Jahangirnagar University (JU)

Institute of Information Technology

Lab Report-5

Assembly Language

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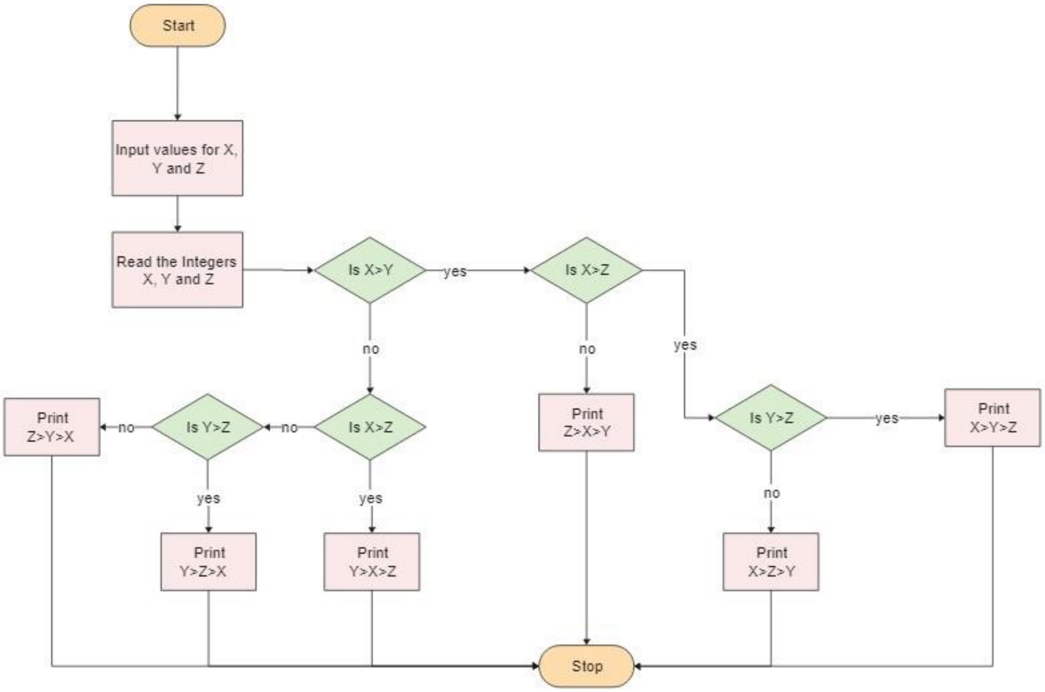
Experiment 1:

To arrange three numbers in descending order.

Algorithm:

1. Load the first digit into a register.
2. Load the second digit into another register.
3. Compare the first and second digits.
4. If the first digit is less than the second digit, swap the two digits.
5. Load the third digit into another register.
6. Compare the first digit with the third digit.
7. If the first digit is less than the third digit, swap the first and third digits.
8. Compare the second digit with the third digit.
9. If the second digit is less than the third digit, swap the second and third digits.
10. The three digits are now arranged in descending order.

