



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECB234 – DIGITAL ELECTRONICS

II YEAR/ III SEMESTER

UNIT 4 – DESIGN OF SEQUENTIAL CIRCUITS

TOPIC – RING COUNTER



RING COUNTER



A ring counter is a Shift Register (a cascade connection of flip-flops) with the output of the last flip flop connected to the input of the first. It is initialized such that only one of the flip flop output is 1 while the remainder is 0.

10/28/2023



WHAT IS THE PURPOSE OF RING COUNTER?



It is also known as switch-tail ring counter, walking ring counter or Johnson counter. It connects the complement of the output of the last shift register to the input of the first register and circulates a stream of ones followed by zeros around the ring. Here, we use Clock (CLK) for all the flip-flops.

10/28/2023



Ring Counters



- One flip-flop (stage) for each state in the sequence.
- The output of the last stage is connected to the D input of the first stage.
- An n -bit ring counter cycles through n states.
- No decoding gates are required, as there is an output that corresponds to every state the counter is in.

10/28/2023

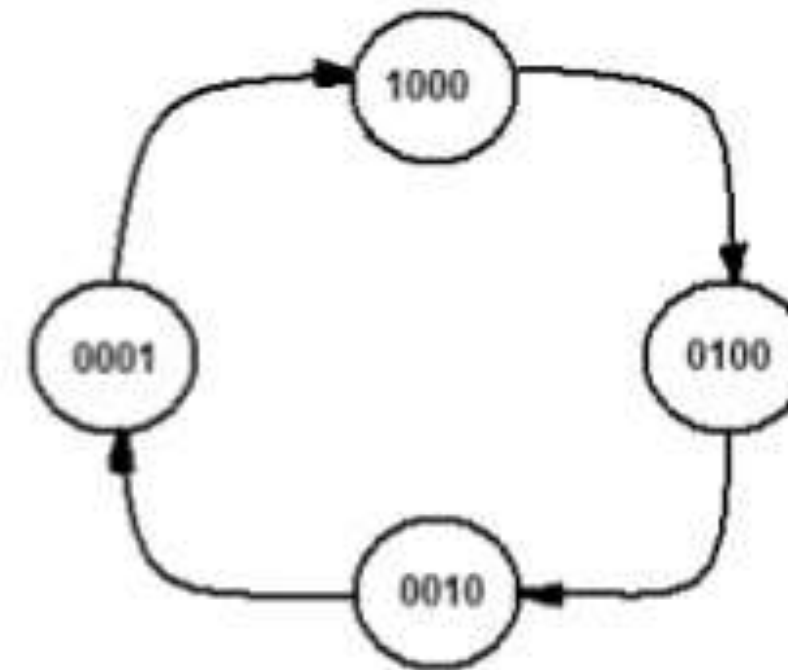


RING COUNTER



Ring Counter (continue)

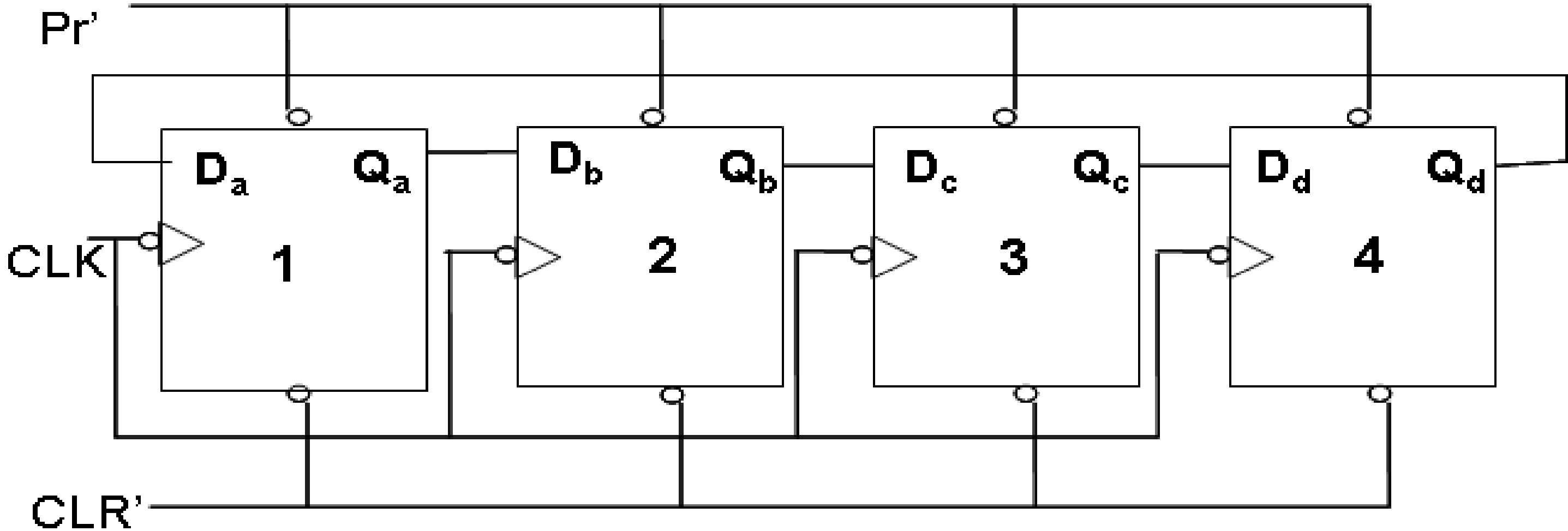
- ❑ Ring counters are used to construct "One-Hot" counters
- ❑ It can be constructed for any desired MOD number
- ❑ A MOD-N ring counter uses N flip-flops connected in the arrangement as shown in fig. a)
- ❑ In general ring-counter will require more flip-flops than a binary counter for the same MOD number



