COMPUTER ORGANIZATION AND ARCHITECTURE

1)Write a program in assembly language to take a single-digit integer from the user and print it on the screen.

CODE:

```
ORG 100h            ; Origin for COM file format (starts at 100h)
; Display message: "Enter a single digit: "
MOV AH, 09h         ; Function 09h is used to display a string
MOV DX, OFFSET msg_input  ; Load the address of the input message into DX
INT 21h             ; DOS interrupt to display message
; Read single character input from the user
MOV AH, 01h         ; Function 01h is used to read a character from input
INT 21h             ; DOS interrupt to get the character from the user
MOV BL, AL          ; Save the input character in BL for later use
; Check if the entered character is a valid digit (between '0' and '9')
CMP AL, '0'         ; Compare with '0'
JL InvalidInput     ; If input is less than '0', it's invalid
CMP AL, '9'         ; Compare with '9'
JG InvalidInput     ; If input is greater than '9', it's invalid
; If valid digit, print the entered digit
; Display message: "The entered digit is: "
MOV AH, 09h         ; Function 09h is used to display a string
MOV DX, OFFSET msg_output ; Load the address of the output message into DX
INT 21h             ; DOS interrupt to display message
; Print the valid digit
MOV DL, BL          ; Move the valid character from BL to DL (for printing)
MOV AH, 02h         ; Function 02h is used to print a single character
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INT 21h             ; DOS interrupt to print the character
JMP EndProgram      ; Jump to EndProgram to terminate successfully
InvalidInput:
MOV AH, 09h         ; Function 09h is used to display a string
MOV DX, OFFSET msg_error ; Load the address of the error message into DX
INT 21h             ; DOS interrupt to display error message
EndProgram:
MOV AH, 4Ch         ; Function 4Ch is used to terminate the program
INT 21h             ; DOS interrupt to exit
msg_input  DB 'Enter a single digit: $'  ; Input prompt message
msg_output DB 0Dh, 0Ah, 'The entered digit is: $'  ; Output message with newline
msg_error  DB 0Dh, 0Ah, 'Error: Invalid input! $'  ; Error message with newline
END                 ; End of program
```

OUTPUT:

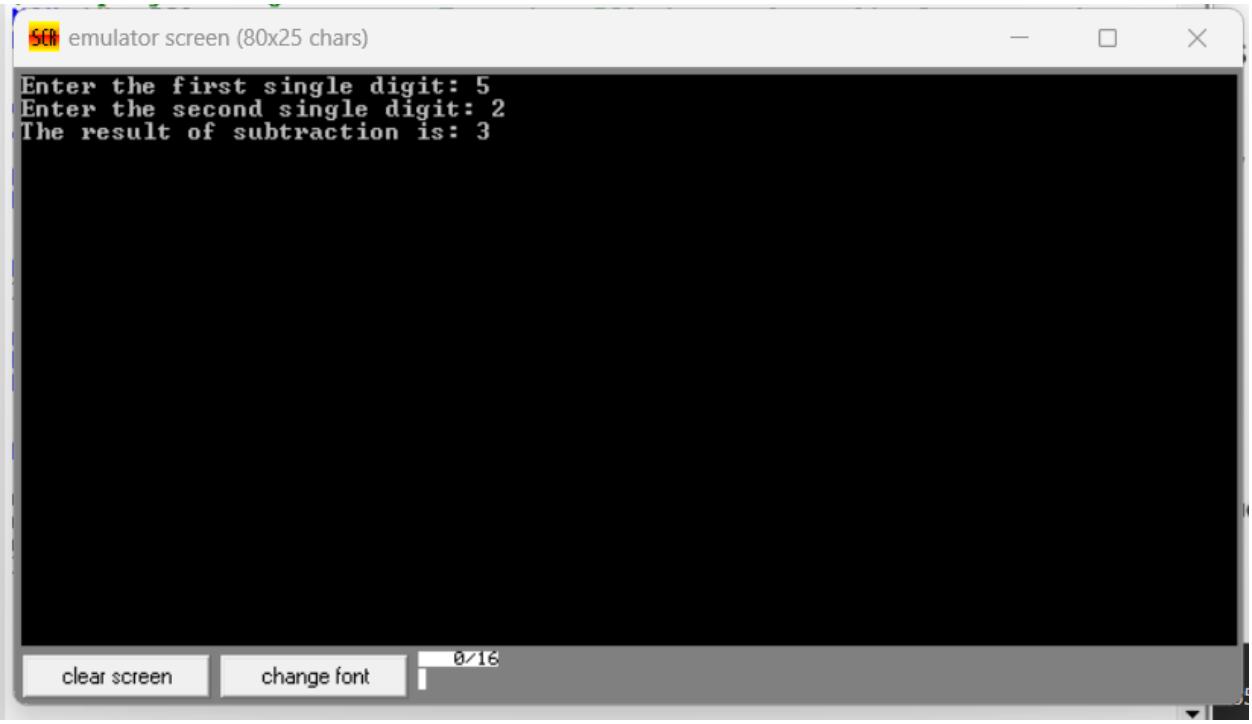
2)Write a program in assembly language to take two single-digit integers from the user and print the result of subtraction on the screen.

