

**CSCI 1411-003**  
**FUNDAMENTALS OF COMPUTING LAB**  
**(FALL 2015)**

Anh Nguyen M.Sc

Lab Introduction

# Introduction

2

- **Course:** CSCI 1411 – 003  
Fundamentals of Computing Lab
- **Instructor:** Anh Nguyen
- **Office Hours:** Mondays – Wednesdays  
(09:00am – 10:00am)
- **Office Location:** LW-822 (MNS Lab)
- **Email:** [anh.t4.nguyen@ucdenver.edu](mailto:anh.t4.nguyen@ucdenver.edu)
- **Website:**  
[http://cse.ucdenver.edu/~anhnguyen/Fundamental Computing Lab.html](http://cse.ucdenver.edu/~anhnguyen/Fundamental_Computing_Lab.html)
  - ▣ [ucdenver.instructure.com](http://ucdenver.instructure.com) (Canvas)

# Objectives

3

1. Introduction
2. Logging into a computer / CSE Unix Servers
3. Unix environment: Terminal (PuTTY)
4. Trying some of the Unix commands
5. Uploading a C++ source file
6. Compiling and Running a C++ program
7. Logging out and terminating a session

# Agreement Form

4

- Require a signature on the Pre-requisite / Co-requisite Agreement.
  - ▣ Pre-requisite: **Freshman status**
  - ▣ Co-requisite: **CSCI 1410 Fundamental of Computing**

# CSCI 1411 Canvas Site

5

- Announcements
- Syllabus/Schedule
- Labs and Assignments (Modules)
- Canvas for Homework Submissions  
(do NOT need to use VPN for Canvas)

# Course Introduction

6

## Goals

- To gain skills in computer programming with the C++ language using a UNIX operating system

## Assignments

- Each **pre-lab** must be submitted at the beginning of class and turned in as **hard-copy**.
- Each **lab** must be completed and turned in **by 01 week after assigned**.
- All **lab** work must be turned in **on Canvas**.

# Course Introduction

7

## Grading Policy

- 14 Labs worth 40 points each:
  - Pre-lab assignments worth 5 points (due at the start of the class)
  - Programming component worth 35 points (in details see syllabus)
  
- No exams

**PLEASE TAKE THIS COURSE SERIOUSLY !!!**

# Course Introduction

8

## Grading Policy

- Pre-lab assignments:
  - Any late submission **during 3 days** after its deadline will be
    - turned in as hard-copy
    - taken **02 points** away
  - Any late submission that is **later than 3 days** will not be considered.



# Course Introduction

## Grading Policy

- Lab assignments:
  - Many versions of the submission can be uploaded. Only the FINAL one will be graded.
  - Any late submission **during 3 days** after its deadline will be taken **05 points** away.
  - Any late submission that is **later than 3 days** will not be considered.

# How to Access Windows & Mac PCs in Lab

10

## Lab PC login

- ❑ **User ID** and **Password** are the same as you use to log into the UCDAcess portal and your UCD email account.
- ❑ Note you will using this same account to log into the Unix server.

# CSE Unix Servers Problems

11

## Contact for problems involving your CSE account.

- Helpdesk system: [csehelp.ucdenver.pvt](https://csehelp.ucdenver.pvt)
- Or e-mail [csehelp@ucdenver.edu](mailto:csehelp@ucdenver.edu)

# How to Get PuTTY

12

## **PuTTY – A secure shell access client**

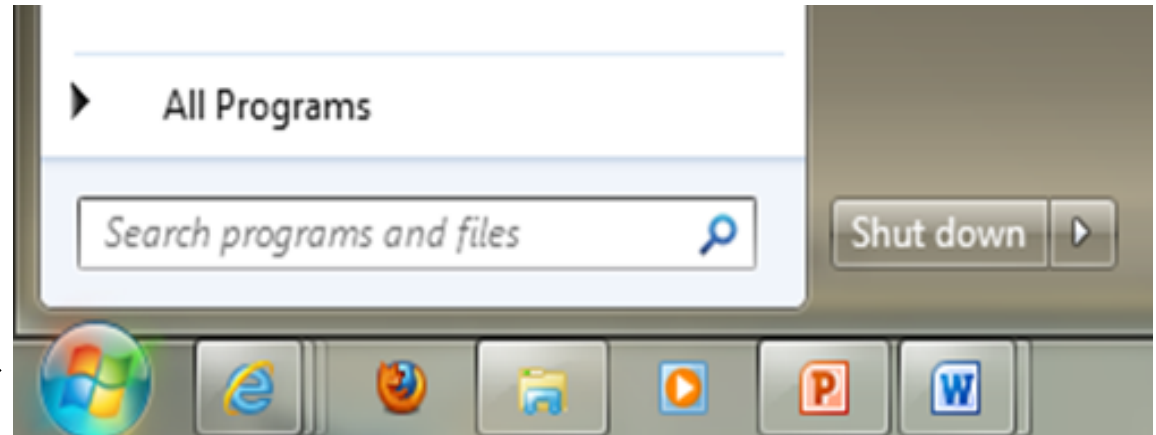
- ❑ Allows for remote terminal access to the Unix grid
- ❑ <http://www.putty.org/>
- ❑ Already installed on the Lab Computers

