Question Description	Answer Choice 1	Answer Choice 2	Answer Choice 3	Answer Choice 4	Correct Answer Choice
In a time-sharing system, if 5 processes are sharing the CPU and each process gets 200 ms time slice, what is the response time for any process?	1000 ms	800 ms	1200 ms	600 ms	1
A system has 1 GB of RAM and uses virtual memory. If each page is 4 KB and the page table size is 1 MB, how many entries does the page table have?	256,000	262,144	64,000	128,000	2
Which of the following techniques minimizes thrashing in a virtual memory system?	Increasing the CPU scheduling priority	Increasing the page size	Reducing the degree of multiprogramming	Decreasing the time slice	3
In which condition does a page fault occur?	When a process accesses a page that is currently not in memory	When a page is corrupted	When the operating system crashes	When a page is modified	1
What is the primary purpose of swapping in operating systems?	To reduce fragmentation	To increase memory size	To allow processes to be temporarily removed from main memory	To allocate continuous memory blocks	3
What is a race condition in operating systems?	When two processes wait for each other indefinitely	When a process enters the critical section without proper synchronization	When a process exceeds the allocated time	When a process releases an I/O device prematurely	2
Which of the following mechanisms does a system use to enforce mutual exclusion?	Semaphore	Priority queue	Process scheduling	Deadlock detection	1
Consider a system with a 64-bit address bus and a page size of 8 KB. How many page frames can be addressed in physical memory?	2^51	2^48	2^46	2^49	1
A disk with 10,000 tracks has a seek time of 10 ms for 100 tracks. What is the average seek time for 500 tracks?	50 ms	25 ms	40 ms	60 ms	1
If a process takes 50 ms to complete and the I/O wait time is 20 ms, what is the CPU utilization during this process?	60%	50%	80%	70%	3
What is the degree of multiprogramming?	the number of processes executed per unit time	the number of processes in the ready state	the number of processes in the I/O queue	the number of processes in memory	4
The number of processes completed per unit time is known as _____	Output	Throughput	Efficiency	Capacity	2
In Unix, which system call creates a new process?	fork()	exec()	open()	close()	1
What is the primary function of an operating system?	To manage hardware resources	to manage softwares	To interact with users	All of the above	4
What is the difference between a process and a thread?	A process is a heavy-weight entity, while a thread is a lightweight entity	both are same	a process runs in RAM while thread runs in Secondry device	All of the above	1
The address of a page table in memory is pointed by _____	stack pointer	page table base register	register	program counter	2
Memory management technique in which system stores and retrieves data from secondary storage for use in main memory is called?	fragmentation	paging	mapping	none of the mentioned	2
—— is contained by the page table	accumulator size	base address of every page	ram size	logical address	2
The address generated by CPU is:	absolute address	logical address	physical address	mac address	2
Which of the following is responsible for process scheduling in an operating system?	mouse	process scheduler	Hard Disk	Keyboard	2
Which of the following scheduling algorithms uses time slices or time quanta for each process?	First-Come-First-Serve (FCFS)	Shortest Job Next (SJN)	Round Robin (RR)	Priority Scheduling	3
What is the purpose of the Ready Queue in process scheduling?	To hold processes that are waiting for I/O	To hold processes that are waiting for CPU to execute	To hold processes that have completed execution	To hold processes that are waiting for memory	2
Which scheduling algorithm selects the process with the shortest total burst time first?	First-Come-First-Serve (FCFS)	Shortest Job Next (SJN)	Priority Scheduling	Round Robin (RR)	2
What is the main disadvantage of the Round Robin scheduling algorithm?	Poor throughput	High turnaround time	Inefficient use of CPU	Low response time	1
What is the purpose of context switching?	To select processes from the Ready Queue	To swap processes in and out of main memory	To allocate CPU to processes	To handle I/O operations	2
Which scheduling algorithm allows processes to hold the CPU for an extended time?	Round Robin (RR)	Shortest Job Next (SJN)	weighted round robin	Priority Scheduling	1
What is the goal of process synchronization in operating systems?	To improve process communication	To prevent deadlocks	To allocate memory efficiently	To manage disk space	2
Which of the following is a characteristic of a distributed file system?	Centralized storage	Limited scalability	redundant data	File distribution across multiple servers	2
Which scheduler Speed is fastest?	LTS	MTS	STS	NOT	2
A_____ is the mechanism to store and restore the state\	PCB	program counter	scheduling queue	context switching	4
In which type of system is deadlock most likely to occur?	Single-user system	Batch processing system	Multi-programming system	Real-time system	3
Which of the following is true about a critical section?	It is a part of the program where the process updates shared resources	It cannot cause a deadlock	It ensures mutual exclusion without any issues	It is not part of the concurrency problem	1
What does the Banker's Algorithm avoid in an operating system?	Starvation	Deadlock	Fragmentation	Thrashing	2
Which of the following statements about virtual memory is true?	It uses physical memory more efficiently	It requires the whole program to be loaded into memory	It allows processes to exceed the physical memory size	It removes the need for memory management	3
A system uses 32-bit virtual addresses and 4 KB page size. How many entries will be there in the page table?	2^22	2^20	2^18	2^12	2
