Program 17: Find square of an 8-bit number.

Flowchart:

```
                    ( Start )
                        |
                        v
        +-------------------------------+
        |   Load H-L pair with the      |
        |   address of operand's        |
        |   memory location.            |
        +-------------------------------+
                        |
                        v
        +-------------------------------+
        |   Move the operand from       |
        |   memory to register B.       |
        +-------------------------------+
                        |
                        v
        +-------------------------------+
        |   Move the same operand from  |
        |   register B to register C.   |
        +-------------------------------+
                        |
                        v
        +-------------------------------+
        |   Initialize register A with 0.|
        +-------------------------------+
                        |
                        v
        +-------------------------------+
        |        Add B with A.          |
        +-------------------------------+
                        |
                        v
        +-------------------------------+
        |   Decrement register C.       |
        +-------------------------------+
                        |
                        v
                 /              \
           No   /     Is         \
        <------<       C = 0?      >
                 \               /
                  \             /
                       | Yes
                       v
        +-------------------------------+
        |   Increment H-L pair.         |
        +-------------------------------+
                        |
                        v
        +-------------------------------+
        |   Move the result from        |
        |   accumulator to memory.      |
        +-------------------------------+
                        |
                        v
                    ( Stop )
```
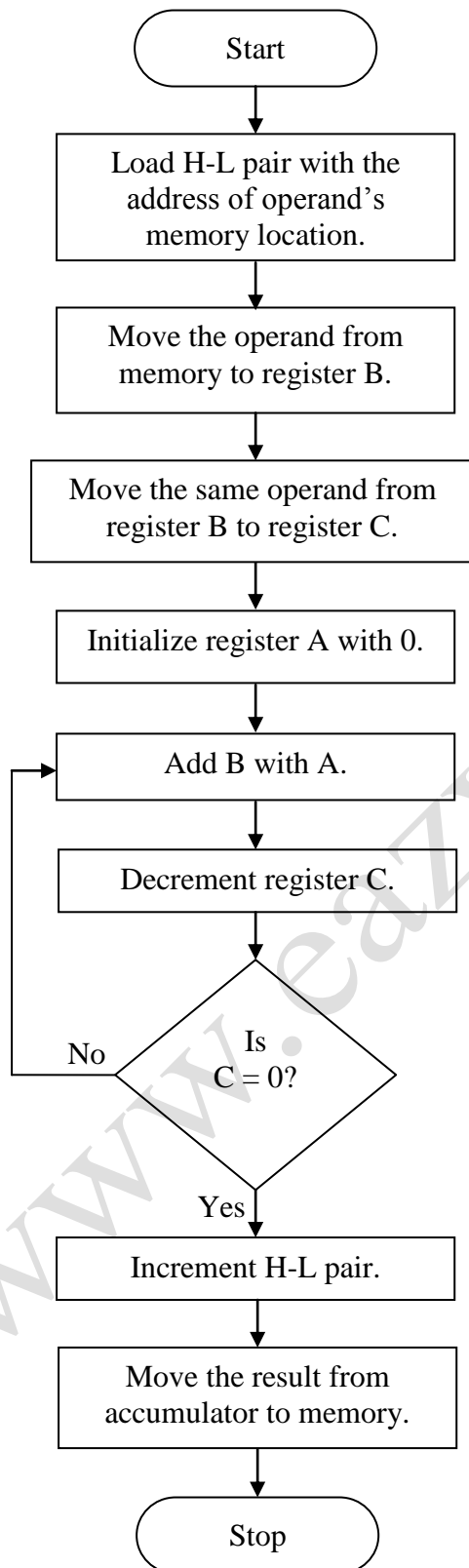
Program:

Address	Mnemonics	Operand	Opcode	Remarks
2000	LXI	H, 3000H	21	Load H-L pair with address 3000H.
2001			00	Lower-order of 3000H.
2002			30	Higher-order of 3000H.
2003	MOV	B, M	46	Move the operand from memory to reg. B.
2004	MOV	C, M	4E	Move the same number from reg. B to reg. C.
2005	MVI	A, 00H	3E	Initialize accumulator with 00H.
2006			00	Immediate value 00H.
2007	ADD	B	80	Add B with A.
2008	DCR	C	0D	Decrement reg. C (counter).
2009	JNZ	2007H	C2	Jump back to address 2007H if C $\neq$ 0.
200A			07	Lower-order of 2007H.
200B			20	Higher-order of 2007H.
200C	INX	H	23	Increment H-L pair.
200D	MOV	M, A	77	Move the result from accumulator to memory.
200E	HLT		76	Halt.

Explanation:

- This program finds the square of an 8-bit number stored in memory location 3000H.

- The square of a number is found by multiplying it by itself.

- Therefore, the number is added with itself and is also used as counter.

- Let us assume that the operands stored at memory location 3000H is 03H.

- Then, by using successive addition method, we get 03H + 03H + 03H = 09H.

- Initially, H-L pair is loaded with the address of the operand.

- The operand is moved to register B from memory location 3000H and then it is copied to register C.

- Accumulator is initialized to 00H.

- Register B is added with accumulator and the result is stored in accumulator.

- Register C (counter) is decremented by 1.

- Then, counter is checked for zero. If it hasn't become zero yet, then register B is again added with accumulator, and counter is again checked for zero.

- If counter becomes zero, then H-L pair is incremented and the result is moved from accumulator to memory location 3001H.

Output:

Before Execution:

3000H: 03H

After Execution:

3001H: 09H