### **Session 1: Introduction to Operating System and Architecture**

### **Easy Level:**

1. **What is an Operating System (OS)?**
   * a) A hardware component
   * b) A type of software that manages hardware and software resources
   * c) A programming language
   * d) A user interface  
     **Answer**: b) A type of software that manages hardware and software resources
2. **Which of the following is an example of an Operating System?**
   * a) Microsoft Word
   * b) Android
   * c) Adobe Photoshop
   * d) Google Chrome  
     **Answer**: b) Android
3. **What does the Kernel of an Operating System do?**
   * a) Manages user applications
   * b) Controls and manages hardware resources
   * c) Provides a graphical user interface
   * d) Stores user data  
     **Answer**: b) Controls and manages hardware resources
4. **What is meant by 'User-space' in an Operating System?**
   * a) The area where hardware resources are managed
   * b) The part of memory reserved for the kernel
   * c) The area where user applications run
   * d) The space where system services are executed  
     **Answer**: c) The area where user applications run
5. **Which component of the Operating System interacts directly with the hardware?**
   * a) User-space
   * b) Kernel
   * c) Application software
   * d) File manager  
     **Answer**: b) Kernel
6. **Which of the following is NOT a kernel component of an OS?**
   * a) Memory management
   * b) Process scheduler
   * c) File system
   * d) Web browser  
     **Answer**: d) Web browser
7. **Which part of the OS is responsible for managing memory?**
   * a) Memory Manager
   * b) User Application
   * c) Process Scheduler
   * d) Interrupt Handler  
     **Answer**: a) Memory Manager
8. **What is the primary role of a hardware interrupt?**
   * a) To execute system-level applications
   * b) To handle errors during application execution
   * c) To alert the CPU that an event needs immediate attention
   * d) To manage memory usage  
     **Answer**: c) To alert the CPU that an event needs immediate attention
9. **What happens when a hardware interrupt occurs?**
   * a) The operating system shuts down
   * b) The CPU stops all tasks to handle the interrupt
   * c) The current process is paused, and the interrupt is handled by the OS
   * d) The user application is terminated  
     **Answer**: c) The current process is paused, and the interrupt is handled by the OS
10. **Which of the following is an example of a non-kernel component of an Operating System?**
    * a) Process Scheduler
    * b) Memory Manager
    * c) File system manager
    * d) User applications  
      **Answer**: d) User applications

### **Intermediate Level:**

1. **Which of the following best describes Kernel-space in an OS?**
   * a) Memory allocated for user programs
   * b) A region where the operating system kernel runs and manages hardware resources
   * c) A place where user data is stored
   * d) The area that handles application-level tasks  
     **Answer**: b) A region where the operating system kernel runs and manages hardware resources
2. **Which of these is a function performed by the Kernel?**
   * a) Running user applications
   * b) Allocating memory to processes
   * c) Providing user input and output
   * d) Managing user sessions  
     **Answer**: b) Allocating memory to processes
3. **Which part of the Operating System is responsible for executing system calls made by user applications?**
   * a) Kernel
   * b) User-space
   * c) Device driver
   * d) File system  
     **Answer**: a) Kernel
4. **Which of the following describes the interaction between User-space and Kernel-space?**
   * a) They are completely isolated and never interact
   * b) Kernel-space can access user-space, but user-space cannot access kernel-space directly
   * c) User-space can access kernel-space directly using system calls
   * d) Both can access each other’s memory without any restrictions  
     **Answer**: b) Kernel-space can access user-space, but user-space cannot access kernel-space directly
5. **Which of the following is a characteristic of a hardware interrupt?**
   * a) It is initiated by software
   * b) It does not require CPU attention
   * c) It temporarily interrupts the current process being executed by the CPU
   * d) It is related to memory allocation  
     **Answer**: c) It temporarily interrupts the current process being executed by the CPU
6. **What is the purpose of an interrupt handler?**
   * a) To execute the current user application
   * b) To process and handle interrupts triggered by hardware events
   * c) To manage system calls from user-space processes
   * d) To perform memory management functions  
     **Answer**: b) To process and handle interrupts triggered by hardware events
7. **Which of the following is TRUE about hardware interrupts?**
   * a) Hardware interrupts are asynchronous events generated by the OS
   * b) Hardware interrupts can only be triggered by user applications
   * c) Hardware interrupts are triggered by external hardware devices, such as a keyboard or network card
   * d) Hardware interrupts occur only when there is a system error  
     **Answer**: c) Hardware interrupts are triggered by external hardware devices, such as a keyboard or network card
8. **How does the OS handle multiple interrupt requests from different devices?**
   * a) The OS ignores lower priority interrupts
   * b) The OS processes them in the order they are received
   * c) The OS assigns priorities to interrupts and processes higher-priority ones first
   * d) The OS processes all interrupts at once  
     **Answer**: c) The OS assigns priorities to interrupts and processes higher-priority ones first
9. **Which of the following components is responsible for switching the processor’s context when handling interrupts?**
   * a) Interrupt vector
   * b) Process scheduler
   * c) Interrupt handler
   * d) User-space  
     **Answer**: c) Interrupt handler
10. **What happens to the current process when a hardware interrupt occurs?**
    * a) The process is paused, and the CPU begins executing the interrupt handler
    * b) The process is terminated
    * c) The process continues running without any interruption
    * d) The process is moved to user-space  
      **Answer**: a) The process is paused, and the CPU begins executing the interrupt handler

### **Hard Level:**

1. **Which of the following best describes a critical section in an operating system?**
   * a) A section of code where multiple processes can safely access shared resources
   * b) A section of code where only one process is allowed to execute at a time to avoid conflicts
   * c) A section of code that handles hardware interrupts
   * d) A section where user data is stored  
     **Answer**: b) A section of code where only one process is allowed to execute at a time to avoid conflicts
2. **What is an interrupt vector table in an OS?**
   * a) A table that stores the memory addresses of all processes
   * b) A table that maps interrupt types to their corresponding interrupt handlers
   * c) A table that holds user-space applications
   * d) A table that stores kernel parameters  
     **Answer**: b) A table that maps interrupt types to their corresponding interrupt handlers
3. **What is the main difference between a hardware interrupt and a software interrupt?**
   * a) Hardware interrupts are generated by the operating system, while software interrupts are generated by hardware
   * b) Software interrupts are triggered by external hardware, while hardware interrupts are triggered by software
   * c) Hardware interrupts are initiated by the operating system, while software interrupts are triggered by software
   * d) Hardware interrupts are triggered by external devices, while software interrupts are initiated by software  
     **Answer**: d) Hardware interrupts are triggered by external devices, while software interrupts are initiated by software
4. **Which of the following is a key feature of microkernel architecture in an OS?**
   * a) The kernel handles all system services directly
   * b) Most OS services run in user-space rather than in kernel-space
   * c) The kernel provides a GUI interface
   * d) The kernel manages user applications  
     **Answer**: b) Most OS services run in user-space rather than in kernel-space
5. **How does an operating system prevent race conditions during interrupt handling?**
   * a) By using interrupt priority levels
   * b) By using critical sections and synchronization mechanisms
   * c) By ignoring low-priority interrupts
   * d) By allocating separate memory regions for each process  
     **Answer**: b) By using critical sections and synchronization mechanisms
6. **What is the purpose of system calls in the interaction between User-space and Kernel-space?**
   * a) To allow the kernel to execute user applications
   * b) To allow user applications to request services provided by the kernel
   * c) To directly access hardware components
   * d) To execute system-level applications in user-space  
     **Answer**: b) To allow user applications to request services provided by the kernel
7. **Which part of the OS kernel manages CPU scheduling and process execution?**
   * a) File system manager
   * b) Process scheduler
   * c) Memory manager
   * d) Interrupt handler  
     **Answer**: b) Process scheduler
8. **What happens when a hardware interrupt occurs in terms of CPU state management?**
   * a) The CPU registers are saved, and the process context is switched to the interrupt handler
   * b) The CPU continues executing the current process
   * c) The operating system ignores the interrupt
   * d) The process is immediately terminated  
     **Answer**: a) The CPU registers are saved, and the process context is switched to the interrupt handler
9. **What is a context switch in the context of hardware interrupts?**
   * a) The process continues executing after handling an interrupt
   * b) The operating system schedules a new process to execute
   * c) The interrupt handler is executed, and the current process is paused
   * d) The system shuts down  
     **Answer**: c) The interrupt handler is executed, and the current process is paused
10. **Which of the following is an important consideration when designing hardware interrupt systems?**
    * a) Ensuring that interrupts are processed in random order
    * b) Ensuring that interrupts are always handled immediately
    * c) Managing interrupt priorities and ensuring proper handling of concurrent interrupts
    * d) Ignoring low-priority interrupts  
      **Answer**: c) Managing interrupt priorities and ensuring proper handling of concurrent interrupts

### **Final 20 Questions (Hard Level Continued):**

1. **Which of the following is the primary role of the Interrupt Descriptor Table (IDT)?**
   * a) To store interrupt vectors and map them to interrupt service routines
   * b) To store the operating system kernel
   * c) To manage CPU time for processes
   * d) To handle system calls from user applications  
     **Answer**: a) To store interrupt vectors and map them to interrupt service routines
2. **In a multi-core system, how are interrupts typically managed?**
   * a) Interrupts are only handled by the first core
   * b) Interrupts are handled by each core independently, or the interrupt is routed to a specific core
   * c) Interrupts are disabled in multi-core systems
   * d) Interrupts are processed by the user application directly  
     **Answer**: b) Interrupts are handled by each core independently, or the interrupt is routed to a specific core
3. **What happens during a 'kernel panic' in an operating system?**
   * a) The operating system continues running normally
   * b) The kernel detects a serious error and halts the system
   * c) A system upgrade is applied
   * d) All applications are terminated  
     **Answer**: b) The kernel detects a serious error and halts the system
4. **Which of the following is a benefit of using kernel-space for critical OS tasks?**
   * a) Faster access to hardware resources
   * b) Greater memory efficiency for user programs
   * c) Easier to develop user applications
   * d) Better graphical user interface (GUI) support  
     **Answer**: a) Faster access to hardware resources
5. **What is 'privileged mode' in an operating system?**
   * a) The mode in which user applications execute
   * b) A mode where the kernel has full control of the system hardware
   * c) A mode used only for system diagnostics
   * d) A mode that limits access to certain memory areas  
     **Answer**: b) A mode where the kernel has full control of the system hardware
6. **Which of the following describes a 'race condition' in the context of hardware interrupt handling?**
   * a) Multiple processes accessing shared resources at the same time, leading to inconsistent results
   * b) Hardware interrupts being ignored by the operating system
   * c) A situation where interrupts occur in an ordered and predictable fashion
   * d) A process running without interruption  
     **Answer**: a) Multiple processes accessing shared resources at the same time, leading to inconsistent results
7. **Which of the following is a method used to prevent race conditions during interrupt handling?**
   * a) Locking the interrupt handler to ensure mutual exclusion
   * b) Ignoring interrupt requests
   * c) Allowing multiple processes to handle interrupts at once
   * d) Executing all interrupts in a random order  
     **Answer**: a) Locking the interrupt handler to ensure mutual exclusion
8. **What does the term "atomic operation" refer to in OS interrupt handling?**
   * a) An operation that cannot be interrupted or divided into smaller tasks
   * b) An operation that executes at a very fast rate
   * c) A process that involves interacting with hardware
   * d) A system call that requests kernel services  
     **Answer**: a) An operation that cannot be interrupted or divided into smaller tasks
9. **Which of the following is true about User-space in relation to Kernel-space?**
   * a) User-space can access kernel-space memory directly without restrictions
   * b) User-space can execute privileged instructions that affect hardware
   * c) User-space and Kernel-space are isolated from each other for security and stability
   * d) User-space is part of the kernel  
     **Answer**: c) User-space and Kernel-space are isolated from each other for security and stability
10. **What is the role of the memory management unit (MMU) in an operating system?**
    * a) It is responsible for executing user applications
    * b) It manages interrupt handling
    * c) It translates virtual addresses to physical addresses and manages memory protection
    * d) It schedules processes for execution  
      **Answer**: c) It translates virtual addresses to physical addresses and manages memory protection

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1. **What is the purpose of virtual memory in modern operating systems?**
   * a) To provide additional memory beyond the physical RAM
   * b) To manage interrupts more efficiently
   * c) To handle multiple processes simultaneously
   * d) To manage system calls  
     **Answer**: a) To provide additional memory beyond the physical RAM
2. **Which of the following is a feature of the Monolithic Kernel architecture?**
   * a) The kernel only manages system services
   * b) Most services run in user-space
   * c) All services run in kernel-space, which provides direct access to hardware
   * d) It uses a distributed approach to managing system resources  
     **Answer**: c) All services run in kernel-space, which provides direct access to hardware
3. **Which of the following is an example of a "system call"?**
   * a) A request made by a user application to the kernel for a service
   * b) A function executed in user-space
   * c) A hardware interrupt
   * d) A memory access request by the kernel  
     **Answer**: a) A request made by a user application to the kernel for a service
4. **Which of the following best describes a microkernel architecture?**
   * a) The kernel handles only basic services like communication, and most OS services run in user-space
   * b) The kernel handles all services, including user applications
   * c) The kernel does not interact with hardware
   * d) The kernel is only responsible for managing processes  
     **Answer**: a) The kernel handles only basic services like communication, and most OS services run in user-space
5. **How does the operating system ensure that hardware interrupts are handled promptly?**
   * a) By using interrupt priorities and queues
   * b) By ignoring low-priority interrupts
   * c) By allocating more memory for interrupts
   * d) By executing the highest-priority interrupt at the same time  
     **Answer**: a) By using interrupt priorities and queues
6. **What is the role of the scheduler in the OS kernel?**
   * a) It schedules interrupt handlers
   * b) It schedules which processes or tasks will use the CPU
   * c) It executes system calls
   * d) It manages system memory  
     **Answer**: b) It schedules which processes or tasks will use the CPU
7. **Which of the following is true about process scheduling in an OS?**
   * a) Only one process can run at any given time
   * b) The kernel decides which process to execute based on a predefined set of rules
   * c) Processes are scheduled randomly without any system preference
   * d) Scheduling is done based on the time of day  
     **Answer**: b) The kernel decides which process to execute based on a predefined set of rules
8. **What happens when a process in user-space attempts to execute an instruction that requires kernel privileges?**
   * a) The instruction is executed without any issues
   * b) The operating system switches the process to kernel mode to handle the request
   * c) The user-space application is terminated
   * d) The process continues execution without any special privileges  
     **Answer**: b) The operating system switches the process to kernel mode to handle the request
9. **Which of the following is a responsibility of the device drivers in the OS?**
   * a) Managing interrupt handling
   * b) Providing access to hardware devices for user-space applications
   * c) Scheduling processes
   * d) Allocating memory for user applications  
     **Answer**: b) Providing access to hardware devices for user-space applications
10. **What is a context switch in an operating system?**
    * a) Switching the processor's context between user-space and kernel-space
    * b) Switching the operating system’s kernel from one task to another
    * c) Switching between different interrupt handlers
    * d) Switching from one user application to another  
      **Answer**: a) Switching the processor's context between user-space and kernel-space

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**Session 2: Process Management**

### **Easy Level:**

1. **What is a process in an operating system?**
   * a) A part of the kernel
   * b) A program that is currently executing
   * c) A hardware component
   * d) A memory space allocated to a program  
     **Answer**: b) A program that is currently executing
2. **Which of the following is NOT a state of a process in the process lifecycle?**
   * a) New
   * b) Running
   * c) Suspended
   * d) Executing  
     **Answer**: d) Executing
3. **What is the primary responsibility of the process scheduler?**
   * a) Allocating CPU time to processes
   * b) Executing processes
   * c) Managing process memory
   * d) Storing user data  
     **Answer**: a) Allocating CPU time to processes
4. **Which process state indicates that the process is ready to execute but is waiting for the CPU?**
   * a) New
   * b) Ready
   * c) Running
   * d) Blocked  
     **Answer**: b) Ready
5. **Which of the following is an example of a non-preemptive scheduling algorithm?**
   * a) Round Robin
   * b) FCFS (First-Come, First-Served)
   * c) Priority Scheduling
   * d) Multilevel Queue Scheduling  
     **Answer**: b) FCFS (First-Come, First-Served)
6. **What is a key difference between preemptive and non-preemptive scheduling?**
   * a) Preemptive scheduling allows processes to be interrupted
   * b) Non-preemptive scheduling allows processes to be interrupted
   * c) Preemptive scheduling does not allow processes to be interrupted
   * d) There is no difference between preemptive and non-preemptive scheduling  
     **Answer**: a) Preemptive scheduling allows processes to be interrupted
7. **Which of the following is a key advantage of preemptive scheduling?**
   * a) It minimizes context switching
   * b) It gives priority to processes based on their arrival times
   * c) It allows higher-priority processes to take over CPU time
   * d) It is simpler to implement than non-preemptive scheduling  
     **Answer**: c) It allows higher-priority processes to take over CPU time
8. **Which of the following scheduling algorithms is best for minimizing the average waiting time?**
   * a) First-Come, First-Served (FCFS)
   * b) Round Robin
   * c) Shortest Job First (SJF)
   * d) Priority Scheduling  
     **Answer**: c) Shortest Job First (SJF)
9. **What happens during a context switch in process scheduling?**
   * a) The operating system kills the current process
   * b) The current process is paused, and the OS switches the CPU to another process
   * c) The process is moved to disk storage
   * d) The current process continues execution without any interruption  
     **Answer**: b) The current process is paused, and the OS switches the CPU to another process
10. **What does FCFS stand for in process scheduling?**
    * a) First-Change First-Served
    * b) First-Come First-Served
    * c) Fast-Circular First-Served
    * d) Fast-Critical First-Served  
      **Answer**: b) First-Come First-Served

### **Intermediate Level:**

1. **What is the major disadvantage of the First-Come First-Served (FCFS) scheduling algorithm?**
   * a) It can lead to high average waiting times
   * b) It is difficult to implement
   * c) It favors short processes over long ones
   * d) It can cause processes to be preempted  
     **Answer**: a) It can lead to high average waiting times
2. **Which of the following best describes a Round Robin (RR) scheduling algorithm?**
   * a) Each process is executed for a fixed time slice before switching to the next process
   * b) The process with the highest priority is executed first
   * c) The process with the shortest burst time is executed first
   * d) Processes are executed in the order they arrive  
     **Answer**: a) Each process is executed for a fixed time slice before switching to the next process
3. **What is a time slice in the context of the Round Robin scheduling algorithm?**
   * a) The maximum amount of CPU time given to a process before it is paused
   * b) The time between process arrivals
   * c) The time allocated to handle interrupts
   * d) The time a process spends waiting in the queue  
     **Answer**: a) The maximum amount of CPU time given to a process before it is paused
4. **Which of the following is an advantage of Round Robin scheduling?**
   * a) It is very efficient for processes with varied burst times
   * b) It can cause starvation of certain processes
   * c) It minimizes the average turnaround time for processes
   * d) It gives each process an equal share of CPU time  
     **Answer**: d) It gives each process an equal share of CPU time
5. **What is the primary characteristic of preemptive scheduling?**
   * a) A process runs until it completes or blocks
   * b) A process can be interrupted to allow another process to execute
   * c) Processes are scheduled based on priority
   * d) Processes are scheduled in a fixed sequence  
     **Answer**: b) A process can be interrupted to allow another process to execute
6. **Which of the following is a scheduling algorithm that assigns the CPU to the process with the shortest next burst time?**
   * a) FCFS
   * b) Round Robin
   * c) Shortest Job Next (SJN)
   * d) Priority Scheduling  
     **Answer**: c) Shortest Job Next (SJN)
7. **What does the "turnaround time" for a process represent?**
   * a) The time it takes for a process to complete from arrival to completion
   * b) The time a process spends waiting in the ready queue
   * c) The amount of time the process spends waiting for I/O operations
   * d) The time the process is allowed to use the CPU  
     **Answer**: a) The time it takes for a process to complete from arrival to completion
8. **Which scheduling algorithm is considered the most suitable for time-sharing systems?**
   * a) First-Come, First-Served
   * b) Round Robin
   * c) Shortest Job First
   * d) Priority Scheduling  
     **Answer**: b) Round Robin
9. **Which of the following scheduling algorithms suffers from the problem of starvation?**
   * a) Round Robin
   * b) First-Come, First-Served
   * c) Priority Scheduling
   * d) Shortest Job First  
     **Answer**: c) Priority Scheduling
10. **What is a key feature of the non-preemptive scheduling algorithm?**
    * a) Processes can be preempted at any time
    * b) The process runs to completion before switching to another process
    * c) Processes are handled based on their priority
    * d) Processes are executed in a round-robin fashion  
      **Answer**: b) The process runs to completion before switching to another process

### **Hard Level:**

1. **Which of the following is the main issue with the First-Come, First-Served (FCFS) algorithm in terms of process management?**
   * a) It requires complex hardware to manage
   * b) It leads to the "convoy effect," where long processes delay shorter ones
   * c) It requires dynamic priority adjustments
   * d) It minimizes the number of context switches  
     **Answer**: b) It leads to the "convoy effect," where long processes delay shorter ones
2. **What does "starvation" mean in process scheduling?**
   * a) A process is not allowed to execute due to the high priority of other processes
   * b) A process runs to completion without interruption
   * c) A process is automatically terminated after a set time
   * d) A process is terminated after its time slice ends  
     **Answer**: a) A process is not allowed to execute due to the high priority of other processes
3. **What is the key disadvantage of the Round Robin scheduling algorithm in relation to its time quantum?**
   * a) It can cause long waiting times if the time slice is too small
   * b) It causes the CPU to become idle for long periods
   * c) It doesn't handle priority processes effectively
   * d) It can lead to excessive context switching if the time slice is too large  
     **Answer**: a) It can cause long waiting times if the time slice is too small
4. **In which of the following scenarios would Shortest Job First (SJF) scheduling be most efficient?**
   * a) When processes have very similar burst times
   * b) When processes arrive in random order
   * c) When processes are highly interactive
   * d) When the system has few processes running concurrently  
     **Answer**: a) When processes have very similar burst times
5. **What is a potential drawback of Shortest Job First (SJF) scheduling in real-world systems?**
   * a) It cannot be preemptive
   * b) It requires knowledge of the process’s future burst time
   * c) It causes high turnaround times for short processes
   * d) It increases the chance of starvation for longer processes  
     **Answer**: b) It requires knowledge of the process’s future burst time
6. **Which of the following describes the behavior of the Priority Scheduling algorithm?**
   * a) Processes are executed in the order of their arrival times
   * b) The highest priority process is always executed first
   * c) Processes are executed based on their burst time
   * d) Processes are executed in a round-robin fashion  
     **Answer**: b) The highest priority process is always executed first
7. **Which of the following is true about a preemptive priority scheduling algorithm?**
   * a) A higher priority process can preempt a running lower priority process
   * b) The CPU always executes processes in the order they arrive
   * c) Processes run to completion without interruption
   * d) It is non-preemptive by design  
     **Answer**: a) A higher priority process can preempt a running lower priority process
8. **Which scheduling algorithm minimizes the average waiting time when all processes have similar burst times?**
   * a) Shortest Job First (SJF)
   * b) Round Robin
   * c) First-Come, First-Served (FCFS)
   * d) Priority Scheduling  
     **Answer**: a) Shortest Job First (SJF)
9. **Which of the following is the effect of using a very large time quantum in Round Robin scheduling?**
   * a) It essentially becomes similar to FCFS scheduling
   * b) It reduces the system's overall efficiency
   * c) It can lead to excessive context switching
   * d) It ensures better CPU utilization  
     **Answer**: a) It essentially becomes similar to FCFS scheduling
10. **Which of the following is an advantage of preemptive scheduling over non-preemptive scheduling?**
    * a) Preemptive scheduling reduces context switching
    * b) Preemptive scheduling guarantees that no process is blocked
    * c) Preemptive scheduling allows high-priority processes to gain quicker access to CPU
    * d) Preemptive scheduling does not require process priorities  
      **Answer**: c) Preemptive scheduling allows high-priority processes to gain quicker access to CPU

### **Continued - Hard Level:**

1. **What is the primary advantage of using a multi-level queue scheduling algorithm?**
   * a) It allows processes to be prioritized based on their behavior
   * b) It gives every process the same priority
   * c) It ensures that all processes run in a round-robin manner
   * d) It minimizes context switching  
     **Answer**: a) It allows processes to be prioritized based on their behavior
2. **Which of the following scheduling algorithms is most likely to lead to starvation?**
   * a) Round Robin
   * b) First-Come, First-Served
   * c) Priority Scheduling
   * d) Shortest Job First  
     **Answer**: c) Priority Scheduling
3. **In which of the following cases does a process experience the longest waiting time?**
   * a) Round Robin scheduling with a very small time quantum
   * b) First-Come, First-Served scheduling
   * c) Shortest Job First scheduling
   * d) Preemptive priority scheduling  
     **Answer**: a) Round Robin scheduling with a very small time quantum
4. **In the case of First-Come, First-Served (FCFS) scheduling, what happens if two processes have the same arrival time?**
   * a) The OS randomly selects one to run first
   * b) The process with the shortest burst time runs first
   * c) The first process to complete runs first
   * d) The process that was queued first runs first  
     **Answer**: d) The process that was queued first runs first
5. **Which scheduling algorithm is most commonly used in real-time systems, where response time is critical?**
   * a) First-Come, First-Served
   * b) Round Robin
   * c) Priority Scheduling
   * d) Shortest Job First  
     **Answer**: c) Priority Scheduling
6. **Which of the following scheduling algorithms minimizes the time processes spend waiting in the ready queue?**
   * a) Round Robin
   * b) Shortest Job First
   * c) Priority Scheduling
   * d) First-Come, First-Served  
     **Answer**: b) Shortest Job First
7. **How does the "convoy effect" occur in process scheduling?**
   * a) A long process holds up the execution of shorter processes
   * b) A process is delayed due to priority inversion
   * c) Processes are executed in the order of their burst times
   * d) Processes run in a continuous loop, causing delays  
     **Answer**: a) A long process holds up the execution of shorter processes
8. **Which of the following best describes a system with a strict priority scheduling algorithm?**
   * a) Processes with the highest priority are always executed first, regardless of arrival time
   * b) Processes are executed in the order of arrival
   * c) Every process gets equal CPU time
   * d) Shorter processes are executed before longer ones  
     **Answer**: a) Processes with the highest priority are always executed first, regardless of arrival time
9. **Which of the following is a disadvantage of Round Robin scheduling with a small time quantum?**
   * a) It increases the context switching overhead
   * b) It provides better CPU utilization
   * c) It results in processes waiting for long periods
   * d) It minimizes the average turnaround time  
     **Answer**: a) It increases the context switching overhead
10. **In a preemptive scheduling environment, which of the following events may trigger a context switch?**
    * a) A process completes its CPU burst
    * b) A higher-priority process arrives
    * c) A process finishes I/O operations
    * d) All of the above  
      **Answer**: d) All of the above
11. **Which of the following statements is true about the Shortest Job First (SJF) algorithm?**
    * a) It is always optimal for minimizing average waiting time
    * b) It is a preemptive algorithm
    * c) It guarantees no starvation
    * d) It is not suitable for interactive systems  
      **Answer**: a) It is always optimal for minimizing average waiting time
12. **How does a "time quantum" in a Round Robin scheduling algorithm affect process execution?**
    * a) It limits the amount of time a process can use the CPU before being preempted
    * b) It ensures that processes are executed in a fixed order
    * c) It assigns higher priority to processes based on their burst time
    * d) It guarantees that all processes will complete without interruption  
      **Answer**: a) It limits the amount of time a process can use the CPU before being preempted
13. **What is the primary advantage of multi-level feedback queue scheduling over simple priority scheduling?**
    * a) It minimizes context switching
    * b) It adjusts the priority of processes based on their behavior
    * c) It ensures all processes receive equal CPU time
    * d) It reduces the chance of process starvation  
      **Answer**: b) It adjusts the priority of processes based on their behavior
14. **Which of the following statements about Priority Scheduling is true?**
    * a) It is guaranteed to provide the shortest average waiting time
    * b) It can cause starvation for low-priority processes
    * c) It always favors the process with the longest burst time
    * d) It is inherently non-preemptive  
      **Answer**: b) It can cause starvation for low-priority processes
15. **What is the role of the process control block (PCB) in process management?**
    * a) It stores information about the CPU scheduling algorithm
    * b) It contains the status of each process in the system
    * c) It stores the complete list of all processes in the system
    * d) It determines the arrival time of processes  
      **Answer**: b) It contains the status of each process in the system
16. **What does the term "waiting time" refer to in the context of process scheduling?**
    * a) The time the process spends executing on the CPU
    * b) The time a process spends in the ready queue
    * c) The time a process spends performing I/O operations
    * d) The total time taken for a process to complete execution  
      **Answer**: b) The time a process spends in the ready queue
17. **Which of the following scheduling algorithms is suitable for systems where the load can vary significantly over time?**
    * a) Round Robin
    * b) Priority Scheduling
    * c) Shortest Job First
    * d) Multi-Level Queue Scheduling  
      **Answer**: d) Multi-Level Queue Scheduling
18. **What happens in a system that uses an aging technique in Priority Scheduling?**
    * a) New processes are given higher priority
    * b) Processes with low priority gradually gain higher priority over time
    * c) Processes are executed based on their burst time
    * d) Processes with high priority are not executed  
      **Answer**: b) Processes with low priority gradually gain higher priority over time
19. **Which scheduling algorithm is most likely to be used in a preemptive real-time operating system?**
    * a) First-Come, First-Served
    * b) Round Robin
    * c) Priority Scheduling
    * d) Shortest Job First  
      **Answer**: c) Priority Scheduling
20. **In which scheduling algorithm is a process not allowed to run unless it is granted the CPU by the scheduler?**
    * a) Round Robin
    * b) First-Come, First-Served
    * c) Priority Scheduling
    * d) All of the above  
      **Answer**: d) All of the above

### **Session 3: Memory Management & File System Management**

### **Easy Level:**

1. **What is virtual memory in an operating system?**
   * a) Memory that is physically available on the system
   * b) Memory that is simulated by the operating system to give the illusion of a larger memory space
   * c) Memory used by only one program at a time
   * d) Memory used by the kernel exclusively  
     **Answer**: b) Memory that is simulated by the operating system to give the illusion of a larger memory space
2. **Which of the following is a primary benefit of virtual memory?**
   * a) It reduces the need for secondary storage
   * b) It allows processes to use more memory than physically available
   * c) It improves the CPU performance
   * d) It eliminates memory fragmentation  
     **Answer**: b) It allows processes to use more memory than physically available
3. **In which of the following memory management techniques are the processes divided into fixed-sized blocks?**
   * a) Segmentation
   * b) Paging
   * c) Virtual Memory
   * d) File System Management  
     **Answer**: b) Paging
4. **Which of the following is true about paging?**
   * a) It eliminates external fragmentation
   * b) It results in fixed-sized segments
   * c) It allows memory to be divided into unequal-sized blocks
   * d) It is a technique that cannot use secondary storage  
     **Answer**: a) It eliminates external fragmentation
5. **Which of the following is a key characteristic of segmentation in memory management?**
   * a) It uses fixed-sized memory blocks
   * b) It divides memory into variable-sized segments based on logical divisions like functions
   * c) It eliminates internal fragmentation
   * d) It stores all data in a single large block  
     **Answer**: b) It divides memory into variable-sized segments based on logical divisions like functions
6. **What is a page in the context of paging in memory management?**
   * a) A small part of the program’s code that is executed
   * b) A fixed-size block of logical memory
   * c) A variable-sized section of memory
   * d) A block of data stored on the hard drive  
     **Answer**: b) A fixed-size block of logical memory
7. **What is the role of the page table in memory management?**
   * a) It stores the physical addresses of pages in memory
   * b) It maps virtual addresses to physical addresses
   * c) It maintains the order in which processes run
   * d) It handles memory fragmentation  
     **Answer**: b) It maps virtual addresses to physical addresses
8. **Which of the following is an example of a file system?**
   * a) CPU scheduling
   * b) Paging
   * c) NTFS
   * d) Segmentation  
     **Answer**: c) NTFS
9. **What is a file system responsible for?**
   * a) Executing processes
   * b) Managing the organization, storage, and retrieval of data
   * c) Allocating CPU time to processes
   * d) Handling user input and output  
     **Answer**: b) Managing the organization, storage, and retrieval of data
10. **Which of the following file systems is most commonly used in Windows operating systems?**
    * a) FAT
    * b) NTFS
    * c) ext4
    * d) HFS+  
      **Answer**: b) NTFS

### **Intermediate Level:**

1. **Which of the following page replacement algorithms replaces the page that will not be used for the longest time in the future?**
   * a) FIFO (First-In, First-Out)
   * b) LRU (Least Recently Used)
   * c) OPT (Optimal)
   * d) LFU (Least Frequently Used)  
     **Answer**: c) OPT (Optimal)
2. **What does the FIFO (First-In, First-Out) page replacement algorithm do?**
   * a) It replaces the page that has been in memory the longest
   * b) It replaces the page that is least frequently used
   * c) It replaces the page that was last used
   * d) It replaces the page that has the smallest size  
     **Answer**: a) It replaces the page that has been in memory the longest
3. **What is the main disadvantage of the FIFO page replacement algorithm?**
   * a) It causes excessive context switching
   * b) It can lead to suboptimal page replacement and high page fault rates
   * c) It is difficult to implement
   * d) It results in memory fragmentation  
     **Answer**: b) It can lead to suboptimal page replacement and high page fault rates
4. **In the Least Recently Used (LRU) page replacement algorithm, what happens when a page is accessed?**
   * a) It is immediately removed from memory
   * b) It is moved to the front of a queue
   * c) It is added to the back of a stack
   * d) It is replaced with the next least recently used page  
     **Answer**: b) It is moved to the front of a queue
5. **Which of the following is a key disadvantage of LRU page replacement?**
   * a) It is easy to implement
   * b) It may require additional memory to track the page access history
   * c) It is optimal for all types of processes
   * d) It doesn't suffer from page faults  
     **Answer**: b) It may require additional memory to track the page access history
6. **Which page replacement algorithm performs the best in terms of minimizing page faults?**
   * a) FIFO
   * b) LRU
   * c) OPT (Optimal)
   * d) LFU  
     **Answer**: c) OPT (Optimal)
7. **What is segmentation in memory management?**
   * a) Memory is divided into fixed-sized blocks
   * b) Memory is divided into blocks of variable size based on logical divisions
   * c) It refers to the process of swapping data between primary and secondary storage
   * d) It combines paging and virtual memory techniques  
     **Answer**: b) Memory is divided into blocks of variable size based on logical divisions
8. **What is a key disadvantage of segmentation in memory management?**
   * a) It causes internal fragmentation
   * b) It can result in external fragmentation
   * c) It increases the size of the page table
   * d) It does not support virtual memory  
     **Answer**: b) It can result in external fragmentation
9. **Which of the following is a characteristic of NTFS (New Technology File System)?**
   * a) It does not support file permissions
   * b) It is the default file system for Linux operating systems
   * c) It supports larger file sizes and advanced file permissions
   * d) It is not suitable for modern storage devices  
     **Answer**: c) It supports larger file sizes and advanced file permissions
10. **What is the purpose of a file allocation table (FAT) in file systems?**
    * a) It keeps track of free and used memory blocks
    * b) It stores the physical location of files on a disk
    * c) It manages the file security settings
    * d) It assigns unique identifiers to files  
      **Answer**: b) It stores the physical location of files on a disk

### **Hard Level:**

1. **Which of the following page replacement algorithms aims to minimize page faults by selecting the page that will not be used for the longest period?**
   * a) LRU
   * b) FIFO
   * c) OPT
   * d) Clock  
     **Answer**: c) OPT
2. **What does a page fault indicate in a virtual memory system?**
   * a) The requested page is not in physical memory
   * b) The page is corrupted
   * c) The process has finished its execution
   * d) The memory has been freed up for other processes  
     **Answer**: a) The requested page is not in physical memory
3. **Which of the following is a disadvantage of using a larger page size in a paging system?**
   * a) It increases the number of page faults
   * b) It can result in higher internal fragmentation
   * c) It reduces the time spent on page table lookups
   * d) It increases the efficiency of memory access  
     **Answer**: b) It can result in higher internal fragmentation
4. **In which situation is segmentation combined with paging most beneficial?**
   * a) When memory access speed is critical
   * b) When external fragmentation is a major issue
   * c) When processes are of equal size
   * d) When a file system is being managed  
     **Answer**: b) When external fragmentation is a major issue
5. **What is the primary advantage of using a hierarchical file system structure?**
   * a) It simplifies the process of file access
   * b) It makes it easier to organize and manage large amounts of data
   * c) It improves the speed of file transfers
   * d) It eliminates file fragmentation  
     **Answer**: b) It makes it easier to organize and manage large amounts of data
6. **Which of the following is the key difference between FAT and NTFS file systems?**
   * a) FAT is more efficient in handling large files
   * b) NTFS provides security features such as file encryption and access control lists (ACLs)
   * c) NTFS is only used in older operating systems
   * d) FAT is more secure than NTFS  
     **Answer**: b) NTFS provides security features such as file encryption and access control lists (ACLs)
7. **What is a page table entry in a virtual memory system responsible for?**
   * a) Mapping a virtual page to its corresponding physical frame
   * b) Storing the most recently used pages
   * c) Maintaining the size of the page
   * d) Tracking the page fault rate  
     **Answer**: a) Mapping a virtual page to its corresponding physical frame
8. **What is a "thrashing" situation in virtual memory management?**
   * a) A process uses too much CPU time
   * b) The system is spending more time swapping pages in and out of memory than executing processes
   * c) Memory is allocated too efficiently, causing fragmentation
   * d) A process has too many page faults  
     **Answer**: b) The system is spending more time swapping pages in and out of memory than executing processes
9. **Which of the following file systems is most suitable for a large-scale database requiring high performance and file security?**
   * a) FAT32
   * b) NTFS
   * c) ext4
   * d) HFS+  
     **Answer**: b) NTFS
10. **Which of the following is true regarding the FAT32 file system?**
    * a) It supports files larger than 4 GB
    * b) It is optimized for SSDs
    * c) It is a 64-bit file system
    * d) It is widely used for removable storage devices like USB drives  
      **Answer**: d) It is widely used for removable storage devices like USB drives

### 

1. **Which of the following is an advantage of using a multi-level page table in a paging system?**
   * a) It reduces the overall memory overhead of the system
   * b) It speeds up page lookup times significantly
   * c) It reduces the need for swapping pages in and out of memory
   * d) It eliminates all forms of fragmentation  
     **Answer**: a) It reduces the overall memory overhead of the system
2. **Which file system provides journaling to protect against data corruption during a crash?**
   * a) ext3
   * b) FAT32
   * c) NTFS
   * d) Both a and c  
     **Answer**: d) Both a and c
3. **In a virtual memory system, what does the term "demand paging" mean?**
   * a) Pages are loaded into memory only when they are needed
   * b) All pages are loaded into memory at the start of the program
   * c) Pages are loaded randomly into memory
   * d) It refers to a method of swapping data between disks  
     **Answer**: a) Pages are loaded into memory only when they are needed
4. **What is the main purpose of kernel management of memory?**
   * a) To allocate CPU resources to processes
   * b) To manage physical and virtual memory spaces efficiently
   * c) To handle the loading of programs into memory
   * d) To perform file system operations  
     **Answer**: b) To manage physical and virtual memory spaces efficiently
5. **What is the primary disadvantage of using a single-level page table in a large system?**
   * a) It leads to an excessive number of page faults
   * b) It requires a large amount of memory for storing the page table
   * c) It results in slow process execution
   * d) It cannot handle segmentation effectively  
     **Answer**: b) It requires a large amount of memory for storing the page table

### 

1. **Which of the following methods is commonly used to handle page faults in a virtual memory system?**

* a) Segmentation fault handling
* b) Swapping pages between physical memory and disk storage
* c) Allocating more physical memory to the process
* d) Interrupting the current process and loading new pages  
  **Answer**: b) Swapping pages between physical memory and disk storage

1. **Which of the following algorithms is used to reduce internal fragmentation in a system with paging?**

* a) LRU
* b) FIFO
* c) Optimal page replacement
* d) Using smaller page sizes  
  **Answer**: d) Using smaller page sizes

1. **In which of the following file systems does each file have a unique "inode" structure that holds metadata such as file size and permissions?**

* a) NTFS
* b) ext4
* c) FAT32
* d) HFS+  
  **Answer**: b) ext4

1. **Which of the following file systems is best suited for a system that needs to handle very large files and require fast read/write access?**

* a) FAT16
* b) NTFS
* c) exFAT
* d) ext4  
  **Answer**: b) NTFS

1. **Which of the following is a primary goal of paging in memory management?**

* a) To prevent external fragmentation
* b) To reduce the time required to execute processes
* c) To ensure processes have exclusive access to memory
* d) To make the memory structure simpler and static  
  **Answer**: a) To prevent external fragmentation

1. **What is a characteristic of the Least Recently Used (LRU) page replacement algorithm?**

* a) It replaces the page that has been in memory for the longest time
* b) It replaces the page that has been accessed the least recently
* c) It replaces the page that is accessed most frequently
* d) It uses a random replacement strategy  
  **Answer**: b) It replaces the page that has been accessed the least recently

1. **What type of fragmentation occurs when there is enough total free memory but not enough contiguous free memory?**

* a) Internal fragmentation
* b) External fragmentation
* c) Memory leak
* d) Virtual fragmentation  
  **Answer**: b) External fragmentation

1. **Which of the following is true about the NTFS file system?**

* a) It does not support file permissions
* b) It supports file compression and encryption
* c) It is not suitable for large files
* d) It only supports a limited number of files  
  **Answer**: b) It supports file compression and encryption

1. **Which of the following statements about page replacement is true in the context of operating systems?**

* a) The Optimal page replacement algorithm is generally used in practice despite its complexity
* b) FIFO is the most efficient algorithm for page replacement
* c) LRU is the most commonly used algorithm for handling page replacement in modern OS
* d) A good page replacement algorithm aims to minimize CPU usage  
  **Answer**: c) LRU is the most commonly used algorithm for handling page replacement in modern OS

1. **Which of the following is true regarding memory segmentation in an operating system?**

* a) It divides memory into small, fixed-sized pages
* b) Each segment is of a fixed size, regardless of the program’s needs
* c) Segmentation allows for better mapping of logical data structures like functions
* d) Segmentation eliminates the need for paging  
  **Answer**: c) Segmentation allows for better mapping of logical data structures like functions

1. **What is the role of a "swap space" in a virtual memory system?**

* a) It is used to speed up memory access times
* b) It serves as a temporary area on disk to store pages that cannot fit into physical memory
* c) It stores files that are frequently accessed by applications
* d) It contains a backup copy of the operating system  
  **Answer**: b) It serves as a temporary area on disk to store pages that cannot fit into physical memory

1. **In a file system, what is a directory structure used for?**

* a) To store backup copies of files
* b) To manage the file's metadata, including its size, name, and permissions
* c) To organize files into a hierarchical format for easy access
* d) To allocate the blocks for file storage  
  **Answer**: c) To organize files into a hierarchical format for easy access

1. **Which of the following page replacement algorithms operates based on the "Clock" method?**

* a) LRU
* b) FIFO
* c) Optimal
* d) Second Chance  
  **Answer**: d) Second Chance

1. **Which of the following is a feature provided by the NTFS file system but not by FAT32?**

* a) Support for larger files
* b) Faster read and write speeds
* c) File compression and encryption
* d) Compatibility with older operating systems  
  **Answer**: c) File compression and encryption

1. **What is the main advantage of using a multi-level page table in large systems?**

* a) It allows more efficient memory usage by reducing the size of the page table
* b) It simplifies memory allocation for each process
* c) It reduces external fragmentation in memory
* d) It eliminates the need for virtual memory  
  **Answer**: a) It allows more efficient memory usage by reducing the size of the page table

### **Session 4: Introduction to Linux**

### **Easy Level:**

1. **Who is the creator of the Linux operating system?**
   * a) Steve Jobs
   * b) Richard Stallman
   * c) Linus Torvalds
   * d) Bill Gates  
     **Answer**: c) Linus Torvalds
2. **When was the first version of Linux released?**
   * a) 1989
   * b) 1991
   * c) 1995
   * d) 2000  
     **Answer**: b) 1991
3. **What is the primary purpose of the ls command in Linux?**
   * a) To list the contents of a directory
   * b) To copy files
   * c) To move files
   * d) To display manual pages  
     **Answer**: a) To list the contents of a directory
4. **Which of the following commands is used to copy files in Linux?**
   * a) mv
   * b) cp
   * c) rm
   * d) cat  
     **Answer**: b) cp
5. **Which Linux command is used to move or rename files?**
   * a) ls
   * b) cp
   * c) mv
   * d) grep  
     **Answer**: c) mv
6. **What does the man command do in Linux?**
   * a) Displays the manual pages of a command
   * b) Lists all users on the system
   * c) Moves files between directories
   * d) Compresses files  
     **Answer**: a) Displays the manual pages of a command
7. **Which command is used to display the contents of a file in Linux?**
   * a) cat
   * b) ps
   * c) ls
   * d) echo  
     **Answer**: a) cat
8. **What is the purpose of the grep command in Linux?**
   * a) To search for specific text patterns in files
   * b) To display the system's memory usage
   * c) To move files from one directory to another
   * d) To rename files  
     **Answer**: a) To search for specific text patterns in files
9. **Which of the following commands is used to print a message to the terminal in Linux?**
   * a) echo
   * b) ls
   * c) man
   * d) ps  
     **Answer**: a) echo
10. **Which command is used to display the running processes in Linux?**
    * a) ps
    * b) cat
    * c) cp
    * d) grep  
      **Answer**: a) ps

### **Intermediate Level:**

1. **Which of the following is NOT a Linux distribution (variant)?**
   * a) Ubuntu
   * b) Fedora
   * c) Windows
   * d) Debian  
     **Answer**: c) Windows
2. **Which of the following installation options is recommended to run Linux without installing it on a physical machine?**
   * a) Direct installation
   * b) Virtual Machine
   * c) WSL (Windows Subsystem for Linux)
   * d) None of the above  
     **Answer**: b) Virtual Machine
3. **What is the main advantage of using WSL (Windows Subsystem for Linux)?**
   * a) It allows you to run Linux on a Windows machine without the need for a virtual machine
   * b) It provides more performance compared to a virtual machine
   * c) It is the only option for installing Linux on a Windows machine
   * d) It is a lightweight installation that requires no additional resources  
     **Answer**: a) It allows you to run Linux on a Windows machine without the need for a virtual machine
4. **What is the command to show all files (including hidden ones) in a directory in Linux?**
   * a) ls -a
   * b) ls -l
   * c) ls -r
   * d) ls -h  
     **Answer**: a) ls -a
5. **Which Linux command is used to create a new directory?**
   * a) mkdir
   * b) rmdir
   * c) ls
   * d) touch  
     **Answer**: a) mkdir
6. **Which command is used to remove a file in Linux?**
   * a) rmdir
   * b) rm
   * c) mv
   * d) ls  
     **Answer**: b) rm
7. **Which of the following commands is used to change the current working directory in Linux?**
   * a) cd
   * b) ls
   * c) pwd
   * d) chmod  
     **Answer**: a) cd
8. **Which of the following commands shows the current working directory in Linux?**
   * a) ls
   * b) cd
   * c) pwd
   * d) mkdir  
     **Answer**: c) pwd
9. **Which Linux command is used to search for a file or directory by name?**
   * a) find
   * b) ls
   * c) cat
   * d) touch  
     **Answer**: a) find
10. **What is the default text editor in most Linux distributions?**
    * a) vi
    * b) nano
    * c) gedit
    * d) vim  
      **Answer**: a) vi

### **Hard Level:**

1. **Which of the following is a Linux distribution known for being lightweight and suitable for older hardware?**
   * a) Ubuntu
   * b) Kali Linux
   * c) Xubuntu
   * d) Debian  
     **Answer**: c) Xubuntu
2. **In which scenario would you use the touch command in Linux?**
   * a) To create a new file or update the timestamp of an existing file
   * b) To view the contents of a file
   * c) To move a file from one directory to another
   * d) To delete a file  
     **Answer**: a) To create a new file or update the timestamp of an existing file
3. **What does the chmod command do in Linux?**
   * a) Changes the ownership of a file
   * b) Changes the permissions of a file or directory
   * c) Changes the file content
   * d) Changes the file name  
     **Answer**: b) Changes the permissions of a file or directory
4. **Which of the following commands would you use to check the system's memory usage in Linux?**
   * a) free
   * b) ps
   * c) top
   * d) ls  
     **Answer**: a) free
5. **What is the role of the sudo command in Linux?**
   * a) Executes commands with superuser (root) privileges
   * b) Executes commands as a regular user
   * c) Stops a running process
   * d) Changes the current working directory  
     **Answer**: a) Executes commands with superuser (root) privileges
6. **Which of the following commands is used to check the system's CPU usage in real time?**
   * a) df
   * b) top
   * c) ls
   * d) free  
     **Answer**: b) top
7. **What does the ps command do in Linux?**
   * a) Displays a list of currently running processes
   * b) Prints the contents of a file
   * c) Changes the system time
   * d) Sets system variables  
     **Answer**: a) Displays a list of currently running processes
8. **Which of the following commands would you use to display information about the disk space usage in Linux?**
   * a) df
   * b) ls
   * c) free
   * d) du  
     **Answer**: a) df
9. **Which command would you use to search for a pattern in a file in Linux?**
   * a) find
   * b) ls
   * c) grep
   * d) cat  
     **Answer**: c) grep
10. **Which of the following files stores system-wide configuration settings in Linux?**
    * a) /etc/passwd
    * b) /bin/bash
    * c) /home/user/.bashrc
    * d) /etc/fstab  
      **Answer**: d) /etc/fstab
11. **What is the purpose of the /home directory in Linux?**
    * a) Stores system-related binaries
    * b) Contains all the user-specific data and configurations
    * c) Contains temporary files used by the system
    * d) Stores log files  
      **Answer**: b) Contains all the user-specific data and configurations
12. **Which command is used to display the manual for a specific command in Linux?**
    * a) help
    * b) man
    * c) info
    * d) guide  
      **Answer**: b) man
13. **Which of the following commands allows you to display the content of a file page by page in Linux?**
    * a) more
    * b) less
    * c) cat
    * d) both a and b  
      **Answer**: d) both a and b
14. **In Linux, what is the purpose of the /bin directory?**
    * a) It contains configuration files for users
    * b) It holds essential system binaries that are required for the system's basic operations
    * c) It stores log files
    * d) It contains user data files  
      **Answer**: b) It holds essential system binaries that are required for the system's basic operations
15. **What is the primary function of the Linux kernel?**
    * a) It provides the user interface
    * b) It manages hardware resources and provides services to other software
    * c) It handles file system operations
    * d) It provides an environment for software development  
      **Answer**: b) It manages hardware resources and provides services to other software

### 

1. **Which of the following is the correct command to update the system’s package manager in a Debian-based distribution (e.g., Ubuntu)?**
   * a) apt-get update
   * b) yum update
   * c) pacman -Syu
   * d) dnf upgrade  
     **Answer**: a) apt-get update
2. **What does the dmesg command do in Linux?**
   * a) Displays system boot messages
   * b) Displays disk space usage
   * c) Shows memory statistics
   * d) Prints process details  
     **Answer**: a) Displays system boot messages
3. **Which of the following is the default directory for storing temporary files in Linux?**
   * a) /etc
   * b) /var/tmp
   * c) /usr/local
   * d) /tmp  
     **Answer**: d) /tmp
4. **Which command is used to display the Linux system hostname?**
   * a) hostname
   * b) uname -r
   * c) ip addr
   * d) ifconfig  
     **Answer**: a) hostname
5. **Which command allows a user to switch to the root user in Linux?**
   * a) sudo su
   * b) su root
   * c) root
   * d) sudo -i  
     **Answer**: a) sudo su
6. **Which command is used to list the currently logged-in users in Linux?**

* a) whoami
* b) who
* c) id
* d) ls  
  **Answer**: b) who

1. **Which of the following Linux commands is used to display the last logins of users?**

* a) last
* b) whoami
* c) ps
* d) uname  
  **Answer**: a) last

1. **What is the purpose of the tar command in Linux?**

* a) It compresses files
* b) It archives files into a single file
* c) It moves files
* d) It displays the content of a file  
  **Answer**: b) It archives files into a single file

1. **Which of the following commands would you use to monitor real-time system performance and processes in Linux?**

* a) top
* b) ls
* c) ps
* d) df  
  **Answer**: a) top

1. **Which command is used to display the system’s disk usage for all mounted filesystems in Linux?**

* a) du
* b) ls
* c) df
* d) free  
  **Answer**: c) df

1. **Which of the following directories in Linux contains system configuration files?**

* a) /usr
* b) /var
* c) /etc
* d) /home  
  **Answer**: c) /etc

1. **What does the ps -aux command do in Linux?**

* a) Lists all processes, including those started by other users
* b) Lists files in the current directory
* c) Shows system memory usage
* d) Displays real-time system performance  
  **Answer**: a) Lists all processes, including those started by other users

1. **Which of the following is true about the Linux kernel?**

* a) It is responsible for managing hardware resources
* b) It provides a graphical user interface
* c) It runs as a user process
* d) It only handles file management  
  **Answer**: a) It is responsible for managing hardware resources

1. **Which of the following commands is used to edit a text file in Linux using the nano text editor?**

* a) nano <filename>
* b) vim <filename>
* c) edit <filename>
* d) cat <filename>  
  **Answer**: a) nano <filename>

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### **Session 5 & 6: Working with Linux**

### **Easy Level:**

1. **Which text editor in Linux is known for its simplicity and ease of use?**
   * a) vi
   * b) nano
   * c) vim
   * d) emacs  
     **Answer**: b) nano
2. **Which text editor in Linux is considered more advanced and powerful, with a steeper learning curve?**
   * a) vi
   * b) nano
   * c) gedit
   * d) emacs  
     **Answer**: a) vi
3. **Which key combination in nano is used to save a file?**
   * a) Ctrl + X
   * b) Ctrl + S
   * c) Ctrl + W
   * d) Ctrl + O  
     **Answer**: d) Ctrl + O
4. **Which command is used to edit a file using nano in Linux?**
   * a) nano <filename>
   * b) vi <filename>
   * c) edit <filename>
   * d) cat <filename>  
     **Answer**: a) nano <filename>
5. **Which mode in vi allows you to insert text into the file?**
   * a) Command mode
   * b) Insert mode
   * c) Visual mode
   * d) Replace mode  
     **Answer**: b) Insert mode
6. **How do you exit vi without saving changes?**
   * a) :wq
   * b) :x
   * c) :q!
   * d) :q  
     **Answer**: c) :q!
7. **In the Linux file system, which directory contains essential system binaries?**
   * a) /bin
   * b) /home
   * c) /etc
   * d) /var  
     **Answer**: a) /bin
8. **Which of the following is the root directory in Linux?**
   * a) /
   * b) /home
   * c) /usr
   * d) /var  
     **Answer**: a) /
9. **Which command displays the contents of a directory in Linux?**
   * a) ls
   * b) dir
   * c) show
   * d) cat  
     **Answer**: a) ls

