Operator System Questions
TEST 1

1. Main memory can be viewed as _____for secondary storage

A. low-speed storage   B. special storage   <u>C. a fast cache</u>   D. cache

2. GUI stands for

A. graphical user interpreter

B. graphical user internet

C. All are true

<u>D. graphical user interface</u>

3. PLO2-PI2.1 (2) **Which of the following describes primary purpose of an operating system?**

a. Primary purpose of an operating system is to make computers easier to use.

b. Primary purpose of an operating system is to allow people to use the computer.

<u>c. Primary purpose of an operating system is to provide an environment in which a user can execute programs in a convenient and efficient manner.</u>

d. Primary purpose of an operating system is to allow people to use the computer. Furthermore, it's to keep system programmers employed.

4. Choose the correct answer regarding the purpose of the system call?

<u>a. To request services from the operating system.</u>

b. To interact with computer hardware

c. To provide a user interface

d. To execute user programs

5. Choose the correct answer regarding the advantages of using loadable kernel modules?

a. Limited flexibility in adding new functionalities

b. Difficulty in updating kernel features

<u>c. Improved system performance</u>

d. Increased kernel size

6. For ensuring the efficient operation of the system itself via resource sharing, set of OS functions provides:

A. A, C

B. Accounting, Protection and security, Error detection

<u>C. Resource allocation, Accounting, Protection and security</u>

D. Accounting, Protection and security

7. A process needs certain resources, including ____, _____, ____, and ____ to accomplish its task.

<u>A. CPU time, memory, files, I/O devices</u>

B. CPU time, RAM, ROM, programs

C. CPU, RAM, ROM, I/O devices

8. System Calls have ____ types, and they are ____

<u>A. 5, Process control, File management, Device management, Information maintenance, Communications</u>

B. 5, File management, Device management, Information maintenance, Communications, Memory management

C. 5, Process control, File management, Device management, Information maintenance, Information security

D. 5, Device management, Information maintenance, Communications, File Modification

9. PLO2-PI2.1 (2) **Which of the following is an example of a file management system call for Windows operating system?**

a. CreateFile( ) , MapViewOfFile( ), CreateFileMapping( ), Close ( )

b. CreateFile( ), Read ( ), MapViewOfFile( ), SetTimer( )

c. CreatePipe( ), WriteFile( ), Read( ), SetTimer( )

<u>d. CreateFile( ), ReadFile( ), WriteFile( ), CloseHandle( )</u>

TEST 2

1. Choose the correct statement of process in operating system is defined ==incorrectly==

a. **Running:** Instructions are being ==created==. (→ executed)

b. **New:** The process is being created.

c. All of the above

d. **Terminated:** The process has finished execution

Process State

- As a process executes, it changes **state**
  - **New**: The process is being created
  - **Running**: Instructions are being executed
  - **Waiting**: The process is waiting for some event to occur
  - **Ready**: The process is waiting to be assigned to a processor
  - **Terminated**: The process has finished execution

2. Choose the state that is not a process state

a. Blocked

b. Execution

c. Running

d. Terminated
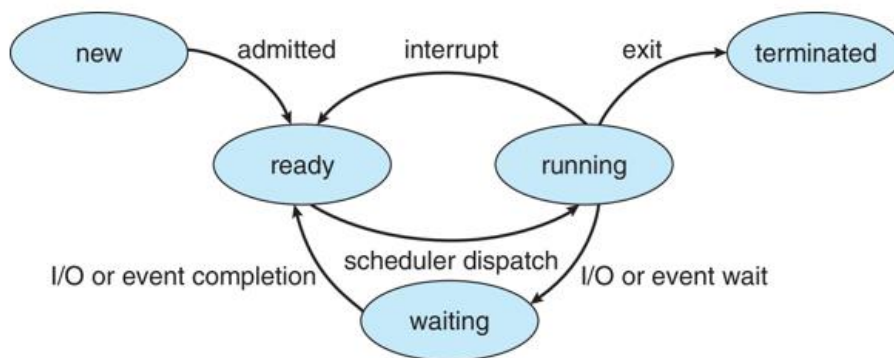
3. PLO2-PI2.1 (2) Which of the following statement about threads is incorrect?

a. Threads of same process share code, data and resources with one another

b. Threads slows down the processing speed due to its complex programming

c. Threads provide low cost method of implementing concurrency

d. Threads have their own stack and CPU state

4. PLO2-PI2.1 (2) Which of the following is true about ?

a. Restrict to load a program into memory.

b. All of the above

c. Provides a mechanism for process synchronization.

d. Do not provides a mechanism for process communication.

