Lecture 2: Introducing Unix and HTML

CS 190 Version 3.0, Spring 2013

Lecture Plan

- Log in to MathCS system
- ComputerSpeak Primer
- Introduction to UNIX
  - Exercise: find that file
- Introduction to HTML
  - Exercise: “hello world!”

Key Objectives for Today

- **Get oriented in the MathCS environment**
  - **Know where your files live ("directory structure")**
  - **How to create and modify file ("editing files")**
  - **Who can do what to whom ("file permissions").**

- **Basic HTML:**
  - **Learn how to make your first Web page ("Hello world")**
  - **Learn how to make it visible to the world**

First exercise of the day

- Login to your computer
- Open a *web browser* (Firefox)
  - Applications → Firefox, or
  - Open terminal (Applications → Terminal)
    Type "firefox & " (last character will be explained later)
- Go to http://www.mathcs.emory.edu/~eugene/cs190/lectures/
  - Open (click on) file **jan17-unix.pdf**
  - This should open the PDF file of today's lecture slides, for your convenience

ComputerSpeak Primer: Key Terms

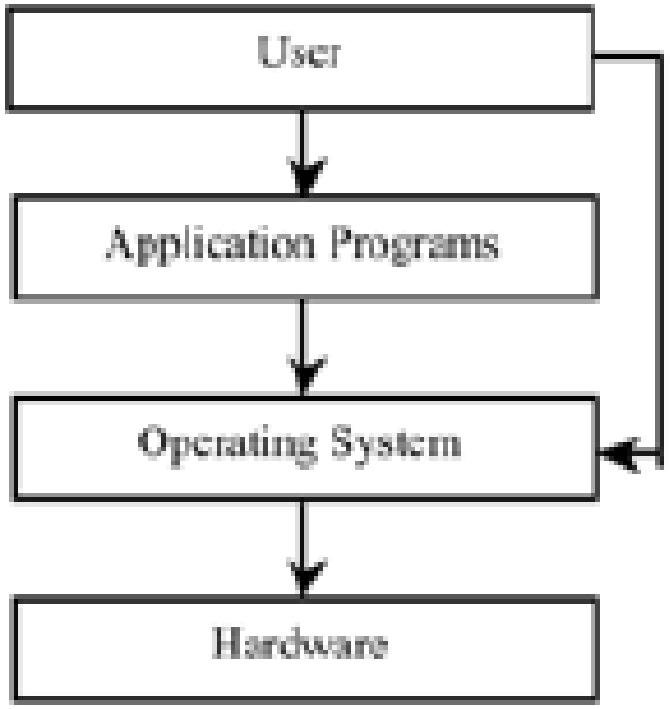
- Computer/Hardware
- Operating System (OS)
- Unix shell
- Computer Program/Application
- Directory
- File
- Permissions

What is a Computer?

- Computer is a machine that performs operations (instructions)
- Instructions are *simple* (add 2 to a number)
- Computer **program** is a series of instructions
- This was **not** always so

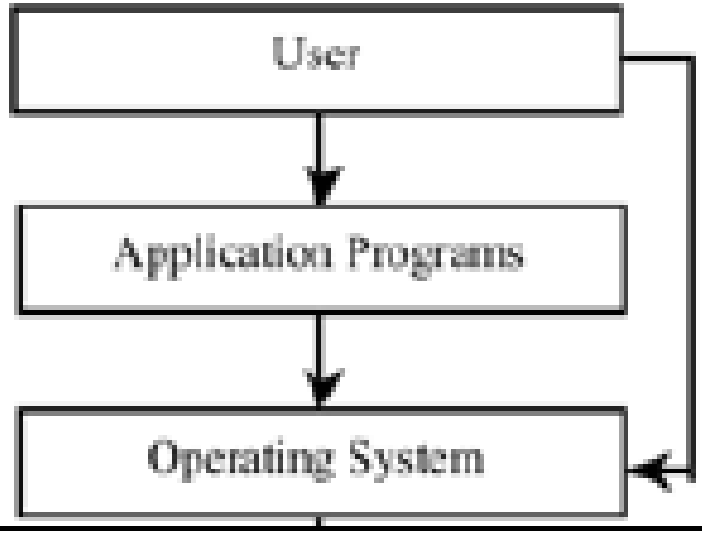
Computer Programs

- Computer program is a set of instructions
- Operating systems: core software of a computer
  - Windows (XP, Vista), Unix, Linux, MacOS, …
- Application software: any software other than operating systems
  - Web browsers, word processors, games, …



Operating Systems (OS)

- A program that manages and controls a computer's activities
- Any other program (internet browser, word processor) is managed by OS
- The programs you write are also managed by OS



What are the tasks of OS?

1. Controlling and monitoring system activities
2. Allocating and assigning system resources
3. Scheduling operations

Introduction to Unix OS

- Unix operating system
  - Command line interface (shell)
    - Use Unix "terminal" program to access the shell

    ➢Try it now!
      - Open "terminal" from "Applications" menu
      - type "whoami"

Files and Folders in Unix

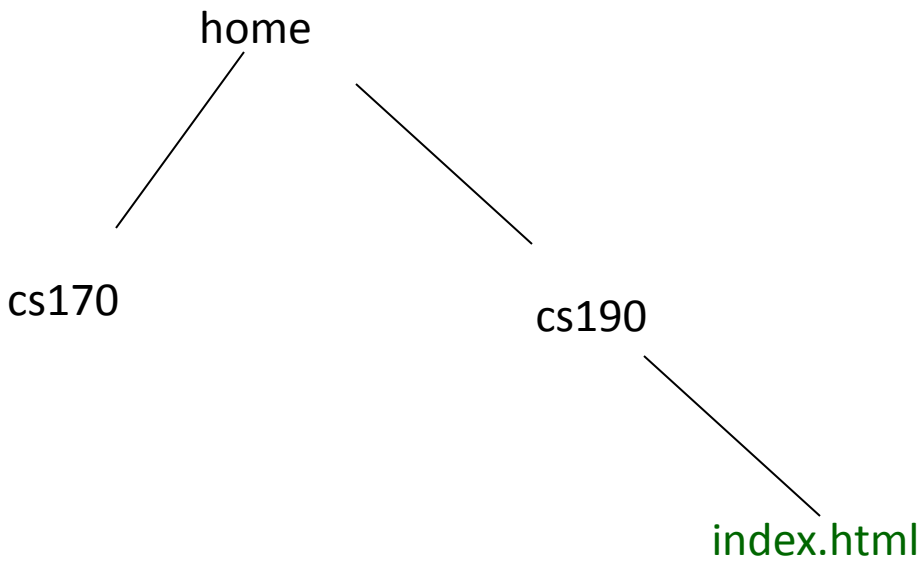
- Web pages are saved as .html **files**
  - index.html
- Files: a collection of items of information that are kept together
- Files have names; legal names:
  - letters (A-z), numbers (0-9), ".", "-", and "_".
  - Welcome.html, 3p0.x, cs190-example.html
- Files are stored in folders or directories; these file containers can be nested

Unix File system (continued)

- Your data **files** are organized inside the computer as a hierarchical file system.
- Files are stored in a "file folder" (a.k.a. **directory**)
- Commands to traverse the file system:
  - **cd**: change the current directory - used to **navigate**
  - **ls**: list - used to examine the content of a directory
- Exercise:
  - Unix tutorial on files/directories: http://www.mathcs.emory.edu/~cheung/Courses/170/Syllabus/02/cd-UNIX-dirs.html

What is a Directory?

A **home** directory might contain a **cd190** directory. This direcotry might contain an “index.html” file.

