CSE 220 – Systems-Level Programming Recitation

Introduction to Sparky

What is Sparky?

- Sparky is a server on campus that runs a UNIX like operating system called Solaris.
- We will use Sparky to submit all of the programming assignments for CSE220.
- We will use Sparky to test our C programming assignments before we submit them for grading.
  - Make sure your assignments work on Sparky.
  - If they work on your computer but **not** Sparky **no one cares!**
  - MAKE SURE YOUR ASSIGNMENTS WORK ON SPARKY!

Getting an account for Sparky

- Everyone registered to the class should have an account already created for them.
- The login information should be your netid and password.
- If you can’t log into sparky contact the main library sinc site.

Logging into Sparky

- The method you use to connect to Sparky will depend on the operating system you are currently using (Windows, OSX, *nix).
- If you don’t have a personal computer to use, you can also use the translab computers in the CS building (Room 2120, Code: 2-7-6-8-4). Note that you will need CS credentials to log into these machines.

Logging into Sparky

- To log into sparky we will connect to it using SSH.
- There are multiple SSH clients that can be used to connect to Sparky.
- The next few slides will share some of the most common ways people connect via SSH.
  - OSX: built-in terminal
  - Windows: GUI Client or CYGWIN

Logging into Sparky - Windows Options

1. Using your netid you can obtain the windows GUI Client - SSH Secure Shell from SoftWeb.

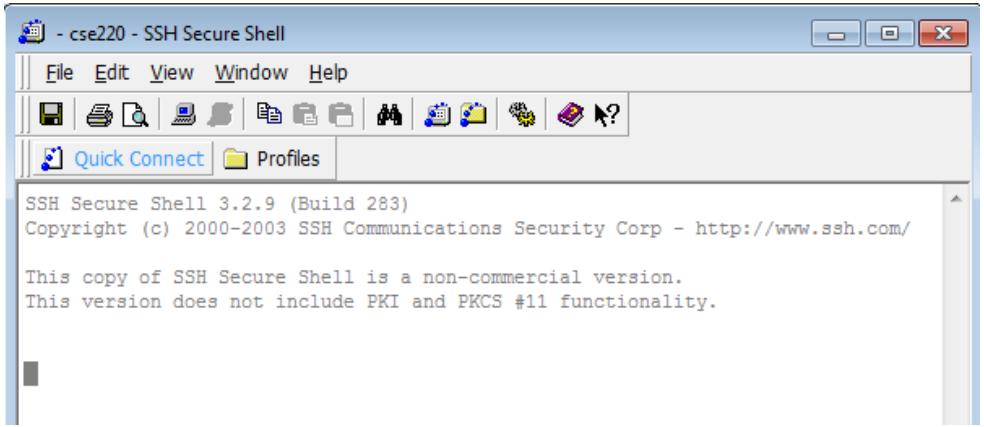
2. Download and install  CYGWIN (this will also give you a head start for the C assignments). CYGWIN is a project that attempts to bring a UNIX like environment to Windows (which makes it similar to the Sparky environment as well)

Windows - SSH Secure Shell Client

- After installing the GUI client you should now have SSH Secure Shell Client and SSH Secure File Transfer installed on your system.
- Lets focus on SSH Secure Shell Client first.

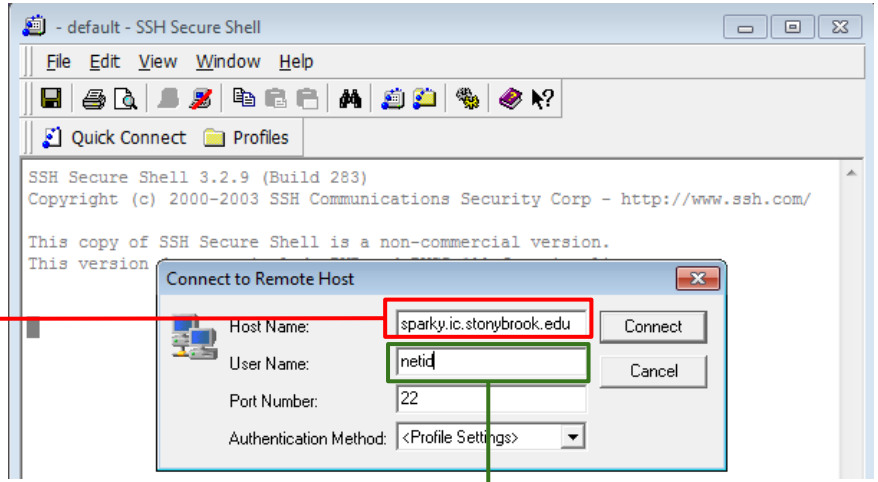
Windows - SSH Secure Shell Client

- After starting up SSH Secure Shell Client click the quick connect button.



