

1. (6 pts) A Sidewinder missile is fired from an F/A-18 Super Hornet. The arming system considers three inputs and depending on the criteria below, arms the missile (A high output from the system indicates that the missile is armed).

For the inputs:

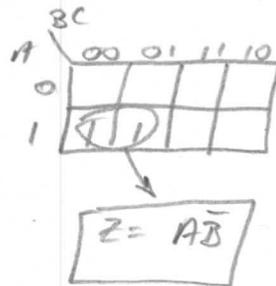
- A is low when the missile is attached to the aircraft and high once fired.
- B is low when the missile has fuel and high otherwise
- C is high when a positive lock is acquired and low otherwise.

In order to arm, the missile must have been launched and still have fuel (i.e. not in free fall).

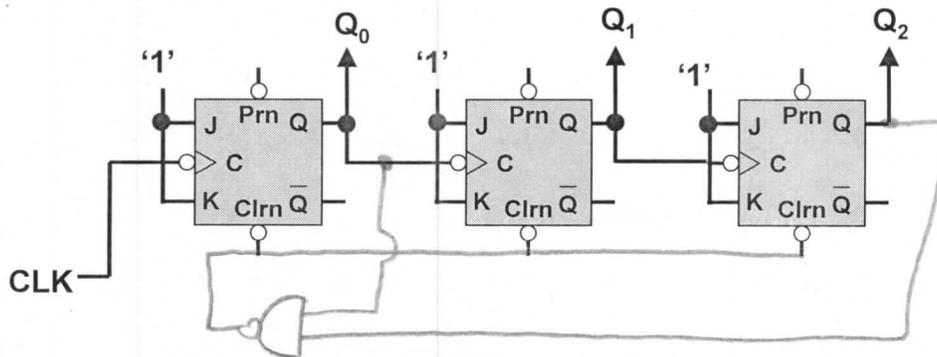
Determine the required logic to implement this system, simplify with a K-map.

A	B	C	Z
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	1
1	0	1	1
1	1	0	
1	1	1	

$\rightarrow A\bar{B}\bar{C}$
 $\rightarrow A\bar{B}C$

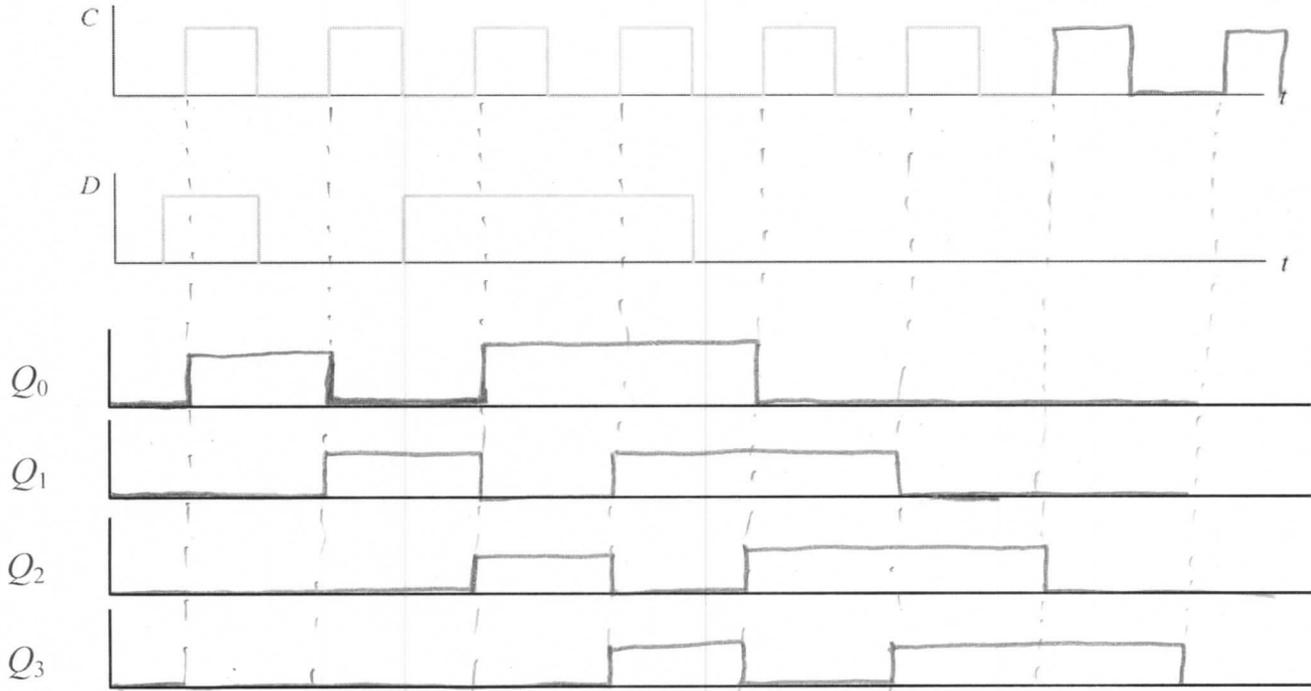
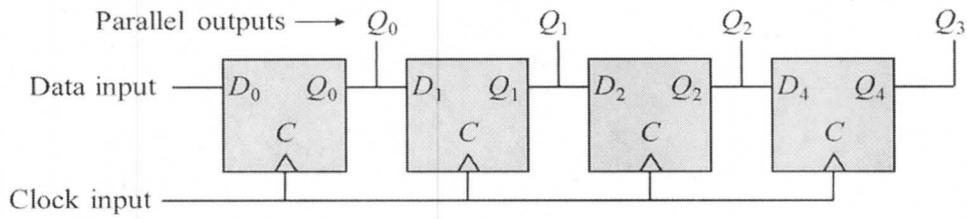


2. (4 pts) – The circuit below is a mod-8 ripple up-counter. Add the necessary logic on this diagram to turn this into a mod-5 ripple counter.



mod-5 \therefore reset @ 101

3. (10 pts) – Draw the outputs for Q_0 , Q_1 , Q_2 , and Q_3 . Be very careful to indicate the time when transitions occur.



4. (Bonus) Design a state machine that counts 1-0-3-2 and repeats using T flip flops.



Q_1, Q_0	Q_1', Q_0'	T_1	T_0
00	11	1	1
01	00	0	1
10	01	1	1
11	10	0	1

