EXPERIMENT REPORT OF ASSEMBLY LANGUAGE

Assignment 1 Experiment 2

NAME : ABID ALI

STUDENT ID :2019380141

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SUBMITTED TO :PROFESSOR Yin LU

Problem Description:

Chapter 3 Experiment 2 Simple IO and Lantern Control

We will start from a virtual device provided by the emu8086. Then move to the Proteus and try to run some program on the virtual hardware circuit.

(1)Output a data to a typical device port.

The emu8086 provides a virtual led display device, which is emulated by a program called “led_display.exe”. The virtual device can display decimal number up to 5 digits.

By output a word type data to port 199, which is a word sized IO port addres, you can change the display to the number you output. Now write a program to display numbers from 0 to 65535 in a loop.

Each time you write a number to the port, remember to call a sub program called “delay”, so that to wait for the display to be stable.

The template of the program is provided by teacher

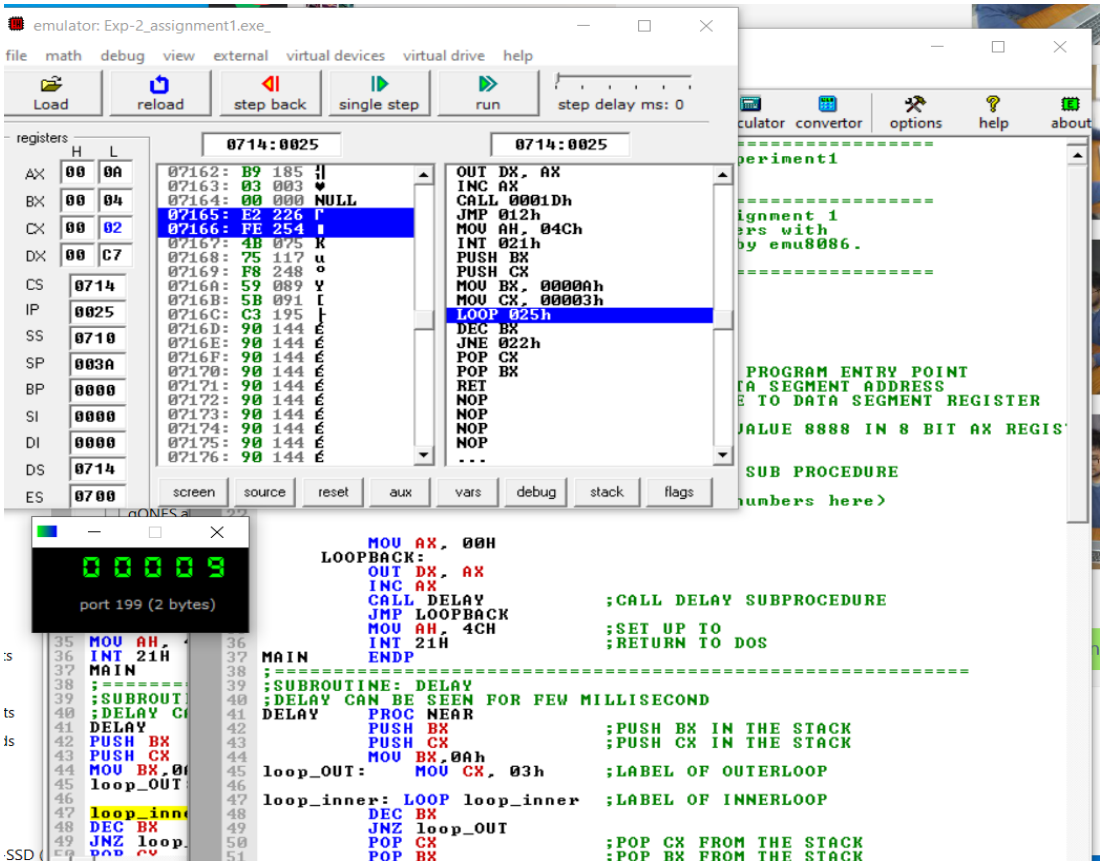
```
#start=led_display.exe#
            .MODEL SMALL
            .STACK 64
            .DATA
            PORT_LED EQU 199
            .CODE
MAIN    PROC FAR;this is the program entry point
            MOV AX, @DATA  ;load the data segment address
            MOV DS, AX  ;assign value to data segment register
            ;TODO1: display 8888 to test the device
            MOV AX, 8888
            MOV DX, PORT_LED
            OUT DX, AX
            CALL DELAY    ;call delay sub procedure
            ;TODO2: start to display numbers
            ;(put your program to do the display of numbers here)
            MOV AH, 4CH ;set up to
            INT 21H  ;return to DOS
MAIN    ENDP
;=============================================================
DELAY    PROC NEAR
            PUSH BX;
            PUSH CX;
            MOV BX,0Ah loop_OUT:          MOV
CX, 03h
loop_inner:   LOOP loop_inner
            DEC BX
            JNZ loop_OUT
            POP CX;
            POP BX;
            RET
DELAY    ENDP
    END MAIN        ;this is the program exit point
```

