FENI UNIVERSITY

Center for Learning and Development

Lab work

on

Assembly Programming

Submitted To

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Submitted By

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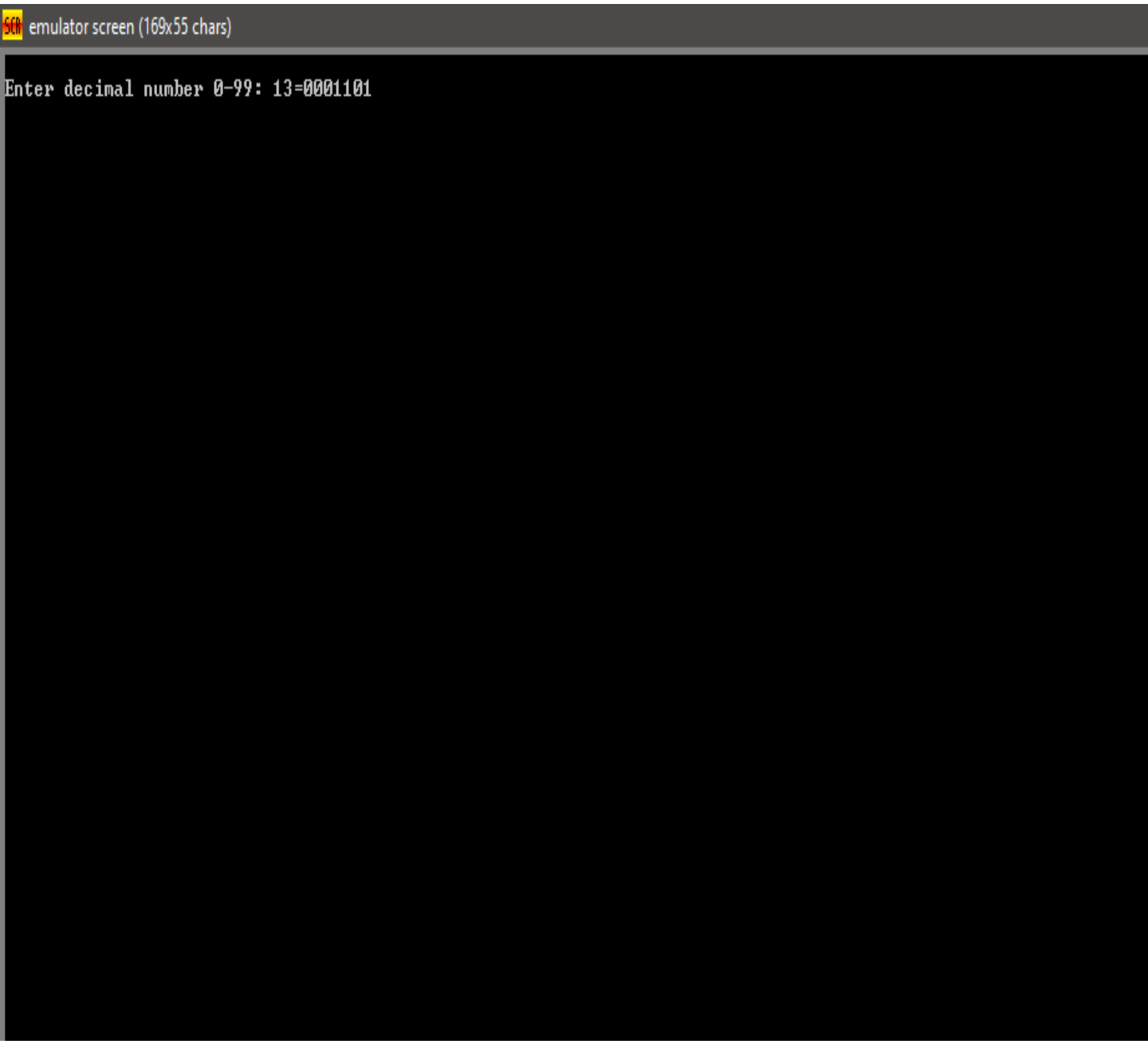
❖ Write an assembly program to convert decimal to binary.

```
.model small
.stack
.data
        cad  db 9 dup (' '),'$'
        var1 db ?
        num  db ?
        aux  db ?

        msg db 10,13, "Enter decimal number 0-99: $", 10, 13

.code
.startup

         mov ah,9
         lea dx,msg
         int 21h
         mov var1,0
         mov ah,01h
         int 21h
         sub al,30h
         mov num,al

         mov al,num
         mov bl,10
         mul bl
         mov aux,al

         mov var1,0
         mov ah,01h
         int 21h
         sub al,30h


        add aux,al
        mov bl,aux
        mov num,bl
```

```
mov ah,02h   ;Prints '=' sign symbol after decimal input
mov dl,'='
int 21h

mov SI,6
L1:
xor Ah,Ah
mov Al,num

mov Bl,2
div Bl
mov var1,Ah
mov num,Al

mov dl,var1
add dl,30h

mov cad[SI],dl

cmp num,1
dec SI
jne L1
je exit



cmp num,0
jne L1
je exit

exit:

mov dl,num
add dl,30h

mov cad[SI],dl

mov ah,09h
lea Dx,cad
int 21h

mov ah,4ch
int 21h
end
```

