# Lab Report on

## Microprocessor and Assembly Language Lab

**Course Code: CSE 232**
**Fall-2014**


## Submitted To:

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# Contents

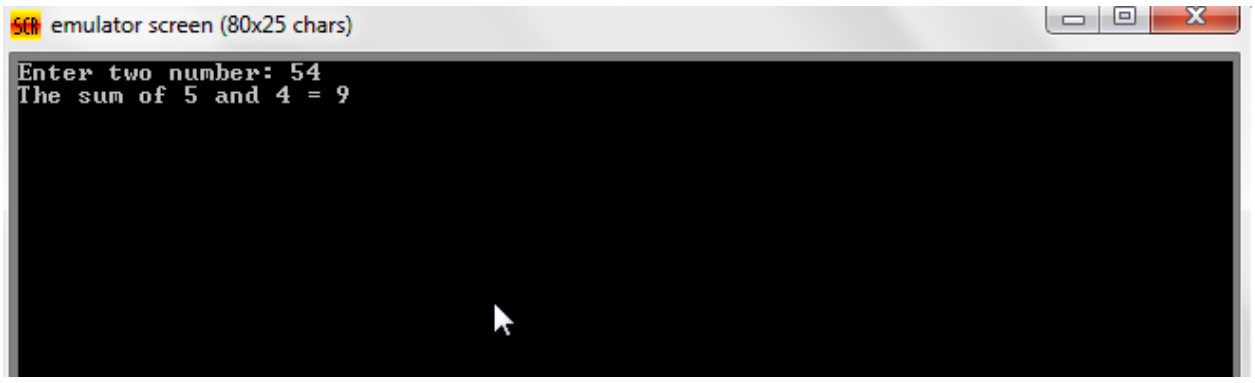
## Problem 1: The sum of 5 and 4 is 9

## Solution:

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

m1 db "Enter two number: $"
m2 db "The sum of $"
m3 db " and $"
m4 db " = $"

.code

main proc

    mov ax,@data
    mov ds,ax

    lea dx,m1
   mov ah,9
 int 21h

    mov ah,1
    int 21h

   mov bl,al


   mov ah,1
  int 21h

    mov bh,al

    mov ah,2
   mov dl,0dh
   int 21h

    mov dl,0ah

    int 21h

    lea dx,m2
    mov ah,9
    int 21h
```

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


    mov ah,9
    lea dx,m3
    int 21h


    mov ah,2
    mov dl,bh
    int 21h

    lea dx,m4
    mov ah,9
    int 21h

    sub bl,30h

    sub bh,30h

    add bl,bh
    add bl,30h

    mov ah,2
   mov dl,bl
   int 21h

    mov ah,4ch
    int 21h

   main endp
end main
```

## Output:



**Problem 2: Write a program to display the left margin:**

**Enter seven initial:12345**

**1**

**2**

**3**

**4**

**5**

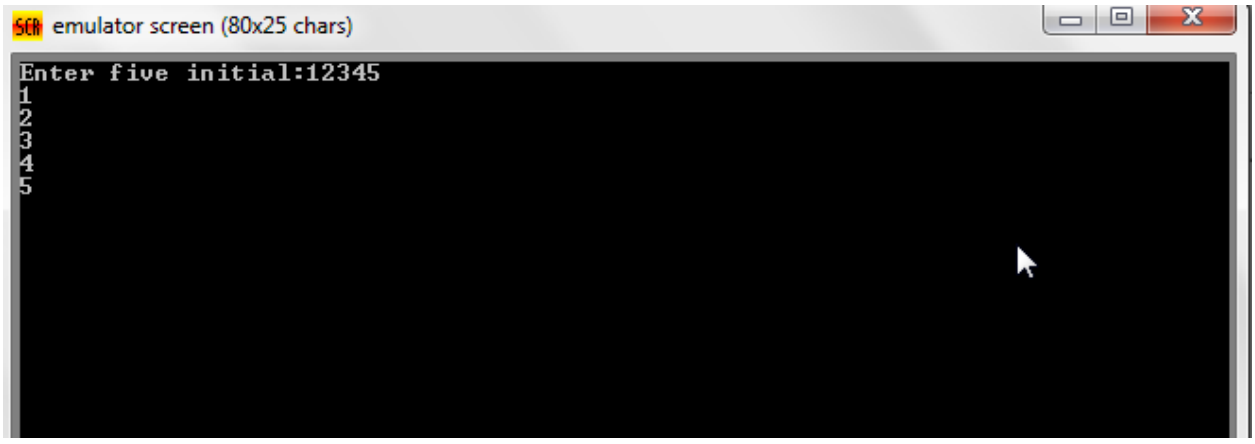
## Solution:

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

m1 db "Enter five initial:$"
.code

main proc

   mov ax,@data
   mov ds,ax

   lea dx,m1
   mov ah,9
   int 21h

   mov ah,1
   int 21h
   mov bl,al

   mov ah,1
   int 21h

  mov bh,al

   mov ah,1
   int 21h

   mov cl,al

   mov ah,1
   int 21h

   mov ch,al
```

```
mov ah,1
int 21h
mov dh,al

mov ah,2
mov dl,0dh
int 21h
mov dl,0ah
int 21h


mov ah,2

mov dl,bl

int 21h


mov ah,2

mov dl,0dh

int 21h

mov dl,0ah

int 21h

mov ah,2
mov dl,bh
int 21h

mov ah,2
mov dl,0dh
int 21h
mov dl,0ah
int 21h

mov ah,2
mov dl,cl
int 21h
mov ah,2

mov dl,0dh
int 21h
mov dl,0ah
int 21h
```

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

    mov ah,2
    mov dl,0dh
    int 21h
    mov dl,0ah
    int 21h

    mov ah,2
   mov dl,dh
    int 21h

    mov ah,4ch
    int 21h

    main endp
end main
```

## Output:



**Problem 3: Suppose AL and BL contain two number,Display the one that comes last in the sequence.**

## Solution:

```
.model small
.stack 100h
.code

main proc
 mov al,68
 mov bl,65

 cmp al,bl
jg d1
jmp d2

 d1:
mov ah,2
mov dl,al
int 21h
jmp exit

d2:
 mov ah,2
 mov dl,bl
 int 21h

   exit:
mov ah,4c
 int 21h

    main endp
end main
```

## Output:

**Problem 4: AL and BL contain two characters. Display the last character.**

## Solution:

```
.model small
.stack 100h
.code


main proc

 mov al,'A'
mov bl,'M'


   cmp al,bl
   jg d1
   jmp d2

   d1:
   mov ah,2
   mov dl,al

    int 21h
    jmp exit

   d2:
   mov ah,2
   mov dl,bl
   int 21h

  exit:
  mov ah,4ch
  int 21h

 main endp
end main
```

## Output:

## Problem 5:If AL contain number display “n” ; If AL contain character display “c”

## Solution:

```
.model small
.stack 100h
.code
main proc

    mov ah,1
    int 21h

    mov bl,al

    mov ah,2
   mov dl,0dh
   int 21h
  mov dl,0ah
   int 21h

    cmp bl,'1'
    je print_number_n
    jmp print_character_c



    print_number_n:
    mov ah,2
    mov dl,'n'
    int 21h
    jmp exit

    print_character_c:
    mov ah,2
    mov dl,'c'
    int 21h

    exit:
   mov ah,4ch
    int 21h
```

```
    main endp
end main
```

## Output:


## Problem 6: Read a character and if it is lowercase letter, Display it.

## Solution:

```
.model small
.stack 100h
.code

main proc

   mov ah,1
   int 21h

   mov bl,al

   cmp bl,'a'
   jnge end_if
   cmp bl,'z'
   jnge end_if

   mov ah,2
  mov dl,bl
  int 21h

  end_if:

 mov ah,4ch
 int 21h
```

main endp
end main

## Output:


## Problem 7:

**Write a count – controlled loop to display a row of 60 stars.**

## Solution:

```
.model small
 .stack 100h
.code

main proc
mov cx,60
mov ah,2
mov dl,'*'


count:

int 21h

loop count


main endp

end main
```

