EXPERIMENT REPORT OF ASSEMBLY LANGUAGE

Project 1

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DATE   : 07/09/2021

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Problem Description:

There are 10 BCD numbers in stored in the memory. Please try to calculate the average value of them. Then display.

You can display it on to screen by invoke INT21 functions. Or you can display it with the virtual led display device provided by EMU8086 software toolkit.

The template given is given below:

.MODEL SMALL

.STACK 32

.DATA

DATA1 DB 89H,98H,78H,92H,86H,72H,85H,79H,80H,88H,

AVERAGE DB 00H

.CODE

MAIN PROC FAR

 ; INITIALIZE DATA SEGMENT

  MOV AX, @DATA

  MOV DS, AX

```
        ;here is the program body
    ; RETURN TO DOS
        MOV AX, 4C00H
        INT 21H
MAIN ENDP
END MAIN
```

Goal:

The average value of 10 BCD numbers.

89H →137D

98H →152D

78H →120D

92H →146D

86H →134D

72H →114D

85H →133D

79H →121D

80H →128D

88H →136D

(+)

1321D

Dividing 1321D/10D ,we will get the average 132D

The Average of the program, 84H(Hexadecimal value) →132D(Decimal value)

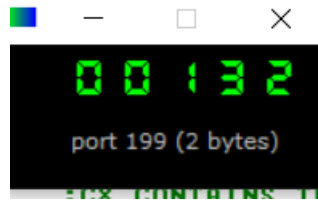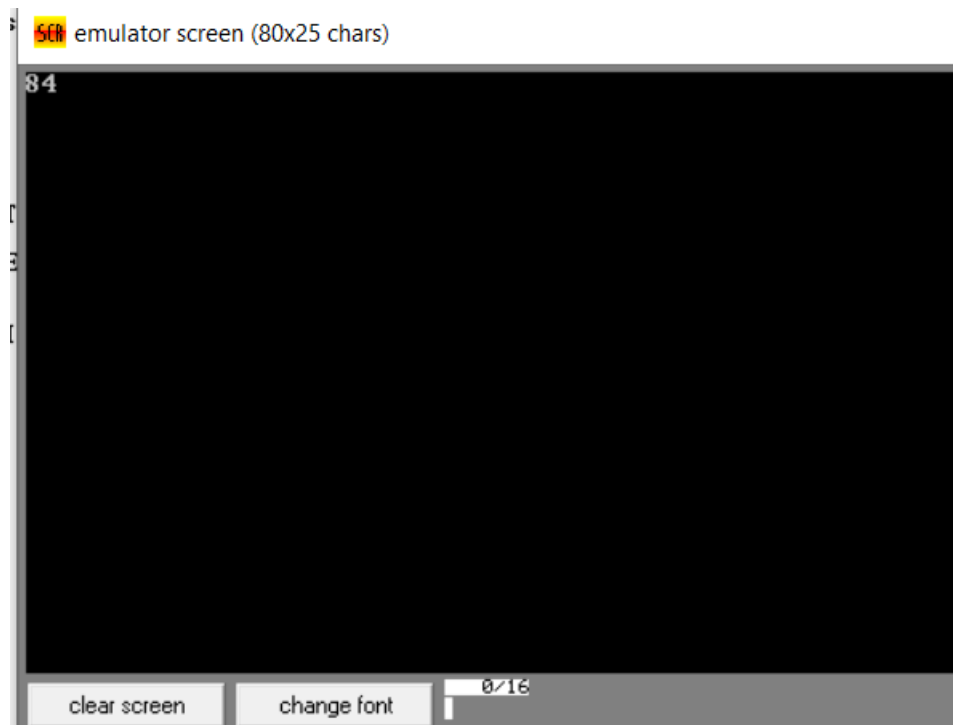Fig:The average is 132D (Decimal Values)

Fig:The average is 84H (Hexadecimal Values)