5. PLO2-PI2.1 (2) In PCB, _____ includes the amount of CPU and real time used, time limits, account numbers, job or process numbers

a. I/O status information

b. Accounting information

c. CPU registers

d. CPU Scheduling Information

- **CPU registers**. The registers vary in number and type, depending on the computer architecture. They include accumulators, index registers, stack pointers, and general-purpose registers, plus any condition-code information. Along with the program counter, this state information must be saved when an interrupt occurs, to allow the process to be continued correctly afterward when it is rescheduled to run.

- **CPU-scheduling information**. This information includes a process priority, pointers to scheduling queues, and any other scheduling parameters. (Chapter 5 describes process scheduling.)

- **Memory-management information**. This information may include such items as the value of the base and limit registers and the page tables, or the segment tables, depending on the memory system used by the operating system (Chapter 9).

- **Accounting information**. This information includes the amount of CPU and real time used, time limits, account numbers, job or process numbers, and so on.

- **I/O status information**. This information includes the list of I/O devices allocated to the process, a list of open files, and so on. **(P110)**

Each process is represented in the operating system by a **process control block** (**PCB**)—also called a **task control block**. A PCB is shown in Figure 3.3. It contains many pieces of information associated with a specific process, including these:

- **Process state**. The state may be new, ready, running, waiting, halted, and so on.

- **Program counter**. The counter indicates the address of the next instruction to be executed for this process.

| process state |
| process number |
| program counter |
| registers |
| memory limits |
| list of open files |
| • • • |
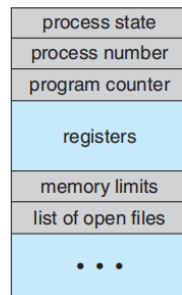
6. Which of the following is **not** an advantage of **multiprogramming?**
I. Increased CPU utilization
II. Better resource utilization
III. Faster response time for the user
IV. Decreased throughput

7. Choose the best answer about the CPU scheduling criteria
   I.   Minimum: Response time, turn-around time
          Maximum: Processor utilization, throughput, waiting time
   II.   Minimum: Response time, turn-around time, waiting time
          Maximum: Processor utilization, throughput
   III.   Minimum: Response time, waiting time
          Maximum: Processor utilization, throughput, turn-around time
   IV.   All I, II, III are TRUE

It is desirable to maximize CPU utilization and throughput and to minimize turnaround time, waiting time, and response time. In most cases, we optimize the average measure. However, under some circumstances, we prefer to optimize the minimum or maximum values rather than the average. For example, to guarantee that all users get good service, we may want to minimize the maximum response time. **(P205)**

8. Choose the correct statement of process in operating system is defined incorrectly
a. None of these
b. Running: Instructions are being **created** (→ executed)
c. New: The process is being created.
d. All of the above

9. Choose the state that is not a process state
a. Running
b. Terminated
c. Blocked
d. All are TRUE

TEST 3

1. PLO2-PI2.1 (2) **CPU scheduling is the basis of _____**
a. All of the above.
b. Larger memory sized systems.
c. Multiprogramming operating systems.
d. Multiprocessor systems.

> CPU scheduling is the basis of multiprogrammed operating systems. By switching the CPU among processes, the operating system can make the computer more productive. In this chapter, we introduce basic CPU-scheduling concepts

2. **Which of the following is not correct regarding FCFS?**
a. FCFS is easy to understand and implement.
b. Its implementation is based on FIFO queue.
c. Average wait time is high.
d. FCFS scheduling algorithm is preemptive → **Nonpreemtive.**

> **5.3 Scheduling Algorithms** 207
>
> devices are idle. Eventually, the CPU-bound process finishes its CPU burst and moves to an I/O device. All the I/O-bound processes, which have short CPU bursts, execute quickly and move back to the I/O queues. At this point, the CPU sits idle. The CPU-bound process will then move back to the ready queue and be allocated the CPU. Again, all the I/O processes end up waiting in the ready queue until the CPU-bound process is done. There is a convoy effect as all the other processes wait for the one big process to get off the CPU. This effect results in lower CPU and device utilization than might be possible if the shorter processes were allowed to go first.
> Note also that the FCFS scheduling algorithm is nonpreemptive. Once the

