Computer Science Department **1st-year Computer Science Engineer**
Module: Machine Structure **Academic year: 2024/2025**

Tutorial Works Series N° 5

Exercise 01:

A. Let the transition table (excitation) of the JK flip-flop be below. Deduce the logic values of the variables J and K for each of the following outputs:

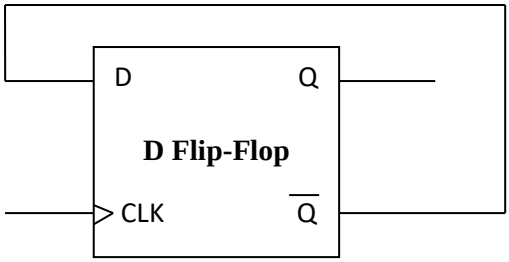
Q	Q+	J	K
0	0		
0	1		
1	0		
1	1		

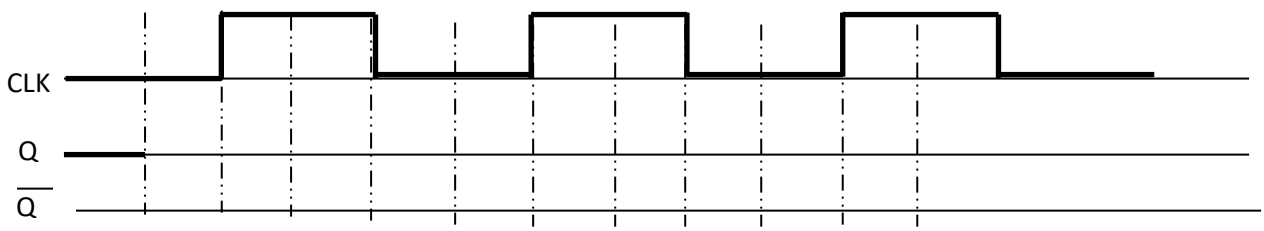
B. From the truth table relating to the following JK flip-flop, give the different output values as well as the operating mode of the flip-flop:

Inputs			**Outputs**		**Functioning**
J	K	Q_n	Q_{n+1}	$\overline{Q}_{n+1}$	
0	0	0			
0	0	1			
0	1	0			
0	1	1			
1	0	0			
1	0	1			
1	1	0			
1	1	1			

Exercise 02:

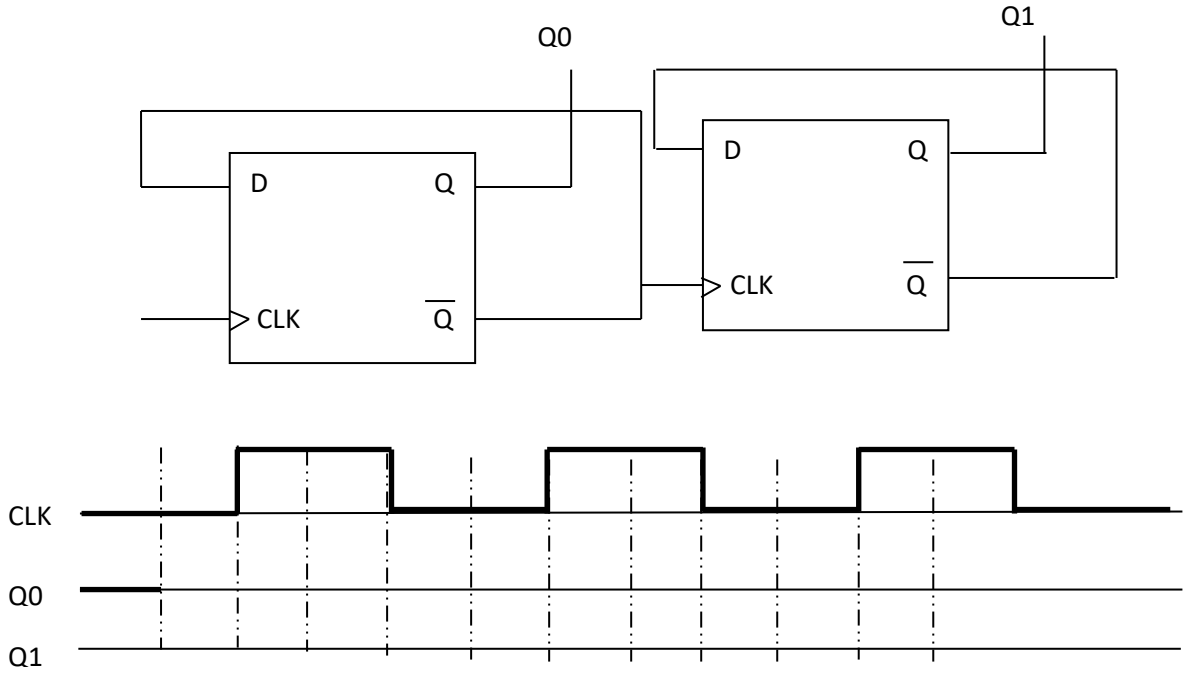
1. Draw the timing diagram obtained from Q in the following figure:





2. Calculate the frequency (F_Q) of Q based on the frequency F_C of the CLK?

3. Draw the timing diagrams of CLK, Q0, and Q1 for the following figure:



Exercise 03:

Complete the timing diagrams below for the following flip-flops: