1. A state is _____ if the system can allocate resources for each process in some order and still avoid a deadlock.
    - None
    - Unsafe
    - Starvation
    - **Safe pg#134**

Safe State

A state is safe if the system can allocate resources to each process in some order and still avoid a deadlock. More formally a system is in a safe state only if there exists a safe

2. _____ algorithm is used in Deadlock avoidance.
    - Bakery
    - Mutual exclusion
    - **Banker's Google**
    - Safe sequence

Banker's Algorithm

Banker's Algorithm is a deadlock avoidance algorithm.

3. Typically monitor, a high level synchronization tool is characterized by _____ and _____.
    - Single, wait
    - Global variable, local variable
    - **Local data, programmer defined operator pg#122**
    - Local variables, semaphores

Monitors

Another high-level synchronization construct is the monitor type. A **monitor** is characterized by local data and a set of programmer-defined operators that can be used to

4. The integer value of _____ semaphores can not be greater than 1.
    - Bounded buffer
    - **Binary pg#114**
    - Counting
    - Mutex

Binary semaphore whose integer value cannot be > 1; can be simpler to implement.

5. Banker's algorithm is used for _____.
   - Deadlock removal
   - **Deadlock avoidance Google**
   - Deadlock detection
   - Deadlock prevention

Banker's Algorithm

Banker's Algorithm is a deadlock avoidance algorithm.

6. Possible side effects of _____ deadlocks are low device utilization and reduced system throughput.
   - Ignoring
   - **Preventing Google**
   - Recovering
   - Avoiding

deadlock cannot occur and, hence, that deadlocks cannot hold. Possible side effects of preventing deadlocks by this method, however, are low device utilization and reduced system throughput. An alternative method for avoiding

7. Preventing the condition of _____ to happen, deadlocks can be prevented to happen.
   - Critical section
   - Monitors
   - Critical region
   - **Circular wait pg#134**

deadlock avoidance algorithm dynamically examines the resource-allocation state to ensure that a circular wait condition can never exist.

8. The process of holding at least one resource and waiting to acquire additional resources that are currently being held by other processes is known as _____.
   - **Hold and wait pg#128**
   - Circular wait
   - No preemption
   - Mutual exclusion

Hold and wait: A process must be holding at least one resource and waiting to acquire additional resources that are currently being held by other processes.

9. The _____ requires that once a writer is ready, that writer performs its write as soon as possible. In other words, if a writer is waiting to access the object, no new readers may start reading.
   - third readers-writers problem
   - fourth readers-writers problem
   - first readers-writers problem
   - **second readers-writers problem pg#116**

readers to finish simply because a writer is waiting. The **second readers-writers problem** requires that once a writer is ready, that writer performs its write as soon as

10. Binary semaphore whose integer value cannot be can be _____ simpler to implement.
    - <=1
    - >=1
    - <1
    - **>1 pg#114**

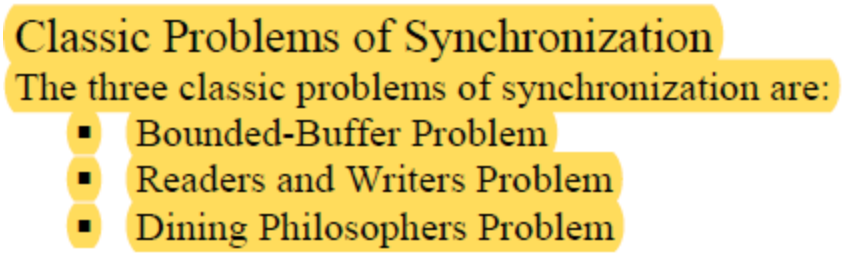
Binary semaphore whose integer value cannot be > 1; can be simpler to implement.