3. PLO2-PI2.1 (2) _____ scheduling is a _____ algorithm and one of the most common scheduling algorithms **in batch systems.**
a. Priority/ nonpreemptive
b. Priority/ preemptive
c. Shortest Remaining Time/ nonpreemptive
d. Round Robin/ nonpreemptive

> **5.3 Scheduling Algorithms** 213
>
> | P_2 | P_5 | P_1 | P_3 | P_4 |
> |---|---|---|---|---|
>
> 0 1   6   16   18 19
>
> The average waiting time is 8.2 milliseconds.
> Priorities can be defined either internally or externally. Internally defined priorities use some measurable quantity or quantities to compute the priority of a process. For example, time limits, memory requirements, the number of open files, and the ratio of average I/O burst to average CPU burst have been used in computing priorities. External priorities are set by criteria outside the operating system, such as the importance of the process, the type and amount of funds being paid for computer use, the department sponsoring the work, and other, often political, factors.
> Priority scheduling can be either preemptive or nonpreemptive. When a process arrives at the ready queue, its priority is compared with the priority of

4. PLO2-PI2.1 (2) Describe disadvantage of the One to One Model ?
a. increased concurrency provided by this model
b. creating a user thread requires creating the corresponding kernel thread
c. creating so many threads at once can crash the system
d. decreased concurrency provided by this model

5. PLO2-PI2.1 (2) **which of the following is not contained by a Process Control Block (PCB)?**
a. Data
b. Bootstrap program
c. Stack
d. Code

6. Which of the following is not correct regarding FCFS (First-Come, First-Served)?
a. It may lead to the "convoy effect" where shorter processes are stuck behind longer ones.
b. It is a non-preemptive scheduling algorithm.
c. FCFS scheduling algorithm is preemptive.
d. It follows the principle of first come, first served.

Assume that you have the following processes, their arrival times and burst times.

Job	Arrival Time	CPU burst
P1	0	5
P2	3	7
P3	4	5
P4	11	4
P5	12	1
P6	15	3

7. For **FCFS** scheduling algorithms, determine the waiting times for the **average waiting times.**
      a. 9.6   b. 8,7   c. 5,3   d. 10

8. For **Round Robin (Time Quantum = 5)** scheduling algorithms, determine the **waiting times** for P5
      a. 7   b. 10   c. 9   d. 15

TEST 4

1. PLO2-PI2.1 (2) Select answer: An_____ provides uinterruptible updates on basic data types such as integers and booleans.
a. Memory Barrier
b. Atomic Variable
c. Compare-and-swap
d. None of the choices

2. Choose the best describe about "mutex":
a. can be accessed from multiple processes.
b. must be accessed from only one process.
c. None of these.
d. is a binary mutex.

3. PLO2-PI2.1 (2) Choose the best describe about "mutex":
a. is a binary mutex.
b. None of these.
c. must be accessed from only one process.
d. can be accessed from multiple processes

4. PLO2-PI2.1 (2) Select answer: Semaphore is a/an _____ to solve the critical section problem.
   a. special program for a system
   b. hardware for a system
   c. integer variable
   d. None of these

5. An_____ provides uninterruptible updates on basic data types such as integers and booleans.
   a. Memory Barrier
   b. Compare-and-swap
   c. None of the choices
   d. Atomic Variable

6. Semaphore is a/an _____ to solve the critical section problem.
   a. integer variable
   b. special program for a system
   c. None of these
   d. All are TRUE

7. PLO2-PI2.1 (2) One disadvantage of spinlocks is:
   a. they require busy waiting
   b. they are too complex for programmers
   c. they are unreliable sometimes
   d. they are not sufficient for many process

8. PLO2-PI2.1 (2) Select answer: _____ are abstract data types that provide a high-level form of process synchronization.
   a. Monitors
   b. Semaphores
   c. Mutex Locks
   d. None of the choices

TEST 5

1. PLO2-PI2.1 (2) Identify a system is in the safe state if:
   I. The system can allocate resources to each process in some order and still avoid a deadlock.
   II. There exists a safe sequence.

a. II	b. I	c. both I and II.	d. Neither I nor II.

