1. Tanenbaum’s chapter 3, problems 2 and 3.

2. Tanenbaum’s chapter 3, problem 6. The difficulty is that to run the commands to kill processes, the system administrator must be able to run a shell which occupies a process. Even if a shell is running, the commands that list processes such as ps and commands to kill processes such as kill are implemented by ordinary programs which, as such, require a process in order to be run.
   
   Hint: Shells generally have an `exec` command that makes the shell run an `exec` type system call.
   
   Also, wise system administrators plan for bad times.


5. The depth-first-search graph based and the matrix based deadlock detection algorithms will both detect a deadlock in cases where there is just one copy of each resource. The objective of this exercise is to practice what computer scientists do when we compare alternative algorithms for the same problem. Also, detailed guidelines are given for studying technical material like this.
   
   (a) Study 3.4.1. Study the “example of how the algorithm runs in practice.” The processing includes some arbitrary choices. Do another example on the same algorithm input graph with essentially different choices. Write down (1) names of the nodes as they are processed and (2) the contents of list $L$ at interesting times (in the style of Tanenbaum’s explanation). Hand in your calculation sheet to prove you followed these instructions; don’t rewrite them for neatness.
   
   (b) Study 3.4.2. Translate the existence/allocation/request state from Figure 3-5(a) into matrices and vectors like those in figure 3-6. It’s wise to use resource and process names to label the matrix/vector rows and columns instead of integers. Next, run the deadlock detection algorithm on the matrices and vectors; write down what happens.
   
   (c) Modify Figure 3-5(a) by erasing node $G$ and the two arrows incident to it. This models the event that process $G$ is killed. Operating systems typically release all resources held by a process when the process is removed in any way (exits, receives a signal whose action is to terminate the process, etc.) Repeat the above exercise with the modified graph and write down what happens.

6. Tanenbaum’s chapter 3, problems 22 and 23.