Oregon State University
School of Electrical Engineering and Computer Science

CS 261 – Recitation 1

Spring 2016

Outline

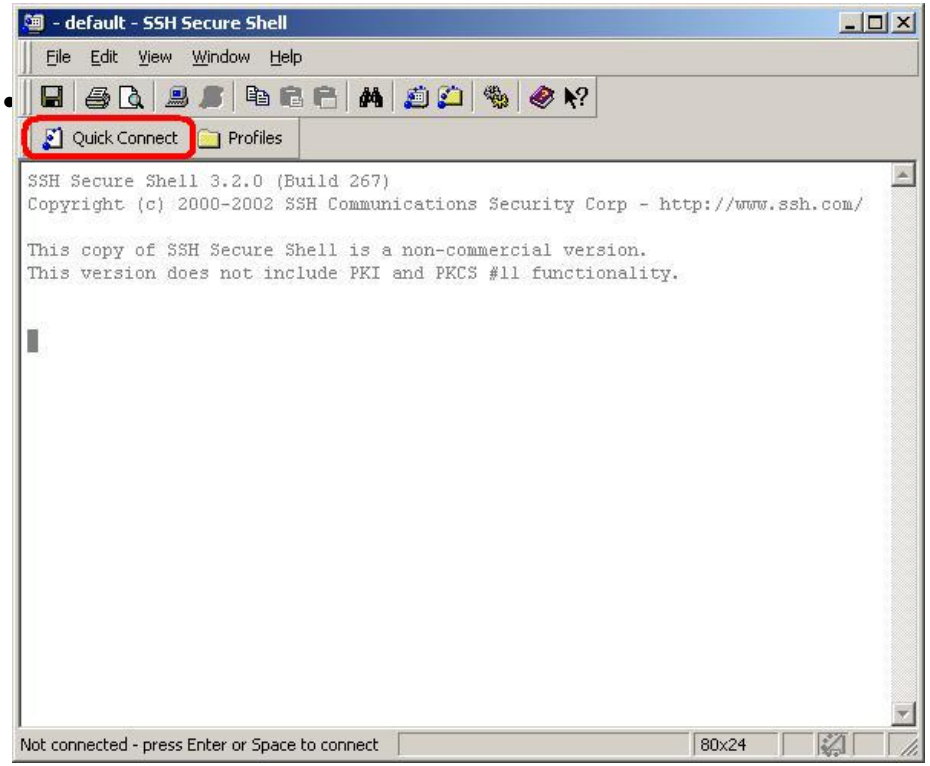
- Using Secure Shell Clients
- The GCC
- C IDE : Codeblocks / Visual Studio / terminal (or Eclipse or Xcode or etc..)
- Some Examples
- Intro to C

Get your terminals

- Windows people, get ssh http://sils.unc.edu/it-services/servers/using-ssh
  - It already has a build-in file transfer client

- Mac people, you have ssh built-in and you can use a file transfer client such as Cyberduck.

Using Secure Shell Clients



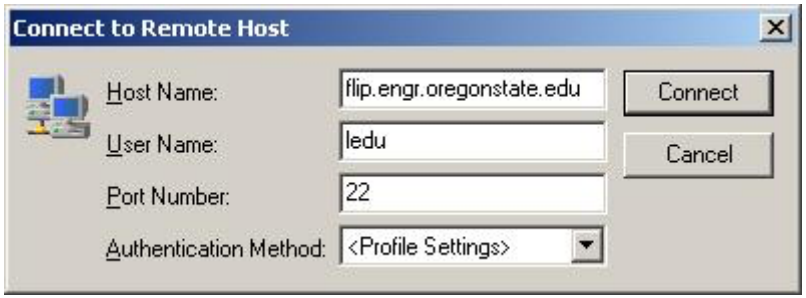
- Open ‘Terminal’ & type *<username>@<host name>* (for Mac)

