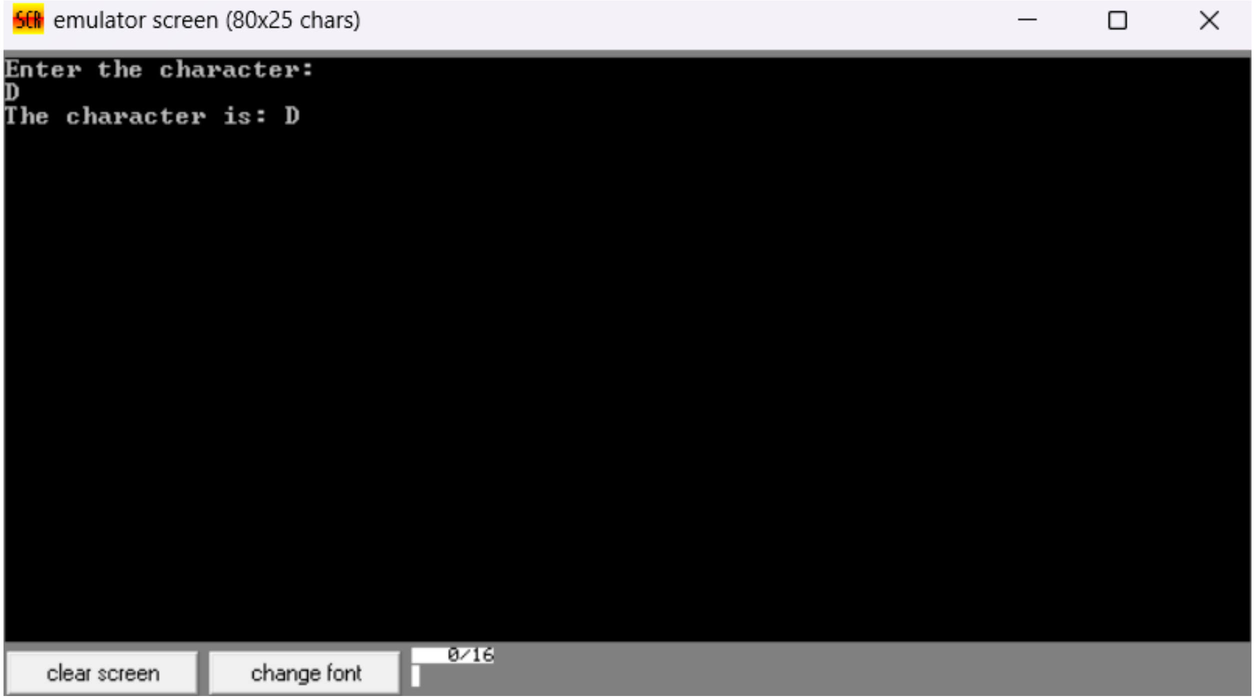
1. (a) Write a program in assembly language to print single character on screen.

Code:

```
org 100h
jmp start

msg1: db "Enter the character: ", 0Dh, 0Ah, 24h
msg2: db 0Dh, 0Ah, "The character is: ", 24h

start:
   mov dx, msg1
   mov ah, 09h
   int 21h

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

   mov dx, msg2
   mov ah, 09h
   int 21h

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

   mov ah, 0
   int 16h

ret
```