# How to Access the CSE Grid Terminal

13

2) All programs →

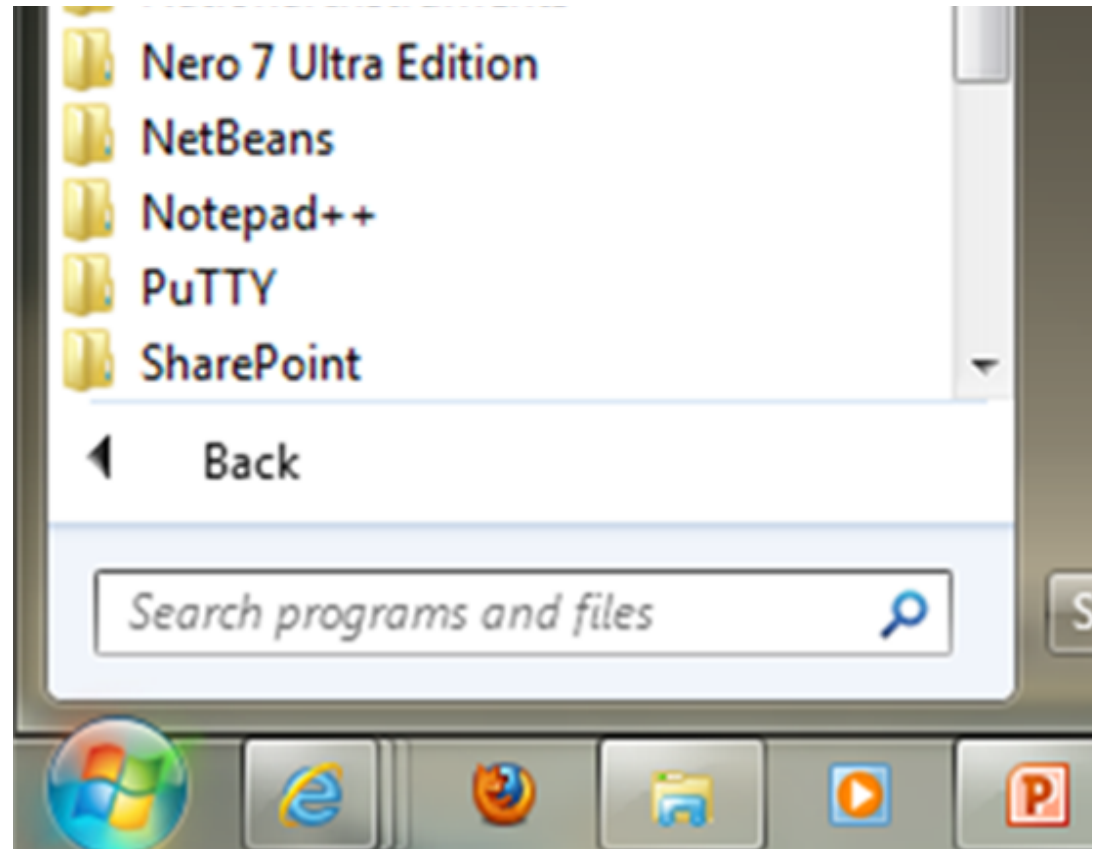
1) Start →



# How to Access the CSE Grid Terminal

14

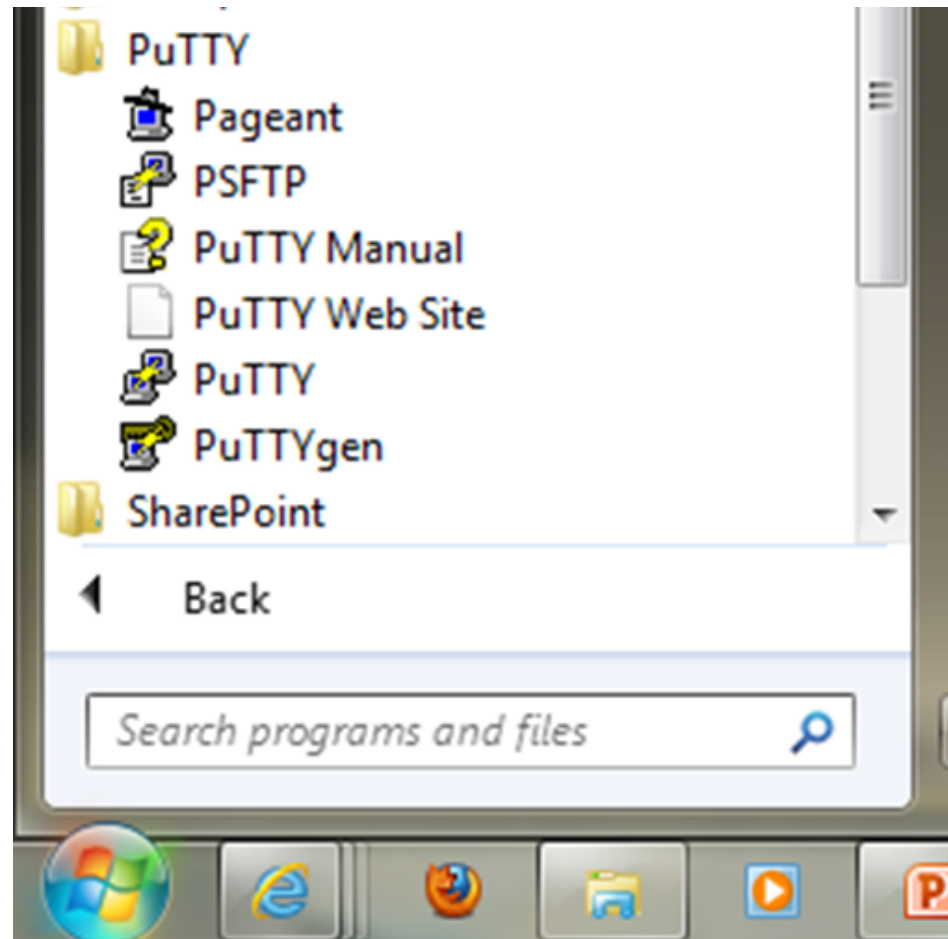
3) PuTTY →



# How to Access the CSE Grid Terminal

15

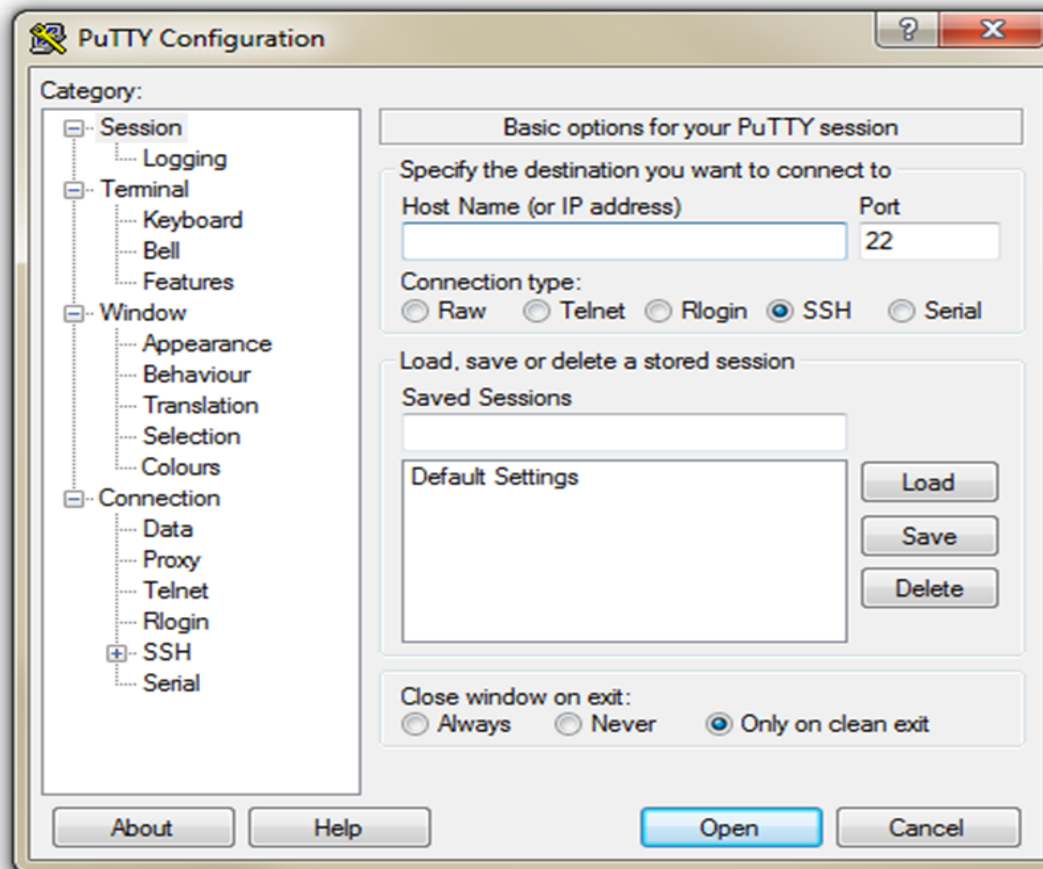
4) PuTTY →



# How to Access the CSE Grid Terminal

16

Host Name: **csegrid.ucdenver.pvt**

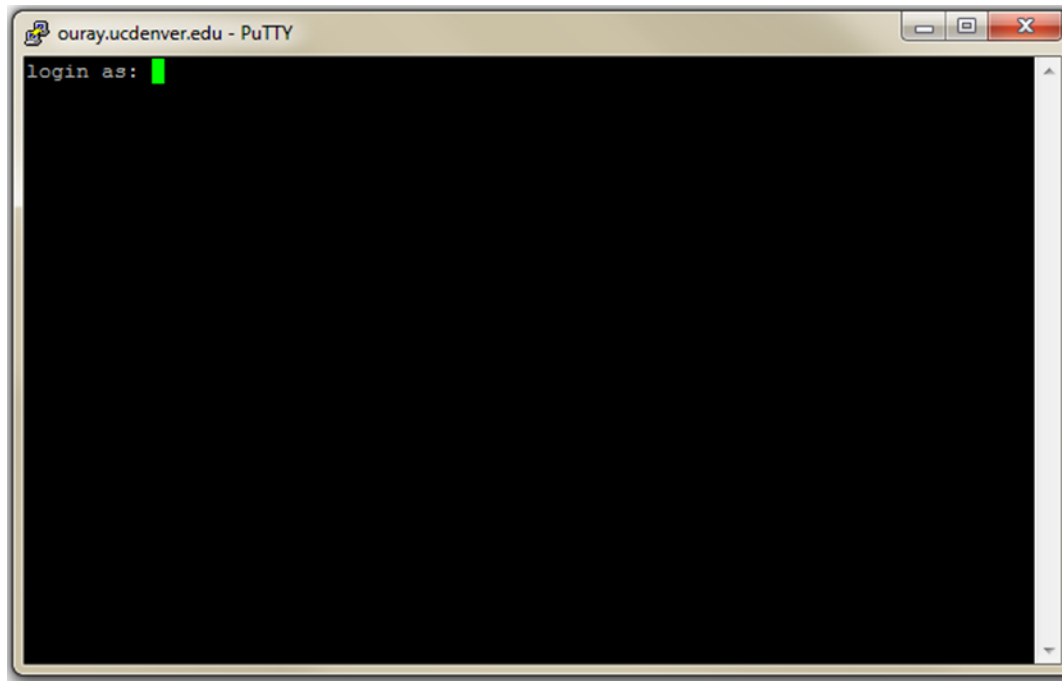




# How to Access the CSE Grid Terminal

17

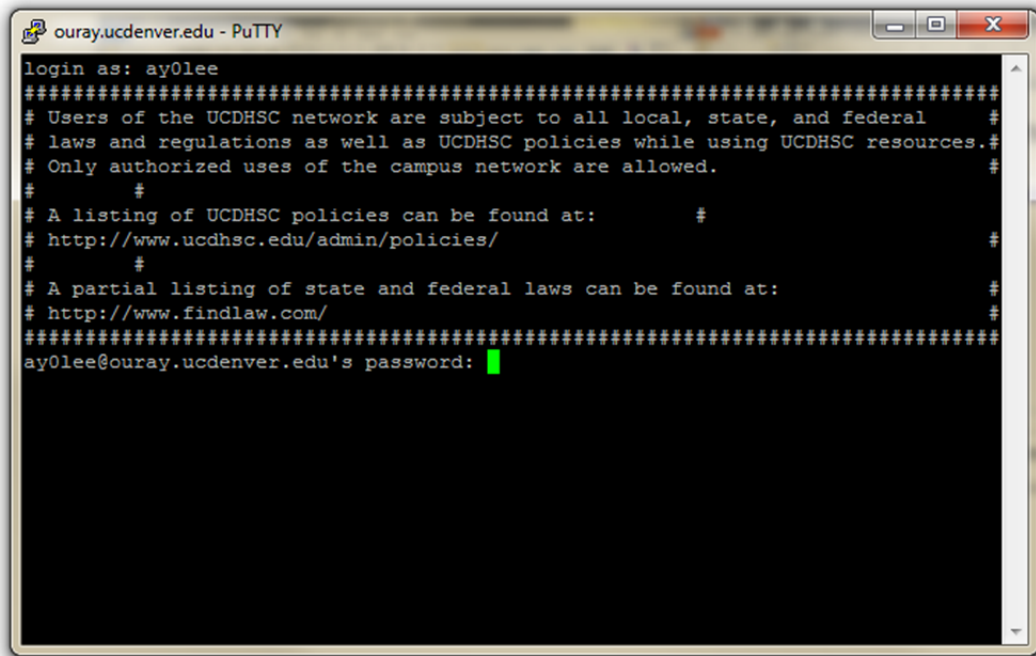
Login as: **UCD User Name**



# How to Access the CSE Grid Terminal

18

Password: **UCD Password**



```
ouray.ucdenver.edu - PuTTY
login as: ay0lee
