

Exp No: 8

Date:

Aim: Ring Counter 4Bit using D flip flops:

Aparatus Required:

- 1- D flip flop
- 1 - LC Trainer Kit

Theory:

Ring counter: is a typical application of Shift Register.
Ring Counter is almost same as the Shift Counter.

The only change is that the output of the last flip flop is connected to the input of the first flip flop.
In case of Ring counter but in case of Shift register it is taken as output.



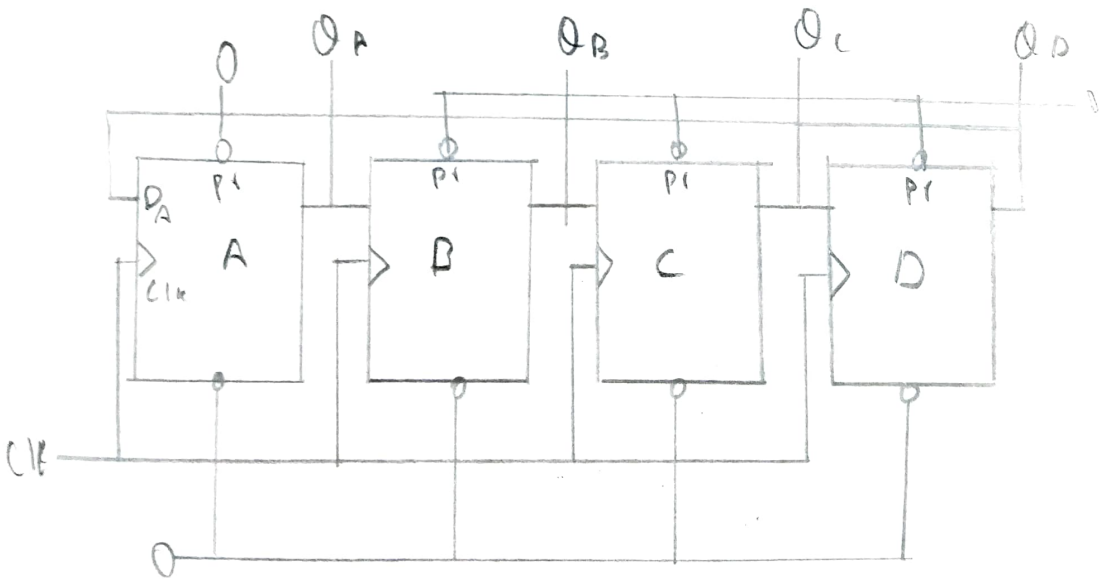
P_s				N_s							
A	B	C	D	A	B	C	D	D_A	D_B	D_C	D_D
1	0	0	0	0	1	0	0	0	1	0	0
0	1	0	0	0	0	1	0	0	0	1	0
0	0	1	0	0	0	0	1	0	0	0	1
0	0	0	1	1	0	0	0	1	0	0	0

$$D_A = \overline{Q_D}$$

$$D_C = Q_B$$

$$D_B = \overline{Q_A}$$

$$D_D = Q_C$$



Step 1: 0 - $\overline{C1x}$ Pin

Step 2: 1 - $\overline{C1x}$ Pin

Step 3: \overline{Pr} of B, C & D $\rightarrow 1$

Step 4: \overline{Pr} of A $\rightarrow 0$

Step 5: \overline{Pr} of A $\rightarrow 1$

Practical Procedure:

1. IC's are placed on breadboard.
2. Make proper connections & make sure of abigent

Power supply

Student's observation and conclusion:

- Counter is a device which stores (and sometimes displays) the number of times a particular event or process has occurred, often in relationship to a clock signal. Counter are used in digital electronics for counting purpose, they can count specific event happening in the circuit.

- Initially, all the flip flops in ring counter are reset to 0 by applying CLEAR signal. Before applying the clock pulse, we apply the PRESET pulse to the flip flops which assigns the value '1' to the ring counter circuit. For each clock signal, the data circulates among all the 4 flip flop stages of ring counter.

- These 4 staged ring counters is called Mod 4 ring counter or 4-bit ring counter. To circulate the data correctly in the ring counter, we must load the counter with required values like all 0's or all 1's.

Name: kaushik Gupta

Regno: 201900318

Date: 23/03/2021

Sign: kaushik

Exp No: 9

Date:

Aim: To construct 4 bit Johnson counter or twisted counter using D flip flops.

