

Operating Systems

(Solutions to Review Questions and Problems)

Review Questions

- Q7-1.** An operating system is a program that facilitates the execution of application programs.
- Q7-3.** In monoprogramming, only a single program is in memory at any time. In multiprogramming, several programs are in memory at a time, but the resources of the computer are only assigned to the program that is running.
- Q7-5.** In regular paging the entire program must be in memory at the same time in order for the program to execute. With demand paging, only some pages of a program can be in memory. This means that, in demand paging, more programs can use the computer's resources at any given time.
- Q7-7.** A process resides, at least in part, in main memory. Programs and jobs reside on a disk.
- Q7-9.** An operating system needs to use queues because there can be many jobs and processes active at the same time. In order to share all of the resources, queues

are necessary to make sure that jobs and processes all get access to the resources that they need.

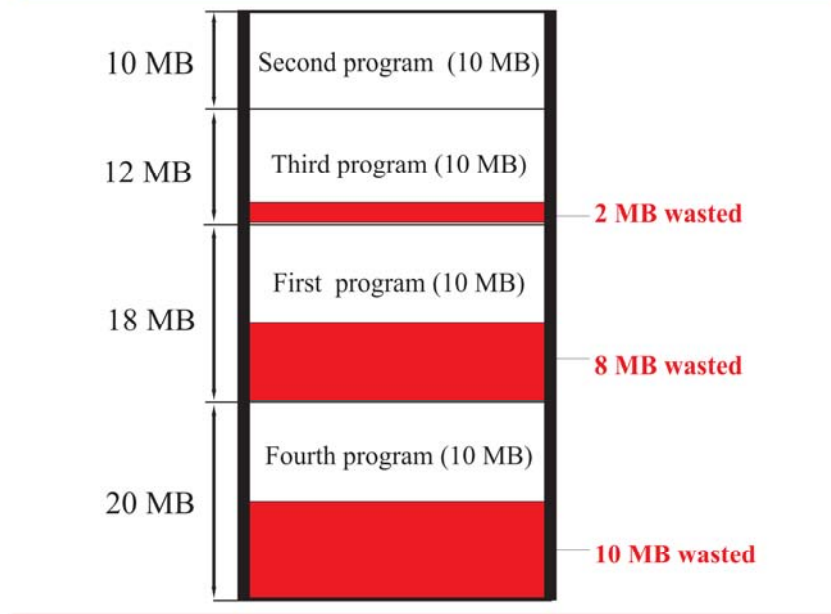
Problems

P7-1. $64 - 4 = 60$ MB.

P7-3. $70 / (70 + 10) \times 100 = 87.5\%$.

- P7-5.** Figure P7-5 shows the partitions and memory used by each program. The total memory wasted = $2 + 8 + 10 = 20$ MB. Memory wasted = $40 / 60 \times 100 = 33.3$ percent. The total memory used = $10 + 10 + 10 + 10 = 40$ MB.

Figure P7-5 Partitioning with same memory need



- P7-7.**

Total memory = $1000 + 100 = 1100$ MB. Number of program = $1100 / 10 = 110$.

- P7-9.** This is a deadlock situation (see Figure P7-9) because all four conditions of deadlock (mutual exclusion, resource holding, no preemption, and circular waiting) are all present.

Figure P7-9 *A deadlock situation*

