Microcontroller Lab Report

8086 programming Part 2b

Aaditya Prakash Kattekola
Roll: 194201
ECE Section B

August 28, 2021

1 Question 1

1.1 Aim

Write the assembly language program for 8086 MP to find the sum of absolute difference between two arrays. Array are available in a connected memory. Length of the array is N. Where N represent the last 2 digits of your roll number. (Since array of length 01 is not ideal, I used array of length 5)

1.2 Program

1.2.1 Code

```
;ROLL => 194201
;SUM OF ABSOLUTE DIFFERENCES
MOV CL, 05H ;ARRAY SIZE, LAST 2 DIGITS ARE 01
MOV SI, 0C900H
MOV DX, 00000H

ITER: MOV AL, [SI]
MOV BL, [SI+05]
SUB AX, BX
JNS UPDATE
NEG AX
UPDATE: ADD DL, AL
INC SI
DEC CL
JNZ ITER
HLT ;HALT
```

1.2.2 Emulator

Address (CS:0100, IP:0000)	Machine code	Instruction
01000	B1, 05	MOV CL, 05H
01002	BE, 00, C9	MOV SI, 0C900H
01005	BA, 00, 00	00000H
01008	8A, 04	MOV AL, [SI]
0100A	8A, 5C, 05	MOV BL, [SI] + 05H
0100D	2B, C3	SUB AX, BX
0100F	79, 02	JNS 013H
01011	F7, D8	NEG AX
01013	02, D0	ADD DL, AL
01015	46	INC SI
01016	FE, C9	DEC CL
01018	75, EE	JNE 08H
0101A	F4	HLT

1.3 Result

1.3.1 Input

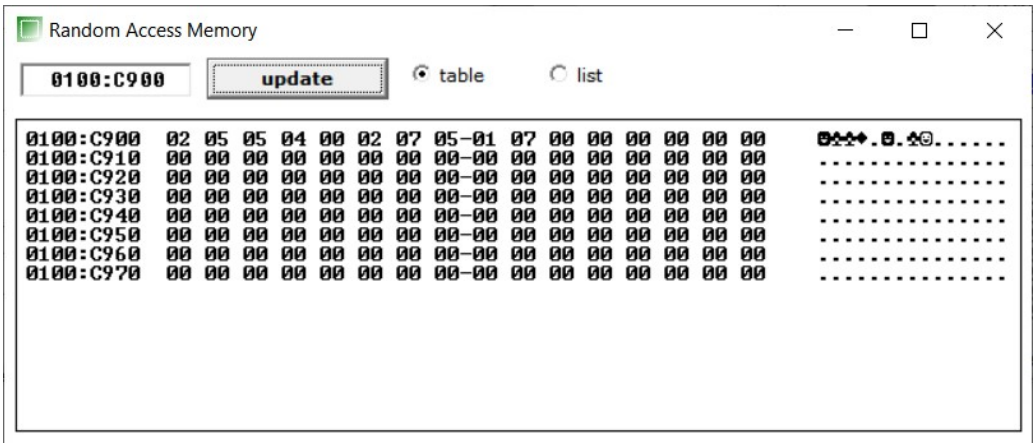

Figure 1: RAM Input for Q1

1.3.2 Expectation

$SI \leftarrow C900H$
$AX \leftarrow \ | [SI] - [SI-1] |$
$DX \leftarrow DX + AX$
$Final\ Ans:\ C\ (12\ in\ DEC)\ in\ DX$