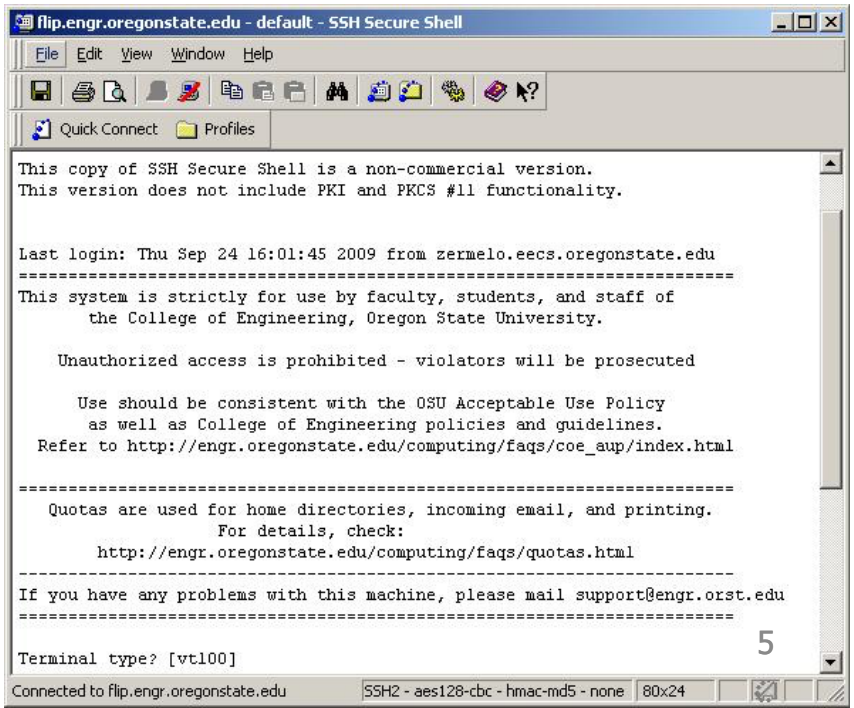
Using Secure Shell Clients

List of available servers :

- flip.engr.oregonstate.edu
- flop.engr.oregonstate.edu – off-campus

And more (see http://eecs.oregonstate.edu/it/)





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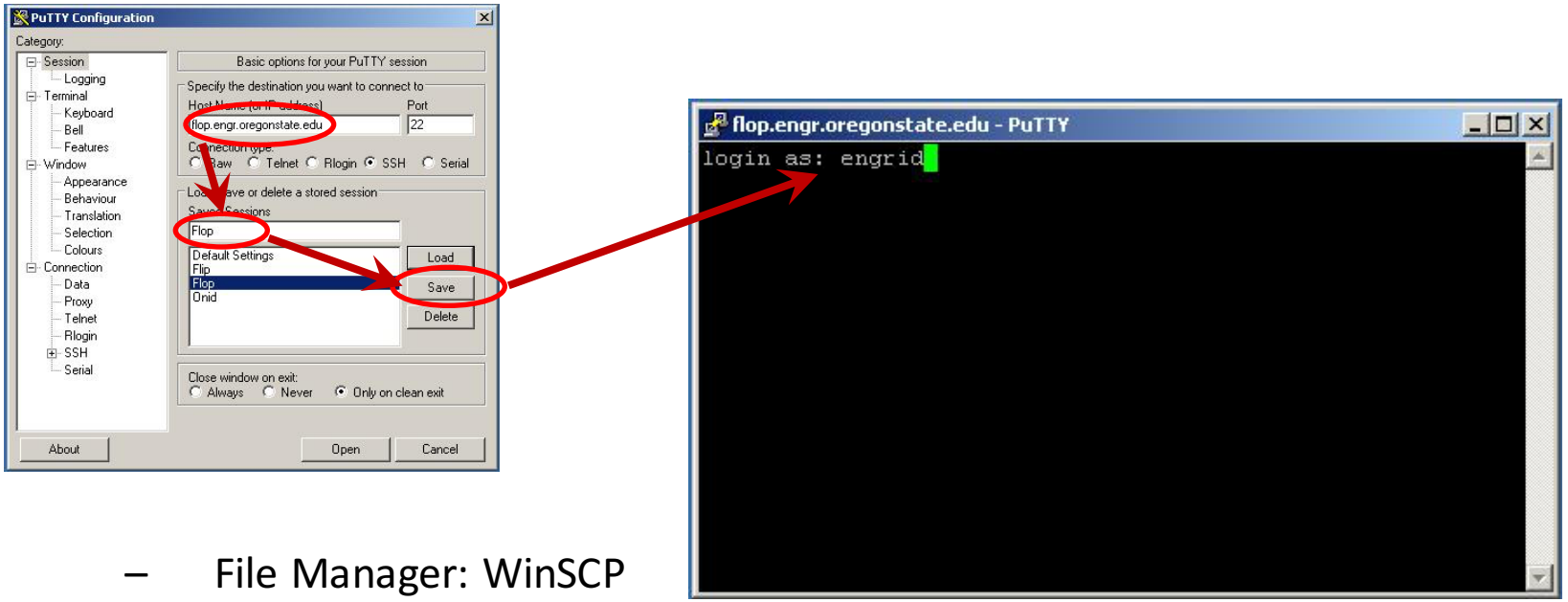
Using Secure Shell Clients

