Summer 2000

Academic Advantage

Wright State University
Dayton, Ohio 45435

Computer Literacy and Applications
Lab Assignment on Unix
Day 1: Aug 21, 2000

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This lab exercise aims to expose you to Unix machines. In most universities, computer science and engineering education is carried out on Unix. Currently, Unix machines are the backbone of the Internet.

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1. Open a `telnet` session from your PC to `paladin`. Log into your account. Read all of the documentation that comes up on the screen. Change your password using the `yppasswd` command.

2. The commands `script, ls, more, mv` and `man` were explained to you. Start a script of your session. Copy all the files, including subdirectories, from the source directory `/public/pmateti/AAP/` to your home directory. Recursively list all files in your directory, including hidden "dot"-files. End the script session. Rename the script file as `script0.txt`.

3. Learn to use as many of the commands listed, on the next page, as you can. Edit and save the file `script0.txt` so that it now has at the top and also at the bottom your full name and SSN. Just before these two last lines, insert a paragraph describing which of the commands you have learned and used today, and any feedback you wish to give us. Send the file `script0.txt` to `pmateti` via email, with `AAP-UnixLab` as the subject.

A short list of Unix commands

`bash`	Bourne-Again Shell
`cat`	concatenates files
`cd`	changes directories
`chmod`	changes the permission on a file
`cmp`	compares two files
`cp`	copies files
`date`	returns the date and time
`diff`	display line-by-line differences between two text files
`echo`	echoes arguments to stdout
`emacs`	the all-powerful text/binary editor; try xemacs also
`env`	lists the current environment variables
`find`	finds a file
`grep`	searches for a pattern within a file; see also fgrep
`kill`	stops a running process
`ln`	creates a link between two files
`ls`	lists the files in a directory; try ls -lisa
`lynx`	WWW/News/Mail browser; try lynx news:wright.ceg.433
`man`	show reference manual pages; try man -k
`mkdir`	makes directory
`more`	displays a data file to the screen
`mv`	used to move or rename files
`yppasswd`	changes your password
`ps`	Lists the current processes running
`pwd`	displays the name of the working directory
`rm`	removes files
`rmdir`	removes directories
`script`	Makes a transcript of terminal session
`set`	lists all the variables in the current shell
`sort`	sorts files
`spell`	checks for spelling errors in a file
`tail`	displays the end of a file
`tar`	copies all specified files into one
`umask`	specify a new creation mask
`vi`	screen-oriented (visual) display editor
`wc`	word count, also line and char count
`who`	info on other people online
`w`	who is on the system, and what they are doing

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Computer Literacy and Applications Lab Assignment on Mathematica Day 2: Aug 22, 2000

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Attempt as many of the problems below as you can. Edit a file called `mathematica.txt` to include your answers as you solve them. Include at the top and also at the bottom your full name and SSN. Insert any feedback you wish to give us. Send the file to `pmateti` via email, with `AAP-Mathematica` as the subject.

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1. Determine the following:
   (a) absolute value of -3
   (b) square root of 18
   (c) natural logarithm of 15
   (d) $\frac{1.7-3.4}{5.2\times 8.2}$
   (e) e^1, e^2,..., e^{11}, rounded to the nearest multiple of 10.
2. Simplify
   (a) $\frac{(6x^2+7x-3)(x^2-5x-140)}{(2x^2+x-3)(3x^2+5x-2)}$
   (b) $\frac{\cos(90+t)\sec(-t)\tan(180-t)}{\sec(360-t)\sin(180+t)\cot(90-t)}$
   (c) $\frac{\sin t-\sin 3t}{\cos 3t+\cos 5t}$
   (d) $\frac{(1-x^4)}{1+x} \div \frac{(1+x^2)}{x^2(1-x)}$

3. Solve the simultaneous equations

   (a)
   ```
   3 x + 2 y -   z  = 10
    -x + 3 y + 2 z  =  5
     x -   y -   z  = -1
   ```

   (b) $2x_1 - 2x_2 + x_3 = 2.5$
   $-2x_1 + 3x_2 + 2x_3 = -5.1$
   $-x_1 + 2x_2 + x_3 = 0.2$

4. Determine the real and complex (if any) roots for the following polynomials.

   (a) $x^3 - 5x^2 + 2x + 8$

   (b) $x^2 + 4x + 4$

   (c) $x^5 - 3x^4 - 11x^3 + 27x^2 + 10x - 24$

   (d) $4x^2 - 2x + 1$

   (e) $x^4 - 3x^2 - 1$

5. If the area square is given by $49x^2 + 28x + 4$, what is the length of a side?

6. The pilot of a helicopter at an altitude of 1200m finds that the two ships are sailing towards it in the same direction.The angles ofdepression of the ships as observed from the helicopter are 60° and 45° respectively. Find the distance between the ships.