Windows - SSH Secure Shell Client

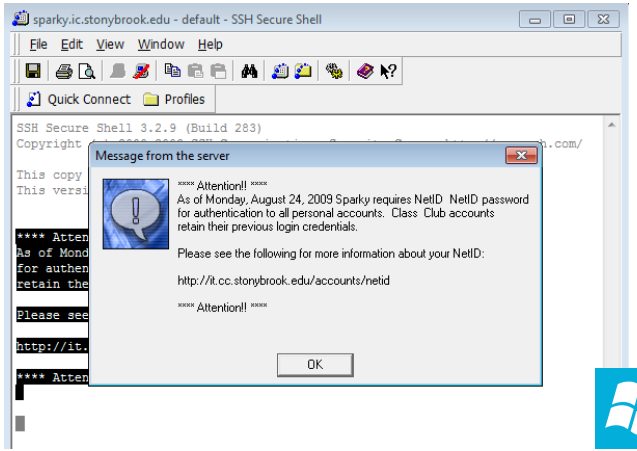
Location of Sparky:
sparky.ic.stonybrook.edu



This is your netid

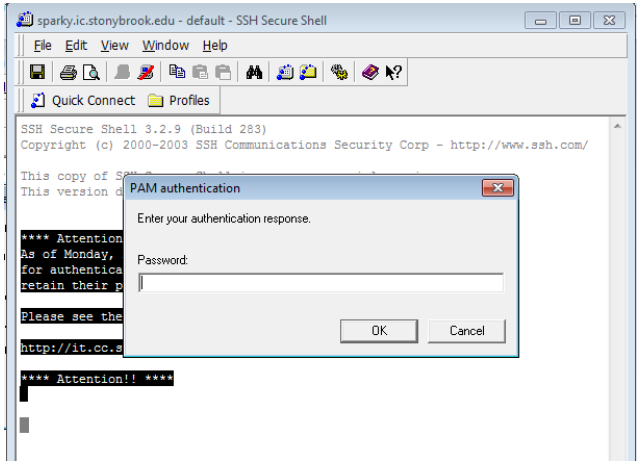
Windows - SSH Secure Shell Client

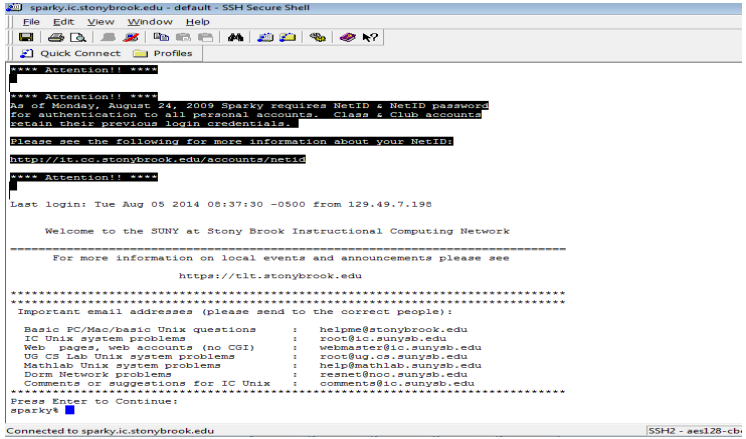
- After you press connect you may see a message about accepting an RSA key. Select yes and continue.
- If all went well you should be prompted with a msg from the server.
- Note that if you take to long while reading these instructions, it might say you became disconnected. Just try to connect again.



