1. What is an operating system (OS)?

- A) A program that acts as an intermediary between a user of a computer and the computer hardware.

- B) A type of hardware that enhances computer performance.

- C) A device used for memory storage.

- D) A tool for developing applications.

2. Which of the following is NOT an objective of an operating system?

- A) Convenience

- B) Efficiency

- C) Ability to evolve

- D) High cost

3. Which component provides the basic computing resources in a computer system?

- A) Operating system

- B) Hardware

- C) Application programs

- D) Users

4. What is the primary task of an OS as a Resource Manager?

- A) To develop programs

- B) To manage and protect memory and I/O devices in a multi-user environment

- C) To generate graphics for the user

- D) To design user interfaces

5. What is the function of the kernel in an operating system?

- A) It is the user interface of the OS.

- B) It manages files and directories.

- C) It is the core of the OS with complete control over everything in the system.

- D) It manages internet connections.

6. In which mode does the executing code have complete and unrestricted access to the underlying hardware?

- A) User Mode

- B) Kernel Mode

- C) Supervisor Mode

- D) Application Mode

7. Which of the following is a service provided by the OS as a user interface?

- A) Memory allocation

- B) Controlled access to files

- C) Device manufacturing

- D) Network administration

8. Which of the following is NOT a function of memory management in an OS?

- A) Keeps track of primary memory

- B) Allocates memory to processes

- C) Manages secondary storage

- D) De-allocates memory when no longer needed

9. What is the main responsibility of the OS in processor management?

- A) File handling

- B) Process scheduling

- C) Display management

- D) Database management

10. Which of the following is NOT an important service provided by an OS?

- A) Security

- B) Control over system performance

- C) Job accounting

- D) Web development

Evolution of Operating Systems

11. What factors contributed to the evolution of operating systems?

- A) Hardware upgrades and new types of hardware

- B) New services

- C) Fixes for existing systems

- D) All of the above

Serial Processing

12. What was a characteristic of serial processing in the early 1940s-50s?

- A) Use of operating systems

- B) Users accessed system hardware directly

- C) High-level programming languages were used

- D) Multiple users could work simultaneously

13. Which of the following was a major issue with serial processing?

- A) Efficient use of CPU

- B) Lack of scheduling time

- C) Easy setup process

- D) Fast input/output devices

Simple Batch Systems

14. What did the introduction of Simple Batch Systems improve?

- A) User interaction with hardware

- B) Grouping similar types of jobs together

- C) Real-time processing capabilities

- D) Networking between computers

15. In Simple Batch Systems, what software was used to control the sequence of events?

- A) Compiler

- B) Monitor

- C) Assembler

- D) Debugger

Batch Systems - Monitor

16. What is the portion of the monitor that resides in the main memory called?

- A) User Program

- B) Resident Monitor

- C) Batch Manager

- D) Compiler

17. What happens when a user program finishes or encounters an error in a Batch System?

- A) The program restarts automatically

- B) Control is returned to the monitor

- C) The system shuts down

- D) The program enters an infinite loop

Batch Systems - Job Control Language (JCL)

