Introduction

Outline

> What SA Should **do**.

> What You can expect to **learn** from this course.

> What **attitude** you should take.

> Syllabus

   – Course Info.

   – Content

   – Grade Policy

> Am I OK to take this course?

> UNIX Introduction

What System Administrator Should do? (1)

> Ordinary list

– Install new system, programs and OS updates

– Monitoring system and trying to tune performance

– Adding and removing users

– Adding and removing hardware

– Backup and Restore

– Security

What System Administrator Should do? (2)

> Non-technique list

- Helping users
- Maintaining documentation
- Moving furniture
- Burning your lung
- Good communication and memorization

What System Administrator Should do? (3)

> The best words to describe the job

- Thankless job.
- System administration is like keeping the trains on time; no one notices except when they're late.

Philosophy of system administration

> Know how things really work.

> Plan it before you do it.

> Make it reversible

> Make changes incrementally.

> Test before you unleash it .

Flow of Change
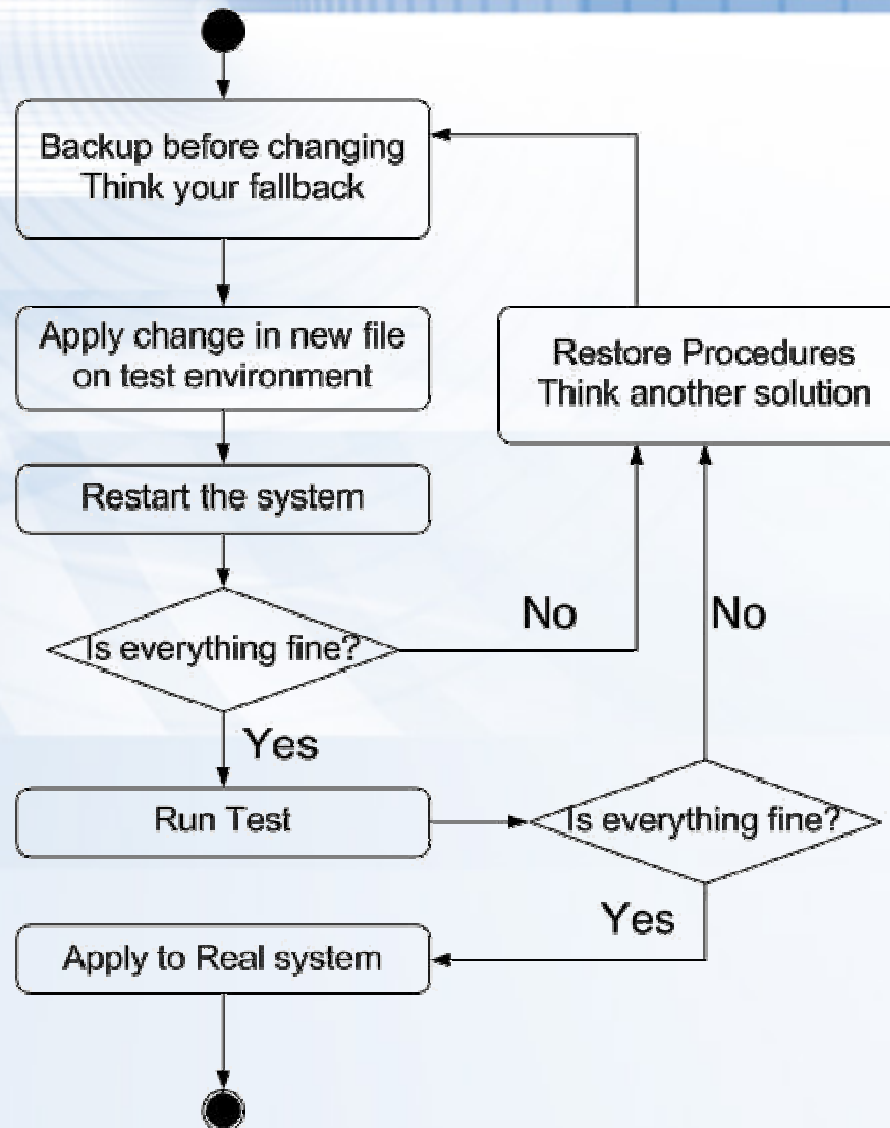
What you can learn in this course?