Code:

```
;===========================================================
;Description: Program of Project 1 Average and display

;Author:[ABID ALI][2019380141]

;Date:[07/09/2021]
```

```
;=========================================================
;to find average first we will Calculate the addition of all 10 numbers and then divide the total ny number of
elements(10).

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


 #start=led_display.exe#
    .MODEL SMALL

    .STACK 32

    .DATA
     PORT_LED EQU 199


DATAI DB 89H,98H,78H,92H,86H,72H,85H,79H,80H,88H


AVERAGE DB 00H


    .CODE
MAIN  PROC FAR              ;THIS IS THE PROGRAM ENTRY POINT
    ;INITIALIZE DATA SEGMENT
    MOV AX, @DATA            ;LOAD THE DATA SEGMENT ADDRESS
    MOV DS, AX             ;ASSIGN VALUE TO DATA SEGMENT REGISTER
    ;HERE IS THE PROGRAM BODY
    ;DISPLAY 0 TO TEST THE DEVICE
    name "led"
    MOV AX,0             ;MOVING THE VALUE 0 IN 8 BIT AX REGISTER
    MOV DX, PORT_LED
    OUT DX,AX


    MOV DX,0000H
    LEA SI,DATAI            ;SI POINTS TO THE FIRST  MEMORY LOCATION THAT IS 89H
    MOV CX,0AH              ;CX CONTAINS THE NUMBER OF ELEMENTS IN THE MEMORY LOCATION
```

```
        MOV AH,00H


Calculate: MOV AL,[SI]

        ADD DX,AX              ;ADDITION OF ALL ELEMENTS IN DX

        DEC CX

        JZ JUMP               ;JUMPS IF CX IS ZERO THAT IS ALL TEN ELEMENTS HAVE BEEN ADDED

        INC SI

        JMP Calculate



JUMP: MOV AX,DX               ;JUMP2 LABEL CREATED

        MOV BL,0AH             ;MOVING 0AH IN BL REGISTER

        DIV BL

        MOV DL,AL             ;MOVING AL REGISTER INSIDE DL REGISTER

        MOV BL,AL             ;MOVING AL REGISTER INSIDE BL REGISTER

        MOV BH,00H             ;MOVING 00H IN BL REGISTER

        CALL DISP             ;DISPLAYS THE AVG. ON THE EMULATOR SCREEN (DISPLAYING
HEXADECIMAL VALUE)
```

;DISPLAYING ON LED

;LED WILL DISPLAY DECIMAL ANSWER

MOV AX,BX

OUT 199,AX

;RETURN TO DOS

MOV AX, 4C00H   ;SET UP TO

```
                         ;RETURN TO DOS

INT 21H


MAIN ENDP

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

;SUBROUTINE:DISP

DISP PROC                ;PROCEDURE TO DISPLAY

    MOV CL,04H           ;MOVING 04H IN CL REGISTER

    MOV CH,02H           ;MOVING 02H IN CH REGISTER

    MOV BL,DL            ;MOVING DL REGISTER INSIDE BL REGISTER

JUMP1:                   ;JUMP1 LABEL CREATED

    ROL BL,CL

    MOV DL,BL

    AND DL,0FH

    CMP DL,0AH

    JB JUMP2

    ADD DL,07H           ;JUMP2 LABEL CREATED

JUMP2:

    ADD DL,30H

    MOV AH,02H

    INT 21H

    DEC CH               ;DECREMENTING CH

    JNZ JUMP1            ;JUMP NOT ZERO FLAG IS SET,WE GO TO JUMP1

    RET

DISP ENDP


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

Debugging:

This assembly language and also IDE for this program was very new to me.I gradually become familiar with them.At first,I was making silly mistakes like syntax error and illegal instructions

used in my program .After reading different articles ,videos,teacher lecture notes.I managed to solve it.

Attachment:

1) Project 1.docx

2) Project 1.pdf

3) Project 1.asm

4) Project 1.mkv

Acknowledgement:

I complete this assignment by myself by using online videos and taking help from online resources.The most useful help was for me,that was my previous practical experiments.The experience I gained through those practicals ,I implemented in this practical.