Material used:

1. D - flip flops
2. IC trainer kit
3. connecting wires.

Theory:

Johnson counter or Twisted ring counter is another shift register with feedback exactly the same as the Standard Ring counter above. except that this time inverted output Q of the last flip flop is now connected back to the input D of first flip flop as shown below.



PS

A	B	C	D
0	0	0	0
0	0	0	1
0	0	1	1
0	1	1	0
1	1	1	1
1	1	1	0
1	1	0	0
1	0	0	0
0	0	1	0
0	1	0	0

NS

D_A	D_B	D_C	D_D
0	0	0	1
0	0	1	1
0	1	1	1
1	1	1	1
1	1	1	0
1	1	0	0
1	0	0	0
0	0	0	0
0	0	0	0
x	x	x	x
x	x	x	x

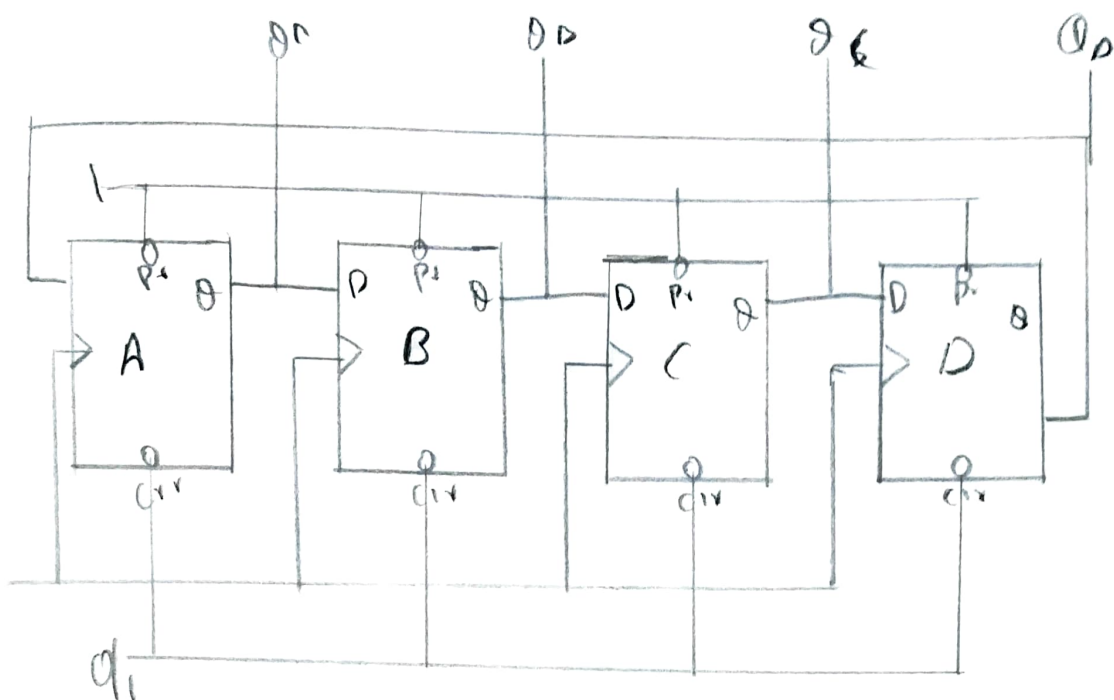
K map:

$$D_A = \overline{D_D}$$

$$D_B = D_A$$

$$D_C = D_D$$

$$D_D = D_D$$



Practical ~~Produce~~ Procedure:

- 1) Ic's are placed on breadboard.
- 2) Make proper connections & make sure of Power supplies to all components.

Student's observation and conclusion:

- Johnson counter is used as a synchronous decade counter or divider circuit.
- It is used in hardware logic design to create complicated Finite states machine. ex: ASIC and FPGA design.
- It is used to divide the frequency of the clock signal by varying their feedback.
- The Johnson counter has same number of flip flop but it can count twice the number of states the ring counter can count.

