NUML

National University of Modern Languages

[LAB REPORT # 06]

(Computer Organization and Assembly Language)

(Coal-Lab(Online))

Submitted By: Khurram Mushtaq

Roll No: BSAI-166

Semester : 4th

Submitted To: Ms. Mehwish Zeb Abbasi

[Coal – Lab(Online)]

[Lab Report #06]

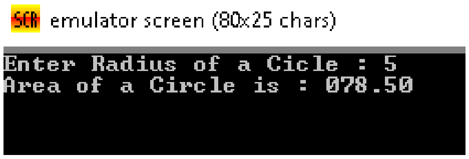
(Assembly Language Programs)

1) **Write a program to calculate the area of various geometric shapes (circle, triangle, and rectangle) based on user input.**

- **Area of Circle:**

```
include 'emu8086.inc'
.model small
.stack 100h
.data
   a db ?
   b db ?
.code
main proc
   print 'Enter Radius of a Cicle : '
   mov ah,1
   int 21h
   mov a,al
   jmp nextline
   start:
   print 'Area of a Circle is : '
   mov al,a
   sub al,30h
   mov bl,al
   mul bl

   mov bx,314
   mul bx

   mov bl,100
   div bl
   mov bl,al
   mov cl,ah
   mov ah,0
   mov al,bl
   mov bl,100
   div bl
   mov dl,al
   mov b,ah
   mov ah,2
   add dl,30h
   int 21h
   mov ah,0
   mov al,b
   mov bl,10
   div bl
   mov dl,al
   mov bl,ah
   mov ah,2
   add dl,30h
   int 21h
   mov dl,bl
   mov ah,2
   add dl,30h
   int 21h
   print '.'
   mov ah,0
   mov al,cl
   mov bl,10
   div bl
   mov dl,al
   mov cl,ah
   mov ah,2
   add dl,30h
   int 21h
   mov dl,cl
   mov ah,2
   add dl,30h
   int 21h
   jmp exit
   nextline:
   mov ah,2
   mov dl,0ah
   int 21h
   mov dl,0dh
   int 21h
   jmp start
   exit:
   main endp
end main
```

Output:



```
Enter Radius of a Cicle : 5
Area of a Circle is : 078.50
```

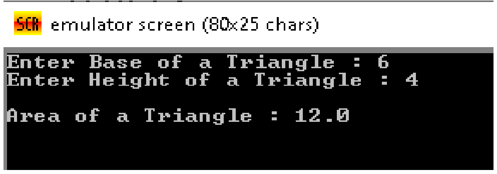
- **Area of Triangle:**

```
include 'emu8086.inc'
.model small
.stack 100h
.data
```

```
    a db ?
.code
main proc
    print 'Enter Base of a Triangle : '
    mov ah,1
    int 21h
    sub al,30h
    mov bl,al
    jmp nextline
    start:
    print 'Enter Height of a Triangle : '
    mov ah,1
    int 21h
    sub al,30h
    mov a,al
    mov ah,2
    mov dl,0ah
    int 21h
    mov dl,0ah
    int 21h
    mov dl,0dh
    int 21h
    print 'Area of a Triangle : '
    mov al,a
    mul bl
    mov bl,5
    mul bl
    mov bl,100
    div bl
    mov dl,al
    mov cl,ah
    mov ah,2
    add dl,30h
    int 21h
    mov al,cl
    mov bl,10
    mov ah,0
    div bl
    mov dl,al
    mov bl,ah
    mov ah,2
    add dl,30h
    int 21h
    print '.'
    mov dl,bl
    mov ah,2
    add dl,30h
    int 21h
    jmp exit
```

```
   nextline:
   mov ah,2
   mov dl,0ah
   int 21h
   mov dl,0dh
   int 21h
   jmp start
   exit:
   main endp
end main
```

Output:

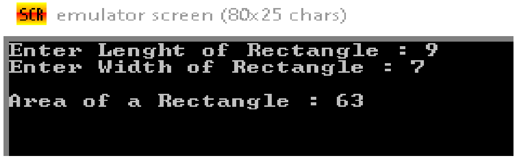


```
Enter Base of a Triangle : 6
Enter Height of a Triangle : 4

Area of a Triangle : 12.0
```

- **Area of Rectangle:**

```
include 'emu8086.inc'
.model small
.stack 100h
.data
   a db ?
.code
main proc
   print 'Enter Lenght of Rectangle : '
   mov ah,1
   int 21h
   sub al,30h
   mov bl,al
   jmp nextline
   start:
   print 'Enter Width of Rectangle : '
   mov ah,1
   int 21h
   sub al,30h
   mov a,al
   mov ah,2
   mov dl,0ah
   int 21h
   mov dl,0ah
   int 21h
   mov dl,0dh
   int 21h
   print 'Area of a Rectangle : '
   mov al,a
   mul bl
   mov bl,10
   div bl
   mov dl,al
   mov cl,ah
   mov ah,2
   add dl,30h
   int 21h
   mov dl,cl
   mov ah,2
   add dl,30h
   int 21h
   jmp exit
   nextline:
   mov ah,2
   mov dl,0ah
   int 21h
   mov dl,0dh
   int 21h
   jmp start
   exit:
   main endp
end main
```

Output:



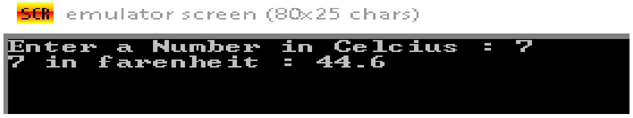
```
Enter Lenght of Rectangle : 9
Enter Width of Rectangle : 7

Area of a Rectangle : 63
```

2) Design an assembly language program to convert temperature from Celsius to Fahrenheit or vice versa.