> Mostly, the skill to be a candidate of system administrator

> Secondary, information about csie computer center

Attitude

> Attend every class

> Do every exercise

    – As early as possible

    – On your own

> Read book at least 6 hours every week

> Collect information on the internet

Syllabus

> http://www.csie.nctu.edu.tw/~tytsai/course/sysadm/

> Instructor:
  – 蔡宗易 tytsai@csie.nctu.edu.tw

> Time:
  – Mon IJK (PM 6:30 ~ 9:20)

> Textbook:
  – UNIX System Administration Handbook," 3rd ed.

Syllabus - Content

> We will cover the following chapters in this semester:
- Chapter 1 ~ 12
- Chapter 13, 17, 18, 22, 23, 26
- Shell Programming

> The following chapters is covered in the next semester:
- Chapter 14, 15, 16, 19, 20
- News Server
- SNMP
- Perl Programming

Syllabus – Grade Policy

> Mid
  - 30 ~ 35%
    - **2004/11/15**

> Final
  - 30 ~ 35%
    - **2005/01/03**

> Exercise
  - 35 ~ 45%
    - **No Delay Work**
    - **We will have probably 9 exercises**
    - **We may have some bonus exercises**

Grade will not be normalize.
Why?
Do exercise gets points.
Study book gets points.

This might be discussed again in class when the list is ascertained.

Finally,
Am I OK to take this course?

> Are you willing to devote yourself to exercise?

  – Yes! Please come

> Are you newbie in this area?

  – Yes!? It's ok, Please come

> Do you take more than 3 major courses?

  – Yes!??? <u>It is quite dangerous</u>, but I can not stop u

UNIX History (1)

> Before Multics there was chaos, and afterwards, too

– Multics:

- <u>Multi</u>plexed information and <u>C</u>omputing <u>S</u>ervice
- 1965 ~ 1969
- Bell labs, GE, MIT
- Ken Thompson, Dennis Ritchie

Lucent Technologies
Bell Labs Innovations

UNIX History (2)

> From Multics to something else

– Ken Thompson first written a game called "Space Travel" on Multics on GE machine in 1969.

– Implement "Space Travel" on PDP-7 again.

– Thompson began to design the shell, the editor and the assembler on PDP-7.

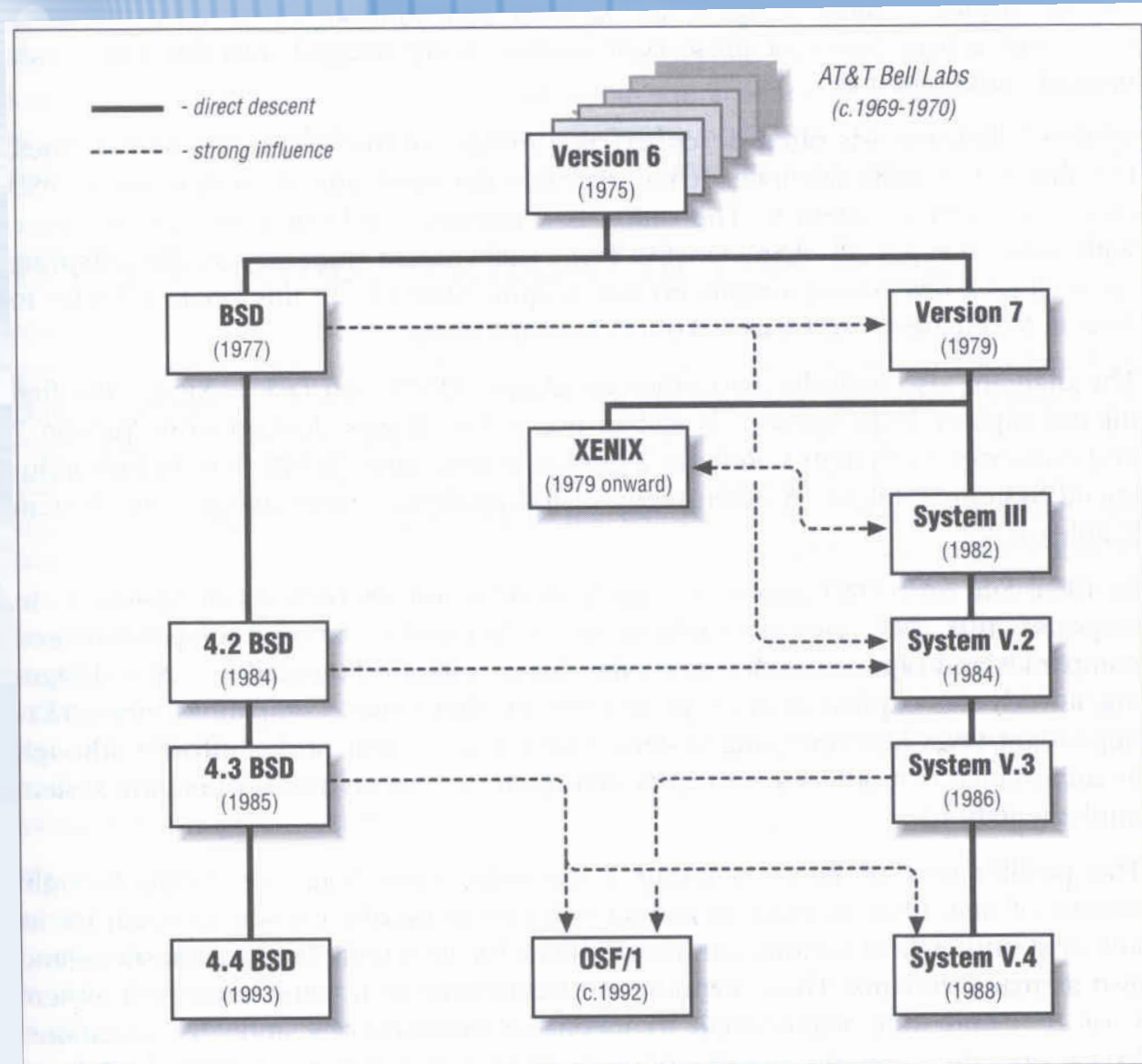– In 1970, Brian Kernighan suggested the name "UNIX".

