2021

ADVANCED OPERATING SYSTEM

Full Marks: 60

Time: 2 hours

The figures in the margin indicate full marks for the questions.

A.   Multiple Choice Questions   1 x 20=20

  1.   Which conditions must be satisfied to solve a critical section problem?

    a.   Bounded Waiting

    b.   Progress

    c.   Mutual Exclusion

    d.   All of these

  2.   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 mentioned

  3.   If all processes I/O bound, the ready queue will almost always be _____ and the Short-term Scheduler will have a _____ to do.

    a.   full, little

    b.   full, lot

    c.   empty, little

    d.   empty, lot

  4.   Which one of the following is a synchronization tool?

    a.   Thread

    b.   Pipe

c. Semaphore

d. Socket

5. When several processes access the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place is called _____

a. dynamic condition

b. race condition

c. essential condition

d. critical condition

6. With _____ only one process can execute at a time; meanwhile all other process are waiting for the processor. With _____ more than one process can be running simultaneously each on a different processor.

a. Multiprocessing, Multiprogramming

b. Multiprogramming, Uniprocessing

c. Multiprogramming, Multiprocessing

d. Uniprogramming, Multiprocessing

7. 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

8. RPC provides a(an) _____ on the client-side, a separate one for each remote procedure.

a. stub

b. identifier

c. name

d. process identifier

9. A process that is based on IPC mechanism which executes on different systems and can communicate with other processes using message based communication, is called _____

a. Local Procedure Call

b. Inter Process Communication

c. Remote Procedure Call

d. Remote Machine Invocation

10. What are the operations that can be invoked on a condition variable?

a. wait & signal

b. hold & wait

c. signal & hold

d. continue & signal

11. If no process is suspended, the signal operation _____

a. puts the system into a deadlock state

b. suspends some default process execution

c. nothing happens

d. the output is unpredictable

12. The bounded buffer problem is also known as _____

a. Readers – Writers problem

b. Dining – Philosophers problem

c. Producer – Consumer problem

d. None of the mentioned

13. The circular wait condition can be prevented by _____

a. defining a linear ordering of resource types

b. using thread

c. using pipes

d. all of the mentioned

14. The hardware mechanism that allows a device to notify the CPU is called _____

a. polling

b. interrupt

c. driver

d. controlling

15. The _____ determines the cause of the interrupt, performs the necessary processing and executes a return from the interrupt instruction to return the

CPU to the execution state prior to the interrupt.

    a. interrupt request line

    b. device driver

    c. interrupt handler

    d. all of the mentioned

16. If the kernel is single threaded, then any user level thread performing a blocking system call will _____

    a. cause the entire process to run along with the other threads

    b. cause the thread to block with the other threads running

    c. cause the entire process to block even if the other threads are available to run

    d. none of the mentioned

17. Multithreading an interactive program will increase responsiveness to the user by _____

    a. continuing to run even if a part of it is blocked

    b. waiting for one part to finish before the other begins

    c. asking the user to decide the order of multithreading

    d. none of the mentioned

18. How many times the following C program prints yes?

```
main()
   {
     fork();fork();printf("yes");
   }
```

    a. only once

    b. twice

    c. four times

    d. eight times

19. Which one of the following is not shared by threads?

    a. program counter

    b. stack

    c. both program counter and stack

    d. none of the mentioned

20   A page fault occurs when?

    a.   a page gives inconsistent data

    b.   a page cannot be accessed due to its absence from memory

    c.   a page is invisible

    d.   all of the mentioned

B.   Very Short Question   2*6=12

1.   What is distributed scheduling?

2.   What is logical clock in distributed system?

3.   What is a virtual machine?

4.   Define Monitor and semaphore.

5.   Define system call and interrupt.

6.   What is a critical section?

C   Short Question   4*7=28

1.
    Differentiate among Time sharing, multiprogramming, multiprocessing OS.

2.
    What is kernel? What is User Mode and kernel Mode?

3.   Explain briefly about deadlock detection in distributed system.

4.   Compare token based and non-token based algorithms for distributed mutual exclusion.

5.   Differentiate between Process and Thread. What are the benefits of threads?

6.   Explain starvation and solution to starvation with regards to Dining Philosopher Problem.

7.   What are User Level Thread and Kernel Level Thread? Compare and contrast User Level Thread and Kernel Level Thread.