



COMP3230 PA1 - Supplementary

Songlin Huang, Weiying Hou

Process Status in Linux

UNIX-like OS manages the process status by PCB (Process Control Block), and it expose some useful info in the `/proc` file system for each process (with pid) and itself

Overview

- General hardware info:
`/proc/cpuinfo`, `/proc/meminfo`
- Process specification:
`/proc/{pid}/stat` - pid, time
`/proc/{pid}/status` - readable

Reading `/proc`

We can access it as normal file, but read-only

```
file = fopen(filename, "r");  
fscanf(file, "%d", &foo_int);  
fclose(file);
```

More specification can be found on <https://man7.org/linux/man-pages/man5/proc.5.html>

Code Example: [Tutorial2-Process/2023-PA1-supplementary/readproc-example.c](#)

Process Termination in Unix/Linux

An extension of Page 20-22 of Lecture 2 - Process Abstraction.

Once a process terminates, all its resources will be cleared. But in UNIX/Linux, it involves two stages:

1. When a process terminates, **its PCB will be kept by OS** and will be kept as a zombie process.
2. When its parent comes and collect some status (optional) by wait API, its PCB will be cleared.

wait API family:

- (ROOT) **waitid(idtype_t idtype, id_t id, siginfo_t *infop, int options)**: powerful but hard to use, can wait a process to be zombie: **waitid(P_PID, pid, &info, WNOWAIT | WEXITED);**
- **waitpid(pid_t pid, int *_Nullable wstatus, int options)**: widely used, collect specific status.

More info on the wait API family: <https://man7.org/linux/man-pages/man2/wait.2.html>

Code Example: <Tutorial2-Process/2023-PA1-supplementary/waitid-example.c>

Two kinds of Termination

Process might terminates due to **(voluntarily) exit** or **(involuntarily) being signalled**

Exit

Example: `exit(0); / return 1;`

Verify by `WIFEXITED(status)`

Get exit status by `WEXITSTATUS(status)`

Code Example: [Tutorial2-Process/2023-PA1-supplementary/exit-status-normal.c](#)

Being Signalled

Example: Ctrl + C or `kill(pid, SIGKILL)`

Verify by `WIFSIGNALED(status)`

Get terminate signal by `WTERMSIG(status)`

Code Example: [Tutorial2-Process/2023-PA1-supplementary/exit-status-signal.c](#)