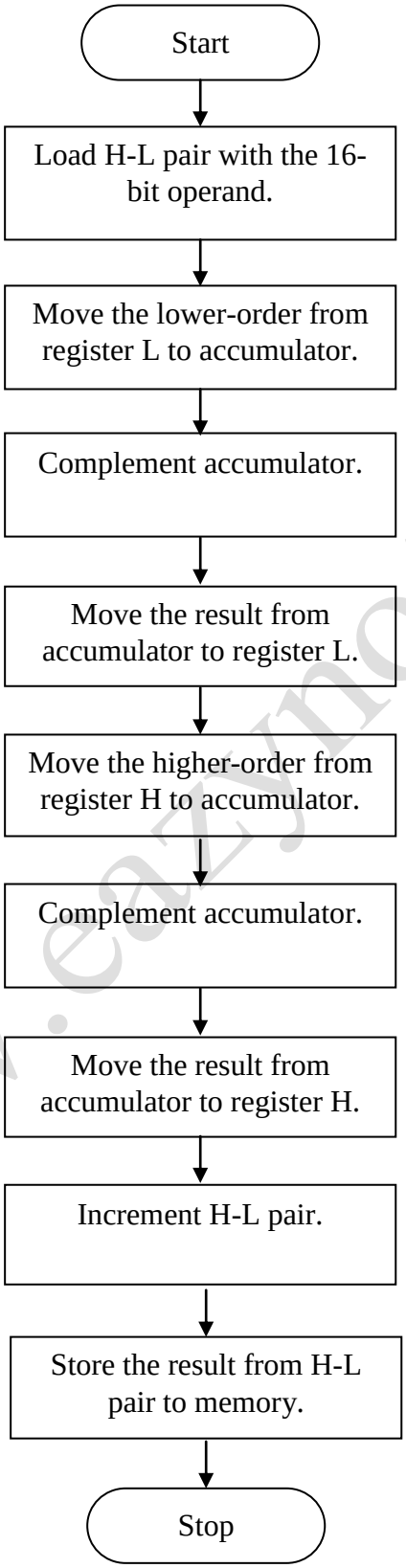
Program 4: 2's complement of 16-bit number.

Flowchart:



Program:

Address	Mnemonics	Operand	Opcode	Remarks
2000	LHLD	3000H	2A	Load H-L pair with operand from 3000H.
2001			00	Lower-order of 3000H.
2002			30	Higher-order of 3000H.
2003	MOV	A, L	7D	Move the lower-order from reg. L to reg. A.
2004	CMA		2F	Complement accumulator.
2005	MOV	L, A	6F	Move the result from reg. A to reg. L.
2006	MOV	A, H	7C	Move the higher-order from reg. H to reg. A.
2007	CMA		2F	Complement accumulator.
2008	MOV	H, A	67	Move the result from reg. A to reg. H.
2009	INX	H	23	Increment H-L pair to find 2's complement.
200A	SHLD	3002H	22	Store the result at address 3002H.
200B			02	Lower-order of 3002H.
200C			30	Higher-order of 3002H.
200D	HLT		76	Halt.

Explanation:

- This program finds the 2's complement of 16-bit number stored in memory locations 3000H-3001H.
- There is no direct way to find 2's complement of 16-bit number. Therefore, this can be accomplished by finding the 1's complement of two 8-bit numbers and then incrementing it to get 2's complement.
- Let us assume that the operand stored at memory locations 3000H-3001H is 12H-05H.
- The operand is loaded into H-L pair from memory locations 3000H-3001H.
- The lower-order is moved from register L to accumulator.
- Its complement is found by using CMA instruction.
- The result obtained is moved back to register L.
- Then, the higher-order is moved from register H to accumulator.
- Its complement is found by using CMA instruction.
- The result obtained is moved back to register H.
- H-L pair is incremented to get 2's complement.
- Now, the final result is in H-L pair.
- The result is stored from H-L pair to memory locations 3002H-3003H.

Output:

Before Execution:		**After Execution:**	
3000H:	12H	3002H:	EEH
3001H:	05H	3003H:	FAH