Flow Chart

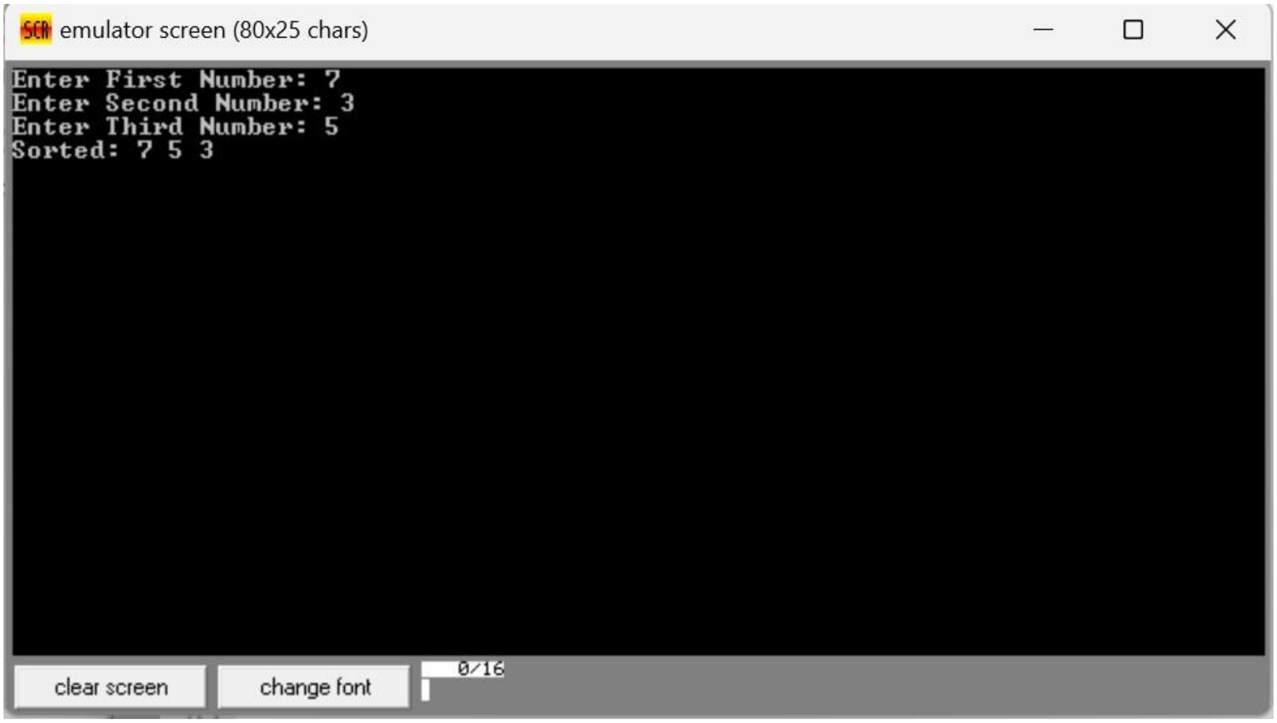

Start
Input values for X, Y and Z
Read the Integers X, Y and Z
Is X>Y
yes
no
Is X>Z
no
yes
Print Z>X>Y
Is Y>Z
yes
Print X>Y>Z
no
Print X>Z>Y
Is X>Z
no
Is Y>Z
no
Print Z>Y>X
yes
Print Y>Z>X
yes
Print Y>X>Z
Stop

Program Source Code:

```
include 'emu8086.inc'

data segment
    num1 db 0
    num2 db 0
    num3 db 0
data ends

code segment
    assume cs:code,ds:data
start:
    mov ax,data
    mov ds,ax

    print 'Enter First Number: '

    mov ah,01h
    int 21h
    mov num1,al

    printn ''
    print 'Enter Second Number: '

    mov ah,01h
    int 21h
    mov num2,al

    printn ''
    print 'Enter Third Number: '

    mov ah,01h
    int 21h
    mov num3,al

    mov al,num1
    mov bl,num2
    cmp al,bl
    jg swap1
    mov num1,bl
    mov num2,al

swap1:
    mov al,num2
    mov bl,num3
    cmp al,bl
    jg swap2
    mov num2,bl
    mov num3,al

swap2:
    mov al,num1
    mov bl,num2
    cmp al,bl
    jg display
    mov num1,bl
    mov num2,al

display:
    printn ''
    print 'Sorted: '

    mov dl,num1
    mov ah,02h
    int 21h

    print ' '

    mov dl,num2
    mov ah,02h
    int 21h

    print ' '

    mov dl,num3
    mov ah,02h
    int 21h

    printn ''

    mov ah,4ch
    int 21h
    code ends
end start
```

Sample Input: 7   3   5

Sample Output: 7 5 3



```
Enter First Number: 7
Enter Second Number: 3
Enter Third Number: 5
Sorted: 7 5 3
```