**Output:**


**Problem 8:**

**Prompt the user to enter a line of text. On the next line, display the capital letter entered that comes first alphabetically and the one that comes last. If no capital entered, display "No capital letters".**

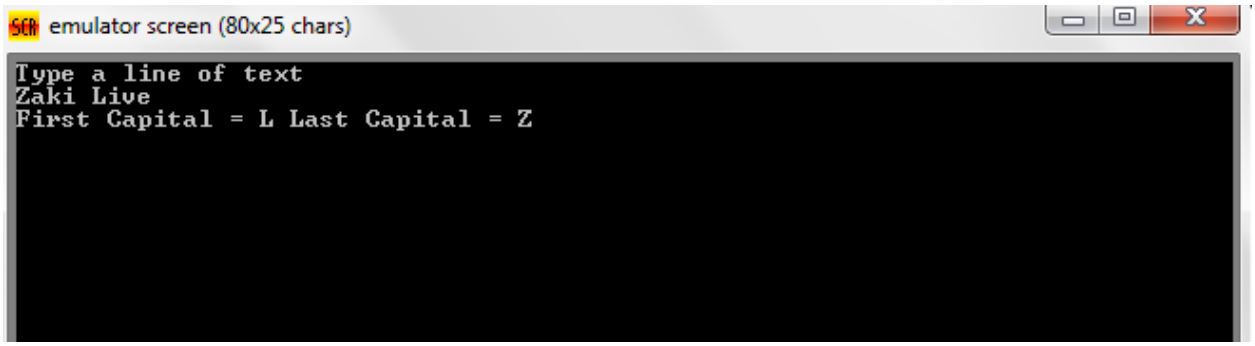
**Solution:**

```
.model small
.stack 100h
.data
prompt  db 'Type a line of text',0dh,0ah,'$'
nocap_msg db 0dh,0ah,'No capitals $'
cap_msg db 0dh,0ah,'First Capital = '
first db '|'
      db ' Last Capital = '
last   db '@ $'

.code
main proc

;initialize ds

   mov ax,@data

   mov ds,ax


   ;display opening message
```

```
mov ah,9                ;display string function
lea dx,prompt           ;get opening message
int 21h                 ;display it

;read and process a line of text

mov ah,1                ;read a character function
int 21h                 ;char in dl

while_:
;while a character is not a carriage return do
cmp al,0dh              ;CR?
je end_while            ;yes,exit


;if character is a capital letter

cmp al,'A'              ;char >='A'?
jnge end_if             ;not a capital letter
cmp al,'Z'              ;char <= 'Z'?
jnle end_if             ;not a capital letter

;then

;if character precedes first capital

cmp al,first            ;char < first capital ?
jnl check_last          ;no, >=

;then first capital = character

mov first,al            ;FIRST=char

;end_if

check_last:             ;char >last capital?

;if character follows last capital

cmp al,last             ;char > last capital?
jng end_if              ;no,<=

;then last capital=character

mov last,al             ;last = char

;end_if
```

```
    end_if:

   ;read a character

   int 21h                ;char in AL
   jmp while_             ;repeat loop


end_while:

   ;display results

   mov ah,9               ;display string function

   ;if no capitals were typed

   cmp first,'|'          ;first '|'
   jne caps               ;no display results

   ;then

   lea dx,nocap_msg       ;no capitals
   jmp display

   caps:

   lea dx,cap_msg         ;capitals

   display:
   int 21h                ;display message

   ;end_if

   ;dos exit

   mov ah,4ch
   int 21h

  main endp
end main
```

**Output:**


emulator screen (80x25 chars)
Type a line of text
Zaki Live
First Capital = L Last Capital = Z