Green University of Bangladesh

Department of Computer Science and Engineering(CSE)

Faculty of Sciences and Engineering

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LAB REPORT NO : 01

Course Title: Microprocessors and Microcontrollers Lab

Course Code: CSE 304 **Section:** PC-DD

Lab Experiment Name: Program structure and familiarization with different instruction.

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Lab Report Status	
Marks: ……	Signature:.....
Comments:.....	Date:.....

TITLE OF THE LAB EXPERIMENT: Program structure and familiarization with different instruction.

OBJECTIVES/AIM:

We learn some op code. They are ADD, SUB, MUL, DIV, MOV, INT 21H. We can use those op-code to find the area of a circle and a triangle very easily and convert Celsius to Fahrenheit or Fahrenheit to Celsius and take user input and this input show as output.

PROCEDURE / ANALYSIS / DESIGN:

Instruction MOV AX, BX is used moves data BX to AX and data is stored in AX.

Instruction DIV BX is used division. Here, AX is divided by BX and Quotient is stored in AL and Remainder is stored in AH.

Instruction MUL BX is used multiplication. Here, BX and AX are multiplied and this data is stored in AX.

Instruction ADD AX, BX is used addition. Here, add to BX and AX and this data is stored in AX.

Instruction SUB AX, BX is used subtraction. Here, BX and AX are subtracted and this data is stored in AX.

Instruction SUB AX, BX is used subtraction. Here, BX and AX are subtracted and this data is stored in AX.

Instruction MOV AH,1 and INT 21H are used for user input and it stored AX.

Instruction MOV DX,AX and MOV AH,2 and INT 21H are used for show output. Here, DX store AX data and compiler understand DX data then it show DX data as output.

Problem-01

Write an assembly program to find the area of a circle.

Pseudo-code:

```
.MODEL SMALL
    .STACK 100H
    .DATA
    .CODE
    MAIN PROC
        MOV AX,22
        MOV BH,7
        DIV BH   ; put the value of pi in AX

        MOV BL,2 ; put the value of radius 2 in BX
        MUL BL   ; pi * radius
        MUL BL   ; pi  * radius *  radius

     MAIN ENDP
    END MAIN
```

Problem-02

Write an assembly program to find the area of a triangle.

Pseudo-code:

```
    .MODEL SMALL
    .STACK 100H
    .DATA
    .CODE
    MAIN PROC
```

```
    MOV AH,1H
    MOV BH,2H
    DIV BH

    MOV BL,2H ;put the value of base 2H
    MUL BL

    MOV BX,5H ;put the value of height 5H
    MUL BX

   MAIN ENDP

END MAIN
```

Problem-03

Write an assembly program to convert Celsius to Fahrenheit.

Pseudo-code:

```
.MODEL SMALL
    .STACK 100H
    .DATA
    .CODE
    MAIN PROC
        MOV AX,29H ; put the value of Fahrenheit 28H in AX(That is 41 in Decimal)
```

```
    MOV BX,20H ; put the value of Fahrenheit 20H in BX(That is 32 in Decimal)
    SUB AX,BX

    MOV BX,5H
    MUL BX
    MOV BX,9H
    DIV BX

  MAIN ENDP
END MAIN
```

Problem-04

Write an assembly program to convert Celsius to Fahrenheit.

Pseudo-code:

```
.MODEL SMALL
    .STACK 100H
    .DATA
    .CODE
    MAIN PROC
        MOV AX,9H
        MOV BX,5H ; put the value of C 5H in BX
        MUL BX
```

```
    DIV BX
    MOV BX,20H ; put the value of 20H in BX(That is 32 in Decimal)
    ADD AX,BX ; here the value of AX (Fahrenheit) is 29 (That is 41 in Decimal)


  MAIN ENDP
END MAIN
```

Problem-05

Write an assembly program to take a input from the user and show that in the output.

Pseudo-code:

```
.MODEL SMALL
 .STACK 100H
 .DATA
 .CODE
 MAIN PROC
    MOV AH,1
    INT 21H

    MOV DX,AX
    MOV AH,2
    INT 21H
  MAIN ENDP
END MAIN
```

Calculation:

From problem 1, we will try to find the area of a circle by using a law. This law is Area = (pi * r * r).where pi is 22/7 and r is the radius.

From problem 2, we will try to find the area of a triangle by using a law. This law is Area = (1 / 2 * b * h).where b is base and h is the height.

