Important Questions for Operating Systems (CS403PC)

B.Tech II Year II Semester,

Prepared for Final Examination (Target: 80% Score)

Compiled based on past JNTUH question papers (2016–2023)

UNIT- I: Operating System- Introduction, Structures, System Components, Processes, and Threads.

Short Answer Questions

1. What are the differences between a process and a thread? (2016, 2019, 2023)
2. Explain the concept of time-shared systems. (2017, 2021)
3. What are system calls? List any five system calls with their purposes. (2018, 2022)
4. Describe the essential properties of parallel operating systems. (2023)
5. What is a cooperating process? Give an example. (2019, 2021)
6. Differentiate between multiprogramming and multitasking. (2016, 2020)

Long Answer Questions

1. Explain the structure of an operating system with a neat diagram and discuss its components. (2018, 2020, 2023)
2. Discuss the process concepts, process states, and process control block (PCB) in detail. (2016, 2019, 2022)
3. Describe the operations on processes, including process creation and termination, with examples. (2017, 2021, 2023)
4. Explain the role of threads in operating systems. Discuss multithreading models with their advantages. (2018, 2020)
5. Discuss different types of operating systems (Batch, Multi programmed, Timeshared, Real-time, Distributed) with their characteristics. (2016,2019,2022)

UNIT-II: CPU Scheduling and Deadlocks

Short Answer Questions

1. Differentiate between preemptive and non-preemptive scheduling. (2016, 2019, 2021)
2. How does priority scheduling differ from the round-robin method? (2023)
3. What is multiple-processor scheduling? (2018, 2020)
4. Describe the wait command in process management. (2023)
5. What is the role of the waitpid() system call? (2019, 2021)

Long Answer Questions

1. Explain various CPU scheduling algorithms (FCFS, SJF, Priority, Round-Robin) with examples and their advantages and disadvantages. (2016, 2018, 2020, 2023)
2. Discuss deadlock prevention and deadlock avoidance techniques in detail. (2017, 2019, 2022)
3. Describe the Banker's algorithm for deadlock avoidance with an example. (2018, 2021, 2023)
4. Explain the methods for handling deadlocks, including detection and recovery mechanisms. (2016, 2020, 2022)

5. Discuss the system call interface for process management with examples of fork(), exec(), wait(), and waitpid(). (2017, 2019, 2023)

UNIT-III: Process Management and Synchronization

Short Answer Questions

1. Define semaphores. Explain the difference between binary and counting semaphores. (2017, 2021, 2023)
2. What are monitors in process synchronization? (2019, 2022)
3. What is synchronization hardware? (2023)
4. Describe message queues in inter process communication (IPC).(2019,2023)
5. What are pipes in IPC? Give an example. (2017, 2021)
6. What is the role of shared memory in IPC? (2019, 2021)

Long Answer Questions

1. Explain the critical section problem and discuss solutions using semaphores and monitors. (2016, 2018, 2020, 2023)
2. Describe the dining philosophers problem and provide a solution using semaphores. (2017, 2019, 2022, 2023)
3. Discuss inter-process communication mechanisms (pipes, FIFOs, message queues, shared memory) with examples. (2018, 2021, 2023)
4. Explain the producer-consumer problem and provide a solution using semaphores. (2016, 2019, 2022)
5. Describe the concept of monitors and provide a solution to the dining philosophers problem using monitors. (2017, 2020, 2023)

UNIT-IV: Memory Management and Virtual Memory

Short Answer Questions

1. What is swapping in memory management? (2017, 2021)
2. What is the difference between segmentation and paging? (2019, 2022)
3. Describe contiguous memory allocation. (2016, 2020)
4. What is a translation lookaside buffer (TLB)? (2018, 2021)
5. Explain the first-fit memory allocation strategy. (2017, 2023)

Long Answer Questions

1. Explain the concept of paging and segmentation with neat diagrams. Discuss segmentation with paging. (2016, 2018, 2020, 2023)
2. Discuss various page replacement algorithms (FIFO, LRU, Optimal) with examples and calculate page faults for a given reference string. (2017, 2019, 2022, 2023)
3. Describe demand paging in detail with a neat diagram and explain its performance. (2018, 2020, 2023)

4. Explain memory management techniques: contiguous allocation, paging, and segmentation. (2016, 2019, 2022)
5. Discuss the concept of virtual memory and its implementation using demand paging and page replacement. (2017, 2021, 2023)

UNIT-V: File System Interface and Operations

Short Answer Questions

1. What are the different file access methods? (2018, 2020, 2023)
2. What is file system protection? List two methods. (2019, 2022)
3. What is free-space management in file systems? (2017, 2023)
4. Explain the read() and write() system calls. (2019, 2021)
5. What is the role of the lseek() system call? (2018, 2022)
6. What is the stat() system call used for? (2019, 2023)
7. Explain the ioctl() system call briefly. (2017, 2021)

Long Answer Questions

1. Discuss various file allocation methods (contiguous, linked, indexed) with their advantages and disadvantages. (2016, 2018, 2020, 2023)
2. Explain the file system structure and its operations (open, read, write, close, lseek) with examples. (2017, 2019, 2022)
3. Describe the directory structure and protection mechanisms in file systems. (2018, 2020, 2023)
4. Discuss free-space management techniques in file systems with examples. (2017, 2021, 2023)
5. Explain the usage of system calls (open, create, read, write, close, lseek, stat, ioctl) in file system operations. (2016, 2019, 2022)