Windows - SSH Secure Shell Client

- Enter your netid password when prompted
- After entering your password you should see the shell prompt: **sparky$**

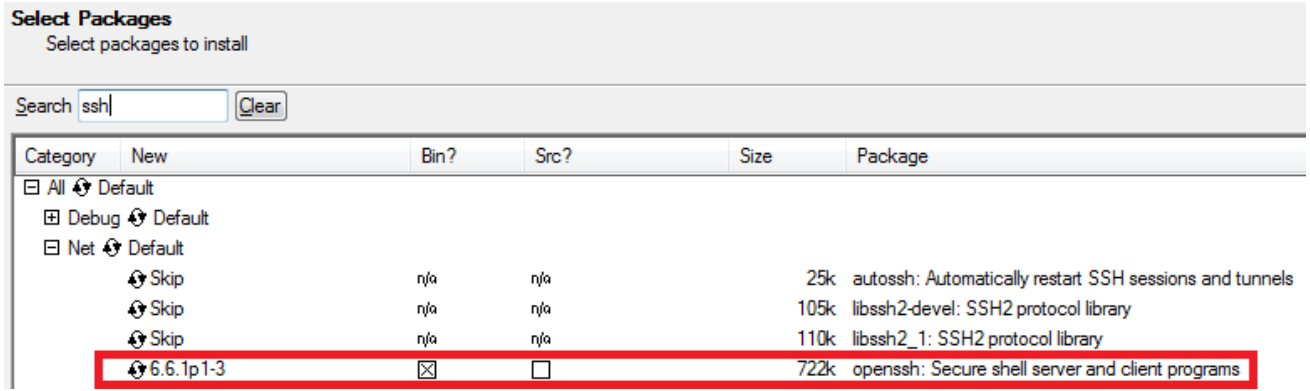


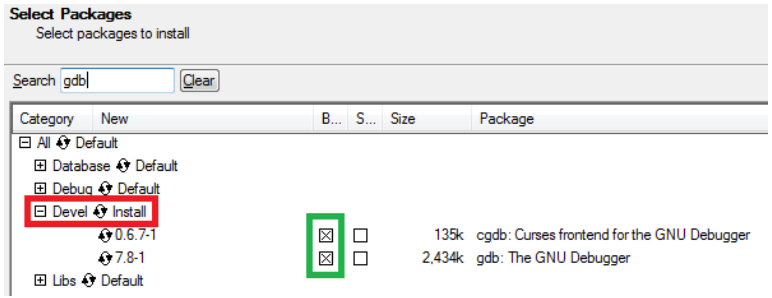


Windows - CYGWIN

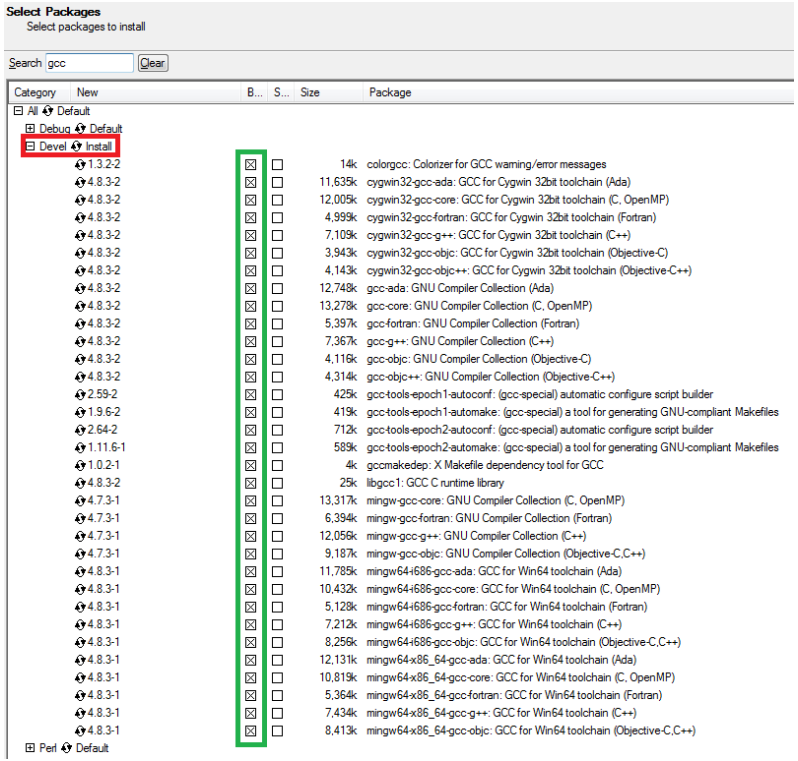
- When installing  CYGWIN you should at some point be presented with a page to select what programs you want to install.
- Look for the program SSH (SCP comes with the SSH download) and then wait a long time for things to download.
- You might also want to look for the programs GCC and GDB so you dont have to do this again for the C segment of the class.