#####
# Users of the UCDHSC network are subject to all local, state, and federal #
# laws and regulations as well as UCDHSC policies while using UCDHSC resources.#
# Only authorized uses of the campus network are allowed. #
#
# A listing of UCDHSC policies can be found at: #
# http://www.ucdhsc.edu/admin/policies/ #
#
# A partial listing of state and federal laws can be found at:
# http://www.findlaw.com/
#####
ay0lee@ouray.ucdenver.edu's password: █
```

My password does not show up!

- The terminal is accepting input, it is just “hidden”

# Unix Terminal

19

- **What is UNIX?** UNIX is an operating system (OS), that manages the hardware and software resources of a computer. (Like Windows, Mac OS)
- **How will we use it?** To write, compile, and execute C++ programs.

# Unix Terminal Commands

20

## Simple Unix Terminal Commands

- ❑ **pwd** - Print the current working directory
- ❑ **mkdir** - Make a new directory (folder)
- ❑ **ls** - List the contents of the current directory (folder)
- ❑ **cd** - Change directory (go to a folder)
- ❑ **rmdir** - Remove a directory (folder)
- ❑ **rm** - Remove a file

# Unix Terminal Command Examples

21

- Making a new directory (folder):
  - ▣ **mkdir** myDirecotryName (The name of the newly created directory will be: myDirectoryName)
  
- Changing the current directory:
  - ▣ **cd** myDirectoryName (The current directory in the terminal will be changed to myDirectoryName)
  
- Removing a file:
  - ▣ **rm** myFile.cpp (Deletes the file: myFile.cpp from the CSE grid server – He's dead Jim!

# Home Directory Setup

22

- **Goal:** Organize a CSCI-1411 directory within your home directory on the CSE grid server.
  - Helps keep each lab organized for the semester
  - Practice using the basic Unix terminal commands
  - Placing all files within a single directory is generally utter chaos
    - Who wants to end up with 20 files named:  
main1.cpp, main2.cpp, main3.cpp main4.cpp, ...
  - What we want to create:
    - /export/homes/yourname/csci1411/lab0
    - /export/homes/yourname/csci1411/lab1
    - ...