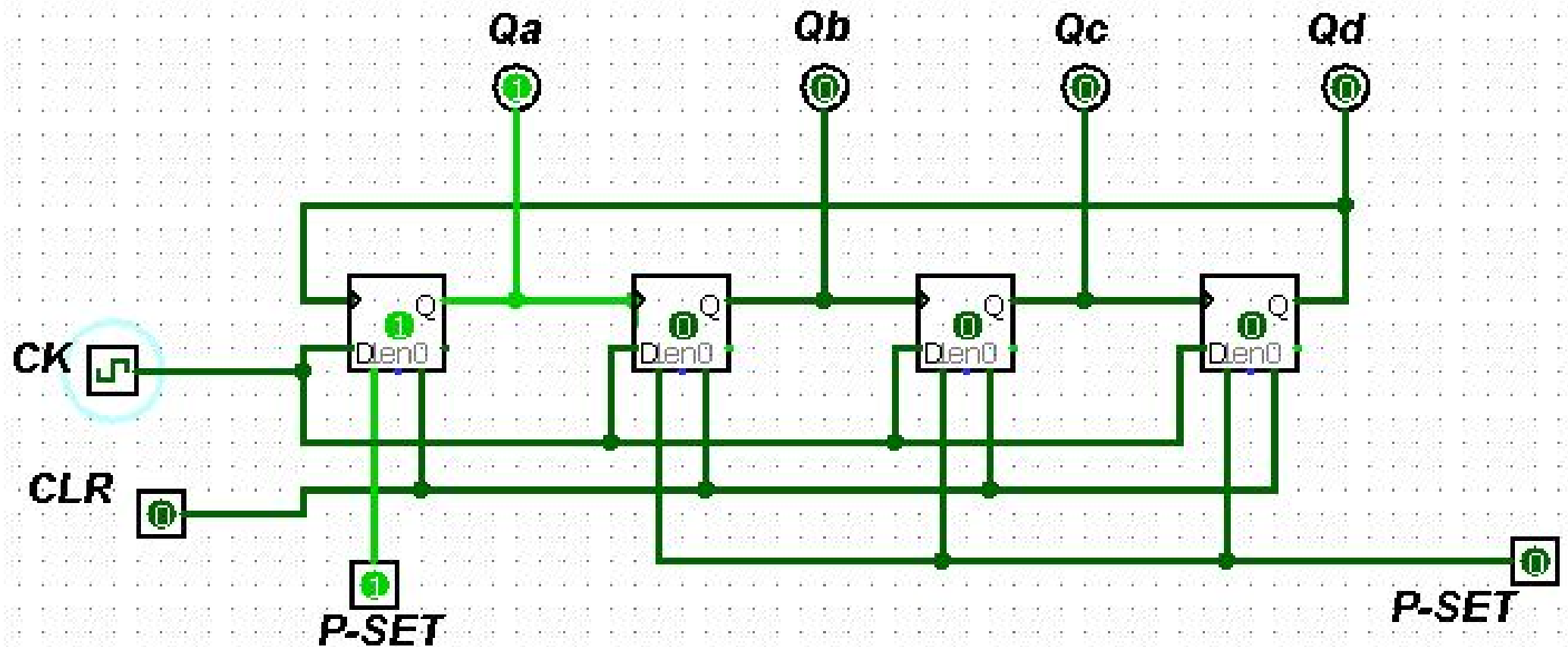
Name: Kaushik Gupta

RegNo: 201900318

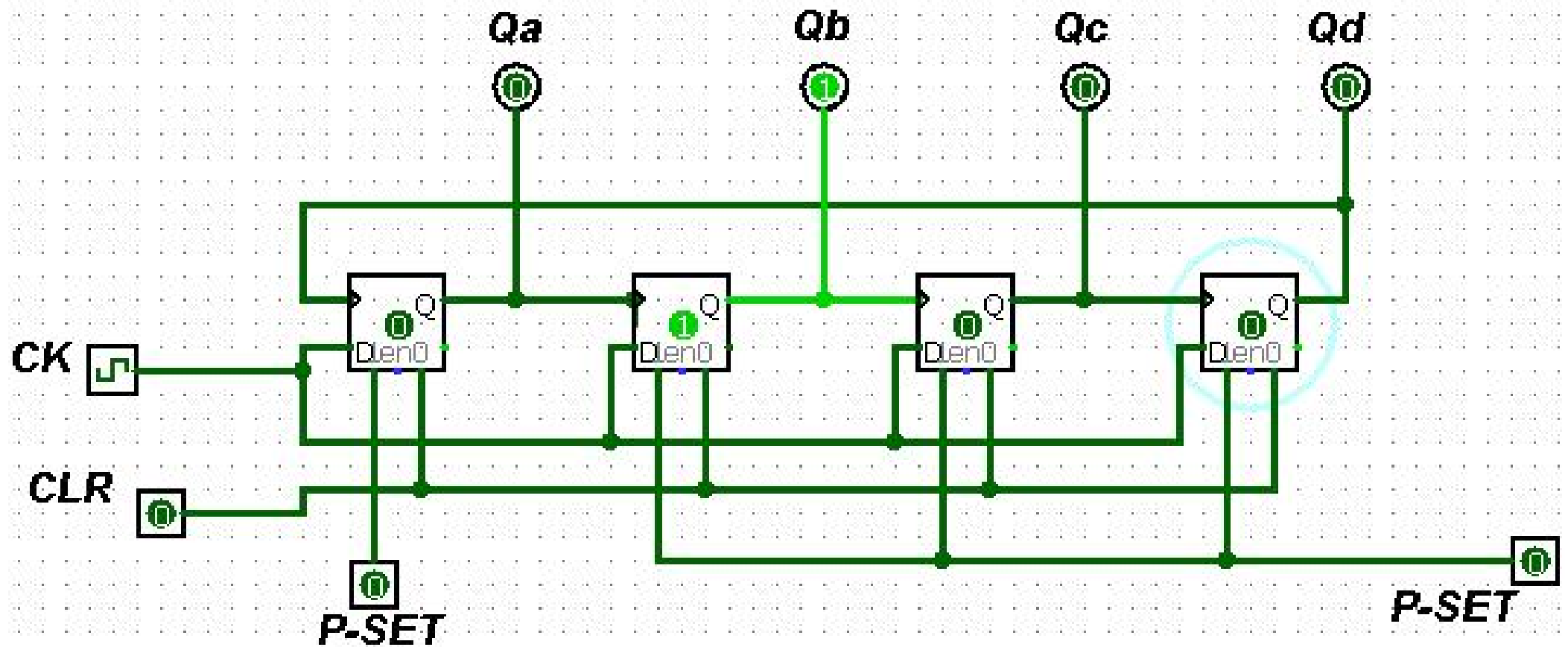
Date: 23/03/2021

Sign: kaushik