From problem 3, we will try to convert Celsius to Fahrenheit by using their relation. This relation is, C/5 = (F -32) / 9 .where C is Celsius and F is Fahrenheit.

So, C = (F -32) * 5 / 9

And, F = 41 = 29H also, 32 = 20H by convert Decimal to Hexadecimal.

From problem 4, we will try to convert Celsius to Fahrenheit by using their relation. This relation is, C/5 = (F -32) / 9 .where C is Celsius and F is Fahrenheit.

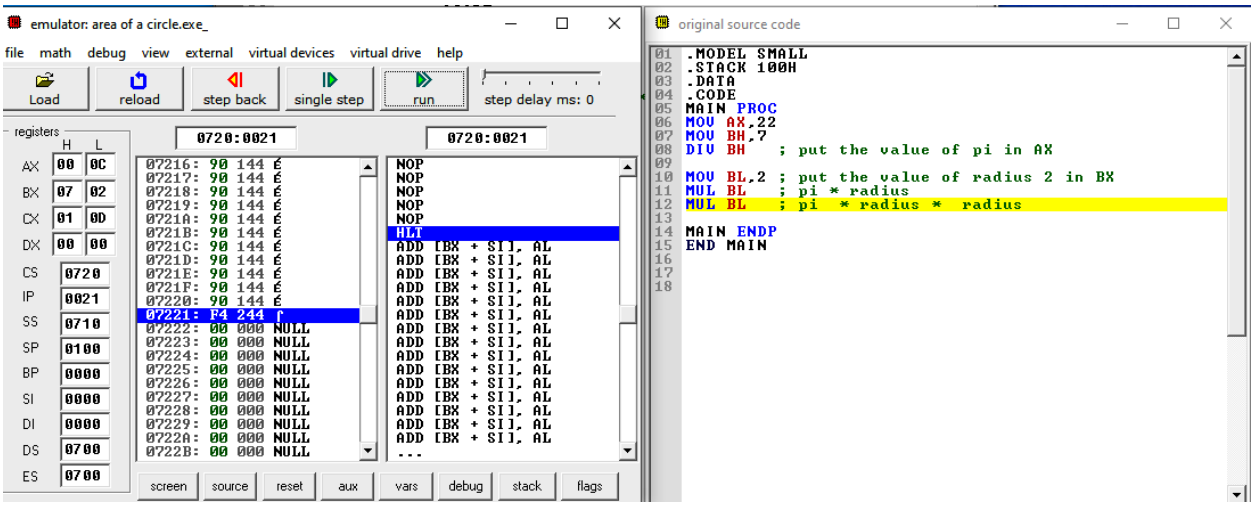
So, F = ((9 * C) / 5) + 32 Where, C = 5.

And, F = 41 = 29H also 32 = 20H by convert Decimal to Hexadecimal.

From problem 5, we will try take a input from the user and show that in the output. MOV AH,1 and INT 21H are used for user input and it stored AX. Again MOV DX,AX and MOV AH,2 and INT 21H are used for show output. Here, DX store AX data and compiler understand DX data then it show the output.

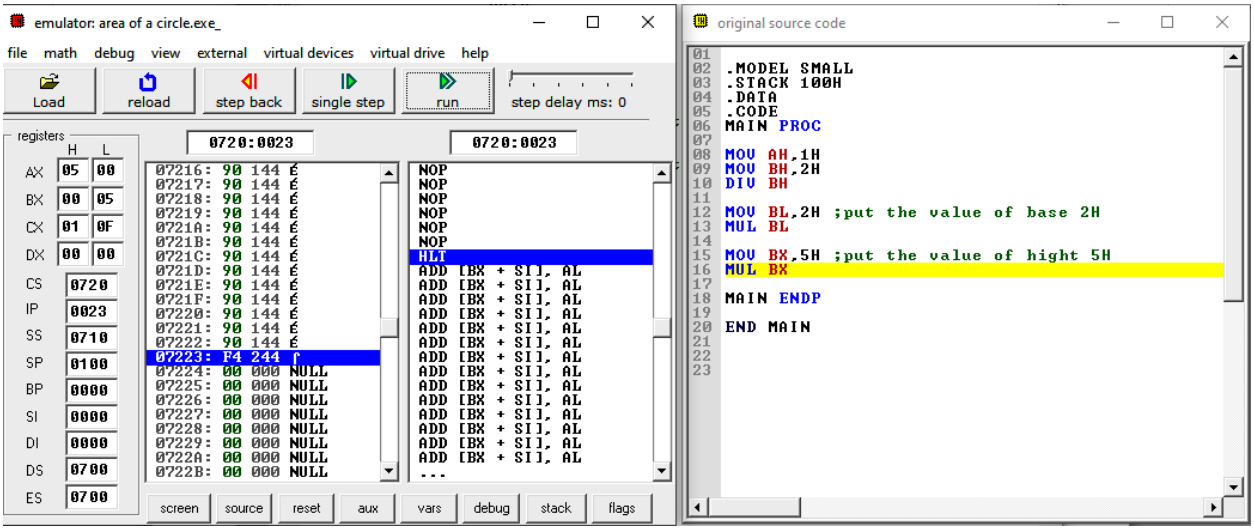
TEST RESULT / OUTPUT:

Problem-1 output:



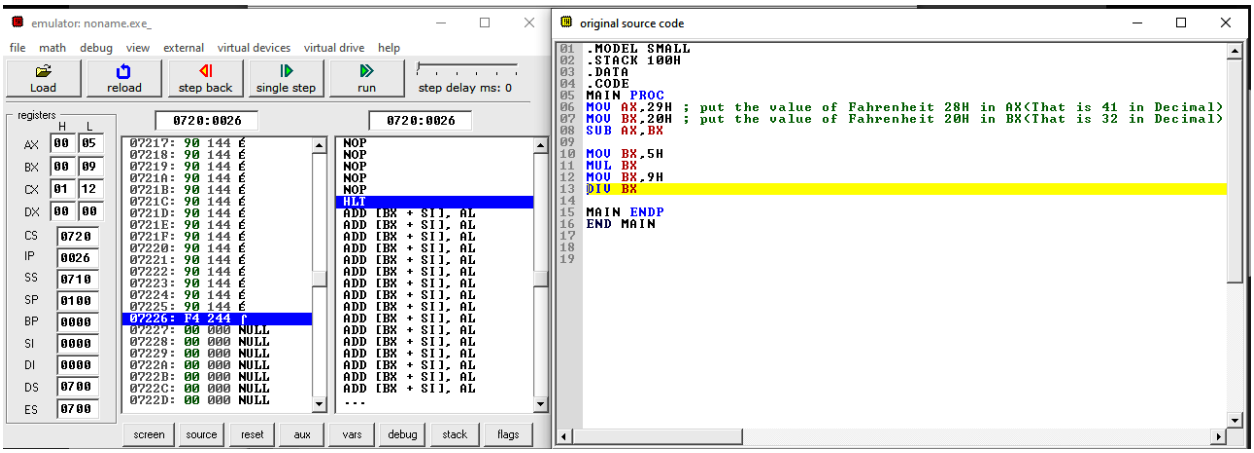
This output is 0C or decimal value is 12 but it should have been 12.5664
That is not 100% right.

Problem-2 output:



This output is 5 and it should have been = ½ * 5 = 5
That is 100% right.

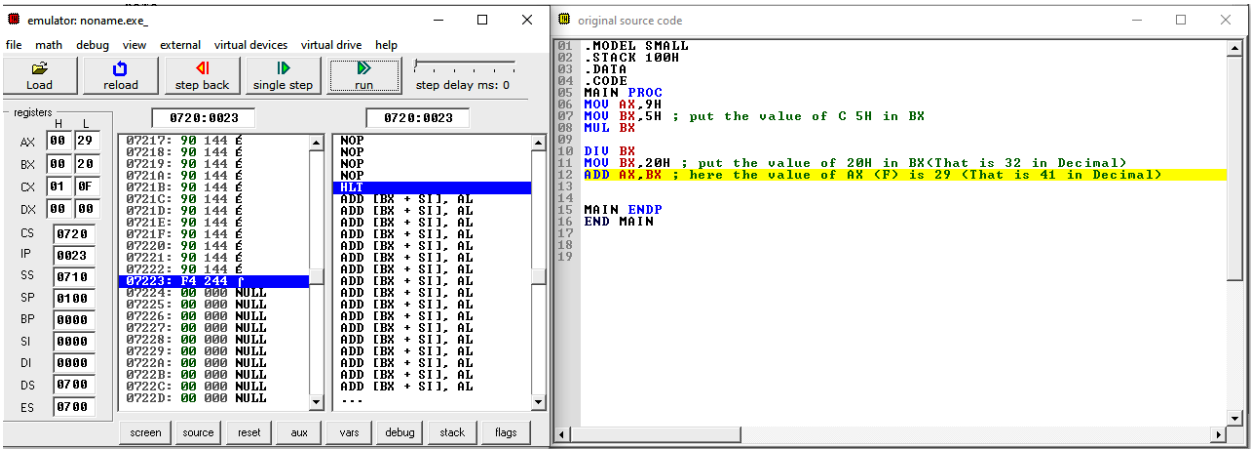
Problem-3 output:



This output is 5 or decimal value is 5 and it should have been = (41 -32) * 5 / 9 = 5

So, that is 100% right.

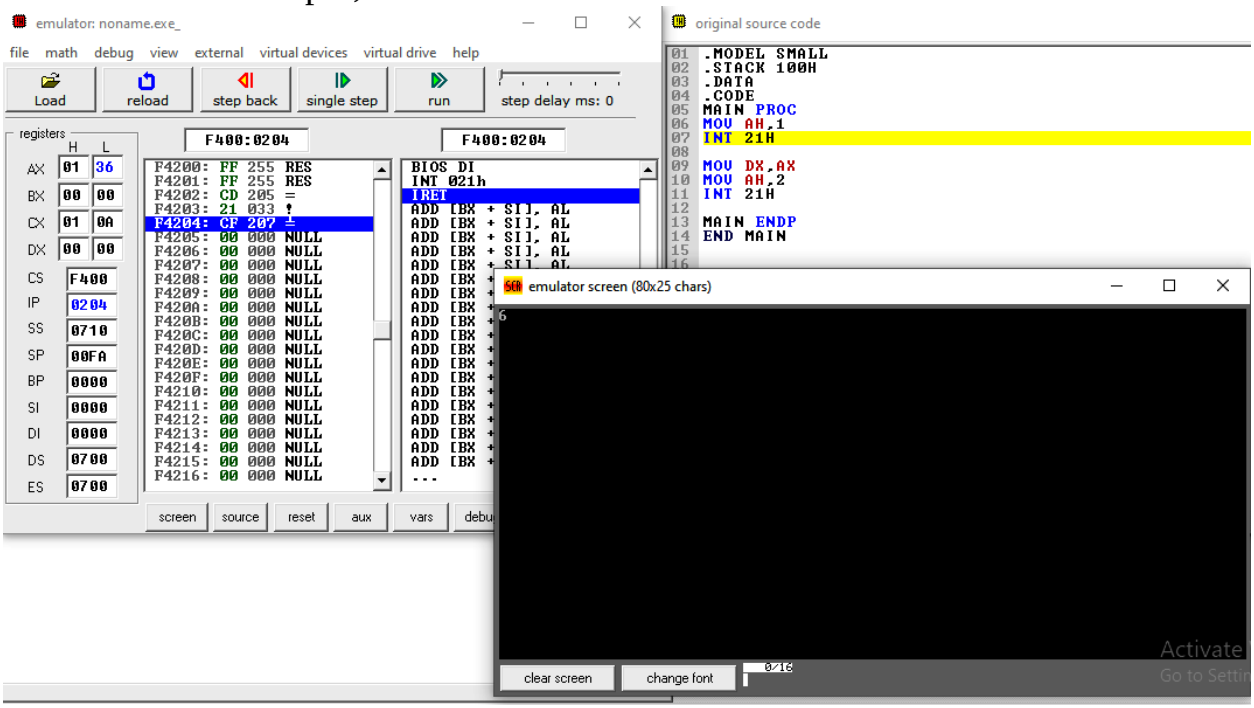
Problem-4 output:



