Report

Design

main.c

In charge of handling input and calling the function `scheduling` with different scheduling policy.

scheduling.c

- next_process Find next candidate process according to scheduling policy `FIFO`, `SJF`, and `PSJF`, by scanning through the process array. Return the index of the selected process. If no process is ready, return -1.
- scheduling Determine which process to execute next by calling `next_process`. Create, block and wake up a child process through function `create`, `block`, `wakeup` defined in `process.c`.
- rr_scheduling In order to achieve round-robin scheduling, an additional ready queue is implemented to find the next candidate process.

process.c

- unit_time Define a time unit.
- assign_cpu Designate the process to specific CPU by `sched_setaffinity` given the pid of the process and the core specified.
- create Use `fork` to create a child process which runs X units of time.
- block Stop a process from executing by setting the scheduling policy to `SCHED_IDLE`.
- wakeup Continue executing a process by setting the scheduling policy to `SCHED_OTHER`.

System Calls

The macro `SYSCALL_DEFINEx` is used to define new system calls.

The function `getnstimeofday` is no longer available in Linux kernel 5.6.7. Related new funcitons are `ktime_get_real` and `ktime_to_timespec64`.

Environment

- Virtual Machine: VMware Workstation 15 Player
- OS: Ubuntu-20.04
- Kernel Version: Linux 5.6.7