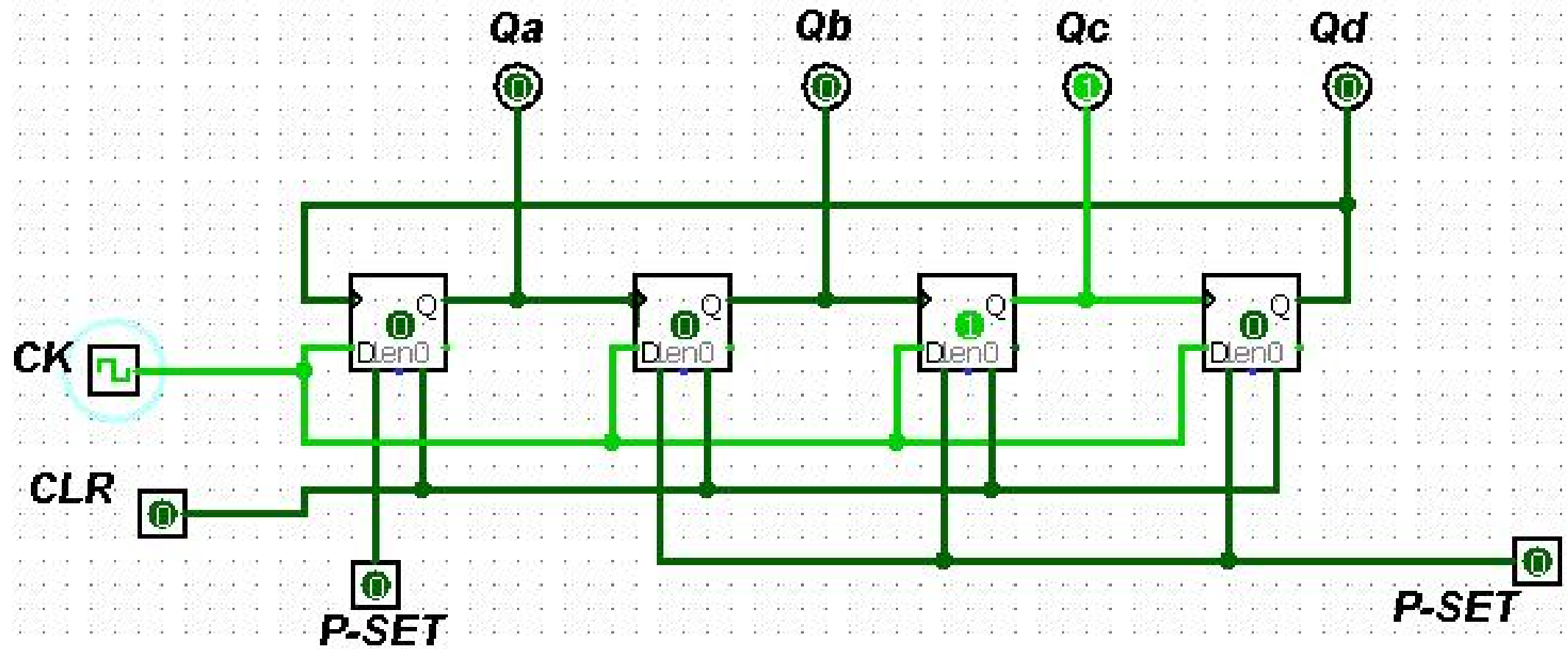
Kaushik gupta_201900318



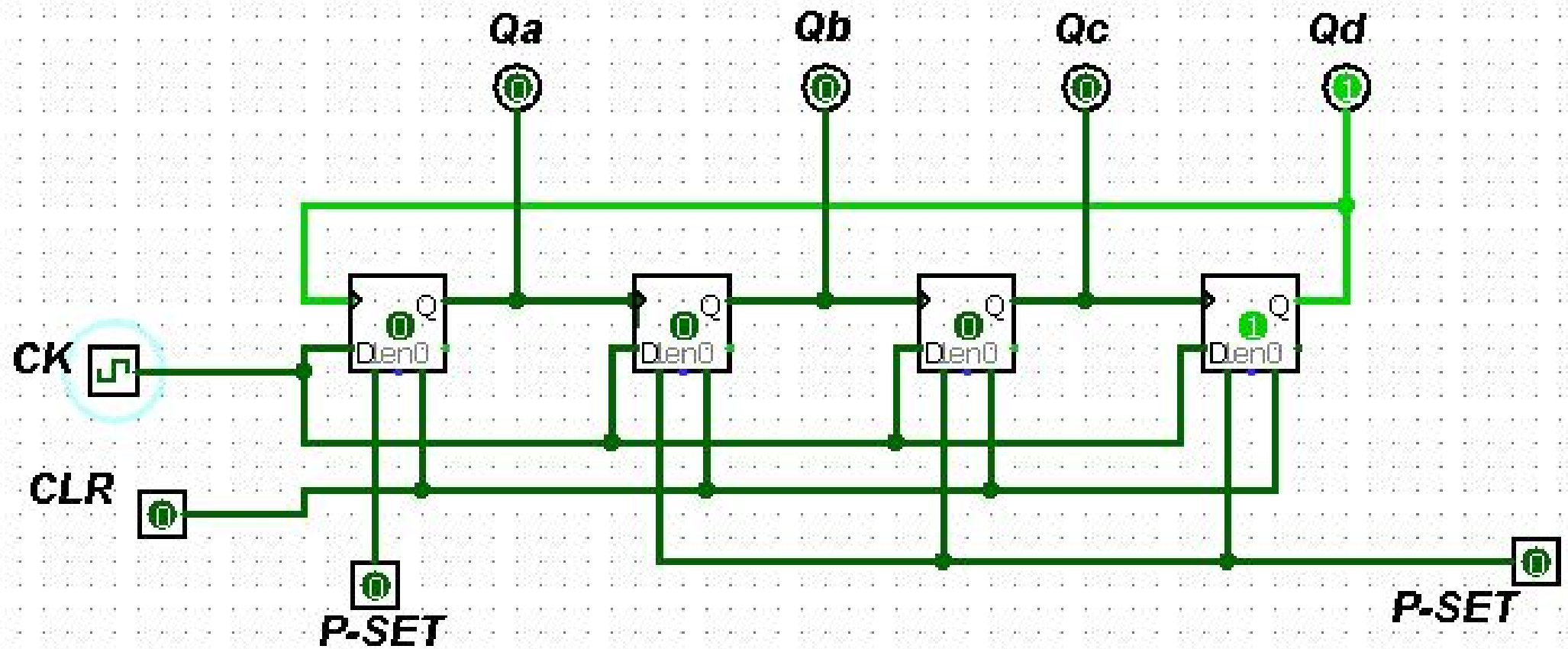
Kaushik gupta_201900318



Kaushik gupta_201900318



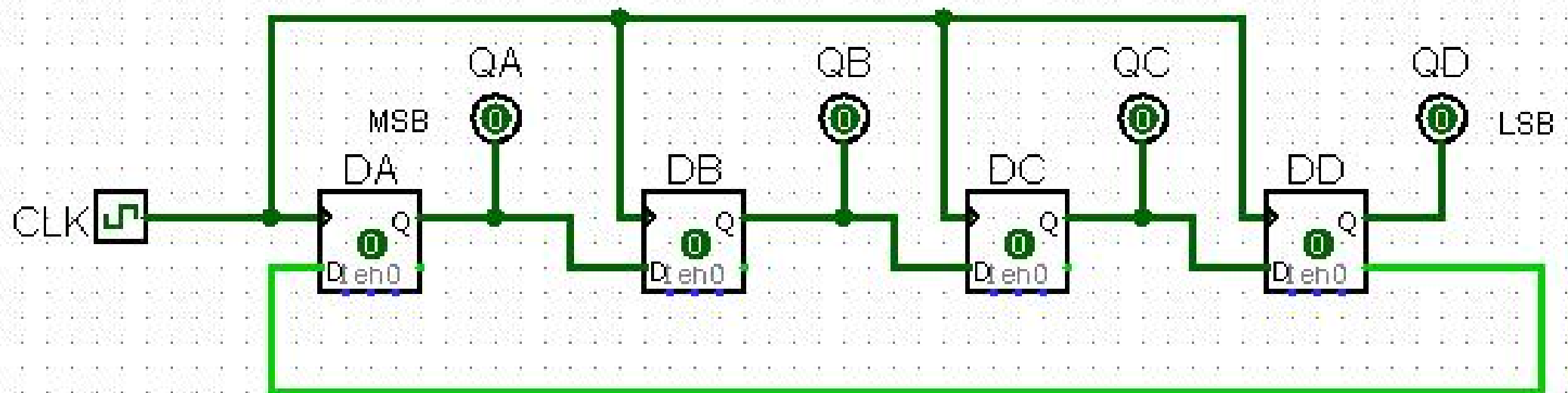
