

Georgia State University
CSc 4320/6320 Operating Systems
Spring 2018

Programming Assignment 2
Due Time: 11:59 PM, February 13

Objective:

To understand and experiment with thread creation using Pthread library in Linux.

Problem Statement:

Design and implement a Sudoku Solution Validator using Pthreads library in Linux virtual machine.

Steps:

- Download the incomplete version of *hw2.c* from iCollege
- Read through Programming Project 1 of Chapter 4 in the textbook.
- Follow the suggestion in the textbook to complete the C program in order to check Sudoku puzzle using 11 children threads. In addition, you program should meet the following requirement
 - The 9x9 data grid to be tested are stored in two txt files, grid1 and grid2, which can be downloaded from iCollege
 - The name of the txt file will be the input to the program via command line, i.e., you can access the name of this file through `argv[1]` in your `main()` function. Then you can open the file and read the data grid from the file.
 - The output message stating whether or not the tested grid is a Sudoku puzzle should be finally printed to the screen.
- Compile the C source file using **`gcc -pthread -o hw2 hw2.c`**
- Use **`./hw2 grid1`** to test the first data grid and **`./hw2 grid2`** to test the second data grid
- Take a screenshot of the program output after you tested the two data grids.

Notes

- Since the data grid is shared between threads, it should be declared in the global data space before the main program. This would be true for any other data being shared among threads.
- Appropriate error checking of the command line is always a good practice for programmers. It is strongly encouraged because it also reduces grading error. (You can follow the examples in the textbook and the slides).
- Design your program in a clear and modular fashion.

Submission:

Submit the following to iCollege:

- The C source file *hw2.c*
- A report in PDF or Word that includes
 - The screenshot of your program output
 - A high-level description of major components/functionality (including data structures) used in the program and how they interact with each other to achieve the assignment task.
 - A copy of your C source code from *hw2.c* file
 - A discussion comparing the advantages and disadvantages when
 - Using 11 children threads as in your program
 - Using 3 threads (one for all rows, one for all columns, one for all 3x3 subgrids)
 - Using only one single child thread to do all checking

Failure to follow the submission requirement will cause 10% deduction in the score.