In a Round Robin scheduling algorithm, if the time slice is 100 ms and there are 5 processes, what will be the turnaround time for a process that needs 300 ms of CPU time?	500 ms	300 ms	400 ms	600 ms	4
If a disk rotates at 5400 RPM and has an average seek time of 12 ms, what is the average time to read a block from the disk?	18 ms	20 ms	24 ms	30 ms	3
If a CPU scheduling algorithm allocates 10% of the CPU time to I/O-bound processes, and there are 4 such processes, what is the total time allocated to all I/O-bound processes?	25% of CPU time	10% of CPU time	40% of CPU time	50% of CPU time	3
A system has a page size of 1 KB and supports 64-bit virtual addresses. What is the size of the virtual memory space?	1 TB	512 GB	64 PB	4 TB	3
A virtual memory system has a page size of 4 KB and the page table occupies 128 KB of memory. How many entries does the page table have?	16,384	32,768	64,000	8,192	1
What is the objective of multiprogramming?	Have a process running at all time	Have multiple programs waiting in a queue ready to run	To increase CPU utilization	None of the mentioned	3
The state of a process is defined by _____	the final activity of the process	the activity just executed by the process	the activity to next be executed by the process	the current activity of the process	4
What is the purpose of a PCB?	To translate virtual memory addresses to physical memory addresses	To manage the allocation and deallocation of memory	to Store process related data in a data structure	All of the above	3
Program always deals with _____	logical address	absolute address	physical address	relative address	1
Run time mapping from virtual to physical address is done by _____	Memory management unit	CPU	PCI	None of the mentioned	1
Which one of the following is the address generated by CPU?	physical address	absolute address	logical address	none of the mentioned	3

With limit registers and relocation, each logical address must be _____ the limit register.	Not equal to	equal to	greater than	less than	4
wihich is worst algorithm for hole finding?	worst fit	first fit	best fit	good fit	1
To load and store the system data from memory —— is used	register	RAM	ROM	BUSES	2
For —— the page table is maintained by the Operating System	each instruction	each process	each thread	each address	2
CPU register are used to	to store data	providing less address space to processes	to protect the address spaces of processes	providing more address space to processes	1
Which of the following stores process data in a dataStructure?	CPU	Operating system	memory management unit	PCB	4
—— is used to point the address of a page table in memory	register	program counter	stack pointer	page table base register	4
What is the purpose of swapping in process management?	To increase system speed	To swap processes in and out of main memory and put another process	To improve process communication	To prevent two or more processes from completing their execution	2
Which of the following is NOT a state of a process in the process life cycle?	Ready	Running	Standby	Terminated	3
What is fragmentation in the context of file systems?	Efficient organization of files	Wastage of storage space due to small free spaces	Fast file access	Compression of files	1
While executing a program, if the program references a page which is not available in the main memory then it is known as?	demand paging	frame fault	page fault	process fault	3
What is the purpose of a file directory?	To store information about files, such as their name, size, and location	To organize files into a hierarchical structure	To make it easier for users to find files	All of the above	2
What is the purpose of a file lock?	To prevent multiple processes from accessing a file simultaneously	To prevent data corruption	To ensure that data is stored in a reliable and consistent manner	All of the above	4
How many state are there in Process Life Cycle?	4	5	6	7	2
What is the initial state of a process when it is created?	Running	Ready	Waiting	New	New
In which state is a process waiting for an event like I/O or a signal?	Running	Ready	Waiting	New	Waiting
A process that is ready to execute but has not been assigned a CPU is in which state?	Running	Ready	Waiting	New	Ready
A process that is currently executing on a CPU is in which state?	Running	Ready	Waiting	New	Running
A process that is waiting for a resource that is currently unavailable is in which state?	Blocked	Ready	Running	Terminated	Blocked
What is the process of transferring a process from the ready state to the running state called?	Context switching	Dispatching	Scheduling	Preemption	Dispatching
What is a process control block (PCB)?	A scheduling algorithm	A memory management technique	A synchronization mechanism	A data structure that contains information about a process	A data structure that contains information about a process
What information is typically stored in a PCB?	File system information	Process ID, program counter, registers, memory allocation	Network connection details	Device driver information	Process ID, program counter, registers, memory allocation
What is a deadlock?	A memory management technique	A scheduling algorithm	A synchronization mechanism	A condition where 2 or mor process are wait for each othr to rase resourse	A condition where 2 or mor process are wait for each othr to rase resourse
What is a process?	A data structure	A sequence of instructions	A hardware component	A program in execution	A program in execution
What is the primary function of an input/output (I/O) system?	To manage the flow of data between the CPU and external devices	To execute instructions	To store data	To control the system clock	To manage the flow of data between the CPU and external devices
Which of the following is NOT a type of I/O device?	Keyboard	Monitor	CPU	Printer	CPU
What is the basic unit of data transfer between the CPU and I/O devices?	Byte	Word	Block	Sector	Byte