18. What is the purpose of Job Control Language in Batch Systems?

- A) To manage user interfaces

- B) To provide instructions to the monitor

- C) To handle network connections

- D) To compile programs

19. Which of the following is NOT an instruction that JCL provides to the monitor?

- A) What compiler to use

- B) What data to use

- C) How to access the internet

- D) How to execute a job

Hardware Features Introduced Due to Batch Systems

20. Which feature prevents the memory area containing the monitor from being altered?

- A) Timer

- B) Memory protection

- C) Interrupts

- D) I/O control

21. In Batch Systems, what is the purpose of having privileged instructions?

- A) To allow user programs to access hardware directly

- B) To ensure only the monitor can execute certain machine-level instructions

- C) To enhance graphical interfaces

- D) To enable remote access

Issues with Simple Batch Systems

22. Why did the processor often remain idle in Simple Batch Systems?

- A) The system was overloaded with jobs

- B) I/O devices were too slow compared to the processor

- C) The system lacked a monitor

- D) There were not enough jobs to process

23. Which of the following was NOT an issue associated with Simple Batch Systems?

- A) Slow I/O devices

- B) Efficient CPU usage

- C) Processor idleness

- D) Delays in job execution

General Understanding

24. What type of operating system was used before the introduction of Simple Batch Systems?

- A) Time-sharing systems

- B) Serial processing systems

- C) Real-time systems

- D) Distributed systems

25. What hardware feature introduced in batch systems allowed the operating system to regain control from user programs?

- A) Memory protection

- B) Interrupts

- C) Timer

- D) Privileged instructions

Issues with Simple Batch Systems

26. What was a major issue with Simple Batch Systems?

- A) Fast processing

- B) Efficient CPU usage

- C) I/O devices were too slow compared to the processor

- D) High memory usage

Multiprogrammed Batch Systems

27. What is a key feature of Multiprogrammed Batch Systems?

- A) Only one job is processed at a time

- B) The processor can switch to another job while one job waits for I/O

- C) Jobs are processed in real-time

- D) All jobs must complete before new ones are loaded

28. Which of the following is required for Multiprogrammed Batch Systems to function?

- A) Direct Memory Access (DMA)

- B) Single-core processors

- C) High-speed printers

- D) Large hard drives

29. What is the purpose of I/O interrupts in Multiprogrammed Batch Systems?

- A) To prevent jobs from starting

- B) To alert the processor to switch tasks

- C) To improve graphics performance

- D) To increase memory capacity

Time Sharing Systems

30. When were Time Sharing Systems developed?

- A) 1940s

- B) 1950s

- C) 1960s

- D) 1970s

31. What is the primary advantage of Time Sharing Systems?

- A) High speed memory

- B) Ability for multiple users to interact with the computer at the same time

- C) No need for an operating system

- D) Faster compilation of programs

32. What technique is used in Time Sharing Systems to manage multiple users?

- A) Time Slicing

- B) Batch Processing

- C) Multiprogramming

- D) Serial Processing

33. What happens to the old user program in a Time Sharing System when a new user program is loaded?

- A) It is deleted from the system

- B) It is stored on disk for later resumption

- C) It continues running in the background

- D) It is executed immediately

Personal Computer Systems

34. What characterizes a Personal Computer System?

- A) Shared among multiple users

- B) Dedicated to a single user

- C) Designed for batch processing

- D) Mainly used in large organizations

35. What was a primary goal of early operating systems for personal computers?

- A) Maximizing CPU and peripheral utilization

- B) Maximizing user convenience and responsiveness

- C) Managing network resources

- D) Enhancing multi-user interaction

Parallel Systems

36. What is an advantage of Parallel Systems?

- A) Slower processing times

- B) Execution of several tasks concurrently by different processors

- C) Simpler operating system design

- D) Less reliable due to multiple processors

37. How do Parallel Systems enhance reliability?

- A) By using a single processor

- B) By allowing another processor to take over if one fails

- C) By running only one task at a time

- D) By using multiple operating systems simultaneously

38. What must an OS do in a Parallel System?

- A) Make the presence of multiple processors apparent to users

- B) Manage scheduling within each processor and synchronization among processors

- C) Only manage one processor at a time

- D) Prevent processors from communicating

Distributed Systems

39. How do Distributed Systems differ from Parallel Systems?

- A) They share memory and a clock

- B) Processors do not share memory or a clock

- C) They use only one processor

- D) They cannot communicate between processors

40. What is a benefit of Distributed Systems?

- A) Higher load on the host machine

- B) Ability for users at one site to utilize resources of systems at other sites