2. Choose the best method that is a visual (mathematical) way to determine the deadlock occurrence
   a. resource allocation graph
   b. none of the mentioned
   c. inversion graph
   d. starvation graph

3. PLO2-PI2.2 (3) Compute of the Need matrix, using the banker's algorithm.

	Allocation $ABCD$	Max $ABCD$
T_0	0 0 1 2	0 0 1 2
T_1	1 0 0 0	1 7 5 0
T_2	1 3 5 4	2 3 5 6

a. The values of Need for processes P_0 through P_4 (0, 1, 0, 0), (0, 7, 5, 0), (1, 4, 0, 2)
b. The values of Need for processes P_0 through P_4 (0, 0, 0, 1), (0, 7, 5, 0), (1, 2, 0, 2)
c. The values of Need for processes P_0 through P_4 (0, 0, 0, 0), (0, 7, 5, 0), (1, 0, 0, 2)
d. The values of Need for processes P_0 through P_4 (0, 0, 2, 0), (0, 7, 5, 0), (1, 0, 1, 2)

4. PLO2-PI2.2 (3) Choose the safe state in a system, using the banker's algorithm.

	Allocation	Max	Available
	A B C D	A B C D	A B C D
T_0	0 0 1 2	0 0 1 2	1 5 2 0
T_1	1 0 0 0	1 7 5 0	
T_2	1 3 5 4	2 3 5 6	

a. P1 -> P2 -> P0
b. P1 -> P0 -> P2
c. P2 -> P0 -> P1
d. P0 -> P2 -> P1

5. PLO2-PI2.2 (3) Choose the safe state in a system, using the banker's algorithm.

	Allocation	Max	Available
	A B C D	A B C D	A B C D
T_0	3 1 4 1	6 4 7 3	2 2 2 4
T_1	2 1 0 2	4 2 3 2	
T_2	2 4 1 3	2 5 3 3	

a. P2 -> P1 -> P0 (cả 2 đều đúng)
b. P1 -> P0 -> P2
c. P2 -> P0 -> P1
d. P1 -> P2 -> P0

6. A process is said to be in the ____ state if it was waiting for an event that will never occur.
a. Terminate
b. Ready
c. Deadlock
d. Blocked

7.
Choose the best statement about the below wait-for graph
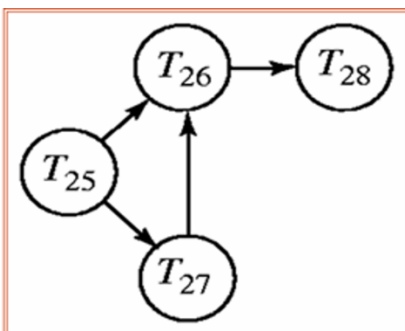
a. This is a no-loop graph
b. All are true
c. The graph is not correct
d. This absolutes having a deadlock

8.

Choose all that are true about the deadlock avoidance method:
I. A state is safe if the system can allocate all resources requested by all processes (up to their stated maximums) without entering a deadlock state.
II. All safe states are deadlock-free, but not all unsafe states lead to deadlocks.
III. This method does not need the system to have some additional a priori information available.

Select one:

a. I, II

b. I, II, III

c. I, III

d. II, III

9.

There are ... way(s) of handling deadlocks, which are ...
I. 4, deadlock prevention, deadlock avoidance, deadlock detection, and recovery, ignore the problem altogether.
II. 3, deadlock prevention, deadlock detection, and recovery ignore the problem altogether
III. 2, deadlock prevention, deadlock detection and recovery
IV. All are TRUE

Select one:

a. I

b. III

c. IV

d. II

TEST 6

1. PLO2-PI2.2 (3) Compute of the Need matrix, using the banker's algorithm.

	Allocation A B C D	Max A B C D
T_0	0 0 1 2	0 0 1 2
T_1	1 0 0 0	1 7 5 0
T_2	1 3 5 4	2 3 5 6

