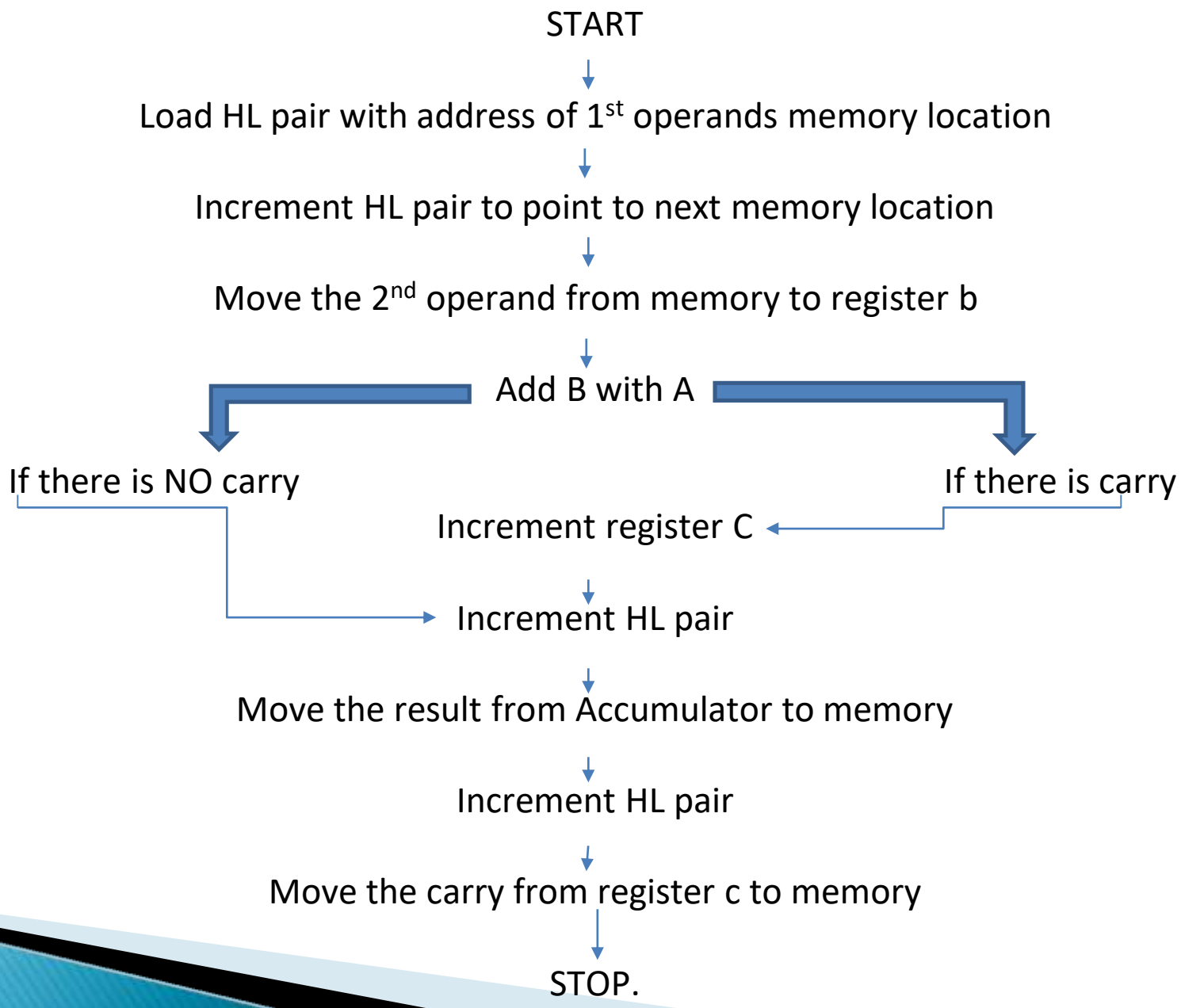
Object:- Addition of two 8 bit number stored in 2000H and 2001H without carry and store the result in memory sequence.

Mnemonics	Comments
LXI H,2000H	Initialization HL pair
MOV A,M	Store the data in accumulator from memory location indicated by HL pair register
INX H	Increment the HL register pair value by one
ADD M	Adding data of memory with accumulator and store the result in accumulator
INX H	Increment the HL register pair value by one
MOV M,A	Store the result from the accumulator to the memory at memory location represented by HL register pair
HLT	End program

OBJECT- WRITE AN ALP TO ADD TWO 8 BIT NUMBERS WITH CARRY?

