

EXPONENTIATION

(i) Aim : To find the square of a number stored at 8100H and store the result , msb byte in 8101H and LSB byte in 8102H .

PROGRAM:

Memory	Label	Instruction	Comment
8000	90:81:00	MOV DPTR, #8100	initialize DPTR with 8100H .
8003	E0	MOVX A, @DPTR	Move content from DPTR to Accumulator.
8004	F5: F0	MOV F0, A	Move content from accumulator to B register.
8006	A4	MUL AB	Multiply the content of Acc. and reg.B.
8007	A3	INC DPTR	Increment DPTR (8101H)
8008	A3	INC DPTR	Increment DPTR (8102H)
8009	FD	MOVX @DPTR, A	Move content from Acc. to DPTR.
800A	E5: F0	MOV A, F0	Move content from reg. B to Accumulator.
800C	90:81:01	MOV DPTR, #8101	Load DPTR with 8101H .
800F	F0	MOVX @DPTR, A	Move content from Acc. to DPTR
8010	80: FE	SJMP 8010	Jump to 8010 to end the program

Problem specification

$$(8100H)^2 = \underset{MSB}{(8101H)} \underset{LSB}{(8102H)}$$

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RESULT:

• Input location :

$$8100H = 79H$$

$$8100$$

output :

$$8101H = 39H$$

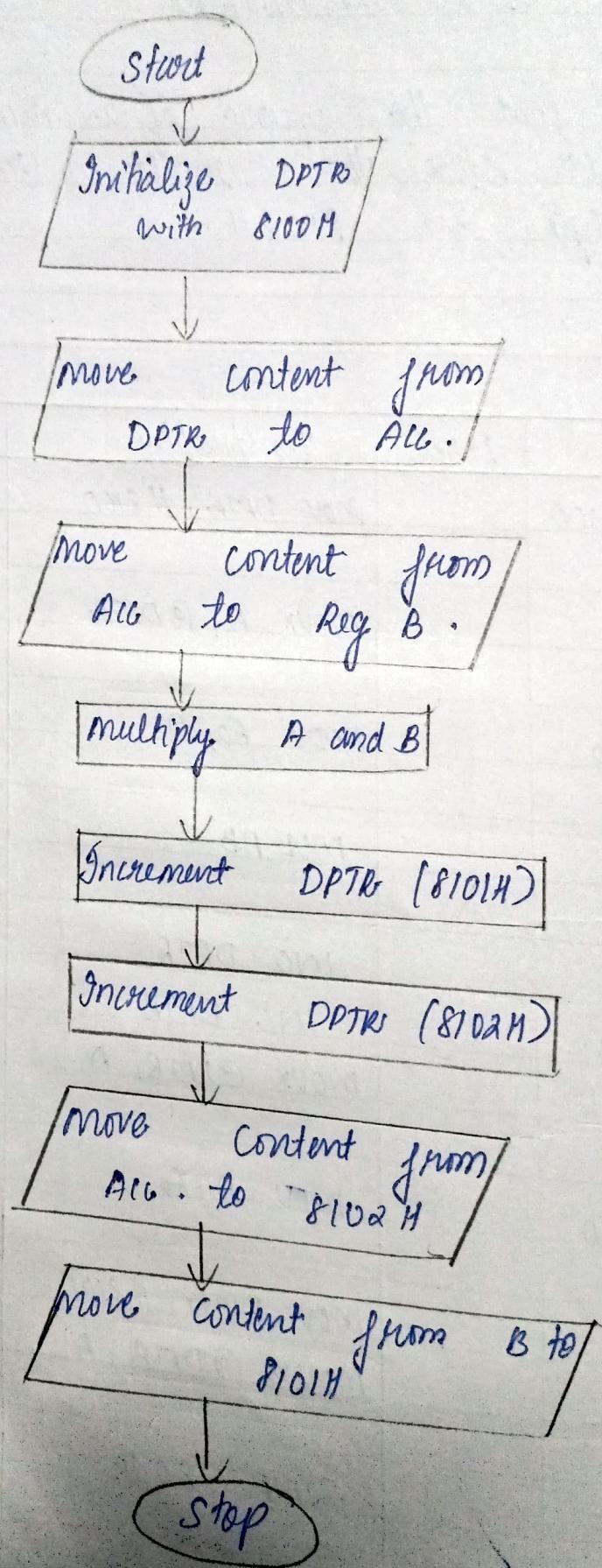
$$8102H = 31H$$

$$8100H = 4AH$$

$$8101H = 15H$$

$$8102H = 6AH$$

Flowchart



(ii) AIM : To find the cube of a number stored at 8100H.
 Store the result, MSB byte in 8101H, middle byte in 8102H
 and LS8 byte in 8103H.

Memory		Label	Instruction	Comment
8000	C3		CLRC	clearing carry.
8001	90:81:00		MOV DPTR, # 8100H	Initialize DPTR with 8100H.
8004	E0		MOVX A, @DPTR,	move content from DPTR to Acc.
8005	F8		MOV R0,A	Copy to R0 from Acc.
8006	F5:F0		MOV F0,A	Copy to Reg.B from Acc.
8008	A4		MUL AB	multiply Acc. and Reg.B
8009	A9:F0		MOV R1, F0	move content from Reg.B to R1.
800B	88:F0		MOV F0,R0	move content from Reg.R0 to Reg.B.
800D	A4		MUL AB	multiply Acc. and Reg.B.
800E	90:81:03		MOV DPTR, # 8103H	Load DPTR with 8103H.
8011	F0		MOVX @DPTR, A	move content from Acc. to DPTR
8012	A4:F0		MOV R2,F0	move content from Reg.B to R2.
8014	E9		MOV A,R1	move content from R1 to Acc.
8015	88:F0		MOV F0,R0	move content from R2 to Reg.B.

