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Experiment 12 : Write X86/64 ALP to perform basicarithmetic operation using simulator .

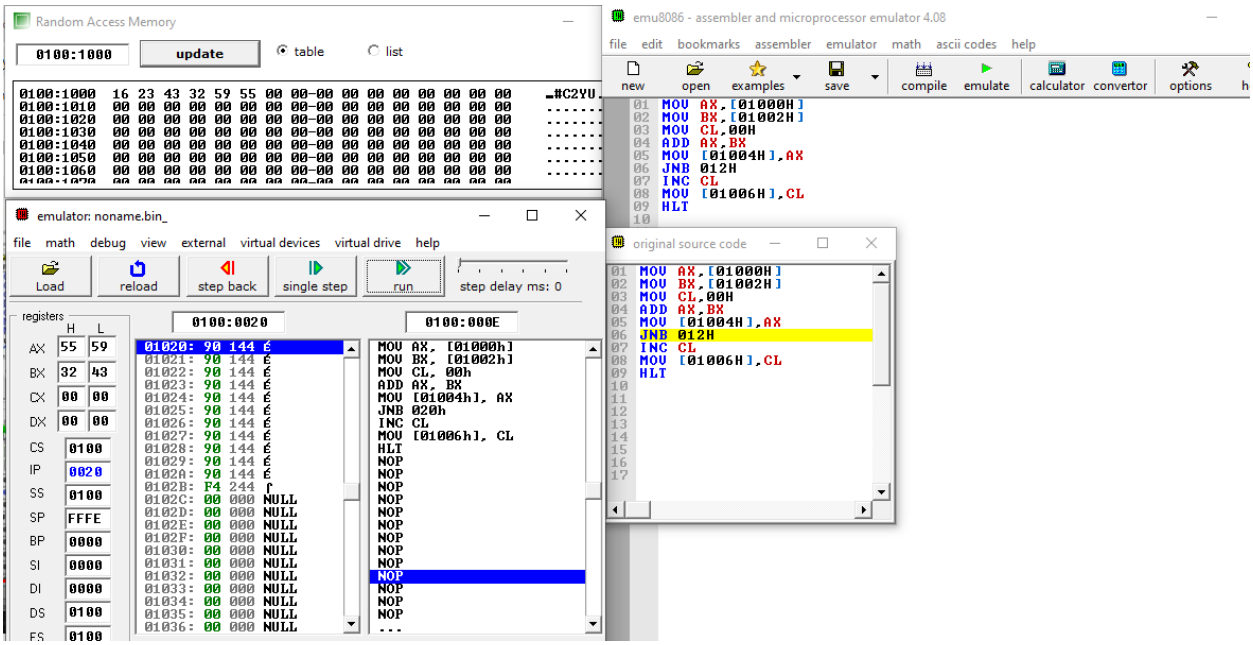
A] 16-Bit Addition

Algorithm :

1. Load the first data in AX register.
2. Load the second data in BX register.
3. Clear CL register.
4. Add the two data and get the sum in AX register.
5. Store the sum in memory.
6. Check for carry . If carry flag is set then go to next step , otherwise go to step 8.
7. Increment CL register.
8. Store the carry in memory.

9. Stop .

Snap shots



Explanation :

1. **MOV** is used to load and store data.
2. **ADD** is used to add two numbers where their one number is in accumulator or not.
3. **JMP** is able to transfer control both forward and backward
4. **INC** is used to increment an register by 1.
5. **HLT** is used to stop the program.
6. **AX** is an accumulator which is used to load and store the data.
7. **BX** is a general purpose register ,It is used for storing second number .

B] 16-Bit Subtraction.

Algorithm :

1. Load the first data in AX register.

2. Load the second data in BX register .

3. Clear CL register .

4. Subtract the two data and get the difference AX register .

5. Check for carry . If carry flag is set then go to next step , otherwise go to step 8 .

6. Increment CL register by one .

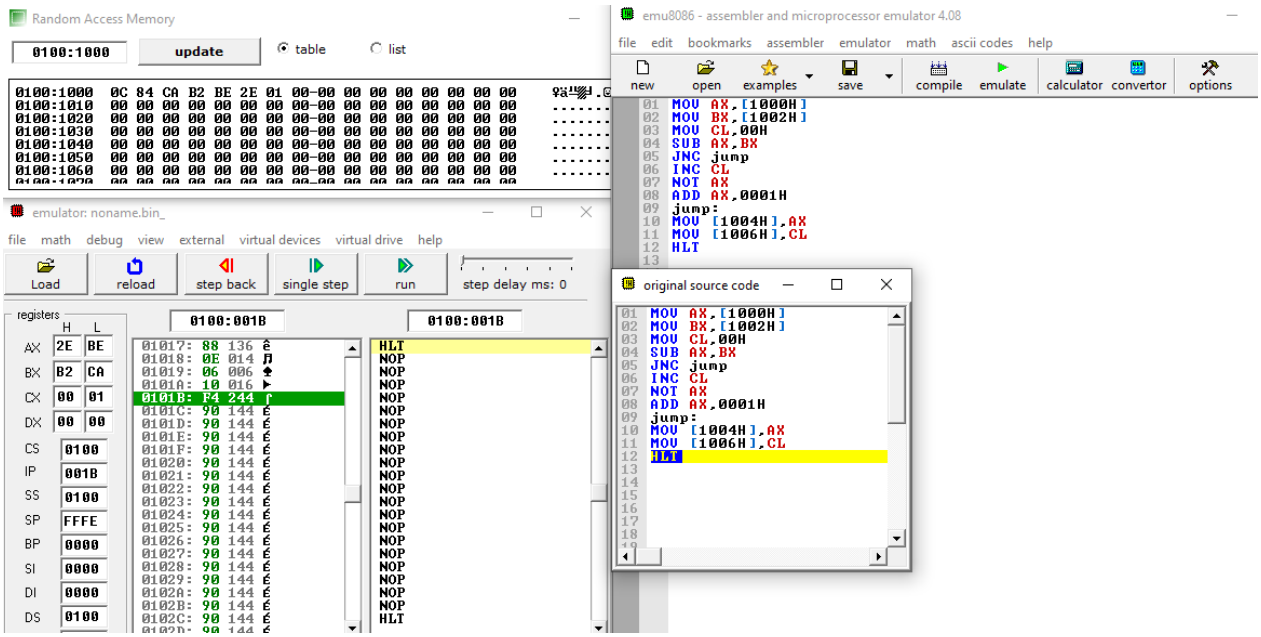
7. Take 2’s complement of the difference in AX register(Complement+1)

8. Store the magnitude of difference in memory .

9. Store the sign bit in memory .

10. Stop .

Snap shots



Explanation –

1. **MOV** is used to load and store data.
2. **SUB** is used to subtract two numbers where their one number is in accumulator or not.
3. **JNC** is a 2-bit command which is used to check whether the borrow is generated from accumulator or not.
4. **INC** is used to increment an register by 1.
5. **HLT** is used to stop the program.
6. **AX** is an accumulator which is used to load and store the data.
7. **BX,** is general purpose register . BX is used for storing second number .

Conclusion : 16-bit addition and 16-bit subtraction is performed on 8086 emulator .