23. Yes, it works, but still busy waiting.

25. To do a semaphore operation, the operating system first disables interrupts, then it reads the value of the semaphore. If it is doing a down and the semaphore is equal to zero, it puts the calling process on a list of blocked processes associated with the semaphore. If it is doing an up, it must check to see if any processes are blocked on the semaphore. If one or more processes are blocked, then is removed from the list of blocked processes and made runnable. When all these operations have been completed, interrupts can be enabled again.

27. If the program operates in phases and neither processes may enter the next phase until both are finished with the current phase, it makes sense to use a barrier.

28. With kernel threads, a thread can block on a semaphore and the kernel can run some other thread in the same process. In result, there is no problem using semaphores. With user-level threads, when one thread blocks on a semaphore, the kernel thinks the entire process is blocked and does not run it ever again. In result, the process fails.

29. It is very expensive to implement. Each time any variable that appears in a predicate on which some process is waiting changes, the runtime system must re-evaluate the predicate to see if the process can be unblocked. With the Hoare and Brinch Hansen monitors, processes can only be awakened on a signal primitive.

30. The employees communicate by passing messages: orders, food, and bags in this case. In UNIX terms, the four processes are connected by pipes.

31. No, it doesn’t lead to race conditions.

32. It needs (nT) sec.

33. In simple cases it may be possible to determine whether I/O will be limiting by looking at source code, For instance a program that reads all its input files into buffers at the start will probably not be I/O bound, but a problem when it reads and writes incrementally to a number of different files is likely to be I/O bound. If the operating system provides a facility that can tell you the amount of CPU time used by a program , you can compare this with total time to complete execution of the program.