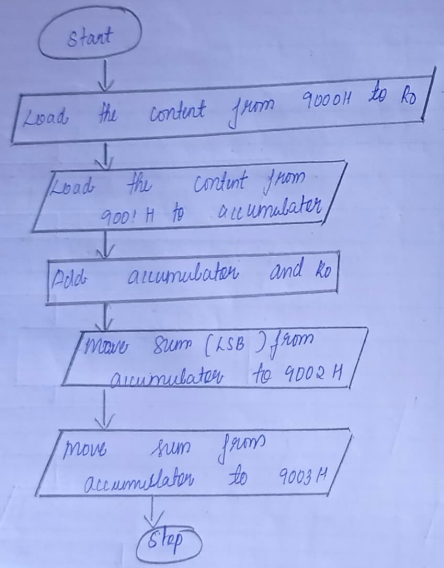
Problem specification

(9000H) + (9001H) ⟶ (9002H)(9003H)
MSB LSB

Flow chart



Observation:

Input data

9000H = FE

9001H = 02

output data

9002H = 00

9003H = 01

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ARITHMETIC OPERATIONS

Addition of two 8 bit numbers

Aim:

To add two data bytes stores at 9000H and 9001H. Store result in 9002H and 9003H.

PROGRAM:

memory location	Hex code	Label	Instructions	Comments
8000	C3		CLRC	clears carry flag
8001	90 : 90 : 00		MOV DPTR, #9000	Initializ DPTR with 9000H
8004	E0		MOVX A, @ DPTR	Data from memory to accumulater
8005	F8		MOV R0, A	move data Accumulater to R0.
8006	A3		INC DPTR	Increment DPTR
8007	E0		MOVX A, @ DPTR	Data from memory to accumulater.
8008	38		ADDC A, R0	Add accumulater content, R0 and carry.
8009	A3		INC DPTR	Increment DPTR
800A	F0		MOVX @DPTR, A	move data accumulater to memory.
800B	74 : 00		MOV A, #00	move 00 to accumulater
800D	34 : 00		ADDC A, #00	Add carry, accumulater content and 00H
800F	A3		INC DPTR	Increment DPTR
8010	F0		MOVX @DPTR, A	move data Accumulater to memory
8011	02 : 80 : 11	HERE	LJMP HERE	End the program.

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RESULT

Input data:

9000H = FE

9001H = 02

Output data

9002H = 00

9003H = 01

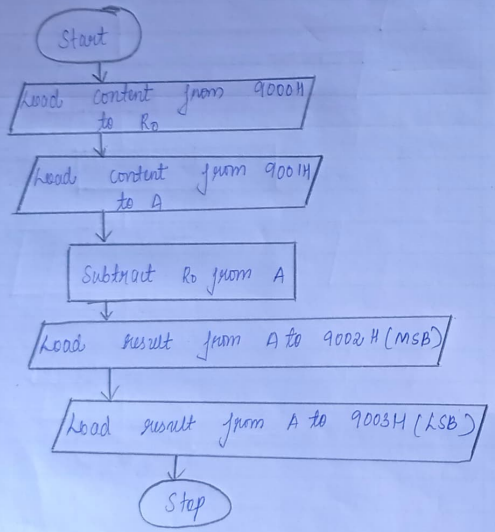
Added two data bytes stored at (9000H) and (9001H) and stored result (9002H) and (9003H).

Problem specification

(9001H) − (9000H) ⟶ (9002H)(9003H)

MSB LSB

Flow chart



observation

Input data

9000H = FE

9001H = 02

output data

9002H = 04

9003H = 01

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Subtraction of two 8 bit numbers

AIM:

To subtract two data bytes stored at 9000H store result in 9002H and 9003H.

PROGRAM:

memory location	Hex code	Label	Instruction	comments
8000	C3		CLR C	clear carry flag
8001	90:90:00		MOV DPTR, #9000	initalize DPTR with 9000H
800 4	E0		MOVX A, @ DPTR	Data from memory to accumulator.
8005	F8		MOV R0, A	move data accumulator to R0
8006	A3		INC DPTR	Increment DPTR
8007	E0		MOVX A, @ DPTR	Data from memory to accumulater
8008	98		SUBB A, R0	subtract value in R0 from value in accumulator.
8009	A3		INC DPTR	Increment DPTR
800A	F0		MOVX @ DPTR, A	move data accumulater to memory.
800B	74:00		MOV A, #00	move 00 to Accumulator
800 D	34:00		ADDC A, # 00	Add carry, accumulater content and 00H
800F	A3		INC DPTR	Increment DPTR
8010	F0		MOVX @ DPTR, A	move data accumulator to memory
8011	02 : 80:11	HERE	LJMP HERE	End the program

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RESULT:

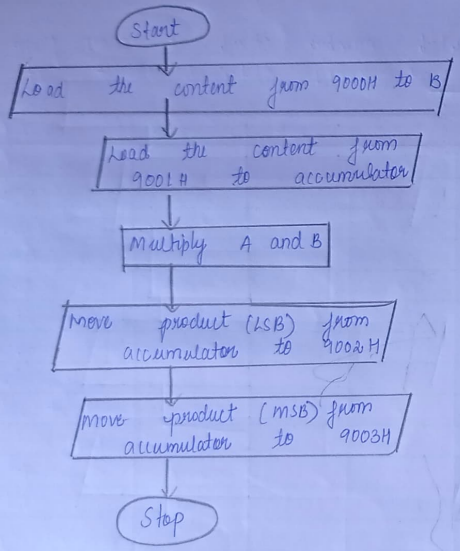
Input data	Output data
9000H = FE	9002H = 04
9001H = 02	9003H = 01

Subtracted number stored at 9000H from number stored at 9001H. Obtained result at 9002H and 9003H.

Problem specification

(9000H) x (9001H) → (9003H)(9002H)

Flow chart



Observation

Input data		Output data	
9000H	= FF	9002H	= 01
9001H	= FF	9003H	= FE

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C. Multiplication of two 8 bit numbers.

AIM:

To multiply two data bytes stored at 9000H and 9001H. Store the result at 9002H and 9003H.

Program

Memory location	Hex code	Label	Instructions	Comments
8000	C3		CLR C	clear carry flag
8001	90:90:00		MOV DPTR, #9000	Initialize DPTR with 9000H
8004	E0		MOVX A, @DPTR	Data from memory to accumulator
8005	F5:F0		MOV F0, A	move data Accumulator to B
8007	A3		INC DPTR	Increment DPTR
8008	E0		MOVX A, @DPTR	Data from memory to A accumulator
8009	98		MUL AB	multiply A and B
800A	A3		INC DPTR	Increment DPTR
800B	F0		MOVX @DPTR, A	move data Accumulator to memory
800C	A3		INC DPTR	Increment DPTR
800D	E5:F0		MOV A, F0	Move B to A
800F	F0		MOVX @DPTR, A	Move content Accumulator to memory
8010	02:80:10	HERE	LJMP HERE	End the program

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RESULT:

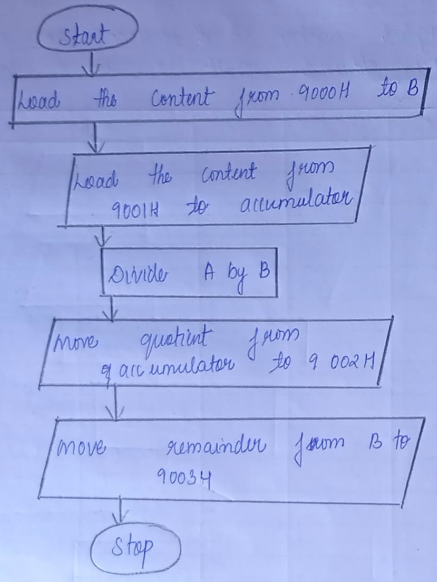
Input data	Output data
9000 H = FF	9002H = 01 (LSB)
9001H = FF	9003H = FE (MSB)

Multiplied number stored at 9000H and number stored at 9001H. obtained result at 9002H and 9003H

Problem specification

(9000H) / (9001H) → (9002H) (quotient) (9002H) (remainder)

Flow chart



Observation

Input data

9000H = 07 (divisor)

9001H = 0A (dividend)

Output data

9002H = 01 (quotient)

9003H = 03 (remainder)

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D. Division of two 8 bit numbers

Aim:

To divide two data bytes stored at 9000H and 9001H. Store the result at 9002H and 9003H.

Memory location	Hex code	Label	Instruction	Comments
8000	C3		CLR C	Clear carry flag
8001	90:90:00		MOV DPTR, #9000	Initialize DPTR with 9000H
8004	E0		MOVX A, @ DPTR	Data from memory to Accumulator
8005	F5:F0		MOV F0, A	Move data Accumulator to B.
8007	A3		INC DPTR	Increment DPTR
8008	E0		MOVX A, @ DPTR	Data from memory to Accumulator.
8009	84		DIV AB	Divide A by B
800A	A3		INC DPTR	Increment DPTR
800B	F0		MOVX @ DPTR, A	Move data Accumulator to memory
800C	A3		INC DPTR	Increment DPTR
800D	E5:F0		MOV A, F0	Move B to A
800F	F0		MOVX @ DPTR, A	Move content Accumulator to memory
8010	02:80:10	HERE	LJMP HERE	End the program

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RESULT:

Divided two data bytes stored at 9000H and 9001H. Stored quotient at 9002H and remainder at 9003H.

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