

**Chapter 6 – Concurrency: Deadlock and Starvation**True / False Questions:

1. Deadlock can be defined as the periodic blocking of a set of processes that either compete for system resources or communicate with each other.
2. All deadlocks involve conflicting needs for resources by two or more processes.
3. A reusable resource is one that can be safely used by only one process at a time and is not depleted by that use.
4. A consumable resource is one that can be safely used by only one process at a time and is not depleted by that use.
5. Although deadlock can potentially exist without it, the condition known as Circular Wait is required for deadlock to actually take place.
6. The strategy of deadlock prevention is to design a system in such a way that the possibility of deadlock is minimized.
7. The Deadlock Avoidance approach to solving the deadlock problem allows the three necessary conditions for deadlocks to exist.
8. In the Resource Allocation Denial approach to Deadlock Avoidance, a safe state is defined as one in which all potential process sequences do not result in a deadlock.
9. Deadlock Detection strategies do not limit resource access or restrict process actions.
10. One of the most common approaches for recovery from deadlocked processes is to abort all deadlocked processes.
11. Although each strategy that deals with deadlocks has its advantages and disadvantages, the best solution to the problem is to choose one and stick with it.
12. The Dining Philosopher's Problem illustrates basic problems in deadlock and starvation.
13. A pipe in UNIX is a circular buffer that allows two processes to communicate on the producer-consumer model.
14. One thread synchronization primitive supported by Solaris is the Mutual Exclusion (mutex) lock.
15. Each synchronization object in a W2K system can either be in a signaled or signaling state.

Multiple Choice Questions:

1. The permanent blocking of a set of processes that either compete for system resources or communicate with each other is called:
  - a. Starvation
  - b. Deadlock
  - c. Prioritization
  - d. All of the above
2. All deadlocks involve conflicting needs for resources by:
  - a. One or more processes
  - b. Two or more processes
  - c. Three or more processes
  - d. None of the above



3. A resource that can be created and destroyed is called a:
  - a. Reusable resource
  - b. Producing resource
  - c. Consumable resource
  - d. All of the above
4. An example of a consumable resource is the following:
  - a. Messages
  - b. Printers
  - c. Main Memory
  - d. All of the above
5. A condition of policy that must be present for a deadlock to be possible is:
  - a. Mutual exclusion
  - b. Hold and wait
  - c. No preemption
  - d. All of the above
6. A direct method of deadlock prevention is to prevent the occurrence of:
  - a. Mutual exclusion
  - b. Hold and wait
  - c. Circular wait
  - d. All of the above
7. One approach to deadlock avoidance is called:
  - a. Process Termination Denial
  - b. Resource Allocation Denial
  - c. Hold and wait
  - d. None of the above
8. In the Resource Allocation Denial approach to Deadlock Avoidance, a safe state is defined as one in which:
  - a. At least one potential process sequence does not result in a deadlock
  - b. All potential process sequences do not result in a deadlock:
  - c. Several potential process sequences do not result in a deadlock:
  - d. None of the above
9. A conservative strategy for dealing with deadlocks that involves limiting access to resources and imposing restrictions on processes is called:
  - a. Deadlock Prevention
  - b. Deadlock Avoidance
  - c. Deadlock Detection
  - d. None of the above
10. In deadlocked process recovery, selection criteria for choosing a particular process to abort or rollback includes designating the process with the:
  - a. Most estimated time remaining
  - b. Lowest priority
  - c. Least total resources allocated so far
  - d. All of the above
11. One approach to an integrated strategy for dealing with deadlocks involves the implementation of:
  - a. Resource classes



- b. Process rollbacks
  - c. Virtual memory
  - d. None of the above
12. The Dining Philosopher's Problem is a standard test case for evaluating approaches to implementing:
- a. Deadlock
  - b. Starvation
  - c. Synchronization
  - d. All of the above
13. A software mechanism that informs a process of the occurrences of asynchronous events in UNIX are called:
- a. Pipes
  - b. Messages
  - c. Signals
  - d. All of the above
14. Thread synchronization primitives supported by Solaris include:
- a. Mutual exclusion (mutex) locks
  - b. Semaphores
  - c. Condition variables
  - d. All of the above
15. The family of synchronization objects implemented by W2K include:
- a. Mutex objects
  - b. Semaphore objects
  - c. Event objects
  - d. All of the above

Fill-In-The-Blank Questions:

1. The permanent blocking of a set of processes that either compete for system resources or communicate with each other is called \_\_\_\_\_.
2. All deadlocks involve conflicting needs for resources by \_\_\_\_\_ or more processes.
3. A resource that can be created (produced) and destroyed (consumed) is called a \_\_\_\_\_ resource.
4. An example of a reusable resource is a \_\_\_\_\_.
5. The \_\_\_\_\_ policy condition, which says a process may hold allocated resources while awaiting assignment of others, must be present for a deadlock to be possible.
6. A(n) \_\_\_\_\_ method of deadlock prevention is to prevent the occurrence of one of the three necessary conditions for deadlock.
7. In Deadlock Avoidance, the Resource Allocation Denial strategy is also referred to as the \_\_\_\_\_.
8. A(n) \_\_\_\_\_ state is one in which every potential sequence of allocation of resources to processes results in a deadlock.
9. In Deadlock Detection, the O/S periodically performs an algorithm that allows it to detect the \_\_\_\_\_ condition.
10. Once a deadlock has been detected, some strategy is needed for \_\_\_\_\_.

11. One approach to an integrated strategy for dealing with deadlocks involves the implementation of \_\_\_\_\_.
12. The Dining Philosopher's Problem illustrates basic problems in \_\_\_\_\_ and \_\_\_\_\_.
13. The type of UNIX pipe that can be shared by unrelated processes is called a(n) \_\_\_\_\_ pipe.
14. The Solaris thread synchronization primitive that is used to wait until a particular condition is true is called a \_\_\_\_\_.
15. In a W2K system, the mutex object is used to enforce mutually exclusive access to a \_\_\_\_\_.