Users and accounts

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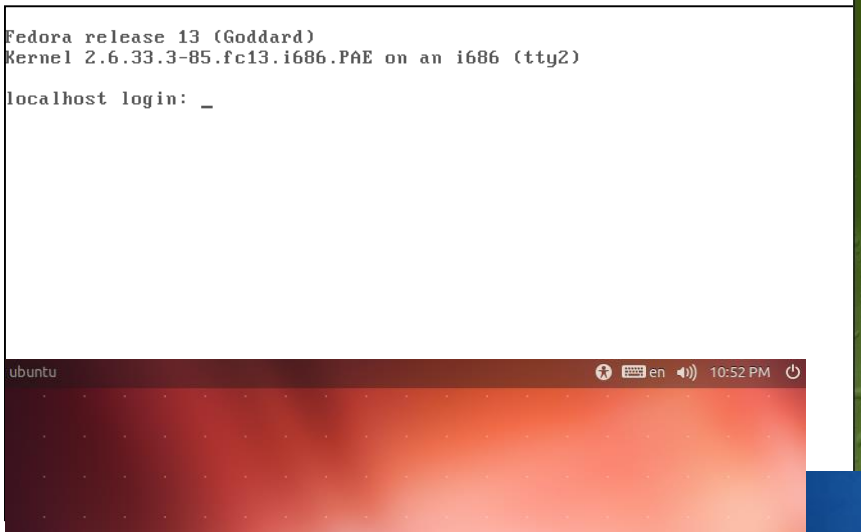
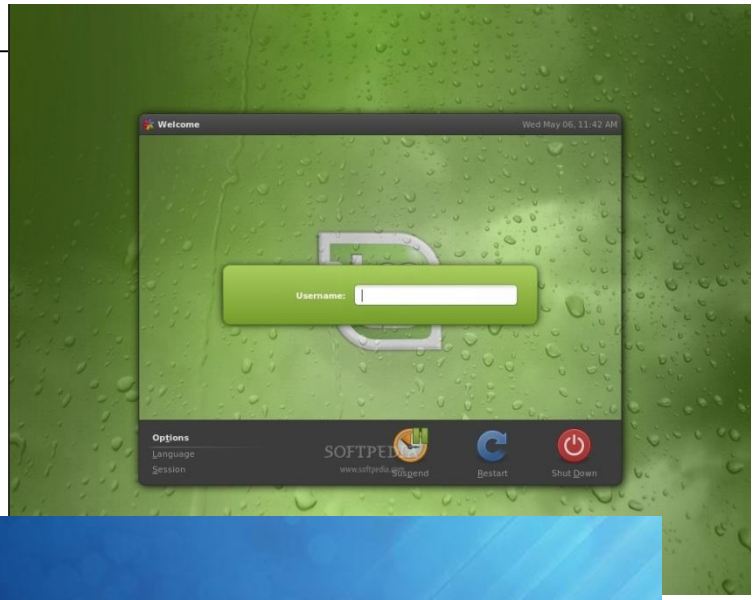
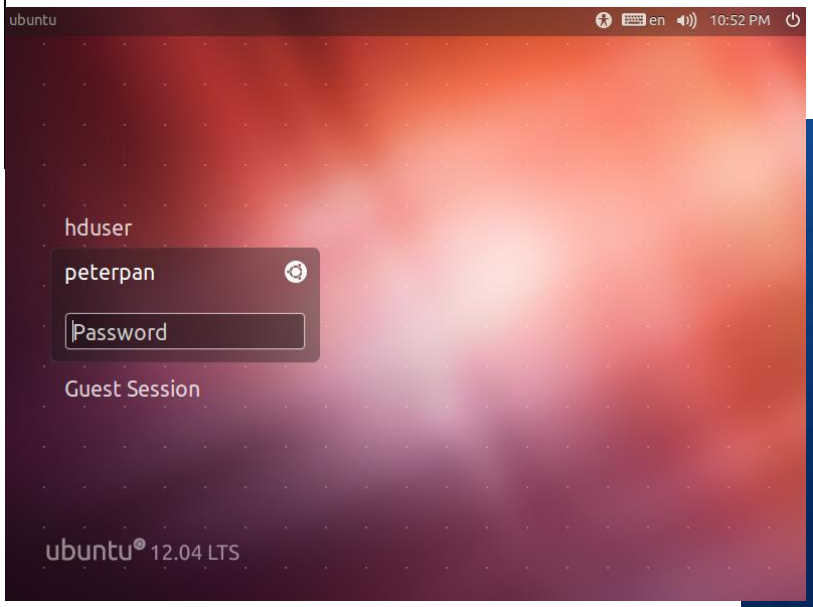
Using a LINUX system

