

TP2 – Fork / Exec / Exit / Wait

IDU – INFO632

The goal of this session is to create new processes in C. Note : during this session you may need to access the libC man pages. To do so, you may have to use the “-S3” (section 3) option of the *man* command. *E.g.*, *man -S3 sleep* to get help on the C function “sleep” (“*man sleep*” without ‘-S3’ will give you help on the shell sleep command). You should have a look at least at the *wait*, *sleep*, and *exec* man pages.

1. Process chain

Write a C program that takes an integer n as argument and that creates a process chain of n processes. *E.g.*, with $n=1$ it should create one child; with $n=2$ it should create 1 child and the child process should create one other child; and so on. Wait a little bit to observe the chain in the console using the *ps* command.

*Help : you may need to use the `atoi()` (see “*man atoi*”) and the `sleep()` functions (see “*man -S3 sleep*”).*

2. Process tree

Same problem as the previous one, but instead of creating a chain create a binary tree : if $n=1$ the process creates two children, if $n=2$ it creates 2 children and each of the children create 2 children, etc. There again, wait a little bit to observe the chain in the console using the *ps* command.

3. Zombie

Create a process that should remain a Zombie during 10 seconds. Observe it using “*ps -l*” in the console.

*Help : you may need to use `sleep` and `wait`... recall that a process remains a zombie until its parents calls “*wait*”.*

4. Returned value

Write a program that creates a child process which returns a value (it can either be hard-coded or read using *scanf*). The parent process should wait for the end of its child and print the returned value.

5. Bonus: Multi-grep

We want to create a new command that will launch the unix *grep* command in parallel.

The new command should be called like this:

```
mgrep pattern file-list
```

This command should print the file names it received in arguments, and create one child process per file. Each child process should then execute the native *grep* command (see *man exec*).