FLOWCHART AND ALGORITHM



PROGRAM

ADDRESS(H)	MNEMONICS	OPERAND	OPCODE	COMMENTS
2000	LXI	H,3000H	21	LOAD HL PAIR WITH 3000H
2001			00	
2002			30	
2003	MOV	A,M	7E	MOVE 1st OPERAND FROM M TO Reg. A
2004	INX	H	23	INCREMENT HL PAIR
2005	MOV	B,M	46	MOVE 2nd OPERAND FROM M TO Reg. B
2006	MVI	C, 00H	0E	INITIALIZE Reg. C WITH 00H
2007			00	

2008	ADD	B	80	ADD B WITH A
2009	JNC	200D	D2	JUMP TO 200DH IF THERE IS NO CARRY
200A			0D	
200B			20	
200C	INR	C	0C	INCREAMENT REG.C
200D	INX	H	23	INCREAMENT H-L PAIR
200E	MOV	M,A	77	MOVE THE RESULT FROM REG.A TO MEMORY
200F	INX	H	23	INCREAMENT H-L PAIR
2010	MOV	M,C	71	MOVE THE RESULT FROM REG.C TO MEMORY
2011	HLT		76	HALT

RESULT

BEFORE EXECUTION:

Memory Location	Data
3000H	FA H
3001H	28 H

AFTER EXECUTION:

Memory Location	Data
3002H	22 H
3003H	01 H

PRORAM EXPLANATION

1. This program adds two operands stored in memory location 3000H and 3001H, along with considering the carry produced (if any).
2. Let us assume that the operands stored at memory location 3000H is FAH and 3001H is 28H.
3. Initially, HL pair is loaded with the address of first memory location.
4. The first operand is moved to accumulator from memory location 3000H and H-L pair is incremented to point to next memory location.
5. The second operand is moved to register 8 from memory location3001H
6. Register C is initialized to 00H. It stores the carry (if any).
7. The two operands stored in register A and B are added and the result is stored in the accumulator.
8. Then, carry flag is checked for carry If there is a carry, C register is incremented.
9. H-L pair is incremented and the result is moved from the accumulator to memory 3002H.
10. H-L pair is again incremented and carry (either 0 or 1) is moved from register C to memory location 3003H.

OBJECT:

Write an ALP to add two 8 bit BCD Number Stored from Memory location 2000H onwards and store the BCD result in memory in sequence

PROGRAM:

MNEMONICS	COMMENTS
LXI H,2001H	Load to 2001H coded in HL register pair
LXI D,2000H	Load 2000H coded in DE paiir
LDAX D	Load DE data in Accumulator
ADD M	Add Memory data with Accumulator
DAA	Decimal Object Accumulator
STA 2002H	Store in 2000H data from Accumulator
HLT	Stop the Microprocessor

Object: Write an ALP to add two 16 bit no. present in memory from location 2000H onwards and store 17 bit result in memory in sequence.

PROGRAM :

MNEMONICS	COMMENTS
LHLD 2000H	Load HL pair from memory location 2000H.
XCHG	Exchange the data of HL & DE .
LHLD 2002H	Load HL pair from memory location 2002H.
DAD D	Double addition with DE.
SHLD 2004H	Store HL pair data at memory location2004H.
MVI A,00H	Move 00H data to accumulator
ADC A	Add accumulator with carry.
STA 2006H	Store accumulator data in memory location2006H.
HLT	Stop program.

OBJECT:

Write an ALP to subtract 8bit data present in memory location 2001H from memory location 2000H and store the result in memory location 2002H.