- **Celcius to Farenheit:**

```
include 'emu8086.inc'
.model small
.stack 100h
.data
   a db ?
   b db ?
.code
main  proc
   print 'Enter a Number in Celcius : '
   mov ah,1
   int 21h
   sub al,30h
   mov b,al
   jmp newline:
   back:
   mov dl,b
   mov ah,2
   add dl,30h
   int 21h
   print ' in farenheit : '
   mov al,b
   mov bl,18
   mul bl
   mov bl,10
   div bl
   add al,32
   mov dl,al
   mov a,ah
   mov ah,0
   mov bl,10
   div bl
   mov dl,al
   mov cl,ah
   mov ah,2
   add dl,30h
   int 21h
   mov dl,cl
   mov ah,2
   add dl,30h
   int 21h
   print '.'
   mov dl,a
   mov ah,2
   add dl,30h
   int 21h
   jmp exit
   newline:
       mov ah,2
       mov dl,0ah
       int 21h
       mov ah,2
       mov dl,0dh
       int 21h
   jmp back
   exit:
   main endp
end main
```

Output:

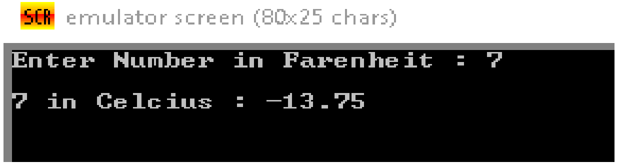


```
Enter a Number in Celcius : 7
7 in farenheit : 44.6
```

- **Farenheit to Celcius:**

```
include 'emu8086.inc'
.model small
.stack 100h
.data
   a db ?
   b db ?
.code
main  proc
   print 'Enter Number in Farenheit : '
   mov ah,1
   int 21h
   sub al,30h
   mov a,al
   jmp nextline
   start:
   mov dl,a
   mov ah,2
   add dl,30h
   int 21h
   print ' in Celcius : -'
   mov al,a
   mov bl,32
   sub bl,al
   mov al,bl
   mov bl,55
   mul bl
   mov bl,100
   div bl
   mov bl,al
   mov cl,ah
   mov ah,0
   mov al,bl
   mov bl,10
   div bl
   mov dl,al
   mov bl,ah
   mov ah,2
   add dl,30h
   int 21h
   mov dl,bl
   mov ah,2
   add dl,30h
   int 21h
   print '.'
   mov ah,0
   mov al,cl
   mov bl,10
   div bl
   mov dl,al
   mov cl,ah
   mov ah,2
   add dl,30h
   int 21h
   mov dl,cl
   mov ah,2
   add dl,30h
   int 21h
   jmp exit
   nextline:
    mov ah,2
    mov dl,0ah
    int 21h
    mov dl,0ah
    int 21h
    mov dl,0dh
    int 21h
   jmp start
   exit:
   main endp
end main
```

Output:



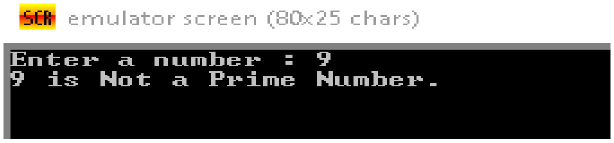
```
Enter Number in Farenheit : 7
7 in Celcius : -13.75
```

3) Implement an assembly language program to check if a given number is prim or not.

```
include 'emu8086.inc'
.model small
.stack 100h
.data
   num db ?
.code
main proc
   print 'Enter a number : '
   mov ah, 1
   int 21h
   sub al, 30h
   mov num, al
   cmp num, 2
   je prime
   jl not_prime
```

```
    mov cl, 2
prime_loop:
   mov al,0
   mov ah,0
   mov al, num
   div cl
   cmp ah, 0
   je not_prime
   inc cl
   cmp cl,num
   je prime
   jne again
   again:
   jmp prime_loop
not_prime:
   mov ah, 2
   mov dl, 0ah
   int 21h
   mov dl, 0dh
   int 21h
   mov ah, 0
   mov dl, num
   mov ah, 2
   add dl, 30h
   int 21h
   print ' is Not a Prime Number.'
   jmp exit
prime:
   mov ah, 2
   mov dl, 0ah
   int 21h
   mov dl, 0dh
   int 21h
   mov dl, num
   mov ah, 2
   add dl, 30h
   int 21h
   print ' is Prime Number.'
   jmp exit
exit:
   main endp
end main
```

Output:



```
Enter a number : 9
9 is Not a Prime Number.
```