1.3.3 Emulator

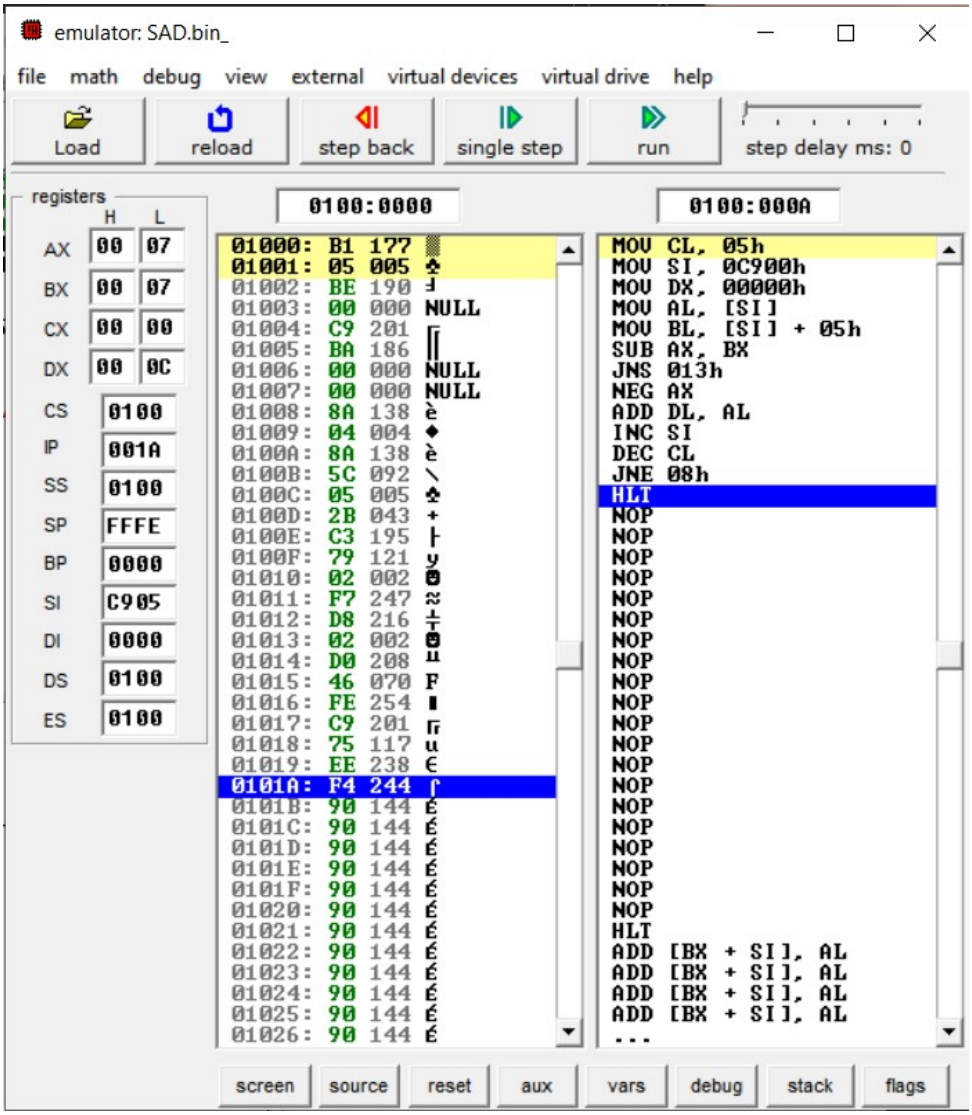

Figure 2: STACK Output for Q1

2 Question 2

2.1 Aim

Write an assembly language program for 8086 MP to model the 4x16 decoder.

2.2 Program

2.2.1 Code

```
;ROLL => 194201
;4X16 DECODER
MOV CL, 1001B
MOV DX, 08000H
SHR DX, CL
END: HLT ;HALT
```

2.2.2 Emulator

Address (CS:0100, IP:0000)	Machine code	Instruction
01000	B1, 09	MOV CL, 09H
01002	BA, 00, 80	MOV DX, 08000H
01005	D3, EA	SHR DX, CL
01007	F4	HLT

2.3 Result

2.3.1 Input

CL: 1001B ; $s_3s_2s_1s_0$
DX: 1000 0000 0000 0000 (8000 in HEX)

2.3.2 Expectation

$DX \leftarrow DX \gg CL$
$8000H \gg 09H \rightarrow 0040H \ in \ DX$

2.3.3 Emulator

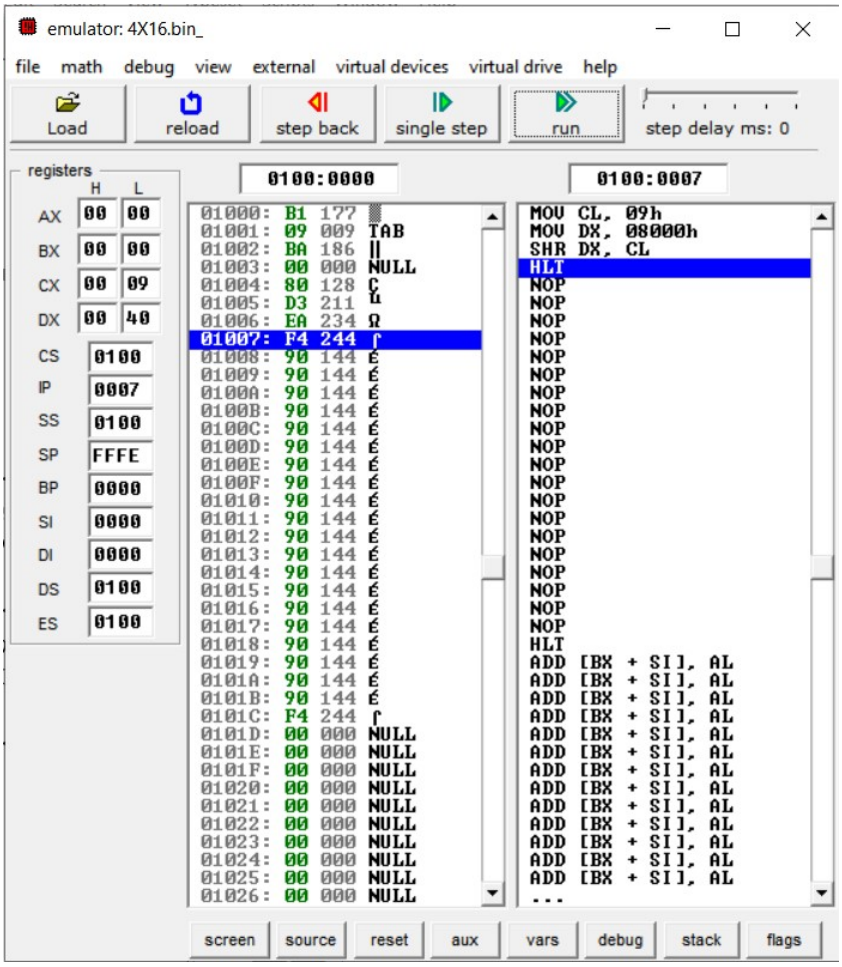

Figure 3: STACK Output for Q2