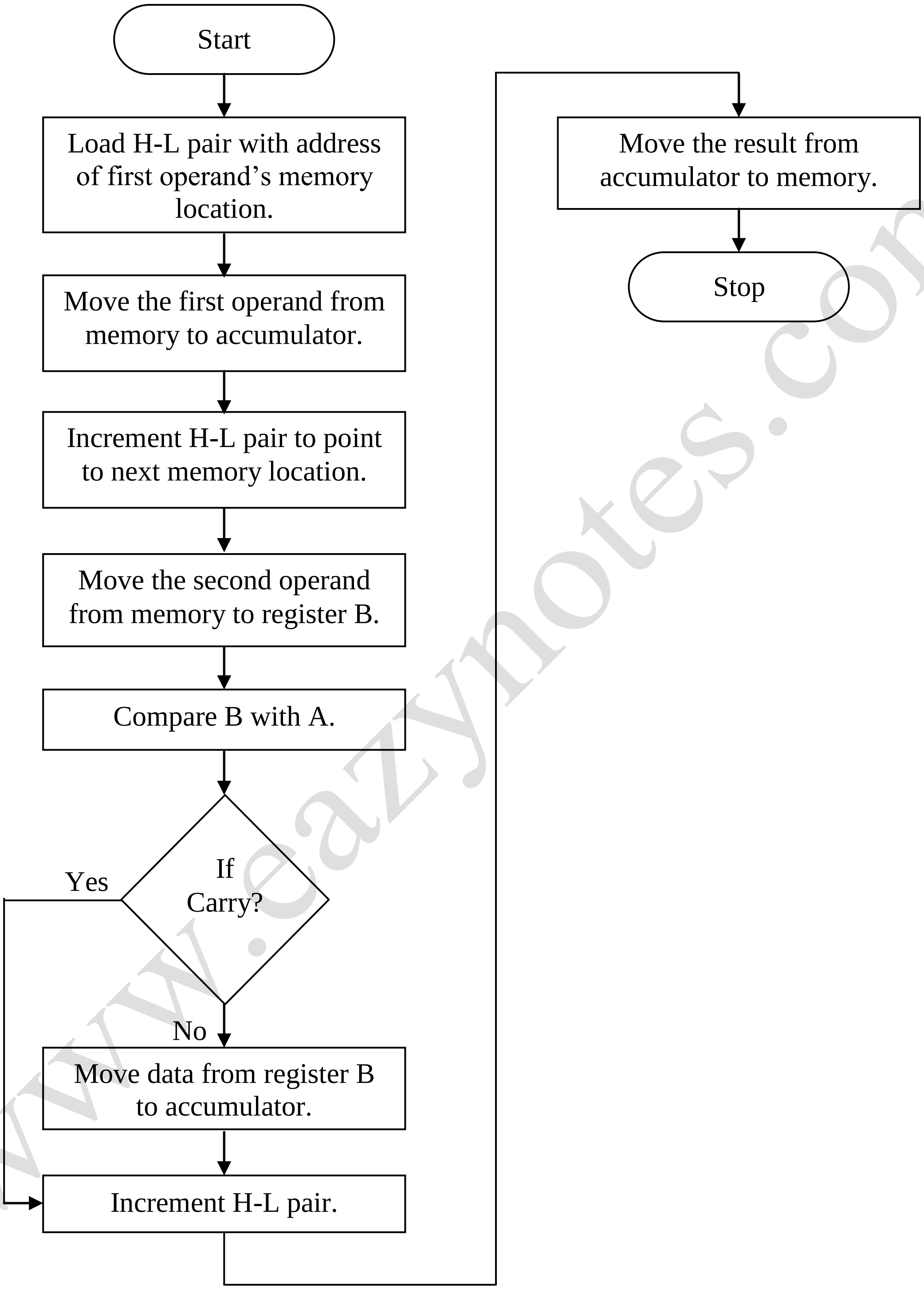
Program 19: Smallest of two 8-bit numbers.

Flowchart:


Start
Load H-L pair with address of first operand's memory location.
Move the first operand from memory to accumulator.
Increment H-L pair to point to next memory location.
Move the second operand from memory to register B.
Compare B with A.
If Carry?
Yes
No
Move data from register B to accumulator.
Increment H-L pair.
Move the result from accumulator to memory.
Stop

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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	A, M	7E	Move the 1st operand from memory to reg. A.
2004	INX	H	23	Increment H-L pair.
2005	MOV	B, M	46	Move the 2nd operand from memory to reg. B.
2006	CMP	B	B8	Compare B with A.
2007	JC	200BH	DA	Jump to address 200BH if there is no carry.
2008			0B	Lower-order of 200BH.
2009			20	Higher-order of 200BH.
200A	MOV	A, B	78	Move smallest from reg. B to reg. A.
200B	INX	H	23	Increment H-L pair.
200C	MOV	M, A	77	Move the result from reg. A to memory.
200D	HLT		76	Halt.

Explanation:

- This program compares two operands to find the smallest out of them.
- After comparison, the smallest of two must be in accumulator. If it is already in accumulator, then it is moved to memory.
- If it is not in accumulator, then first it is moved to accumulator and then from there, it is moved to memory.
- Let us assume that the operands stored at memory location 3000H is 25H and 3001H is 15H.
- Initially, H-L pair is loaded with the address of first memory location.
- The first operand is moved to accumulator from memory location 3000H and H-L pair is incremented to point to next memory location.
- The second operand is moved to register B from memory location 3001H.
- The two operands are compared.
- After comparison, if A > B, then CF = 0, and if A < B, then CF = 1.
- Carry flag is checked for carry. If there is no carry, it means B is smaller than A and it is moved to accumulator.
- At last, H-L pair is incremented and the smallest number is moved from accumulator to memory location 3002H.

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Output:

Before Execution:

```
3000H:      25H
3001H:      15H
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After Execution:

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3002H:      15H
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