



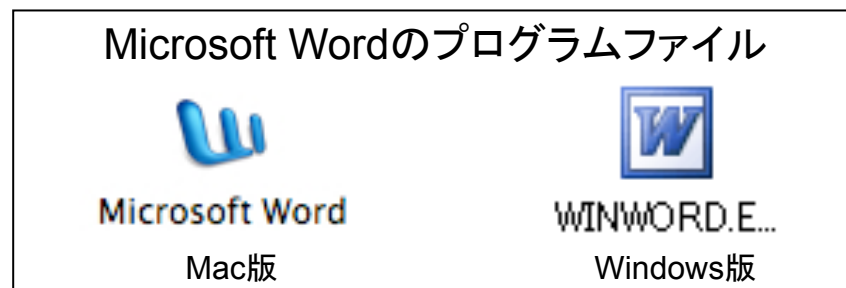
ICT Foundation

# File and Directory

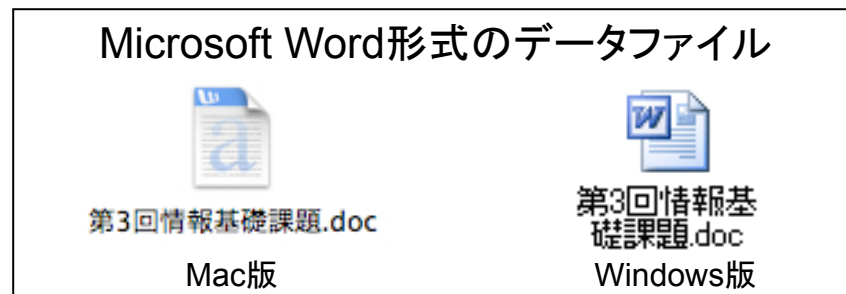
# File

---

- Files are unit to handle data that is created and edited by various softwares, and the softwares themselves as well
  - Softwares (programs) themselves are handled as files



- Data created and edited by softwares also handled as files



# Directory (Folder)

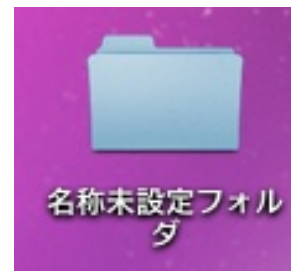
---

- Directory is container that used to group files in order to manage them.
- In this lecture, we use the name directory
  - In Windows and Mac, they are called Folder
  - In Unix, they are basically called Directory



新しいフォルダ

Folder in Windows



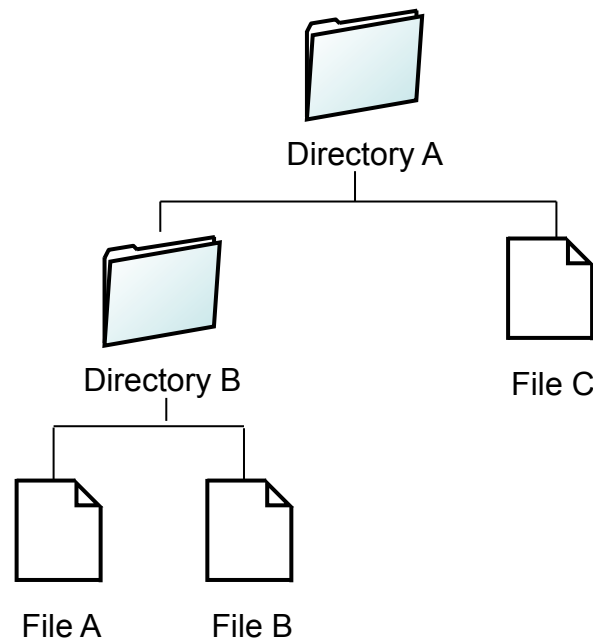
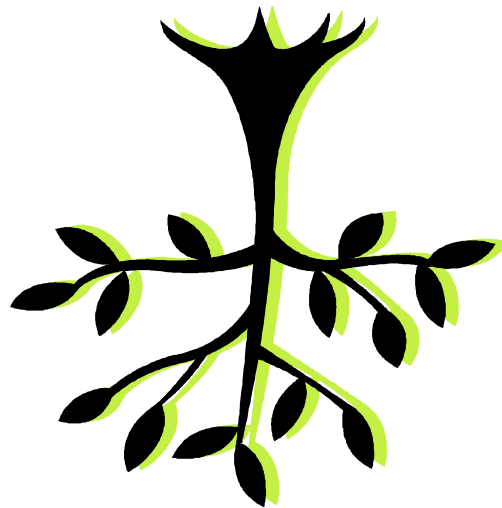
名称未設定フォルダ

Folder in Mac

# Tree Structure of File and Directory

---

- Directories can be put inside other directory
- This structure can be drawn as a tree in reverse order