Output:


emulator screen (169x55 chars)
Enter decimal number 0-99: 13=0001101

❖ Write an assembly program to perform arithmetic operations.

```
.model small
.stack 100h
.data

main_menu db ,0dh,0ah,"Calculator",0dh,0ah


   db "[[[########<<<<>>>>########]]]",0dh,0ah
   db "Press 'a' for Addition",0dh,0ah
   db "Press 's' for Subtraction",0dh,0ah
   db "Press 'm' for Multiplication",0dh,0ah
   db "Press 'd' for Division",0dh,0ah
   db "Press 'e' for Exit",0dh,0ah
   db "Press 'r' for Return main menu",0dh,0ah
   db "[[[########<<<<>>>>########]]]",0dh,0ah
   db "Enter your choice: ",0dh,0ah,'$'


   num1 db "Enter First Number: ",0dh,0ah,'$'
   num2 db ,0dh,0ah,"Enter Second Number",0dh,0ah,'$'


   add1 db ,0dh,0ah,"****<<<<ADDITION>>>>****",0dh,0ah,'$'
   sub1 db ,0dh,0ah,"****<<<<SUBTRACTION>>>>****",0dh,0ah,'$'
   mul1 db ,0dh,0ah,"****<<<<MUlTIPLICATION>>>>****",0dh,0ah,'$'
   div1 db ,0dh,0ah,"****<<<<DIVISION>>>>****",0dh,0ah,'$'
   ex db ,0dh,0ah,"Good Luck!!",0dh,0ah,'$'
   ans db ,0dh,0ah,"Answer: ",0dh,0ah,'$'
   continue db ,0dh,0ah,"Do you want to continue(y/n): ",0dh,0ah,'$'

   op1 db ?
   op2 db ?
   Operand db ?
   con db ?

.code
.startup
start:

   mov ah,09h
   mov dx,offset main_menu
   int 21h
```

```
mov ah,01h
int 21h

mov operand,al
mov al,operand
cmp al,'a'
je add
cmp al,'s'
je sub
cmp al,'m'
je mul
cmp al,'d'
je div
cmp al,'r'
je start
cmp al,'e'
je exit


add:
   mov ah,09h
   mov dx,offset add1
   int 21h

   mov ah,09h
   mov dx,offset num1
   int 21h

   mov ah,01h
   int 21h
   mov op1,al

   mov ah,09h
   mov dx,offset num2
   int 21h

   mov ah,01h
   int 21h
   mov op2,al

   mov ah,09h
   mov dx,offset ans
   int 21h
```

```
    mov al,op1
    mov bl,op2
    add al,bl

    aas
    or ax,3030h
    mov ah,0eh
    int 10h

    mov ah,09h
    mov dx,offset continue
    int 21h

    mov ah,01h
    int 21h

    mov con,al
    mov al,con
    cmp al,'y'
    je start
    cmp al,'n'
    je exit

sub:
    mov ah,09h
    mov dx,offset sub1
    int 21h

    mov ah,09h
    mov dx,offset num1
    int 21h

    mov ah,01h
    int 21h
    mov op1,al

    mov ah,09h
    mov dx,offset num2
    int 21h

    mov ah,01h
    int 21h
    mov op2,al
```

```
mov ah,09h
      mov dx,offset ans
      int 21h

      mov al, op1
      mov bl,op2
      sub al,bl

      aas
      or ax,3030h
      mov ah,0eh
      int 10h

      mov ah,09h
      mov dx,offset continue
      int 21h

      mov ah,01h
      int 21h
      mov con,al
      mov al,con
      cmp al,'y'
      je start
      cmp al,'n'
      je exit


   mul:
      mov ah,09h
      mov dx,offset mul1
      int 21h

      mov ah,09h
      mov dx,offset num1
      int 21h

      mov ah,01h
      int 21h
      sub al,30h
      mov op1,al
      mov ah,09h
      mov dx,offset num2
      int 21h
```

```
mov ah,01h
      int 21h
      sub al,30h
      mov op2,al

      mov ah,09h
      mov dx,offset ans
      int 21h

      mov al, op1
      mov bl,op2
      mul bl
      add al,30h

      mov ah,0eh
      int 10h

      mov ah,09h
      mov dx,offset continue
      int 21h

      mov ah,01h
      int 21h
      mov con,al
      mov al,con
      cmp al,'y'
      je start
      cmp al,'n'
      je exit


   div:
      mov ah,09h
      mov dx,offset div1
      int 21h

      mov ah,09h
      mov dx,offset num1
      int 21h

      mov ah,01h
      int 21h
      sub al,30h
      mov op1,al
```

```
mov ah,09h
      mov dx,offset num2
      int 21h

      mov ah,01h
      int 21h
      sub al,30h
      mov op2,al

      mov ah,09h
      mov dx,offset ans
      int 21h

      mov ax,0000h
      mov al, op1
      mov bl,op2
      div bl
      add al,30h

      mov ah,0eh
      int 10h

      mov ah,09h
      mov dx,offset continue
      int 21h

      mov ah,01h
      int 21h
      mov con,al
      mov al,con
      cmp al,'y'
      je start
      cmp al,'n'
      je exit


   exit:
      mov ah,09h
      mov dx,offset ex
      int 21h
.exit
end
```