Need = Max - Allocation

a. The values of Need for processes P_0 through P_4 (0, 1, 0, 0), (0, 7, 5, 0), (1, 4, 0, 2)
b. The values of Need for processes P_0 through P_4 (0, 0, 0, 1), (0, 7, 5, 0), (1, 2, 0, 2)
c. The values of Need for processes P_0 through P_4 (0, 0, 0, 0), (0, 7, 5, 0), (1, 0, 0, 2)
d. The values of Need for processes P_0 through P_4 (0, 0, 2, 0), (0, 7, 5, 0), (1, 0, 1, 2)

2. The page table contains _____
A. page offset
B. none of the mentioned
C. base address of each page in physical memory
D. page size

3. A system with 5 processes P0 through P4 and three resource types A, B, C have A with 10 instances, B with 5 instances, and C with 7 instances. At time t_0, the following snapshot has been taken:

Allocation (process-wise: P_0 through P_4 top **to** bottom)

A B C
0 1 0
2 0 0
3 0 2
2 1 1
0 0 2

MAX (process-wise: P_0 through P_4 top **to** bottom)

A B C
7 5 3
3 2 2
9 0 2
2 2 2
4 3 3

Available

A B C
3 3 2

The sequence <P1, P2, P3, P4, P0> leads the system to _____
A. a safe state
B. an unsafe state
C. a protected state
D. a deadlock

4. To avoid deadlock _____
A. there must be a fixed number of resources to allocate
B. resource allocation must be done only once
C. all deadlocked processes must be aborted
D. inversion technique can be used

5. PLO2-PI2.1 (2) Choose the best method that is a visual (mathematical) way to determine the deadlock occurrence
a. inversion graph
b. none of the mentioned
c. resource allocation graph
d. starvation graph

6. PLO2-PI2.2 (3) Apply Dynamic Storage-Allocation using first-fit method, what is the remaining memory?
Given five memory partitions of 100 KB, 600 KB, 200 KB, 300 KB, and 500 KB (in order), place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)?
a. All are right.
b. 100, 276,200,300,83
c. 100,388,200,300,388
d. All are wrong.

7. PLO2-PI2.1 (2) Choose the best answer about the Paging
I. Paging allows modular programming.
II. Paging solves the memory fragmentation problem
III. Paging avoids deadlock.

a. I   b. III   c. Both I and II   d. II

8. PLO2-PI2.1 (2) Describe of the following is the deadlock avoidance algorithm?

a. round-robin algorithm

b. elevator algorithm

c. karn's algorithm

d. banker's algorithm

TEST 7

1. Choose the wrong statement(s) about the advantages of placing functionality in a device controller, rather than in the kernel

a. The kernel is simplified by moving algorithms out of it (chura check)

b. Performance can be improved by utilizing dedicated hardware and hard-coded algorithms

c. Bugs are less likely to cause an operating system crash

d. All of the above.

2. When the valid - invalid bit is set to valid, it means that the associated page _____

a. has data in it

b. is in the process's logical address space

c. is in the TLB

d. is the system's physical address space

3. Choose the wrong statement(s) about Paging Advantages

a. All are wrong.

b. Easy to use memory management Algorithm.

c. No external fragmentation.

d. Faster memory lookup times than segmentation.

4. Choose the correct statement(s) about l/O hardware

a. l/O hardware contains: port, bus, controller, devices I/O.

b. l/O hardware contains: port.

c. I/O hardware contains: port, bus, controller

d. l/O hardware contains: bus, controller.

5. Apply the page replacement is "LRU" method, if all page frames are initially empty, and a process is allocated 4 page frames in real memory and references its pages in the order 123412012345, the total number of page faults caused by the process will be

a. 5

b. 8

c. 7

d. 9

6. Choose the method of data transfer that eliminates the participation of the processor during data transfer.

I. Programmed I/O

Il. Interrupt-driven I/O

IlI. Direct Memory Access (DMA)

IV. Input/Output Memory Management Unit (IOMMU)

a. II

b. I

c. IV

d. III

7. Apply the page replacement is "Optimal" method, if all page frames are initially empty, and a process is allocated 4 page frames in real memory and references its pages in the order 123412512 345, the total number of page faults caused by the process will be

a. 8
b. 5
c. 7
d. 6

8. _____allocates the largest hole (free fragment) available in the memory

I. Best Fit
II. First Fit
III. Worst Fit
IV. All are TRUE
a. I
b. IV
c. III
d. II

9. PLO2-PI2.1 (2) Choose the correct statement(s) about Polling Controller sets_____, executes transfer.
a. busy bit
b. error bit
c. wait bit
d. command-ready

10. Choose the **wrong statement(s)** about the advantages of placing functionality in a device controller, rather than in the kernel
a. Bugs are less likely to cause an operating system crash
b. Performance can be improved by utilizing dedicated hardware and hard-coded algorithms
c. Bugs are easy to fix-a new firmware version or new hardware is needed.
d. All of the above.