d) State Diagram



4 BIT RING COUNTER



10/28/2023



TRUTH TABLE

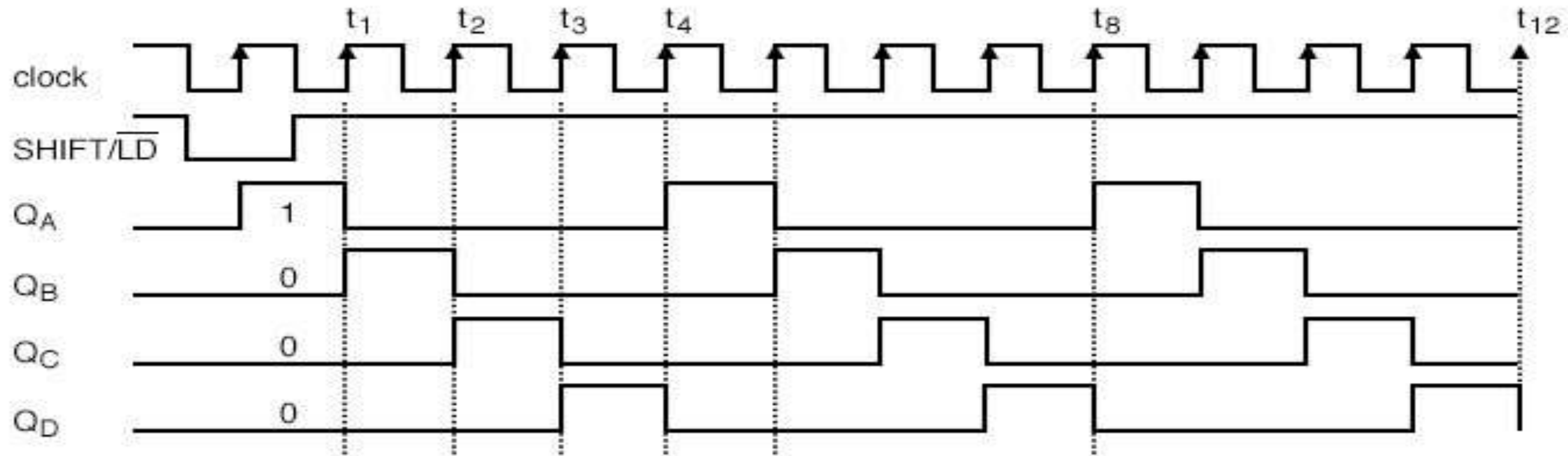


States	Q_A	Q_B	Q_C	Q_D
1	0	0	0	0
2	1	0	0	0
3	1	1	0	0
4	1	1	1	0
5	1	1	1	1
6	0	1	1	1
7	0	0	1	1
8	0	0	0	1

10/28/2023



TIMING DIAGRAM



Load 1000 into 4-stage ring counter and shift

10/28/2023



Applications of Ring Counter



- Animation and simulation video.
- Data counting loop.
- (BCD) counter and divider circuit.
- Quadrature generator.
- Use in Digital Clocks

10/28/2023



APPLICATIONS



Ring Counter Application

- Some devices require scanning. Scanning is when devices are enabled one at a time to:
 - check their status, or
 - enable their output
- An example of scanning is for keyboard inputs. The ring counter enables each of the keys in turn to check on their state.

10/28/2023



ASSESSMENT



- 1.What is Register?
- 2.List the types of Shift registers.
- 3.Explain the operation of SISO,SIPO shift register.

10/28/2023



THANK YOU

10/28/2023

10/13/2020

RING COUNTER /Mrs.P.UmaMaheswari/AP/ ECE/SNSCT

12/12