1. **Question:** Which of the following is a characteristic of a real-time operating system (RTOS)?
   * **a) Time-sharing**
   * b) High latency
   * c) Predictability
   * d) Batch processing
2. **Question:** Which operating system is known for its microkernel architecture?
   * **a) Linux**
   * b) Windows NT
   * c) MacOS
   * d) Minix
3. **Question:** What is the main advantage of a distributed operating system?
   * a) Centralized resource management
   * **b) Scalability and resource sharing**
   * c) Simplified user interface
   * d) Reduced complexity in network communication
4. **Question:** Why is an operating system necessary for a computer system?
   * **a) To manage hardware resources**
   * b) To increase hardware costs
   * c) To run only specific types of software
   * d) To reduce the processing power
5. **Question:** Which of the following is not a primary function of an operating system?
   * a) Memory management
   * b) Processor management
   * **c) Application development**
   * d) Device management
6. **Question:** What role does the operating system play in security?
   * a) It only monitors user activities
   * **b) It provides user authentication, access control, and data encryption**
   * c) It primarily focuses on hardware repair
   * d) It does not have any security role
7. **Question:** Which of the following is not a valid process state?
   * a) New
   * b) Running
   * c) Terminated
   * **d) Sleeping**
8. **Question:** In which state is a process when it is waiting for an I/O operation to complete?
   * a) Running
   * b) Ready
   * **c) Blocked**
   * d) New
9. **Question:** What happens to a process in the 'terminated' state?
   * a) It is running
   * b) It is waiting for an event to occur
   * **c) It has finished execution**
   * d) It is ready to be executed
10. **Question:** Which of the following is a mechanism to ensure mutual exclusion in process synchronization?
    * a) Paging
    * b) Segmentation
    * **c) Mutex locks**
    * d) Caching
11. **Question:** What is a semaphore used for in operating systems?
    * a) To handle interrupts
    * b) To manage memory allocation
    * **c) To synchronize processes**
    * d) To prioritize tasks
12. **Question:** Which problem is associated with process synchronization?
    * **a) Starvation**
    * b) Fragmentation
    * c) Paging
    * d) Segmentation
13. **Question:** A shared variable xxx, initialized to zero, is operated on by four concurrent processes W, X, Y, Z as follows. Each of the processes W and X reads xxx from memory, increments by one, stores it to memory and then terminates. Each of the processes Y and Z reads xxx, decrements by two, stores it to memory, and then terminates. Each process before reading xxx invokes the P operation (i.e. wait) on a counting semaphore S and invokes the V operation (i.e. signal) on the semaphore S after storing xxx to memory. Semaphore S is initialized to two. What is the maximum possible value of xxx after all processes complete execution?
    * a) -4
    * b) -2
    * c) 0
    * **d) 2**
14. **Question:** What is the purpose of the binary semaphore in operating systems?
    * a) To manage memory
    * **b) To manage access to shared resources**
    * c) To prioritize process execution
    * d) To handle device interrupts
15. **Question:** Which of the following problems can arise when using semaphores?
    * a) Deadlock
    * b) Starvation
    * c) Priority Inversion
    * **d) All of the above**
16. **Question:** Consider two processes P1 and P2, both requiring access to a critical section. Which semaphore operations will be used to implement mutual exclusion?
    * a) P and V
    * b) Wait and Signal
    * **c) Both a and b**
    * d) None of the above
17. **Question:** Which synchronization problem can be solved using semaphores?
    * a) Readers-Writers problem
    * b) Producer-Consumer problem
    * c) Dining Philosophers problem
    * **d) All of the above**
18. **Question:** Which command is used to list all files and directories in Linux?
    * **a) ls**
    * b) cp
    * c) mv
    * d) rm
19. **Question:** What is the purpose of the 'chmod' command in Linux?
    * **a) To change file ownership**
    * b) To change file permissions
    * c) To move files
    * d) To delete files
20. **Question:** Which of the following commands is used to display the content of a file in Linux?
    * **a) cat**
    * b) rm
    * c) cp
    * d) mv
21. **Question:** What is the 'grep' command used for in Linux?
    * **a) To search for text within files**
    * b) To copy files
    * c) To remove directories
    * d) To change directory
22. **Question:** Which command is used to check disk usage in Linux?
    * **a) df**
    * b) du
    * c) top
    * d) ps
23. **Question:** How can you view currently running processes in Linux?
    * a) ls
    * **b) ps**
    * c) chmod
    * d) mkdir
24. **Question:** What does the 'sudo' command do in Linux?
    * **a) Allows a permitted user to execute a command as the superuser or another user**
    * b) Lists directory contents
    * c) Changes file ownership
    * d) Moves files and directories
25. **Question:** What is the default shell used in most Linux distributions?
    * **a) bash**
    * b) zsh
    * c) fish
    * d) ksh
26. **Question:** Which command in Linux is used to change the current working directory?
    * **a) cd**
    * b) ls
    * c) pwd
    * d) mkdir
27. **Question:** How do you recursively remove a directory and its contents in Linux?
    * **a) rm -r**
    * b) del
    * c) mv -r
    * d) cp -r
28. **Question:** Which command is used to initialize a new Git repository?
    * **a) git init**
    * b) git start
    * c) git create
    * d) git begin
29. **Question:** How do you clone a repository from GitHub?
    * **a) git clone <repo\_url>**
    * b) git copy <repo\_url>
    * c) git fetch <repo\_url>
    * d) git pull <repo\_url>
30. **Question:** Which command stages files for commit in Git?
    * **a) git add**
    * b) git commit
    * c) git push
    * d) git init
31. **Question:** How do you commit changes in Git with a message?
    * **a) git commit -m "message"**
    * b) git push -m "message"
    * c) git add -m "message"
    * d) git init -m "message"
32. **Question:** Which command is used to check the status of your working directory and staging area in Git?
    * **a) git status**
    * b) git log
    * c) git diff
    * d) git branch
33. **Question:** How do you create a new branch in Git?
    * **a) git branch <branch\_name>**
    * b) git create <branch\_name>
    * c) git checkout <branch\_name>
    * d) git merge <branch\_name>
34. **Question:** Which command is used to merge branches in Git?
    * **a) git merge <branch\_name>**
    * b) git join <branch\_name>
    * c) git add <branch\_name>
    * d) git commit <branch\_name>
35. **Question:** How do you switch to another branch in Git?
    * a) git checkout <branch\_name>
    * **b) git switch <branch\_name>**
    * c) git merge <branch\_name>
    * d) git branch <branch\_name>
36. **Question:** Which command fetches changes from the remote repository in Git?
    * a) git fetch
    * **b) git pull**
    * c) git clone
    * d) git push
37. **Question:** How do you push changes to the remote repository in Git?
    * **a) git push**
    * b) git pull
    * c) git fetch
    * d) git commit
38. **Question:** How can you view the commit history in Git?
    * **a) git log**
    * b) git status
    * c) git diff
    * d) git branch
39. **Question:** What does the 'git revert' command do?
    * **a) Undo a commit by creating a new commit**
    * b) Delete the commit history
    * c) Temporarily save changes
    * d) Merge branches
40. **Question:** How do you view the differences between two commits in Git?
    * **a) git diff**
    * b) git log
    * c) git status
    * d) git merge
41. **Question:** Which command creates a tag in Git?
    * **a) git tag <tag\_name>**
    * b) git create-tag <tag\_name>
    * c) git new-tag <tag\_name>
    * d) git add-tag <tag\_name>
42. **Question:** How do you delete a branch in Git?
    * a) git branch -d <branch\_name>
    * **b) git remove <branch\_name>**
    * c) git delete <branch\_name>
    * d) git drop <branch\_name>
43. **Question:** What does 'git stash' do?
    * **a) Saves the changes temporarily for later use**
    * b) Commits the changes
    * c) Discards the changes
    * d) Merges changes
44. **Question:** How do you apply stashed changes in Git?
    * **a) git stash apply**
    * b) git stash add
    * c) git stash commit
    * d) git stash save
45. **Question:** Which command shows a summarized view of the commit history in Git?
    * a) git log --oneline
    * **b) git status --summary**
    * c) git diff --summary
    * d) git branch --history
46. **Question:** How do you rename a branch in Git?
    * a) git branch -m <new\_name>
    * **b) git rename <new\_name>**
    * c) git change-branch <new\_name>
    * d) git switch <new\_name>