OUTPUT:



```
Enter the character:
D
The character is: D
```

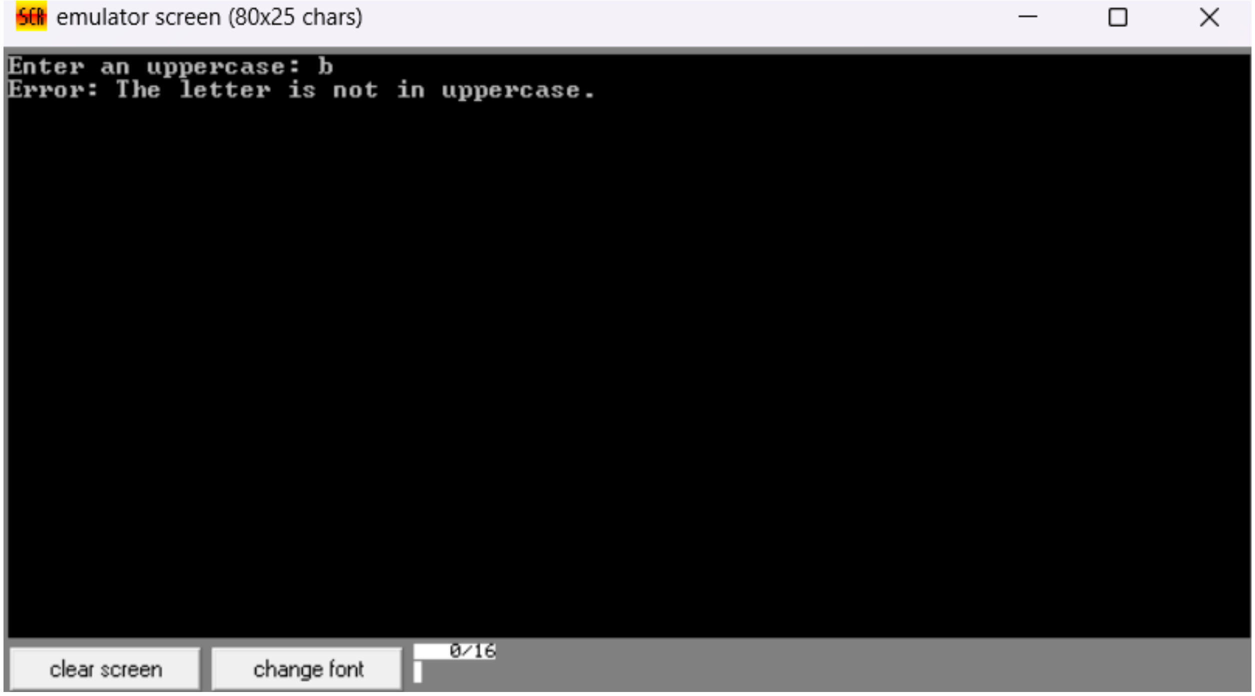
1.(b) Write an assembly language program to convert an upper-case letter to the corresponding lower-case letter.

<u>Code</u>:

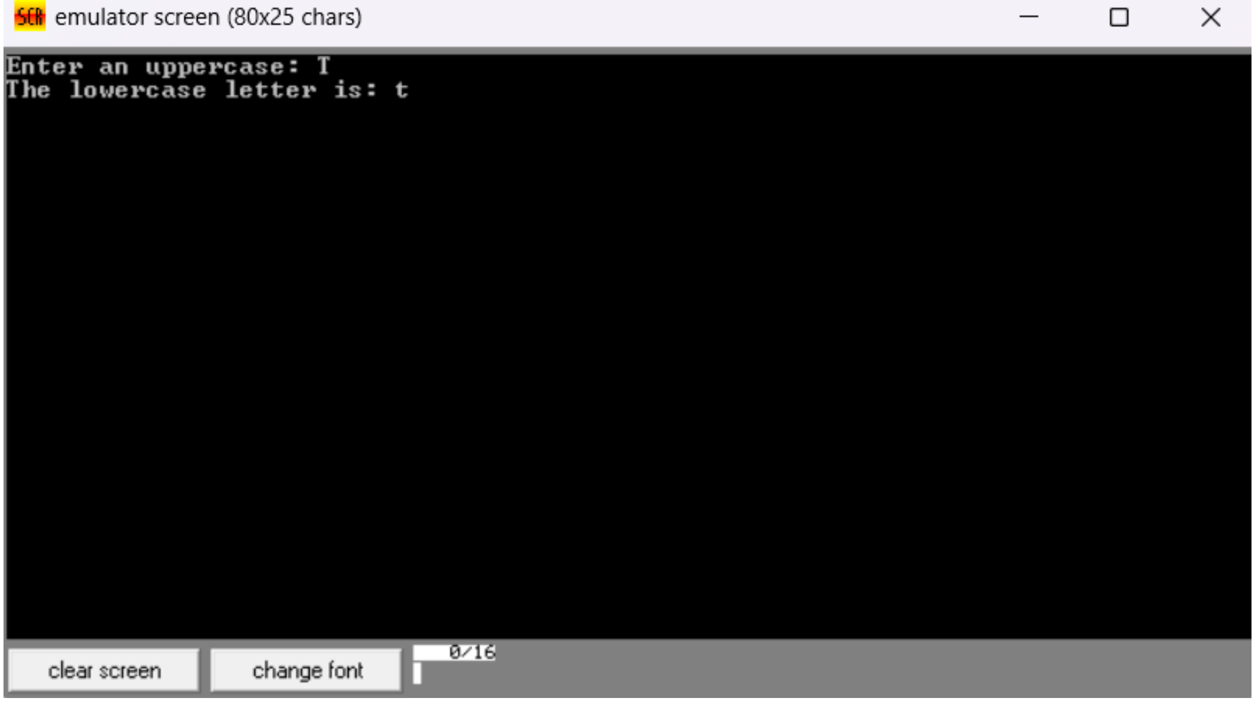
```
org 100h

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

   mov ah, 01h
   int 21h
   mov dl, al
   mov bl, al

   cmp al, 'A'
   jl notuppercase
   cmp al, 'Z'
   jg notuppercase
```

```
    add bl, 20h

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

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

    jmp endprogram

notuppercase:
    mov dx, offset msg_error
    mov ah, 09h
    int 21h

endprogram:
    mov ah, 4Ch
    int 21h

msg_input db 'Enter an uppercase: $'
msg_output db 0dh, 0ah, 'The lowercase letter is: $'
msg_error db 0dh, 0ah, 'Error: The letter is not in uppercase. $
```

