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CS 342 – 1
Project 3 – Report

Summary and Functions

First of all, I adapted the monitor based solution given in our textbook. initialization, test, pickup and putdown functions are those functions that adapted form textbook with pthread library functions. I have also a trace function to determine what a philosopher does. It was also used for testing and debugging. With this function, if a philosopher eats <count> times, thread will be exited. Moreover, I have life function which is given to threads. It shows the life of philosophers, thinking and eating. Randomizing eating and thinking times is done in this function. I have also a standartDeviation function to find the standard deviation of hungry duration for each philosopher. Lastly, in main function, I started with some if statements to check the inputs. For example, if number of philosophers is given as 28, one of those ifs gives an error message and then terminate the code. Then, threads are created and finally, total durations of hungry state, average durations of hungry states and standard deviation of hungry state duration for all philosophers are given as milliseconds at the end of main function. Moreover, I print the average duration of hungry state of all philosophers with its standard deviation.

Generating Random Variables

For uniform distribution, what I did is just generating an int between max and min values for eating and thinking by using modulo since we can assume rand function gives results uniformly. rand()%(maxthink – minthink + 1) + minthink is for generating a time for thinking for instance.

For exponential distribution, I determine the mean as (min + max)/2 and create a random variable between 0 and 1. Then, I use the formula log(1-k)/(-1/mean), which gives an exponential variable. If the result is smaller than min or greater than max, then I generate this new random variable with the same way. Then I cast it into int and then sleep the philosopher.

Sample Output

Output for hungry states with the input **./phil 7 500 1000 50 100 uniform 10**

philospher 1 duration of hungry state = 57.679000
philospher 2 duration of hungry state = 0.165000
philospher 3 duration of hungry state = 106.732000
philospher 4 duration of hungry state = 90.816000
philospher 5 duration of hungry state = 0.136000
philospher 6 duration of hungry state = 0.146000
philospher 7 duration of hungry state = 123.677000

philospher 1 avg duration of hungry state = 5.767900
philospher 2 avg duration of hungry state = 0.016500
philospher 3 avg duration of hungry state = 10.673200
philospher 4 avg duration of hungry state = 9.081600

philospher 5 avg duration of hungry state = 0.013600
philospher 6 avg duration of hungry state = 0.014600
philospher 7 avg duration of hungry state = 12.367700

philospher 1 std deviation of hungry duration = 11.657157
philospher 2 std deviation of hungry duration = 0.004080
philospher 3 std deviation of hungry duration = 21.530984
philospher 4 std deviation of hungry duration = 27.204133
philospher 5 std deviation of hungry duration = 0.003200
philospher 6 std deviation of hungry duration = 0.004030
philospher 7 std deviation of hungry duration = 20.065468

Avg duration of hungry state for all philosophers = 54.193000

Std deviation of duration of hungry state for all philosophers = 50.290629