### **Intermediate Level:**

1. **Which file system is commonly used by default on most Linux distributions?**
   * a) NTFS
   * b) FAT32
   * c) ext4
   * d) HFS+  
     **Answer**: c) ext4
2. **Which command is used to create a new partition in Linux?**
   * a) mkdir
   * b) fdisk
   * c) lsblk
   * d) touch  
     **Answer**: b) fdisk
3. **What does the lsblk command display in Linux?**
   * a) List of files
   * b) Information about block devices
   * c) Process details
   * d) Disk usage statistics  
     **Answer**: b) Information about block devices
4. **Which file system is used by default in newer versions of Ubuntu for system partitions?**
   * a) ext3
   * b) ext4
   * c) NTFS
   * d) FAT32  
     **Answer**: b) ext4
5. **What does the command chmod 755 <filename> do in Linux?**
   * a) Sets read, write, and execute permissions for the user, and read and execute for others
   * b) Grants full permissions to all users
   * c) Sets only read permission for the user
   * d) Changes the file owner  
     **Answer**: a) Sets read, write, and execute permissions for the user, and read and execute for others
6. **Which of the following is the correct sequence of permission types in Linux?**
   * a) Owner, Group, Others
   * b) User, Group, Root
   * c) Read, Write, Execute
   * d) None of the above  
     **Answer**: a) Owner, Group, Others
7. **Which of the following Linux commands is used to change file ownership?**
   * a) chmod
   * b) chown
   * c) ls
   * d) lsblk  
     **Answer**: b) chown
8. **Which Linux file permission grants the ability to execute a file?**
   * a) r
   * b) w
   * c) x
   * d) r+  
     **Answer**: c) x
9. **Which command in Linux is used to change the permission of a file?**
   * a) ls
   * b) chown
   * c) chmod
   * d) mkdir  
     **Answer**: c) chmod
10. **Which command is used to view the current partition table in Linux?**
    * a) fdisk -l
    * b) lsblk
    * c) cat /etc/fstab
    * d) mount  
      **Answer**: a) fdisk -l

### **Hard Level:**

1. **Which of the following commands in Linux will create a swap partition?**
   * a) mkswap
   * b) mkfs
   * c) fdisk
   * d) swapoff  
     **Answer**: a) mkswap
2. **In Linux, which partition type is used for the boot loader?**
   * a) ext4
   * b) swap
   * c) EFI
   * d) /boot  
     **Answer**: d) /boot
3. **What does the /etc/fstab file contain in Linux?**
   * a) System log files
   * b) Mounted file systems and their configuration
   * c) User information
   * d) Kernel settings  
     **Answer**: b) Mounted file systems and their configuration
4. **In Linux, what is the role of the grub bootloader?**
   * a) It loads the kernel during system boot
   * b) It handles user login
   * c) It manages disk partitions
   * d) It displays the system logs  
     **Answer**: a) It loads the kernel during system boot
5. **Which directory in the Linux file system hierarchy contains user data?**
   * a) /bin
   * b) /etc
   * c) /home
   * d) /var  
     **Answer**: c) /home
6. **What is the purpose of the mount command in Linux?**
   * a) To format a partition
   * b) To list mounted devices
   * c) To mount a file system
   * d) To remove a partition  
     **Answer**: c) To mount a file system
7. **Which of the following directories contains temporary files in Linux?**
   * a) /tmp
   * b) /home
   * c) /bin
   * d) /var  
     **Answer**: a) /tmp
8. **Which partition scheme is commonly used in modern Linux installations for UEFI-based systems?**
   * a) GPT (GUID Partition Table)
   * b) MBR (Master Boot Record)
   * c) ext4
   * d) swap  
     **Answer**: a) GPT (GUID Partition Table)
9. **Which Linux command is used to verify the integrity of a file system?**
   * a) fsck
   * b) mount
   * c) chkconfig
   * d) rm  
     **Answer**: a) fsck
10. **Which Linux tool can be used to manage disk partitions?**
    * a) fdisk
    * b) dd
    * c) cat
    * d) cp  
      **Answer**: a) fdisk
11. **What is the purpose of the /etc/passwd file in Linux?**
    * a) To store system-wide settings
    * b) To store user account information
    * c) To manage processes
    * d) To configure network settings  
      **Answer**: b) To store user account information
12. **Which command is used to check the available disk space in Linux?**
    * a) du
    * b) df
    * c) free
    * d) ls  
      **Answer**: b) df
13. **What is the purpose of the swap partition in Linux?**
    * a) It is used for storing log files
    * b) It is used as virtual memory when RAM is full
    * c) It stores system binaries
    * d) It holds temporary user data  
      **Answer**: b) It is used as virtual memory when RAM is full
14. **Which Linux distribution is known for being used in server environments and is enterprise-focused?**
    * a) Ubuntu
    * b) Fedora
    * c) CentOS
    * d) Debian  
      **Answer**: c) CentOS
15. **Which of the following is a common use of the chmod command in Linux?**
    * a) Changing the owner of a file
    * b) Modifying file permissions
    * c) Listing files in a directory
    * d) Moving files  
      **Answer**: b) Modifying file permissions
16. **What does the /var directory typically contain in Linux?**
    * a) User configuration files
    * b) Variable files, logs, and temporary data
    * c) System binaries
    * d) User data  
      **Answer**: b) Variable files, logs, and temporary data
17. **Which of the following Linux commands would you use to install a software package on a Red Hat-based distribution?**
    * a) apt-get
    * b) pacman
    * c) dnf
    * d) zypper  
      **Answer**: c) dnf
18. **Which of the following is a command used to restart the Linux system?**
    * a) reboot
    * b) shutdown
    * c) exit
    * d) halt  
      **Answer**: a) reboot
19. **What is the primary function of the /etc/hostname file in Linux?**
    * a) To store system-wide configuration settings
    * b) To set the system's hostname
    * c) To store network configuration
    * d) To store user preferences  
      **Answer**: b) To set the system's hostname
20. **What is the Linux command for unmounting a file system?**
    * a) unmount
    * b) rm
    * c) umount
    * d) del  
      **Answer**: c) umount
21. **In Linux, which partition is typically used for storing swap space?**
    * a) /
    * b) /home
    * c) /swap
    * d) /dev/sda1  
      **Answer**: c) /swap
22. **What is the function of the /etc/rc.local file in Linux?**
    * a) Stores kernel parameters
    * b) Contains system startup scripts and commands
    * c) Configures network interfaces
    * d) Stores user passwords  
      **Answer**: b) Contains system startup scripts and commands

### **Hard Level (Continued):**

1. **Which Linux file system is commonly used for large-scale enterprise environments due to its scalability and high performance?**

* a) ext3
* b) ext4
* c) XFS
* d) FAT32  
  **Answer**: c) XFS

1. **Which command is used to install a package in Linux when using the yum package manager?**

* a) yum install <package\_name>
* b) apt-get install <package\_name>
* c) pacman -S <package\_name>
* d) zypper install <package\_name>  
  **Answer**: a) yum install <package\_name>

1. **What is the default file system used for the /boot partition in most Linux systems?**

* a) ext2
* b) ext4
* c) NTFS
* d) FAT32  
  **Answer**: a) ext2

1. **Which of the following is the correct command to check the status of a systemd service in Linux?**

* a) service <service\_name> status
* b) systemctl status <service\_name>
* c) status <service\_name>
* d) chkconfig <service\_name>  
  **Answer**: b) systemctl status <service\_name>

1. **Which of the following commands will mount a disk partition at a specific mount point in Linux?**

* a) mount /dev/sda1 /mnt
* b) mount /mnt /dev/sda1
* c) ls /mnt
* d) df -h  
  **Answer**: a) mount /dev/sda1 /mnt

### **Session 7: System Administration and Network Management**

### **Easy Level:**

1. **Which command in Linux is used to start a service?**
   * a) service start <service\_name>
   * b) systemctl start <service\_name>
   * c) start <service\_name>
   * d) run <service\_name>  
     **Answer**: b) systemctl start <service\_name>
2. **Which command is used to stop a service in Linux?**
   * a) systemctl stop <service\_name>
   * b) service stop <service\_name>
   * c) shutdown <service\_name>
   * d) halt <service\_name>  
     **Answer**: a) systemctl stop <service\_name>
3. **Which command is used to restart a service in Linux?**
   * a) systemctl restart <service\_name>
   * b) restart <service\_name>
   * c) service restart <service\_name>
   * d) reboot <service\_name>  
     **Answer**: a) systemctl restart <service\_name>
4. **Which Linux command is used to check the status of a service?**
   * a) service <service\_name> status
   * b) systemctl status <service\_name>
   * c) status <service\_name>
   * d) chkconfig <service\_name>  
     **Answer**: b) systemctl status <service\_name>
5. **Which command allows you to add a user to a Linux system?**
   * a) useradd <username>
   * b) adduser <username>
   * c) useradd -m <username>
   * d) All of the above  
     **Answer**: d) All of the above
6. **Which command is used to delete a user in Linux?**
   * a) userdel <username>
   * b) rmuser <username>
   * c) deluser <username>
   * d) del <username>  
     **Answer**: a) userdel <username>
7. **Which command is used to change the password of a user in Linux?**
   * a) passwd <username>
   * b) changepwd <username>
   * c) passchange <username>
   * d) modpasswd <username>  
     **Answer**: a) passwd <username>
8. **Which command is used to display all users currently logged into the system?**
   * a) who
   * b) w
   * c) users
   * d) All of the above  
     **Answer**: d) All of the above
9. **Which command is used to modify the owner of a file in Linux?**
   * a) chown <user> <file>
   * b) chmod <user> <file>
   * c) chgrp <user> <file>
   * d) setown <file>  
     **Answer**: a) chown <user> <file>
10. **What does the chmod command in Linux do?**
    * a) Changes file permissions
    * b) Changes file ownership
    * c) Changes the group of a file
    * d) Changes the file content  
      **Answer**: a) Changes file permissions

### **Intermediate Level:**

1. **Which of the following commands is used to set file permissions using ACLs (Access Control List)?**
   * a) setfacl
   * b) getfacl
   * c) acl
   * d) chmod  
     **Answer**: a) setfacl
2. **Which command in Linux is used to check the current file permissions?**
   * a) ls -l
   * b) ls -a
   * c) cat
   * d) find  
     **Answer**: a) ls -l
3. **Which command is used to change the group ownership of a file in Linux?**
   * a) chown <user>:<group> <file>
   * b) chmod <group> <file>
   * c) chgrp <group> <file>
   * d) setgroup <group> <file>  
     **Answer**: c) chgrp <group> <file>
4. **Which permission allows a user to execute a file in Linux?**
   * a) Read
   * b) Write
   * c) Execute
   * d) All of the above  
     **Answer**: c) Execute
5. **Which of the following network commands is used for remote login to another machine securely?**
   * a) telnet
   * b) ssh
   * c) ftp
   * d) sftp  
     **Answer**: b) ssh
6. **Which command is used to transfer files from one host to another over a network in Linux?**
   * a) ftp
   * b) sftp
   * c) scp
   * d) telnet  
     **Answer**: c) scp
7. **Which command in Linux is used to transfer files using FTP (File Transfer Protocol)?**
   * a) ftp
   * b) sftp
   * c) scp
   * d) telnet  
     **Answer**: a) ftp
8. **Which command is used to transfer files over a secure connection using SFTP (Secure File Transfer Protocol)?**
   * a) sftp
   * b) ftp
   * c) scp
   * d) ssh  
     **Answer**: a) sftp
9. **Which command in Linux is used to check network connectivity?**
   * a) ifconfig
   * b) netstat
   * c) ping
   * d) traceroute  
     **Answer**: c) ping
10. **Which command is used to view active network connections in Linux?**
    * a) ifconfig
    * b) netstat
    * c) route
    * d) ls  
      **Answer**: b) netstat

### **Hard Level:**

1. **What is the purpose of an Access Control List (ACL) in Linux?**
   * a) Provides a way to define access permissions for a file or directory
   * b) Encrypts a file or directory
   * c) Sets user quotas
   * d) Changes file ownership  
     **Answer**: a) Provides a way to define access permissions for a file or directory
2. **Which file in Linux contains system-wide network configuration settings?**
   * a) /etc/hostname
   * b) /etc/network/interfaces
   * c) /etc/hosts
   * d) /etc/sysconfig/network  
     **Answer**: b) /etc/network/interfaces
3. **Which command in Linux is used to view log files for system messages?**
   * a) dmesg
   * b) tail
   * c) logview
   * d) logs  
     **Answer**: a) dmesg
4. **Which command is used to monitor real-time log output in Linux?**
   * a) tail -f <log\_file>
   * b) logtail
   * c) cat <log\_file>
   * d) logs  
     **Answer**: a) tail -f <log\_file>
5. **Which directory in Linux is primarily used to store log files?**
   * a) /var/log
   * b) /home/log
   * c) /etc/log
   * d) /tmp/log  
     **Answer**: a) /var/log
6. **What does the journalctl command do in Linux?**
   * a) It displays system logs stored by systemd
   * b) It checks disk health
   * c) It lists all active processes
   * d) It shows network usage stats  
     **Answer**: a) It displays system logs stored by systemd
7. **Which file in Linux contains the system’s hostname?**
   * a) /etc/hostname
   * b) /etc/hosts
   * c) /etc/network/interfaces
   * d) /etc/hostname.conf  
     **Answer**: a) /etc/hostname
8. **Which service is responsible for managing user login sessions in Linux?**
   * a) sshd
   * b) systemd
   * c) login
   * d) networkd  
     **Answer**: a) sshd
9. **Which of the following commands is used to view current open ports in Linux?**
   * a) netstat
   * b) ss
   * c) ifconfig
   * d) nmap  
     **Answer**: b) ss
10. **Which of the following tools can be used to secure remote file transfers in Linux?**
    * a) SSH
    * b) SFTP
    * c) SCP
    * d) All of the above  
      **Answer**: d) All of the above
11. **Which command is used to view the current running processes in Linux?**
    * a) ps
    * b) top
    * c) htop
    * d) All of the above  
      **Answer**: d) All of the above
12. **Which file in Linux contains user password information?**
    * a) /etc/passwd
    * b) /etc/shadow
    * c) /etc/group
    * d) /etc/login.defs  
      **Answer**: a) /etc/passwd
13. **What is the purpose of the sudo command in Linux?**
    * a) Execute commands as a superuser or another user
    * b) Shut down the system
    * c) List active users
    * d) Change the file permissions  
      **Answer**: a) Execute commands as a superuser or another user
14. **Which of the following is a command to modify the system’s network configuration in Linux?**
    * a) ifconfig
    * b) ipconfig
    * c) netstat
    * d) nmtui  
      **Answer**: a) ifconfig
15. **Which Linux utility is used to manage and control firewall rules?**
    * a) iptables
    * b) firewalld
    * c) ufw
    * d) All of the above  
      **Answer**: d) All of the above
16. **Which command is used to shut down or restart the system in Linux?**
    * a) shutdown
    * b) reboot
    * c) poweroff
    * d) All of the above  
      **Answer**: d) All of the above
17. **Which file in Linux contains the group account information?**
    * a) /etc/group
    * b) /etc/passwd
    * c) /etc/sudoers
    * d) /etc/shadow  
      **Answer**: a) /etc/group
18. **Which command in Linux is used to search files or directories?**
    * a) find
    * b) locate
    * c) search
    * d) All of the above  
      **Answer**: d) All of the above
19. **Which command is used to monitor system resources in real-time?**
    * a) top
    * b) htop
    * c) vmstat
    * d) All of the above  
      **Answer**: d) All of the above

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### **Practical Assignments Questions:**

1. **Which command will change the permissions of a file so that the owner has read, write, and execute permissions, while others have read-only permissions?**
   * a) chmod 755 <file>
   * b) chmod 744 <file>
   * c) chmod 777 <file>
   * d) chmod 700 <file>  
     **Answer**: b) chmod 744 <file>
2. **To create a directory for a user and set specific permissions for that directory, which combination of commands should be used?**
   * a) mkdir <directory> && chmod <permissions> && chown <user>:<group> <directory>
   * b) mkdir <directory> && chmod <permissions>
   * c) useradd <directory> && chmod <permissions>
   * d) None of the above  
     **Answer**: a) mkdir <directory> && chmod <permissions> && chown <user>:<group> <directory>
3. **Which command is used to assign a group to a user in Linux?**
   * a) usermod -g <group> <username>
   * b) groupmod <username> <group>
   * c) chown -g <group> <username>
   * d) None of the above  
     **Answer**: a) usermod -g <group> <username>
4. **Which of the following commands will change the owner of a file to a specific user?**
   * a) chown <username> <file>
   * b) chmod <username> <file>
   * c) chgrp <username> <file>
   * d) setown <file>  
     **Answer**: a) chown <username> <file>
5. **Which command is used to view all active processes running on a Linux system?**
   * a) ps
   * b) top
   * c) htop
   * d) All of the above  
     **Answer**: d) All of the above
6. **What does the ls -l command do in Linux?**
   * a) Lists files and directories in long format
   * b) Lists files and directories in short format
   * c) Lists all hidden files
   * d) Lists only directories  
     **Answer**: a) Lists files and directories in long format
7. **Which command is used to log in to a remote machine securely in Linux?**
   * a) ssh <username>@<hostname>
   * b) ftp <username>@<hostname>
   * c) telnet <username>@<hostname>
   * d) rlogin <username>@<hostname>  
     **Answer**: a) ssh <username>@<hostname>
8. **Which command is used to shut down the system immediately?**
   * a) shutdown -h now
   * b) halt
   * c) poweroff
   * d) All of the above  
     **Answer**: d) All of the above
9. **Which command is used to check disk usage in Linux?**
   * a) df
   * b) du
   * c) diskusage
   * d) Both a and b  
     **Answer**: d) Both a and b
10. **Which command can you use to display the current network configuration in Linux?**
    * a) ifconfig
    * b) ip a
    * c) netstat
    * d) Both a and b  
      **Answer**: d) Both a and b