- C) Slower processing

- D) Lack of communication between processors

41. What are Distributed Systems also referred to as?

- A) Tightly coupled systems

- B) Loosely coupled systems

- C) Single-user systems

- D) Centralized systems

Mobile Operating Systems

42. What is a key characteristic of Mobile Operating Systems?

- A) Built for desktop computers

- B) Built exclusively for mobile devices

- C) Requires extensive hardware resources

- D) Identical to standard operating systems

43. Which of the following is NOT a popular mobile operating system?

- A) Android

- B) Symbian

- C) Windows Mobile

- D) Linux

44. What constraints do Mobile Operating Systems manage?

- A) High memory and processor power

- B) Battery life, memory, and processor power

- C) Unlimited storage

- D) Multi-user access

45. What additional functionality do Mobile Operating Systems provide?

- A) Desktop application management

- B) Cellular and wireless network connectivity management

- C) Advanced graphical rendering

- D) High-speed computing

Understanding Processes

46. What is a process in the context of operating systems?

- A) A static set of instructions

- B) A program in execution

- C) A block of memory

- D) A compilation of code

47. Which of the following is NOT a characteristic of a process?

- A) Execution of a sequence of instructions

- B) A current state

- C) An associated set of system instructions

- D) Compilation of source code

48. What are the components that a process is comprised of?

- A) Program code and a set of data

- B) Only program code

- C) Memory only

- D) User interface

Process Elements

49. Which of the following is NOT an element associated with a running process?

- A) Identifier

- B) Memory pointers

- C) User interface

- D) Program counter

50. What does the program counter in a process represent?

- A) The current instruction being executed

- B) The amount of memory used

- C) The priority of the process

- D) The status of I/O operations

Process Control Block

51. What is a Process Control Block (PCB)?

- A) A storage device

- B) A data structure that contains the process elements

- C) A type of processor

- D) A file system component

52. Why is the Process Control Block important in process management?

- A) It stores all user data

- B) It allows the OS to interrupt and later resume a process

- C) It controls memory allocation

- D) It handles user inputs

Process Execution

53. What role does the dispatcher play in process execution?

- A) It creates processes

- B) It switches the processor from one process to another

- C) It manages memory allocation

- D) It terminates processes

54. In a system with three processes and a dispatcher, what happens when a process is interrupted?

- A) The process is terminated

- B) The process is switched out by the dispatcher

- C) The process continues running in the background

- D) The process is moved to the I/O device

Two-State Process Model

55. What is the simplest model to understand the behavior of a process?

- A) Three-State Process Model

- B) Two-State Process Model

- C) Multi-State Process Model

- D) Five-State Process Model

56. In the Two-State Process Model, what are the two possible states of a process?

- A) Running and Waiting

- B) Running and Not-Running

- C) Ready and Suspended

- D) Active and Idle

57. What happens to a process when it is in the "Not-Running" state?

- A) It is deleted from memory

- B) It waits for an opportunity to be executed

- C) It terminates immediately

- D) It runs in the background

Queuing in Process Management

58. Where are processes stored while they are waiting to be executed?

- A) In the processor

- B) In a queue

- C) In secondary storage

- D) In the Process Control Block

59. What happens to a process once it is terminated?

- A) It is sent back to the queue

- B) It is taken out of the queue

- C) It continues to run

- D) It is stored in the PCB

60. What occurs to processes that are interrupted and moved to the "Not-Running" state?

- A) They are deleted from the system

- B) They are sent back to the queue

- C) They immediately resume execution

- D) They stay in memory indefinitely

Process Creation and Termination

61. What is one of the initial steps the OS performs when creating a new process?

- A) Terminating other processes

- B) Allocating memory space and priority to the process

- C) Executing the process immediately

- D) Removing the Process Control Block (PCB)

62. What happens during the Process Exit state?

- A) The process is moved to the blocked state

- B) The OS stores some information before terminating the process

- C) The process is immediately deleted from memory

- D) The process is restarted

Five-State Process Model

63. Why was the "Not-Running" state split into "Ready" and "Blocked" states in the Five-State Process Model?

- A) To improve memory allocation

- B) To distinguish between processes ready to execute and those waiting for an I/O operation