Kaushik gupta_201900318



Kaushik Gupta

201900318

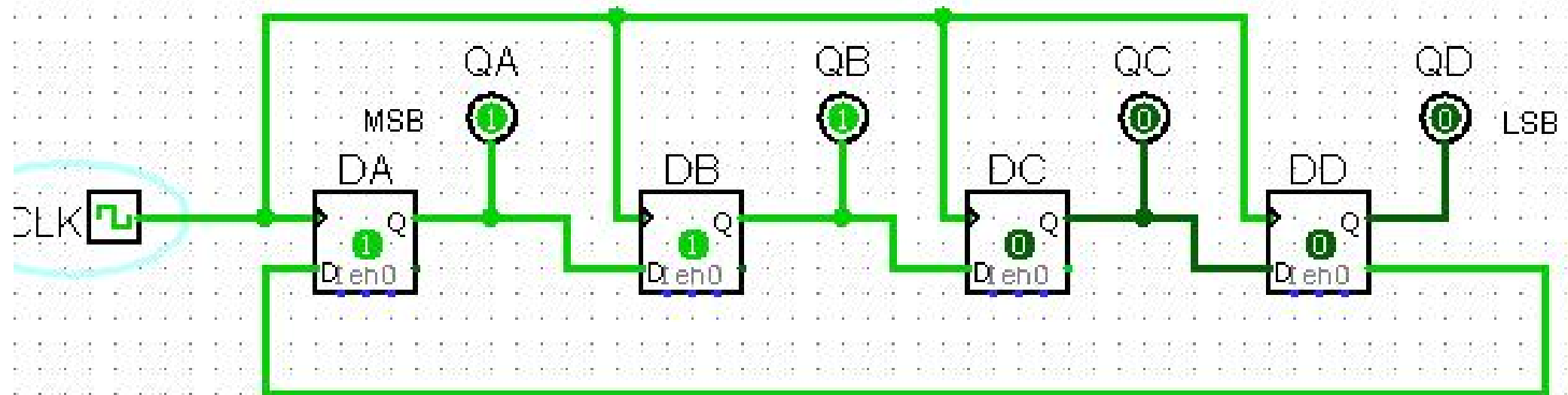
4 BIT TWISTED RING OR JOHNSON COUNTER



Kaushik Gupta