Output:



```
Enter an uppercase: b
Error: The letter is not in uppercase.
```



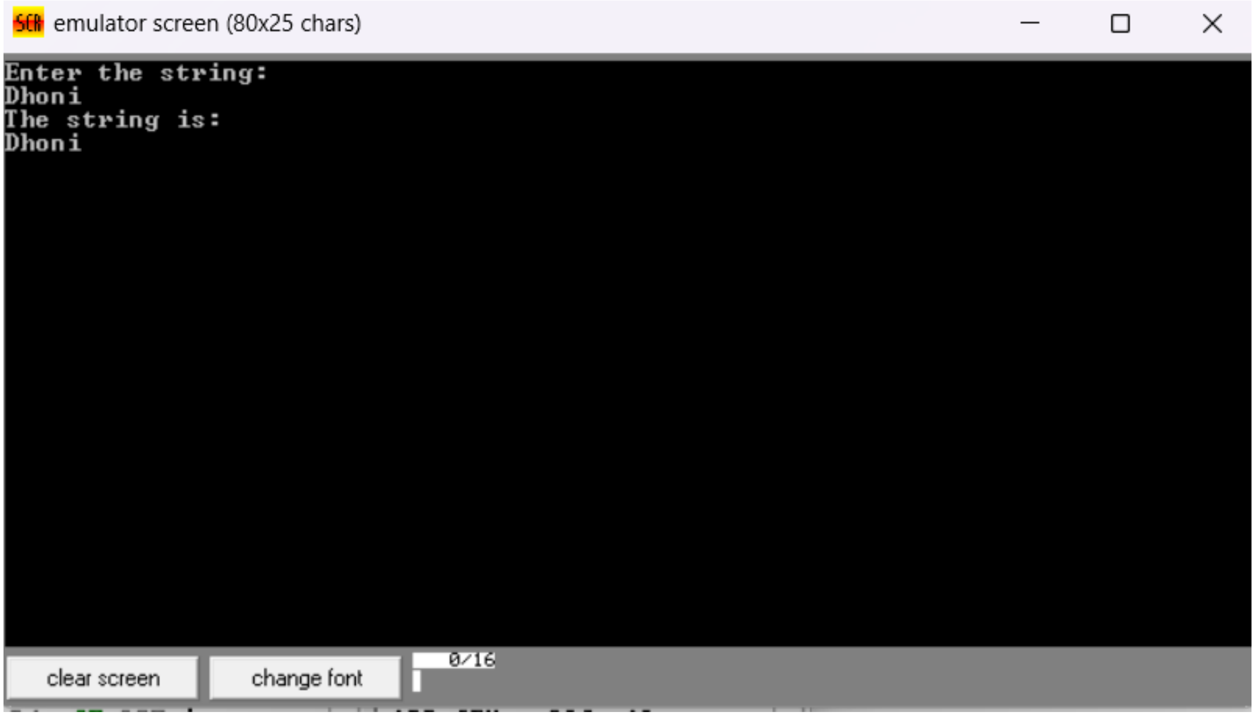
```
Enter an uppercase: T
The lowercase letter is: t
```

2.(a) Write a program in assembly language to print multiple characters on screen.

Code:

```
org 100h
jmp start

msg1: db "Enter the string: ", 0Dh, 0Ah, 24h
msg2: db 0Dh, 0Ah, "The string is: ", 0Dh, 0Ah, 24h
buffer db 20, ?, 20 dup('$')  ; Buffer to store the input string (max 20 characters)

start:
    ; Display "Enter the string: "
    mov dx, msg1
    mov ah, 09h
    int 21h
    ; Input string from user
    mov dx, offset buffer
    mov ah, 0Ah   ; DOS function to get input string
    int 21h

    ; Display "The string is: "
    mov dx, msg2
    mov ah, 09h
    int 21h

    ; Display the input string
    lea dx, [buffer + 2] ; Offset to skip buffer length and CR
    mov ah, 09h
    int 21h

    ; Wait for a key press before exiting
    mov ah, 0
    int 16h

ret
```

Output:



```
Enter the string:
Dhoni
The string is:
Dhoni
```

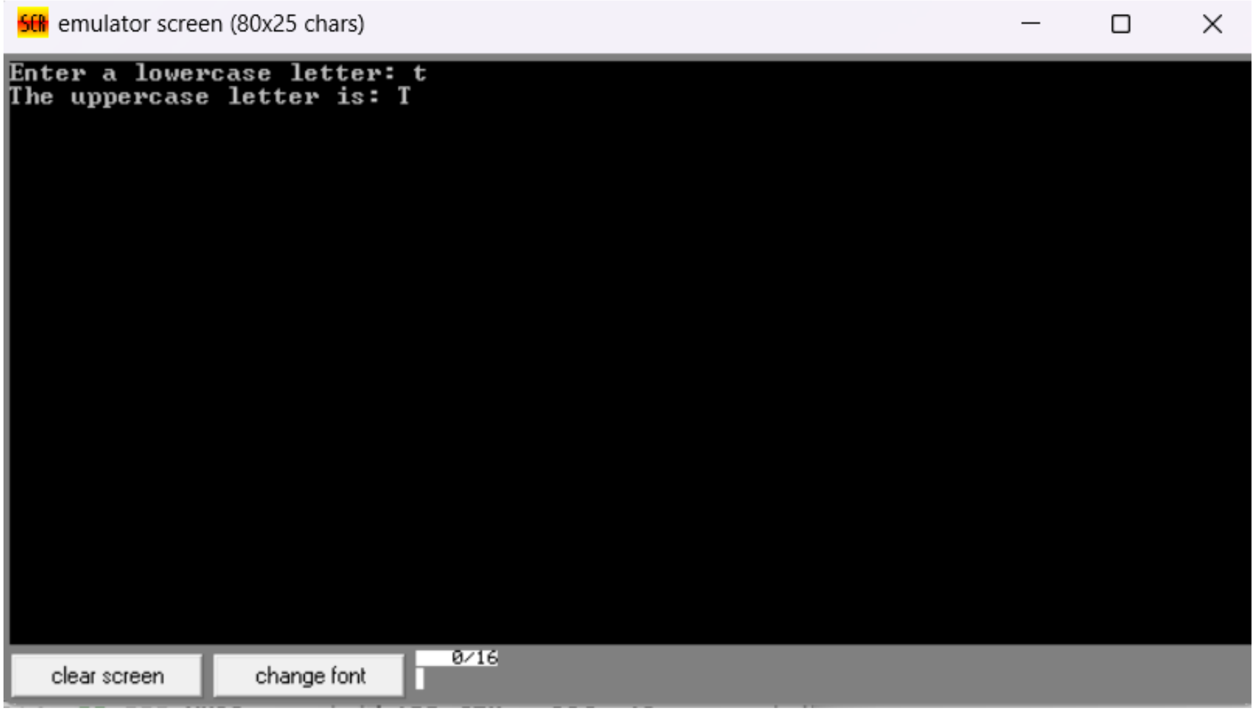
2.(b) Write an assembly language program to convert a lower-case letter to the corresponding upper-case letter.

