

**Exercise 23.1** Processes

1. Run **ps** with the options **-ef**. Then run it again with the options **aux**. Note the differences in the output.
2. Run **ps** so that only the process ID, priority, nice value, and the process command line are displayed.
3. Start a new **bash** session by typing **bash** at the command line. Start another **bash** session using the **nice** command but this time giving it a nice value of 10.
4. Run **ps** as in step 2 to note the differences in priority and nice values. Note the process ID of the two **bash** sessions.
5. Change the nice value of one of the **bash** sessions to 15 using **renice**. Once again, observe the change in priority and nice values.
6. Run **top** and watch the output as it changes. Hit **q** to stop the program.

**Solution 23.1**

1. 

```
$ ps -ef
$ ps aux
```
2. 

```
$ ps -o pid,pri,ni,cmd
  PID PRI  NI CMD
 2389  19   0 bash
22079  19   0 ps -o pid,pri,ni,cmd
```

(Note: There should be no spaces between parameters.)

3. 

```
$ bash
$ nice -n 10 bash
$ ps -o pid,pri,ni,cmd
  PID PRI  NI CMD
 2389  19   0 bash
22115  19   0 bash
22171   9  10 bash
22227   9  10 ps -o pid,pri,ni,cmd
```
4. 

```
$ renice 15 -p 22227
$ ps -o pid,pri,ni,cmd
  PID PRI  NI CMD
 2389  19   0 bash
22115  19   0 bash
22171   4  15 bash
22246   4  15 ps -o pid,pri,ni,cmd
```
5. 

```
$ top
```