Andy Qin

COEN 177 L

22 Feb 2022

Lab 7 Report

**Objective**

* Modify Minix 3 scheduler by adding some randomness in picking the lower priority processes
* Understand the behavior of kernel after changing scheduler algorithms

**Procedures**

1. Set up Vmware Minix 3 kernel with **setup vmware**, **minix-get-image**, **vmware &** sequence. After that, select “Minx3” option from the manager popped up and then log in with credentials.
2. Look for a specific file that carries out process scheduling
   1. Hint1: a function is responsible for “pick” a process and then “proc” it to the process table
   2. Hint2: a variable **q** is used to determine the priority of the scheduled process picked; priority goes from q = **0** to q = **NR\_SCHED\_QUEUES**
   3. Uses the **grep** tool inside the **/usr/src/kernel** folder to narrow down file options
      1. Try **grep pick, grep proc**, **grep pick | proc**, **grep “pick” “proc”**
         1. Narrow files down to proc.c, system.c, debug.c, table.c
      2. Try **grep q, grep NR\_SCHED\_QUEUES**
         1. Narrow files down to proc.c, debug.c, clock.c
      3. The intersection of the two lists are:
         1. proc.c and debug.c
      4. By the name, it is obvious that the file is **proc.c**
   4. Uses grep -n to find the line number containing the keywords in **proc.c**
      1. Try grep -n NR\_SCHED-QUEUES, and grep -n pick proc
      2. Find the function that selects the process of priority q as **pick\_proc(),** which returns the pointer to the next picked process in the process table.
3. Modify the behavior of the scheduler by adding randomness in the selection of q = priority for q >= 3

Text

Description automatically generated

* Added a 25% chance for selecting from lower priority then actual priority when q >= 3

1. Test the modified kernel
   1. Remove the old **proc.c** and add the newly modified **proc.c**
   2. Go back to **usr/src** folder and run **make world** to recompile the kernel
   3. If nothing goes wrong, reboot Minix 3 with **reboot** keyword

**Observations**

1. If nothing goes wrong, we should see that Minix 3 **is booting up with a visibly slower speed as compared to before.**

**2**. Wecan also see that the built-in **system calls (ls, cd, passwd) are operating slower** as well.