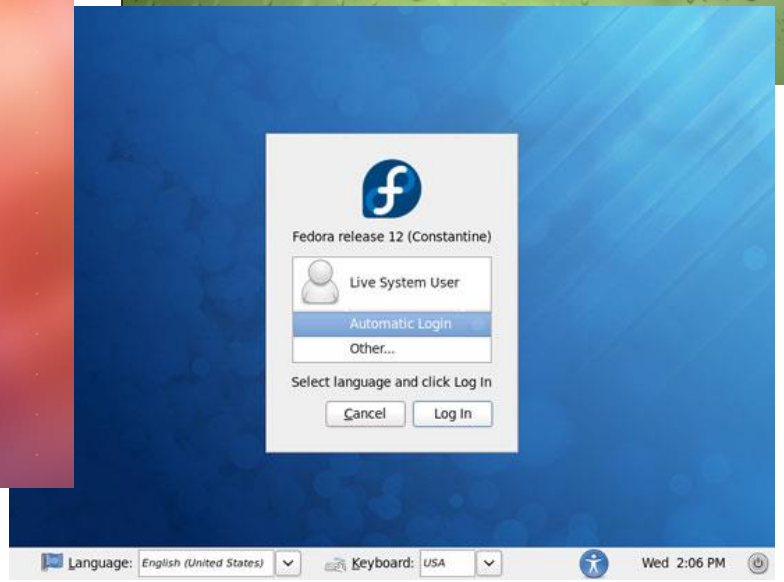
- Login prompt displayed
  - When Linux first loads after booting the computer
  - After another user has logged out
- Need to enter a **username** and **password**
- The login prompt may be graphical or simple text
  - if text, login prompt will present a **shell**
  - If graphical, login prompt will present a desktop
    - A shell runs in a terminal window

Login Prompts









Linux Command Line

- A shell is where commands are invoked
- A command is typed at a shell prompt
  - A prompt ends in a sign : **$ or % or >**
- After typing a command, press **Enter** to invoke it
  - The shell will try to obey the command
  - Another prompt will appear
- Example:

```
$ date
Fri Mar 2 09:10:00 PST 2012
$
```

Command Syntax

- Most commands take **parameters**
  - Some commands require them
  - Parameters are also known as **arguments**
  - Commands are **case-sensitive**
  - Example : echo simply displays its arguments

```
$ echo

$ echo Hello linux
Hello linux
$ ECHO
bash: ECHO : command not found
```

