Practical: 9

Aim: Write an Assembly Language Program for 8-bit multiplication & 16-bit division in 8086.

Theory:

The program starts at memory address 100h, which is common for many simple DOS-based assembly programs.

Loading Values into Registers:
The program moves the values 5 and 10 into the registers AL and BL, respectively.

Multiplication:
Multiply AL by BL , result in AL and AH

Division:
Divide AL by BL (3), result in AL and AH

Printing the Result in Binary Format:
The next section of the program prints the binary representation of the value in BL. The loop is executed 8 times to print each bit (since it's an 8-bit value).

Loop Setup:
The register CX is loaded with the value 8 to represent the 8 bits.

assembly

Test and Print Each Bit:
The program uses the TEST instruction to check the most significant bit of BL. If the bit is set, the program prints '1'; otherwise, it prints '0'.

Printing Binary Suffix:
After printing the binary digits, the program appends the character 'b' to indicate that the output is in binary format.

Waiting for Key Press:
The program halts its execution and waits for the user to press any key. This ensures that the result remains visible until a key is pressed.

Return:
Finally, the program terminates by returning control to the operating system.

Algorithm Steps:

1. Start the program execution.
2. Initialize the program's starting point:
    - Set the code origin to memory location 100h.

3. Load values into registers:
    - Load the value 2 into the AL register.
    - Load the value 3 into the BL register.
4. Perform multiplication:
    - Multiply the value in AL (which is 2) to the value in BL (which is 3).
    - The result of 2 * 3 (which is 6) is stored in AL.
5. Perform Division:
    - Divide 6 by the value in BL (which is 3).
    - The result of 6/3 (which is 2) is stored in AL.
6. Set up loop for printing binary output:
    - Initialize the CX register with the value 8 to represent the number of bits (since BL is 8-bit).
7. Loop to print each bit:
    - For each bit in BL:
        - Set the default print character to '0'.
        - Test the most significant bit (MSB) of BL.
        - If the MSB is set, change the character to '1'.
        - Print the character ('0' or '1').
        - Shift BL left by 1 to check the next bit.
        - Repeat for all 8 bits.
8. Print the binary suffix:
    - Print the character 'b' to indicate binary output.
9. Wait for user input:
    - Wait for any key press to ensure the result stays visible until the user presses a key.
10. Terminate the program:
    - Return control to the operating system.

Flowchart:

Conclusion: Hence, we have implemented an Assembly language program for addition in 8086.