

Assignment No.4

Title = Multiplication of two digit Numbers.

Problem statement - Write x86/64 ALP to perform multiplication of two 8-bit hexadecimal numbers. Use the successive addition & add & shift method.

Objective :-

- To understand following multiplication technique in ALP.
 - i) successive addition.
 - ii) Add and Shift method.

Software packages & :- editor = gedit
h/w apparatus assembler = NASM
Debugger = gdb

Theory :-

- Successive addition method:-

Consider that a byte is present in AL register & second byte present in BL register

▷ we have to multiply the byte in AL with byte in BL.

▷ we will multiply the number using successive addition method.

- ▷ In successive addition method, one number is accepted & other number is taken as a counter. The first number is added with itself. till the counter decrements to zero.
- ▷ Result is stored in DX register. Display the result using display routine.

For e.g. $AL = 12H$, $BL = 10H$

$$\text{Result} = 12H + 12H + 12H + 12H + 12H + 12H + 12H + 12H + 12H + 12H = 0120H$$

- Add & shift method :

Consider that one byte is present in AL register & another byte is present in BL register. we will multiply the number using add & shift method.

In this method, you add number with itself & rotate the number each time & shift it by one bit to left along with carry. if carry is present then add the two numbers.

Initialize counter to 4 as we are scanning for 4 digits. Decrement counter each time when bits are added.

Flow - diagram

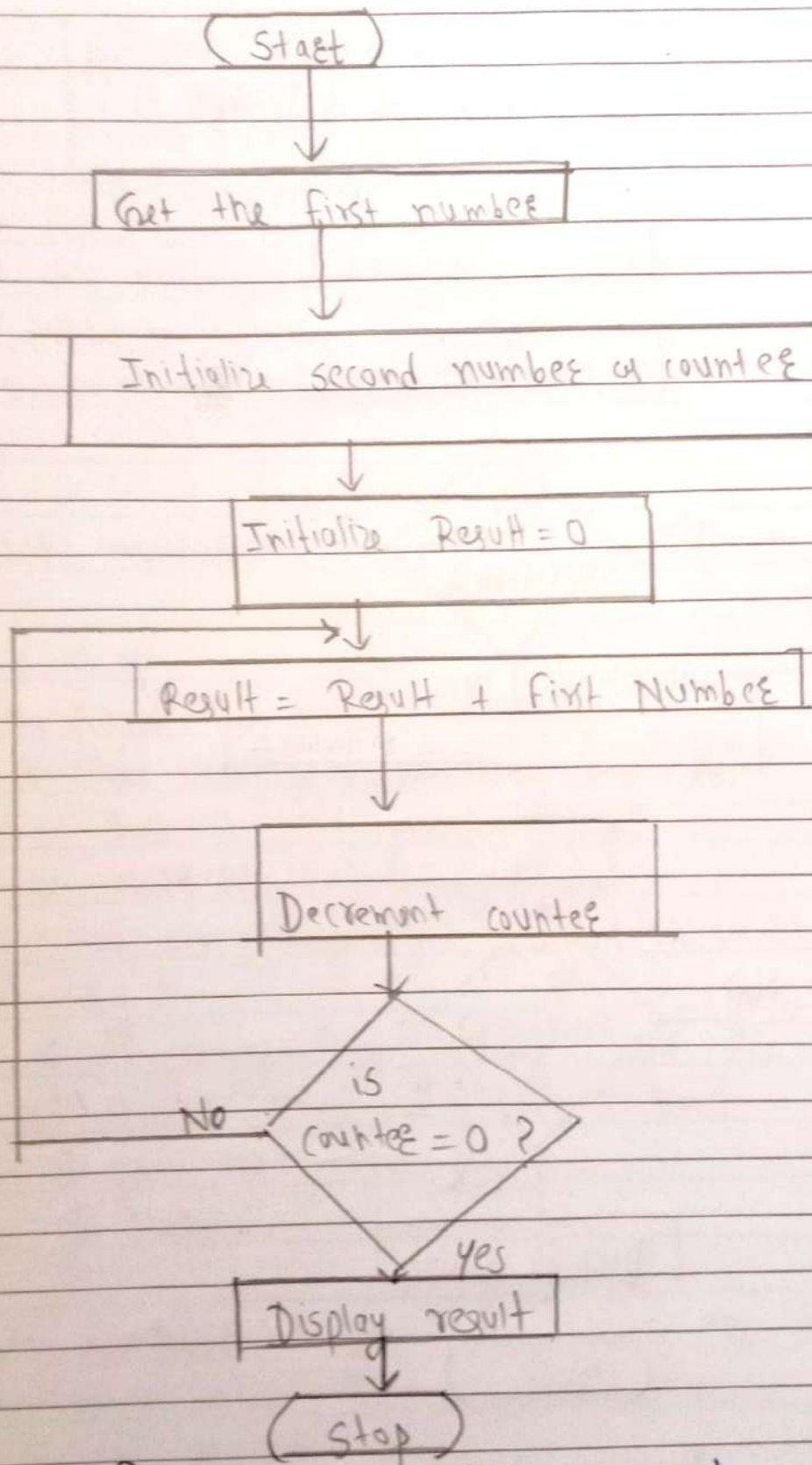


Fig. Successive addition method.