7. A cylindrical rod of iron, whose length is 12 times its radius, is melted and cast into spherical balls of the same radius. How many balls were made?

8. Two trains 132 m and 108 m in length are running towards each other on parallel lines, one at the rate of 32 m/sec and another at 40 m/sec. In what time will they be clear of each other from the moment they meet.

9. Create the vector $V = e^{-3t/2}\sin(\pi t/8)$ when t varies from 0 to 1 by increments of 0.01.

10. Create a vector Y that contains nine evenly spaced values, rounded to the nearest one hundredth, of the function $\cos(x)$ for x from 0 to 2π.

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Computer Literacy and Applications

Lab Assignment on Web Exploration

Day 3: Aug 23, 2000

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You can easily spend a whole day visiting the sites mentioned here! So, watch out! But do visit as many of the sites as you can. Edit a file called `webExplore.txt` to journal your visits to them, and to include your thoughts. Include at the top and also at the bottom your full name and SSN. Insert your answer to Item 3 below. Insert any feedback you wish to give us. Send the file to `pmateti` via email, with `AAP-webExplore` as the subject.

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1. Visit the following sites and write a one-para summary of what is available there. Use the browsers Netscape, Internet Explorer and the the ascii-text based browser `lynx` at least once.
   - `http://www.cats.wright.edu/`
   - `http://www.w3.org`
   - `http://www.whatis.com`
   - `http://wdvl.internet.com/Vlib/`
   - `http://www.freebiedirectory.com/`
   - `http://www.weeklyfreebie.com/`
   - `http://internet.com/`
2. Search the Web, and find out.
   - How many high schools are there in Ohio?
   - Collect at least five URLs of online computer tutorials that you might use to further your self-study of computers.
   - Discover at least two names of browsers not developed by Netscape or Microsoft.

- Find out what "dog-food" means. Developers at Microsoft are quoted as saying, "We have to dog-food this architecture before we release it." At Rational, a software development company, a developer is quoted as saying "We have to dog-food this puppy."
- What is VoxML?

3. Find a site that is offering a free personal web page. Write a speculation as to why they are doing that.

Search Engine Glossary

You may be *searching*, bur are you *finding*? • **Boolean search**: A search allowing the inclusion or exclusion of documents containing certain words through the use of operators such as AND, NOT and OR. • **Concept search**: A search for documents related conceptually to a word, rather than specifically containing the word itself. • **Full-text index**: An index containing every word of every document cataloged, including stop words. • **Fuzzy search**: A search that will find matches even when words are only partially spelled or misspelled. • **Index**: The searchable catalog of documents created by search engine software. Also called "catalog." • **Keyword search**: A search for documents containing one or more words that are specified by a user. • **Precision**: The degree in which a search engine lists documents matching a query. The more matching documents that are listed, the higher the precision. For example, if a search engine lists 80 documents found to match a query but only 20 of them contain the search words, then the precision would be 25 • **Proximity search**: A search where users to specify that documents returned should have the words near each other. • **Query-By-Example**: A search where a user instructs an engine to find more documents that are similar to a particular document. Also called "find similar." • **Recall**: Related to precision, this is the degree to which a search engine is returning all the matching documents in a collection. There may be 100 matching documents, but a search engine may only find 80 of them. It then has a recall of 80 • **Relevancy**: How well a document provides the information a user is looking for, as measured by the user. • **Search Engine**: The software that searches an index and returns matches. Search engine is often used synonymously with spider and index, although these are separate components that work with the engine. • **Spider**: The software that scans documents and adds them to an index by following links. Spider is often used as a synonym for search engine. • **Stemming**: The ability for a search to include the "stem" of words. For example, stemming allows a user to enter "swimming" and get back results also for the stem word "swim." • **Stop words**: Conjunctions, prepositions and articles and other words such as AND, TO and A that appear often in documents yet alone may contain little meaning.

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Computer Literacy and Applications

Lab Assignment on Structure of the Web

Day 4: Aug 24, 2000

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Today we would like you develop and publish your own Home Page. To do a good job can easily take several days. For now, your goal is to compose a Web page using as many of the elements listed on the next page as possible.
Edit a file called `webDesign.txt` to journal your composition of the home page, and to include your thoughts. Include at the top and also at the bottom URLs of your page, your full name and SSN. Insert any feedback you wish to give us. Send the file to `pmateti` via email, with `AAP-webDesign` as the subject.

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1. Check out a few simple design examples by visiting

   `http://www.cats.wright.edu/catsweb/images/default.html`.

   You can save these pages and start editing them as you like. Your page will be judged by AAP students and staff for "impact." So, do your best!