- C) To increase CPU speed

- D) To reduce the number of processes

64. Which of the following is NOT a state in the Five-State Process Model?

- A) New

- B) Running

- C) Suspended

- D) Exit

State Transitions

65. What happens to a process in the Blocked state when the event it is waiting for occurs?

- A) It moves to the Exit state

- B) It moves to the Ready state

- C) It stays in the Blocked state

- D) It is deleted

66. What state transition occurs if a blocked process is swapped out to disk?

- A) Blocked to Ready

- B) Blocked to Exit

- C) Blocked to Blocked/Suspend

- D) Blocked to New

67. When might a process be moved from the Ready state to the Ready/Suspend state?

- A) When the process has higher priority

- B) When the OS needs to free up memory space

- C) When the process has finished execution

- D) When the process is waiting for I/O

Suspension and Additional States

68. Why would the OS move a process from the Blocked/Suspend state to the Ready/Suspend state?

- A) The process has been terminated

- B) The event the process was waiting for has occurred

- C) The process has lower priority

- D) The OS needs more memory space

69. What state transition might occur if a new process is created but there is insufficient memory in the main memory?

- A) New to Ready/Suspend

- B) New to Exit

- C) New to Blocked

- D) New to Running

70. Why might the OS move a running process directly to the Ready/Suspend queue?

- A) The process is too slow

- B) A higher-priority process in the Blocked/Suspend queue has become unblocked

- C) The process has finished its execution

- D) The OS is shutting down

Process Suspension and State Management

71. What is a key reason for suspending a process?

- A) To execute it immediately

- B) To free up main memory for higher-priority processes

- C) To delete it from the system

- D) To upgrade the process priority

72. Which state transition might occur if a process in the Blocked/Suspend state has higher priority than any process in the Ready/Suspend queue?

- A) Blocked/Suspend to Ready

- B) Blocked/Suspend to Exit

- C) Blocked/Suspend to Blocked

- D) Blocked/Suspend to New

73. What happens when a process is moved to the Exit state?

- A) It continues to execute in the background

- B) It is terminated and removed from all queues

- C) It is moved to the New state

- D) It waits for a higher-priority process

Execution of Applications

74. What is one of the main roles of the Operating System in managing applications?

- A) Creating applications

- B) Allocating resources to processes

- C) Designing hardware

- D) Writing software programs

75. What happens when process P2 is blocked in the system?

- A) It is terminated

- B) It waits for an I/O device allocated to another process

- C) It takes over the processor

- D) It is immediately swapped out

Operating System Control Structures

76. What information is maintained in Memory Tables by the OS?

- A) Status of I/O operations

- B) Allocation of main and secondary memory to processes

- C) Process identifiers

- D) File locations on disk

77. What do I/O Tables help the OS manage?

- A) The process scheduling

- B) I/O devices and channels

- C) File locations in memory

- D) User interface designs

78. Which of the following information is NOT stored in File Tables?

- A) Existence of files

- B) Current file status

- C) Process scheduling

- D) File location on secondary memory

Process Control Block (PCB)

79. What does the Process Control Block (PCB) contain?

- A) Only the program code of a process

- B) All information needed by the OS to manage a process from inception to termination

- C) The status of I/O operations

- D) Information about memory allocation only

80. Why is it important to protect the PCB in an OS?

- A) To prevent unauthorized user access

- B) To ensure the system can manage processes without corruption from bugs or design changes

- C) To speed up process execution

- D) To allow multiple processes to share the same PCB

Process Switching

81. When does a process switch occur?

- A) When a process starts execution

- B) When the currently running process is interrupted and the OS assigns the processor to another process

