ECE213: Digital Electronics

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The Course Contents

Unit V

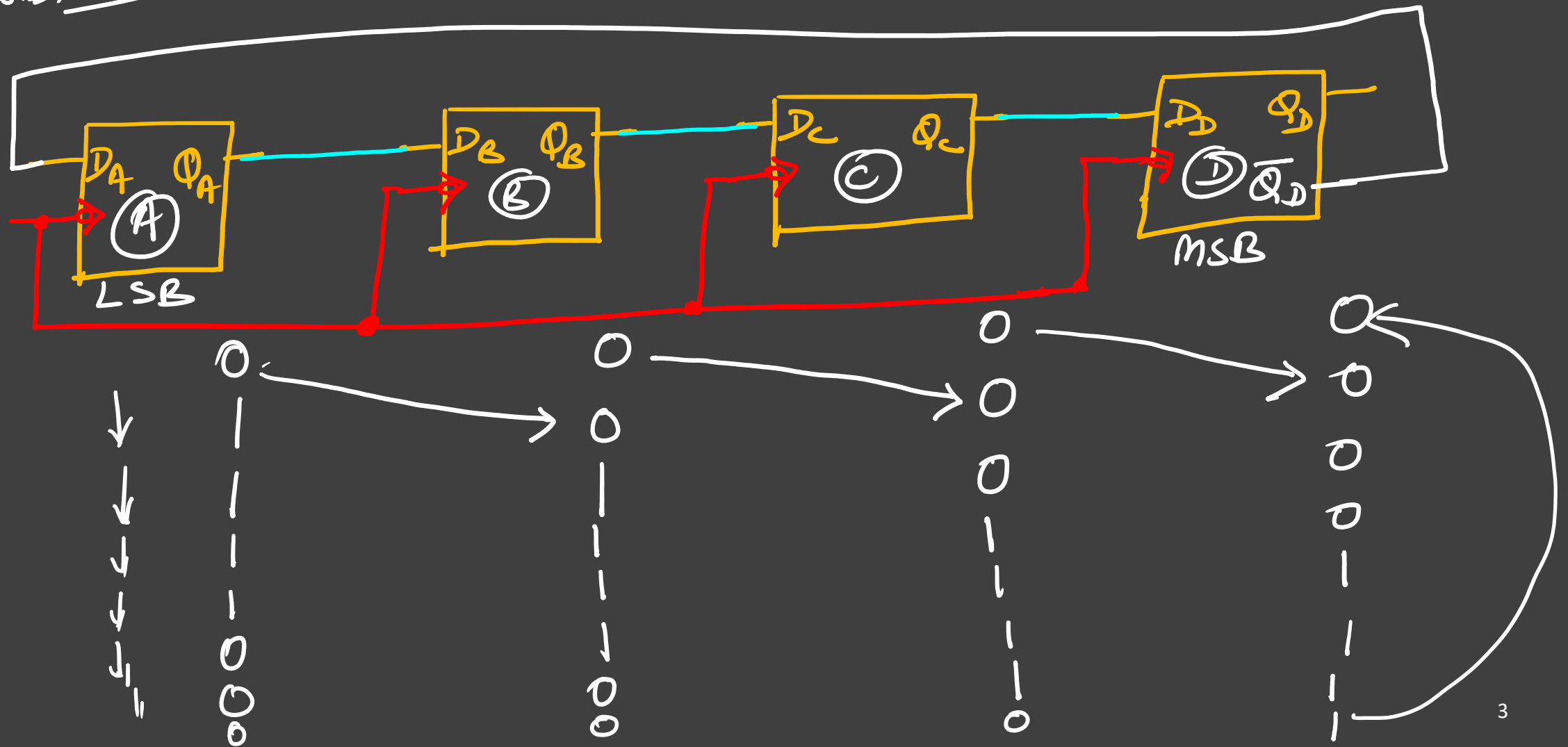
Sequential Logic Circuits Applications : Registers: Operation of all basic Shift Registers, Counters: Design of Asynchronous and Synchronous counters, Ring counter and Johnson ring counter