Output:

emulator screen (169x55 chars)

```
Calculator
[[[#########<<<<>>>>#########]]]
Press 'a' for Addition
Press 's' for Subtraction
Press 'm' for Multiplication
Press 'd' for Division
Press 'e' for Exit
Press 'r' for Return main menu
[[[#########<<<<>>>>#########]]]
Enter your choice:
a
****<<<<ADDITION>>>>****
Enter First Number:
4
Enter Second Number
3
Answer:
7
Do you want to continue(y/n):
```

emulator screen (169x55 chars)

```
 alculator
[[[#########<<<<>>>>#########]]]
Press 'a' for Addition
Press 's' for Subtraction
Press 'm' for Multiplication
Press 'd' for Division
Press 'e' for Exit
Press 'r' for Return main menu
[[[#########<<<<>>>>#########]]]
Enter your choice:
s
****<<<<SUBTRACTION>>>>****
Enter First Number:
8
Enter Second Number
5
Answer:
3
Do you want to continue(y/n):
```

emulator screen (169x55 chars)

```
 alculator
[[[#########<<<<>>>>########]]]
Press 'a' for Addition
Press 's' for Subtraction
Press 'm' for Multiplication
Press 'd' for Division
Press 'e' for Exit
Press 'r' for Return main menu
[[[#########<<<<>>>>########]]]
Enter your choice:
m
****<<<<MULTIPLICATION>>>>****
Enter First Number:
3
Enter Second Number
2
Answer:
6
Do you want to continue(y/n):
```

emulator screen (169x55 chars)

```
 alculator
[[[#########<<<<>>>>########]]]
Press 'a' for Addition
Press 's' for Subtraction
Press 'm' for Multiplication
Press 'd' for Division
Press 'e' for Exit
Press 'r' for Return main menu
[[[#########<<<<>>>>########]]]
Enter your choice:
d
****<<<<DIVISION>>>>****
Enter First Number:
6
Enter Second Number
2
Answer:
3
Do you want to continue(y/n):
```

❖ Write an assembly program to perform logical operations.

```
.model small
.stack 100h
.data

a db 10,13,'for and $'
b db 10,13,'for or $'
c db 10,13,'for xor $'
.code

main proc
   mov ax,@data
   mov ds,ax

   mov ah,9
   lea dx,a
   int 21h

   mov bl,111b
   and bl,101b

   add bl,48

   mov ah,2
   mov dl,bl
   int 21h

   or1:
   mov ah,9
   lea dx,b
   int 21h

   mov bl,101b
   or bl,111b

   add bl,48

   mov ah,2
   mov dl,bl
   int 21h
```

```
xor1:
   mov ah,9
   lea dx,c
   int 21h

   mov bl,111b
   xor bl,100b

   add bl,48

   mov ah,2
   mov dl,bl
   int 21h

   exit:
   mov ah,4ch
   int 21h
   main endp
end main
```

Output: