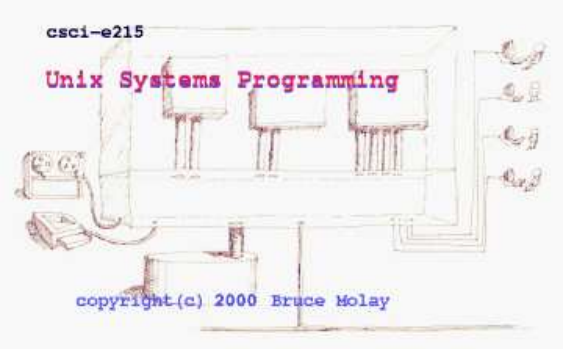
page000.html **Welcome** **000**




page001.html **001**

CSCI-E28
Unix/Linux Systems Programming

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Alexis Layton
Brandon Williams

page002.html **Course Info** **002**

Outline

- Welcome
- Where are we going?
- How will we get there?
  - course mechanics
  - content preview/overview
  - operating environment
  - our approach

page003.html **Systems Programming** **003**

## Where are we going?

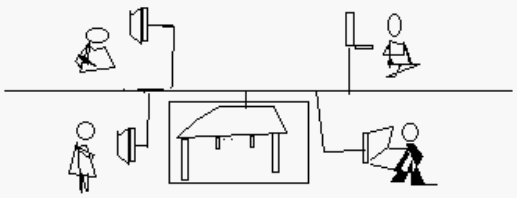
By the end of the course, you will have written or be able to write:

a) The Unix tool bc
b) Internet multi-player bridge
c) A web server

What skills and ideas do you need to do these?

page004.html **004**

## Internet Bridge



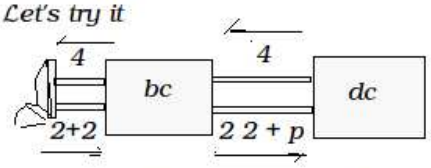
ideas/skills
multiple users
distributed data

communication, cooperation, coordination

page005.html **005**

## Ex2: bc calculator ...

Let's try it



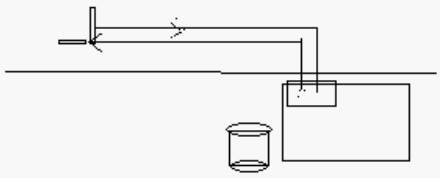

bc is actually a front-end to the dc calculator

bc translates infix to rev polish notation

Involves: communication,
cooperation,
coordination

page006.html **006**

*Ex3: Web server + browser*

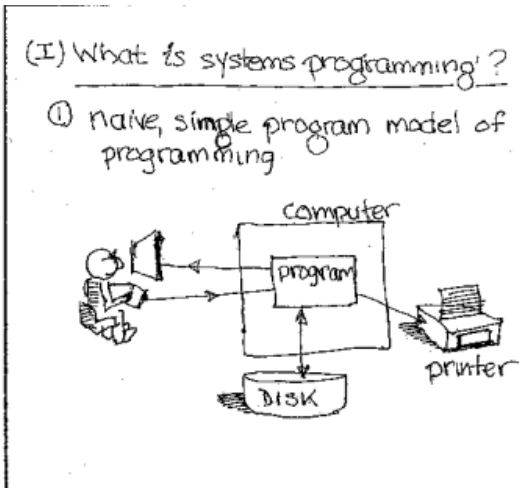


*multiple programs*
*communication*
*cooperation*
*coordination*

page007.html **007**

*How do we get there?*
*Canvas site: Zoom, Ed, Videos*
*dce-lib215: classes, projects, the rest*
*we go over the packet of handouts*
*outline*
*description*
*schedule*
*classes : each week has a page*
*projects page - read the nice documents*
*required work description/specs*
*do student info form so we can schedule*
*office hours and sections*

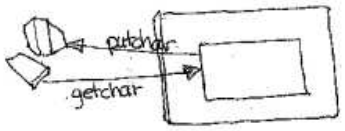
page008.html **Role of Operating System** **008**



