

Project 1 – Mutual exclusion using tokens
50 Points
CS421 – Dr. Shaffer
Due: Wednesday October 11, 2000

1 Introduction

Reminder: Projects are individual work as discussed in class.

The ability to provide coordinated, time multiplexed, access to several processes accessing a single device is one of the more central issues in operating system and network design. It has been the subject of hundreds of research papers and many programming languages have been invented to make transparent the mechanisms underlying novel approaches to this problem. The UNIX operating systems has many examples of implementation of such mutual exclusion schemes (for example lpd, the print queue manager). Here we implement a technique through which several processes can share a single device (the stderr channel) in such a way that no more than one process is writing to that device at a time. The technique is referred to as a “token ring” and is algorithmically similar to the mechanisms of the Token Ring network technology.

2 Your project

{30 points} Implement the “ring3” version of the process ring described on page 148 of your text. Complete the exercises in section 4.3 (bottom of page 151).

{20 points} Implement the voting scheme described in section 4.4 to overcome the “busy waiting” of the above version.

3 What you should hand in

Complete the two parts of the project above **separately** (ie in their own directories) and include a Makefile and any special instructions which you believe are needed to build and test your project. Send them to me via e-mail in either a .tar.gz file or a .zip file containing the entirety of the two project directories, including the directories themselves. For example, if your projects are in directories `project1a` and `project1b` respectively, then the command: `tar czf project1.tar.gz project1a project1b` will create a .tar.gz file containing your project. Verify that the contents are correct by running `tar tzf project1.tar.gz`.