

COM S 352

Assignment 4

Due: October 6, 2017

5.8 The first known correct software solution to the critical-section problem for two processes was developed by Dekker. The two processes, P0 and P1, share the following variables:

```
boolean flag[2];
```

```
/* initially false */ int turn;
```

The structure of process P_i ($i = 0$ or 1) is shown in Figure 5.21. The other process is P_j ($j = 1$ or 0). Prove that the algorithm satisfies all three requirements for the critical-section problem.

5.11 Explain why interrupts are not appropriate for implementing synchronization primitives in multiprocessor systems.

5.16 The implementation of mutex locks provided in Section 5.5 suffers from busy waiting. Describe what changes would be necessary so that a process waiting to acquire a mutex lock would be blocked and placed into a waiting queue until the lock became available.

5.29 How does the `signal()` operation associated with monitors differ from the corresponding operation defined for semaphores?

5.32 A file is to be shared among different processes, each of which has a unique number. The file can be accessed simultaneously by several processes, subject to the following constraint: the sum of all unique numbers associated with all the processes currently accessing the file must be less than n . Write a monitor to coordinate access to the file.