9.13 Explain why mobile operating systems such as iOS and Android do not support swapping.
→ **Swapping in mobile system OS, like Android, is not feasible.**

Consider the resource allocation graph in the figure-
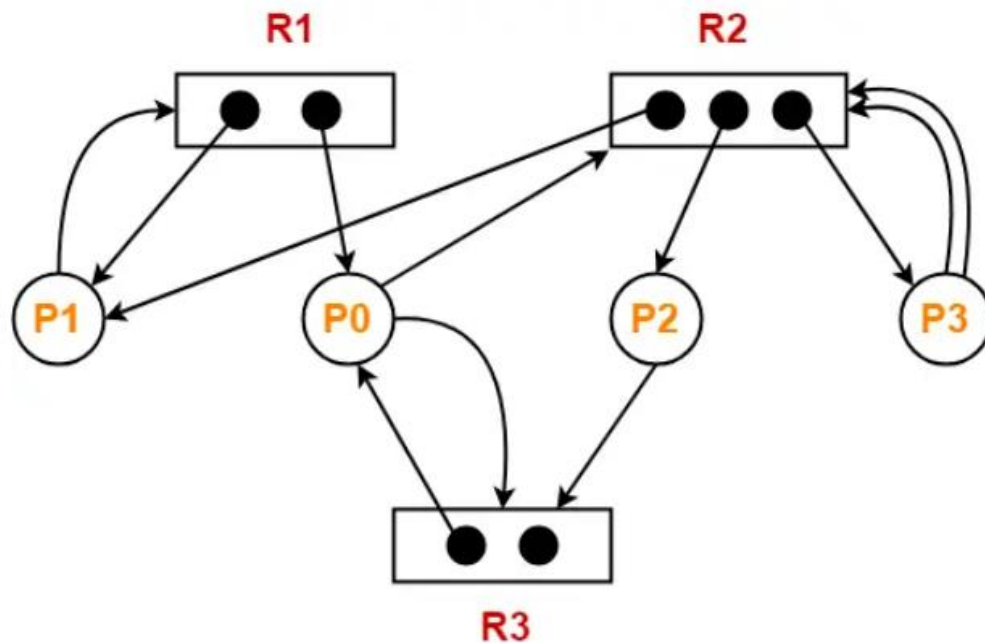
Find if the system is in a deadlock state otherwise find a safe sequence.

Solution-

- The given resource allocation graph is multi instance with a cycle contained in it.
- So, the system may or may not be in a deadlock state.


TEST 8 (MID-TERM TEST)
1. With multithreaded design, which of the following benefits is especially important for the user interface?
a. Economy
b. Scalability
c. Resource Sharing
d. Responsiveness

2. Which of the following system call allows the parent to terminate the execution of child processes?
a. Fork()
b. Exit()
c. Abort()
d. Exec()

3. Which statement is correct about when describing the state transition of curved arrow number 4 in the following diagram of process state?
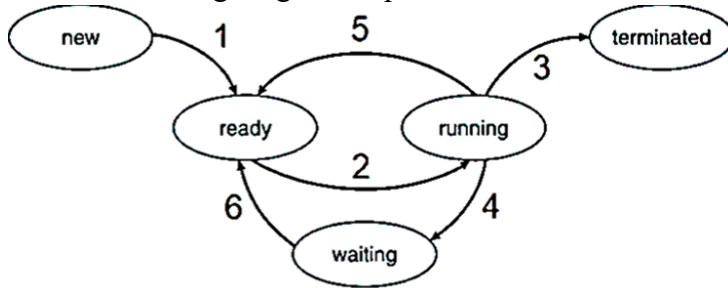
a. When a process pauses due to CPU usage time running out, the dispatcher will choose another process to processing, then the process is transitioned from the running state to waiting state.

b. When the resource requested by the process becomes available for allocation or the I/O operation that the process is waiting for has completed, then the process set is moved from the running state to the blocked state.

c. When a process requests a resource but is not satisfied because the resource is not available or the process is waiting for an I/O operation to complete or the process is waiting for some event, then the process is transitioned from the running state to waiting state.

d. The newly created process (if memory is free) will be put into memory and ready to receive the CPU, then the process from the running state is moved to the waiting state.

