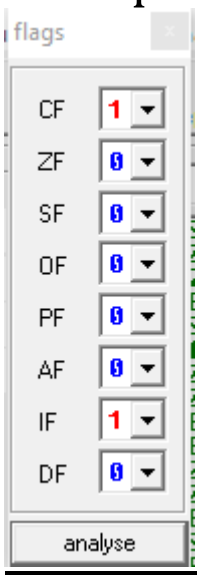
Example- INC AX



Here, after performing INC operation, the value of CF,SF,PF,AF and IF flags are 1 and all other flags are 0.

For “DEC” Operation:

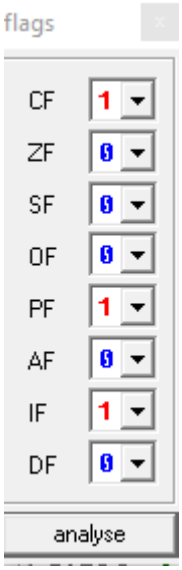
Example- DEC BX



Here, after performing DEC operation, the value of CF and IF flags are 1 and all other flags are 0.

For “NEG” Operation:

Example-NEG DX



Here, after performing NEG operation, the value of CF,PF and IF flags are 1 and all other flags are 0.