11. The condition where a set of blocked processes each holding a resource and waiting to acquire a resource held by another process in the set, is termed as _____.
    - **Deadlock pg#127**
    - Starvation

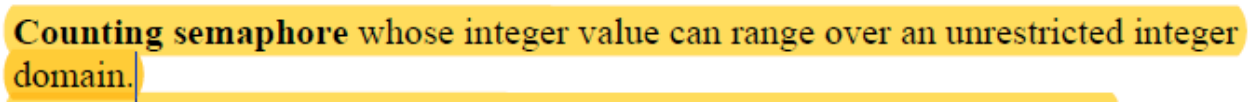
The Deadlock Problem

A set of blocked processes each holding a resource and waiting to acquire a resource held by another process in the set. Here's an example:

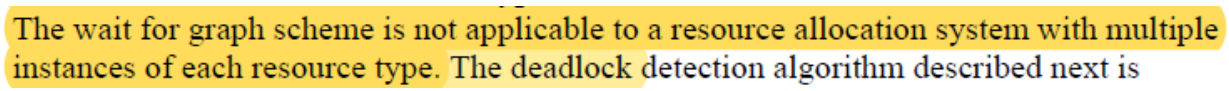
12. Following is not the classical problem of synchronization.
    - Reader writer problem
    - Dining philosophers problem
    - **Counting semaphore problem pg#115**
    - Bounded buffer problem



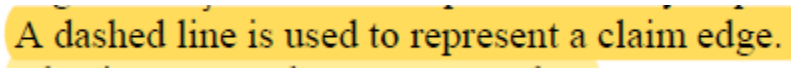
13. The integer value of _____semaphores can range over an unrestricted integer domain.
    - Mutex
    - **Counting pg#114**
    - Bounded buffer
    - Binary



14. The _____ scheme is not applicable to a resource allocation system with multiple instances of each resource type.
    - None of the given options
    - **Wait for graph pg#145**
    - Resource allocation graph
    - Both resource-allocation and wait-for graph



15. A dashed line is used to represent a _____ in Resource Allocation Graph.
    - Assignment edge
    - **Claim edge pg#135**
    - Allocation edge
    - Request edge



16. _____ is an integer variable accessible through wait and signal which are atomic operations.
    - Signal
    - **Semaphore pg#108**
    - Busy waiting
    - Mutex

semaphore. A **semaphore** S is an integer variable that, apart from initialization is accessible only through two standard atomic operations: wait and signal. These

17. _____ is an integer variable accessible through wait and signal which are atomic operations.
    - Signal
    - **Semaphore** **page 108**
    - Busy waiting
    - Mutex

    semaphore. A **semaphore** S is an integer variable that, apart from initialization is accessible only through two standard atomic operations: wait and signal. These
18. Removing the possibility of deadlock in dining philosopher problem does not ensure the _____ problem will not occur.
    - **Starvation** **page 120**
    - Mutual Exclusion
    - Critical Section
    - Bounded Buffer

    Removing the possibility of deadlock does not ensure that starvation does not occur.
19. Which of the following is correct definition for wait operation?
    - Wait(S) {
      S--;
      }
    - **Wait(S) {** **page 108**
      While(S<=0)
      ; // no op
    - Wait(S) {
      S++;
      }
    - Wait(S) {
      While(S>=0)
      ; // no op

```
wait(S) {
  while(S<=0)
  ;// no op
  S--;
}
```

20. In deadlock detection and recovery algorithm, a deadlock exists in the system if and only if the wait for graph contains a _____.
    - Edge

- **Cycle** **page 144**
- Graph
- Node

As before, a deadlock exists in the system if and only if the wait for graph contains a cycle. To detect deadlocks the system needs to maintain the wait-for graph and

KUBRA FILE

21. Deadlock_____ provides a set of methods for setting that at least one of the necessary conditions cannot hold.
    - **. prevention** **page 132**
    - . Avoidance
    - . Handling
    - . Recovery

Deadlock prevention: is a set of methods for ensuring that at least one of the necessary conditions cannot hold. These methods prevent deadlocks by

22. In Resource Allocation Graph, a_____ Pi ----> Rj indicates that process Pi may request resource Rj at some time in the future
    - **. claim edge** **page 135**
    - . assignment edge
    - . allocation edge
    - . request edge

introduce a new type of edge called a **claim edge** to resource allocation graphs. A claim edge $P_i \rightarrow R_j$ indicates that process P_i may request resource R_j at some time in the future.

23. Deadlock can be deal with _____ ways.
    - 4
    - 6
    - **3** **page 132**
    - 2

We can deal with deadlocks in a number of ways:

- Ensure that the system will never enter a deadlock state.
- Allow the system to enter a deadlock state and then recover from deadlock.
- Ignore the problem and pretend that deadlocks never occur in the system.

