GSI018 – SISTEMAS OPERACIONAIS

Operating Systems – William Stallings – 7th Edition
Chapter 02 – Operating System Overview

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REVIEW QUESTIONS

2.1. What are three objectives of an OS design?

2.2. What is the kernel of an OS?

2.3. What is multiprogramming?

2.4. What is a process?

2.9. Explain the difference between a monolithic kernel and a microkernel.

2.10. List the key design issues for an SMP operating system.

PROBLEMS

2.1. Suppose that we have a multiprogrammed computer in which each job has identical characteristics. In one computation period, T , for a job, half the time is spent in I/O and the other half in processor activity. Each job runs for a total of N periods. Assume that a simple round-robin scheduling is used, and that I/O operations can overlap with processor operation.

    Define the following quantities:
i) Turnaround time = actual time to complete a job;
ii) Throughput = average number of jobs completed per time period T;
iii) Processor utilization = percentage of time that the processor is active (not waiting).

    Compute these quantities for one, two, and four simultaneous jobs, assuming that the period T is distributed in each of the following ways:
a. I/O first half, processor second half
b. I/O first and fourth quarters, processor second and third quarter

2.2. An I/O-bound program is one that, if run alone, would spend more time waiting for I/O than using the processor. A processor-bound program is the opposite. Suppose a short-term scheduling algorithm favors those programs that have used little processor time in the recent past. Explain why this algorithm favors I/O-bound programs and yet does not permanently deny processor time to processor-bound programs.

2.3. Contrast the scheduling policies you might use when trying to optimize a time-sharing system with those you would use to optimize a multiprogrammed batch system.

2.4. What is the purpose of system calls, and how do system calls relate to the OS and to the concept of dual-mode (kernel-mode and user-mode) operation?