Logging out

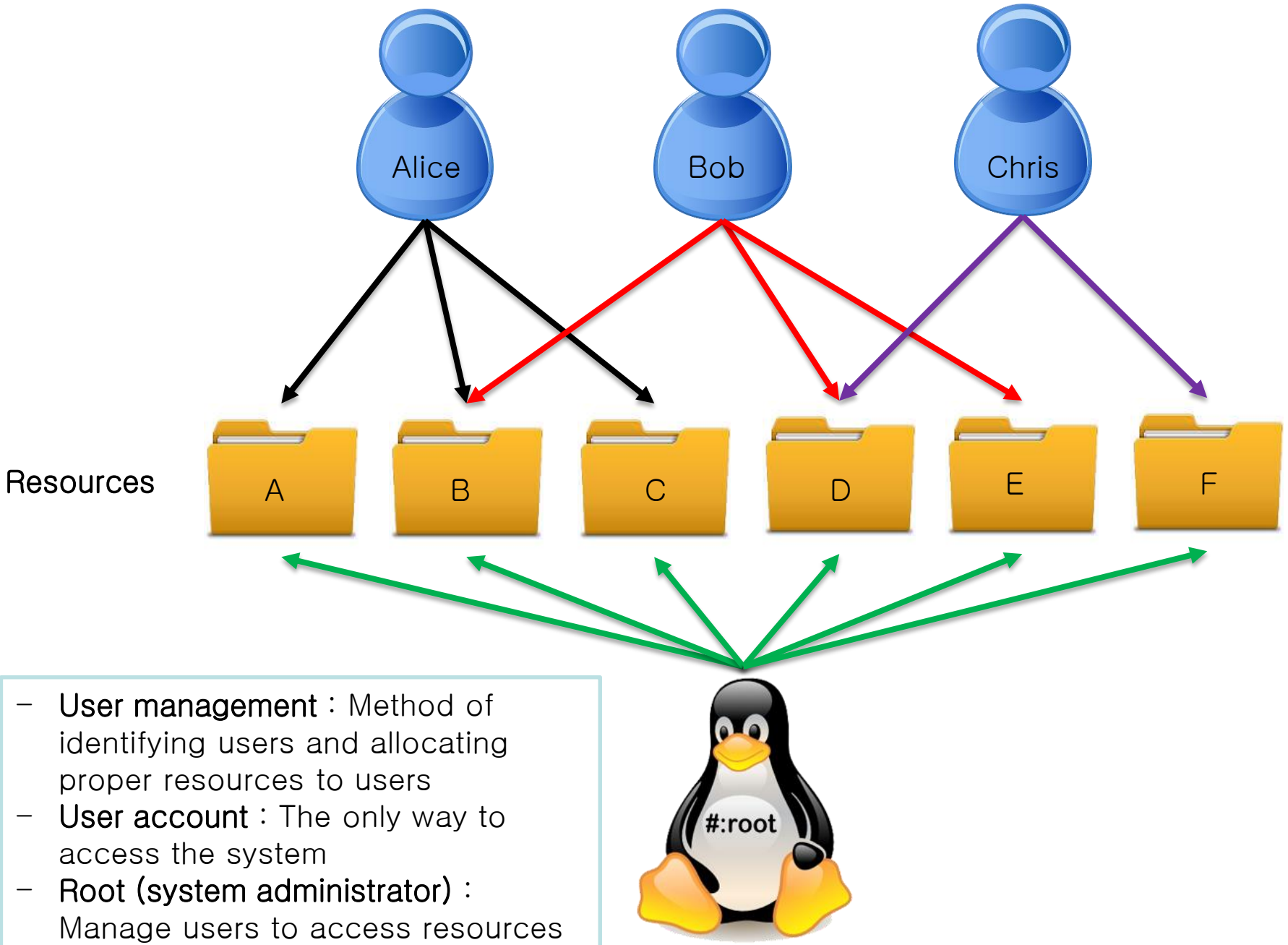
- To exit from a shell, use the **exit** command
- Pressing **Ctrl+D** at a shell prompt will also quit the shell
- Quitting all programs should log you out
  - In a text-only single-shell environment, exiting the shell should be sufficient
  - In a window environment, the window manager should have a log out command for this purpose
- After logging out, a new login prompt should be displayed
- C.F.)Shutdown : power off the machine

Users and Groups

- Anyone using a Linux computer is a **user**
- The system keeps track of different users, by **username**
  - Security features allow different users to have different privileges
- Users can belong to **groups**
  - Allowing security to be managed for collections of people with different requirements

The superuser : Root

- Every Linux system has a user called **'root'**
- The root user is all-powerful
  - Can access any files
- The root user account should only be used for system administration, such as installing software
- When logged in as root, the shell prompt usually ends in '#'



- **User management** : Method of identifying users and allocating proper resources to users
- **User account** : The only way to access the system
- **Root (system administrator)** : Manage users to access resources

User accounts

account:password:UID:GID:GECOS:home directory:login shell

- User information is stored in **/etc/passwd** file
  - account : login ID or username
  - password : encrypted field for the user password
    - /etc/shadow : contains password chunks
  - UID : user ID (UID), Linux identifies accounts with this ID.
  - GID : group ID (GID), ID of the default group of this account
  - GECOS : Optional filed
    - General Electric Comprehensive Operating Systems
    - usually used for the full user name
  - home directory : the absolute path of the account
  - login shell : the default shell of the account
- **/etc/shadow** : Secure user account information
  - You can see the password, even though it is encrypted

