Process Commands

UNIX is a multi-tasking operating system
- Multiple "processes" can be run at once
- Shell normally does not accept another command until current one completes

Background execution
- Place ampersand (&) at end of command

```
dchang@quake:~> sleep 2 &
[2] 8403
dchang@quake:~>
[2] Done sleep 2
```

- Command is assigned a process ID and a job number
- Once the process completes a "Done" message is sent
- Commands or programs that generate output will have output suspended, but might conflict
**ps [-a] [-l] [-u]**

Description: Displays information about current processes.
- Each process has a "process ID"

Options:
- [-a] All processes for everyone.
- [-l] Displays longer version
- [-u] Displays user oriented report

Examples:
```
ps -al
```

**jobs**

Description: Displays information on current jobs
- Each job has a "job number"
- State of each job is displayed ("Running" or "Suspended")
- "Active" job is identified with (+)

Example:
```
dchang@quake:~> jobs
[1]  + Suspended (tty output)        emacs
[2]  - Running                       sleep 10000
```

**<ctrl-z>**

Description: While running some programs, <ctrl-z> will cause the program to suspend and be placed into the background. The shell will then be available for more commands.
**bg**  `[[jobnumber]]`

Description: Continues a suspended job in the background
- You must use square brackets around "jobnumber"
- If "jobnumber" is not specified the active job will be used
- If the process referenced outputs to screen it may not be able to run in the background

Options:
- `[[jobnumber]]` The job number you want to run in the background. You must include square brackets around the actual number.

**fg**  `[jobnumber|commandname]`

Description: Brings a suspended job back into the foreground
- Do not include square brackets around "jobnumber"
- If "jobnumber" is not specified the active job will be used

Options:
- `[jobnumber]` The job number you want to run in the background. Do not include square brackets around the actual number.
- `[commandname]` Instead of the job number, the command itself may be used. This will fail if more than one job uses the same command
**kill** *pid*

Description: Stops a process running in the background

Options:
- [pid] The process ID of the process to kill.

**at** [-f *filename*][-m] time [date]

**at** -l

**at** -r *job*

Description: Schedules a command to be run at a particular time. Great for running CPU-intensive processes at a later date.

Options:
- [-f *filename*] Name of a file that contains the command. Otherwise you must enter commands manually, ended with <ctrl-d>.
- [-m] Sends an electronic message when completed
- [time] Indicates when you want to execute
- [date] Indicates what day you want to execute on
- [-l] List the names of commands that are already scheduled
- [-r *job*] Cancels a job previously scheduled

Example:
- `at midnight <r>`
- `at> lpr Plov260 big.report <r>`
- `at> ^d <r>"
script  [-a][filename]

Description: Starts a new instance of the shell, then stores the conversation you're having with UNIX in a file. To end recording, use the command "exit".

Options:
• [-a] Appends information to the file, preserving any existing contents
• [filename] File in which to store output

Examples:
  script -a sessionlog