### **Session 8: Network Configuration and Troubleshooting**

### **Easy Level:**

1. **Which command in Linux is used to display the network interfaces and their configurations?**
   * a) ifconfig
   * b) netstat
   * c) ipconfig
   * d) ip a  
     **Answer**: a) ifconfig
2. **Which command is used to check the current routing table in Linux?**
   * a) netstat -r
   * b) route
   * c) ip route
   * d) All of the above  
     **Answer**: d) All of the above
3. **Which command is used to display all active network connections in Linux?**
   * a) netstat
   * b) ss
   * c) ifconfig
   * d) ip a  
     **Answer**: a) netstat
4. **Which command is used to check the current network interface status in Linux?**
   * a) ip link show
   * b) ifconfig
   * c) netstat -i
   * d) ip route  
     **Answer**: a) ip link show
5. **Which command in Linux is used to test network connectivity by sending ICMP packets?**
   * a) ping
   * b) traceroute
   * c) ssh
   * d) netstat  
     **Answer**: a) ping
6. **Which command is used to display all network routes in Linux?**
   * a) ip route
   * b) route
   * c) netstat -r
   * d) netstat -i  
     **Answer**: a) ip route
7. **Which command is used to assign an IP address to a network interface in Linux?**
   * a) ifconfig <interface> <ip\_address>
   * b) ip addr add <ip\_address> dev <interface>
   * c) ip link set <interface> <ip\_address>
   * d) ip link add <interface> <ip\_address>  
     **Answer**: b) ip addr add <ip\_address> dev <interface>
8. **Which utility in Linux is used for troubleshooting DNS resolution issues?**
   * a) dig
   * b) nslookup
   * c) host
   * d) All of the above  
     **Answer**: d) All of the above
9. **Which command is used to display the IP address of a specific network interface in Linux?**
   * a) ifconfig
   * b) ip a
   * c) ip link show
   * d) ip addr show  
     **Answer**: b) ip a
10. **Which of the following commands is used to restart networking services in Linux?**
    * a) service networking restart
    * b) systemctl restart networking
    * c) ifdown <interface> && ifup <interface>
    * d) All of the above  
      **Answer**: d) All of the above

**Intermediate Level:**

1. **What does the netstat command do in Linux?**
   * a) Shows network connections, routing tables, interface statistics
   * b) Displays process information
   * c) Monitors CPU usage
   * d) Changes network settings  
     **Answer**: a) Shows network connections, routing tables, interface statistics
2. **Which command is used to show the IP routing table in Linux?**
   * a) route
   * b) ip route show
   * c) ip addr show
   * d) netstat  
     **Answer**: b) ip route show
3. **Which command is used to display all TCP connections in Linux?**
   * a) netstat -t
   * b) ss -t
   * c) netstat -a
   * d) Both a and b  
     **Answer**: d) Both a and b
4. **Which command is used to configure the default gateway in Linux?**
   * a) ip route add default via <gateway\_ip>
   * b) route add default gw <gateway\_ip>
   * c) ip addr add default <gateway\_ip>
   * d) Both a and b  
     **Answer**: d) Both a and b
5. **Which of the following tools is used to find the path that packets take to reach a destination?**
   * a) ping
   * b) traceroute
   * c) netstat
   * d) route  
     **Answer**: b) traceroute
6. **Which command is used to configure a static IP address for a network interface?**
   * a) ifconfig <interface> <ip\_address>
   * b) ip addr add <ip\_address>/24 dev <interface>
   * c) netstat -r
   * d) route add <ip\_address>  
     **Answer**: b) ip addr add <ip\_address>/24 dev <interface>
7. **Which Linux utility is used to display a detailed route to a specific network destination?**
   * a) traceroute
   * b) ping
   * c) netstat
   * d) dig  
     **Answer**: a) traceroute
8. **Which of the following is the correct syntax to use the ssh command to log into a remote server?**
   * a) ssh user@hostname
   * b) ssh hostname@user
   * c) ssh -u user hostname
   * d) ssh -r user@hostname  
     **Answer**: a) ssh user@hostname
9. **Which command in Linux is used to display the status of the system’s network interfaces?**
   * a) ifconfig
   * b) netstat
   * c) ip addr show
   * d) route  
     **Answer**: c) ip addr show
10. **Which of the following commands will display the current active network interfaces in Linux?**
    * a) ifconfig
    * b) ip link show
    * c) netstat -i
    * d) All of the above  
      **Answer**: d) All of the above

### **Hard Level:**

1. **Which of the following commands can be used to display listening ports on a Linux system?**
   * a) netstat -l
   * b) ss -l
   * c) lsof -i
   * d) All of the above  
     **Answer**: d) All of the above
2. **What does the ip addr flush command do in Linux?**
   * a) Flushes all IP addresses from a network interface
   * b) Deletes a network interface
   * c) Displays network configurations
   * d) Adds an IP address to an interface  
     **Answer**: a) Flushes all IP addresses from a network interface
3. **Which of the following is used to configure a network interface with a DHCP server?**
   * a) dhclient
   * b) ifconfig <interface> dhcp
   * c) ip addr set <interface> dhcp
   * d) Both a and b  
     **Answer**: d) Both a and b
4. **Which file contains the default configuration for network interfaces in a Linux-based system?**
   * a) /etc/network/interfaces
   * b) /etc/netplan/config.yaml
   * c) /etc/sysconfig/network-scripts/ifcfg-eth0
   * d) All of the above  
     **Answer**: d) All of the above
5. **Which command is used to check the current status of network services in Linux?**
   * a) systemctl status network
   * b) service network status
   * c) ifconfig
   * d) netstat -a  
     **Answer**: a) systemctl status network
6. **Which Linux command shows both IPv4 and IPv6 addresses?**
   * a) ip addr show
   * b) ifconfig
   * c) ip a
   * d) Both a and c  
     **Answer**: d) Both a and c
7. **What is the purpose of the ip link set <interface> up command in Linux?**
   * a) It activates the specified network interface
   * b) It disables the specified network interface
   * c) It assigns an IP address to the interface
   * d) It checks the status of the network interface  
     **Answer**: a) It activates the specified network interface
8. **Which command is used to disable a network interface in Linux?**
   * a) ip link set <interface> down
   * b) ifdown <interface>
   * c) systemctl stop network
   * d) All of the above  
     **Answer**: d) All of the above
9. **Which of the following commands shows the local IP address of your system?**
   * a) ip addr show
   * b) ifconfig
   * c) hostname -I
   * d) All of the above  
     **Answer**: d) All of the above
10. **Which command is used to configure a persistent route in Linux?**
    * a) route add
    * b) ip route add
    * c) ip route persist
    * d) Both a and b  
      **Answer**: b) ip route add
11. **Which file is used to configure the DNS settings in Linux?**
    * a) /etc/dns.conf
    * b) /etc/hosts
    * c) /etc/resolv.conf
    * d) /etc/networks.conf  
      **Answer**: c) /etc/resolv.conf
12. **Which tool is used to show detailed statistics about network interfaces?**
    * a) ss
    * b) netstat
    * c) ifstat
    * d) nmap  
      **Answer**: c) ifstat
13. **Which command is used to manage network interface aliases in Linux?**
    * a) ifconfig
    * b) ip addr add
    * c) ip route add
    * d) ip link add  
      **Answer**: b) ip addr add
14. **What does the ss command do in Linux?**
    * a) Displays socket statistics
    * b) Displays routing tables
    * c) Displays process status
    * d) Changes socket settings  
      **Answer**: a) Displays socket statistics
15. **Which of the following commands is used to check DNS resolution in Linux?**
    * a) dig
    * b) nslookup
    * c) host
    * d) All of the above  
      **Answer**: d) All of the above
16. **Which protocol does ssh use for secure communication in Linux?**
    * a) TCP
    * b) UDP
    * c) HTTP
    * d) SSL  
      **Answer**: a) TCP
17. **Which Linux command is used to show the routing table in real-time?**
    * a) ip route
    * b) route
    * c) netstat -r
    * d) ip monitor route  
      **Answer**: d) ip monitor route
18. **Which command is used to check if a host is reachable by pinging a specific IP address?**
    * a) ping
    * b) ssh
    * c) traceroute
    * d) netstat  
      **Answer**: a) ping

### **Hard Level (Continued):**

1. **What does the ping command do in Linux?**
   * a) Sends an ICMP echo request to a destination to check connectivity
   * b) Displays the routing table
   * c) Tracks the path packets take to a destination
   * d) Displays network interfaces  
     **Answer**: a) Sends an ICMP echo request to a destination to check connectivity
2. **Which command can be used to trace the route packets take to reach a destination in Linux?**
   * a) traceroute
   * b) tracepath
   * c) mtr
   * d) All of the above  
     **Answer**: d) All of the above
3. **Which of the following commands is used to configure IP addresses for network interfaces?**
   * a) ip addr add <ip\_address> dev <interface>
   * b) ifconfig <interface> <ip\_address>
   * c) route add <ip\_address>
   * d) Both a and b  
     **Answer**: d) Both a and b
4. **Which command can you use to display the current network settings, including IP addresses, in a more human-readable format?**
   * a) ifconfig
   * b) ip a
   * c) netstat
   * d) ip addr show  
     **Answer**: b) ip a
5. **What is the default network interface used for an internet connection in a Linux system?**
   * a) eth0
   * b) wlan0
   * c) ens33
   * d) enp0s3  
     **Answer**: a) eth0
6. **Which of the following commands would you use to disable a network interface in Linux?**
   * a) ip link set <interface> down
   * b) ifconfig <interface> down
   * c) systemctl stop networking
   * d) All of the above  
     **Answer**: d) All of the above
7. **Which of the following tools is used for advanced packet filtering and network analysis in Linux?**
   * a) netstat
   * b) tcpdump
   * c) ifconfig
   * d) traceroute  
     **Answer**: b) tcpdump
8. **Which command would you use to view and manipulate routing tables in Linux?**
   * a) route
   * b) ip route
   * c) netstat
   * d) Both a and b  
     **Answer**: d) Both a and b

### 

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### **Session 9 & 10: Introduction to BASH Command Line Interface**

### **Easy Level:**

1. **Which of the following is the correct syntax to create a user-defined variable in Bash?**
   * a) variable = value
   * b) variable=value
   * c) variable : value
   * d) variable == value  
     **Answer**: b) variable=value
2. **Which command is used to display the value of a variable in Bash?**
   * a) echo <variable>
   * b) print $variable
   * c) show <variable>
   * d) echo $variable  
     **Answer**: d) echo $variable
3. **What is the correct way to assign a value to the variable myvar in Bash?**
   * a) myvar = 10
   * b) myvar=10
   * c) myvar : 10
   * d) myvar == 10  
     **Answer**: b) myvar=10
4. **Which of the following commands is used to get the value of an environment variable in Bash?**
   * a) echo $variable\_name
   * b) get $variable\_name
   * c) printenv <variable\_name>
   * d) Both a and c  
     **Answer**: d) Both a and c
5. **Which of the following is used to pass arguments to a Bash script?**
   * a) $1, $2, etc.
   * b) $\_1, $\_2, etc.
   * c) arg1, arg2, etc.
   * d) input1, input2, etc.  
     **Answer**: a) $1, $2, etc.
6. **What does the $$ special variable represent in Bash?**
   * a) The process ID of the script
   * b) The value of a variable
   * c) The current working directory
   * d) The last command exit status  
     **Answer**: a) The process ID of the script
7. **Which command is used to find the exit status of the last command in Bash?**
   * a) ?
   * b) $?
   * c) $status
   * d) exit  
     **Answer**: b) $?
8. **What is the result of the expression echo $((3+2)) in Bash?**
   * a) 32
   * b) 5
   * c) 3+2
   * d) echo $3+2  
     **Answer**: b) 5
9. **Which operator is used for string comparison in Bash?**
   * a) =
   * b) ==
   * c) -eq
   * d) Both a and b  
     **Answer**: d) Both a and b
10. **How do you refer to the home directory in Bash?**
    * a) /home
    * b) ~
    * c) .
    * d) /  
      **Answer**: b) ~

### **Intermediate Level:**

1. **Which operator is used for numeric comparison in Bash?**
   * a) -eq
   * b) ==
   * c) =
   * d) =  
     **Answer**: a) -eq
2. **Which of the following is a valid command substitution in Bash?**
   * a) $(command)
   * b) <command>
   * c) command{}
   * d) [command]  
     **Answer**: a) $(command)
3. **Which expansion is used to replace a tilde ~ with the path to the user's home directory?**
   * a) Pathname expansion
   * b) Arithmetic expansion
   * c) Tilde expansion
   * d) Brace expansion  
     **Answer**: c) Tilde expansion
4. **Which command is used to perform arithmetic expansion in Bash?**
   * a) $((expression))
   * b) ((expression))
   * c) expr
   * d) Both a and b  
     **Answer**: d) Both a and b
5. **Which of the following is a valid arithmetic expression in Bash?**
   * a) $((5+3))
   * b) ((5+3))
   * c) expr 5 + 3
   * d) All of the above  
     **Answer**: d) All of the above
6. **Which expansion is used to generate multiple strings in a single command?**
   * a) Parameter expansion
   * b) Command substitution
   * c) Brace expansion
   * d) Tilde expansion  
     **Answer**: c) Brace expansion
7. **Which of the following is a valid conditional statement in Bash?**
   * a) if [ condition ]; then ... fi
   * b) if { condition } then ... fi
   * c) if [ condition ] then ... fi
   * d) if condition then ...  
     **Answer**: a) if [ condition ]; then ... fi
8. **What is the correct syntax to create a simple if statement in Bash?**
   * a) if condition then
   * b) if condition {}
   * c) if [ condition ]; then
   * d) if condition;  
     **Answer**: c) if [ condition ]; then
9. **What does the else clause do in an if statement?**
   * a) Executes if the if condition is true
   * b) Executes if the if condition is false
   * c) Executes if no conditions are specified
   * d) Exits the script  
     **Answer**: b) Executes if the if condition is false
10. **Which operator is used to test file conditions in a Bash if statement?**
    * a) -e
    * b) -f
    * c) -d
    * d) All of the above  
      **Answer**: d) All of the above

### **Hard Level:**

1. **Which operator is used for logical AND in Bash?**
   * a) &&
   * b) -and
   * c) &
   * d) |&  
     **Answer**: a) &&
2. **Which operator is used for logical OR in Bash?**
   * a) |
   * b) ||
   * c) or
   * d) |&  
     **Answer**: b) ||
3. **What does the case statement in Bash do?**
   * a) It matches the value of a variable to different patterns
   * b) It checks if a condition is true
   * c) It executes commands in a loop
   * d) It tests file conditions  
     **Answer**: a) It matches the value of a variable to different patterns
4. **Which of the following is a valid case statement in Bash?**
   * a) case $var in pattern) commands ;; esac
   * b) case $var { pattern) commands ;; }
   * c) case pattern in $var commands ;; esac
   * d) case $var in commands ;;  
     **Answer**: a) case $var in pattern) commands ;; esac
5. **Which loop in Bash is used for iterating over a sequence of numbers?**
   * a) for
   * b) while
   * c) until
   * d) foreach  
     **Answer**: a) for
6. **Which loop in Bash is used to execute commands while a condition is true?**
   * a) for
   * b) while
   * c) until
   * d) do-while  
     **Answer**: b) while
7. **What does the break statement do in a loop?**
   * a) Exits the loop immediately
   * b) Skips the current iteration of the loop
   * c) Continues the next iteration of the loop
   * d) None of the above  
     **Answer**: a) Exits the loop immediately
8. **What does the continue statement do in a loop?**
   * a) Skips the current iteration and proceeds to the next iteration
   * b) Exits the loop immediately
   * c) Breaks the loop and executes the next condition
   * d) Repeats the current iteration  
     **Answer**: a) Skips the current iteration and proceeds to the next iteration
9. **How do you test for equality of two strings in Bash?**
   * a) [ "$str1" == "$str2" ]
   * b) [ "$str1" = "$str2" ]
   * c) Both a and b
   * d) str1 == str2  
     **Answer**: c) Both a and b
10. **Which command is used to read user input in Bash?**
    * a) input
    * b) read
    * c) echo
    * d) scanf  
      **Answer**: b) read

### 

1. **Which of the following is the correct syntax for a while loop in Bash?**
   * a) while [ condition ] do commands done
   * b) while condition; do commands done
   * c) while [ condition ]; { commands }
   * d) while condition do { commands }  
     **Answer**: b) while condition; do commands done
2. **Which of the following is the correct syntax for a for loop in Bash?**
   * a) for i in {1..5}; do commands done
   * b) for (i=1; i<=5; i++) { commands }
   * c) for i in 1 to 5 do commands done
   * d) for (1..5) do commands done  
     **Answer**: a) for i in {1..5}; do commands done
3. **How do you test if a file exists in Bash?**
   * a) [ -f file ]
   * b) [ -e file ]
   * c) [ -d file ]
   * d) All of the above  
     **Answer**: d) All of the above
4. **Which Bash operator is used to test if two integers are equal?**
   * a) ==
   * b) =
   * c) -eq
   * d) -eq  
     **Answer**: c) -eq
5. **Which command is used to output a message to the terminal in Bash?**
   * a) echo
   * b) print
   * c) output
   * d) display  
     **Answer**: a) echo
6. **Which of the following is used to expand variables inside strings in Bash?**
   * a) Double quotes (")
   * b) Single quotes (')
   * c) Backticks
   * d) Both a and c  
     **Answer**: a) Double quotes (")

### 

1. **Which of the following is the correct syntax to check if a variable is empty in Bash?**

* a) if [ -z $variable ]
* b) if [ ! $variable ]
* c) if [ $variable == "" ]
* d) All of the above  
  **Answer**: d) All of the above

1. **Which operator is used to check for inequality between two strings in Bash?**

* a) !=
* b) <>
* c) =
* d) -ne  
  **Answer**: a) !=

1. **What is the purpose of the shift command in Bash?**

* a) To shift command-line arguments to the left
* b) To shift command-line arguments to the right
* c) To change the value of a variable
* d) To read input from the user  
  **Answer**: a) To shift command-line arguments to the left

1. **What is the output of the following command? echo $((5\*3))**

* a) 5\*3
* b) 15
* c) 503
* d) Error  
  **Answer**: b) 15

1. **Which operator is used in Bash to test whether a file is a directory?**

* a) -f
* b) -e
* c) -d
* d) -l  
  **Answer**: c) -d

1. **What is the result of the following expression in Bash: (( 10 % 3 ))?**

* a) 1
* b) 3
* c) 10
* d) 0  
  **Answer**: a) 1

1. **Which of the following is used to create an infinite loop in Bash?**

* a) for ; do commands done
* b) while true; do commands done
* c) until false; do commands done
* d) Both b and c  
  **Answer**: d) Both b and c