These three ways result in the following general methods of handling deadlocks:

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24. In order to remove the problem like busy waiting, some high level synchronization constructs are defined. What are they?
    - ●Critical regions and Semaphores
    - **●Critical regions and monitors** **page 113**

These problems are due to programming errors because of the tandem use of the wait and signal operations. The solution to these problems is higher-level language constructs such as critical region (region statement) and monitor. We discuss these constructs and their use to solve the critical section and synchronization problems in the next lecture.

25. The condition in witch a set {P0, P1... Pn} of waiting processes must exist such that P0 is waiting for a resource that is held by P1, P1 is waiting for a resource that is held by P2, and so on, Pn-1 is waiting for a resource held by Pn.
    and Pn is waiting for a resource held P0. This condition is known as _____.
    - ●Mutual exclusion
    - **●Circular wait** **page 128**
    - ●No preemption
    - ●Hold and wait

Circular wait: A set $\{P_0, P_1 \ldots P_n\}$ of waiting processes must exist such that P_0 is waiting for a resource that is held by P_1, P_1 is waiting for a resource that is held by P_2, and so on, P_{n-1} is waiting for a resource held by P_n, and P_n is waiting for a resource held by P_0.

26. Deadlock detection and recovery technique is exactly similar to deadlock avoidance technique to handle deadlock in the system
    - **. false** **page 132** **RECHECK**
    - . true

Deadlock Avoidance: This method of handling deadlocks requires that processes give advance additional information concerning which resources they will request and use during their lifetimes. With this information, it may be decided whether a process should wait or not.

Allowing Deadlocks and Recovering: One method is to allow the system to enter a deadlocked state, detect it, and recover.

27. Semaphores are used to synchronize _____processes
    - . running
    - **. tough** **page 108** **RECHECK**
    - . concurrent
    - . parallel

Semaphores

Hardware solutions to synchronization problems are not easy to generalize to more complex problems. To overcome this difficulty we can use a synchronization tool called a

28. The problem of Deadlocks can be solved by _____ method(s).
    - ●Deadlock avoidance
    - ●Allowing deadlock to occur, then detect and recover
    - **●All of the given** **page 132**
    - ●Deadlock prevention

Deadlock Handling

We can deal with deadlocks in a number of ways:

- Ensure that the system will never enter a deadlock state.
- Allow the system to enter a deadlock state and then recover from deadlock.
- Ignore the problem and pretend that deadlocks never occur in the system.

These three ways result in the following general methods of handling deadlocks:

1. **Deadlock prevention:** is a set of methods for ensuring that at least one of the necessary conditions cannot hold. These methods prevent deadlocks by constraining how processes can request for resources.
2. **Deadlock Avoidance:** This method of handling deadlocks requires that processes give advance additional information concerning which resources they will request and use during their lifetimes. With this information, it may be decided whether a process should wait or not.
3. **Allowing Deadlocks and Recovering:** One method is to allow the system to enter a deadlocked state, detect it, and recover.

29. _____ is used in the detection and recovery mechanism to handle deadlocks.
    - Claim Edge Graph
    - Resource allocation Graph
    - **Wait-for Graph** **page 144**
    - Circular Graph

If all resources have only a single instance, then we can define a deadlock detection algorithm that uses a variant of the resource allocation graph, called a **wait-for graph**.

30. Wrong use of wait and signal operations (in context with semaphores) can cause _____ problem (s).
    - **All of the given options are correct** **Google**
    - Bounded Waiting
    - Mutual Exclusion
    - Deadlock
31. Which of the following is correct definition for signal operation?
    - Signal(S) {
      S--
      }
    - Signal(S) {
      While(S<=0)
      ; // no op
      S--
      }
    - **Signal(S) {** **page 108**
      S++

}

- Signal(S) {
  While(S>=0)
  ; // no op
  S--
  }

```
signal(S) {
   S++;
}
```

32. If system is not in a safe state, there can be NO deadlocks.
    - True
    - **False** **page 134**

If a system is in a safe state, there can be no deadlocks.