Basic Unix

Biochemistry laboratories - 201
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Find this document here (short URL) today: http://go.wisc.edu/4iu8u5

*Note*: To see as slides click on "Gift icon" at the top right. To revert back to page view click on "book icon" when on the first slide.

Set-up

- check your name on the attendees list
- choose an iMac
- login with your NetID (@wisc.edu is not necessary)
- If this is the first time this Mac "sees" you it will go through a quick set-up: simply skip using "Apple ID"

Finding Terminal on the iMac

Method 1

- Click on the "Finder"

  ![Finder icon](image1)

  at the bottom left of the "Dock" on the bottom of the screen. This will open a new window.
- On the left click on "Applications"
- In the alphabetical list open folder Utilities
- double click to open Terminal

  ![Utilities icon](image2)
  ![Terminal icon](image3)
Method 2

- *Spotlight Search:* Click the magnifying glass at the top right corner of your screen
- type Terminal
- press the return key

Web Linux Terminal

Today we'll work in Mac OS Terminal.

You can try the *Linux* option later within a web-based terminal

<table>
<thead>
<tr>
<th>Choice</th>
<th>URL</th>
</tr>
</thead>
</table>

Unix Exercise Files

Hand-outs are in HTML format:

- Basic Unix Part I: [Unix001.html](https://biochem.wisc.edu/sites/default/files/facilities/bcrf/tutorials/unix/basic_unix/unix001.html)
- Basic Unix Part II: [Unix002.html](https://biochem.wisc.edu/sites/default/files/facilities/bcrf/tutorials/unix/basic_unix/unix002.html)

*Note:* other formats and other tutorials are at [https://biochem.wisc.edu/bcrf/tutorials](https://biochem.wisc.edu/bcrf/tutorials)

Class evaluation

After class:

- fill-in the one page "evaluation" form for this class

The evaluation is anonymous. [Evaluation link on Qualtrics](https://uwmadison.co1.qualtrics.com/SE/?SID=SV_abfJhXcXXzbTMwd) or type: [http://go.wisc.edu/tgep55](http://go.wisc.edu/tgep55)

*Note:* Survey will be unlocked when workshops are held.
Hard drive file system

Root:

/
Command-line operation: The Shell

The prompt

$  

Your hard drive area
Your user space
whomai

Home directory
~

Print working directory (current directory)
pwd
Current and Parent directories

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Naming convention</th>
</tr>
</thead>
</table>
| ![Diagram](parent) | `../`  
*dot dot*
Parent directory: directory “above” containing the “current” directory. |
| ![Diagram](current) | `./`  
*dot*
Current directory |

Absolute and Relative path

Absolute: starts with / root level

Relative: relative to another directory

For example using

`. /
`../`
`../../`
`../../Documents`

etc.
List files

```
ls
```

Long list of home directory

```
ls ~
```

```
total 0

drwx------+  5 YOU AD\Domain Users   170 Mar 15 18:36 Desktop

drwx------+  3 YOU AD\Domain Users   102 Jun 19  2014 Documents

drwx------+  5 YOU AD\Domain Users   170 Mar 15 18:36 Downloads

drwx------@ 43 YOU AD\Domain Users  1462 Mar 15 18:36 Library

drwx------+  3 YOU AD\Domain Users   102 Jun 19  2014 Movies

drwx------+  3 YOU AD\Domain Users   102 Jun 19  2014 Music

drwx------+  3 YOU AD\Domain Users   102 Jun 19  2014 Pictures

drwxr-xr-x+  5 YOU AD\Domain Users   170 Jun 19  2014 Public
```
Groups and Privileges

In order to organize privileges and permissions the Unix system is designed around the following definitions:

<table>
<thead>
<tr>
<th>User group</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>user</td>
<td>A user of the computer. Your specific user name is shown with <code>whoami</code>.</td>
</tr>
<tr>
<td>group</td>
<td>Multiple users can be assembled into a group e.g. from the same lab. The system administrator of the computer will create the group.</td>
</tr>
<tr>
<td>others</td>
<td>This is &quot;anyone&quot; else; on older system this was called &quot;the world&quot;.</td>
</tr>
<tr>
<td>all</td>
<td>Contains everyone including user, group and anyone but not present in this listing.</td>
</tr>
</tbody>
</table>

Table: Definitions of user groups. In the listing above they belong to user **YOU** and group **AD\Domain Users**.

Privileges

<table>
<thead>
<tr>
<th>Privilege</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>This is a directory</td>
</tr>
<tr>
<td>r</td>
<td>The file can be read.</td>
</tr>
<tr>
<td>w</td>
<td>The file can be written or even overwritten.</td>
</tr>
<tr>
<td>x</td>
<td>The execute privilege. For a directory it means its content can be listed.</td>
</tr>
<tr>
<td>-</td>
<td>The privilege within that column is not granted.</td>
</tr>
</tbody>
</table>

Table: Privilege tags
Standard Input/Output streams

<table>
<thead>
<tr>
<th>Handle</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>stdin</td>
<td>Standard input</td>
</tr>
<tr>
<td>1</td>
<td>stdout</td>
<td>Standard output</td>
</tr>
<tr>
<td>2</td>
<td>stderr</td>
<td>Standard error</td>
</tr>
</tbody>
</table>

Table: Understanding I/O streams numbers

Variables

water  wine  juice

The glass content can vary. The glass is the variable, the content is the variable value.
Separating the container and the content:
'glass' is the container 'glass' is the content and can vary.