Windows - CYGWIN





Windows - CYGWIN



Logging into Sparky - OSX

- OSX is a UNIX like operating system which comes with the traditional command line tool SSH.
- To access this tool you simply need to open up your terminal.
- If you type **`ssh`** and press enter, you should be presented with the usage message

```
usage: ssh [-1246AaCfgKkMNnqsTtVvXxYy] [-b bind_address] [-c cipher_spec]
           [-D [bind_address:]port] [-E log_file] [-e escape_char]
           [-F configfile] [-I pkcs11] [-i identity_file]
           [-L [bind_address:]port:host:hostport] [-l login_name] [-m mac_spec]
           [-O ctl_cmd] [-o option] [-p port]
           [-Q cipher | cipher-auth | mac | kex | key]
           [-R [bind_address:]port:host:hostport] [-S ctl_path] [-W host:port]
           [-w local_tun[:remote_tun]] [user@]hostname [command]
```

Logging into Sparky - OSX & CYGWIN

- If you are using the Windows GUI tool these instructions will **NOT** apply to you.
- Open up your shell (CYGWIN terminal or your OSX terminal)
- Type the following command:

```
ssh user@sparky.ic.stonybrook.edu
```

- where user is your netid

Logging into Sparky - OSX & CYGWIN

- You may get a message that looks like the following:

```
The authenticity of host 'sparky.ic.stonybrook.edu
(129.49.1.3)' can't be established.
DSA key fingerprint is 43:41:7b:1b:58:53:d8:f1:55:9f:aa:
0a:f0:5f:42:b1.
Are you sure you want to continue connecting (yes/no)?
```

- Type **`yes`** and press enter.

Logging into Sparky - OSX & CYGWIN

- After typing **yes** you should see:

```
**** Attention!! ****
As of Monday, August 24, 2009 Sparky requires NetID & NetID password
for authentication to all personal accounts.  Class & Club accounts
retain their previous login credentials.
Please see the following for more information about your NetID:
http://it.cc.stonybrook.edu/accounts/netid
**** Attention!! ****
PAM authentication
Password:
```

- Type in your password; Nothing will show as you type.

Logging into Sparky - OSX & CYGWIN

- If all went well you should see a bunch of text scroll by and eventually a prompt that says: **`Press Enter to Continue:`**
- Press enter. You should now see the Sparky command line prompt: **`sparky%`**

Logging into Sparky - OSX & CYGWIN

- Type **bash** and press enter.

```
bash-2.05$
```

- Note that bash is not essential and you don't have to use it.
- If we do use bash though we can get features such as tab completion and enhanced shell scripting.
- To quit bash simply type **exit**

You should now be able to LOGIN to Sparky using your computer

Learning the command line

- To interact with Sparky (and other unix like systems) we need to use the command line and the command line utilities.
- Learning the basic commands that are about to be mentioned is essential to being able to submit your homework on Sparky.

Learning the command line

- Using the command `ls` we can list all files in our current directory. (Output below will be different for you)

```
bash-2.05$ ls
cse220hw cse310hw helloworld.c
```

- Unfortunately the shell on Sparky does not color code the `ls` results by default. So it is difficult to determine if these are directories or files.

Learning the command line

- To make ls display more information we can use the **-l** option. (Output below will be different for you)

```
bash-2.05$ ls -l
drwxr-xr-x 2 cse220 4911 512  Oct 21  2012 cse220hw
drwxr-xr-x 2 cse220 4911 512  Dec  6  2013 cse310hw
-rw-r--r-- 1 cse220 4911 1589 Apr 25 14:52 helloworld.c
```

- Theres a lot of information here but what is important is the **drwxr-xr-x** the **d** means that this file is a directory.
- The rest of the information in **drwxr-xr-x** is related to the UNIX permissions of the file.

Learning the command line

- The next command we should learn is **`mkdir`**.
- This command makes a new directory.
- If we type **`mkdir test`** and then type **`ls`** you should now see test listed.

