

1. Connecting via a terminal to the server:

a. Remotely:

```
ssh username@ccarh.stanford.edu
```

Using X-windows:

```
ssh -Y username@ccarh.stanford.edu
```

b. From Windows XP computers in the Lab

Open “Cygwin” which is a black “C” icon with a green triangle at the bottom of the screen. Resize the black window which appears if you want a larger window (*before* logging in). Then follow the instructions for remote connections above.

In order to connect via X-windows, type “**startx &**” in the terminal (black window) before connecting to the server, and then type the “ssh -Y” command in the white terminal which appears.

c. From the OS X computer in the Lab

Open the Terminal.app which is located in Applications/Utilities of the Finder (or on the Dock). Then follow the remote connections above. X-windows would need to be started first for x-window connections.

Note: Users of the CCRMA computer system can access the Humdrum Toolkit by adding these lines to a file in their home directory called **.cshrc**:

```
if ( -r /usr/ccrma/package/humdrum/init/ccrma/humdrum-ccrma.csh ) \  
    source /usr/ccrma/package/humdrum/init/ccrma/humdrum-ccrma.csh
```

Do not put spaces or tabs after the backslash at the end of the first line.

2. Survival Unix Commands:

Once you connect to the server and login, you can run Unix commands. Useful commands for basic navigation of the file system:

- **ls** — will list the files in the current directory. I like using “ls -asCF” which adds four options: -a (show all files), -s (list the size of the file) -C (display the files in multiple columns) and -F (show the function of a file with a character marker after the filename, particularly * for executable programs, and / for directories). You can create an alias for a longer command, try typing: `alias myls="ls -asCF"` and then type `myls` as a command to the terminal.
- **cd** — change directory. type “cd dirname” to change the current working directory to a directory called dirname which is listed in the current directory when typing the “ls” command above.
- **pico** — is a simple text editor which does not require any (or only a few minutes) of training to use. You should become familiar with either **vi** or **emacs** if you are not already. (See chapter 5 of Paul Cobbaut’s book mentioned below for learning vi (or rather vim which is a newer version of the original vi editor).
- If you are not familiar with command-line Unix tools or want a review, then I would suggest “Linux Training” by Paul Cobbaut: <http://www.cobbaut.be/lt/LinuxTraining.pdf>, particularly sections 1.5, 2, 3, 4, 11, 12 and 13. Also, chapters 8, 16, 24 and 32 of the Humdrum User’s guide relate Unix shells (command-line terminals) to use with Humdrum tools.

3. Humdrum data on the Server:

- Copied into your home directory is a set of Humdrum data files stored in a directory called “**scores**”. These are the traditional set of Humdrum files used in the class, but which may be more up-to-date on <http://kern.ccarh.org>.
- Also, there is a directory called “**kernscores**” which connects directly to the kernscores website where you can store data files for access through the website as well as from the command-line (useful for listening to MIDI versions of the Humdrum files, viewing automatically generated notation of the data files, or viewing keyscales of the data). Online browsing of the files you place into the kernscores directory:

<http://kern.ccarh.org/cgi-bin/ksbrowse?l=/ccarh/class/2009>

- To copy a set of files from kernscores to your account, the easiest way is using “wget”. For example, to copy data files for Joplin’s ragtime music:

<http://kern.ccarh.org/cgi-bin/ksbrowse?type=collection&l=/users/craig/ragtime/joplin>

Right click on the “Z” icon on the above page, and copy the link location it points to, then type:

```
wget 'xxx' -O joplin.zip
```

Replacing the string xxx with a paste of the copied link:

<http://kern.ccarh.org/cgi-bin/ksdata?l=/users/craig/ragtime/joplin&format=zip>

Then unzip the data: “unzip joplin.zip” which will create a directory called “joplin” which contains 45 Humdrum files.

4. Running Humdrum Tools on the Server:

- download the Joplin rags as described in the above section (into your scores or kernscores directory or anywhere else you want to put them).
- Type “key -h”. This will display a short description of the Humdrum key command which estimates the musical key of a data file based on a count of the pitch-classes present in the data.
- Type “key mapleleaf.krn”. The key program will report what it thinks the best key is to fit the composition.
- Type “key -a mapleleaf.krn” to list all of the possible candidate keys and a measurement score for their suitability.
- Type “key -f mapleleaf.krn” to list a count of each pitch-class duration represented in the composition (by whole notes).
- What does “key *.krn” do?

5. Assignment for next week:

Select one of the following humdrum commands to present for ~5 minutes to the rest of the class (how to use the program, what its options are, what it might be useful for). List of suggested commands to choose from: *scramble*, *yank*, *rid*, *trans*, *timebase*, *extract*, *assemble*, *key*, *mint*, *hint*, *freq*.

- **Useful Links:**

<http://humdrum.ccarh.org> = list of Humdrum Toolkit and data resources.