UNIX genealogy

> ## AT&T
> - Version 7~10
> - System III ~ V
> ## UCB
> - BSD
> ## IBM、DEC、HP
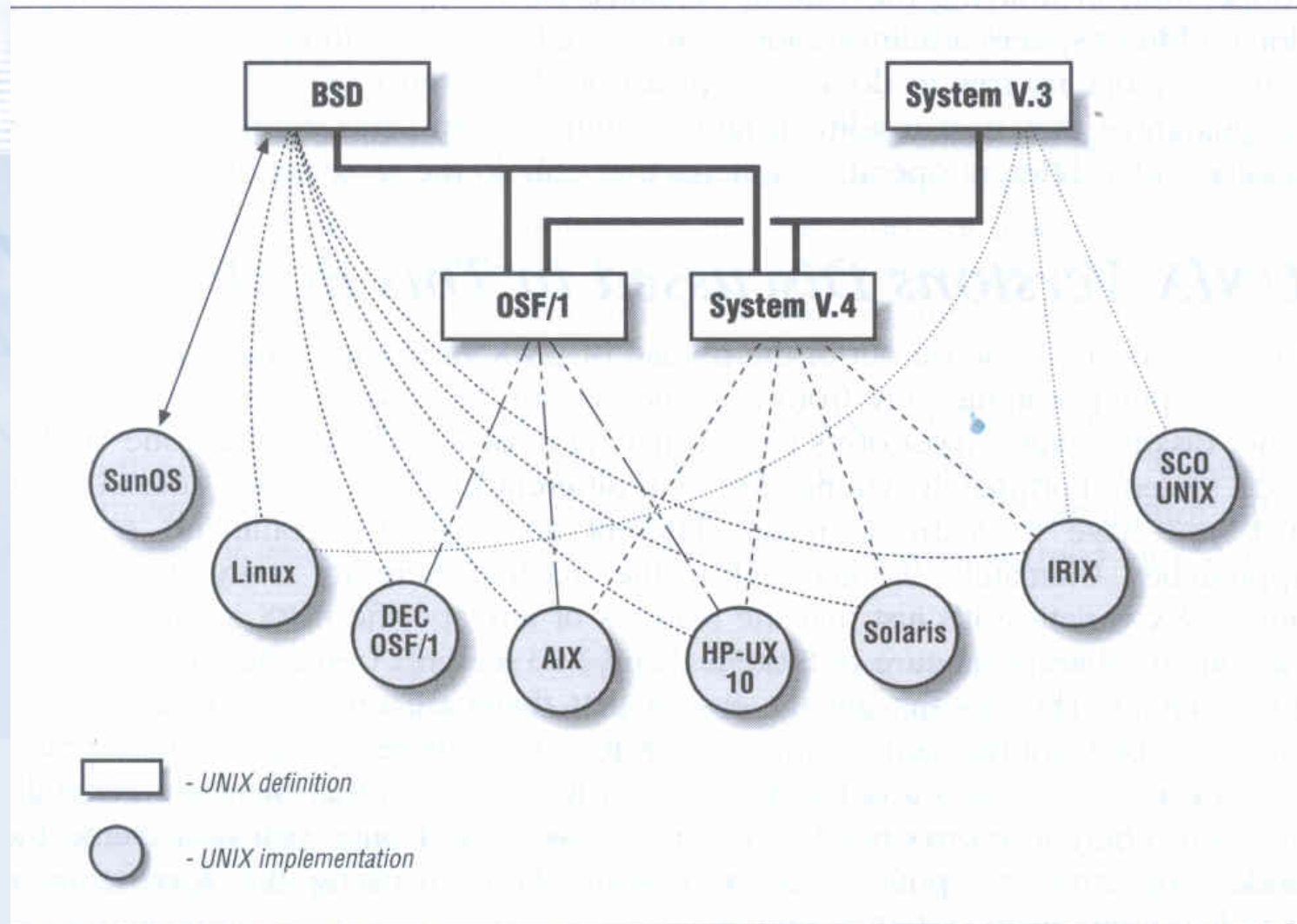> - OSF/1

UNIX versions

Figure 2: UNIX versions discussed in this book

man pages (manual)

> Contain descriptions of

- Individual command.
  - **% man cp**
- File format.
  - **% man rc.local**
- Library routines.
  - **% man strcpy**

man command

> Command

   – % man [-s section] *title*   (AT&T)

   – % man [section] *title*   (BSD)

      • **% man printf**   (bash printf command)

      • **% man 3 printf**   (C Standard printf func.)

      • **% man –k exit**   (keyword search)

> Man pages organization

AT&T	BSD	Contents
1	1	User-Level **commands** and applications
2	2	**System calls** and kernel error code
3	3	**Library** calls
4	5	Standard file format
5	7	Miscellaneous files and documents
6	6	Games and demonstrations
7	4	Device Drivers and network protocols
1m	8	System administration commands
9	9	Obscure kernel specs and interfaces

UNIX Concepts - ID

> ## User ID, Group ID
  - % **id** tytsai
    - **uid=11896(tytsai) gid=200(dcp) groups=200(dcp)**

> ## Super user
  - root
    - **uid=0(root) gid=0(wheel) groups=0(wheel)**, ...