What is the purpose of I/O controllers?	To control the flow of data between the CPU and I/O devices	To execute instructions	To store data	To control the system clock	To control the flow of data between the CPU and I/O devices
Which I/O technique transfers data directly between the I/O device and main memory, without involving the CPU?	Programmed I/O (PIO)	Interrupt-driven I/O	Direct Memory Access (DMA)	Memory-mapped I/O	Direct Memory Access (DMA)
What is the main advantage of DMA over programmed I/O?	Higher data transfer rates	Lower CPU overhead	Simpler implementation	All of the above	All of the above
In memory-mapped I/O, I/O devices are treated as memory locations. How does the CPU access these locations?	By using special I/O instructions	By using regular memory access instructions	By using interrupts	By using DMA	By using regular memory access instructions
Which I/O technique is commonly used for high-speed devices like disks and network interfaces?	Programmed I/O (PIO)	Interrupt-driven I/O	Direct Memory Access (DMA)	Memory-mapped I/O	Direct Memory Access (DMA)
Which system call is used to create a new file?	open()	create()	mkdir()	fopen()	open()
Which system call is used to read data from a file?	read()	write()	open()	close()	read()
Which system call is used to write data to a file?	read()	write()	open()	close()	write()
Which system call is used to close a file descriptor?	read()	write()	open()	close()	close()
Which system call is used to rename a file?	unlink()	rmdir()	rename()	open()	rename()
Which system call is used to create a directory?	mkdir()	rmdir()	rename()	open()	mkdir()
Which system call is used to remove a directory?	mkdir()	rmdir()	rename()	open()	rmdir()
Which system call is used to move the file pointer within a file?	open()	read()	write()	seek()	seek()
Which system call is used to create a new process?	fork()	exec()	wait()	exit()	fork()
Which system call is used to wait for the termination of a child process?	fork()	exec()	wait()	exit()	wait()
Which system call is used to terminate the current process?	fork()	exec()	wait()	exit()	exit()
Which system call is used to change the data segment size for a process in heap memory?	munmap()	sbrk()	mmap()	brk()	brk()
Which system call is used to map a file or device into a process's address space?	brk()	sbrk()	mmap()	munmap()	mmap()
Which system call is used to unmap a memory-mapped file from a process's address space?	brk()	sbrk()	mmap()	munmap()	munmap()
Which system calls are used to lock and unlock pages in memory to prevent them from being swapped out?	brk() and sbrk()	mmap() and munmap()	mlock() and munlock()	malloc() and free()	mlock() and munlock()
Which system call is used to create a pipe for interprocess communication?	fork()	exec()	wait()	none of the above	none of the above
Which system call is used to read from a pipe?	read()	write()	open()	close()	read()
Which system call is used to write to a pipe?	read()	write()	open()	close()	write()

Which system call is used to create a message queue for interprocess communication?	msgget()	msgsnd()	msgrcv()	msgctl()	msgget()
Which system call is used to create a shared memory segment for interprocess communication?	shmget()	shmat()	shmdt()	shmctl()	shmget()
Which system call is used to take control access of opened file or a device file?	open()	read()	access()	close()	open()
Which system call is used to read data from a device file?	read()	write()	open()	close()	read()
In a unipropramming system, how many programs can be executed at a time?	One	Two	Many	Depends On the System	One
Multiprogramming allows for:	Multiple programs to be executed simultaneously	A single program to be executed on multiple CPUs	Multiple tasks within a single program	Real-time processing	Multiple programs to be executed simultaneously
Multitasking refers to:	Running multiple programs simultaneously on a single CPU	Running multiple programs on multiple CPUs	Running multiple tasks within a single program	Real-time processing	Running multiple tasks within a single program
Multiprocessing involves:	Running multiple programs simultaneously on a single CPU	Running multiple programs on multiple CPUs	Running multiple tasks within a single program	Real-time processing	Running multiple programs on multiple CPUs
Embedded systems are typically:	General-purpose computers	Specialized computers with limited resources	High-performance computing systems	Large-scale server systems	Specialized computers with limited resources
Real-time systems are designed to:	Process data as quickly as possible	Provide a user-friendly interface	Handle large datasets	Run on embedded devices	Process data as quickly as possible
Which of the following is a common handheld operating system?	Windows 11	macOS	Android	Linux	Android
Which of the following is an example of a real-time system?	A word processor	A web browser	A flight control system	A database management system	A flight control system
Which of the following is a key advantage of multiprogramming?	Improved CPU utilization	Increased system overhead	Reduced response time	Both A and C	Both A and C
What is the difference between preemptive and non-preemptive multitasking?	Preemptive allows OS to interrupt.	Non-preemptive allows OS to interrupt.	Preemptive for real-time, non-preemptive for general-purpose.	No difference.	Preemptive allows OS to interrupt.
What is a thread?	A lightweight process	A process control block	A memory management technique	A synchronization mechanism	A lightweight process
How do threads differ from processes?	Threads share the same address space, processes hv sparate address spaces.	Threads have their own stack, while processes do not.	Threads are created using the fork() system call	Threads are more expensive to create and manage than processes.	Threads share the same address space, processes hv sparate address spaces.