/etc/passwd

```
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/bin/sh
bin:x:2:2:bin:/bin:/bin/sh
sys:x:3:3:sys:/dev:/bin/sh
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/bin/sh
man:x:6:12:man:/var/cache/man:/bin/sh
lp:x:7:7:lp:/var/spool/lpd:/bin/sh
mail:x:8:8:mail:/var/mail:/bin/sh
news:x:9:9:news:/var/spool/news:/bin/sh
uucp:x:10:10:uucp:/var/spool/uucp:/bin/sh
kbkim:x:1000:1000:Kyungbaek Kim,,,:/home/kbkim:/bin/bash
yez:x:1001:1001:Ye Zhao,,,,:/home/yez:/bin/bash
mglee:x:1002:1001::/home/mglee:/bin/bash
```

Decoding user information

```
kbkim:x:1000:1000:Kyungbaek Kim,,,:/home/kbkim:/bin/bash
```

- Account : kbkim
- Password : x (not displayed to users)
- User ID : 1000
- Group ID : 1000
- GECOS (Optional Field): Kyungbaek Kim
- Home Directory : /home/kbkim
- Login shell : /bin/bash

/etc/shadow

```
daemon:*:16105:0:99999:7:::
bin:*:16105:0:99999:7:::
peterpan:$1$4cxEeSCx$JeWhRsuySxowaR8mf5sKT0:16205:0:99999:7:::
```

Account : Password : Last changed : MIN : MAX : WARNING : INACTIVE : EXPIRE : R

- Account → Login name
- Password → Encrypted password
- Last changed → The date of the last password change, expressed as the number of days since Jan 1, 1970
- MIN → The minimum password age. The number of days the user will have to wait before she will be allowed to change her password again. The empty field and value 0 mean that there is no minimum password age.
- MAX → The maximum password age. The number of days after which the user will have to change her password.
- WARNING → The password warning period. The number of days before a password is going to expire. When the password is expired, no login is possible using the current user's password
- INACTIVE → The password inactive period. The number of days after a password has expired during which the password should still be accepted.
- EXPIRE → Account expiration date. After this date, the user shall not be allowed to login. (C.f. password expiration)

UID

- User ID
  - A computer is a number-oriented machine.
    - Different accounts with the same UID are recognized as the same user of Linux
  - Regular user's UID usually starts from 1000
  - 0~999 and 65534 is assigned for Linux
    - **0** : UID of Root
    - 1 : daemon
    - 65534 : nobody

Groups and GID

- Users may be grouped together into a “group”
- Users may choose to join an existing group to utilize the privileged access it grants
- All the groups on a system are listed in **/etc/group** file
  - Representing which users are included in which group
- A private GID for every UID of 1000 and greater is created
- GID of passwd file → the default group of the account
  - Other groups are described in /etc/group file

/etc/group

```
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:kbkim,nmdo,yez
tty:x:5:
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
kbkim:x:1000:
dsm:x:1001:kbkim,mglee,yez
yez:x:1002:
```

Group name: x : GID : Group member

- Group name → name of the group
- x → group password, not shown to user
- GID → group id
- Group member → members of the group, separated by comma “,”

Kbkim
→ Default group : kbkim (GID 1000)
→ Supplementary groups : adm, dsm

su command

- Use **su** to switch to a different user
  - Quicker than logging off and back on again
- Usually best to use **su** for working as root.

```
$ su - peter
Password:
```

Changing to another user named peter

```
$ su -
Password:
```

Changing to root

"-", "-l", or "--loging" ➔ Provide an environment similar to what the user would log in directly.