> ## Other Important Users
  - daemon: owner of unprivileged software
  - bin: owner of system commands
  - sys: owner of the kernel and memory images
  - nobody: owner of nothing

Unix Concept - Files

> % ls –l

– d rwxr-xr-x 22 tytsai dcp   512 Sep 1 18:17 public_html/

File type

File access mode

# of inodes

File user owner

File group owner

File size

File last modify time

File name

File types

> File types

symbol	File types
b	Block device file
c	Character device file
d	Directory
l	symbolic Link
s	Socket
p	named Pipe
-	Regular file

> **file** command
  - determine file type
    - **% file .tcshrc ➔ .tcshrc: ASCII text**
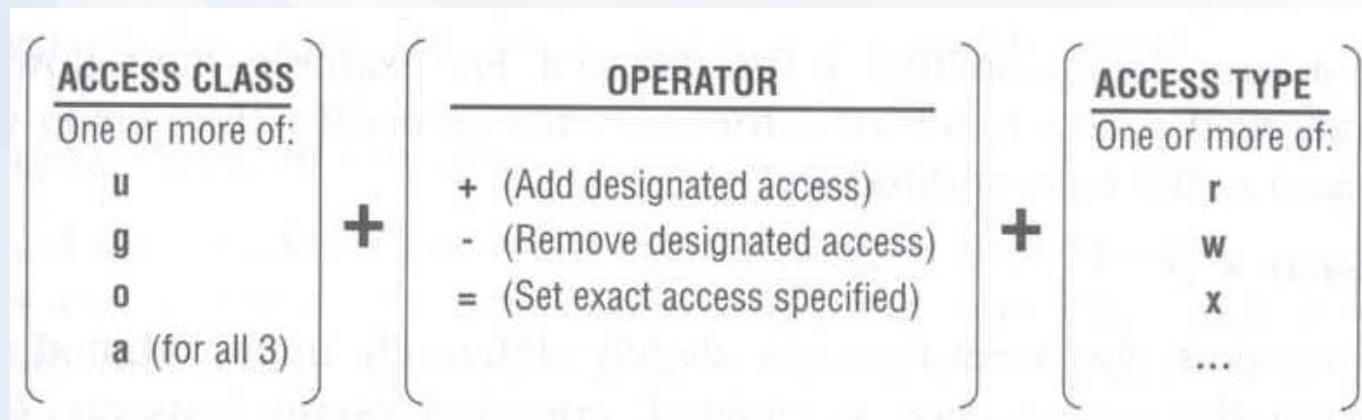 - /usr/share/misc/magic

File Access Mode

> ## rwx r-x r-x

  – User, group, other privileges

> ## chmod command

  – % **chmod** *access-string   file*

    • % chmod u+x test.sh
    • % chmod go-w .tcshrc
    • % chmod u+w,r-w hehe haha
    • % chmod –R 755 public_html/

ACCESS CLASS One or more of:		OPERATOR		ACCESS TYPE One or more of:
u	**+**	+ (Add designated access)	**+**	r
g		- (Remove designated access)		w
o		= (Set exact access specified)		x
a (for all 3)				...