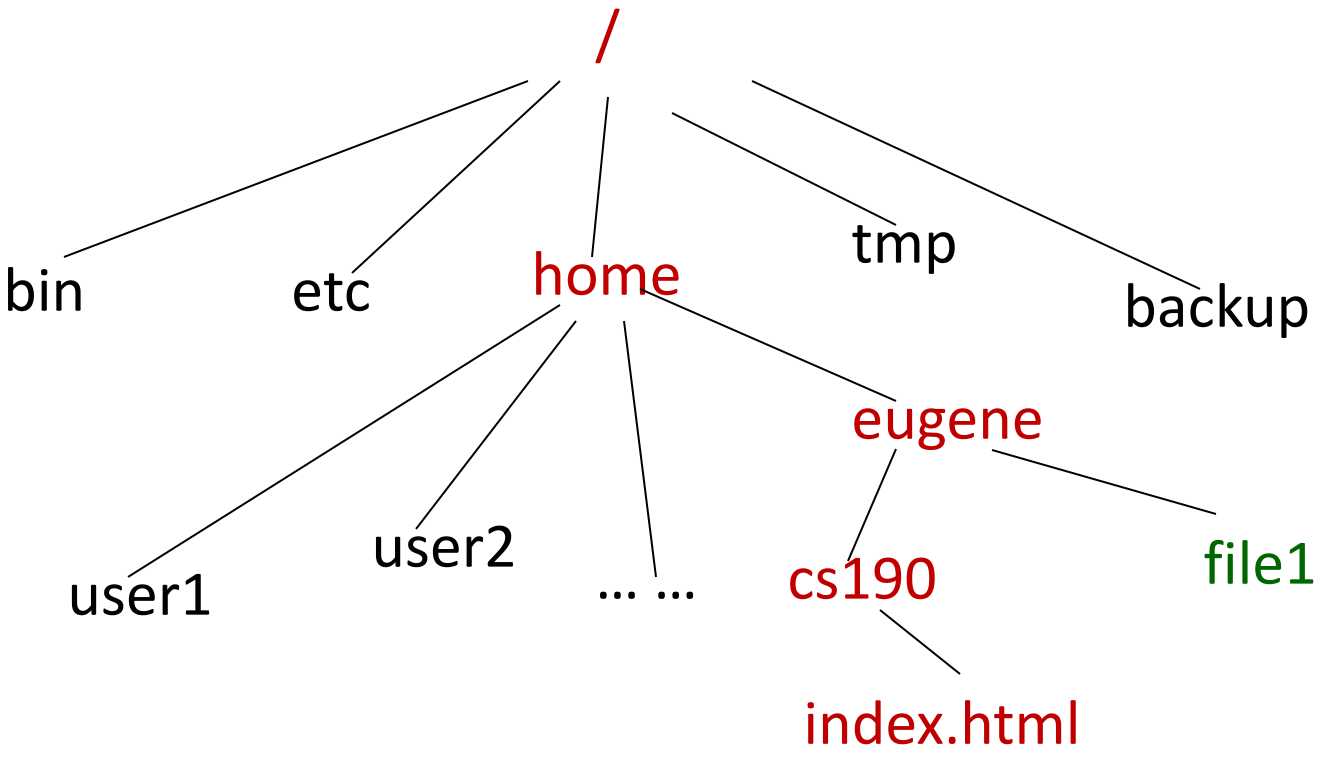


What's a directory?

- Files are grouped in the directory structure.
- The file-system is arranged like hierarchical tree (inverted)structure.
- The top of the tree is called **"root"** which usually contains several sub-directories. In UNIX **"/"**(forward slash) is used to present the "root".

What is directory?