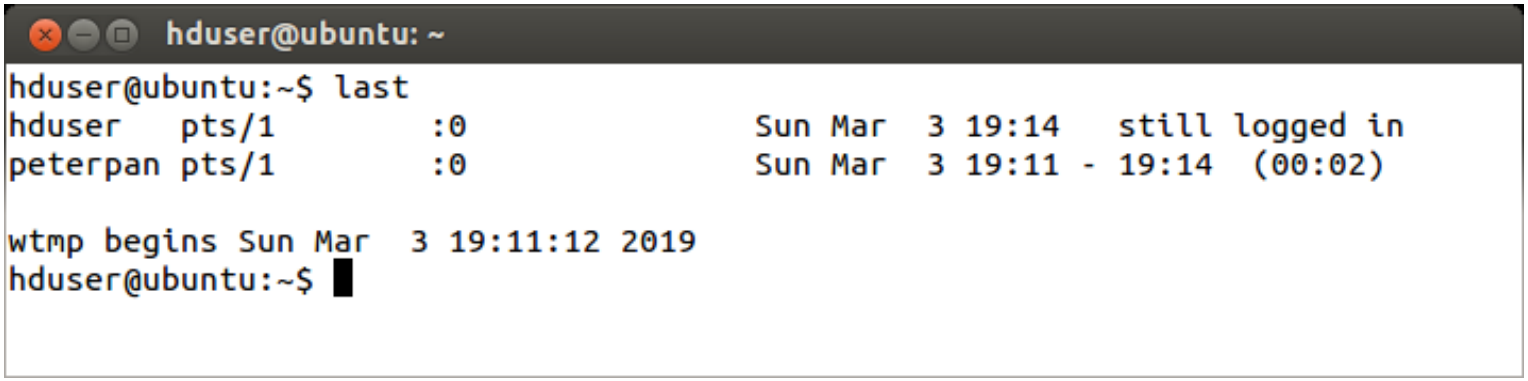
who and whoami command

- who
  - Display who is on the system
- whoami
  - Display the effective username of the current user when invoked

```
$ whoami
kbkim
$ su -
Password:
# whoami
root
```

Last command

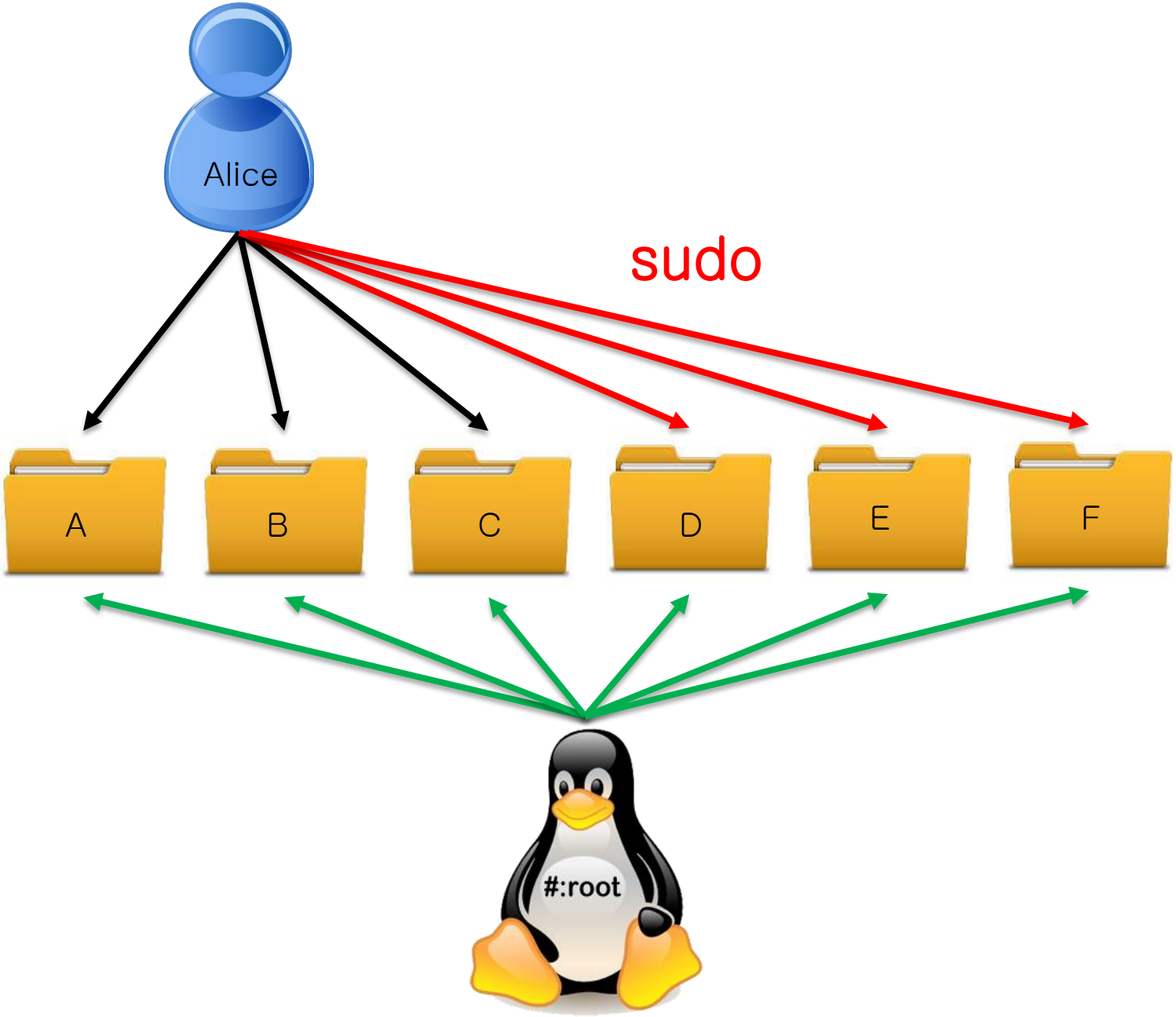
- last
  - Display account, login, logout, terminal or IP address