- Other Secure shell clients available :
  - Remote connect: PuTTY

    http://www.chiark.greenend.org.uk/~sgtatham/putty/



  - File Manager: WinSCP

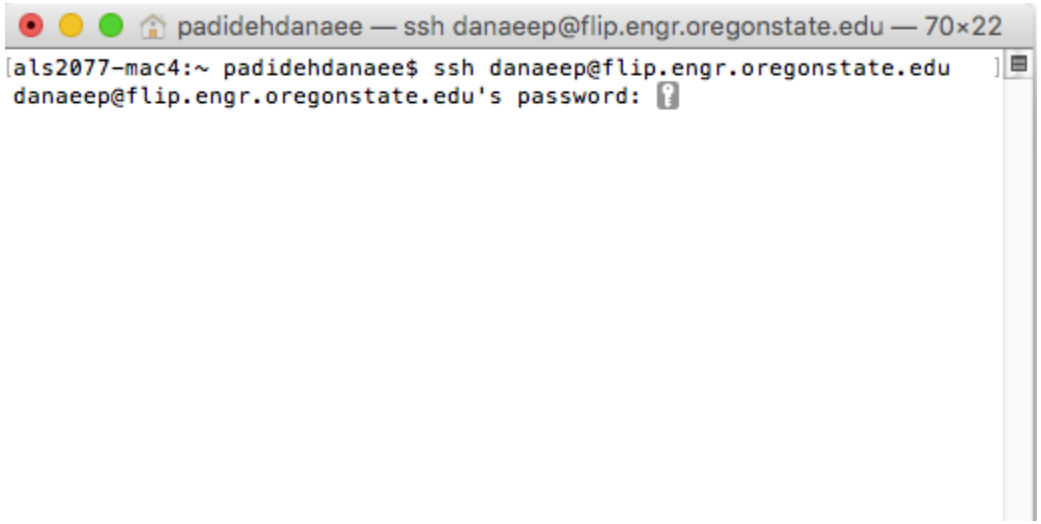
    http://winscp.net/eng/index.php

Using Linux Shell

- For Mac and Unix users :
  - Open the shell terminal and enter the following

ssh engid@flip.engr.oregonstate.edu → On campus

ssh engid@flop.engr.oregonstate.edu → Off campus



Basic commands

- **pwd**
  - Present working directory
- **ls**
  - list files and directories in current directory
  - % ls –la : '*el* ' denotes long listing
    '*a*' including all hidden files
- **cd**
  - Change directory
- **mkdir**
  - make new directory
- **cp**
  - copy <srcFileName> <desFileName>
- **mv**
  - Moves / renames <srcFileName> <desFileName>
- **rm**
  - remove file
- **cat**
  - show file content
- **exit**
  - exit the session

Basic commands continued..