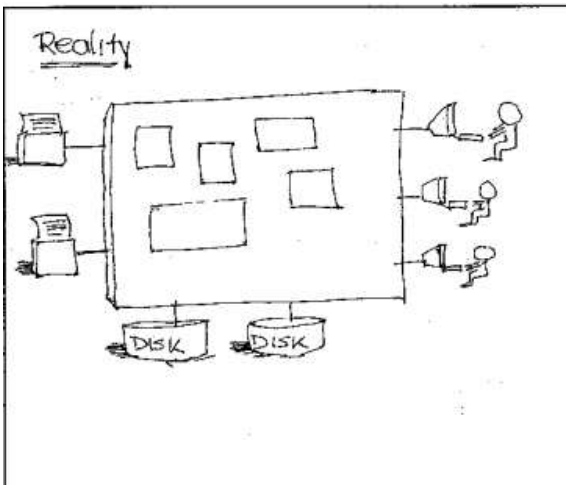
page009.html **009**

typical program in this model

```
main()
{
   int c;
   while ( (c=getchar()) != EOF)
        putchar(c);
}
```



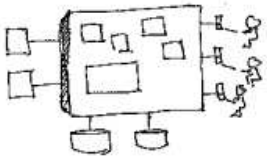

page010.html **Topics and Approach** **010**




page011.html **011**

Reality

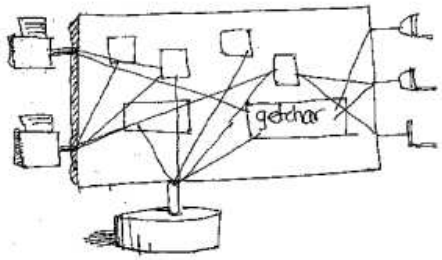
lots of programs
lots of users
lots of disk files
lots of devices



Somehow they are all connected

page012.html **Using Unix** **012**

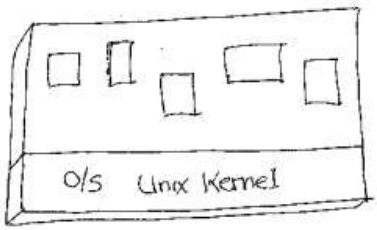
LOTS OF CONNECTIONS (TOO MANY?)




page013.html **013**

THE ROLE OF THE OPERATING SYSTEM:

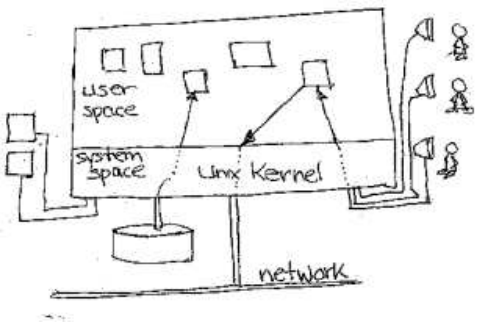
to manage all resources and connect the various devices to the correct programs.




page014.html **014**

PROVIDING SERVICES TO PROGRAMS

programs request services from the OS. the OS contains code to provide services.



page015.html **Files and Directories** **015**

We shall learn to use the services provided by the kernel.

1) input/output
2) process management
3) memory
4) devices: tapes, CDs, mice, ...
5) timers
6) IPC
7) network

page016.html **016**

OUR GOAL

To understand Unix services by:

① seeing how they are used
② learning about the system calls to invoke the services
③ writing our own versions of various systems programs

page017.html **017**

Unix Systems Programming
Tonight's outline

~~① course info~~
~~② course content~~
③ intro to unix NEXT
④ examples to show what we'll be doing

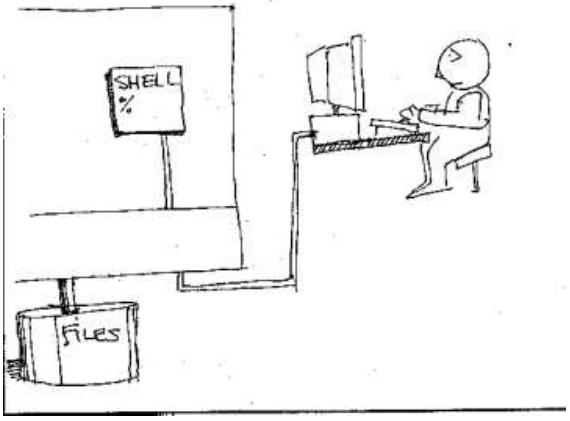
page018.html **Sample Unix Programs** **018**

