

Homework #9 (Due: Mar. 30)

Total 300 points

Please write down your name on your homework.

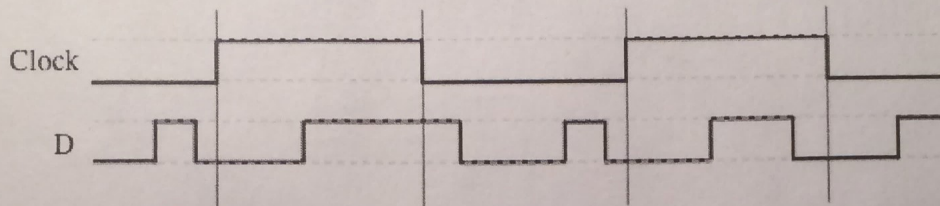
Please submit your homework online through Canvas by Friday 10:00pm.

Late homework will be penalized.

Important: Your submission must be in .pdf format ONLY!

Class 26 (100 points)

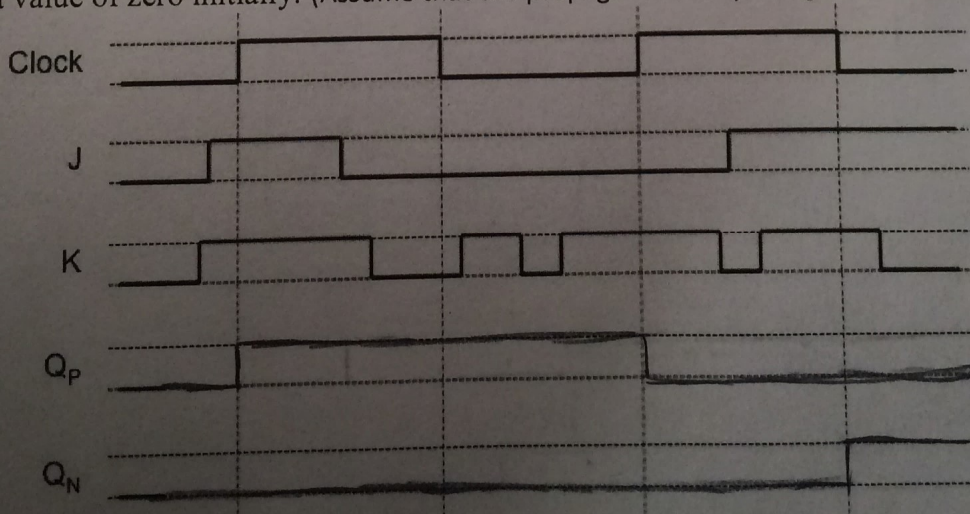
1. (100 points) Consider the following timing diagram.



- a) (40 points) Assuming that the Clock and D inputs shown are applied to the circuit in Fig. 5.9(a) of the textbook (page 257). Draw waveforms for the Q_m and $Q_s (=Q)$ signals. (Assume that the propagation delay along circuits is negligible.)
- b) (60 points) Assuming that the Clock and D inputs shown are applied to the circuit in Fig. 5.10(a) of the textbook (page 259). Draw waveforms for the Q_a , Q_b , and Q_c signals. (Assume that the propagation delay along circuits is negligible.)

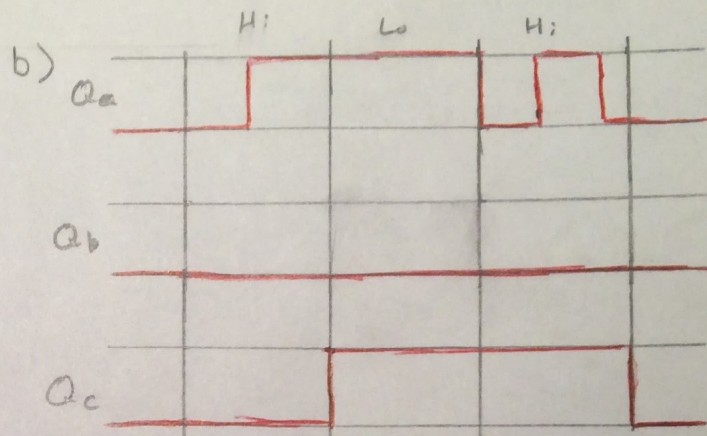
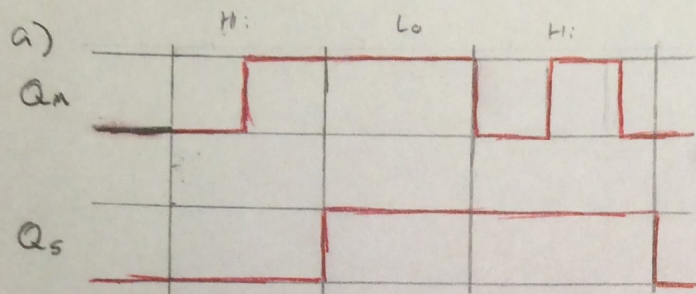
Class 27 (100 points)

1. (40 points) Show how a D flip-flop can be constructed using a T flip-flop and other logic gates.
2. (60 points) Consider one positive-edge-triggered JK flip-flop with output Q_P and one negative-edge-triggered JK flip-flop with output Q_N . Assume the Clock, J and K inputs shown below are applied to the two flip-flops. Draw the waveforms for Q_P and Q_N . Note that both flip-flops store a value of zero initially. (Assume that the propagation delay along circuits is negligible.)

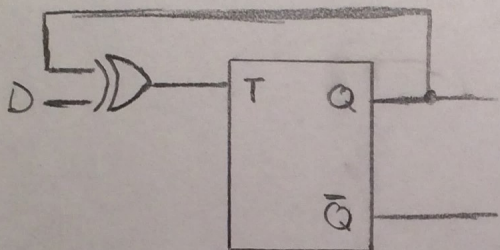


Class 26

Secn Gordon



Class 27



Class 28 (100 points)

This question is rather vague ...

1. (100 points) In this question, you are asked to construct a register file with one input port and two output ports. The register file contains two registers and each register stores a 2-bit data. You are allowed to use D flip-flops, 2-to-1 1-bit MUXs, and 1-to-2 decoders with enable only. Draw a circuit diagram for the register file. Please label your diagram clearly (especially the signals on the MUXs and decoders).