Sequential Logic Circuits Applications

Johnson Ring Counter 4-bit

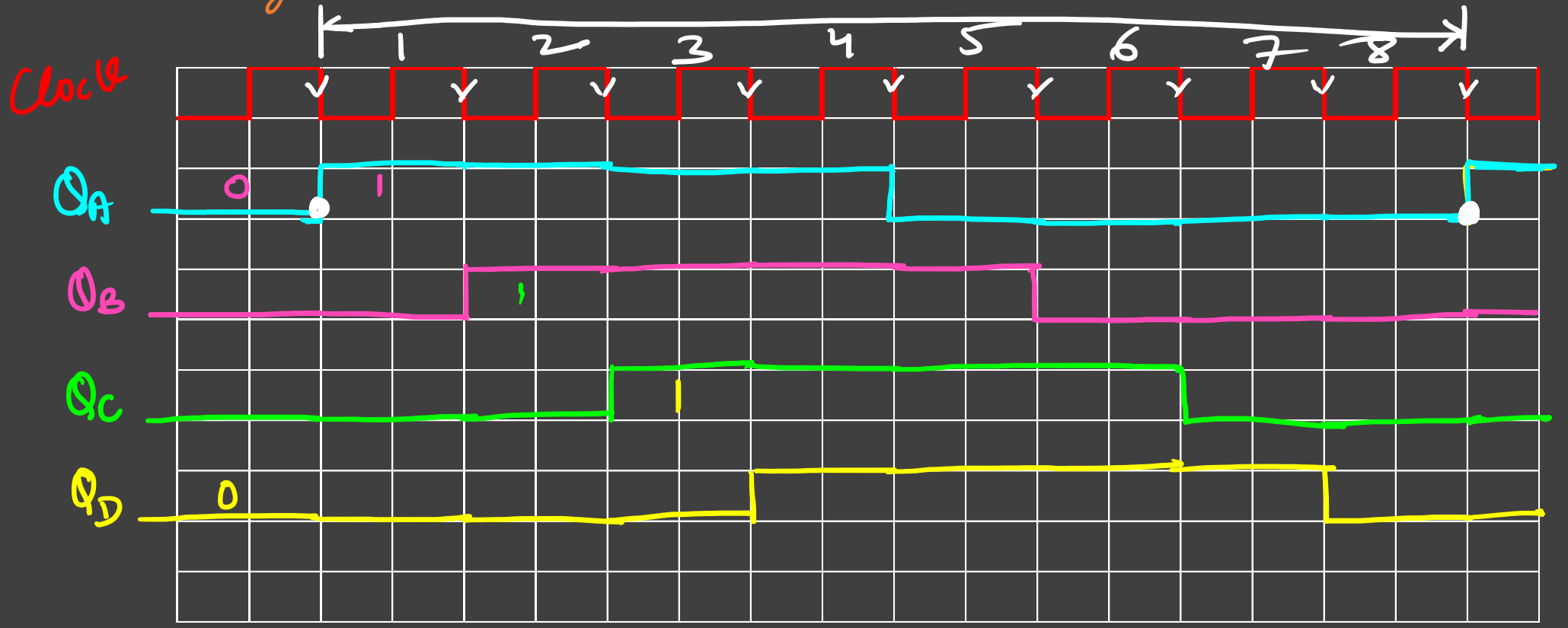
(MOD 8 Johnson Ring Cou)
(MOD 2n Johnson Cou.)

Twisted



Sequential Logic Circuits Applications

Johnson Ring Counter



Sequential Logic Circuits Applications

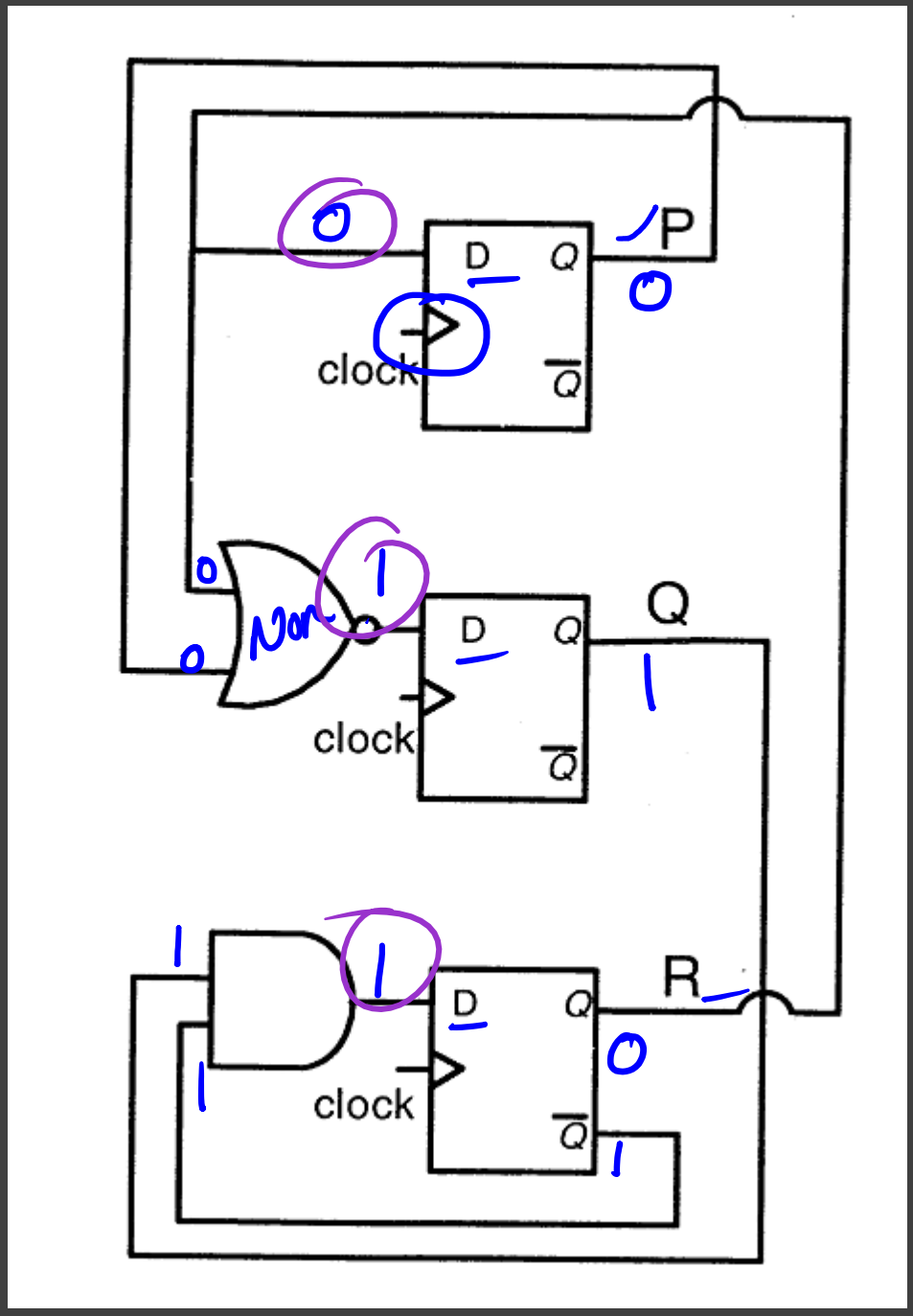
Consider the following circuit involving three D-type flip-flops used in a certain type of counter configuration.

If at some instance prior to the occurrence of the clock edge, P, Q and R have a value 0, 1 and 0 respectively, what shall be the value of PQR after the clock edge?

→ +ve edge

011

a) 000
b) 001
c) 010
d) 011

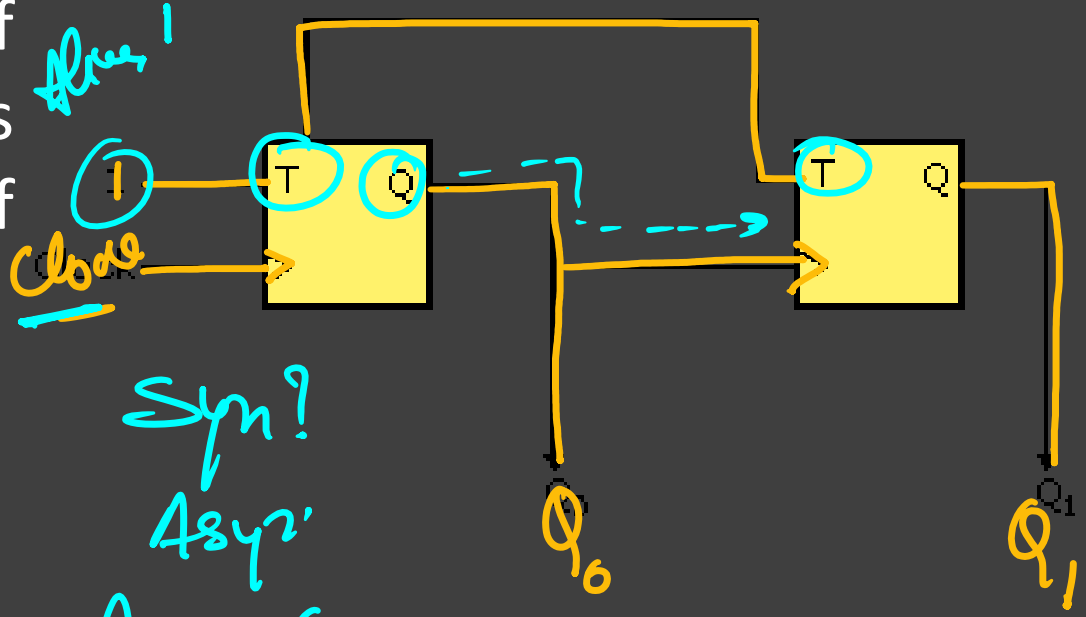


Sequential Logic Circuits Applications

In the sequential circuit shown below,if the initial value of the output Q1Q0 is 00,what are the next four values of Q1Q0?

a) 11, 10, 01, 00
b) 10, 11, 01, 00
c) 10, 00, 01, 11
d) 11, 10, 00, 01

00 0
11 3
10 2
01 1
01 0



Sync?
Asyn?
Asyn Count

+Ve edge

Q is for next FF Clk

$\overline{Q}$

2-bit Down
Down

-ve edge

Sequential Logic Circuits Applications

Let k = 2^n. A circuit is built by giving the output of an n-bit binary counter as input to an n-to-2^n bit decoder. This circuit is equivalent to a

a) k-bit binary up counter.
b) k-bit binary down counter.
c) k-bit ring counter.
d) k-bit Johnson counter