4. Which of the following calls in UNIX is equivalent to the "CreateFile()" command in Windows?

a. openfile()
b. open()
c. setfile()
d. create()

Assume that you have the following processes, their arrival times and burst times.

Job	Arrival Time	CPU Burst
P1	0	5
P2	3	7
P3	4	5
P4	11	4
P5	12	1
P6	15	3

5. For **SJF-Non preemptive** scheduling algorithms, determine the waiting times for the **average waiting times.**

a. 5,3
b. 8.6
c. 7,7
d. 4,3

6. For **Round Robin (Time Quantum = 5)** scheduling algorithms, determine the **waiting times for P5**

a. 15
b. 10
c. 8
d. 7 or 9.

7. For **FCFS** scheduling algorithms, determine the **waiting times for P5**

a. 11
b. 10
c. 22
d. 9

8. For **SJF Non-preemptive** scheduling algorithms, determine the **waiting times for P4**

a. 12

b. 14

c. 5

<u>d. 10</u>

9. For FCFS scheduling algorithms, determine the waiting times for the **average waiting times.**

<u>a. 5,3</u>

b. 9.6

c. 10

d. 8,7

10. Computer system can be divided into:

a. Hardware, application programs, users

<u>b. Hardware, application programs, users, operating system</u>

c. Application programs, users, operating system

d. Hardware, application users, operating system

11. Program resides on secondary storage as:

a. executable file

b. binary file

<u>c. binary executable</u>

d. file executable

12. The functions that the operating system provides:

a. Ul, program execution, l/O operations, file-system manipulation, communications, error detection, logging, protection and security

<u>b. UI, program execution, I/O operations, file-system manipulation, communications, error detection, resource allocation, logging, protection and security</u>

c. Program execution, l/O operations, file-system manipulation, communications, error detection, resource allocation, logging, protection and security

d. UI, program execution, I/O operations, file-system manipulation, communications, error detection, resource allocation, protection and security

13. For Non-preemtive scheduling, once the CPU has been allocated to a process, how long will the process hold the CPU?

a. Switches from waiting to ready

<u>b. Switches from running to waiting state</u>

c. Switches from running to ready state

d. Switches from one process to another

14. How to select CPU-scheduling algorithm for an OS?

a. Random selection

<u>b. Determine criteria, then evaluate algorithms</u>

c. Evaluate algorithms

d. Determine criteria

15. Which of the following threads is not created by a programmer?

<u>a. Implicit Threading</u>

b. Thread Libraries

c. Java Threads

d. Pthread

16. Use RR, please indicate the average waiting time of the following Gannt chart? Suppose all four processes have time to enter at the same time, with Time Quantum = 5

P1	P2	P3	P4	P1	P2
0	5	10	12	17	18	23

a. 10.5
b. 11.75
c. 11
d. 6.75

17. When a thread has been running on one processor, where are the thread's memory accesses stored?
a. RAM
b. CPU core
c. Register
d. Cache

18. The operating system preserves the state of the CPU by:
a. Control program
b. Storing the program counter
c. Storing the registers
d. Storing the registers and the program counter

19. To decide next task to run, how does the scheduler choose which task has a virtual runtime?
a. The medium
b. The lowest
c. The parallel
d. The fastest

20. How many parts does the UNIX operating system consist of? What are those parts?
a. Two parts: applications programs and the kernel
b. Two parts: systems programs and the kernel
c. Two parts: users programs and kernel program
d. Two parts: users programs and the kernel

Given five memory partitions of 100 KB, 600 KB, 200 KB, 300 KB, and 500 KB (in order), how would each of the First-fit place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)?

Result: 100KB, 276KB, 200KB, 300KB, 83KB