# ECE 478 Laboratory Work #4

1) Design an even parity detector state machine for a sequence consisting of $N$ bits. Implement your state machine in VHDL.

2) Draw the state machine of "010" non-overlapping detector. Implement your circuit in VHDL.

3) Arbiters are used to manage access to shared resources. An example is depicted in Figure 1, which shows three peripherals (P1 to P3) that use a common bus to access common resources.

Obviously, only one of them can use the bus at a time; for example, if P1 wants to use the bus, it issues a request ($r_1$ ='1') to the arbiter, which grants ( $g_1$ = '1' ) access only if the bus is idle at that moment.

If multiple requests are received by the arbiter, access is granted based on pre-established priorities. Assuming that the priorities are P1 > P2 > P3, draw a state transition diagram for a machine capable of implementing this arbiter. The machine's input and output are the vectors $r = r_1 r_2 r_3$ and $g = g_1\, g_2\, g_3$ , respectively (besides clock and reset, of course).

Implement the state machine of the arbiter in VHDL.

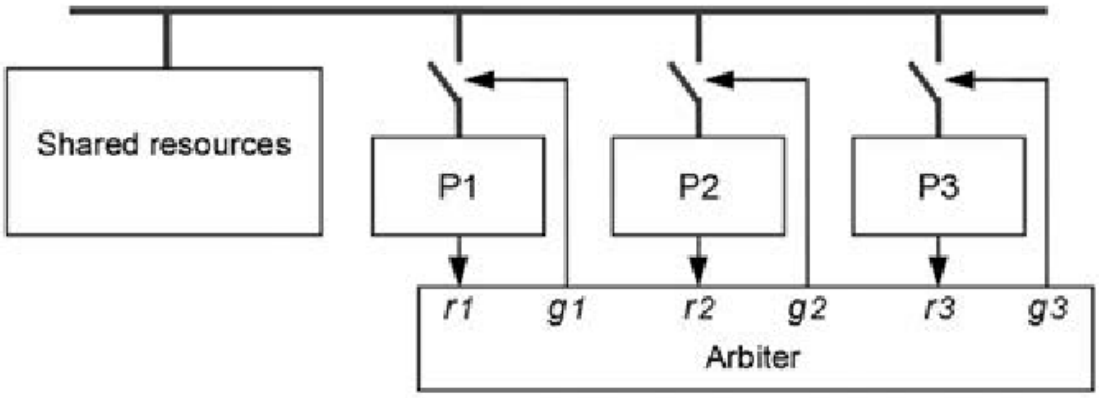


**Fig-1**