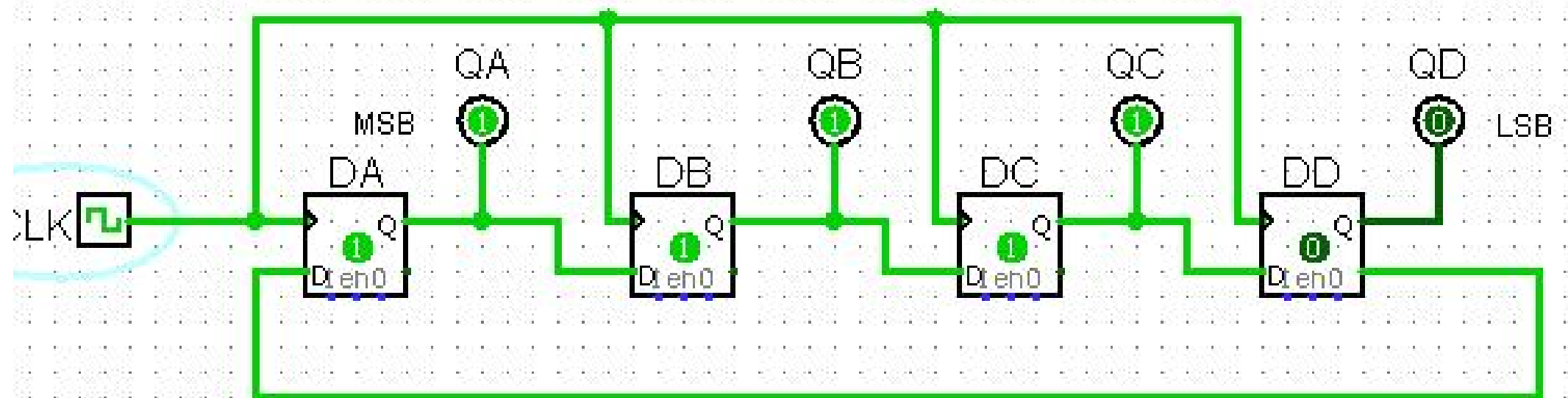
201900318

4 BIT TWISTED RING OR JOHNSON COUNTER



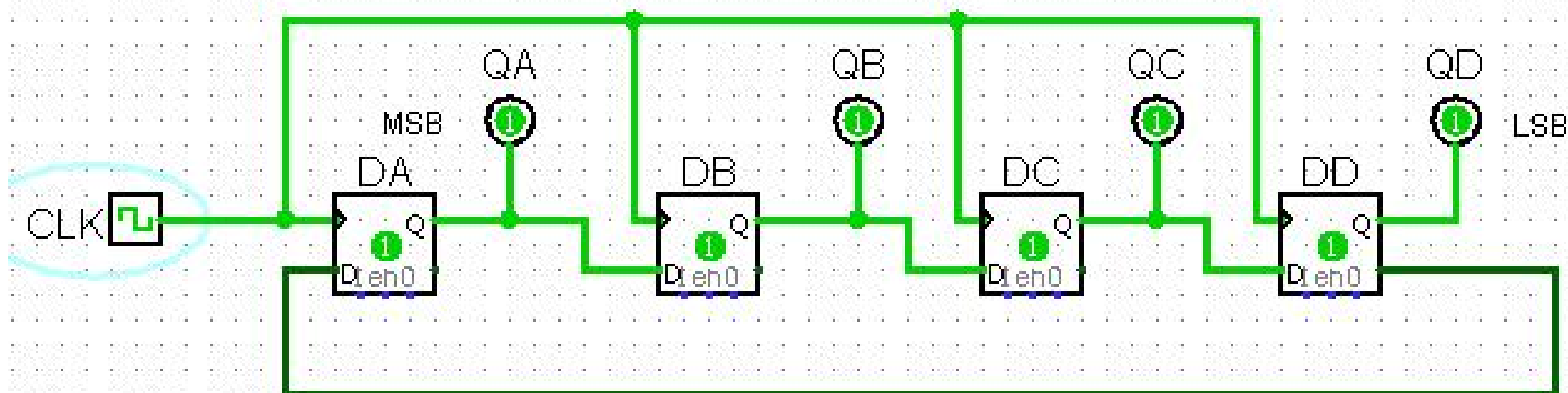
201900318

4 BIT TWISTED RING OR JOHNSON COUNTER