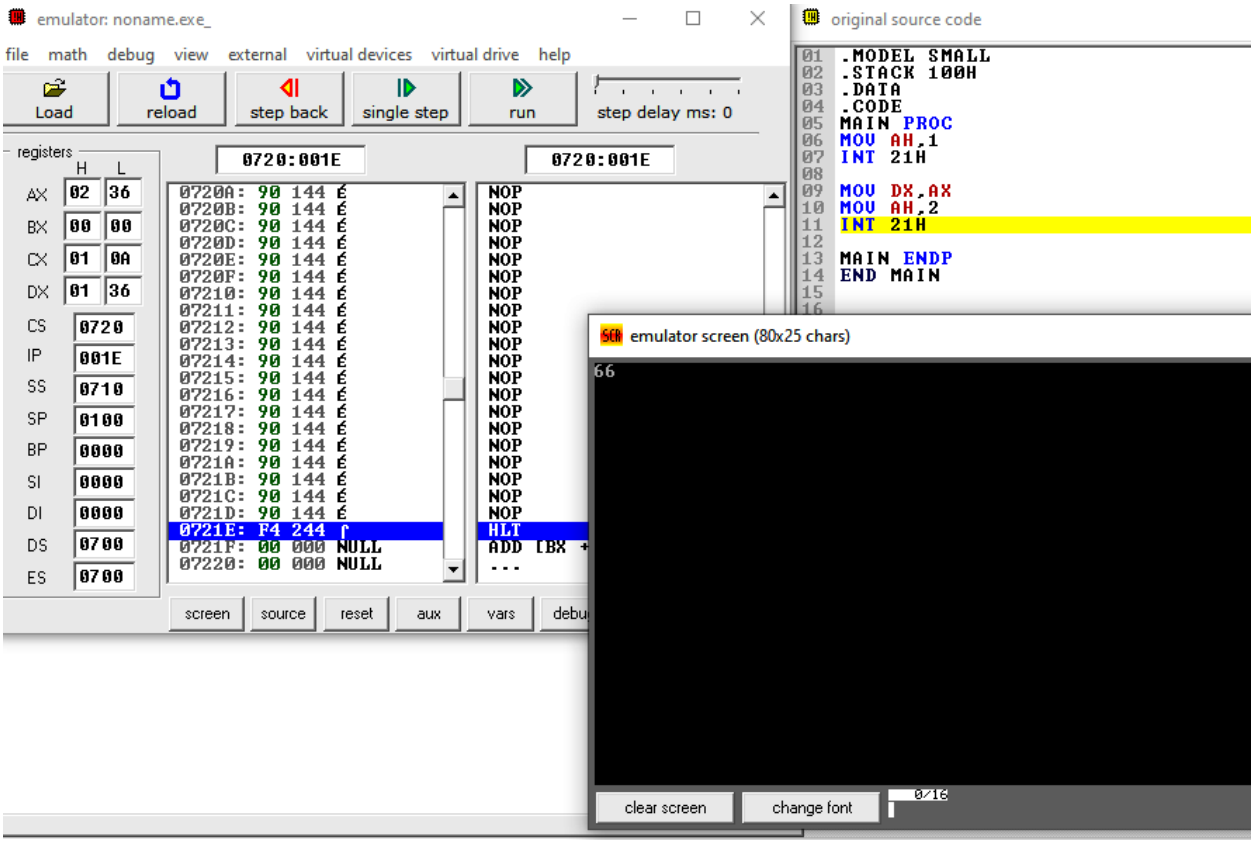
This output is 29 or decimal value is 41 and it should have been = ((9 * 5) / 5) + 32 = 41
So, that is 100% right.

Problem-5 output:

Put on user input,



After output,



We take 6 as input and output show 6. It should have been 6.
So, that is 100% right.

ANALYSIS AND DISCUSSION:

1. Due to Covid-19 situation, we can't do this experiment directly. So, it is completely based on software.

2. Since, it is done with Software. So it may have some Software and Mechanical errors.

3. From problem-1 pi = 22/7 but our compiler takes the next integer value. Where pi = 22/7 = 3.1429 but compiler takes 4. That is big error.

4. From problem-2, we can use AH instead of AX and BL, BH instead of BX. That is new for me. But it is easy to understand and this problem is very easy than other problem.

5. From problem-3 and 4, we see some greater than 9 decimal-number. Our compiler understand only hexadecimal that why we all-time convert the output decimal to hexadecimal or hexadecimal to decimal. That is very confusing.

6. From problem-5, to convert user input to output that is really confusing.

7. Network problem. Cause of the ups and downs of the internet we could not attend the class properly. That why I saw the class recording but this video was very bad quality. This reason I have so many confusion.

SUMMARY:

From those 5 problems, we can find the area of a circle and a triangle very easily and convert Celsius to Fahrenheit or Fahrenheit to Celsius and take user input which will help the user to change the program's output. Those are very important to complete this course.