CS 5500 Homework 3

Sally Devitry (A01980316)

Approach

To create the 'too many chefs' simulation, I made process 0 the cook and all of the others the chefs.

The chef processes were the simple part of this assignment. They check to see if the cook is still working (by checking for a poison message) and if he is, they repeatedly send orders to the cook using MPI_Send.

Writing the code for the cook process was a little bit more complicated. I began this assignment thinking it may be useful to use MPI_Reduce to keep track of how many orders had piled up when the cook came back. This turned out to be more work than necessary. Instead, I had the cook do repeated probing and receiving until there was nothing left to receive, keeping track of how many orders were received.

Implementation

My program uses process 0 as the cook who waits for the other processes to send orders. The cook uses MPI_Iprobe to check if there are any orders. If there are orders, it repeatedly probes and receives until there are no more orders, then the cook completes the orders (sleeps). If the cook checks for orders and there are more than 20, they will print a frustrated message, and send a 'poison' message to kill all of the processes.

The simulation runs with any amount of processes. When run with only 2 processes, the back and forth between the cook and the one chef never stops.

Some example output looks as follows:

running- `mpirun -np 5 -oversubscribe ./a.out`
Cook: 'I'm going out for a smoke'
Cook: 'I'm going out for a smoke'
Cook: 'I'm going to cook for 4 seconds.'
Cook: 'I'm going to cook for 1 seconds.'
Cook: 'I'm going to cook for 6 seconds.'
Cook: 'I'm going out for a smoke'
Cook: 'I'm going to cook for 8 seconds.'
Cook: 'I'm going to cook for 1 seconds.'
Cook: 'I'm going to cook for 12 seconds.'
Cook: 'I'm going out for a smoke'
Cook: 'I'm going to cook for 13 seconds.'
Cook: 'I'm going to cook for 2 seconds.'
Cook: 'I'm going to cook for 14 seconds.'
Cook: 'I'm going to cook for 5 seconds.'

Cook: 'I'm going to cook for 16 seconds.'
Cook: 'I'm going to cook for 8 seconds.'
Cook: 'ARGH, I'm outta here.'

running- `mpirun -np 10 -oversubscribe ./a.out`
Cook: 'I'm going out for a smoke'
Cook: 'I'm going out for a smoke'
Cook: 'I'm going to cook for 10 seconds.'
Cook: 'I'm going to cook for 3 seconds.'
Cook: 'ARGH, I'm outta here.'

Concluding Remarks

Overall, this assignment was a very insightful way for me to explore some new MPI commands. MPI_Reduce turned out to be unhelpful in this exercise, but I still learned a lot about it. MPI_Probe was a key MPI command in this exercise as the cook had to check for messages before receiving them.