CCPS590 Lab 4 – Processes VS Threads in Linux

Preamble

Last week we used **`fork()`** to spawn child processes. This week, you'll use **`clone()`** to spawn threads, which are also known as *lightweight* processes in Linux.

Lab Description

This lab comes with several accompanying C programs:

cloneProcess.c is a program in which the main process spawns a child process.
cloneThread.c is a program in which the main process spawns a thread.

Look at both, understand what they do. Notice that they only differ significantly in a single place – the arguments passed to the **`clone()`** function.

1) Compile and run cloneProcess.c. Your output should be (except for differing PIDs):

```
The variable was: 9
Part after clone has pid 10992
I am 10993 and my parent is 10992
The variable is now: 9
Read from the file: a
```

Why is the file closure and the variable modification made by the child *not* recognized by the parent? Why, when printed by the parent, does the variable have old value, and why is the file still open?

2) Compile and run cloneThread.c. Your output should be (except for differing PIDSs):

```
The variable was: 9
Part after clone has pid 11051
I am 11052 and my parent is 11051
The variable is now: 42
File Read Error: Bad file descriptor
```

Explain why the file closure and the variable modification ARE recognized (variable has new value, and file closed).

3) The third file given with this lab is fork_mpm.c. It should not be too hard to discern what it does if you did last week's lab. Check it out, compile it, run it.

Create a new file named clone_mpmProcess.c that accomplishes the same thing as fork_mpm, but uses **`clone()`** instead of **`fork()`**. Your output should be:

```
This is process(thread) 11501.
x+y=1
This is process(thread) 11502.
x+y=7
```

The best way to get started is to use cloneProcess.c as a guide. Trying copying the code in cloneProcess, and modifying it to do the same thing as fork_mpm.

4) Copy your clone_mpmProcess.c to clone_mpmThread.c and modify the latter so that it spawns a thread instead of a process. This one is a very simple modification. Your output should be:

```
This is process(thread) 11504.
x+y=1
This is process(thread) 11505.
x+y=8
```

Submission

For this lab you will submit your two files clone_mpmProcess.c and clone_mpmThread.c. You don't need to submit written answers to questions 1 and 2.

Labs are to be submitted ***individually***! Make sure your code is clean and easy to read.