Rotate right – Rotate left

From 2 inputs data (X & Y) comes from 2 input ports do the following operations

A= Rotate right (X).

B = Rotate left (Y).

Then out the results thought two output port to view through 2 seven segments

Code

2. **First Rotate right (A):**

```
LD E,02H
IN A,(00H)
LD B,A
AND 01H
LD D,A
LD A,B
```

- E: Divisor for Div subroutine
- B:Stores the initial number to be rotate
- D:Stores the LSB
- The input A will be input at gate (00h)
- Check the LSB by Anding with 01h

2.

```
CALL DIV
LD A,00H
ADD A,D
JP NZ,ONER
LD A,C
```

- Call DIV subroutine to divide by 2 to shift right
  - Then check D register
  If D=1:

```
ONER    LD A,C
        OR 80H
        JP CONR
```

- Oring the Shifted right number with 80h to complete rotate right

     If D=0:

then we have already the rotated right number.

second Rotate left (B):

```
LD E,02H
IN A,(10H)
LD B,A
AND 80H
LD D,A
LD A,B
ADD A,A
LD B,A
LD A,00H
ADD A,D
JP NZ,ONEL
LD A,B
```

- The input B will be input at gate (10h)
- Check the MSB by Anding with 80h
- Shift left by adding A+A
- Then store the shifted in reg B

- Then check D register
  If D=1:

```
ONEL   LD A,B
       OR 01H
       JP CONL
```

Oring the Shifted right number with 01h to complete rotate left

If D=0:

Then we have already the rotated left number.

3. to Output the BCD for both outputs we have 2 sub routines:

```
BCDR    LD E,0AH
        CALL DIV
        OUT (05H),A
        LD A,C
        CALL DIV
        OUT (04H),A
        LD A,C
        OUT (03H),A
        RET
BCDL    LD E,0AH
        CALL DIV
        OUT (15H),A
        LD A,C
        CALL DIV
        OUT (14H),A
        LD A,C
        OUT (13H),A
        RET
```

- To get the BCD we divide the resulted number by 10
- So we load 0Ah in the devisor E
- Then Call DIV subroutine

4. DIV subroutine

```
DIV     LD C,00H
LOOP    INC C
        SUB E
        JP C,MIN
        JP NZ,LOOP
END     RET
MIN     DEC C
        ADD A,E
        JP END
```

5. full code:

```
            LD E,02H
            IN A,(00H)
            LD B,A
            AND 01H
            LD D,A
            LD A,B
            CALL DIV
            LD A,00H
            ADD A,D
            JP NZ,ONER
            LD A,C
CONR    CALL BCDR
            LD E,02H
            IN A,(10H)
            LD B,A
            AND 80H
            LD D,A
            LD A,B
            ADD A,A
            LD B,A
            LD A,00H
```

```
              ADD A,D

              JP NZ,ONEL

              LD A,B

CONL    CALL BCDL

HALT     SUB E

              JP C,MIN

              JP NZ,LOOP


ONER    LD A,C

              OR 80H

              JP CONR

ONEL    LD A,B

              OR 01H

              JP CONL

DIV        LD C,00H

LOOP    INC C

END       RET

MIN       DEC C

              ADD A,E

              JP END
```
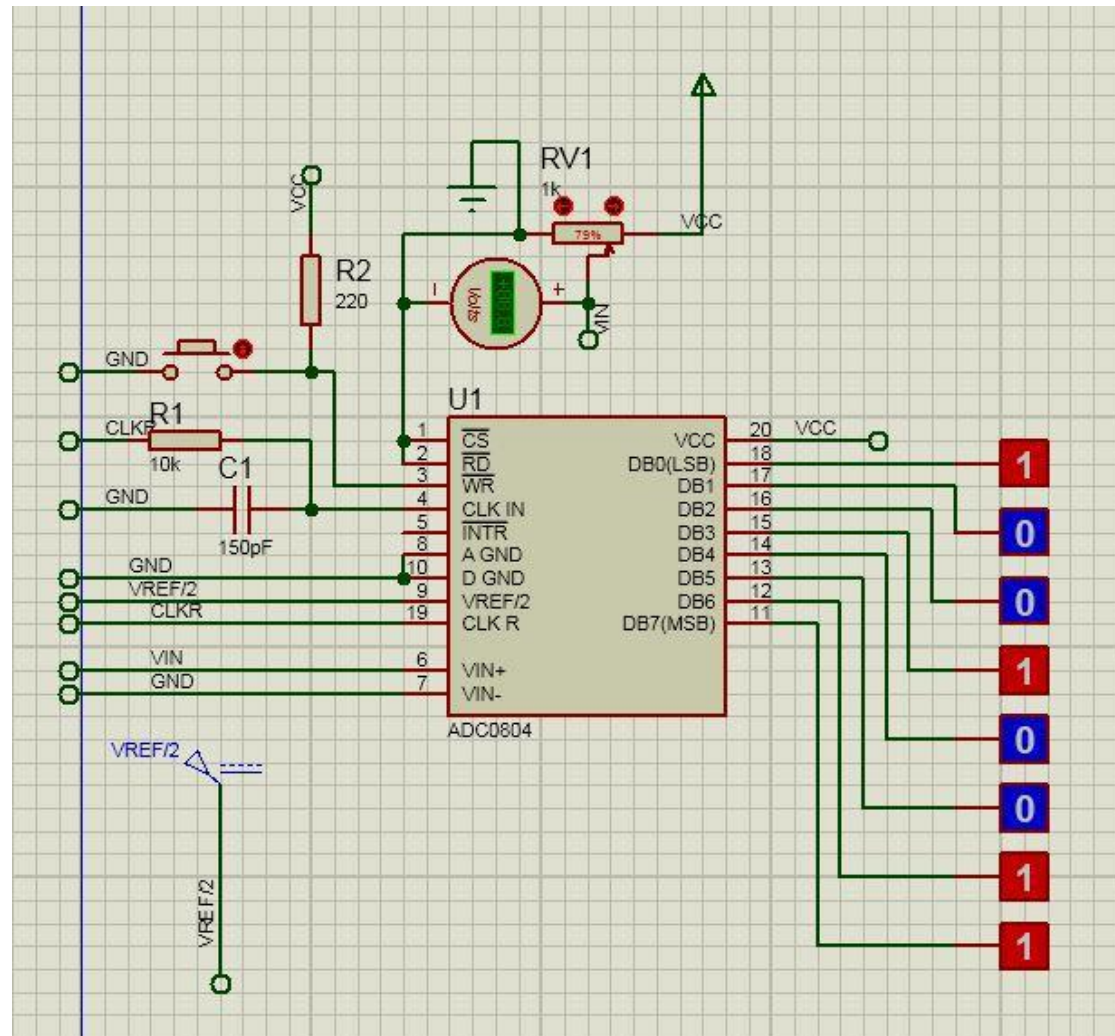
```
BCDR    LD E,0AH
            CALL DIV
            OUT (05H),A
            LD A,C
            CALL DIV
            OUT (04H),A
            LD A,C
            OUT (03H),A
            RET
BCDL    LD E,0AH
            CALL DIV
            OUT (15H),A
            LD A,C
            CALL DIV
            OUT (14H),A
            LD A,C
            OUT (13H),A
            RET
```

6. Circuit

1. ADC

2. Data presentation :