Vidyavardhini's College

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Title:	Program to display character in uppercase and lowercase.
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Aim: Assembly Language Program to display character A to z in both uppercase and lowercase

Theory:

DOS provide various interrupt services that are used by the system programmer. The most commonly used interrupt is INT 21H. It invokes inbuilt DOS functions which can be used to perform various tasks. The most common tasks are reading a user input character from the screen, displaying result on the exiding program etc.

In this program, we display the characters A to Z on the DOS prompt. DOS interrupt function 02 displays the contents of DL (ASCII code) on the screen. By loading the ASCII code of 'A' in the DL register, loading AH register with 02h and calling INT 21h it is possible to display character from A to Z on the screen.

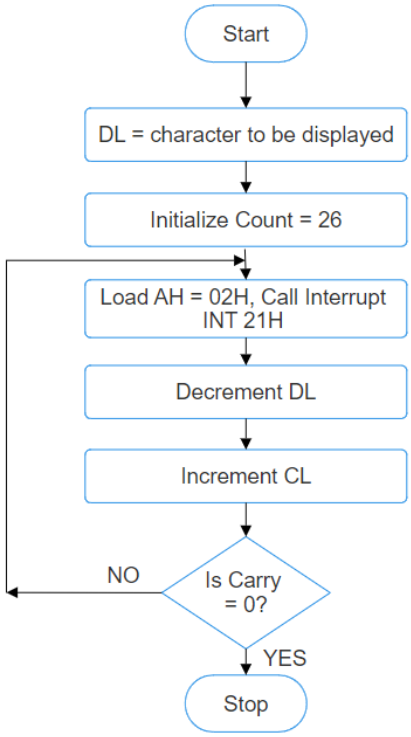
INT 21h/AH = 2 - write character to standard output.

Entry: DL = character to write, after execution AL = DL.

Example :-

```
mov ah , 2

mov dl , 'a'

int 21h
```

Flowchart:



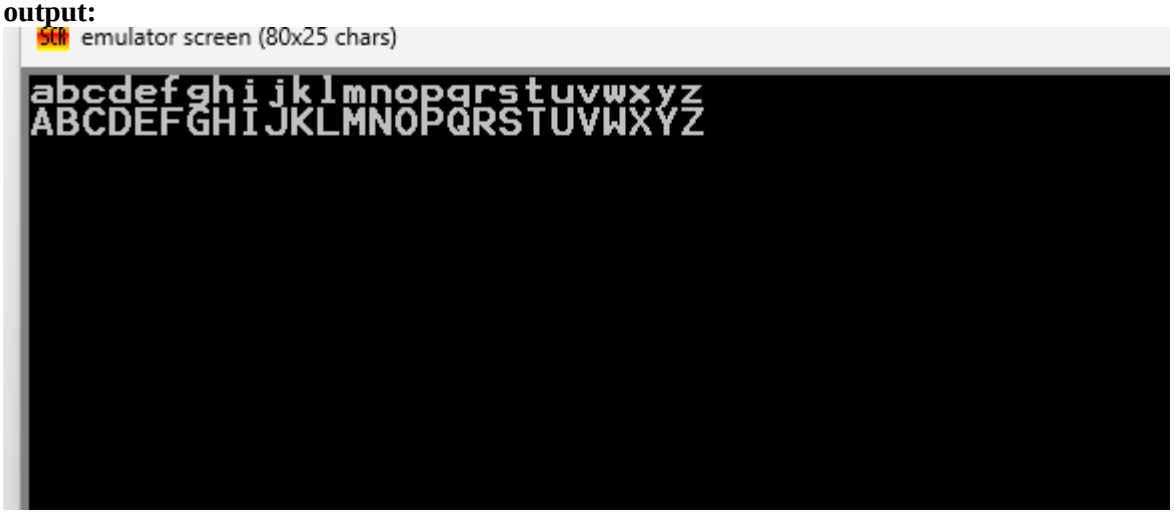
Algorithm:

1. Start.
2. Initialize DL with 'A'.
3. Load CL with count = 26.
4. Load AH = 02H and call INT 21H.
5. Increment DL, to next character.
6. Decrement the count.
7. Repeat steps 4,5,6 till CL is not zero.
8. To end the program use DOS interrupt:
   1) Load AH = 41H.
   2) Call INT 21 H.
9. Stop.

Code:

```
org 100h


mov cx, 1Ah
mov dl,'a'
L1:
mov ah, 02h
int 21h
inc dl
dec cx
jnz L1

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

mov cx, 26
mov dl,'A'
L2:
mov ah, 02h
int 21h
inc dl
dec cx
jnz L2

ret
```

output:



Conclusion:

1. Explain INT 21H.
   Ans: INT 21h is a software interrupt in the x86 architecture, commonly used for invoking DOS (Disk Operating System) services. It provides a wide range of functions for file operations, input/output, and program execution. Programs can use INT 21h to perform tasks such as reading and writing files, accessing directories, and interacting with the user through the keyboard and screen. By specifying a function code in the AH register before calling INT 21h, programs can request specific services from the DOS interrupt handler. INT 21h is a crucial mechanism for DOS-based software, offering a standardized interface for accessing operating system services in a DOS environment. It simplifies programming tasks and enhances compatibility across different DOS systems.

2. Explain working of increment and decrement instructions.
   Ans: Increment and decrement instructions are fundamental operations in microprocessor programming for increasing or decreasing the value of a register or memory location by one, respectively. The "INC" instruction increments the value stored in a register or memory location, while the "DEC" instruction decrements it. These instructions are commonly used in loop counters, array indexing, and arithmetic operations. They are efficient, single-cycle instructions that directly modify the operand's value without affecting any flags. Increment and decrement instructions are essential for implementing iterative algorithms and performing data manipulation tasks in assembly language programming.
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