- C) When a new process is created

- D) When a process accesses I/O devices

82. What is a "mode switch" in the context of operating systems?

- A) Changing from one process to another

- B) Switching between user mode and kernel mode

- C) Restarting the OS

- D) Moving from primary memory to secondary memory

Execution of the Operating System

83. In a Non-process Kernel, how is the operating system code executed?

- A) As a user process

- B) Outside of any process, operating in privileged mode

- C) Within the context of a user process

- D) As a regular application

84. What is the key advantage of executing OS software within the context of a user process?

- A) No need for a process switch to run OS routines

- B) Faster process termination

- C) Easier memory allocation

- D) Reduced system security

85. What is the main benefit of implementing the OS as a collection of system processes?

- A) It simplifies the OS design

- B) It encourages a modular OS design with clean interfaces between modules

- C) It reduces the number of processes

- D) It prevents user access to system functions

Design Issues and Protection

86. Why is protection an important design issue for the Process Control Block?

- A) To ensure that user programs can modify the PCB

- B) To prevent system crashes due to bugs in routines that access the PCB

- C) To make the OS run faster

- D) To allow users to control processes directly

87. Which of the following is an approach to accessing and protecting the PCB?

- A) Allow direct access by all OS modules

- B) Use an intermediary handler routine to access the PCB

- C) Store the PCB in secondary memory

- D) Prevent any changes to the PCB after creation

Scheduling Fundamentals

88. What is the primary resource that an OS allocates among competing processes?

- A) Memory space

- B) Execution time on the processor

- C) Disk storage

- D) Network bandwidth

89. What is the overall aim of processor scheduling?

- A) To ensure all processes terminate simultaneously

- B) To assign processes to be executed by the processor in a way that meets system objectives

- C) To minimize the number of processes in the system

- D) To reduce the need for I/O operations

Scheduling Objectives

90. Which of the following is NOT a typical objective of scheduling?

- A) Prevent starvation of a process

- B) Use the processor efficiently

- C) Maximize system crashes

- D) Prioritize processes when necessary

91. What does "preventing starvation" in scheduling mean?

- A) Ensuring that low-priority processes never run

- B) Ensuring that all processes get a chance to execute

- C) Allocating maximum CPU time to a single process

- D) Minimizing memory usage

Types of Processor Scheduling

92. When is long-term scheduling performed?

- A) When a process is ready to run

- B) When a new process is created

- C) When a process is blocked

- D) When a process is terminated

93. What is the main role of medium-term scheduling?

- A) Managing the degree of multiprogramming

- B) Starting new processes

- C) Assigning priorities to processes

- D) Handling system calls

94. Which type of scheduling is referred to as the "dispatcher"?

- A) Long-term scheduling

- B) Medium-term scheduling

- C) Short-term scheduling

- D) Preemptive scheduling

Scheduling Criteria

95. Which of the following is considered a user-oriented criterion for short-term scheduling?

- A) Response Time

- B) Processor utilization

- C) Throughput

- D) Swapping time

96. What type of scheduling criteria are response time and throughput?

- A) Non-performance related

- B) User-oriented only

- C) Performance-related

- D) Qualitative

Priority Scheduling

97. What happens in a priority scheduling system when there is a steady supply of high-priority processes?

- A) All processes are executed simultaneously

- B) Low-priority processes may suffer from starvation

- C) High-priority processes are demoted

- D) The system automatically shuts down

98. What is the technique called that gradually increases the priority of processes that wait in the system for a long time?

- A) Aging

- B) Decay

- C) Preemption

- D) Swapping

99. What is a common solution to the problem of starvation in priority scheduling?

- A) Increasing the CPU clock speed

- B) Allowing dynamic prioritization through Aging

- C) Reducing the number of processes

- D) Switching to a non-priority scheduling system

General Understanding

100. Which type of scheduling determines the degree of multiprogramming in a system?

- A) Short-term scheduling

- B) Long-term scheduling

- C) Medium-term scheduling

- D) Priority scheduling

101. In which scenario is short-term scheduling invoked?

- A) When a process is created

- B) When an I/O interrupt occurs

- C) When the system is idle

- D) When memory needs to be allocated

102. What is the main objective of short-term scheduling?

- A) To ensure all processes start at the same time

- B) To allocate processor time to optimize system behavior

- C) To minimize memory usage

- D) To prevent system calls

CPU Scheduling Policies

103. What is the primary role of short-term scheduling, also referred to as CPU scheduling?

- A) To determine which process should be brought into the running state and when

- B) To allocate memory resources

- C) To terminate inactive processes

- D) To manage user inputs

104. Which of the following is a characteristic of non-preemptive scheduling?

- A) The currently running process can be interrupted at any time

- B) Once a process starts running, it continues until it terminates or blocks itself for I/O

