Chapter 10 - Job Control & Process Management

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Process

- Instance of a running program
- PID: Each process has a process identifier (1- 32768)
- PPID: Parent PID
- pid 0: schedule daemon
- pid 1: init process

```
$ ps [-l] # see own processes
$ ps -ef # see all processes
$ echo $$ # see current shell pid
```

Shell Scripts

- # : comments
- #! : sh-bang
  - Tell the kernel to run the program listed after the #!
- my.sh
  - #!/bin/cat
  - Hello World
  - ^d
- chmod u+x my.sh
- ./my.sh

Stopping Process

- Ctrl + C (^C)
  - Stops current process
- kill commands (send SIGNAL to process)

```
$ kill -l # list signal names
$ kill -9 pid # terminates process pid
$ pkill program_name # terminates process by name
$ pkill sleep #
```

/proc file system

- Contains a directory for active process named after PID

```
$ ls -l /proc/$$ # current process
$ ls -l /proc/1 # process pid 1
```

SETUID

- When a regular user runs a prorgram that has a SETUID bit, the effective UID is change to the UID of the program owner
- /usr/bin/passwd
  - If the file is part of the process started by a user, the process is able to progress with the permission of the file's owner
- /usr/bin/crontab

```
$ find / -perm -4000 # Find Special permission file using SETUID
$ chmod u+s myprog # Set special permission for myprog file for the user
```

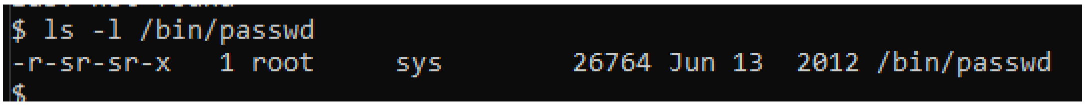
SETGID

- When a regular user runs a program that has a SETUID bit, the effective GID is changed to the GID of the program owner

```
$ find / -perm -2000 # finds file with SETGID bit set
$ chmod g+s myprog # adds setgid for file myprg
```

Example:

/bin/passwd



```
$ ls -l /bin/passwd
-r-sr-sr-x   1 root     sys        26764 Jun 13  2012 /bin/passwd
$
```

The file has SETUID set and with the permission of root the user is able to change its password. The root permission allows to write the password into the /etc/shadow file, which the user does not have access to.

Job Control

- Two types of process:
  - Foreground: Terminal occupied
  - Background: Release the terminal
- & ampersand
  - Start as background

```
$ sleep 60 & # starts sleep 60 seconds in background and does not occupy the terminal
$ jobs # shows background process
$ ps # shows foreground and background process
```

Job commands

```
$ jobs # list jobs
$ fg [%n] # change process to foreground
$ bg [%n] # change process to background
$ kill %n # kill process
$ kill -18 %n # stop process
$ kill -19 %n # resume process
$ kill -9 pid # kill process
```