

1)

$$Z = X + Y$$

The screenshot shows an 8086 assembler and emulator interface. The main window displays the assembly code for a program that calculates Z = X + Y. The code is as follows:

```
01 ; USER INPUT CODE AND PRINT THE USER INPUT
02 ORG 0100h
03
04 .DATA
05 X DB ?
06 Y DB ?
07 Z DB ?
08
09 .CODE
10 MAIN PROC
11     MOV AX,@DATA
12     MOV DS,AX
13
14     MOV AH, 1 ; USER INPUT
15     INT 21H ; STORE USER INPUT INTO AL REGISTER
16     SUB AL, 48
17     MOV X, AL ; MOV AL VALUE TO BL
18
19     MOV AH, 1 ; USER INPUT
20     INT 21H ; STORE USER INPUT INTO AL REGISTER
21     SUB AL, 48
22     MOV Y, AL
23
24     MOV BL, X ; SUMMATION
25     ADD BL, Y
26     MOV Z, BL
27
28     MOV AH, 2 ; NEW LINE CODE
29     MOV DL, 0DH
```

The 'original source code' window shows the same code, with line 41 highlighted. The 'variables' window shows the memory addresses for X (03h), Y (05h), and Z (08h). The 'emulator screen' window shows the program output. The 'emulator: 1A.com' window shows the registers and the message 'PROGRAM HAS RETURNED CONTROL TO THE OPERATING SYSTEM'.

$$Z = X - Y + 1$$

The screenshot shows the same 8086 assembler and emulator interface, but with a different program. The main window displays the assembly code for a program that calculates Z = X - Y + 1. The code is as follows:

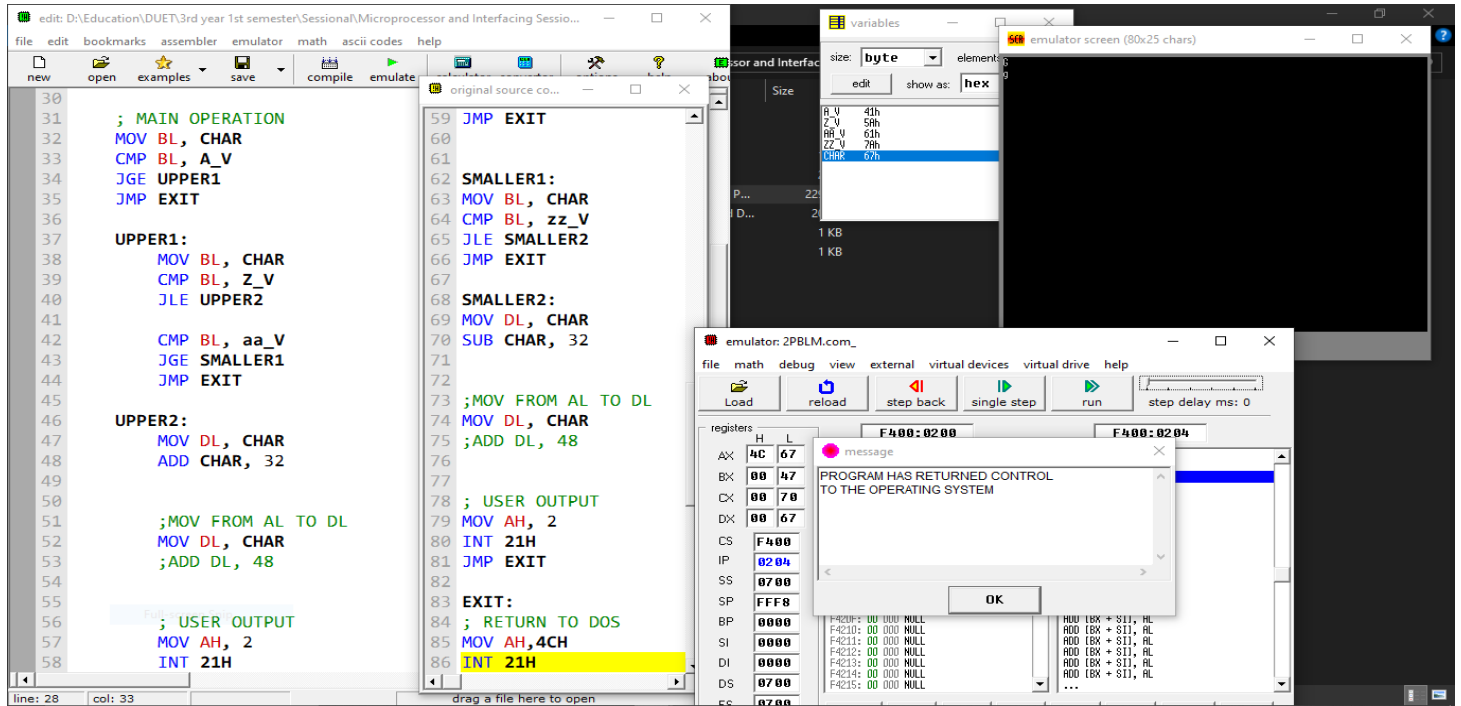
```
10 MAIN PROC
11     MOV AX,@DATA
12     MOV DS,AX
13
14     ; USER INPUT
15     MOV AH, 1
16     INT 21H ; STORE USER INPUT INTO AL REGISTER
17     SUB AL, 48
18     MOV X, AL ; MOV AL VALUE TO BL
19
20     MOV AH, 1 ; USER INPUT
21     INT 21H ; STORE USER INPUT INTO AL REGISTER
22     SUB AL, 48
23     MOV Y, AL
24
25     MOV BL, X
26     SUB BL, Y
27     ADD BL, 1
28     MOV Z, BL
29
30     ; NEW LINE CODE
31     MOV AH, 2
32     MOV DL, 0DH
33     INT 21h
34     MOV DL, 0AH
35     INT 21h
36
37     ;MOV FROM AL TO DL
38
```