Directories can hold files and other directories

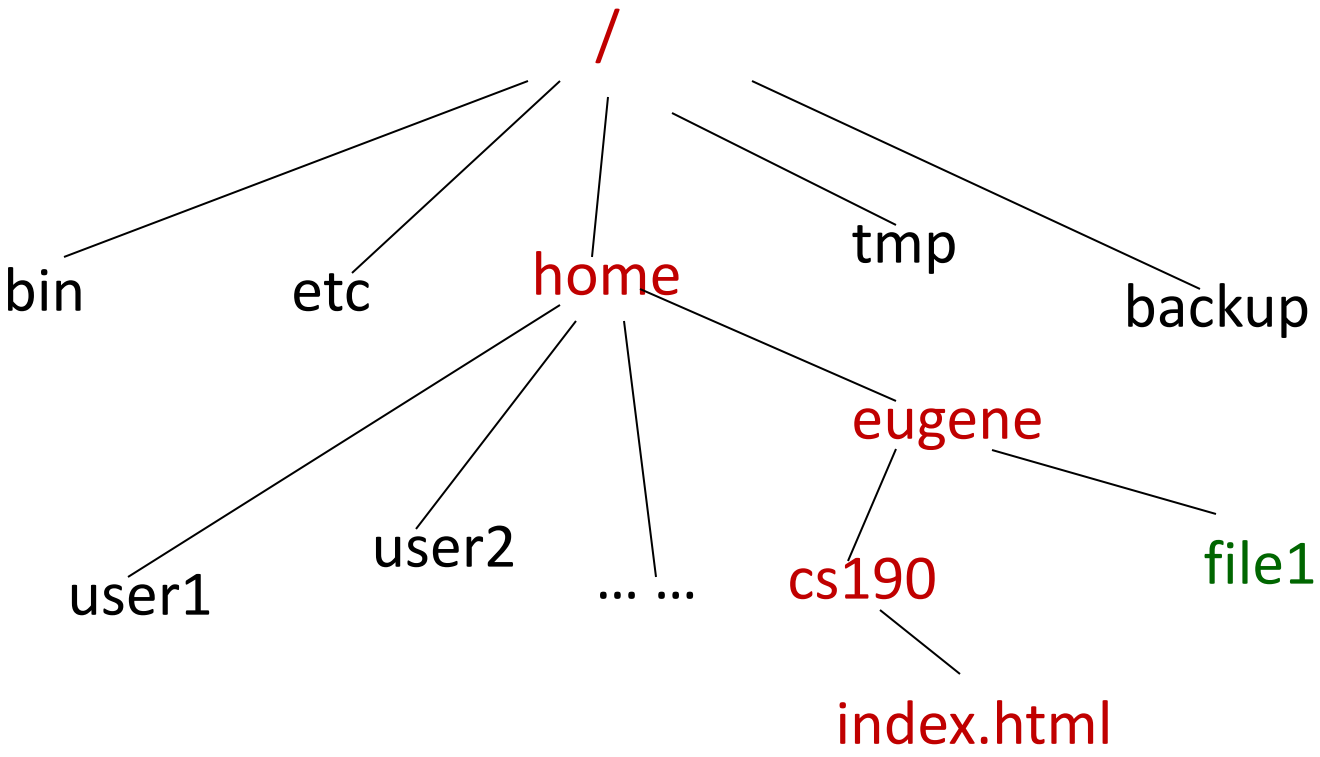


Pathnames

- Absolute Pathnames
  - In the previous tree /home/eugene/file1 is an absolute pathname.
- Relative pathnames
  - If you are already in the home directory, the relative pathname for file1 is eugene/file1.

