

## **CASE CONVERSION**

**Exp No.:** 8

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**AIM:**

To write assembly language programs to perform alphabetical case conversion on the fly from standard input to standard output.

## **PROGRAM - 1: CASE CONVERSION:**

### **ALGORITHM:**

1. Begin.
2. Declare the data segment.
3. Initialize data segment with the count (number of input characters)
4. Close the data segment.
5. Declare the code segment.
6. Load the data segment content into AX register.
7. Transfer the contents of AX register to DS register.
8. Move the count into CX register.
9. Loop through count C1:
  - a. Move 01h to AH, to input a character.
  - b. Interrupt to get input.
  - c. If input > 60
    - i. Subtract the ASCII value by 20h.
  - d. Else
    - i. Add the ASCII value by 20h.
  - e. Print the output through DOS's standard output by moving it into DL register.
10. Introduce an interrupt for safe exit. (INT 21h)
11. Close the code segment.
12. End.

PROGRAM	COMMENTS
assume cs:code, ds:data	Declare code and data segment.
data segment	Initialize data segment with values.
count equ 10h	Number of input characters to be taken.
data ends	
code segment	Start the code segment.
org 0100h	Initialize an offset address.
start: mov ax, data	Transfer data from "data" to AX.
mov ds, ax	Transfer data from memory location AX to DS.
mov cx, count	Loads the value in count to CX register.
L1: mov ah, 1	To input a character.
int 21h	
	ASCII (hex): A-Z= 41-5A, a-z= 61-7A.
cmp al, 60h	If AL > 60, then jump to 'upper'.
jnc upper	
add al, 20h	To convert the character to lowercase.
jmp skip	
upper: sub al, 20h	To convert the character to uppercase.
skip: mov ah, 2	To output a character.
mov dl, al	Transfers the contents in AL to DL to support printing.
int 21h	
loop L1	Loops till CX = 0.
mov ah, 4ch	
int 21h	Interrupt the process with return code and exit.
code ends	
end start	

## UNASSEMBLED CODE:

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
Microsoft Object Linker V2.01 (Large)
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Warning: No STACK segment

There was 1 error detected.

Q:\>DEBUG CASECNU.EXE
-u
076A:0000 B86A07      MOV     AX,076A
076A:0003 8ED8        MOV     DS,AX
076A:0005 B91000      MOV     CX,0010
076A:0008 B401        MOV     AH,01
076A:000A CD21        INT     21
076A:000C 3C60        CMP     AL,60
076A:000E 7304        JNB     0014
076A:0010 0420        ADD     AL,20
076A:0012 EB02        JMP     0016
076A:0014 2C20        SUB     AL,20
076A:0016 B402        MOV     AH,02
076A:0018 8AD0        MOV     DL,AL
076A:001A CD21        INT     21
076A:001C E2EA        LOOP    0008
076A:001E B44C        MOV     AH,4C
-
```

## SAMPLE I/O SNAPSHOT:

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
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076A:001A CD21        INT     21
076A:001C E2EA        LOOP    0008
076A:001E B44C        MOV     AH,4C
-g
aABbcCDdEefFGghHIiJjkKLmMnNOopP
Program terminated normally
-
```

**RESULT:**

The assembly level program was written to perform the above specified case conversion and the output was verified.