sudo command

- Use **sudo** command to acquire root privilege without switching to root user
  - A user simply give his password to acquire root privilege through sudo
  - Once you give the password for sudo, you don't need to provide password again until its token is expired

```
$ whoami
kbkim
$ sudo whoami
[sudo] password for kbkim:
root
```


Alice
sudo
A
B
C
D
E
F
#:root

sudoers

- Users who can perform “sudo”
  - So, we call sudoer (“sudo” + “er”)
- */etc/sudoers* file controls sudoers

```
#User Specification Syntax → Account  Host=Command
root    ALL=(ALL:ALL) ALL
#user1 has root privilege while running “useradd”
user1 ALL=/user/sbin/useradd

#Members of group admin do not need a password
%admin ALL=NOPASSWD: ALL
#Members of the sudo group may gain root privileges
%sudo ALL=(ALL:ALL) ALL
#Add users to group “admin” or “sudo” to make them sudoers.
```

Adding a user

- **useradd** command
  - Parameters for adding a new user
    - Username
    - -m : creating the user home directory (/home/[username])
    - -g [default_group] : defining the group name of the user's default login group
    - –G [supplementary_groups] : introducing a list of supplementary groups which the user is also a member; each group is separated by comma
    - –p [password] : defining the default password
      - Encrypted password : possibility of leak – not recommended option
    - -d [home_directory] : defining the home directory
    - –s [login_shell] : defining the path and filename of user's default login shell
    - -o : allow non-unique UID
  - e.g.) useradd –m –g team1 steve

Adding a user : Example

- Make a user “stack” and make him a sudoer.

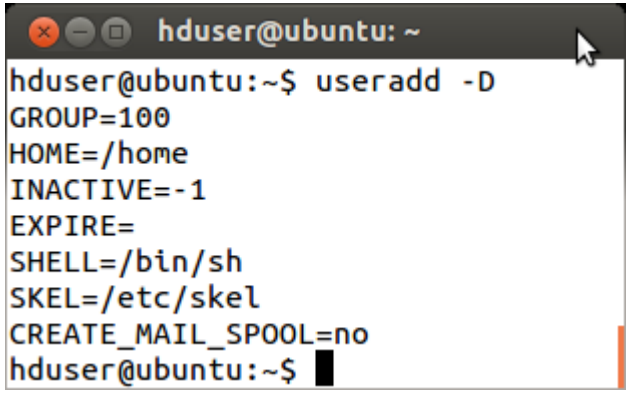
```
$ useradd -m -G admin -s /bin/bash stack
```