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File Protection

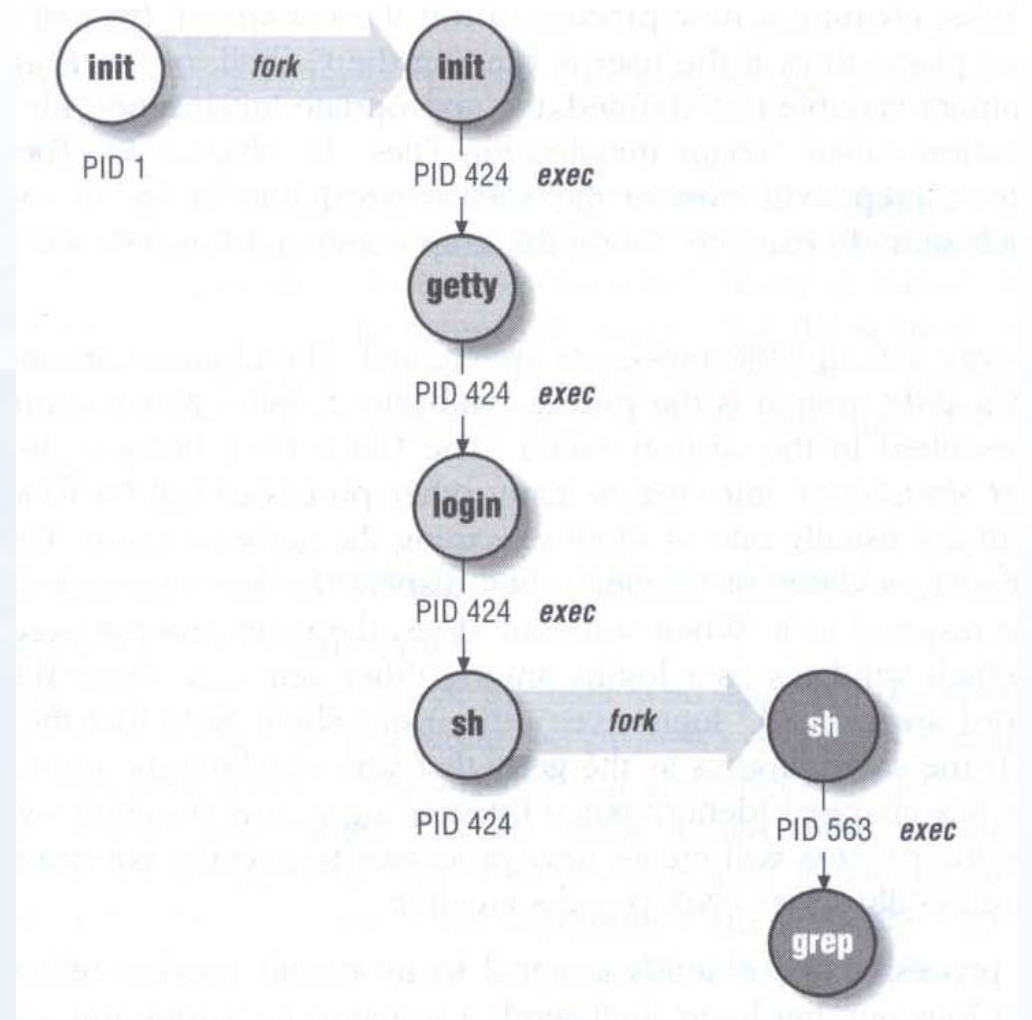| Command	Minimum Access Needed	
	On file itself	On directory file is in
cd /home/test		x
ls /home/test/*.c		r
ls –s /home/test/*.c		rx
cat runme	r	x
cat >> runme	w	x
run-binary	x	x
run-script	rx	x
rm rumme		wx

UNIX Concept - Process

> A working program

– foreground

- **remain attached to the terminal**

– background

- **can not communicate with terminal**

> Process Life Cycle

– fork, exec

Watching Process

> ## ps command

– ps –aux, ps –auxww

- **USER, PID, %CPU, %MEM, VSZ RSS, TTY, STAT, START, TIME, COMMAND**
  - > D: in Disk
  - > I: Idle
  - > R: Running
  - > S: Sleeping
  - > T: sTopped
  - > Z: Zombie
  - > man ps...

```
tytsai@qkmj, ~, 12:33:25, CODE=0                                    _ □ X
Connection  Edit  Transfer  Options  Help
USER         PID %CPU %MEM   VSZ   RSS  TT  STAT STARTED       TIME COMMAND      ▲
root           0  0.0  0.0     0     0  ??  DLs  23Aug04    0:00.00  (swapper)
tytsai     81638  0.0  0.2   540   400  pi  R+   12:33PM    0:00.00 ps auxww
```

Kill Process

> kill command

– % **kill** –[*signal_name*] pid

– % **kill** –[*signal_number*] pid

- % kill –HUP 88192   (hang up, reset)
- % kill -1 88192
- % kill –TERM 12345   (software termination)
- % kill –15 12345
- % kill –KILL 3456   (kill program at OS level)
- % kill -9 3456

CSIE workstation group

> FreeBSD

  – ccbsd1 ~ ccbsd12, ccbsd18

> Linux

  – linux1 ~ linux20

> Solaris

  – ccsun1 ~ ccsun7

> SunOS

  – ccsun30, ccsun31, ccsun32

Thank you!

> Q & A