Homework 6 Parallel Programming, Algorithms, and Architectures Fall 2000

Due date: 5pm Thursday, November 30, 2000

Problem 1

Use MPI on the SGIs to simulate the global broadcast on a ring with $p$ processors and a hypercube with $2^d$ processors. Your code should handle any $1 \leq p \leq 16$ for the ring and $p = 2, 4, 8, 16$ for the hypercube. Use the rank in the world communicator as the address of the processor in the network. You should place a barrier before and after the code that implements the broadcast for convenience. Implement store-and-forward and cut-through for the ring and store-and-forward for the hypercube.

1. For full credit (20 pts) you may assume that the root is always processor 0 and that a known fixed sized message is being sent.

2. For extra credit (30 pts total) implement versions where the root and message length must be communicated via the point to point messages sent between processors.

Be prepared to describe your strategy, justify it and demonstrate the code during a meeting similar to those we had before for the previous programming assignments.