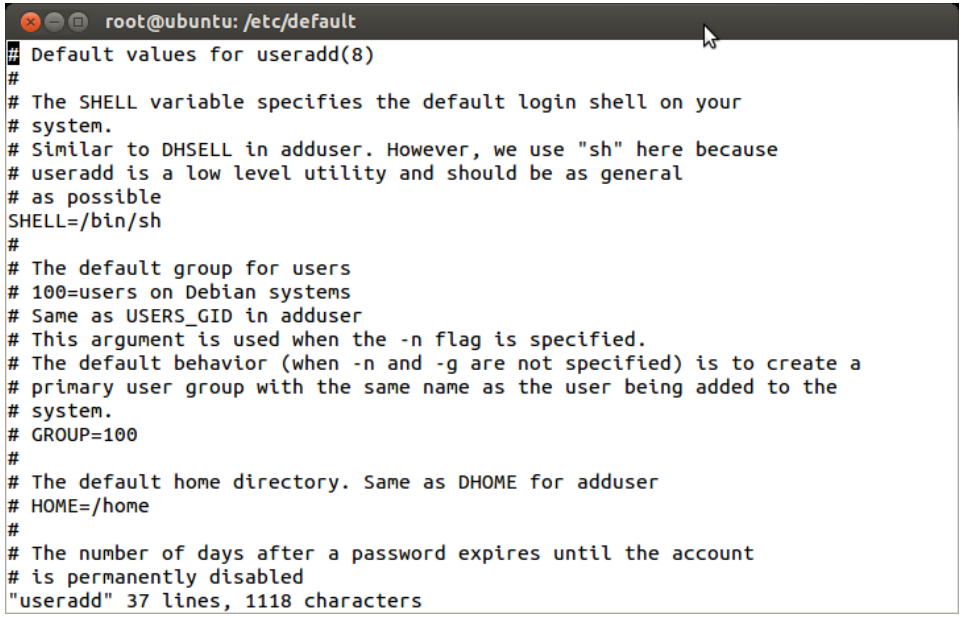
- Make a user “gslee” and set his default group to “faculty” group

```
$ useradd -m -g faculty -s /bin/bash gslee
```

Checking default configuration of “useradd”

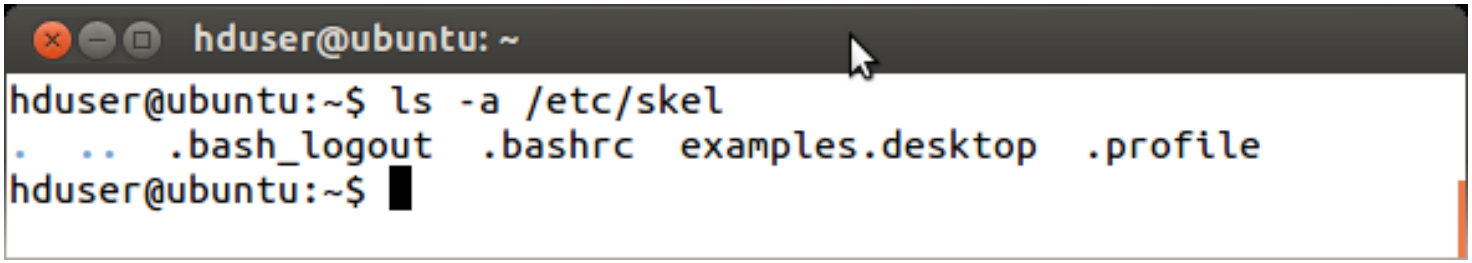
- useradd –D
  - Checking the default configuration of “useradd”
  - “/etc/default/useradd” contains the details of default configuration
    - Modify this file for the configuration





