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**EXP 6**

**Aim:** Write an ALP of addition using 8051 microcontroller.

**Apparatus required:** 8051 microcontroller kit

**Algorithm:**

Addition:

Step 1 :Move 1H data to memory

Step 2 :Add 1H data with 2nd data

Step 3 :Initialize data pointer.

Step 4 :Move result to memory pointed by DPTR.

**Code:**

MOVR0,#20H ;set source address 20H to R0

MOVR1,#30H ;set destination address 30H to R1

MOVA,@R0 ; take the value from source to register A

MOVR5,A ; Move the value from A to R5

MOVR4,#00H ; Clear register R4 to store carry

INCR0 ; Point to the next location

MOVA,@R0 ; take the value from source to register A

ADDA,R5 ;Add R5 with A and store to register A

JNC SAVE

INCR4 ; Increment R4 to get carry

MOVB,R4 ;Get carry to register B

MOV@R1,B ; Store the carry first

INCR1 ; Increase R1 to point to the next address

SAVE: MOV@R1,A ;Store the result

HALT: SJMP HALT ;Stop the program

**Result:** Addition using 8051 microcontroller was successfully performed.

**EXP 7**

**Aim:** Write an ALP of subtraction using 8051 microcontroller.

**Apparatus required:** 8051 microcontroller kit

**Algorithm:**

Addition:

Step 1 :Move 1H data to memory

Step 2 :Subtract 1H data with 2nd data

Step 3 :Initialize data pointer.

Step 4 :Move result to memory pointed by DPTR.

**Code:**

MOVR0,#20H ;set source address 20H to R0

MOV1,#30H ;set destination address 30H to R1

MOVA,@R0 ;take the value from source to register A

MOVR5,A ; Move the value from A to R5

MOVR4,#00H ; Clear register R4 to store borrow

INCR0 ; Point to the next location

MOVA,@R0 ; take the value from source to register A

MOVR3,A ; store second byte

MOVA,R5 ;get back the first operand

SUBBA,R3 ; Subtract R3 from A

JNCSAVE

INCR4 ; Increment R4 to get borrow

MOVB,R4 ;Get borrow to register B

MOV@R1,B ; Store the borrow first

INCR1 ; Increase R1 to point to the next address

SAVE: MOV@R1,A ; Store the result

HALT: SJMP HALT ;Stop the program

**Result:** Subtraction using 8051 microcontroller was successfully performed.

**EXP 8**

**Aim:** Write an ALP of Multiplication using 8051 microcontroller.

**Apparatus required:** 8051 microcontroller kit

**Algorithm:**

Multiplication

Step 1 :Get 1H data and 2nd data to memory

Step 2 :Multiply 1H data with 2nd data

Step 3 :Initialize data pointer.

Step 4 :Move result to memory pointed by DPTR (first port)

Step 5 :Increment DPTR

Step 6 :Move 2nd part of result to register A

Step 7 :Move result to 2nd memory location pointer by DPTR

**Code:**

MOVR0,#20H ;set source address 20H to R0

MOV1,#30H ;set destination address 30H to R1

MOVA,@R0 ;take the value from source to register A

MOVR5,A ; Move the value from A to R5

MOVR4,#00H ; Clear register R4 to store borrow

INCR0 ; Point to the next location

MOVA,@R0 ; take the value from source to register A

MOVR3,A ; store second byte

MOVA,R5 ;get back the first operand

SUBBA,R3 ; Subtract R3 from A

JNCSAVE

INCR4 ; Increment R4 to get borrow

MOVB,R4 ;Get borrow to register B

MOV@R1,B ; Store the borrow first

INCR1 ; Increase R1 to point to the next address

SAVE: MOV@R1,A ; Store the result

HALT: SJMP HALT ;Stop the program

**Result:** Multiplication / Division using 8051 microcontroller was successfully performed.

**EXP 9**

**Aim:** Write an ALP of Division using 8051 microcontroller.

**Apparatus required:** 8051 microcontroller kit

**Algorithm:**

Division

Step 1 :Get 1H data and 2nddata to memory

Step 2 :Multiply or divide 1H data with 2nd data

Step 3 :Initialize data pointer.

Step 4 :Move result to memory pointed by DPTR (first port)

Step 5 :Increment DPTR

Step 6 :Move 2nd part of result to register A

Step 7 :Move result to 2nd memory location pointer by DPTR

**Code:**

MOV R0, #20H ;set source address 20H to R0

MOV R1, #30H ;set destination address 30H to R1

MOV A, @R0 ;take the first operand from source to register A

INC R0 ; Point to the next location

MOV B, @R0 ; take the second operand from source to register B

DIV AB ; Divide A by B

MOV @R1, A ; Store Quotient to 30H

INC R1 ; Increase R1 to point to the next location

MOV @R1, B ; Store Remainder to 31H

HALT: SJMP HALT ;Stop the program

**Result:**Division using 8051 microcontroller was successfully performed.