## Unix From The User Perspective

login
files
programs
I/O
pipes
documentation

page019.html **019**

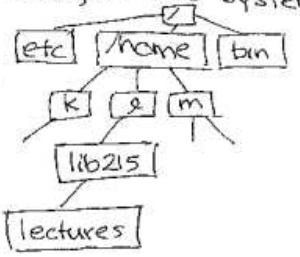
## Login - Run Programs - Logout




page020.html **020**

## Files and Directories

Unix organizes files in a tree-structured directory system and provides commands to view and navigate this system




ls
cd
pwd
mkdir
rmdir

page021.html **021**

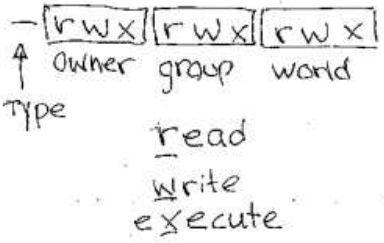
## Operations on Files

| operation | Unix command |
|---|---|
| examine | cat, more |
| copy | cp old new |
| delete | rm |
| rename | mv old new |
| print | lpr |

page022.html **022**

## FILE PERMISSIONS

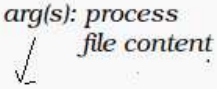
Every file has an "owner" and three groups of file permission attributes:




page023.html **023**

## Let's TRY WRITING ONE: more

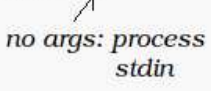
Usage:




more filename ...

OR

cmd | more



page024.html **024**

Let's try writing one: more

Usage: more filename
or
cmd | more

Action

- show 24 lines
- print MESSAGE
- accept 2, space, q
- if 2 advance line
- if space
- if q → exit

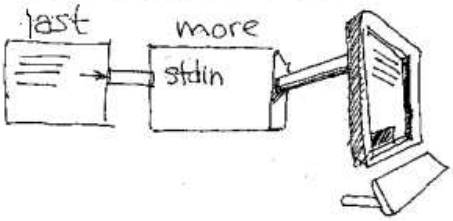
page025.html **025**

UNIX programming is not as hard as you think it is, but it's not as easy as you first imagine.

page026.html **026**

## Writing more

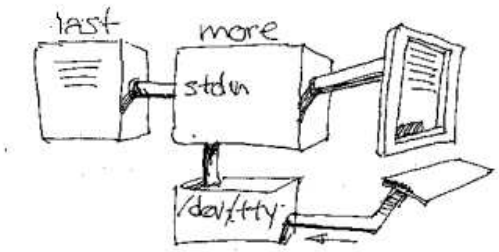
Our first draft




last | more

page027.html **027**

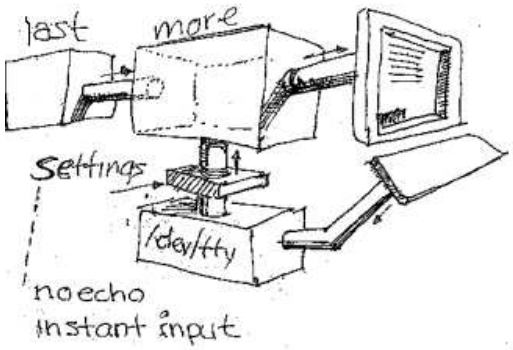
THE REAL MORE




last | more

page028.html **028**

THE REAL MORE




last | more

page029.html **029**

"more" questions

① % of file?

ANS: count lines?

ANS: the OS knows the filesize

②

page030.html **030**

"more" questions

① % of file?

ANS: count lines?

ANS: the OS knows the filesize

② Reverse Video

How to do it correctly?

ANS termcap & terminfo

db of every terminal + how to control it

page031.html **031**