- C) A process is selected based on the shortest burst time

- D) New processes are always given priority over running processes

105. In preemptive scheduling, under which conditions might a running process be interrupted?

- A) When it completes execution

- B) When a new process arrives or an interrupt occurs

- C) When it requests an I/O operation

- D) When the system is idle

Scheduling Concepts and Calculations

106. What does the selection function in a scheduling policy determine?

- A) Which process should be terminated

- B) Which process among the ready processes is selected next for execution

- C) How memory is allocated

- D) The priority of user requests

107. How is the Turnaround Time (TAT) of a process calculated?

- A) TAT = Completion Time – Arrival Time

- B) TAT = Waiting Time + Service Time

- C) TAT = Arrival Time – Waiting Time

- D) TAT = Completion Time – Service Time

108. What does Waiting Time (WT) represent in CPU scheduling?

- A) The total time from the arrival of a process to its completion

- B) The amount of time a process waits for the processor

- C) The time required for an I/O operation

- D) The time it takes for a process to be swapped in or out of memory

Scheduling Algorithms

109. What is a key characteristic of the First-Come-First-Served (FCFS) scheduling policy?

- A) It selects processes based on the shortest burst time

- B) It is preemptive, allowing interruptions

- C) It is non-preemptive and selects the process that has waited the longest

- D) It uses a dynamic priority system

110. Which of the following is a disadvantage of the First-Come-First-Served (FCFS) scheduling policy?

- A) Complex to implement

- B) May cause short processes to wait a long time before execution

- C) Inefficient for long jobs

- D) High computational overhead

111. In the Shortest Job First (SJF) scheduling policy, which process is selected for execution?

- A) The process with the earliest arrival time

- B) The process with the shortest burst time

- C) The process with the highest priority

- D) The process with the longest burst time

112. What is a major drawback of the Shortest Job First (SJF) scheduling policy?

- A) Difficult to predict burst time

- B) High computational complexity

- C) Always causes starvation

- D) Requires all jobs to have the same arrival time

113. What is the key difference between Shortest Job First (SJF) and Shortest Remaining Time First (SRTF)?

- A) SRTF is non-preemptive

- B) SRTF allows preemption if a new process has a shorter burst time

- C) SJF allows preemption while SRTF does not

- D) SRTF always executes the longest remaining job first

Round Robin and Advanced Scheduling

114. In the Round Robin scheduling policy, what determines when a process is preempted?

- A) The length of its burst time

- B) A fixed time quantum

- C) Its priority level

- D) Its waiting time

115. What is a major design issue in the Round Robin scheduling policy?

- A) Selecting the value of time quantum

- B) Determining process priorities

- C) Ensuring non-preemption

- D) Predicting burst time accurately

116. What is the advantage of the Highest Response Ratio Next (HRRN) scheduling policy?

- A) It always selects the shortest job first

- B) It balances the needs of small and long-waiting processes

- C) It uses non-preemptive scheduling

- D) It eliminates the need for a ready queue

117. How does Multi-Level Feedback Scheduling penalize longer jobs?

- A) By reducing their priority as they run longer

- B) By immediately terminating them

- C) By allocating less memory to them

- D) By increasing their burst time

118. In Multi-Level Feedback Scheduling, what happens to a process after it is preempted?

- A) It is always placed in the highest-priority queue

- B) It is demoted to the next lower-priority queue

- C) It is terminated

- D) It remains in the same queue

Scheduling Algorithm Comparison

119. Which scheduling policy generally offers the best performance for systems with a mixture of short and long processes?

- A) First-Come-First-Served (FCFS)

- B) Shortest Job First (SJF)

- C) Round Robin with a large quantum

- D) Multi-Level Feedback Scheduling

**Note:**

***The multiple-choice questions (MCQs) provided here have been created to assist in understanding and reviewing the concepts related to Operating Systems. However, please be aware that there might be errors or inaccuracies in the answers. It is strongly recommended that you cross-check the answers with reliable sources or consult with an instructor to ensure their correctness.***

***If you encounter any mistakes, please bring them to my attention so that I can make the necessary corrections. Your feedback is valuable, and by identifying any issues, we can improve the quality of these materials for future learners.***

***Thank you for your understanding and cooperation.***