# Home Directory Setup Guide

23

- Once you have logged in to the CSE Grid (PuTTY), enter each command and press enter at the terminal (assuming you start at: /export/homes/*yourname*/)
  - pwd
  - mkdir csci1411
  - ls
  - cd csci1411
  - pwd
  - mkdir lab0
  - ls

# Home Directory Setup Result

24

- Utilize the `pwd` command to print the working directory after you have changed to the `lab0` directory:
  - `/export/homes/yourname/csci1411/lab0/`



# UNIX Text Editors

25

There are two editors that you can use to author the (C++) source code for this course:

1) **nano** (Less features – Easy to use)

`nano file_name`

Example: `nano main.cpp`

To Save: **Ctrl-O**

To Exit: **Ctrl-X**

2) **vi** (Extensive number of features – More complex)

`vi file_name.cpp`

Example: `vi main.cpp`

To Exit: Press Esc. Enter **:q** or **:wq** to save and quit

# A Simple C++ Program

26

- No programming introduction is complete without the obligatory ‘Hello World’ program:
  - Utilize one of the introduced editors: (nano or vi)
  - Create a main.cpp C++ source file
    - nano main.cpp
    - vi main.cpp
  - Enter the following code to implement the Hello World program in C++

# C++ Hello World

27

```
#include <iostream>
```

```
using namespace std;
```

```
int main()
```

```
{  
    cout << "Hello World" << endl;  
    return 0;  
}
```

# Compiling and Executing a C++ program

28

- Exit your editor (nano or vi)
- At the **terminal** enter the following to compile your C++ program:
  - `g++ main.cpp` (This compiles the C++ source code!)
- Once the C++ source code has been compiled into a binary file:
  - `./a.out` (This executes the compiled program!)

# Accessing UCD Grid Files

29

## WinSCP

- ❑ Manage files on the UCD Grid
- ❑ <http://winscp.net/>
- ❑ Already installed on the Lab computers

# Accessing UCD Grid Files

30

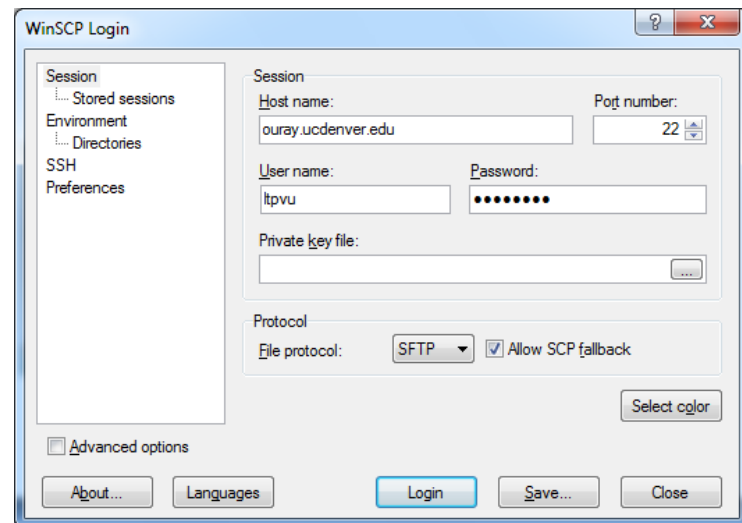
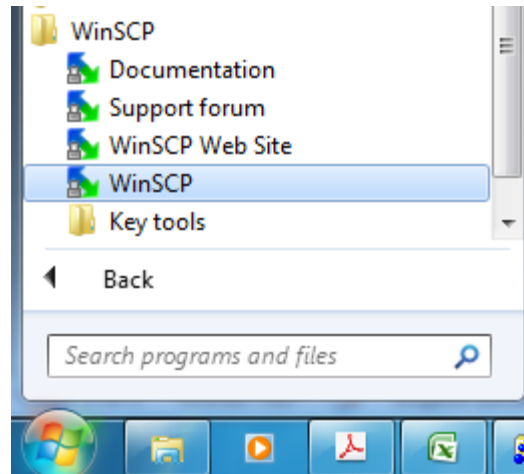
## File Transfers

- ▣ WinSCP to csegrid.ucdenver.pvt (this doesn't work until you log in using **ssh** for the first time, otherwise your home directory will not have been created)
- ▣ **(Windows)** Connect to: \\cseenas.ucdenver.pvt \<username> from Windows desktop and copy files to home directory
- ▣ **(Mac)** Connect to: SMB://cseenas.ucdenver.pvt/ <username> from a Mac finder window and copy files to home directory.