CODE:

```
ORG 100h
; Display message: "Enter the first single digit: "
MOV AH, 09h            ; Function 09h is used to display a string
MOV DX, OFFSET msg_input1 ; Load the address of the input message into DX
INT 21h                ; DOS interrupt to display message
; Read the first single digit from the user
MOV AH, 01h            ; Function 01h is used to read a character from input
INT 21h                ; DOS interrupt to get the character
SUB AL, '0'            ; Convert ASCII digit to actual number
MOV BL, AL             ; Store the first digit in BL
; Display message: "Enter the second single digit: "
MOV AH, 09h            ; Function 09h is used to display a string
MOV DX, OFFSET msg_input2 ; Load the address of the input message into DX
INT 21h                ; DOS interrupt to display message
; Read the second single digit from the user
MOV AH, 01h            ; Function 01h is used to read a character from input
INT 21h                ; DOS interrupt to get the character
SUB AL, '0'            ; Convert ASCII digit to actual number
MOV BH, AL             ; Store the second digit in BH
; Subtract the second digit from the first
SUB BL, BH             ; Subtract BH (second digit) from BL (first digit)
; Display message: "The result of subtraction is: "
MOV AH, 09h            ; Function 09h is used to display a string
MOV DX, OFFSET msg_output ; Load the address of the output message into DX
```

```
INT 21h              ; DOS interrupt to display the message
; Check if the result is negative
CMP BL, 0            ; Compare the result with 0
JGE PrintResult      ; If result is >= 0, jump to print result
; If the result is negative, print the minus sign
MOV DL, '-'          ; Load the minus sign into DL
MOV AH, 02h          ; Function 02h to print a single character
INT 21h              ; DOS interrupt to print the minus sign
; Convert the negative result to positive
NEG BL               ; Negate the result to make it positive
PrintResult:
; Convert result to ASCII and print
ADD BL, '0'          ; Convert result back to ASCII
MOV DL, BL           ; Move result into DL for printing
MOV AH, 02h          ; Function 02h is used to print a single character
INT 21h              ; DOS interrupt to print the result
; End the program
MOV AH, 4Ch          ; Function 4Ch is used to terminate the program
INT 21h              ; DOS interrupt to exit
msg_input1  DB 'Enter the first single digit: $'
msg_input2  DB 0Dh, 0Ah, 'Enter the second single digit: $'
msg_output  DB 0Dh, 0Ah, 'The result of subtraction is: $'
END
```

OUTPUT:


emulator screen (80x25 chars)
Enter the first single digit: 5
Enter the second single digit: 2
The result of subtraction is: 3
clear screen
change font
0/16

GITHUB LINK: https://github.com/Nikitha2341/COA-LAB-TASK-7