Process Control

Process
Software program in execution is called process. Each process is identified by a process Identification number (PID). PID 1 is assigned to init, which is the first process that stands at boot time.

To show Process Tree in tree structure

```bash
pstree
```

List out processes running in system

```bash
ps
```

Process Status

<table>
<thead>
<tr>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>runnable</td>
</tr>
<tr>
<td>S</td>
<td>sleeping</td>
</tr>
<tr>
<td>T</td>
<td>stopped</td>
</tr>
<tr>
<td>D</td>
<td>uninterruptable sleep</td>
</tr>
<tr>
<td>Z</td>
<td>zombic</td>
</tr>
<tr>
<td>N</td>
<td>low priority process</td>
</tr>
<tr>
<td>&lt;</td>
<td>high priority process</td>
</tr>
<tr>
<td>w</td>
<td>No resident pages in the memory</td>
</tr>
</tbody>
</table>

Sending Signals to processes
TERM(15) soft signal
KILL(9) strong signal

```bash
kill -TERM <pid>
kill -15 <pid>
kill <pid>
```

Terminating process
Different ways of ending an application
1. Ending application normally
2. Pressing Ctrl+c
3. Kill –TERM <PID>
4. kill -9 <PID>

Altering Process scheduling priority
Maximum priority that can be assigned: -20
Minimum priority that can be assigned: 19
Default priority: 0
Running process with priority -10 (high) through nice command

```
nice -n -10 find /
```

Modifying process in execution with renice

```
renice -n 11 init
```

To view the background processes use jobs

```
jobs
```

Stopping/suspending a process

```
ctrl+z
```

**Resuming the stopped process**

Running resumed process in background

```
bg %<jobid>
```

Running resumed process in foreground

```
fg %<jobid>
```

**Monitoring Process**

**Locating for vulnerable files:**

Locate SUID and SGID files and stories named in /root/ stickyfiles:

```
#find / -tpe f -perm +6000 2>/dev/null >/root/stickyfiles
```

Locate world-writable files and store their named in root/world.writable.files:

```
find / ty -pe f -perm -2 2>/dev/null>/root/world.writable.files
```

**Controlling access to files**

1. create a user named shiba
2. create two files in shiba's home directory
3. prevent the payroll file from being deleted
   
   ```
   #chattr +i /home/shiba/payroll
   ```
4. verify that the attributes have been changed
   
   ```
   #lsattr /home/shiba/*
   ```
5. Try to remove the file
   
   ```
   #rm /home/shiba/payroll
   ```

**Monitoring processes**

**Top command**

```
top
```

<table>
<thead>
<tr>
<th>Key Letters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>sort by memory usage</td>
</tr>
<tr>
<td>L</td>
<td>load average display on/off</td>
</tr>
<tr>
<td>P</td>
<td>processor Usage</td>
</tr>
<tr>
<td>T</td>
<td>Time based sort</td>
</tr>
<tr>
<td>u</td>
<td>user based sort</td>
</tr>
<tr>
<td>k</td>
<td>lkik process</td>
</tr>
<tr>
<td>r</td>
<td>to renice sort</td>
</tr>
<tr>
<td>s</td>
<td>to update time</td>
</tr>
</tbody>
</table>

Targeted Audience: Students of Network and System Administration CSIT (TU), System Administration (Elective) BE Computer/BIT (Purbanchal University), MCS 22: Operating System Concepts and Network Management IGNOU, MCS 52: Network Administration and Programming. IGNOU
Display login and reboot history

<table>
<thead>
<tr>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>last</td>
</tr>
<tr>
<td>To display last reboot time</td>
</tr>
<tr>
<td>last reboot</td>
</tr>
</tbody>
</table>

To display all running progress

```
ps -ax
```

(for detail see man page)

To kill process use kill command (for detail see man)

```
kil -9 <process_id>
```

Display the average lode of CPU and time duration of system running

```
uptime
```