Problem specification:

$$(8100H)^3 = (8101H) \underset{MSB}{(8102H)} \underset{MB}{(8103H)} \underset{LSB}{(8104H)}$$

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8017	A4	MUL AB	
8018	2A	ADD A, R2	Multiply Acc and Reg B Add the content of Acc. and R2 and store the result to in Acc.
8019	15: 82	DEC 82	Decrement DPL
801B	F0	MOV X @ DPTR, D	move content from Acc. to DPTR
801C	15: 62	DEC 82	Decrement DPL
801F	E5: F0	MOV A, F0	move content from Reg B to Acc.
8020	34: 00	ADD C A, # 00	Add the Content of Acc. without and carry
8022	F0	MOVX @DPTR, A	move content from Acc to DPTR
8023	80: FE	HERE SJMP 8023	Jump to 8023 to end the program

RESULT:

Input location :

8100H = 79H

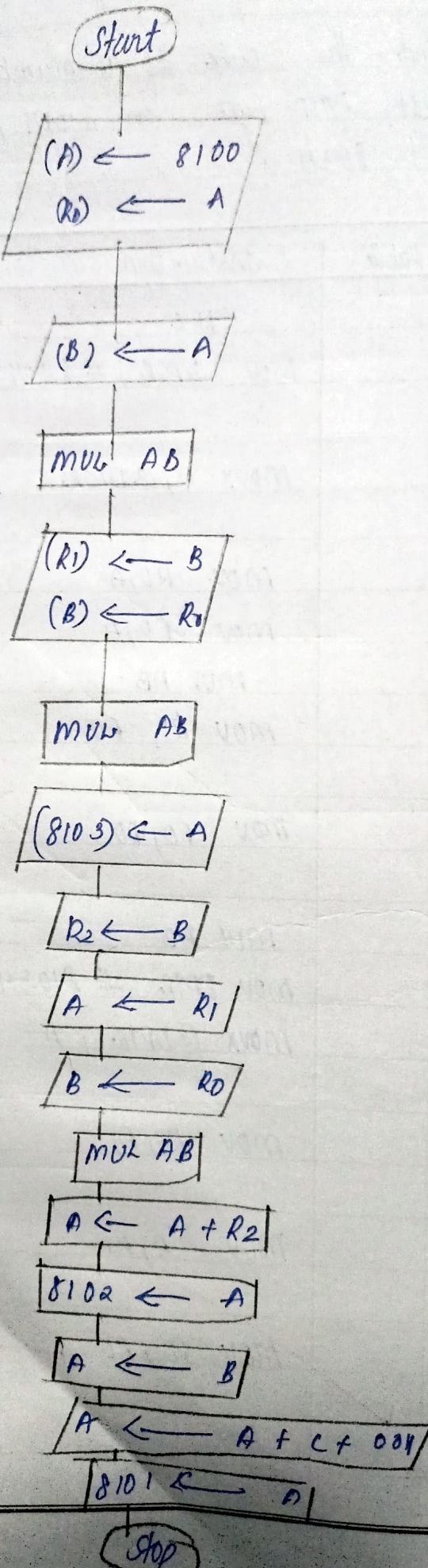
Output :

8101H = 1BH

8102H = 08H

8103H = 29H

Flowchart



(ii) To find the square root of a number stored at 8100H.
 Store the result at 8101H, if it is a perfect number. If not store FF in 8101H, it indicate error message.

Memory	Label	Instruction	Comments
8000	90:81:00	MOV DPTR, #8100	Initialise DPTR with 8100H
8003	E0	MOVX A, @DPTR	Move content from DPTR to Acc.
8004	F9:01	MOV R1, #01	Load R1 with 01H.
8006	FA:00	MOV R2, #00	Load R2 with 00H
8008	99	LOOP SUBB A, R1	Subtract R1 from Acc.
8009	0A	INC R2	Increment R2.
800A	60:06	JZ DONE (8012)	Jump to 8012 if Acc. is zero.
800C	A0:09	JG NOTE (8017)	Jump to 8017 if carry bit is set.
800E	09	INC R1	Increment R1
800F	09	INC R1	Increment R1.
8010	80:F6	SJMP LOOP (8008)	Jump to 8008.
8012	CA	DONE MOV A, R2	Copy to Acc. from R2
8013	A3	INC DPTR	Increment DPTR
8014	F0	MOVX @DPTR, A	Move content from Acc. to DPTR.
8015	80:04	SJMP HERE	Jump to 801B
8017	F4:FF	NOTE MOV A, #FF	Load Acc with FFH
8019	A3	INC DPTR	Increment DPTR (8012n)

Problem specification

$$\sqrt{8100\pi} = (8101\pi)$$

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801A	F0	MOVX @DPTR, A	Move Content from A16 · to DPTR (8102H)
801B	80·FE	HERE SJMP HERE (801B)	Jump to 801B to end the program.

RESULT:

Input

$$8100H = 09H$$

$$8100H = 05H$$

Output

$$8101H = 03H$$

$$8101H = FFH$$

(20%)

~~DATA~~
~~REG~~

Flow chart

