

## Lab 7- Sequential Circuits (II): Counters

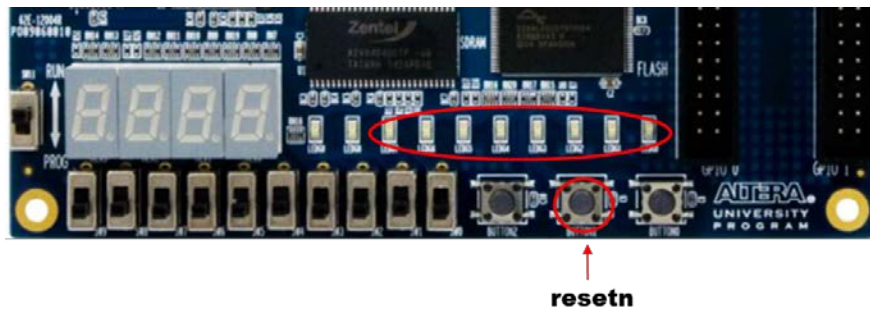
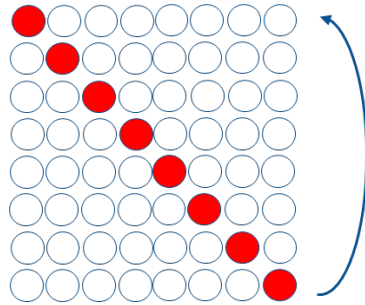
The purpose of this exercise is to practice counters.

### Lab 7.1:

A simple LED lighting circuit:

Design a circuit that successively lights up LEDG7 through LEDG0, at 1 Hz, as follows.

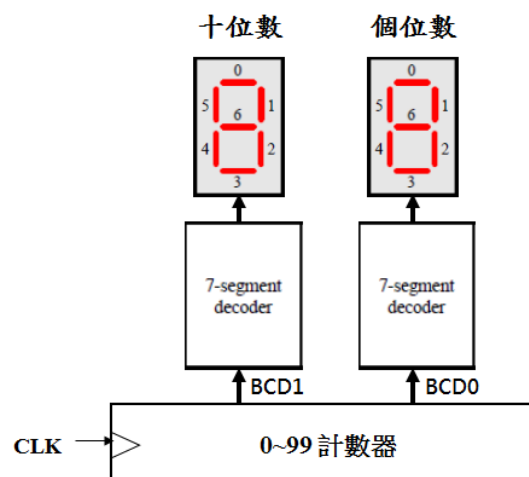
- Use Button1 as an active-low asynchronous reset to initial pattern.

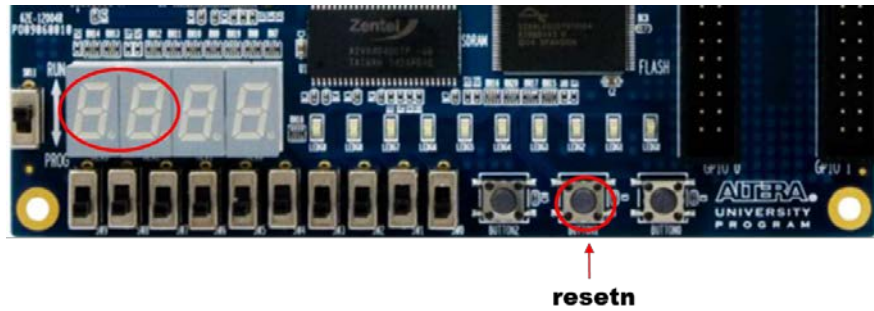


### Lab 7.2:

A 2-digit BCD counter. (Count range: 0~99)

- Display the contents of the counter on two 7-segment displays.
- Derive a new clock signal, from the 50-MHz clock signal provided on the DE0 board, to increment the contents of the counter at one-fifth of a second intervals (5Hz).
- Use the Button1 to reset the counter to 0.





### Lab-report:

Submit a lab report on **ilearn** by 11:00pm the day before of next lab. (The lab report must be a **PDF** file.) Your Lab report should include the following items:

- 1) VHDL code and discussion for Lab 7.1.
- 2) VHDL code and discussion for Lab 7.2.