MNEMONICS	COMMENTS
LXI H,2000H	Load immediate data into register pair HL
MOV A,M	Move memory data into register A
INX H	Increment in HL pair data (memory location)
SUB M	Subtract memory data
INXH	Increment in HL pair data (memory location)
MOV M,A	Move register A data into memory
HLT	Stop the program

OBJECT:

Write an ALP to perform substraction of two 8bit BCD numbers (X-Y) present in memory location 2000H and 2001H and store the BCD result in memory location 2002H

MNEMONICS	COMMENTS
LXI H,2001H	Load immediate data into register pair HL
MVI A,99H	Move immediate data into register
SUB M	Subtract memory data from Accumulator data
ADI 01H	Add memory data into accumulator
DAA	Decimal adjust Accumulator
DCX H	Decrease reg. Pair HL by 1
ADD M	Add M data with Accumulator data
DAA	Decimal adjust Accumulator
INX H	Increase reg. pair HL by 1
INX H	Increase reg. pair HL by 1
MOV M,A	Copy Accumulator data into memory
HLT	Ends the programme

OBJECT:

Write an ALP to subtract two 16bit numbers present in memory from location 2000H and 2100H onwards and store the result in memory location 2100H and 2101H

MNEMONICS	COMMENTS
LXI H,2100H	2100 is loaded to register pair HL
LXI B,2000H	2000H is loaded to register pair BC
LDAX B	Load A with register B data
SUB M	Subtract M data with Accumulator
MOV M,A	Move A data to M
INX H	Increase HL pair
INX B	Increase BC pair
LDAX B	Load A with register B data
SBB M	Subtract M data to A
MOV M,A	Move A data to M
HLT	

OBJECT:

Write an ALP to perform subtraction (X-Y) using 2's compliment method where X and Y are two 16 bit number present in memory from 2000H onwards and store the result in memory in sequence.

MNEMONICS	COMMENTS
LHLD 2002H	Load data in HL pair from 2002H and 2003H
MOV A,L	Move data L to A
CMA	Complement Accumulator data
MOV L,A	Move data of Acc. to L
MOV A,H	Move data of reg. H to Acc.
CMA	Complement Acc. data
MOV H,A	Move data of Acc to reg. H
INX H	Increase HL pair
XCHG	Exchange HL into DE
LHLD 2000H	Load data in HL pair from 2000H and 2001H
DAD D	Double addition reg. pair DE
SHLD 2004H	Store data in HL pair from 2004H and 2005 H
HLT	Ends the programme

Object:-Ten data bytes are stored from 2000H onwards write an ALP to add these numbers and store the result at the end of the block.

Program:-

MEMORY ADDRESS	MNEMONICS	OPCODE	COMMENT
2500H	LXI H,2000H	21 H	Memory initialization (load immediate Data into register pair HL
2501H		00 H	
2502H		20 H	
2503H	MVI C,0AH	0E H	Move immediate data into register C
2504H		0A H	
2505H	MVI A,00H	3E H	Move immediate data into accumulator
2506H		00	

MEMORY ADDRESS	MNEMONICS	OPCODE	COMMENT
2607H	MVI B,00H	06 H	Move immediate data into register B
2508H		00 H	
2509H : L2	ADD M	86 H	Add data of memory with accumulator data
250AH	JNC L1	25 H	Jump on carry
250BH		0E H	
250CH		25 H	
250DH	INR B	04 H	Increment register B data by 1
250EH : L1	INX H	23 H	Increment register pair HL data by 1
250FH	DCR C	0D H	Decrement register C data by 1
2510H	JNZ L2	C2 H	Jump on no zero
2511H		09 H	
2512H		25 H	
2513H	MOV M,A	77 H	Move accumulator data to memory
2514H	INX H	23 H	Increment HL pair data by 1
2515H	MOV M,B	70 H	Move register B data by 1
2516H	HLT	76 H	Stop the program

DATA :

MEMORY LOCATIONS	DATA
2000H	00 H
2001H	01 H
2002H	02 H
2003H	03 H
2004H	04 H
2005H	05 H
2006H	06 H
2007H	07 H
2008H	08 H
2009H	09 H
200AH	2D H
200BH	00 H

RESULT : ----------[

Object-10 data byte are store on 2000H onwards.Write an ALP by using DAD instruction to add these numbers and store the result at the end of the block.

Mnemonics	Comments
LXI H,2000 H	Load immediate data into register pair HL
LXI D,0000 H	Load immediate data into register pair DE
MVI B,00 H	Move immediate data into register B
MVI A,0A H	Move immediate data into register A
L1: MOV C,M	Move memory data into register C
XCHG	Exchange
DAD B	Register pair B,C add with H,L pair and store in HL pair
XCHG	Exchange
INX H	Increment HL pair
DCR A	Decrement A data by 1
JNZ L1	Jump on non zero to given address data
MOV M,E	Move register E data in memory
INX H	Increment HL pair
MOV M,D	Move register D data in memory
HLT	Stop the program.