What is the primary advantage of using threads over processes?	Improved performance	Increased security	Simplified programming	All of the above	All of the above
A situation where two or more threads are competing for access to a shared resource	To allocate and deallocate memory to processes	To manage I/O operations	To schedule processes	To handle system calls	To allocate and deallocate memory to processes
What is the purpose of a memory management unit (MMU)?	To manage I/O operations	To schedule processes	To translate virtual addresses to physical addresses	To handle system calls	To translate virtual addresses to physical addresses
Which scheduling algorithm selects the process with the shortest estimated burst time for execution?	First-Come-First-Served (FCFS)	Shortest Job First (SJF)	Priority Scheduling	Round Robin	Shortest Job First (SJF)
SJF is an example of which type of scheduling algorithm?	Preemptive	Non-preemptive	Both preemptive and non-preemptive	Neither preemptive nor non-preemptive	Non-preemptive
What is the main disadvantage of SJF scheduling?	It can lead to starvation of long processes	. It is difficult to implement	It is not suitable for interactive systems	It has high overhead	It can lead to starvation of long processes
Which of the following is a variation of SJF scheduling?	Priority Scheduling	Shortest Remaining Time First (SRTF)	Round Robin	None of the above	Shortest Remaining Time First (SRTF)
What is external fragmentation?	The space between allocated blocks of memory	The space within an allocated block of memory	A memory management technique	A scheduling algorithm	The space between allocated blocks of memory
Which memory allocation strategy is more susceptible to external fragmentation?	Contiguous allocation	Segmentation	Paging	None of the above	Contiguous allocation
What is the primary goal of partition allocation policies?	To manage the allocation of memory to processes	To schedule processes	To handle I/O operations	To control the system clock	To manage the allocation of memory to processes
Which partition allocation policy allocates contiguous blocks of memory to processes?	Fixed-partition allocation	Variable-partition allocation	Buddy system	Place allocation	Fixed-partition allocation
Which partition allocation policy is often used in operating systems that support dynamic memory allocation?	Fixed-partition allocation	Variable-partition allocation	Buddy system	none of above	Variable-partition allocation
What is the term for the process state where a process is waiting for some event to occur?	Running	Blocked	Ready	Suspended	2
In which process state is a process removed from memory and placed back in the job queue?	Ready	Blocked	Suspended	Terminate	3
Which information is typically stored in the Process Control Block (PCB)?	Process ID and priority	CPU registers and program counter	Base and limit registers	All of the above	4
What is the state of a process after it has been loaded into the main memory?	Ready	Running	Blocked	New	2
What is the role of the scheduler in process management?	Allocating memory to processes	Determining which process to run next	Managing file systems	Controlling input/output devices	2
Which scheduling queue typically holds processes that are waiting for I/O?	Ready queue	Waiting queue	Execution queue	New queue	2
What is the purpose of the PCB?	To store the process execution state	To manage the process queue	To handle memory allocation	To control I/O operations	1
Which scheduling algorithm provides the minimum average waiting time?	First-Come-First-Serve (FCFS)	Shortest Job Next (SJN)	Round Robin (RR)	Priority Scheduling	2
Consider three processes with burst times of 4, 8, and 6 units. If the time quantum is 5 units, what is the turnaround time for the last process in Round Robin scheduling?	13 units	18 units	21 units	24 units	3
What is the primary advantage of using virtual memory?	Faster access to data	Increased program size	Better utilization of the CPU	More efficient use of physical memory	2
In a multi-programming environment, what does the term "context switch" refer to?	Changing the state of a process	Allocating memory to a process	Handling I/O operations	Swapping processes in and out of main memory	4
Which algorithm selects the process with the highest priority for execution?	Round Robin (RR)	Shortest Job Next (SJN)	Priority Scheduling	First-Come-First-Serve (FCFS)	3
The address of a page table in memory is pointed by _____	stack pointer	page table base register	register	program counter	2
The stack pointer is a register that points to the	Push of the stack	Bottom of the stack	Top of the stack	Pop of the stack	2
What is the main disadvantage of the Round Robin scheduling algorithm?	Poor throughput	High turnaround time	Inefficient use of CPU	Low response time	1
In a multi-programming environment, what does the term "context switch" refer to?	Changing the state of a process	Allocating memory to a process	Handling I/O operations	Swapping processes in and out of main memory	4
What is the purpose of file permissions in a file system?	To control access to files and directories	To compress files for storage	To organize files in a directory	To encrypt file contents	1
Which of the following is an example of a non-pre-emptive scheduling algorithm?	Round Robin	Shortest Job Next (SJN)	Priority Scheduling	Multilevel Queue Scheduling	3
Which page replacement algorithm replaces the page that has not been used for the longest period of time?	FIFO (First-In-First-Out)	LRU (Least Recently Used)	Optimal	MRU (Most Recently Used)	2
What is swapping in the context of operating systems?	Moving a process from the ready queue to the execution queue	Moving a process from main memory to disk and vice versa	Exchanging data between two processes	Allocating memory to a new process	2
Consider the set of 6 processes whose arrival time 0,1,2,3,4,5 and burst time are 7,5,3,1,2,1 If the CPU scheduling policy is shortest remaining time first, calculate the average waiting time	4	5	6	3	1

Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2. the number of frames in the memory is 3. Find out the number of page faults using Optimal Page Replacement Algorithm	3	4	5	6	3
A system uses a round-robin scheduling algorithm with a time quantum of 20 milliseconds. If a process requires 60 milliseconds of CPU time, how many times will it be scheduled to run?	1	2	3	4	3
What is a potential drawback of using the Priority Round-Robin scheduling algorithm?	Unequal CPU time distribution	Increased waiting time for high-priority tasks	Improved system throughput	Reduced context switching overhead	2
What challenge is associated with implementing the Shortest Job First (SJF) scheduling algorithm in a dynamic environment?	Improved CPU efficiency	Difficulty in predicting burst times	Reduced waiting time for long processes	Enhanced fairness among processes	2
If a computer system uses fixed partitioning for memory management, what is a potential drawback of having a large number of partitions?	Increased internal fragmentation	Efficient memory utilization	Improved context switching time	Reduced CPU overhead	1
If a process holds a lock and is waiting for a resource, what is the state of the process?	Running	Ready	Blocked	Terminated	3
In a multithreading environment, what is a potential benefit of using user-level threads over kernel-level threads?	Improved thread synchronization	Enhanced parallelism	Simplified context switching	Efficient memory utilization	2
If a process requires a large contiguous block of memory and the system uses paging, what problem might occur?	Increased page fault rate	Efficient memory utilization	External fragmentation	Improved TLB efficiency	3
In a file system, what is a potential advantage of using the Master File Table (MFT) approach over the File Allocation Table (FAT) method?	Reduced disk I/O speed	Improved data reliability	Simpler directory structures	Enhanced disk space utilization	4
What is the primary purpose of a Process Control Block (PCB)?	To manage file operations	To store information about a process	To allocate memory	To control input/output devices	2
Which of the following is a valid process state?	Running	Sleeping	Blocked	All of the above	4
Which page replacement algorithm is based on the principle of discarding the page that has not been used for the longest time?	FIFO	LRU	Optimal Page Replacement	Clock	2
Which scheduling queue typically holds processes that are waiting for I/O?	Ready queue	Waiting queue	Execution queue	New queue	2
What is the purpose of a short-term scheduler?	Allocating CPU time to processe	Allocating memory to processes	Allocating I/O devices to processes	Allocating disk space to processes	1
In paging, what is the term for a fixed-size contiguous block of virtual memory?	Page	Frame	Blocked	New	1
What is threading in the context of operating systems?	A type of process	A mechanism to share memory between processes	A way to divide a process into multiple threads	A form of file organization	3
Which type of memory management allows processes to be allocated physical memory that is not necessarily contiguous?	Contiguous memory allocation	Paging	Segmentation	Fragmentation	2
What is the main difference between pre-emptive and non-pre-emptive scheduling?	Pre-emptive allows a process to be interrupted and moved out of the CPU, while non-pre-emptive does not.	Non-pre-emptive allows a process to be interrupted and moved out of the CPU, while pre-emptive does not.	Both pre-emptive and non-pre-emptive scheduling operate the same way.	Pre-emptive scheduling is used in real-time systems, while non-pre-emptive is used in general-purpose systems.	1
What is segmentation in memory management?	Dividing memory into fixed-size blocks	Dividing memory into variable-sized segments	Allocating memory in a contiguous manner	Allocating memory dynamically	2
What is a Process Control Block?	Process type variable	Data Structure	A secondary storage section	A Block in memory	2
CPU register are used to	to store data	providing less address space to processes	to protect the address spaces of processes	providing more address space to processes	1
What is the purpose of context switching?	To select processes from the Ready Queue	To swap processes in and out of main memory	To allocate CPU to processes	To handle I/O operations	2
What is the state of a process after it has been loaded into the main memory?	Ready	Running	Blocked	New	2
Which scheduling algorithm allows processes to hold the CPU for an extended time?	Round Robin (RR)	Shortest Job Next (SJN)	weighted round robin	Priority Scheduling	1
What is the purpose of a file lock?	To prevent multiple processes from accessing a file simultaneously	To prevent data corruption	To ensure that data is stored in a reliable and consistent manner	All of the above	4
A single thread of control allows the process to perform	only one task at a time	multiple tasks at a time	only two tasks at a time	all of the mentioned	1
In a preemptive multitasking system, what triggers a process transition from running to ready state?	Completion of execution	External interrupt	I/O operation	System call	2
What is the key difference between a process and a thread?	Processes have their own memory space, while threads share the same memory space.	Threads have their own program counter, while processes share the same program counter.	Processes are lightweight, while threads are heavyweight	Threads can't run concurrently, while processes can.	1
In a multithreaded system, what is thread synchronization used for?	To improve CPU scheduling	To prevent race conditions	To increase thread priority	To manage thread termination	2
Four jobs to be executed on a single processor system arrive at time 0 in the order A, B, C, D. Their burst CPU time requirements are 4, 1, 8, 1 time units respectively. The completion time of A under round robin scheduling with time slice of one time unit is-	10	4	8	9	4
Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2. the number of frames in the memory is 3. Find out the number of page faults using LRU Page Replacement Algorithm	3	6	5	4	2
In a multithreading environment, if a system follows a priority-based scheduling algorithm with thread priorities ranging from 1 to 10, what is the priority of a newly created thread?	1	5	10	It depends on the system configuration	4
In a system with two threads sharing a common resource, if thread A is executing a critical section, what is the state of thread B?	Running	Ready	Blocked	Terminated	3
Threading in operating systems introduces complexities related to:	Memory fragmentation	Process synchronization	TLB management	Disk scheduling	2
Swapping in process management may lead to:	Decreased context switching time	Improved CPU utilization	Increased I/O overhead	Reduced memory fragmentation	3
In a demand-paging system, what is the purpose of the page table?	Manage TLB entries	Map logical to physical addresses	Handle page replacement	Allocate main memory to processes	2
In a multiprocessing system, three processes are in execution. Process A is waiting for an I/O operation, Process B is in the running state, and Process C has completed its execution. What state is Process C in now?	Ready	Blocked	Terminated	Zombie	3
A process with a high priority is continuously arriving in the system, causing other processes with lower priority to wait for a long time. What scheduling queue management strategy would address this issue?	Aging	Round-Robin	Priority adjustment	FCFS	1
A file system uses a flat directory structure. What challenge might arise as the number of files in the system increases?	Improved file access speed	Reduced file fragmentation	Difficulty in organizing and searching for files	Efficient use of disk space	3
What is the term for the process state where a process is waiting for some event to occur?	Running	Blocked	Ready	Suspended	2

In which process state is a process removed from memory and placed back in the job queue?	Ready	Blocked	Suspended	Terminate	3
What is external fragmentation?	Holes in memory caused by processes being loaded and removed	Unused memory within a partition	Memory blocks of varying sizes	Memory blocks of fixed sizes	1
What is demand paging in virtual memory?	Loading all pages into memory at program startup	Loading pages into memory only when they are needed	Swapping pages in and out of memory constantly	Allocating a fixed amount of memory for each process	2
Which scheduling algorithm uses the principle of giving each process a fixed time slot?	Round Robin	First Come First Serve (FCFS)	Shortest Job Next (SJN)	Priority Scheduling	1
In which situation would a priority scheduling algorithm be most appropriate?	When all processes are of equal importance	When the priority of each process is known in advance	When the length of each process is known in advance	When the arrival time of each process is known in advance	2
What is the purpose of virtual memory?	To provide additional RAM	To create a virtual machine	To emulate different operating systems	To manage processes	1
Which page replacement algorithm replaces the page that has not been used for the longest period of time?	FIFO (First-In-First-Out)	LRU (Least Recently Used)	Optimal	MRU (Most Recently Used)	2
Which of the following is responsible for process scheduling in an operating system?	mouse	process scheduler	Hard Disk	Keyboard	2
What is the purpose of swapping in process management?	To increase system speed	To swap processes in and out of main memory and put another process	To improve process communication	To prevent two or more processes from completing their execution	2
What is the purpose of the Ready Queue in process scheduling?	To hold processes that are waiting for I/O	To hold processes that are waiting for CPU to execute	To hold processes that have completed execution	To hold processes that are waiting for memory	2
What is the purpose of a process control block (PCB)?	To manage file systems	To store process-related information	To control network connections	To allocate memory to processes	2
What is the goal of process synchronization in operating systems?	To improve process communication	To prevent deadlocks	To allocate memory efficiently	To manage disk space	2
What is fragmentation in the context of file systems?	Efficient organization of files	Wastage of storage space due to small free spaces	Fast file access	Compression of files	1
What are the different process states?	Running: The process is currently executing on the CPU.	Ready: The process is waiting to run and is available to be scheduled onto the CPU.	Waiting: The process is waiting for a resource, such as I/O or memory.	all of the above	4
What is the key advantage of multithreading?	Improved program structure	Enhanced parallelism	Simplified debugging	All of the above	2
What is thrashing in the context of virtual memory?	Excessive page faults, leading to a decrease in system performance	Efficient memory management	Rapid swapping of processes	Sudden termination of processes due to insufficient memory	1
What is the role of the zombie state in the context of process states?	Represents a process that has terminated	Represents a process waiting for an event	Represents a process in the running state	Represents a process that is ready to execute	1
In demand paging, what is a page fault?	When a page is loaded into memory	When a page is accessed and is not in memory	When a page is swapped out of memory	When a page is allocated to a process	2
Which information is typically stored in the Process Control Block (PCB)?	Process ID and priority	CPU registers and program counter	Base and limit registers	All of the above	4
Consider the set of 3 processes whose arrival time 0,3,5 and burst time are2,1,6 If the CPU scheduling policy is FCFS, calculate the average waiting time	3	0	1	4	2
Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2. the number of frames in the memory is 3. Find out the number of page faults using FIFO Page Replacement Algorithm	3	6	5	2	2
Discuss the role of access methods in a file system and provide an example of a common access method.	Access methods define file attributes, and an example is the file control block.	Access methods determine the sequence of file operations, and an example is indexing.	Access methods control how files are stored and retrieved, and an example is hashing.	Access methods manage file access permissions, and an example is the file allocation table.	3
A file system uses the File Allocation Table (FAT) to manage file storage. How does the FAT contribute to file retrieval efficiency?	Accelerates random access time	Reduces disk space wastage	Difficulty in organizing and searching for files	Minimizes directory search time	1
If a system uses a Round-Robin scheduling algorithm with a time quantum of 20 milliseconds and has three processes, each requiring 30 milliseconds of CPU time, how many times will each process get to execute before the next process in the queue gets a turn?	1	2	3	4	3
In a demand-paging system, a page fault occurs, and the required page is not in memory. What is the specific name for this type of page fault?	Major page fault	Minor page fault	Critical page fault	Access violation	2
In a preemptive Priority scheduling system with priorities ranging from 1 to 5, if a process with priority 3 is currently running, and a process with priority 4 arrives, what will be the new running process?	Priority 3 process	Priority 4 process	None	Both will run concurrently	2
In a Priority Round-Robin scheduling system, a low-priority process has been in the ready queue for a long time. How can this situation be addressed to ensure fairness among processes?	Increase the time quantum for low-priority processes	Decrease the time quantum for low-priority processes	Adjust the priority dynamically	Apply the Aging technique	3
In a non-preemptive Priority scheduling system with priorities ranging from 1 to 10, if a process with priority 8 is currently running, and a process with priority 5 arrives, what will be the new running process?	Priority 8 process	Priority 5 process	No change	Both will run concurrently	3
In a file system, what information is typically stored in the File Control Block (FCB) of a file?	File name and location	File access permissions	File data content	File owner and creation time	1
Which of the following is a non-preemptive scheduling algorithm?	Round Robin	First-Come, First-Served	Shortest Job Next	Priority Scheduling	2
A race condition occurs when multiple threads access shared data simultaneously. What is a common way to prevent this?	Using CPU scheduling	Using locks	Increasing memory allocation	Using multiple processors	2
What is the primary benefit of using threads in a program?	Increased memory usage	Increased responsiveness	Simplified programming model	Faster I/O operations	2
What does multithreading allow a program to do?	Run multiple processes	Run multiple threads in parallel	Increase disk space usage	Enhance single-thread performance	2
In contiguous memory allocation, what is the main issue that can arise?	Thrashing	Fragmentation	Deadlock	Race conditions	2
What is the primary purpose of paging in memory management?	To eliminate fragmentation	To allow multiple processes to run	To swap data between disk and RAM	To create virtual memory spaces	1
Segmentation differs from paging because it is based on:	Fixed-size blocks	Variable-sized segments	Page tables	Physical memory	2
What does thrashing refer to in the context of virtual memory?	Excessive page faults	High CPU utilization	Increased memory access speed	Data corruption in memory	1
What occurs when a page fault happens?	Data is written to the disk	The operating system allocates memory	The required page is not in memory	CPU performance decreases	3
Which page replacement algorithm replaces the least recently used page?	FIFO	LRU	Optimal	Second Chance	2
What is the primary function of a file system?	To manage CPU scheduling	To handle memory allocation	To manage data storage and retrieval	To control hardware devices	3
Which of the following is a method of implementing a file system?	File Allocation Table	Multilevel Feedback Queue	Segmentation	Round Robin	1
Which disk scheduling algorithm services requests in the order they arrive?	FCFS	SSTF	SCAN	C-SCAN	1
Which technique allows the system to use disk space as additional memory?	Paging	Segmentation	Virtual Memory	Contiguous Allocation	3

What is context switching?	Changing the CPU's context from one process to another	Swapping processes between memory and disk	Switching between user and kernel modes	Allocating memory to processes	1
What is a necessary condition for a deadlock to occur?	Preemption	Circular wait	Resource allocation	Non-sharing of resources	2
Which of the following is NOT a function of an operating system?	Process management	Memory management	Data processing	File management	3
In which mode does the operating system run?	User mode	Kernel mode	Both user and kernel mode	System mode	2
Which of the following is NOT a state of a process?	New	Running	Waiting	Stored	4
Which CPU scheduling algorithm is known for minimizing turnaround time?	Shortest Job First	Round Robin	First-Come, First-Served	Priority Scheduling	1
If three processes have burst times of 4, 3, and 5 milliseconds, what is the average waiting time using First-Come, First-Served (FCFS) scheduling?	3 ms	4 ms	5 ms	2.67 ms	2
Using Shortest Job First (SJF) scheduling, if two processes have burst times of 8 ms and 2 ms, what is the average turnaround time?	6 ms	10 ms	8 ms	7 ms	3
If a thread takes 20 ms to complete, how many threads can run in parallel on a CPU with a time slice of 5 ms?	4 threads	5 threads	3 threads	6 threads	4