- **.** (dot)
  - Represents current directory
- **..** (dot dot)
  - Represents parent directory

Text Editors

- Vim
  - To start : vim <*filename*>
  - 3 modes for text editing:
    - **Insert** (i) / Replace (r / R) /**Browse** (Esc)
  - To save - :w
  - To quit - :q
  - **dd** delete 1 line
  - **ZZ** save the file and quit vi

  More information : http://vimdoc.sourceforge.net/htmldoc/usr_toc.html

- Emacs
  - To start : emacs <*filename*>
  - Common commands:
    - Ctrl X Ctrl S: Save
    - Ctrl X Ctrl C: Exit

  More information: http://lowfatlinux.com/linux-editor-emacs.html

- You can use other GUI editors like Notepad++ which have syntax highlighting and is available on ENGR servers.

Useful vi Commands

- **arrow keys** and h,j,k,l move cursor
- **dd** delete 1 line
- **:w** save file
- **:q!** quit even if file is not saved
- **ZZ** save the file and quit vi

The GCC

- The GNU Compiler Collection (usually shortened to GCC) is a command line compiler system produced by the GNU Project, supporting various programming languages (includes C, C++).

- Compiling with GCC:

  gcc <list of options> sourcefile.c

  e.g.: *gcc -o test test.c*

- Output:
  - Compiling the code converts it into object files (*.o)
  - Linking the code uses the information from the object code to build executable.

Using the GCC compiler (cont.)

- Compile multiple files:
    1. To stop the process till compilation step :
       gcc –c code1.c code2.c code3.c

    2. To link the individual '.o' files to generate the executable :
       gcc –o executor code1.o code2.o code3.o

    The same can be done in a single step :
       gcc –o executor code1.c code2.c code3.c

Examples

- Write a program to print “Hello World”.
- Compile it using “make”
- Contents of “makefile”

```
default:main
main: main.c
  gcc main.c –o main
clean:
  rm main main.o
```

NOTE

You can use any IDE(Integrated Development Environment) to develop and test your C application before submitting. However, Linux is the environment in which the program will be graded. So make sure your program will **compile and run without errors or warnings** using GCC only on *'**flop.engr.oregonstate.edu**'*.

Intro 2 C

- Useful websites:
  - cplusplus.com
  - http://www.cprogramming.com/

Headers in C

- Essential header:

#include <stdio.h> :Includes the standard Input/output library. Without this statement the program will not be able to print/read data.

- Other headers & including any files : (Next class..)

Variable/function declaration

- All the variables/functions are required to be declared prior to its use in the program.

Eg.

```
int add (int , int);  // function declaration /prototyping
void main(){
    int var1 = 10;
    printf("%d", var1);
    int var2=20;
    printf("%d", var2);
    int result = add(var1, var2);
}
int add(int a, int b){
    return (a+b);
}
```

Should be placed before *void main(){ ..}*

Pointers

- A tutorial on Pointers & Arrays in C

- Example:

```
int var1=10;
int *pointertovar1;
pointertovar1=&var1;  // & is called as 'ampersand'. It means 'address of'
*pointertovar1=20;    //  * denotes the 'thing pointed by'
printf("%d%", var1);  //Now the value of var1 becomes 20.
```

Memory allocation and structures

- Memory has to be managed manually due to absence of 'Garbage collector'.
- Syntax :

  datatype * ***varname*** = (*datatype* *) malloc (sizeof(*datatype*));

  eg. struct record *Rec = (struct record *)malloc(sizeof(struct record))

- Structures are similar to classes.
  - struct record{
    char name[20];
    int id;
    float GPA;
    }
- A structure stores only variables but no functions.
- Details of both these topics in the next session..

That’s all for today.

Please remember the earlier NOTE.