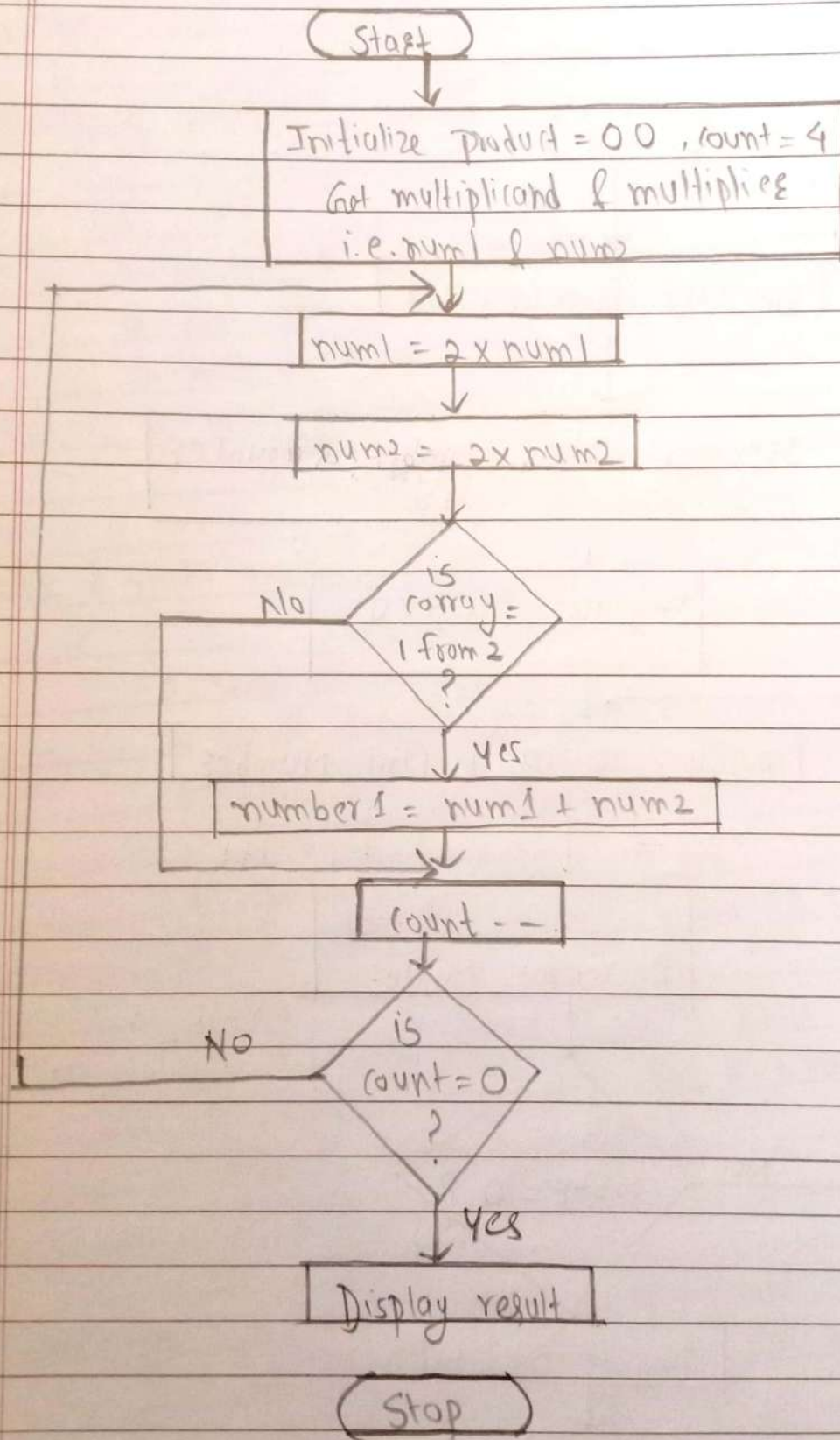


fig. add & shift method.

Algorithm :-

• Successive addition :-

1. Start
2. Accept 2-digit number
3. Set multiplicand value as counter value.
4. Add multiplier with itself
5. print the answer.

• Add & shift method :-

1. Start
2. Accept two 2-digit number.
3. store multiplier to BL & multiplicand to CL
Initialize Ax with 00
4. Shift BL to left by 1 bit
5. if carry flag is set, added CL to AL & shift AL to left by 1
6. if carry flag is reset, shift AL to left by 1-bit.
7. Repeat step 4 & 6 for 8-times.
8. print result from Ax
9. END.

Conclusion :- we have learn & implement the different multiplication techniques - successive addition & add & shift method.