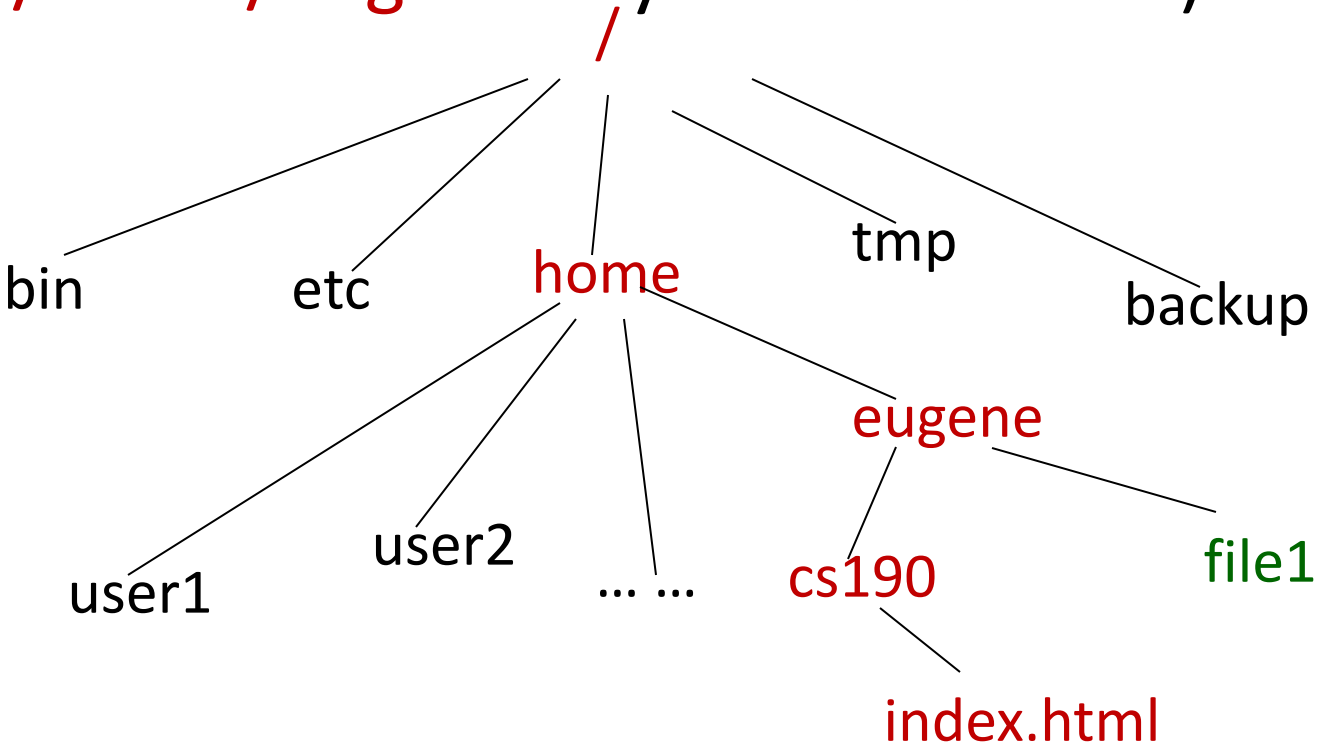
Specifying Paths

What is the **absolute path** to index.html?



Specifying Paths

What is the **relative path** to index.html (assume that /home/eugene is your **current dir**)?



More UNIX commands

- pwd –let you know the absolute pathname of your current working directory (Print Working Directory)

- cd *[dir]* – change directory

  - ***cd ..*** –go back to parent directory. "**..**" is the relative pathname to the parent directory.
  - "**.**" -stands for current (working) directory.
  - ***"~"*** – the tilde ~ character can refer your **home directory**

More UNIX commands

- mkdir *directory* – create one or more directories. You can specify them by absolute or relative pathnames.
- cp
  - cp *file1 file2* – copy *file1* to *file2.* If there's already a *file2,* the old one will be overwritten.
  - cp *file(s) directory* – *file(s)* will be copied to the *directory.*

More UNIX commands

- mv *sourcefile targetfile* –rename *sourcefile* to *targetfile*.
  - If there's a file with the same name as *targetfile*, it may be overwritten.
  - mv works for directories the same way

Editing Files in Unix

- "Make Changes to file"
- **Editor :** tool for making edits
- Common editors in UNIX:
  - gedit : gedit file_name (e.g., gedit index.html &)
  - pico
- **My** favorite editors:
  - vi or Vim
  - Emacs

MathCS Web server

- http://www.mathcs.emory.edu/

- Your site:
  http://www.mathcs.emory.edu/~your_login/
  mine: http://www.mathcs.emory.edu/~cs190000/

➢ **Cannot log in to it!**

- But, **can** control the **files** visible on the web:
  /home/your_login/share/public_html/

Exercise: Make your first homepage

- **Change** to directory **share** in your **home** directory
  `cd /home/your_login/share`
- **Create** directory **public_html** in your **share** directory
  `mkdir public_html`
- Change to directory **public_html**

- Open or create file **index.html** using **gedit**
  - `gedit index.html &`
  - **Copy/paste or type content:**

```
<html>
<h1>Hello World!</h1>
</html>
```

  - **Save file**

- **Start firefox** in **background** (firefox **&**)
- **Goto** http://www.mathcs.emory.edu/~**username**/
- Voila!

Hypertext Markup Language

- Can modify pretty much anything about the *look* and *organization* of your page
  - Font size/level (<h1>, <h2>, …. <h6>)
  - Font weight (<b>, <i>, <u>)
- Organize your content into
  - Lists (<ul>, <ol>)
  - Tables (<table>)
  - (more on this on Tuesday)

Hypertext Markup Language

- Can *link* to other resources – on your computer or anywhere else on the web
- Syntax:
  - description (href is a parameter)
     The Borg
  - Working example:

    www.mathcs.emory.edu/~cs190000/lab1/link.html
  - Parameters:
    - target
    - id
    - …
    - **Events (**later!)
  - Many more: www.w3schools.com/TAGS/tag_a.asp