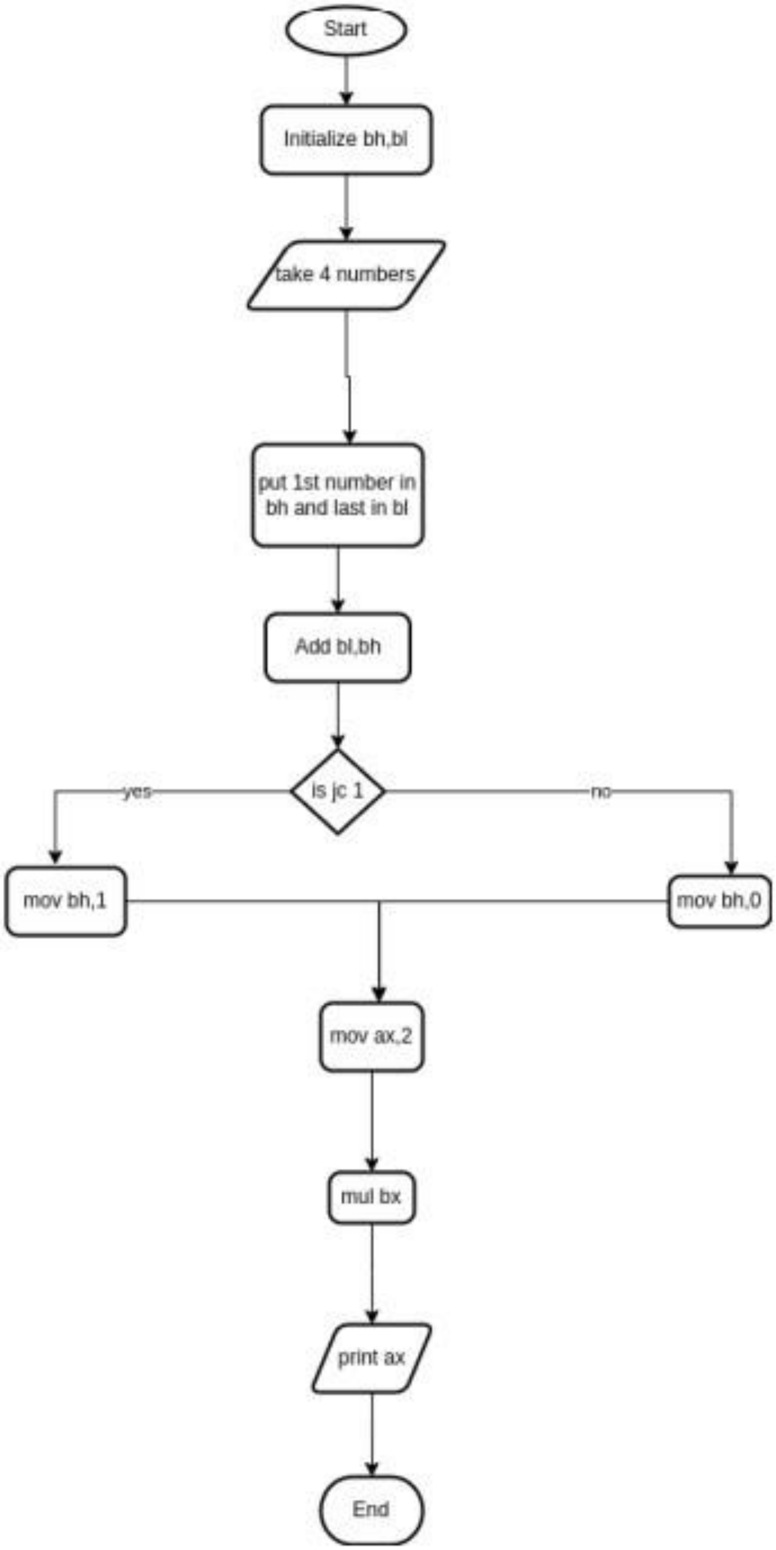
Experiment 2:

To find the summation of series of four 8-bit numbers

Algorithm:

1. Load the first 8-bit number into a register.
2. Load the second 8-bit number into another register.
3. Add the second number to the first number, storing the result in the first register.
4. Load the third 8-bit number into the second register.
5. Add the third number to the result in the first register, storing the result in the first register.
6. Load the fourth 8-bit number into the second register.
7. Add the fourth number to the result in the first register, storing the result in the first register.
8. Store the final result in memory.

Flow Chart:


Start
Initialize bh,bl
take 4 numbers
put 1st number in bh and last in bl
Add bl,bh
is jc 1
yes
no
mov bh,1
mov bh,0
mov ax,2
mul bx
print ax
End

