

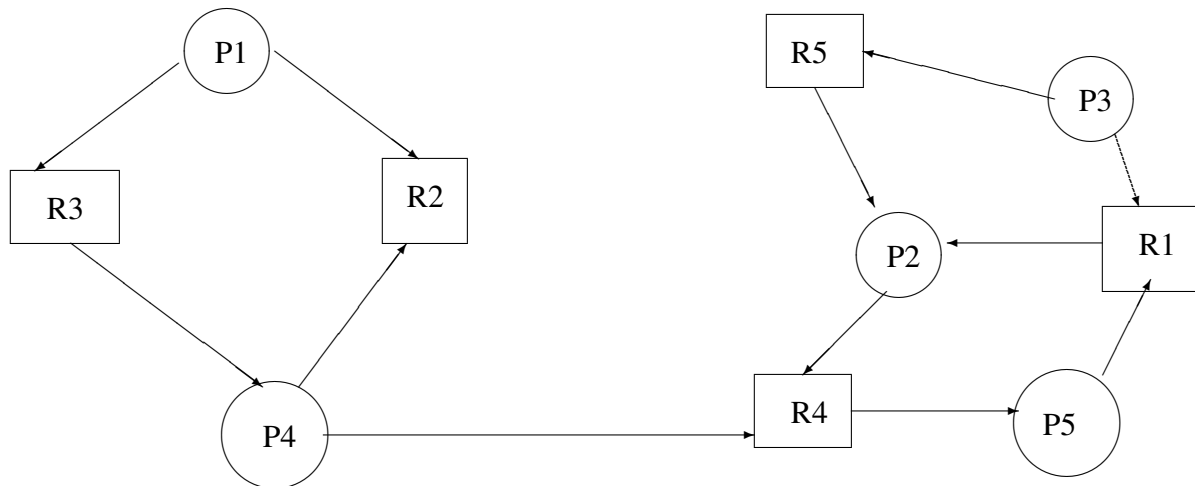
**CSCI 40300/ECE 40800**  
**Operating Systems– Fall 2016**  
**Quiz 8**  
**Solutions**

Name: \_\_\_\_\_

Question:	1	Total
Points:	10	10
Score:		

Normalized Total to 100 =  $100 \times \text{Total}/10 =$  \_\_\_\_\_ (what will appear in Canvas gradebook).

1. (10 points) In the following diagram, resources R are rectangles, processes P are circles. Each resource type has only one instance. An arrow from a circle to a rectangle is a request for a resource. An arrow from a rectangle to a circle is a resource granted to the process. In the following diagram, which processes are in deadlock?



Explain:

**Answer:** In a resource allocation graph, cycles indicate deadlock. In this graph, the processes, P2 and P5 are deadlocked, because there is a cycle formed by P2, R4, P5, and R1. There are no other cycles in the graph. P1 and P4 are not currently deadlocked, because they are not in a cycle: the direction of the arrows makes a difference.