# Download/Upload files using WinSCP

31

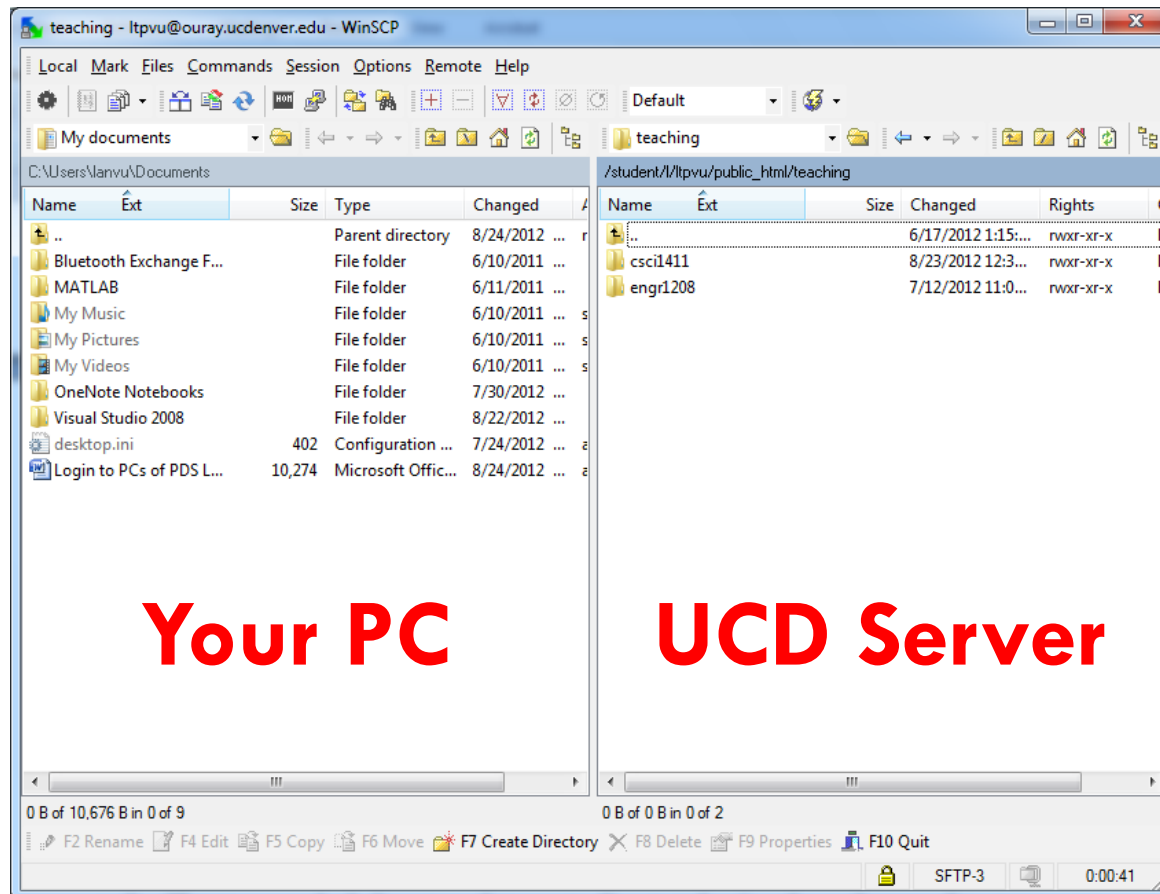
- Start → All Program → WinSCP → WinSCP
- Enter Hostname: **csegrid.ucdenver.pvt**
- Enter **Username & Password** used for Univ. login



# Download/Upload files using WinSCP

32

- Drap & Drop files between two windows to download/upload file into UCD Server





# Accessing CSE Servers from off Campus

33

## 1. Install Virtual Private Network

Used to connect to the UCD network

<https://itservices-web.ucdenver.edu/VPN/>

## 2. Use your University Account to Authenticate

## 3. Download the Correct Version of the VPN based on your home computer OS version.

# Accessing CSE Servers from off Campus

34

- Basic terminal access (if off campus turn on VPN first, if on campus don't use VPN):

- Connect to the load balancer

**csegrid.ucdenver.pvt**

via ssh using the client of your choice (This will forward you to one of the six blades based on a round-robin algorithm)