Goal:

We are going to make a virtual device provided by the emu8086.Try to work with peripheral device.The virtual device can display can show up to 5 digits.

We use a word type to port 199 this is the IO address .

Each time we write a number to the port then a sub program is called “delay”,we need to wait for the display to be stable.



Code:

```
;=========================================================

;Description: Program of Assignment 1 Experiment2

;Author:[ABID ALI][2019380141]
```

```
;Date:[05/17/2021]

;=========================================================

;This is the program for experiment2 assignment 1

;In this program, we try to display numbers with

; a virtual led display device provided by emu8086.

;The port to setup the display is 199

;=========================================================

#start=led_display.exe#

        .MODEL SMALL

        .STACK 64

        .DATA

        PORT_LED EQU 199

        .CODE

MAIN     PROC FAR          ;THIS IS THE PROGRAM ENTRY POINT

    MOV AX, @DATA          ;LOAD THE DATA SEGMENT ADDRESS

    MOV DS, AX         ;ASSIGN VALUE TO DATA SEGMENT REGISTER

;TODO1: DISPLAY 8888 TO TEST THE DEVICE

        MOV AX, 8888       ;MOVING THE VALUE 8888 IN 8 BIT AX REGISTER

        MOV DX, PORT_LED

        OUT DX, AX
```

```
   CALL DELAY           ;CALL DELAY SUB PROCEDURE
;TODO2: START TO DISPLAY NUMBERS
;(put your program to do the display of numbers here)



       MOV AX, 00H
    LOOPBACK:
       OUT DX, AX
       INC AX
       CALL DELAY        ;CALL DELAY SUBPROCEDURE
       JMP LOOPBACK
       MOV AH, 4CH       ;SET UP TO
    INT 21H              ;RETURN TO DOS
MAIN    ENDP
;=========================================================
;SUBROUTINE: DELAY
;DELAY CAN BE SEEN FOR FEW MILLISECOND
DELAY   PROC NEAR
       PUSH BX           ;PUSH BX IN THE STACK
       PUSH CX           ;PUSH CX IN THE STACK
```

```
        MOV BX,0Ah

loop_OUT:         MOV CX, 03h     ;LABEL OF OUTERLOOP



loop_inner:       LOOP loop_inner  ;LABEL OF INNERLOOP

        DEC BX

        JNZ loop_OUT

        POP CX            ;POP CX FROM THE STACK

        POP BX            ;POP BX FROM THE STACK

        RET

DELAY    ENDP

    END MAIN            ;THIS IS THE PROGRAM EXIT POINT
```

Debugging:

This is a new IDE for me ,I have never used it before .So,at the beginning ,I couldn't understand the use of so many features.Eventually,after watching video.

Attachment:

1) Experiment-2(assignment-1).mkv
2) Exp-2_ assignment1.asm
3) Exp-2_ assignment1.pdf

Acknowledgement:

I complete this assignment by myself by using online videos and taking help from online.The most useful help from teacher's hint given in question ,the theory class and the lecture note from the practical class