Learning the command line

- To change directories into your newly created test directory type: `cd test`
- Now if we type `ls` we should see no files (because we didn't put any into this directory yet.)
- To make a new blank file we can use the `touch` command. `touch newfile.txt` will create a new file with the given name.

Learning the command line

- Typing `ls` should now show the file newfile.txt
- To remove the file we can use the command `rm`

  ```
  rm newfile.txt
  ```

- Now if you type `ls` the file should no longer be there.
- If we type the command `pwd` it should show your present working directory within the file system.

Learning the command line

- To navigate back to where we came from we can type `cd ..` to go back one directory or if you are lost you can simply type `cd ~/` (or just `cd`) to return back to your home directory.
- Navigate back to your home directory . To delete the test directory we need to use the command `rm -r test`
- Make note of the special `-r` flag, this recursively deletes the contents of the folder. Without it we cannot delete the directory. (Try to run the command `rm test` without the `-r`)

Learning the command line

- Another essential command we need to know is `mv`.

  ```
  mv helloworld.c test/
  ```

- The `mv` command allows us to move files and directories to different locations on the file system.
- We can also use the `mv` command to rename files.

  ```
  mv helloworld.c test.c
  ```

- If you type `ls` you will no longer see `helloworld.c` but instead `test.c`

Learning the command line

- If you want to learn how to use commands you are unfamiliar with or just forgot how a command works you can use the `man` command to get the manual.
- Simply type for example `man ls` and you will be taken to the documentation about the `ls` command.
- Press the letter `q` to quit.
- You can even type `man man` to see documentation about the `man` command!
- Click here to see a cheat sheet with some common UNIX commands.

Getting your file on Sparky

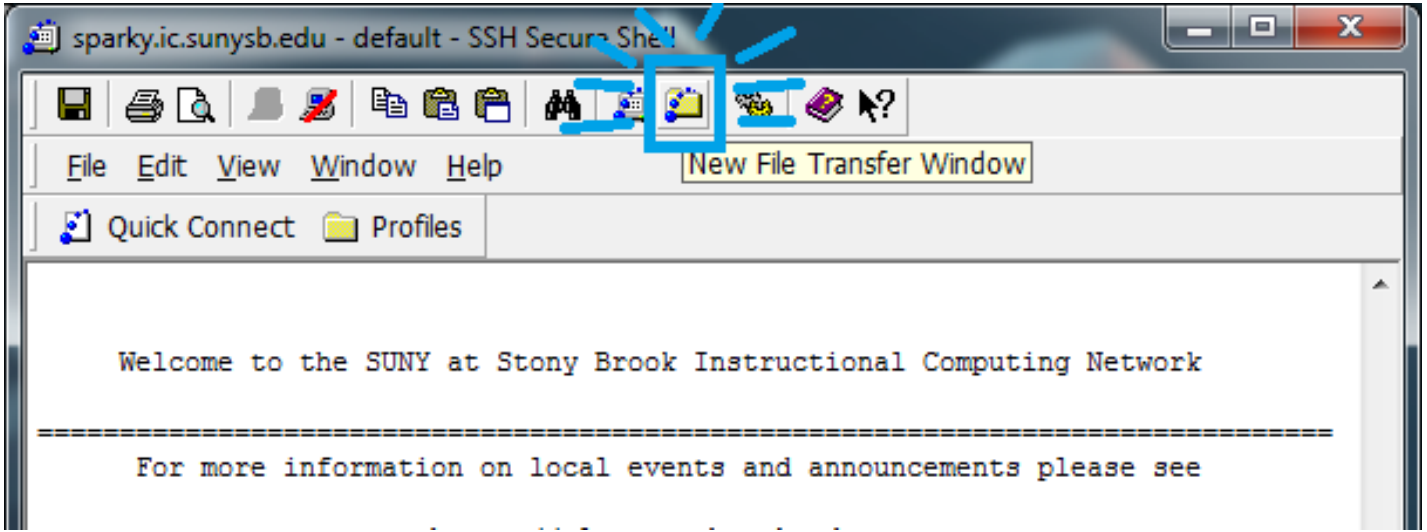
- Unless we do all of our work on Sparky we need a way to get our files from our machine to Sparky.
- The most common way to do this is using the `scp` command.

```
$ scp file.txt user@sparky.ic.stonybrook.edu:.
```

- The user should be your netid.
- file.txt is any file that you want to transfer over the network to Sparky.
- Make note of the **:.** at the end of stonybrook.edu
  - If you don't have this the file will not transfer over to Sparky.