The 'original source code' window shows the same code, with line 49 highlighted. The 'variables' window shows the memory addresses for X (06h), Y (02h), and Z (05h). The 'emulator screen' window shows the program output. The 'emulator: 1B.com' window shows the registers and the message 'PROGRAM HAS RETURNED CONTROL TO THE OPERATING SYSTEM'.

2)

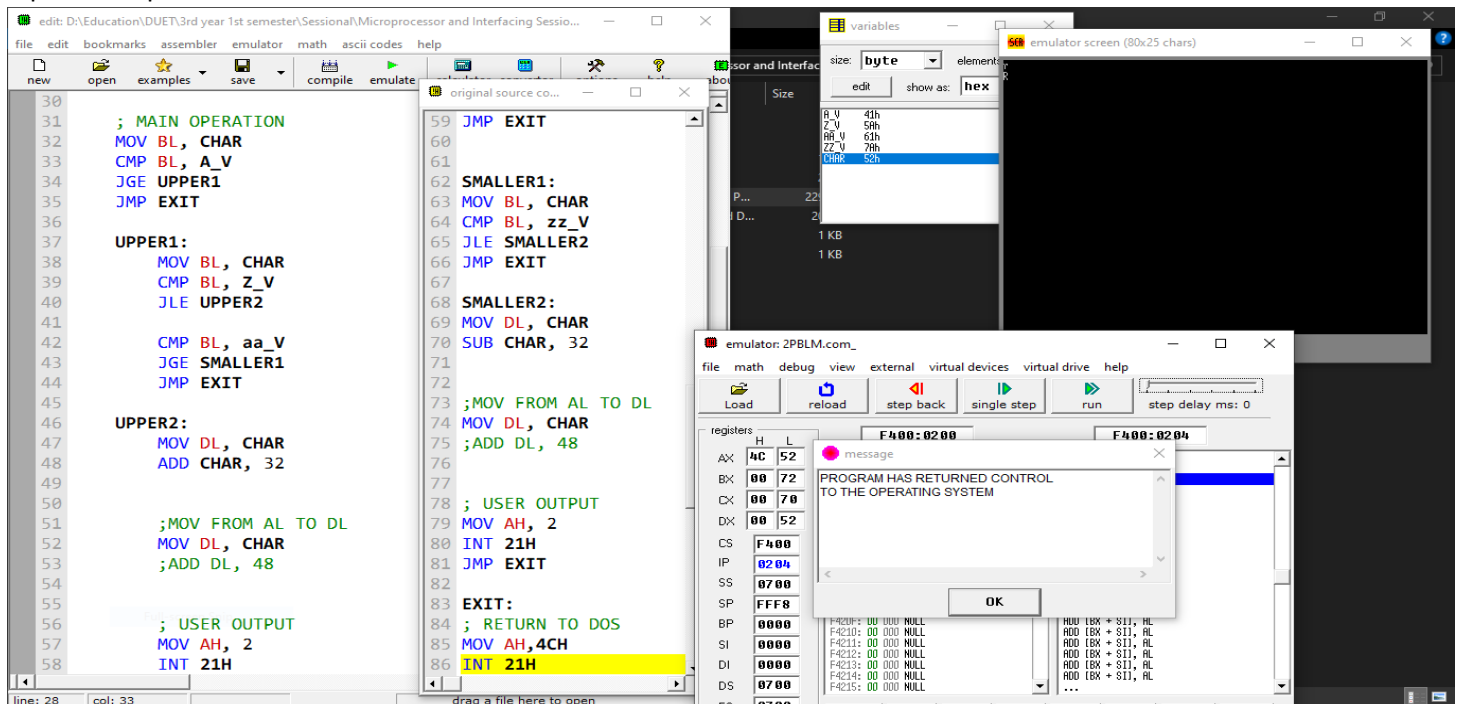
Sample Input / Output:

Input: G Output: g



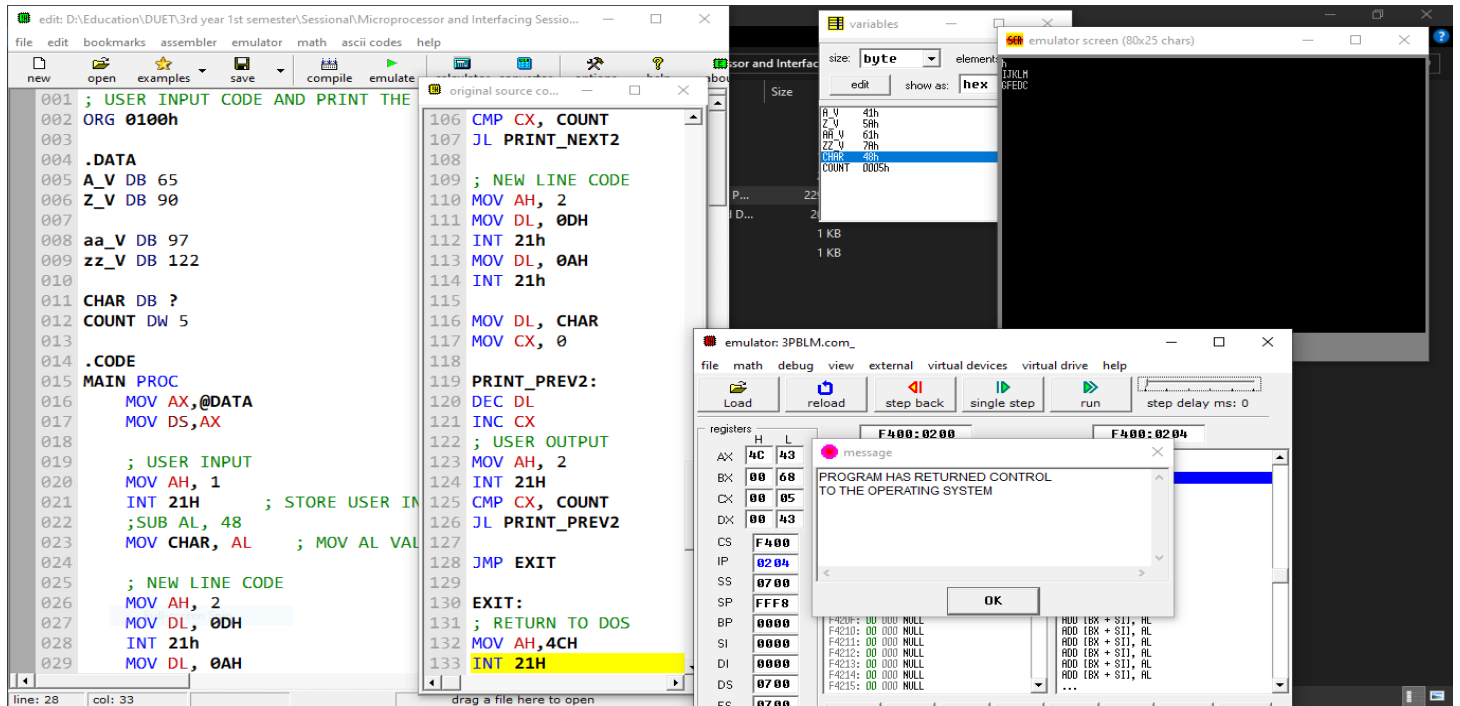
Sample Input / Output:

Input: r Output: R



3)

Input: h
Output: IJKLM
GFEDC



Input: G
Output: hijkl
fedcb

