California State University, Sacramento
CSC 139 Operating System Principles
Quiz 1, Spring 2018

48

Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page.

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Section: 4

Multiple Choice (4 points each)

1. Which of the following is NOT a component of a computer system?
   - (A) Computer hardware
   - B. Operating system
   - C. System and application programs
   - D. Users
   - E. None of the above

2. Which of the following would lead you to believe that a given system is an SMP-type system?
   - A. Each processor is assigned a specific task.
   - B. There is a bossworker relationship between the processors.
   - (C) Each processor performs all tasks within the operating system.
   - D. None of the above

3. The tendency of execution to involve a number of memory locations that are clustered, i.e., with addresses that are close together is termed
   - A. spatial locality
   - B. temporal locality
   - C. recursion
   - D. hit ratio
   - (E) concurrency

4. Which of the following storage medium is faster in speed?
   - (A) register
   - B. cache
   - C. main memory
   - D. magnetic disk

5. In which mode is a system call executed?

   User

(A) User mode
B. Kernel mode
C. Either of user mode or kernel mode
D. None of the above

6. When an external device detects an event that requires the attention of the operating system, it
   A. performs a system call
   B. executes a trap instruction
   C. waits for the processor to notice
   (D) sends an interrupt to the processor
   E. sends a message to the operator

7. Which of the following is one type of user interface?
   A. Command-line (CLI)
   (B) Graphics User Interface (GUI)
   C. Batch
   D. All of the above
   E. None of the above

8. Which of the following runs inside the kernel?
   A. User programs
   B. System programs
   C. Library calls
   (D) OS services
   E. All of the above

9. Which of the following is true regarding system calls?
   A. It's the only gateway for a program to get OS services
   (B) It can be directly accessed by user programs
   C. It can replace the system programs as using it can fulfil all the necessary functionalities
   D. All of the above
   E. None of the above

10. Which of the following is used to contain temporary data in a process's memory layout?
    A. Text section

B. Stack

C. Heap

D. Data section

E. None of the above

11. Which of the following is true about process?

A. Process state can be changed from ready to terminated

B. Context of a process is represented in the Process Control Block (PCB)

C. Context switch means CPU chooses one process from the ready queue to be executed next

D. A thread means a single process

12. Which of the following system calls is used to let the parent process wait for termination of a child process?

A. abort()

B. wait()

C. fork()

D. exec()

13. Which of the following system calls is used to let the parent process creates a child process?

A. abort()

B. wait()

C. fork()

D. exec()

14. Which of the following is true about producer-consumer problem where the shared buffer is implemented as a circular array with two logical pointers: *in* and *out*, and the variable *in* points to the next free position in the buffer; *out* points to the first full position in the buffer?

A. The buffer is empty when $in == out$; the buffer is full when $((in + 1)\ \%\ BUFFER\ SIZE) == out$

B. The buffer is full when $in == out$; the buffer is empty when $((in + 1)\ \%\ BUFFER\ SIZE) == out$

C. All the elements of the buffer can be used

D. A and C

E. B and C

15. Which of the following is true about threads?

A. Threads can share all the sections including code, data, files, stack and registers
B. Each thread has a program counter
C. There can be parallelism on multi-threaded single-core system
D. There is no way multiple threads could make progress on a single-core system

16. A message-passing model is _____.
    A. easier to implement than a shared memory model for inter-computer communication
    B. faster than the shared memory model
    C. a network protocol, and does not apply to operating systems
    D. only useful for small simple operating systems

17. A microkernel is a kernel _____.
    A. containing many components that are optimized to reduce resident memory size
    B. that is compressed before loading in order to reduce its resident memory size
    C. that is compiled to produce the smallest size possible when stored to disk
    D. that is stripped of all nonessential components

18. In a(n) _____ temporary queue, the sender must always block until the recipient receives the message.
    A. zero capacity
    B. variable capacity
    C. bounded capacity
    D. unbounded capacity

19. A process that has terminated, but whose parent has not yet called wait(), is known as a _____ process.
    A. zombie
    B. orphan
    C. terminated
    D. init

20. A _____ uses an existing thread - rather than creating a new one - to complete a task.
    A. lightweight process
    B. thread pool
    C. scheduler activation
    D. asynchronous procedure call

21. In indirect communication between processes P and Q,
   (A) there is another process R to handle and pass on the messages between P and Q.
   B. there is another machine between the two processes to help communication.
   C. there is a mailbox to help communication between P and Q.
   D. None of the above

22. In UNIX, the return value for the fork system call is _____ for the child process and _____ for the parent process.
   A. a negative integer; zero
   B. zero; a negative integer
   C. zero; a nonzero integer
   (D.) a nonzero integer; zero

True or False (2 points each)

23. True/False F A system call is triggered by hardware.

24. True/False T Many operating system merge I/O devices and files into a combined file because of the similarity of system calls for each.

25. True/False T The single benefit of a thread pool is to control the number of threads.

26. True/False T Application programmers typically use an API rather than directory invoking system calls.

27. True/False T It is possible to create a thread library without any kernel-level support.

28. True/False F It is possible to have concurrency without parallelism.

End of exam.