If a process requires 300 KB and the available memory is 1 MB with a hole of 400 KB, can it fit?	Yes	No	Only with fragmentation	Depends on allocation method	1
In a system with 3 page frames, if pages 1, 2, 3, 4, 1, 2, 5 are referenced in that order, how many page faults occur using FIFO?	4 page faults	5 page faults	6 page faults	3 page faults	2
If a process needs 300 KB of memory and each page is 100 KB, how many pages are necessary?	3 pages	2 pages	4 pages	5 pages	3
Given that 1 MB of memory is allocated in 256 KB segments, how many segments can be utilized if the total available memory is 1.5 MB?	5 chunks	6 chunks	7 chunks	4 chunks	2
If a system encounters 100 page faults every second and each fault takes 20 ms to fix, what is the overall time spent on page faults in one minute?	1200 seconds	2000 seconds	3000 seconds	1200 ms	2
For a 500 KB file saved in a file system with a block size of 128 KB, how many blocks will be required?	3 blocks	4 blocks	5 blocks	6 blocks	4
If two threads each increment a counter starting at 0 for a total of 1 million iterations, what could the final value be without any synchronization?	0	1 million	2 million	Between 1 million and 2 million	4
If a process requires 300 KB of memory and the page size is 100 KB, how many pages will be needed?	3 pages	2 pages	4 pages	5 pages	3
If 1 MB of memory is allocated in 256 KB chunks, how many chunks can be allocated if there is 1.5 MB of total memory?	5 chunks	6 chunks	7 chunks	4 chunks	2
If a system experiences 100 page faults per second, and each page fault takes 20 ms to resolve, what is the total time spent on page faults in one minute?	1200 seconds	2000 seconds	3000 seconds	1200 ms	2
If a file of 500 KB is stored in a file system with a block size of 128 KB, how many blocks are needed?	3 blocks	4 blocks	5 blocks	6 blocks	4
If two threads increment a counter starting at 0 for 1 million iterations each, what is the potential final value if no synchronization is used?	0	1 million	2 million	Between 1 million and 2 million	4
If three processes have execution times of 4, 3, and 5 milliseconds, what is the average waiting time when using First-Come, First-Served (FCFS) scheduling?	3 ms	4 ms	5 ms	2.67 ms	2
When applying Shortest Job First (SJF) scheduling, if there are two processes with burst times of 8 ms and 2 ms, what is the average turnaround time?	6 ms	10 ms	8 ms	7 ms	3
If completing a thread takes 20 ms, how many threads can execute simultaneously on a CPU that has a time slice of 5 ms?	4 threads	5 threads	3 threads	6 threads	4
If a process needs 300 KB of memory and there is 1 MB of total available memory with a 400 KB hole, can the process fit into it?	Yes	No	Only with fragmentation	Depends on allocation method	1
In a system that has 3 page frames, if the pages referenced are 1, 2, 3, 4, 1, 2, and 5 in that order, how many page faults will occur using FIFO page replacement?	4 page faults	5 page faults	6 page faults	3 page faults	2
What is a semaphore primarily used for?	Memory allocation	Process synchronization	File management	CPU scheduling	2
What type of fragmentation occurs when free memory is divided into small blocks?	External fragmentation	Internal fragmentation	Logical fragmentation	Temporal fragmentation	2
What are the common types of file permissions in UNIX/Linux?	Read, Write, Execute	Read, Modify, Delete	Access, Change, Execute	Open, Close, Read	2
What does mounting a file system do?	Adds a new file to the system	Integrates a file system into the directory structure	Removes a file from the system	Converts file formats	2
What is the purpose of I/O buffering?	To speed up data transfer	To free up memory	To ensure data integrity	To manage CPU scheduling	2
Which file organization method allows for quick access to records?	Sequential organization	Hashed organization	Indexed organization	Random organization	1
What is the role of the kernel in an operating system?	To manage applications	To manage system resources	To provide user interfaces	To execute user commands	2
What is a system call?	A way for applications to request services from the kernel	A method for managing threads	A type of hardware interrupt	An application-level error handler	1
What is the main purpose of time-sharing in operating systems?	To enhance security	To allow multiple users to access a computer simultaneously	To manage memory effectively	To increase processing speed	3
What is a virtual file system (VFS)?	A system for managing physical disks	An abstraction layer to allow different file systems to be accessed uniformly	A type of file encryption system	A file compression tool	2
Which mechanism is commonly used for process synchronization?	Mutex	Semaphore	Both A and B	None of the above	3
Which of the following is an example of a real-time operating system?	Windows	Linux	QNX	macOS	1
Which protocol is commonly used in network file systems?	FTP	NFS	HTTP	SMTP	1
When many threads access shared data at the same time, a race condition happens. What is a standard procedure to avoid this?	Using CPU scheduling	Using locks	Increasing memory allocation	Using multiple processors	2
What is the main advantage of a program that uses threads?	Increased memory usage	Increased responsiveness	Simplified programming model	Faster I/O operations	2
What prerequisites must be met for there to be a deadlock?	Preemption	Circular wait	Resource allocation	Non-sharing of resources	2
Which of the following is NOT a function of an operating system?	Process management	Memory management	Data processing	File management	3
Which disc scheduling technique responds to queries in the sequence that they come in?	FCFS	SSTF	SCAN	C-SCAN	1
What method enables the system to utilize disk space as extra memory?	Paging	Segmentation	Virtual Memory	Contiguous Allocation	3
What does context switching involve?	Changing the CPU's context from one process to another	Swapping processes between memory and disk	Switching between user and kernel modes	Allocating memory to processes	1