CPSC 3125, Operating Systems Lab Assignment

Lab 8

This lab is based on the file "thread_progs.txt" located at `https://github.com/ccc31807/CPSC-3125/blob/master/Labs/thread_progs.txt`. This text file contains the source code for seven programs taken from the text *Operating Systems: Three Easy Pieces*, which can be found on the book's GitHub repository.

1 Part One, Condition Variables

Examine the source code of these five programs listed below. Compile each of these five programs and run them. If you use the book's repository, you can compile all of them by running `make`. For each program other than `join_modular`, write a brief explanation of the output, the problem (or problems) that the program illustrates, and the issue that causess the problem or the solution. Please be specific.

For the last program, `join_modular`, write a *brief* documentation page for each data structure and function on the program. By "documentation page" I mean the typical documentation that you might expect using a man page (on Linux) describing the input values, return values, purpose, etc. A typical man page contains the following headings: name, synopsis, description, and return value.
See `https://man7.org/linux/man-pages/man3/pthread_create.3.html` for an example.

These are the five programs in Part One:

1. join_spin.c: Working solution but wastes CPU.
2. join_no_lock.c: What happens when you don't put a lock around the state change and signal
3. join_no_state_var.c: What happens if you don't have a state variable
4. join.c: A working solution
5. join_modular.c: A modularized version

2 Part Two, Producer Consumer Problem

Examine the source code of these two programs listed below. Compile each of these two programs and run them. If you use the book's repository, you can compile all of them by running `make`. Explain the problem illustrated by `pc_single_cv.c` and the solution in `pc.c`. Please be specific in your discussion.

These are the two programs in Part Two:

1. pc_single_cv.c: What happens if you only use one condition variable
2. pc.c: A working solution