

CUBE OF A NUMBER USING 8051

Exp No.: 13

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AIM:

To write an assembly language program to calculate the cube of an 8-bit number using an 8051 microcontroller.

PROGRAM – 1: CUBE OF A NUMBER:

ALGORITHM:

1. Begin.
2. Initialize R0 with 00h.
3. Move the value in R1 to A.
4. Move the value in R1 to B.
5. Multiply A and B.
6. Move the value in R1 to B.
7. Multiply A and B.
8. Move B to R4 (MSB of cube) and A to R5 (LSB of cube)
9. End.

PROGRAM	COMMENTS
MOV R0, #00	R0 has address of 0x00
MOV A, R1	Transferring 8-bit number to reg A
MOV B, R1	Transferring 8-bit number to reg B
MUL AB	BA = A x B
	Since it is 8-bit B = 0x00
MOV B, R1	Transfer 8-bit value to B
MUL AB	BA = A x B
MOV R5, A	Moving lower byte to R5
MOV R4, B	Moving higher byte to R4
HALT:	
SJMP HALT	Halt the program with a loop.

SAMPLE I/O SNAPSHOT:

EdSim51DI - Version 2.1.21

System Clock (MHz) 12.0 Update Freq. 1

SBUF

R/O	W/O	TH0	TL0	R7	0x00	B	0x02
0x00	0x00	0x00	0x00	R6	0x00	ACC	0x00
RxD	TxD	TMOD	0x00	R5	0x00	PSW	0x04
1	1	TCOD	0x00	R4	0x02	IP	0x00
SCON	0x00	TCOD	0x00	R3	0x00	IE	0x00
				R2	0x00	PCON	0x00
pins	bits	TH1	TL1	R1	0x08	DPH	0x00
0xFF	0xFF	P3	0x00	0x00	R0	0x00	DPL
0xFF	0xFF	P2					SP
0xFF	0xFF	P1					
0xFF	0xFF	P0					

PC 8051

Modify RAM

Data Memory

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	00	08	00	00	02	00	00	00	00	00	00	00	00	00	00
10	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
30	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
40	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
50	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
60	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

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RST Step Run New Load Save Copy Paste

Time: 37us - Instructions: 18

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;8051 ALP TO FIND CUBE OF AN 8
0000| MOV    R0, #00    ;R0 has ac
0002| MOV    A, R1      ;Transfer
0003| MOV    B, R1      ;Transfer
0005| MUL    AB          ;BA = A x
                        ;Since it
0006| MOV    B, R1      ;Transfer
0008| MUL    AB          ;BA = A x
0009| MOV    R5, A      ;Moving Ls
000A| MOV    R4, B      ;Moving Ms

HALT:
000C| SJMP   HALT

```

P0.7 1 Display-select Decoder CS|DAC WR
P0.6 1 Keypad Column 2
P0.5 1 Keypad Column 1
P0.4 1 Keypad Column 0
P0.3 1 Keypad Row 3
P0.2 1 Keypad Row 2
P0.1 1 Keypad Row 1
P0.0 1 Keypad Row 0
P1.7 1 LED 7|Seg. dp|DAC DB7|LCD DB7
P1.6 1 LED 6|Seg. g|DAC DB6|LCD DB6
P1.5 1 LED 5|Seg. f|DAC DB5|LCD DB5
P1.4 1 LED 4|Seg. e|DAC DB4|LCD DB4
P1.3 1 LED 3|... d|..DB3|..DB3|.. RS
P1.2 1 LED 2|... c|..DB2|..DB2|LCD E
P1.1 1 LED 1|Seg. b|DAC DB1|LCD DB1
P1.0 1 LED 0|Seg. a|DAC DB0|LCD DB0
P2.7 1 SW 7|ADC DB7
P2.6 1 SW 6|ADC DB6
P2.5 1 SW 5|ADC DB5
P2.4 1 SW 4|ADC DB4
P2.3 1 SW 3|ADC DB3
P2.2 1 SW 2|ADC DB2
P2.1 1 SW 1|ADC DB1
P2.0 1 SW 0|ADC DB0
P3.7 1 ADC RD|Comparator Output
P3.6 1 ADC WR
P3.5 1 Motor Sensor
P3.4 1 Display-select Input 1
P3.3 1 AND Gate Output|Display-se..t 0
P3.2 1 ADC INTR
P3.1 1 Motor Control Bit 1|Ext. UART Rx
P3.0 1 Motor Control Bit 0|Ext. UART Tx

DI / LD

1 2 3 AND Gate Disabl...
4 5 6 Key Bounce Disabl...
7 8 9 Standard
* 0 #

U Odd Parity 8-bit UART @ 4800 Baud
Rx Rx Reset
Tx Tx Send

0.0 V output
Scope
DAC

BF 0 AC 0x00 IR 0x00 DR 0x00

0.0 V input
11111111
ADC

MAX
MIN
Motor Enabled

RESULT:

An assembly level program was written to calculate the cube of a given 8-bit number using an 8051 microcontroller and the output was verified.