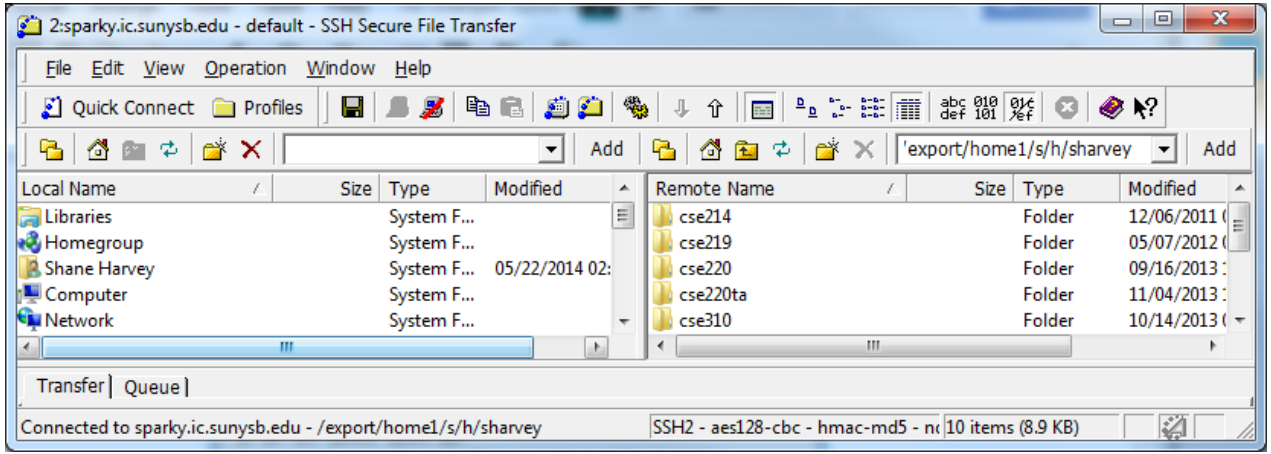
SSH Secure Shell - File Transfer

- After logging into Sparky click **`New File Transfer`**.



SSH Secure Shell - File Transfer

- A new window should appear.
- Left is your filesystem, right is remote file system.
- Use like Windows Explorer (copy/paste, drag & drop, etc.)



Sparky homework submission script

- Now that we are logged into Sparky one of the tasks we will use Sparky for is submitting homework.
- Either copy a file using **`scp`** or make a file on Sparky using the **`touch`** command.
- To use the homework submission command type:

```
$ ~cse220/submit
```

Sparky homework submission script

- Make sure you entered the correct section number.
  - If you submit to the wrong section you will lose points.

```
Welcome to the CSE220 project submission program.


What section are you in?
(Note: There is a penalty for submitting to the wrong section.)
Valid sections are:
1 2 3 4 5


>
```

Sparky homework submission script

- After entering your section number you should see:

```
Please choose one of the following:

1) Submit your project.
2) Check on your current submissions.
3) Exit.

Please enter the number of your choice.
>
```

Sparky homework submission script

If you choose option 1, you should be presented with a very long message about academic dishonesty and then eventually you should be prompted for a file. If we submitted sample.c and it contained 3 lines of text this is what it would look like.

```
Please enter the name of the file you wish to submit.
This should be a .c file for C code, or a .asm file for MIPS assembly
NOTE: THIS SUBMISSION WILL OVERWRITE ANY PREVIOUS SUBMISSION!
> sample.c
A file with 3 lines was successfully submitted.
```

Sparky homework submission script

You can then use option 2, to check the status of your submission. If you have not submitted an assignment or it failed you would see:

```
Unable to locate a submission for this assignment.
```

If you successfully submitted the sample.c you should see:

```
A file with 3 lines was successfully submitted.
```

Sparky homework submission script

Using option 3 exits the submission program, bringing you back to the shell.

This concludes the tutorial on sparky. If you don’t understand or need help please ask questions on piazza or come to office hours.