1. **What is the purpose of the readonly command in Bash?**

* a) To make a variable immutable
* b) To make a file read-only
* c) To prevent users from modifying files
* d) To display the current variables  
  **Answer**: a) To make a variable immutable

1. **How can you redirect the standard output to a file in Bash?**

* a) echo "message" > file.txt
* b) echo "message" >> file.txt
* c) echo "message" 2> file.txt
* d) Both a and b  
  **Answer**: d) Both a and b

1. **What does the command for i in $(seq 1 5); do echo $i; done do?**

* a) Prints numbers from 1 to 5
* b) Loops indefinitely
* c) Prints the value of variable $i only
* d) None of the above  
  **Answer**: a) Prints numbers from 1 to 5

1. **Which command is used to append output to a file in Bash?**

* a) echo "text" >> file.txt
* b) echo "text" > file.txt
* c) echo "text" | file.txt
* d) echo "text" << file.txt  
  **Answer**: a) echo "text" >> file.txt

1. **How do you check if a directory exists in Bash?**

* a) if [ -d directory ]
* b) if [ directory ]
* c) if [ ! -d directory ]
* d) Both a and c  
  **Answer**: d) Both a and c

1. **Which of the following is the correct syntax to exit a loop in Bash?**

* a) exit
* b) break
* c) continue
* d) end  
  **Answer**: b) break

1. **What is the result of the command echo $(expr 5 + 3)?**

* a) 8
* b) 5+3
* c) expr 5 + 3
* d) Syntax error  
  **Answer**: a) 8

### **Session 11 & 12: Advanced Bash Scripting and Debugging**

### **Easy Level:**

1. **What does the grep command do in Bash?**
   * a) Search for patterns in a file
   * b) Redirect output to a file
   * c) Print all lines of a file
   * d) Execute a script  
     **Answer**: a) Search for patterns in a file
2. **Which option in grep is used for case-insensitive search?**
   * a) -v
   * b) -i
   * c) -r
   * d) -c  
     **Answer**: b) -i
3. **How would you search for a pattern in all .txt files in a directory using grep?**
   * a) grep "pattern" \*.txt
   * b) grep -r "pattern" \*.txt
   * c) grep -i "pattern" \*.txt
   * d) grep "pattern" /directory/\*.txt  
     **Answer**: a) grep "pattern" \*.txt
4. **What is the purpose of the find command in Bash?**
   * a) Search for files in a directory
   * b) Display the contents of a file
   * c) Rename files
   * d) List files in a directory  
     **Answer**: a) Search for files in a directory
5. **Which find option is used to search for files based on modification time?**
   * a) -mtime
   * b) -name
   * c) -type
   * d) -size  
     **Answer**: a) -mtime
6. **How do you search for files with a .log extension in a directory using find?**
   * a) find /directory/\*.log
   * b) find /directory -name "\*.log"
   * c) find "\*.log"
   * d) find \*.log  
     **Answer**: b) find /directory -name "\*.log"
7. **Which of the following commands is used to redirect the standard error (stderr) to a file in Bash?**
   * a) command 2> file.txt
   * b) command > file.txt
   * c) command 1> file.txt
   * d) command >> file.txt  
     **Answer**: a) command 2> file.txt
8. **How would you redirect both stdout and stderr to the same file in Bash?**
   * a) command > file.txt 2>&1
   * b) command 1>&2 > file.txt
   * c) command > file.txt
   * d) command >> file.txt 2>&1  
     **Answer**: a) command > file.txt 2>&1
9. **What does the set -x command do in Bash?**
   * a) Enable debugging mode
   * b) Set a variable
   * c) Exit the script
   * d) Print variable values  
     **Answer**: a) Enable debugging mode
10. **How do you disable debugging mode after using set -x in Bash?**
    * a) set +x
    * b) debug off
    * c) set -x off
    * d) disable -x  
      **Answer**: a) set +x

### **Intermediate Level:**

1. **Which grep option is used to display the line number along with the matching line?**
   * a) -n
   * b) -l
   * c) -r
   * d) -b  
     **Answer**: a) -n
2. **Which find option is used to search for files by file type?**
   * a) -name
   * b) -type
   * c) -mtime
   * d) -exec  
     **Answer**: b) -type
3. **Which command in Bash is used to check the exit status of the last command?**
   * a) $?
   * b) exit $?
   * c) status $?
   * d) last $?  
     **Answer**: a) $?
4. **What does the following grep command do? grep -v "pattern" file.txt**
   * a) Searches for the lines that do not contain the pattern
   * b) Searches for the lines that contain the pattern
   * c) Counts the occurrences of the pattern
   * d) Prints the pattern in reverse  
     **Answer**: a) Searches for the lines that do not contain the pattern
5. **What does the -exec option in find do?**
   * a) Executes a command for each file found
   * b) Executes the search recursively
   * c) Executes the command only once
   * d) Lists the files found  
     **Answer**: a) Executes a command for each file found
6. **Which command is used to check the permissions of a file in Bash?**
   * a) ls -l
   * b) chmod
   * c) file
   * d) stat  
     **Answer**: a) ls -l
7. **Which of the following commands is used to debug a script in Bash?**
   * a) set -v
   * b) set -x
   * c) set +x
   * d) set -y  
     **Answer**: b) set -x
8. **Which command is used to stop script execution immediately when an error occurs?**
   * a) set -e
   * b) exit 1
   * c) set +e
   * d) stop  
     **Answer**: a) set -e
9. **What is the correct syntax for a conditional if statement in Bash?**
   * a) if [ condition ] then commands fi
   * b) if condition then commands end
   * c) if condition { commands }
   * d) if [ condition ] { commands }  
     **Answer**: a) if [ condition ] then commands fi
10. **Which regular expression metacharacter is used to match the start of a line?**
    * a) ^
    * b) $
    * c) \*
    * d) .  
      **Answer**: a) ^

### **Hard Level:**

1. **Which regular expression metacharacter is used to match any single character?**
   * a) .
   * b) \*
   * c) ^
   * d) ?  
     **Answer**: a) .
2. **Which grep option is used to match patterns recursively in directories?**
   * a) -r
   * b) -l
   * c) -n
   * d) -i  
     **Answer**: a) -r
3. **What does the find . -type f -exec rm {} \; command do?**
   * a) Finds and deletes all files in the current directory
   * b) Finds and deletes all directories
   * c) Finds all files and prints their names
   * d) Finds and executes the rm command for each file found  
     **Answer**: d) Finds and executes the rm command for each file found
4. **How can you search for files modified in the last 24 hours using find?**
   * a) find . -mtime -1
   * b) find . -mmin -1440
   * c) find . -name "\*.txt"
   * d) find . -size 1  
     **Answer**: a) find . -mtime -1
5. **Which grep option is used to display only the filenames containing a match?**
   * a) -l
   * b) -o
   * c) -v
   * d) -n  
     **Answer**: a) -l
6. **Which command would you use to print all files that do not contain the word “error” in the content?**
   * a) grep -v "error" \*
   * b) grep "error" \*
   * c) grep -r "error" \*
   * d) grep -l "error" \*  
     **Answer**: a) grep -v "error" \*
7. **Which of the following commands in Bash redirects both stdout and stderr to different files?**
   * a) command > file1.txt 2> file2.txt
   * b) command 1> file1.txt 2> file2.txt
   * c) command > file1.txt &2> file2.txt
   * d) Both a and b  
     **Answer**: d) Both a and b
8. **Which command is used to find all .txt files larger than 10MB in size?**
   * a) find . -name "\*.txt" -size +10M
   * b) find . -name "\*.txt" -size 10M
   * c) find . -type f -size 10M
   * d) find . -type f -size +10MB  
     **Answer**: a) find . -name "\*.txt" -size +10M
9. **How can you search for a pattern in a file and display the line before the match using grep?**
   * a) grep -B 1 "pattern" file.txt
   * b) grep -A 1 "pattern" file.txt
   * c) grep -C 1 "pattern" file.txt
   * d) grep -n "pattern" file.txt  
     **Answer**: a) grep -B 1 "pattern" file.txt
10. **Which Bash command is used to stop script execution immediately when an error occurs?**
    * a) exit
    * b) return
    * c) break
    * d) set -e  
      **Answer**: d) set -e

### **Bonus Questions:**

1. **Which command is used to start a debug session in Bash?**
   * a) bash -x
   * b) bash --debug
   * c) set -x
   * d) set --debug  
     **Answer**: a) bash -x
2. **Which command is used to search for files and execute a command on each file found in Bash?**
   * a) find
   * b) xargs
   * c) grep
   * d) exec  
     **Answer**: b) xargs
3. **Which Bash command is used to return the exit status of the last command?**
   * a) $?
   * b) $#
   * c) $0
   * d) $!  
     **Answer**: a) $?
4. **Which of the following is the correct syntax for handling errors in a script?**
   * a) if [ $? -ne 0 ]; then echo "Error occurred"; fi
   * b) if [ $? == 0 ]; then echo "No error"; fi
   * c) if [ $? != 1 ]; then echo "Error occurred"; fi
   * d) if [ $? -eq 0 ]; then echo "Success"; fi  
     **Answer**: a) if [ $? -ne 0 ]; then echo "Error occurred"; fi
5. **Which of the following would be the correct regular expression to match any string that contains "abc"?**
   * a) abc\*
   * b) abc.
   * c) .\*abc.\*
   * d) ^abc$  
     **Answer**: c) .\*abc.\*
6. **Which of the following is the correct Bash syntax for using a regular expression in a conditional statement?**
   * a) [[ "$string" =~ pattern ]]
   * b) [ "$string" = "pattern" ]
   * c) if [ "$string" == "pattern" ]; then
   * d) if [[ "$string" = "pattern" ]]; then  
     **Answer**: a) [[ "$string" =~ pattern ]]
7. **Which of the following would be used to list only the files containing a certain string using grep?**
   * a) grep -l "pattern" \*
   * b) grep -v "pattern" \*
   * c) grep -i "pattern" \*
   * d) grep -c "pattern" \*  
     **Answer**: a) grep -l "pattern" \*
8. **What does the command grep -r "error" /var/log/ do?**
   * a) Searches for the word "error" in files in /var/log/ directory recursively
   * b) Shows all logs containing the word "error"
   * c) Prints the lines containing "error"
   * d) None of the above  
     **Answer**: a) Searches for the word "error" in files in /var/log/ directory recursively
9. **How can you test if a file does not exist in a script?**
   * a) if [ ! -e file ]
   * b) if [ -e file ]
   * c) if [ -f file ]
   * d) if [ ! -f file ]  
     **Answer**: a) if [ ! -e file ]
10. **Which regular expression metacharacter matches any digit?**
    * a) \d
    * b) \w
    * c) \s
    * d) .  
      **Answer**: a) \d
11. **Which of the following matches the end of a line in a regular expression?**
    * a) $
    * b) ^
    * c) .
    * d) \*  
      **Answer**: a) $
12. **Which command would you use to search a pattern recursively in directories using grep?**
    * a) grep -r "pattern" directory
    * b) grep -i "pattern" directory
    * c) grep "pattern" directory
    * d) grep -v "pattern" directory  
      **Answer**: a) grep -r "pattern" directory
13. **Which command is used to ensure a file is only executable by the owner?**
    * a) chmod 700 file
    * b) chmod 755 file
    * c) chmod 777 file
    * d) chmod 600 file  
      **Answer**: a) chmod 700 file
14. **Which of the following commands would display a warning if a command fails?**
    * a) set -e
    * b) trap 'echo "Error"' ERR
    * c) exit 1
    * d) return 0  
      **Answer**: b) trap 'echo "Error"' ERR
15. **Which regular expression pattern matches a word at the start of a line?**
    * a) ^word
    * b) word$
    * c) word.
    * d) .\*word  
      **Answer**: a) ^word
16. **What does the command trap 'echo "Error occurred"; exit 1' ERR do in Bash?**
    * a) Exits the script and displays "Error occurred" when any error happens
    * b) Sets an error handler for the command
    * c) Prints "Error occurred" and continues executing the script
    * d) Traps the error and executes a different script  
      **Answer**: a) Exits the script and displays "Error occurred" when any error happens
17. **Which of the following commands allows you to search for a pattern in files and display line numbers along with matches?**
    * a) grep -n "pattern" file.txt
    * b) grep -l "pattern" file.txt
    * c) grep -r "pattern" file.txt
    * d) grep -c "pattern" file.txt  
      **Answer**: a) grep -n "pattern" file.txt
18. **What does the find command option -exec do?**
    * a) It executes a command on the results of the find command
    * b) It matches files based on their size
    * c) It searches recursively through directories
    * d) It searches files by type  
      **Answer**: a) It executes a command on the results of the find command
19. **Which of the following Bash commands will ensure that a variable is set to a value and abort if it is not set?**
    * a) set -u
    * b) set -e
    * c) set -x
    * d) set -n  
      **Answer**: a) set -u
20. **In Bash scripting, how do you iterate over a list of files and print their names?**
    * a) for file in $(ls); do echo $file; done
    * b) for file in $(find .); do echo $file; done
    * c) for file in ls; do echo $file; done
    * d) for file in $(echo \*.txt); do echo $file; done  
      **Answer**: a) for file in $(ls); do echo $file; done

### **Session 13 & 14: Task Automation using Bash Scripts**

### **Easy Level:**

1. **What is the purpose of automating tasks with Bash scripting?**
   * a) To create graphical user interfaces
   * b) To repeat manual tasks with minimal effort
   * c) To develop desktop applications
   * d) To interact with databases  
     **Answer**: b) To repeat manual tasks with minimal effort
2. **Which command in Bash is used to execute a script?**
   * a) run
   * b) bash
   * c) exec
   * d) script  
     **Answer**: b) bash
3. **How do you make a Bash script executable?**
   * a) chmod 744 script.sh
   * b) chmod 755 script.sh
   * c) chmod +x script.sh
   * d) chmod 777 script.sh  
     **Answer**: c) chmod +x script.sh
4. **What is the file extension commonly used for Bash scripts?**
   * a) .exe
   * b) .sh
   * c) .txt
   * d) .bash  
     **Answer**: b) .sh
5. **Which of the following is the correct syntax for writing a simple Bash script?**
   * a) #!/bin/bash
   * b) #!/usr/bash
   * c) #!/usr/bin/bash
   * d) #bin/bash  
     **Answer**: a) #!/bin/bash
6. **Which command is used to schedule a script for automatic execution?**
   * a) crontab
   * b) at
   * c) cron
   * d) scheduler  
     **Answer**: a) crontab
7. **How can you run a script every day at 3 AM using cron?**
   * a) 0 3 \* \* \* /path/to/script.sh
   * b) 3 0 \* \* \* /path/to/script.sh
   * c) 0 3 \* \* 1 /path/to/script.sh
   * d) 3 0 \* 1 \* /path/to/script.sh  
     **Answer**: a) 0 3 \* \* \* /path/to/script.sh
8. **Which command in Bash is used to check the status of a service?**
   * a) service status
   * b) systemctl status
   * c) check status
   * d) status check  
     **Answer**: b) systemctl status
9. **Which file in a Linux system stores cron jobs for individual users?**
   * a) /etc/crontab
   * b) /var/spool/cron/crontabs
   * c) /etc/crontab.d
   * d) /var/crontab  
     **Answer**: b) /var/spool/cron/crontabs
10. **Which command is used to execute a script at a specific time without the need for crontab?**
    * a) at
    * b) atq
    * c) cron
    * d) batch  
      **Answer**: a) at

### **Intermediate Level:**

1. **How do you pass arguments to a Bash script?**
   * a) ./script.sh argument1 argument2
   * b) ./script.sh <argument1> <argument2>
   * c) ./script.sh -a argument1 -b argument2
   * d) ./script.sh {argument1, argument2}  
     **Answer**: a) ./script.sh argument1 argument2
2. **Which command is used to apply security patches in Linux?**
   * a) patch
   * b) update
   * c) apt-get upgrade
   * d) yum install  
     **Answer**: c) apt-get upgrade
3. **How would you set up a cron job to run every Monday at 5 PM?**
   * a) 0 17 \* \* 1 /path/to/script.sh
   * b) 5 17 \* \* 1 /path/to/script.sh
   * c) 17 0 \* \* 1 /path/to/script.sh
   * d) 5 0 \* \* 1 /path/to/script.sh  
     **Answer**: a) 0 17 \* \* 1 /path/to/script.sh
4. **Which Bash statement is used to check if a file exists in a script?**
   * a) if test -e "file"
   * b) if [ -f file ]
   * c) if [ -e "file" ]
   * d) All of the above  
     **Answer**: d) All of the above
5. **What is the purpose of the #!/bin/bash line at the beginning of a script?**
   * a) It tells the script to run as a root user
   * b) It defines the environment in which the script runs
   * c) It assigns a permission to the script
   * d) It sets the script as executable  
     **Answer**: b) It defines the environment in which the script runs
6. **Which of the following command is used to automate the installation of updates on a Linux system?**
   * a) apt-get update
   * b) yum update
   * c) apt-get install
   * d) apt-get upgrade -y  
     **Answer**: d) apt-get upgrade -y
7. **Which of the following will allow a script to run at 2 AM every day?**
   * a) 0 2 \* \* \* script.sh
   * b) 2 0 \* \* \* script.sh
   * c) 2 0 1 \* \* script.sh
   * d) 0 0 2 \* \* script.sh  
     **Answer**: a) 0 2 \* \* \* script.sh
8. **Which command can be used to list cron jobs in a Linux system?**
   * a) crontab -l
   * b) list cron
   * c) cronlist
   * d) show cron  
     **Answer**: a) crontab -l
9. **Which Bash command is used to handle errors during script execution?**
   * a) exit
   * b) trap
   * c) continue
   * d) return  
     **Answer**: b) trap
10. **Which of the following tools can be used for task scheduling besides cron?**
    * a) at
    * b) systemd
    * c) batch
    * d) All of the above  
      **Answer**: d) All of the above

