**Avdon Racki – 100661246 – OS Cheat Sheet**

**MULTIPLE CHOICE**

1)When a process creates a new thread using the pthread\_create () operation, which of the following states is shared between the parent process and the new thread?

**All of the others**

2)  The \_\_\_\_\_\_\_\_\_ is the less-privileged mode.

**user mode**

3)  A \_\_\_\_\_\_\_\_\_ is a single execution path with an execution stack, processor state, and scheduling information.

**Thread**

4)  A \_\_\_\_\_\_\_\_\_\_ is an entity corresponding to a user job or application that owns resources such as memory and open files.

**process**

5)  A thread enters the \_\_\_\_\_\_\_\_\_ state, if it is ready to run but the resources are not available.   
**Waiting**

6)  The \_\_\_\_\_\_\_\_\_\_ state is when the thread has terminated.

**zombie**

7)  The \_\_\_\_\_\_\_\_\_ are the fundamental entities that can be scheduled and dispatched run on one of the system processors.

**Kernel threads**

8)  The management of multiple processes within a uniprocessor system is \_\_\_\_\_\_\_\_\_\_.

**Multiprogramming**

9)  The requirement that when one process is in a critical section that accesses shared resources, no other process may be in a critical section that accesses any of those shared resources is \_\_\_\_\_\_\_\_.

**mutual exclusion**

10)  A means for two processes to exchange information is with the use of \_\_\_\_\_\_\_\_\_.

**messages**

11)  A \_\_\_\_\_\_ occurs when multiple processes or threads read and write data items so that the final result depends on the order of execution of instructions in the multiple processes.

**Race condition**

12) \_\_\_\_\_\_\_\_ is when the sequence of instruction is guaranteed to execute as a group, or not execute at all, having no visible effect on system state.

**A close up of a map

Description automatically generatedAtomic operation**

13) A process control block (PCB) \_\_\_\_.

**includes information on the process's state**

14)  When a child process is created, which of the following is a possibility in terms of the execution or address space of the child process?

**All of the others**

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Description automatically generated15)  A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ saves the state of the currently running process and restores the state of the next process to run.

**context switch**

16) In a(n)\_\_\_\_ queue, the sender must always block until the recipient receives the message.

**zero capacity**

17)  Which of the following would lead you to believe that a given system is a Symmetric Multi-Processor-type system?

**Each processor performs all tasks within the operating system.**

18)  The term \_\_\_\_\_\_\_ refers to a technique in which a process can do nothing until it gets permission to enter its critical section but continues to execute an instruction or set of instructions that tests the appropriate variable to gain entrance.

**spin waiting**

19)  Cache coherency means:

**To ensuring that multiple caches store the most updated version of the stored data.**

20)  Which statement is true?

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Description automatically generated**Interrupts may be triggered by either hardware of software.**

21)  According to Amdahl's Law, what is the speedup gain for an application that is 40% parallel and we run it on a machine with 3 processing cores?  
**a) 1.36**22) Thread-local storage is data that \_\_\_\_.

**is unique to each thread.**

23)  What (are) is considered a challenge when designing applications for multicore systems.

**All of the others.**

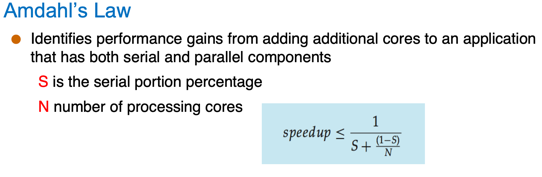
24) In Pthreads, a parent uses the pthread\_join () function to:

**wait for its child thread to complete**

25)  A mutex lock \_\_\_\_.

**is a Boolean variable**

**A close up of a map

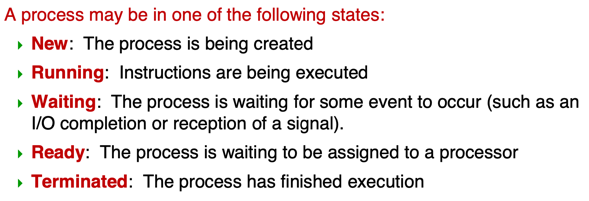
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Description automatically generated**26)  Probably the most useful combination, \_\_\_\_\_\_\_\_ allows a process to send one or more messages to a variety of destinations as quickly as possible. **nonblocking send, blocking receive**   
27) What is the difference between protection and security?   
**Protection is controlling the access to the computer resource. Security is to defend the system from internal or external attacks.**   
28)  What is the correct order of operations for protecting a critical section using mutex locks?  **acquire () followed by release ()**   
29) \_\_\_\_\_ can be used to prevent busy waiting when implementing a semaphore.   
**Waiting queues**   
30) A\_\_\_\_\_\_\_\_ relationship allows multiple server processes to provide concurrent service to multiple clients.   
**many-to-many  
SHORT ANSWER**a) Two of the main design goals in building an operating system are fairness and real-time. Explain if these design goals contradict each other or not. **Solution:**   
Yes they contradict each other.  
Fairness requires that each process be allocated its resources in a fair way, with no process getting more than its fair share.  
On the other hand, real time requires that resources be allocated based on the times when different processes must complete their execution.  
A real time process may get a disproportionate share of the resources.   
b) In a system with threads, is there one stack per thread or one stack per process? Why?   
**Solution:**   
Each thread should have its own stack since it may call procedures on its own, so it must have its own stack for the local variables, return addresses, and so on.   
c) What are the main benefits of multithreaded programming?   
**Solution:**   
responsiveness,  
resource sharing,  
economy,  
utilization of multiprocessor architectures.   
d) What are the three conditions that must be satisfied in order to solve the critical section problem?   
**Solution**:  
Mutual exclusion: no thread may be executing in its critical section if a thread is currently executing in its critical section.   
Progress: only those threads that are not executing in their critical sections can participate in the decision on which process will enter its critical section next.   
Bounded delay: a bound must exist on the number of times that other threads are allowed to enter their critical state after a thread has made a request to enter its critical state

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