Assignment 4 – A multithreaded system simulator

Lab Report

Objectives:

In this assignment, we will simulate a simple multithreaded environment with limit resources to practice the lock and thread system. This programming assignment is intended to give you experience in developing multithreaded programs that require thread synchronization and deadlock prevention. After this assignment I know how to build multithread function and managing sharing resources.

Design Overview

To started with, the function will check the input argument is correct or not. Than main function will call read File function to read the file line by and line and divide the information. For line of resources, there will be an specify function called setResList to handle it and this function will use divideRes as help. After read the file, main function will create monitor (monitorExecute) thread at first. Than create task thread for each task read from file. It will lock mutex when create task thread.

For monitor thread, it will sleep for amount of time and lock the monitor mutex to check all task's state and then print the information out. It will unlock the mutex after print out the information then wait for next iteration.

For each task thread, it will read from the task list to get itself data. In each iteration, task will try to change it state to wait first (lock the monitor mutex). After change the states, It will lock the resources mutex to check out the resources. If there are enough resources, task

will try to take the resources and change states to run. After run time amount, the task will return resources and change states to idle. All the action about change and read public resources have lock the mutex first and unlock it after using.

There are many small function to do specify thing, most are easy to understand by their names and there are also comments in the code.

Project Status

All functions are working. Not really have huge problem in this assignment. But since it is a multithread function, debug will use more time than normal functions.

Testing and Results

I have built my own test case with task that no need resources and both the own test case and example works will with my function.

Acknowledgements

Both 2 textbooks;

Lab code;

http://man7.org/linux/man-pages/man2/nanosleep.2.html

https://stackoverflow.com/questions/51806983/warning-return-with-no-value-in-function-returning-non-void-what-should-it