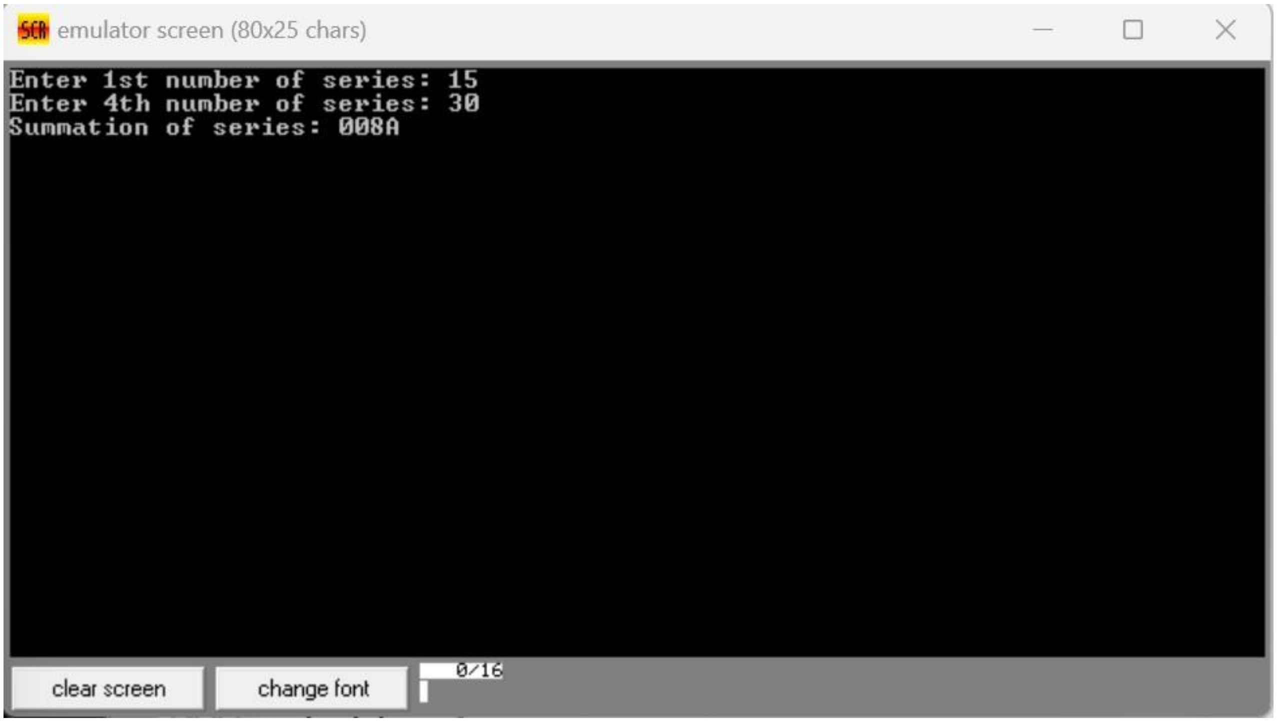
Program Source Code:

```
.model small
.stack 100h
.data
msg1 dw 'Enter 1st number of series : $'
msg2 dw 'Enter 4th number of series : $'
msg3 dw 'Summation of series : $'
nl db 0ah,0dh,'$'
.code
main proc
 mov ax,@data
 mov ds,ax

 lea dx,msg1
 mov ah,9
 int 21h

 mov ah,1
 while:
 int 21h
 cmp al,0dh
 je end_while

 cmp al,39h
 jg letter

 and al,0fh
 jmp shift

 letter:
 sub al,37h

 shift:
 shl bh,4

 or bh,al
 jmp while

 end_while:

 lea dx,nl
 mov ah,9
 int 21h

 lea dx,msg2
 mov ah,9
 int 21h
```

```
mov ah,1
while2:
int 21h
cmp al,0dh
je end_while2

cmp al,39h
jg letter2

and al,0fh
jmp shift2

letter2:
sub al,37h

shift2:
shl bl,4

or bl,al
jmp while2

end_while2:

lea dx,nl
mov ah,9
int 21h

add bl,bh
jc one
jmp zero
one:
mov bh,1
jmp prnt
zero:
mov bh,0

prnt:
lea dx,msg3
mov ah,9
int 21h

mov ax,2
mul bx
mov bx,ax


mov cx,4

mov ah,2

for:
 mov dl,bh
 shr dl,4
 shl bx,4

 cmp dl,10
 jge letter3

 add dl,30h
 int 21h
 jmp end_of_loop

 letter3:
 add dl,55
 int 21h

 end_of_loop:
 loop for
main endp
 end main
```

Sample Input: 15 30

Sample Output: 008A



```
Enter 1st number of series: 15
Enter 4th number of series: 30
Summation of series: 008A
```

THE END