

1.	Discuss how the following pairs of scheduling criteria conflict in certain settings. a) CPU utilization and response time b) Average turnaround time and maximum waiting time
2.	What is the meaning of the term busy waiting? What other kinds of waiting are there in an operating system? Can busy waiting be avoided altogether? Explain your answer.
3.	Consider the deadlock situation that can occur in the dining philosopher's problem when the philosophers obtain the chopsticks one at a time. Discuss how the four necessary conditions for deadlock hold in this setting. Discuss how deadlock can be avoided by eliminating any one of the four necessary conditions.
4.	Compare the memory organization schemes of contiguous memory allocation, pure segmentation and pure paging with respect to the following issues a) External fragmentation b) Internal fragmentation c) ability to share code across processes
5.	Compare segmented paging scheme with the hashed page table scheme for handling large address spaces. Under what circumstances is one scheme preferable to other?
6.	What are different types of operating system configurations possible for multiprocessor computers?
7.	Explain the working set model for page replacement in context of virtual memory management.
8.	Consider a file system in which a file can be deleted and its disk space reclaimed while links to that file still exist. What problems may occur if a new file is created in the same storage area or with the same absolute path name? How can these problems be avoided?
9.	Fragmentation on a storage device can be eliminated by recompactation of the information. Typical disk devices do not have relocation or base registers (such as those used when memory is to be compacted), so how can we relocate files? Give three reasons why recompacting and relocation of files are often avoided.
10.	Consider A file system that uses inodes to represent files. Disk blocks are 8 KB in size, and a pointer to a disk block requires 4 bytes. This file system has 12 direct disk blocks, as well as single, double and triple indirect disk blocks. What is the maximum size of the file that can be stored in this file system.
11.	With respect to the RPC mechanism considers the "exactly once" semantic. Does the algorithm for implementing this semantic execute correctly even if the ACK message back to the client is lost due to a network problem? Describe the sequence of messages and discuss "exactly once" is still preserved.
12.	Would it be possible for the user to develop a new command interpreter using the system call interface provided by the operating system? What is the purpose of the command interpreter? Why is it usually separate from the kernel?
13.	The issue of resource utilization shows up in different forms in different types of operating systems. List what resources must be managed carefully in the following settings

a) Mainframe or minicomputer systems

b) Workstations connected to servers

c) Handheld computers