Hypertext Markup Language

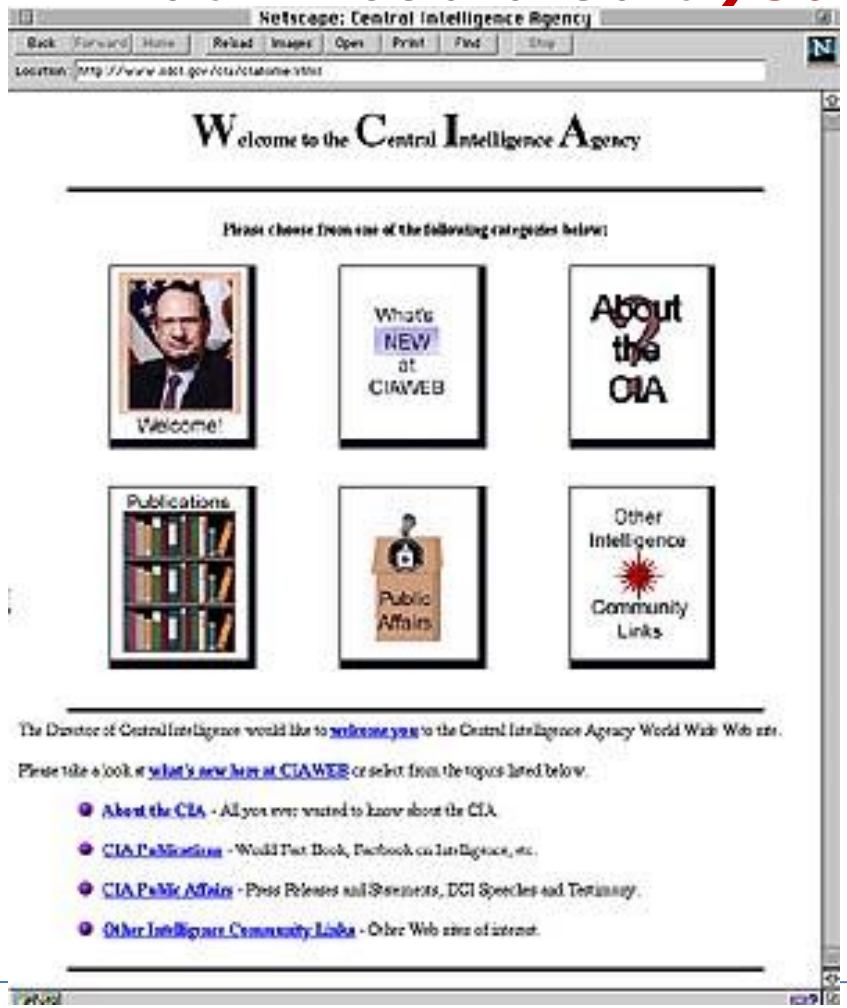
- Can *embed* other resources – on your computer or anywhere else on the web
- Example resource: **Images**:
  - **The <img> element**
  - Example:

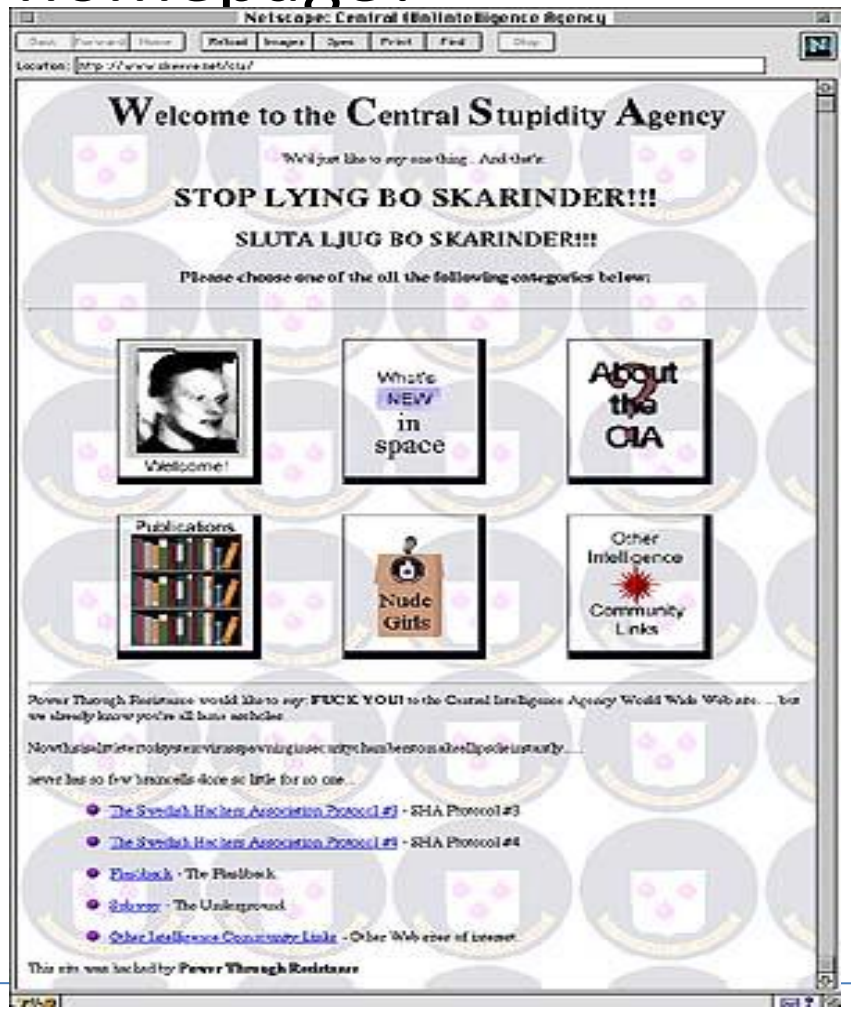
```
<img src="mcs.jpg">
<img src="http://www.mathcs.emory.edu/images/index-building-01.png">
```

  - Example:
    http://www.mathcs.emory.edu/~cs190000/lab1/image.html
  - IMG parameters:
    - src
    - height
    - width
    - alt
    - **Events (**later!)
  - Many more: http://www.w3schools.com/tags/tag_IMG.asp

Harsh Realities of the Web …

- What if **I** could edit ***your*** homepage?





Permissions

- There are three types of file access supported by UNIX.
  - r – read, view the contents of a file or a directory
  - w –write, edit file/directory contents
  - x –execute, run executable file

- Exercise:
  - type **chmod a-r index.html**
  - Try to reload your homepage

Permissions

Here's an example

– Suppose you type in *ls -l index.html* and the result is

- rwx r-x r-- 1 hans doc 858 Aug 22 22:28 index.html

What do all these symbols mean?

Permissions

- Who:
  - u: User – the person who created the file.
  - g: Group – the group owns the file.
  - a: All – the rest of the world
- What:
  - r: can read (access)
  - x: can execute (run)
  - w: can modify (delete/create)
- chmod mode *file(s)* – changes file or directory permissions

  chmod a+rx pub

  chmod a+r index.html: make index.html readable by all
- Try to open your homepage again (reload)
- Voila!

Permissions (continued)

- Suppose you are careless and allow others permission to edit:
  - `chmod a+rw index.html` (everybody is allowed to edit)
- Now **anyone** can modify your homepage!
  - Ask your neighbor for their **login_ID (not** password!)
  - type `cd /home/login_ID/share/public_html`
  - type `gedit index.html`
  - Modify the text in the page (be nice!!! ☺)
  - Ask your neighbor to reload their homepage.
  - Ouch!
- Restore correct permissions:
  - `chmod a-w index.html` (nobody is allowed to edit)
  - `chmod u+rw index.html` (only owner is allowed edit)

Additional Resources

- HTML Primer:
  http://www.htmlprimer.com/

- Unix commands/survival guide:
  http://www.cs.csubak.edu/howto_guides/unix_survival_guide.html

Summary

- ✓ **Get oriented in the MathCS environment**
  - ✓ **Know where your files live ("directory structure")**
  - ✓ **How to create and modify file ("editing files")**
  - ✓ **Who can do what to whom ("file permissions").**
- ✓ **Basic HTML:**
  - ✓ **Learn how to make your first Web page ("Hello world")**
  - ✓ **Learn how to make it visible to the world**
  - ✓ **Begin exploring HTML markup**

Next Session: Computer Lab (probably)

- Next meeting (Tuesday 1/22) **should be** again in the computer lab **but stay tuned for changes**

- Learn more about HTML
- Create more sophisticated web page
- First “project” will be assigned