Algorithm

The location of choice is moved to A. If it is 1, addition is performed; 2, subtraction is performed; 3, multiplication is performed; 4, division is performed; else, program stops. For addition, 1st number is in R5 & 2nd number is in A. If there is a carry, it is stored 1st. Then the result is stored. For subtraction, 1st number is in A & 2nd number is in R5. If there is a carry, it is stored first. Then the result is stored. For multiplication, 1st number is in A & 2nd number is in B. After multiplication, higher byte is stored 1st, followed by lower byte. For division, 1st number is in A & 2nd number is in B. After division, quotient is stored 1st, followed by the remainder.

Input

040
01

020
FF

021
FF

Output

030
01

031
FE

Experiment Name / No.: 17. CALCULATOR

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Date 10 / 03 / 2020

Aim

To develop a calculator to perform basic arithmetic operations.

Program

```
        ORG 00H
        MOV R0,#40H; choice
        MOV A,@R0; copy R0 to A
        CJNE A,#01H,L1; compare with 01H
        JMP ADD1; jump to ADD1
L1:     CJNE A,#02H,L2; compare with 02H
        JMP SUBT; jump to SUBT
L2:     CJNE A,#03H,L3; compare with 03H
        JMP MULT; jump to MULT
L3:     CJNE A,#04H,HALT; compare with 04H
        JMP DIV1; jump to DIV1
ADD1:   MOV R0,#20H; source
        MOV R1,#30H; destination
        MOV A,@R0; copy R0 to A
        MOV R5,A; copy A to R5
        MOV R4,#00H; set R4 to 00H
        INC R0
        MOV A,@R0; copy R0 to A
        ADD A,R5; add A & R5
        JNC SAVE1; jump if no carry
        INC R4
        MOV B,R4; copy carry to B
        MOV @R1,B; copy B to R1
        INC R1
SAVE1:  MOV @R1,A; copy A to R1
HALT1:  SJMP HALT1
SUBT:   MOV R0,#20H; source
        MOV R1,#30H; destination
        MOV A,@R0; copy R0 to A
        MOV R5,A; copy A to R5
        MOV R4,#00H; set R4 to 00H
        INC R0
        MOV A,@R0; copy R0 to A
        MOV R3,A; copy A to R3
        MOV A,R5; copy R5 to A
        SUBB A,R3; subtract A & R3
        JNC SAVE2; jump if no carry
        INC R4
        MOV B,R4; copy R4 to B
        INC R4
        MOV @R1,B; copy B to R1
        INC R1
SAVE2:  MOV @R1,A; copy A to R1
HALT2:  SJMP HALT2
MULT:   MOV R0,#20H; source
        MOV R1,#30H; destination
        MOV A,@R0; copy R0 to A
        INC R0
        MOV B,@R0; copy R0 to B
        MUL AB; multiply A & B
        MOV @R1,B; copy B to R1
        INC R1
        MOV @R1,A; copy A to R1
HALT3:  SJMP HALT3
DIV1:   MOV R0,#20H; source
        MOV R1,#30H; destination
        MOV A,@R0; copy R0 to A
        INC R0
        MOV B,@R0; copy R0 to B
        DIV AB; divide A by B
        MOV @R1,A; copy quotient to R1
        INC R1
        MOV @R1,B; copy remainder to R1
HALT4:  SJMP HALT4
HALT:   SJMP HALT
```

Result

Developed a calculator to perform basic arithmetic operations.

Teacher's Signature: