# Session: File System and Commands
# Topic: Process Control

Daniel Chang

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
dchang@quake:~>
```

- 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