Code:

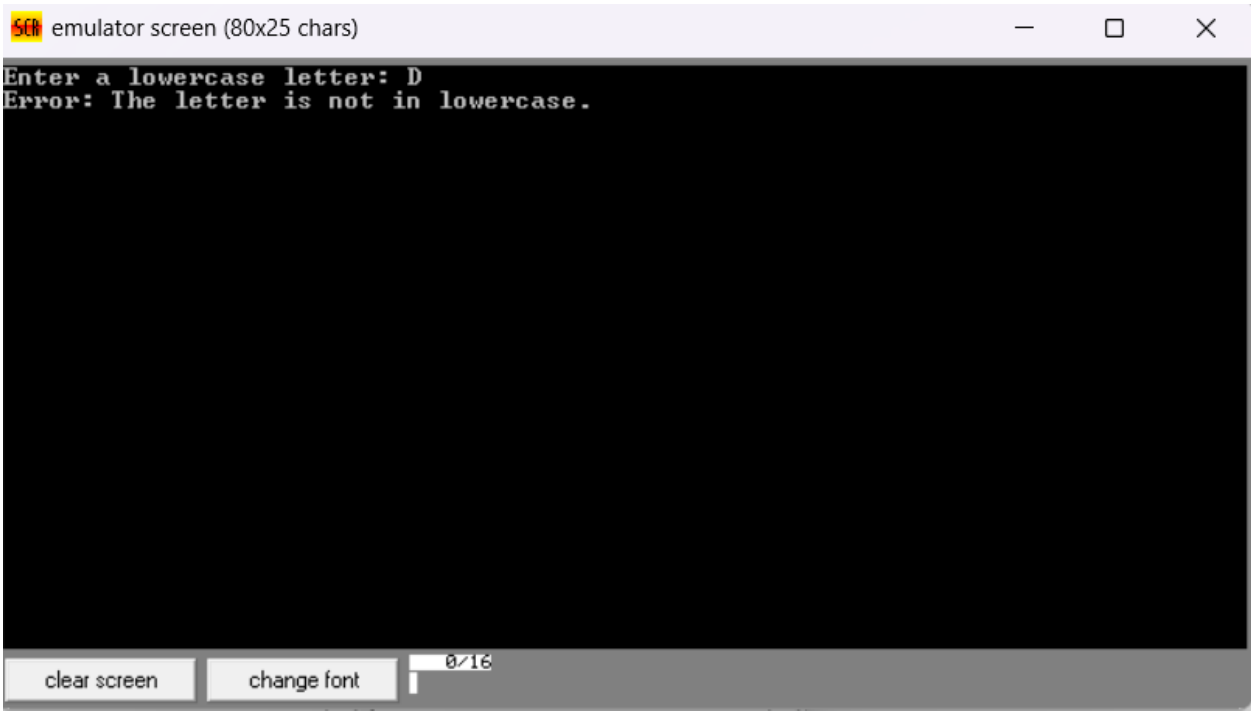
```
org 100h

; Display input message
mov dx, offset msg_input
mov ah, 09h
int 21h

; Read character
mov ah, 01h
int 21h
mov dl, al
mov bl, al

; Check if the character is a lowercase letter
cmp al, 'a'
```

```
jl notlowercase
cmp al, 'z'
jg notlowercase

; Convert lowercase to uppercase
sub bl, 20h

; Print the output message
mov dx, offset msg_output
mov ah, 09h
int 21h

; Print the converted uppercase letter
mov dl, bl
mov ah, 02h ; 02h to print a single character
int 21h

jmp endprogram

notlowercase:
; Print the error message
mov dx, offset msg_error
mov ah, 09h
int 21h

endprogram:
; End the program
mov ah, 4Ch
int 21h

; Data segment
msg_input db 'Enter a lowercase letter: $'
msg_output db 0dh, 0ah, 'The uppercase letter is: $'
msg_error db 0dh, 0ah, 'Error: The letter is not in lowercase. $'
```

Output:



```
Enter a lowercase letter: t
The uppercase letter is: T
```



```
Enter a lowercase letter: D
Error: The letter is not in lowercase.
```