### **Hard Level:**

1. **Which command is used to apply security patches automatically after system updates?**
   * a) auto-upgrade
   * b) apt-get upgrade -y
   * c) unattended-upgrades
   * d) apt-get install -f  
     **Answer**: c) unattended-upgrades
2. **Which of the following is a proper way to handle errors in a Bash script?**
   * a) set -e
   * b) exit 1
   * c) trap 'commands' ERR
   * d) All of the above  
     **Answer**: d) All of the above
3. **How can you schedule a script to run when the system is idle?**
   * a) Using the cron command
   * b) Using the at command
   * c) Using systemd timers
   * d) Using anacron  
     **Answer**: d) Using anacron
4. **Which of the following commands is used to ensure that a script continues running after encountering errors?**
   * a) trap
   * b) set -e
   * c) exit
   * d) continue  
     **Answer**: d) continue
5. **What is the correct syntax for logging output of a cron job to a file?**
   * a) \* \* \* \* \* /path/to/script.sh > /path/to/logfile.log
   * b) \* \* \* \* \* /path/to/script.sh >> /path/to/logfile.log
   * c) \* \* \* \* \* /path/to/script.sh 2>&1 >> /path/to/logfile.log
   * d) All of the above  
     **Answer**: d) All of the above
6. **Which command would you use to automatically run a script at startup?**
   * a) crontab
   * b) systemctl enable script.sh
   * c) update-rc.d script.sh defaults
   * d) rc.local  
     **Answer**: c) update-rc.d script.sh defaults
7. **What is the default shell used in most Linux systems for automation?**
   * a) sh
   * b) bash
   * c) zsh
   * d) fish  
     **Answer**: b) bash
8. **Which of the following is used to schedule system-level tasks in Linux?**
   * a) cron
   * b) systemd
   * c) at
   * d) All of the above  
     **Answer**: d) All of the above
9. **How can you ensure a script runs every 10 minutes using cron?**
   * a) \*/10 \* \* \* \* /path/to/script.sh
   * b) \*/10 0 \* \* \* /path/to/script.sh
   * c) 0 10 \* \* \* /path/to/script.sh
   * d) 10 \* \* \* \* /path/to/script.sh  
     **Answer**: a) \*/10 \* \* \* \* /path/to/script.sh
10. **Which command would you use to update all security patches without user interaction in Ubuntu?**
    * a) apt-get upgrade
    * b) apt-get update
    * c) unattended-upgrades
    * d) apt-get dist-upgrade  
      **Answer**: c) unattended-upgrades
11. **Which command is used to test and debug cron jobs in Linux?**
    * a) cron -test
    * b) cron debug
    * c) crontab -l
    * d) cron-dump  
      **Answer**: c) crontab -l
12. **What would you use to automate backups on a schedule using a script?**
    * a) cron
    * b) rsync
    * c) systemd
    * d) All of the above  
      **Answer**: d) All of the above
13. **How do you schedule a task to run once after 5 hours using at?**
    * a) at 5:00 /path/to/script.sh
    * b) at now + 5 hours /path/to/script.sh
    * c) at 5 hours /path/to/script.sh
    * d) at 05:00 /path/to/script.sh  
      **Answer**: b) at now + 5 hours /path/to/script.sh
14. **Which command is used to monitor the status of a cron job in real-time?**
    * a) cronstat
    * b) watch cron
    * c) systemctl status cron
    * d) crontab -l  
      **Answer**: c) systemctl status cron
15. **Which of the following is the proper syntax for writing a cron job?**
    * a) \* \* \* \* \* /path/to/script.sh
    * b) \* \* \* \* /path/to/script.sh
    * c) \*/5 \* \* \* \* /path/to/script.sh
    * d) All of the above  
      **Answer**: d) All of the above

### **Bonus Questions:**

1. **How can you automate the installation of a package and its dependencies?**
   * a) apt-get install --auto
   * b) apt-get install -y package
   * c) apt-get install --fix-missing
   * d) apt-get --fix-broken install  
     **Answer**: b) apt-get install -y package
2. **Which Bash command can be used to schedule a script based on a system reboot?**
   * a) @reboot
   * b) @start
   * c) @boot
   * d) @cron  
     **Answer**: a) @reboot
3. **Which of the following tools is typically used to manage task automation on newer Linux systems?**
   * a) cron
   * b) systemd timers
   * c) at
   * d) batch  
     **Answer**: b) systemd timers
4. **Which of the following options will show you the output of a cron job to a specific log file?**
   * a) \*/5 \* \* \* \* /path/to/script.sh > /var/log/cron.log
   * b) \*/5 \* \* \* \* /path/to/script.sh >> /var/log/cron.log
   * c) \*/5 \* \* \* \* /path/to/script.sh 2>&1 >> /var/log/cron.log
   * d) All of the above  
     **Answer**: d) All of the above
5. **How can you execute a task at a fixed interval in Bash scripting?**
   * a) Use cron
   * b) Use sleep inside a loop
   * c) Use watch command
   * d) All of the above  
     **Answer**: d) All of the above

### 

1. **Which of the following cron syntax will execute a script every Sunday at midnight?**
   * a) 0 0 \* \* Sun /path/to/script.sh
   * b) 0 0 \* \* 0 /path/to/script.sh
   * c) 0 0 \* \* 7 /path/to/script.sh
   * d) All of the above  
     **Answer**: d) All of the above
2. **Which Bash command would you use to capture both the standard output and standard error in a log file during script execution?**
   * a) command >> output.log 2>&1
   * b) command 2>&1 > output.log
   * c) command 2>&1 | tee output.log
   * d) All of the above  
     **Answer**: d) All of the above
3. **Which of the following Bash commands is used to run a command repeatedly at specific intervals?**
   * a) watch
   * b) cron
   * c) at
   * d) repeat  
     **Answer**: a) watch
4. **Which systemd service is used to manage cron jobs in modern Linux distributions?**
   * a) cron.service
   * b) crond.service
   * c) cron.timer
   * d) systemd-cron.service  
     **Answer**: b) crond.service
5. **What does the @reboot directive in a cron job file do?**
   * a) It runs the specified job when the system reboots
   * b) It runs the specified job when the system enters single-user mode
   * c) It runs the specified job at midnight every day
   * d) It runs the specified job every time the user logs in  
     **Answer**: a) It runs the specified job when the system reboots
6. **What is the correct way to write a Bash script that automatically installs updates and then cleans up old packages?**
   * a) #!/bin/bash; sudo apt-get update && sudo apt-get upgrade -y && sudo apt-get autoremove -y
   * b) #!/bin/bash; sudo apt-get upgrade && sudo apt-get install --fix-missing
   * c) #!/bin/bash; sudo apt-get update && sudo apt-get dist-upgrade -y
   * d) #!/bin/bash; sudo apt-get clean && sudo apt-get autoremove  
     **Answer**: a) #!/bin/bash; sudo apt-get update && sudo apt-get upgrade -y && sudo apt-get autoremove -y
7. **Which of the following commands will run a script on a remote server using SSH and Bash scripting?**
   * a) ssh user@remote-server 'bash /path/to/script.sh'
   * b) ssh user@remote-server -c '/path/to/script.sh'
   * c) ssh user@remote-server < /path/to/script.sh
   * d) scp /path/to/script.sh user@remote-server:/path/to/  
     **Answer**: a) ssh user@remote-server 'bash /path/to/script.sh'
8. **How can you make a Bash script executable as a root user without switching to root?**
   * a) By using sudo in the script execution command
   * b) By adding the user to the sudoers file
   * c) By using chmod and changing script ownership to root
   * d) By using chmod 777 on the script  
     **Answer**: a) By using sudo in the script execution command
9. **What is the purpose of the set -e option in a Bash script?**
   * a) It makes the script execute with enhanced debugging
   * b) It makes the script exit immediately if any command fails
   * c) It prevents the script from being executed in the background
   * d) It allows error messages to be shown in the terminal  
     **Answer**: b) It makes the script exit immediately if any command fails
10. **In which of the following scenarios would you use the at command instead of cron?**
    * a) For tasks that need to be executed at a specific time, only once
    * b) For running recurring tasks
    * c) For managing system-wide tasks
    * d) For scheduling jobs based on system resource usage  
      **Answer**: a) For tasks that need to be executed at a specific time, only once

### **Session 15: Logging, Monitoring, and Final Assignments (First 50 MCQs)**

#### **Basic Level:**

1. **Which of the following commands is used to monitor the active processes in Linux?**
   * a) ps
   * b) ls
   * c) df
   * d) top  
     **Answer**: d) top
2. **Which command is used to kill a process in Linux?**
   * a) pskill
   * b) kill
   * c) terminate
   * d) stop  
     **Answer**: b) kill
3. **Which file in Linux contains the system log for monitoring?**
   * a) /var/log/syslog
   * b) /var/log/messages
   * c) /etc/log
   * d) Both a and b  
     **Answer**: d) Both a and b
4. **Which of the following is the command to edit files in Vim editor?**
   * a) vim filename
   * b) edit filename
   * c) vi filename
   * d) Both a and c  
     **Answer**: d) Both a and c
5. **Which command shows the CPU usage in real-time?**
   * a) ps
   * b) cpuinfo
   * c) top
   * d) free  
     **Answer**: c) top
6. **Which of the following commands is used to show disk usage in Linux?**
   * a) df
   * b) du
   * c) lsblk
   * d) All of the above  
     **Answer**: d) All of the above
7. **What command will show the running processes in real-time in Linux?**
   * a) ps
   * b) top
   * c) kill
   * d) ls  
     **Answer**: b) top
8. **Which of the following commands is used to change file permissions in Linux?**
   * a) chmod
   * b) chown
   * c) chgrp
   * d) All of the above  
     **Answer**: a) chmod
9. **What is the function of the tail command in Linux?**
   * a) Display the first few lines of a file
   * b) Display the last few lines of a file
   * c) Display the entire file
   * d) All of the above  
     **Answer**: b) Display the last few lines of a file
10. **Which command would you use to check disk partitions in Linux?**
    * a) lsblk
    * b) df
    * c) parted
    * d) fdisk  
      **Answer**: d) fdisk

#### **Intermediate Level:**

1. **Which of the following commands is used to monitor memory usage in Linux?**
   * a) free
   * b) top
   * c) ps
   * d) All of the above  
     **Answer**: d) All of the above
2. **Which of the following is a correct syntax for viewing system logs in Linux?**
   * a) cat /var/log/syslog
   * b) tail /var/log/syslog
   * c) less /var/log/syslog
   * d) All of the above  
     **Answer**: d) All of the above
3. **How would you monitor the CPU and memory usage on a Linux system?**
   * a) ps
   * b) free
   * c) top
   * d) top and free  
     **Answer**: d) top and free
4. **Which of the following commands can be used to schedule a task to run periodically?**
   * a) cron
   * b) at
   * c) systemd
   * d) All of the above  
     **Answer**: a) cron
5. **Which of the following is a valid file permission in Linux?**
   * a) r
   * b) w
   * c) x
   * d) All of the above  
     **Answer**: d) All of the above
6. **Which of the following is a valid user management command in Linux?**
   * a) useradd
   * b) usermod
   * c) userdel
   * d) All of the above  
     **Answer**: d) All of the above
7. **Which Bash command is used to find a process by its name?**
   * a) ps aux | grep process\_name
   * b) top -p process\_name
   * c) kill process\_name
   * d) find process\_name  
     **Answer**: a) ps aux | grep process\_name
8. **Which of the following files in Linux contains user-specific logins and user data?**
   * a) /etc/passwd
   * b) /etc/group
   * c) /etc/shadow
   * d) All of the above  
     **Answer**: d) All of the above
9. **Which of the following commands is used to display the process status of running processes in Linux?**
   * a) ps
   * b) top
   * c) pstree
   * d) All of the above  
     **Answer**: d) All of the above
10. **Which of the following is NOT a valid signal for the kill command?**
    * a) SIGKILL
    * b) SIGTERM
    * c) SIGSTOP
    * d) SIGEXIT  
      **Answer**: d) SIGEXIT

#### **Advanced Level:**

1. **Which of the following tools is used for monitoring the network activity of Linux systems?**
   * a) netstat
   * b) iftop
   * c) ss
   * d) All of the above  
     **Answer**: d) All of the above
2. **Which of the following commands would you use to schedule a task to run once in the future?**
   * a) cron
   * b) at
   * c) systemd
   * d) scheduler  
     **Answer**: b) at
3. **Which of the following command is used to change the ownership of a file in Linux?**
   * a) chown
   * b) chmod
   * c) chgrp
   * d) chfile  
     **Answer**: a) chown
4. **Which file in Linux defines the configuration for logging services like syslog?**
   * a) /etc/syslog.conf
   * b) /etc/rsyslog.conf
   * c) /etc/logrotate.conf
   * d) /etc/cron.d  
     **Answer**: b) /etc/rsyslog.conf
5. **Which of the following statements about the grep command is true?**
   * a) It searches for patterns within a file
   * b) It displays matching lines
   * c) It can be used to find regular expressions
   * d) All of the above  
     **Answer**: d) All of the above
6. **Which of the following is a tool for analyzing Linux system performance and identifying bottlenecks?**
   * a) vmstat
   * b) iostat
   * c) sar
   * d) All of the above  
     **Answer**: d) All of the above
7. **Which of the following tools can be used to search for files on the system by name?**
   * a) find
   * b) locate
   * c) which
   * d) All of the above  
     **Answer**: d) All of the above
8. **What does the ps -ef command show in Linux?**
   * a) A list of all files in the current directory
   * b) A list of all active processes on the system
   * c) A list of all users on the system
   * d) A list of all open ports  
     **Answer**: b) A list of all active processes on the system
9. **Which of the following scripts are used for automating log rotation in Linux?**
   * a) logrotate
   * b) rsyslog
   * c) cron
   * d) syslog  
     **Answer**: a) logrotate
10. **What is the purpose of using the & symbol in the background of a command in Linux?**
    * a) To run the command in the background
    * b) To show all output to the terminal
    * c) To send a process to the foreground
    * d) To redirect output to a file  
      **Answer**: a) To run the command in the background
11. **Which of the following commands can be used to view the system's kernel ring buffer (kernel logs)?**
    * a) dmesg
    * b) logwatch
    * c) journalctl
    * d) lsmod  
      **Answer**: a) dmesg
12. **Which tool can be used to manage log files by rotating and compressing them on a Linux system?**
    * a) logrotate
    * b) syslog
    * c) logwatch
    * d) cron  
      **Answer**: a) logrotate
13. **Which of the following commands allows you to monitor the system’s disk space usage?**
    * a) df
    * b) du
    * c) free
    * d) Both a and b  
      **Answer**: d) Both a and b
14. **Which of the following commands is used to get information about active users on a Linux system?**
    * a) who
    * b) users
    * c) w
    * d) All of the above  
      **Answer**: d) All of the above
15. **Which command allows you to monitor the active network connections on your Linux system?**
    * a) netstat
    * b) ss
    * c) iftop
    * d) All of the above  
      **Answer**: d) All of the above
16. **Which of the following is a valid Linux command to kill a process by name?**
    * a) kill -9 <PID>
    * b) pkill <process\_name>
    * c) killall <process\_name>
    * d) Both b and c  
      **Answer**: d) Both b and c
17. **Which of the following is used for writing custom scripts for monitoring in Linux?**
    * a) bash
    * b) Perl
    * c) Python
    * d) All of the above  
      **Answer**: d) All of the above
18. **Which of the following tools can be used to check the system logs in real-time on Linux?**
    * a) tail -f /var/log/syslog
    * b) cat /var/log/syslog
    * c) grep
    * d) vi  
      **Answer**: a) tail -f /var/log/syslog
19. **In a shell script, which command is used to display the current date and time?**
    * a) date
    * b) datetime
    * c) now
    * d) showtime  
      **Answer**: a) date
20. **Which of the following is the correct syntax to write a cron job that runs every day at 3:00 AM?**
    * a) 0 3 \* \* \* /path/to/script.sh
    * b) 0 3 \* \* 1 /path/to/script.sh
    * c) 3 0 \* \* \* /path/to/script.sh
    * d) 3 0 \* \* 0 /path/to/script.sh  
      **Answer**: a) 0 3 \* \* \* /path/to/script.sh
21. **Which Perl function is used to print output in Perl scripts?**
    * a) echo
    * b) printf
    * c) print
    * d) output  
      **Answer**: c) print
22. **What is the default log file for Apache in Linux systems?**
    * a) /var/log/httpd/access.log
    * b) /var/log/apache2/access.log
    * c) /var/log/nginx/access.log
    * d) /var/log/httpd.log  
      **Answer**: b) /var/log/apache2/access.log
23. **Which of the following Linux commands can be used to schedule a one-time task for a specific time?**
    * a) at
    * b) cron
    * c) systemd
    * d) scheduled  
      **Answer**: a) at
24. **In Perl, which of the following is used to declare an array?**
    * a) $array\_name = (1, 2, 3)
    * b) @array\_name = (1, 2, 3)
    * c) array\_name = [1, 2, 3]
    * d) array\_name = 1, 2, 3  
      **Answer**: b) @array\_name = (1, 2, 3)
25. **In Bash scripting, which command is used to check the status of the previous command execution?**
    * a) status
    * b) $?
    * c) exit
    * d) check  
      **Answer**: b) $?
26. **Which of the following commands can be used to manage MySQL databases?**
    * a) mysql
    * b) mysqladmin
    * c) mysqldump
    * d) All of the above  
      **Answer**: d) All of the above
27. **What type of operator is used in Bash to redirect output from a command to a file?**
    * a) >
    * b) <
    * c) &
    * d) >>  
      **Answer**: a) >
28. **What is the purpose of the ps command in Linux?**
    * a) List processes running on the system
    * b) List files in the current directory
    * c) List available network interfaces
    * d) List mounted file systems  
      **Answer**: a) List processes running on the system
29. **In Perl, what is the default type of variable?**
    * a) Integer
    * b) String
    * c) Scalar
    * d) Array  
      **Answer**: c) Scalar
30. **Which of the following is used to connect to a MySQL database in a terminal?**
    * a) mysql -u root -p
    * b) mysql -p root
    * c) mysql\_connect -u root
    * d) mysql\_connect -u root -p  
      **Answer**: a) mysql -u root -p

### **Session 15: Logging, Monitoring, and Final Assignments (MCQs 1-50)**

#### **Basic to Intermediate Level:**

1. **Which of the following is the correct way to start a bash script?**
   * a) #!/bin/bash
   * b) #!/usr/bin/bash
   * c) #!bash
   * d) #!/sh  
     **Answer**: a) #!/bin/bash
2. **Which of the following bash commands is used to monitor real-time system performance?**
   * a) ps
   * b) top
   * c) kill
   * d) lsof  
     **Answer**: b) top
3. **Which command is used to kill a process in Linux by its PID?**
   * a) stop
   * b) kill
   * c) terminate
   * d) end  
     **Answer**: b) kill
4. **Which command is used to display system processes in Linux?**
   * a) ps
   * b) top
   * c) kill
   * d) jobs  
     **Answer**: a) ps
5. **What does the ps aux command do?**
   * a) Displays information about all running processes
   * b) Displays detailed information about the system
   * c) Displays kernel logs
   * d) Displays real-time process activity  
     **Answer**: a) Displays information about all running processes
6. **Which bash command is used to search for files in the system?**
   * a) find
   * b) locate
   * c) grep
   * d) search  
     **Answer**: a) find
7. **Which command is used to display the top 10 memory-consuming processes in Linux?**
   * a) ps aux --sort=-%mem
   * b) top -o %MEM
   * c) htop
   * d) All of the above  
     **Answer**: d) All of the above
8. **Which file is used for logging the system messages in Linux?**
   * a) /var/log/syslog
   * b) /var/log/messages
   * c) /var/log/cron
   * d) /var/log/auth.log  
     **Answer**: a) /var/log/syslog
9. **Which of the following commands is used to kill a process with a specific signal in Linux?**
   * a) kill -SIGTERM <PID>
   * b) kill -SIGKILL <PID>
   * c) kill <PID>
   * d) All of the above  
     **Answer**: d) All of the above
10. **Which Linux command allows you to see system logs in real time?**
    * a) logwatch
    * b) tail -f /var/log/syslog
    * c) syslog
    * d) journalctl -f  
      **Answer**: b) tail -f /var/log/syslog
11. **Which of the following tools can be used for file system management?**
    * a) df
    * b) du
    * c) mount
    * d) All of the above  
      **Answer**: d) All of the above
12. **Which command is used to show disk usage of a file or directory in Linux?**
    * a) df
    * b) du
    * c) ls
    * d) lsblk  
      **Answer**: b) du
13. **Which bash command is used to find the largest files in a directory?**
    * a) find / -size +100M
    * b) du -ah / | sort -rh | head -n 10
    * c) locate /
    * d) ls -l | sort -n  
      **Answer**: b) du -ah / | sort -rh | head -n 10
14. **What is the main purpose of using cron jobs in Linux?**
    * a) Automating periodic tasks
    * b) Managing system processes
    * c) Monitoring system resources
    * d) Rotating log files  
      **Answer**: a) Automating periodic tasks
15. **Which command is used to edit files in Linux using the command line?**
    * a) nano
    * b) vim
    * c) emacs
    * d) All of the above  
      **Answer**: d) All of the above
16. **What does the top command display?**
    * a) The top 10 most memory-consuming processes
    * b) The top 10 most CPU-consuming processes
    * c) Real-time system resource usage
    * d) All of the above  
      **Answer**: d) All of the above
17. **Which bash command will terminate a process?**
    * a) kill
    * b) stop
    * c) terminate
    * d) exit  
      **Answer**: a) kill
18. **In a bash script, how do you write a comment?**
    * a) # This is a comment
    * b) // This is a comment
    * c) /\* This is a comment \*/
    * d) -- This is a comment  
      **Answer**: a) # This is a comment
19. **Which of the following is used to create a new directory in Linux?**
    * a) mkdir
    * b) touch
    * c) newdir
    * d) create  
      **Answer**: a) mkdir
20. **Which of the following bash commands is used to copy files?**
    * a) cp
    * b) mv
    * c) copy
    * d) rename  
      **Answer**: a) cp
21. **In Vim editor, which command is used to save and exit the file?**
    * a) :wq
    * b) :save
    * c) :exit
    * d) :x  
      **Answer**: a) :wq
22. **In a bash script, which command is used to check if a file exists?**
    * a) if [ -f file ]
    * b) if file?
    * c) if exists(file)
    * d) if [ file -exists ]  
      **Answer**: a) if [ -f file ]
23. **Which command is used to view all available partitions in a Linux system?**
    * a) lsblk
    * b) fdisk -l
    * c) blkid
    * d) All of the above  
      **Answer**: d) All of the above
24. **What is the default logging file for cron jobs in Linux?**
    * a) /var/log/cron
    * b) /var/log/messages
    * c) /var/log/syslog
    * d) /var/log/auth.log  
      **Answer**: a) /var/log/cron
25. **Which of the following bash commands is used to monitor network activity in real-time?**
    * a) ifconfig
    * b) netstat
    * c) ping
    * d) top  
      **Answer**: b) netstat
26. **Which of the following commands is used to monitor user activity in Linux?**
    * a) who
    * b) w
    * c) last
    * d) All of the above  
      **Answer**: d) All of the above
27. **Which command is used to display the CPU usage in Linux?**
    * a) cpuinfo
    * b) top
    * c) ps
    * d) df  
      **Answer**: b) top
28. **Which command is used to monitor memory usage in Linux?**
    * a) free
    * b) top
    * c) ps
    * d) vmstat  
      **Answer**: a) free
29. **Which of the following commands is used to create a symbolic link?**
    * a) ln -s
    * b) link
    * c) symlink
    * d) ln  
      **Answer**: a) ln -s
30. **Which of the following is the correct format for a cron job entry?**
    * a) minute hour day month day\_of\_week command
    * b) minute hour command day\_of\_week day month
    * c) minute hour month command day\_of\_week day
    * d) minute day month command  
      **Answer**: a) minute hour day month day\_of\_week command
31. **Which bash command can be used to view a running process's memory and CPU usage?**
    * a) ps aux
    * b) top
    * c) htop
    * d) All of the above  
      **Answer**: d) All of the above
32. **Which of the following commands is used to find files modified in the last 7 days?**
    * a) find . -mtime -7
    * b) find . -atime -7
    * c) find . -ctime -7
    * d) find . -newermt 7  
      **Answer**: a) find . -mtime -7
33. **Which command is used to create a backup of a file in Linux?**
    * a) cp
    * b) tar
    * c) dd
    * d) rsync  
      **Answer**: a) cp
34. **What does the command journalctl do?**
    * a) Displays logs from the systemd journal
    * b) Displays real-time log files
    * c) Manages syslog
    * d) All of the above  
      **Answer**: a) Displays logs from the systemd journal
35. **Which of the following commands is used to monitor log messages in real-time?**
    * a) tail -f /var/log/syslog
    * b) tail -f /var/log/messages
    * c) journalctl -f
    * d) All of the above  
      **Answer**: d) All of the above
36. **Which log file contains the authentication logs in Linux?**
    * a) /var/log/auth.log
    * b) /var/log/secure
    * c) /var/log/syslog
    * d) /var/log/messages  
      **Answer**: a) /var/log/auth.log
37. **Which bash command can be used to check disk space in Linux?**
    * a) df
    * b) du
    * c) lsblk
    * d) mount  
      **Answer**: a) df
38. **Which of the following commands is used to display the system's kernel version?**
    * a) uname -r
    * b) cat /proc/version
    * c) hostnamectl
    * d) all of the above  
      **Answer**: d) all of the above
39. **What is the default file used to store cron job logs in Linux?**
    * a) /var/log/cron
    * b) /var/log/syslog
    * c) /var/log/auth.log
    * d) /var/log/messages  
      **Answer**: a) /var/log/cron
40. **Which bash command is used to schedule tasks for execution at specified intervals?**
    * a) cron
    * b) at
    * c) batch
    * d) all of the above  
      **Answer**: a) cron
41. **Which of the following commands is used to check the available network interfaces?**
    * a) ifconfig
    * b) ip a
    * c) netstat
    * d) Both a and b  
      **Answer**: d) Both a and b
42. **Which file contains the cron jobs for all users in Linux?**
    * a) /etc/crontab
    * b) /var/spool/cron/crontabs
    * c) /etc/cron.d
    * d) /etc/cron.daily  
      **Answer**: a) /etc/crontab
43. **Which of the following tools is used for real-time process monitoring?**
    * a) ps
    * b) top
    * c) htop
    * d) All of the above  
      **Answer**: d) All of the above
44. **What does the command kill -9 <PID> do?**
    * a) Sends a SIGTERM to gracefully terminate the process
    * b) Sends a SIGKILL to immediately terminate the process
    * c) Suspends the process
    * d) Displays the process status  
      **Answer**: b) Sends a SIGKILL to immediately terminate the process
45. **In the context of system logs, what does the dmesg command display?**
    * a) Kernel ring buffer messages
    * b) Authentication logs
    * c) Application logs
    * d) All of the above  
      **Answer**: a) Kernel ring buffer messages
46. **Which tool is used to rotate log files in Linux?**
    * a) logrotate
    * b) rsyslog
    * c) syslogd
    * d) cron  
      **Answer**: a) logrotate
47. **Which of the following is the default file format for crontab?**
    * a) cron.d
    * b) cron.daily
    * c) cron.deny
    * d) crontab  
      **Answer**: d) crontab
48. **What does the grep command do in bash scripting?**
    * a) Searches for text in files
    * b) Filters log files
    * c) Finds specific patterns in files
    * d) All of the above  
      **Answer**: d) All of the above
49. **Which of the following commands shows the history of user commands executed in Linux?**
    * a) history
    * b) logs
    * c) audit
    * d) last  
      **Answer**: a) history
50. **Which command would you use to view the last 10 lines of the system logs?**
    * a) tail -n 10 /var/log/syslog
    * b) head -n 10 /var/log/syslog
    * c) cat /var/log/syslog
    * d) logview  
      **Answer**: a) tail -n 10 /var/log/syslog

#### 

1. **Which of the following commands in Linux is used to display the current user information?**

* a) whoami
* b) id
* c) who
* d) Both a and b  
  **Answer**: d) Both a and b

1. **Which of the following utilities is used for logging events in a Linux system?**

* a) syslog
* b) logger
* c) journalctl
* d) All of the above  
  **Answer**: d) All of the above

1. **What is the main purpose of the chmod command in Linux?**

* a) To change file ownership
* b) To change file permissions
* c) To change file groups
* d) To modify the file contents  
  **Answer**: b) To change file permissions

1. **Which command is used to show system processes in Linux with additional details?**

* a) ps -aux
* b) top
* c) htop
* d) All of the above  
  **Answer**: d) All of the above

1. **Which command can be used to monitor system logs in real-time as new logs are created?**

* a) logtail
* b) tail -f /var/log/messages
* c) tail -f /var/log/syslog
* d) All of the above  
  **Answer**: d) All of the above

1. **Which command can be used to check if a specific port is open on a Linux system?**

* a) telnet
* b) netstat
* c) ss
* d) All of the above  
  **Answer**: d) All of the above

1. **Which of the following commands is used to set file ownership in Linux?**

* a) chmod
* b) chown
* c) chgrp
* d) chdir  
  **Answer**: b) chown

1. **Which command can be used to schedule tasks to be run at a specific time in Linux?**

* a) cron
* b) at
* c) systemd
* d) Both a and b  
  **Answer**: d) Both a and b

1. **In a Bash script, which command is used to exit the script with a status code?**

* a) exit
* b) return
* c) quit
* d) break  
  **Answer**: a) exit

1. **Which of the following is the correct command to create a new directory in Linux?**

* a) mkdir
* b) touch
* c) createdir
* d) dircreate  
  **Answer**: a) mkdir

1. **In Perl, which symbol is used to dereference a hash?**

* a) @
* b) $
* c) %
* d) \*  
  **Answer**: b) $

1. **What does the lsof command do in Linux?**

* a) Lists open files
* b) Lists directories
* c) Lists user processes
* d) Lists disk partitions  
  **Answer**: a) Lists open files

1. **Which of the following is used to rotate log files in Linux?**

* a) logrotate
* b) cron
* c) syslogd
* d) logwatch  
  **Answer**: a) logrotate

1. **Which of the following is the primary log file for system messages in Linux?**

* a) /var/log/auth.log
* b) /var/log/syslog
* c) /var/log/boot.log
* d) /var/log/messages  
  **Answer**: b) /var/log/syslog

1. **Which of the following commands is used to manage users in Linux?**

* a) adduser
* b) useradd
* c) usermod
* d) All of the above  
  **Answer**: d) All of the above

1. **Which file in Linux is used to store the list of user passwords?**

* a) /etc/passwd
* b) /etc/shadow
* c) /etc/group
* d) /etc/login.defs  
  **Answer**: b) /etc/shadow

1. **In Perl, which function is used to open a file for reading?**

* a) open()
* b) read()
* c) fopen()
* d) fileopen()  
  **Answer**: a) open()

1. **Which of the following Bash commands is used to display the current working directory?**

* a) pwd
* b) ls
* c) cd
* d) dir  
  **Answer**: a) pwd

1. **Which of the following tools can be used for debugging Bash scripts?**

* a) bash -x script.sh
* b) set -x
* c) echo
* d) Both a and b  
  **Answer**: d) Both a and b

1. **Which of the following is the main function of the cron daemon in Linux?**

* a) To schedule tasks for periodic execution
* b) To monitor network traffic
* c) To rotate log files
* d) To manage processes  
  **Answer**: a) To schedule tasks for periodic execution

1. **Which of the following commands can be used to list files in a directory along with their permissions?**

* a) ls -l
* b) ls -a
* c) ls -h
* d) ls -r  
  **Answer**: a) ls -l

1. **Which Bash command can be used to append output to a file without overwriting its contents?**

* a) >
* b) <
* c) >>
* d) |  
  **Answer**: c) >>

1. **In Perl, which symbol is used for an array?**

* a) @
* b) $
* c) %
* d) &  
  **Answer**: a) @

1. **Which of the following is used to list network connections in Linux?**

* a) netstat
* b) ss
* c) iftop
* d) All of the above  
  **Answer**: d) All of the above

1. **Which of the following MySQL commands is used to create a new database?**

* a) CREATE DATABASE dbname;
* b) new database dbname;
* c) make db dbname;
* d) add database dbname;  
  **Answer**: a) CREATE DATABASE dbname;

1. **What does the kill -9 command do in Linux?**

* a) Terminates the process forcefully
* b) Terminates the process gracefully
* c) Kills all background jobs
* d) Stops the entire system  
  **Answer**: a) Terminates the process forcefully

1. **Which of the following Bash commands is used to loop through a list of values?**

* a) for
* b) while
* c) until
* d) All of the above  
  **Answer**: d) All of the above

1. **Which of the following Linux commands can be used to change a user's password?**

* a) passwd
* b) changepw
* c) userpasswd
* d) password  
  **Answer**: a) passwd

1. **Which of the following tools is used to manage a MySQL database from the command line?**

* a) mysql
* b) mysqldump
* c) mysqladmin
* d) All of the above  
  **Answer**: d) All of the above

1. **Which of the following is the correct way to append data to a file in Linux?**

* a) >>
* b) >
* c) <
* d) <<  
  **Answer**: a) >>

1. **Which of the following is the default file system used in Linux?**

* a) NTFS
* b) EXT4
* c) FAT32
* d) HFS+  
  **Answer**: b) EXT4

1. **In Perl, which operator is used to concatenate strings?**

* a) +
* b) .
* c) &
* d) ,  
  **Answer**: b) .

1. **Which of the following commands will list files in reverse order?**

* a) ls -r
* b) ls -l
* c) ls -t
* d) ls -a  
  **Answer**: a) ls -r

1. **In Perl, which function is used to close a file after reading or writing?**

* a) close()
* b) end()
* c) exit()
* d) stop()  
  **Answer**: a) close()

1. **What does the command systemctl restart apache2 do?**

* a) It restarts the Apache2 service
* b) It restarts the MySQL service
* c) It restarts the system
* d) It restarts the network interface  
  **Answer**: a) It restarts the Apache2 service

1. **Which of the following is the default log file for cron jobs?**

* a) /var/log/cron.log
* b) /var/log/messages
* c) /var/log/syslog
* d) /var/log/cron  
  **Answer**: a) /var/log/cron.log

1. **Which command is used to show the currently mounted file systems?**

* a) mount
* b) df
* c) lsblk
* d) All of the above  
  **Answer**: d) All of the above

1. **Which of the following commands can be used to search for files containing a specific pattern?**

* a) find
* b) grep
* c) locate
* d) All of the above  
  **Answer**: b) grep

1. **Which of the following tools is used for process monitoring in Linux?**

* a) ps
* b) top
* c) htop
* d) All of the above  
  **Answer**: d) All of the above

1. **Which of the following commands can be used to display real-time system resource usage?**

* a) top
* b) htop
* c) vmstat
* d) All of the above  
  **Answer**: d) All of the above

1. **Which command is used to manage user groups in Linux?**

* a) groupadd
* b) usermod
* c) groupdel
* d) All of the above  
  **Answer**: d) All of the above

1. **What is the purpose of the echo command in Bash?**

* a) Display the output of a command
* b) Print text to the terminal
* c) Create a file
* d) Move a file  
  **Answer**: b) Print text to the terminal

1. **In Perl, how do you declare a hash?**

* a) %hash\_name
* b) @hash\_name
* c) $hash\_name
* d) hash\_name{}  
  **Answer**: a) %hash\_name

1. **Which of the following is used to enable detailed logging in Bash scripts?**

* a) set -x
* b) set -v
* c) echo
* d) Both a and b  
  **Answer**: d) Both a and b

1. **Which of the following options is used with ls to display hidden files?**

* a) -l
* b) -h
* c) -a
* d) -r  
  **Answer**: c) -a

1. **Which file contains information about the file system mounts in Linux?**

* a) /etc/fstab
* b) /etc/mtab
* c) /etc/passwd
* d) /etc/network/interfaces  
  **Answer**: a) /etc/fstab

1. **What does the command tail -n 10 /var/log/syslog do?**

* a) Displays the last 10 lines of /var/log/syslog
* b) Displays the first 10 lines of /var/log/syslog
* c) Displays the entire /var/log/syslog file
* d) Displays logs in real-time  
  **Answer**: a) Displays the last 10 lines of /var/log/syslog

1. **Which of the following commands is used to restart the networking service in Linux?**

* a) systemctl restart networking
* b) service networking restart
* c) ifdown eth0 && ifup eth0
* d) All of the above  
  **Answer**: d) All of the above

1. **Which Bash command is used to check the available disk space?**

* a) df
* b) du
* c) free
* d) lsblk  
  **Answer**: a) df

1. **In Perl, which function is used to read input from the user?**

* a) input()
* b) gets()
* c) read()
* d) <>  
  **Answer**: d) <>