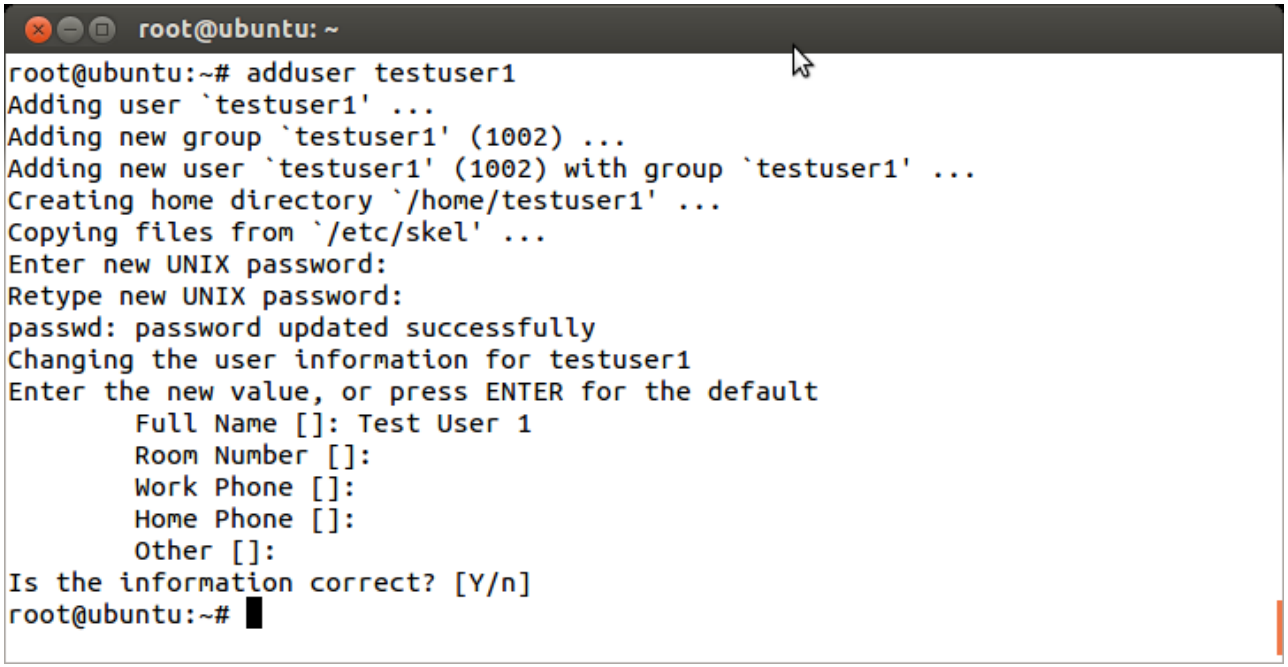
Resource skeleton for a user

- "/etc/skel" directory
  - Contains the default files to be distributed when a new account is generated
  - Bash settings : ".bashrc", ".bash_logout"
  - Other files : "examples.desktop"



“adduser” command

- Alternative command for adding a user
- Options : --uid UID, --gid GID,
  --home DIR, --shell SH



Modifying Users

- **usermod** command
  - Modifies the system account files to reflect the changes that are specified on the command line
  - e.g.) usermod –g prof kbkim
  - Options
    - Similar to the **useradd** command
    - c.f.) –l : change account name as a new name, should check the existence of home directory
    - c.f.) –m : move the user home directory (do not create the directory)

Managing User

- **passwd** command
  - Specifying the password of a user
  - e.g.) passwd kbkim
- **chfn** command
  - Change the GECOS field
  - e.g.) chfn kbkim
- **userdel** command
  - Deleting a user account
  - -r option : removing home directories as well
    - e.g.) userdel -r kbkim
  - -f option : forcefully deleting a user account, even though the user is logging in

Password aging related commands

- passwd –n → set the minimum password age
- passwd –x → set the maximum password age
- passwd –w → set the password warning period
- usermod –f → set the password inactive period
- Usermod –e yyyy-mm-dd → set account expiration date

Managing Groups

- **groupadd** : creates and adds a new group
  - Without "-g" option, the next value of greatest GID will be assigned to a new group
  - E.g.) groupadd –g 1004 gradstudents
  - Alternative command : "addgroup"
- **groupmod** : changes name or GID
    - Options: -n name, -g GID
- **groupdel** : removes an existing group

Managing Groups : check up

- **groups** command
  - Display group membership of a user
  - e.g.) groups kbkim
- **id** command
  - Display details of group information of user
  - UID and GIDs
  - e.g.) id kbkim

Group password

- A group may have a password
- “gpasswd” command
  - Set the password of a group
  - Options
    - -a : add a user to a group
    - -d : delete a user from a group
    - -r : remove group password

newgrp command

- Log in to a new group
  - Change the current group ID during a login session
    - Group password is required