2. Your page should, minimally, have the following web page elements:

   • five links • one bulleted list • one numbered list • three clip art images • one animated GIF image • two tables • two frames • a mailto URL to yourself • one Java applet • two JavaScript methods

3. Let your home page contain whatever you wish. Some suggestions are: your resume, your interests, etc.

4. Publish the home page you developed in two places: our WSU's site for student homepages, and also at the free site you discovered in the previous lab.

A List of Web Page Elements

Look up Chapters 5 and 6 in your AAP binder for more details.

HTML Every Web page is a text file of HyperText Markup Language. HTML documents are nothing more than standard files with formatting codes that contain information about layout (text styles, document titles, paragraphs, lists, formatted tables, graphics, ...) and hyperlinks.

The current standard is HTML 4.0.

Learn HTML – Not? To create a Web page without learning HTML, use a Wysiwyg HTML page editor, such as Microsoft's FrontPage, or Netscape's Composer.

JavaScript JavaScript is a scripting language, a special kind of programming language that makes it easy for the programmer to manipulate (e.g., pop up, close, flash colors) windows, fill in and submit forms, and compute strings. You can view the JavaScript source code of a Web page.

VBScript VBScript is a scripting language based on Visual Basic. Its capabilities are similar to JavaScript. You can view the VBScript source code of a Web page.

Java Don't confuse JavaScript with Java. Java is a programming language similar to the popular C++ language used to make applications like word processors or spreadsheets. Java programs – known on the Web as applets – can on any operating system, from Windows to Mac to Unix. A Java applet is *compiled* into a *byte-code* file, which is downloaded into your machine as needed.

ActiveX An ActiveX control has capabilities similar to the Java applet. Whereas a Java applet can run on different systems, ActiveX runs only on MS Windows. An ActiveX control is typically written in C++ and *compiled* into a *machine-code* file for Intel x86 architecture, which is downloaded into your machine as needed.

Dynamic HTML All these are technologies that let programmers create animated and interactive Web pages–the kinds that move, flash, and play games. Dynamic HTML which only now emerging into common use can make a page interactive just like Java, JavaScript and ActiveX do.

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Computer Literacy and Applications

Lab Assignment on Internet Internals

Day 5: Aug 25, 2000

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Today we would like to focus on how the Internet and the Web function. Edit a file called `internet.txt` to include your answers to the questions below. Include at the top and also at the bottom your full name and SSN. Insert any feedback you wish to give us. Send the file to `pmateti` via email, with `AAP-Internet` as the subject.

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1. A symbolic name such as `www.yahoo.com` is known as a *host address*. Domain Name Service (DNS) looks up tables, and finds the *IP address* 32-bit number 204.71.200.74, written as four bytes separated by dots. A simple way for us to find the IP address is to use the command `ping`
2. Invoke, on `paladin`, the command `traceroute` with your favorite web site as its argument. Find and report what the generated output means.
3. Search our Notes, and the Web and find answers:
   (a) What are cookies? Where are they stored? Is it ok to find and delete them?
   (b) What is a temporary file cache?
   (c) What is a Web server as opposed to a web client such as a browser?
   (d) What is a web spider?

Internet Internals

- The World-Wide Web is not the Internet! The Internet is the world-wide collection of network-connected computers. In July 1999, there were 56,218,000 computers connected to the Net (see `www.isc.org`). The World Wide Web is a collection of interlinked documents that work together using protocols such as HTTP running on computers connected to the Internet. Nobody owns the World-Wide Web.

- The final component (some times referred to as top level domain names) of a host address has some meaning; the rest are "just names". Here is an inomplete list.

com	Commercial.
edu	Educational.
gov	Government.
mil	Military.
net	Network related.
org	Miscellaneous Organization.

- In information technology, a protocol is the set of rules that a telecommunication connection uses when the two end points send signals back and forth. TCP (Transmission Control Protocol), which uses a set of rules to exchange messages with other Internet points at the information packet level. IP (Internet Protocol), which uses a set of rules to send and receive messages at the Internet address level. HTTP, FTP, and other protocols, each with defined sets of rules to use with other Internet points relative to a defined set of capabilities.

- The Web is based on a set of rules for exchanging text, images, sound, video, and other multimedia files, which is collectively known as HTTP, or hypertext transfer protocol. Web pages can be exchanged over the Net because browsers (which read the pages) and Web servers (which store the pages) both understand HTTP.

- SSL (Secure Sockets Layer) is a program layer created by Netscape for managing the security of message transmissions in a network. SSL uses the public-and-private key encryption system from RSA, which also includes the use of a digital certificate. SSL is an integral part of a browser.

- SMTP Simple Mail Transfer Protocol: Sends your e-mail messages from your computer to an e-mail server.

- Internet2 is a U.S. governement project to create a powerful leading edge network for universities and the national research community. Read more about it at `http://www.internet2.edu/`.