201900318

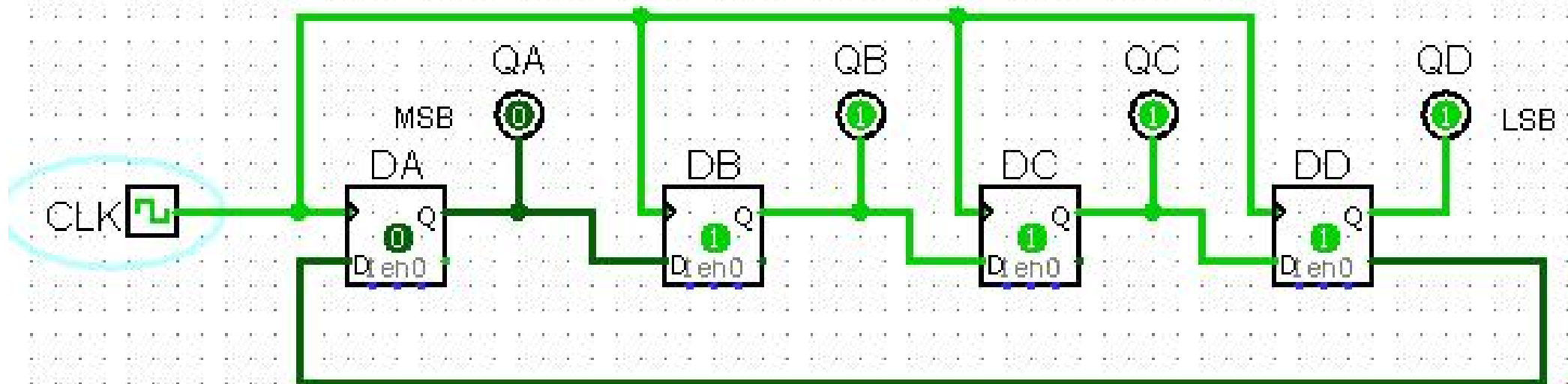
4 BIT TWISTED RING OR JOHNSON COUNTER



Kaushik Gupta

201900318

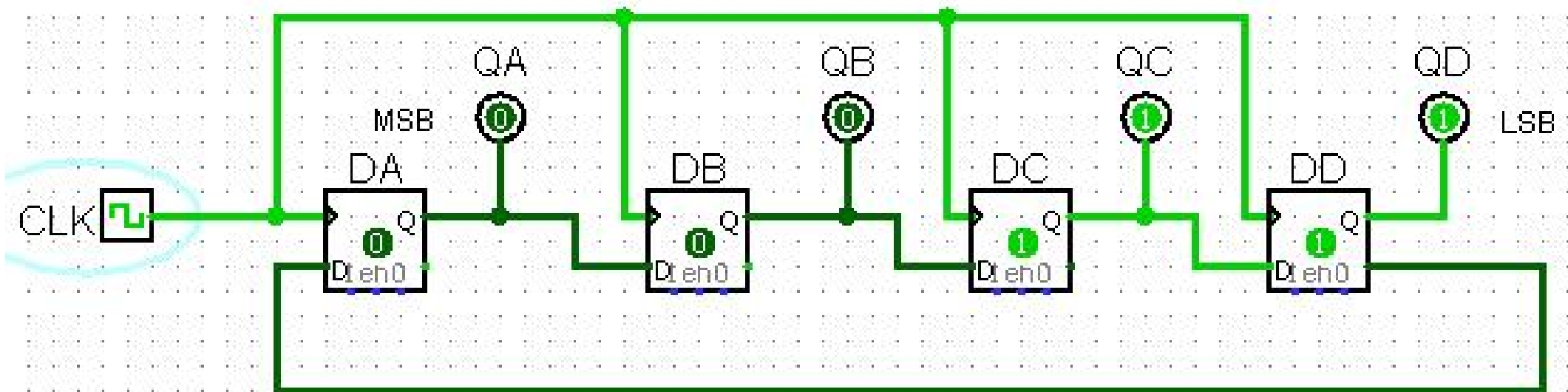
4 BIT TWISTED RING OR JOHNSON COUNTER



Kaushik Gupta

201900318

4 BIT TWISTED RING OR JOHNSON COUNTER



Kaushik Gupta

201900318

4 BIT TWISTED RING OR JOHNSON COUNTER

