Quiz #2 (Module 4) - Answers

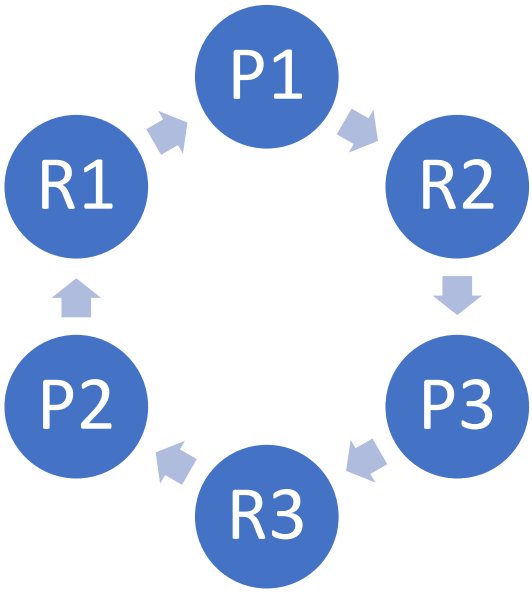
COMP.3080 – Operating Systems

Fall 2019 – Dr. Wilkes

1. (**multiple choice**) (2 points) When does a deadlocked state occur?
    a. A process is unable to release its request for a resource after use.
    b. A process is waiting for I/O to a device that does not exist.
    c. Every process in a set is waiting for an event that can only be caused by another process in the set.
    d. The system has no available free resources.
    e. None of the above
2. (**multiple choice**) (2 points) Which type of scheduling is approximated by predicting the next CPU burst with an exponential average of the measured lengths of previous CPU bursts?
    a. FCFS
    b. Multilevel queue
    c. RR
    d. SJF
    e. None of the above
3. (**true/false**) (1 point) In a resource-allocation graph, a cycle is a necessary and sufficient condition for a deadlock in the case that each resource has exactly one instance.
4. (**true/false**) (1 point) An unsafe state is necessarily, and by definition, always a deadlocked state.

5. (**short answer**) (4 points total) A system has the following characteristics:
   - There are three processes called P1, P2, & P3.
   - There are three resource types R1, R2, & R3, and there is a single instance of each resource type.
   - R1 has been allocated to P1, R2 has been allocated to P3, and R3 has been allocated to P2.
   - P2 is waiting for R1, P1 is waiting for R2, and P3 is waiting for R3.

   a. (2 points) Draw the resource-allocation graph corresponding to the system described above.



   b. (2 points) Is this system in deadlock? Briefly explain your answer.
   YES, because there is a cycle in the resource-allocation graph (i.e., each process is waiting for another process to release a resource it needs).