

I. Basic functionality and general questions

1. What is the main advantage of moving the scheduler out of kernel-mode?
 - Reduces the size of the micro-kernel
2. What is the main disadvantage of moving the scheduler to user-mode?
 - Security issues since now the user can interact directly with the scheduling process
3. Explain what is the operation performed when SCHEDULING_START is invoked. (check schedule.c in the same folder)
 - It's used when a process inherits its parent scheduling priority, includes quantum
4. What is the default quantum assigned to user-level processes?
 - Time slices of 200ms
5. What is the priority assigned to user-level processes? Others?
 - Users: 1 Others: -1
6. What is the function in charge of scheduling processes? (invoked at do_start_scheduling)
 - `schedule_process(struct schedproc * rmp, unsigned flags)`
7. Identify system files. Describe the main objective of each, and provide details of how it is implemented.
 - a. `/usr/lib/src/libsys/sys_schedule.c`
 - To pass the priority, end point, quantum slice and CPU number to the system call `SYS_SCHEDULE`
 - b. `/usr/src/kernel/system/do_schedule.c`
 - Schedule a process. If its valid it takes the given priority, quantum and CPU number and runs the process
8. Identify function `sched_proc (/usr/kernel/system.c)` and explain its purpose.
 - Schedules a process. Checks if its runnable and valid and schedules it

II. Advanced Features

1. What is the policy in MINIX to manage those processes that have exhausted all their quantum (out-of-quantum)? (follow the invocation of `SCHEDULING_NO_QUANTUM` in `main.c`)
 - If a process is in this case, the scheduler will add the process another level of priority to force processes with less priority to stay behind this process
2. Explain the purpose of the scheduling queues. (see Fig. 2)
 - The purpose of scheduling queues is to maintain a balance on the processes priority, which might change given time or other variables so the process will jump to the corresponding priority being changed
3. Describe the steps that the scheduler takes to increase the priority of a process. (see `balance_queues` in `schedule.c`)
 - Every 100 ticks the scheduler bumps down one priority a process if they run out of quantum. The function finds all the processes that passed through this and pulls them back up.

4. Describe the functionality of function `pick_proc` (see `/usr/src/kernel/proc.c`)
- Decides which process runs now. Always uses the run queues of the local CPU's, checks the processes that are ready in such queues and assigns their priorities in the task table.