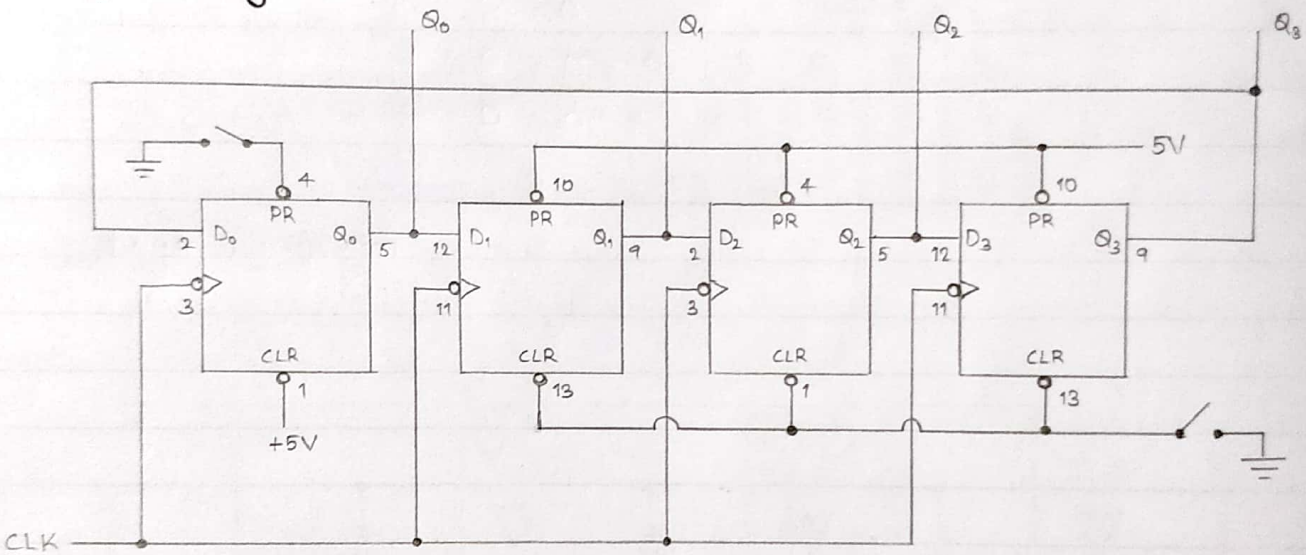
Ring Counter

Truth Table

CLK	Q_0	Q_1	Q_2	Q_3
1	1	0	0	0
2	0	1	0	0
3	0	0	1	0
4	0	0	0	1
5	1	0	0	0

Logic Diagram



Expt. No. 11 RING COUNTER AND JOHNSON COUNTER Date

Page No. 61

Aim

To design & set up 4-bit ring and johnson counters using flip-flops.

Components Required

IC 7474 and connecting wires.

Theory

Ring Counter

It is a shift counter shifting the sequence in a cyclic nature. A ring counter is constructed using JK flip-flops by connecting Q and $\bar{Q}$ outputs from preceding flip-flops to J and K inputs of the succeeding flip-flops. The output of the final flip-flop is connected to the input of first flip-flop. To start the counter, the FFs should be initialized using preset and clear inputs. For each clock pulse, the number gets shifted like in a ring. Ring counter is known as 'divide by N counter' where 'N' is the number of FFs. Ring counter divides clock pulse frequency by N.

Johnson Counter

A ring counter can be converted to johnson counter by connecting Q and $\bar{Q}$ output of the final FF to K and J inputs of the first FF respectively. The modulus of a johnson counter is double that of ring counter. It is also called "twisted" ring counter.

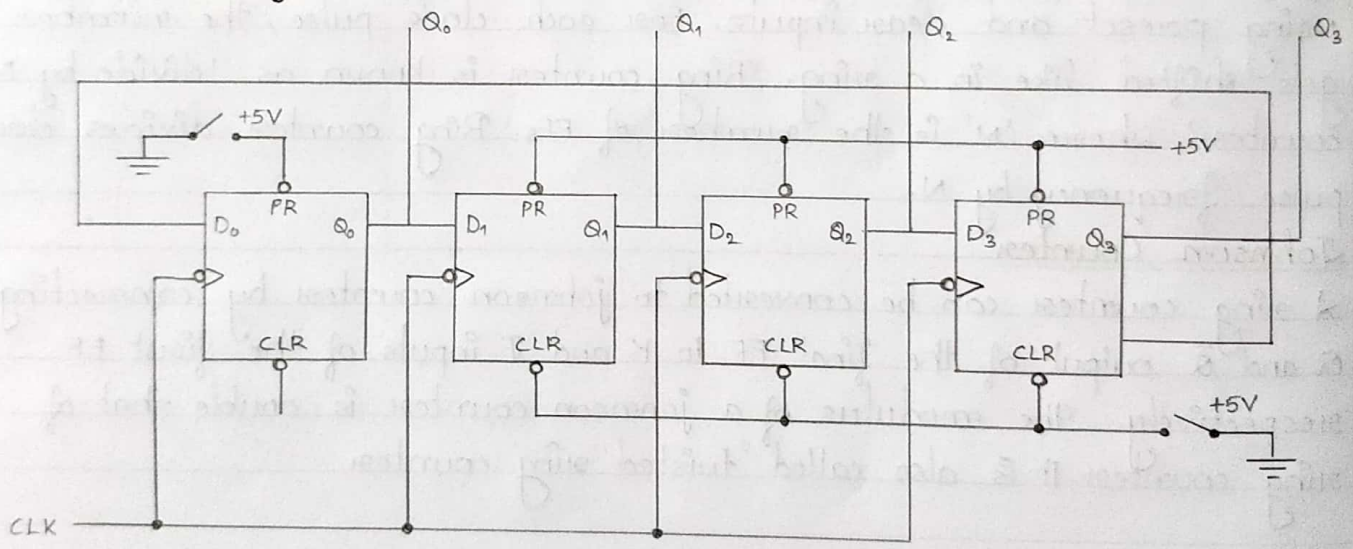
Teacher's Signature : _____

Johnson Counter

Truth Table

CLK	Q_0	Q_1	Q_2	Q_3
0	0	0	0	0
1	1	0	0	0
2	1	1	0	0
3	1	1	1	0
4	1	1	1	1
5	0	1	1	1
6	0	0	1	1
7	0	0	0	1
8	0	0	0	0

Logic Diagram



Expt. No. 11 Date

Page No. 63

Procedure

1. Test all the components and IC packages.
2. Set up the circuit one by one and verify the counter states.

Result

Designed & set up 4-bit ring and johnson counters using flip-flops.

Teacher's Signature :