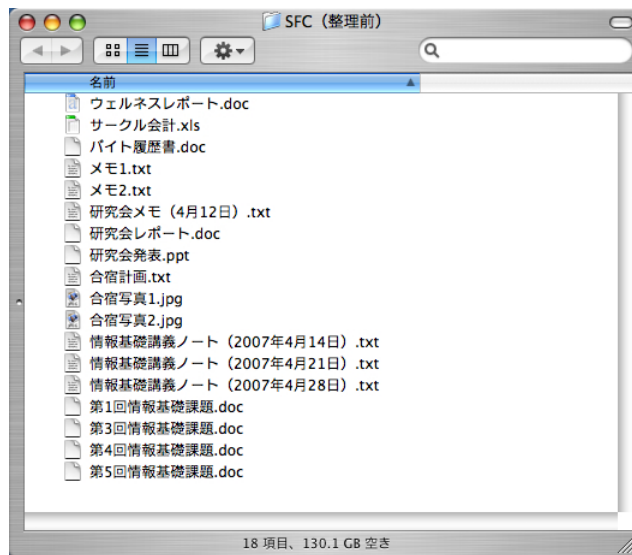


Directory A is parent of Directory B

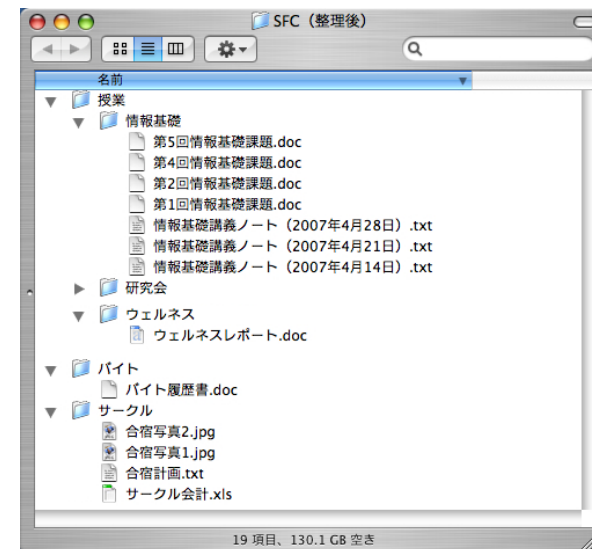
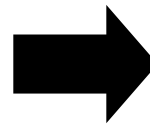
Directory B is a child of Directory A, as called as sub-directory

# File management by Directory

- File management such as Search, copy, move become easier if files are grouped and organized into directories



Before

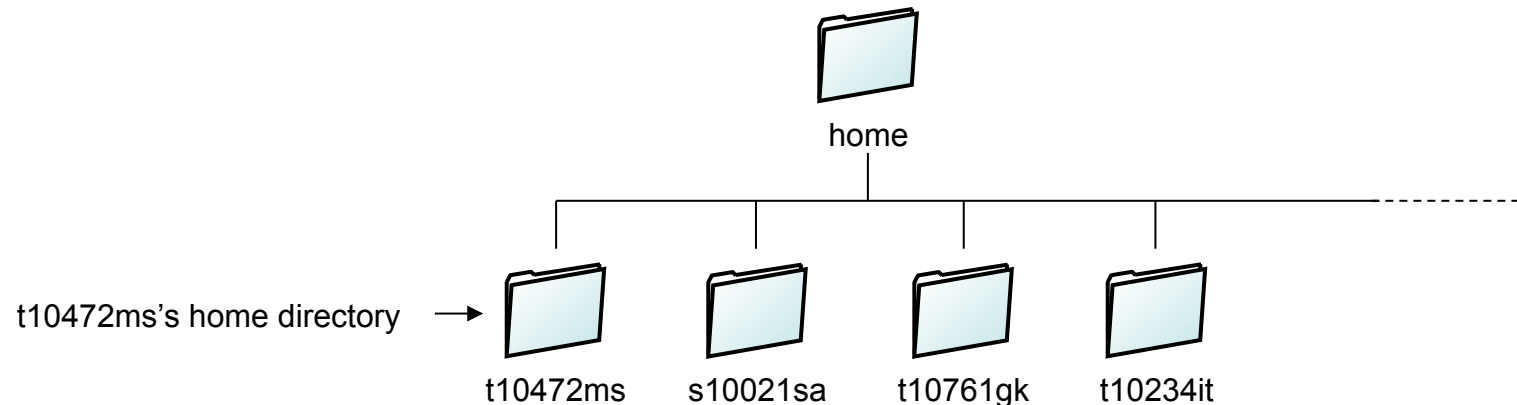


After

# CNS's File Server

---

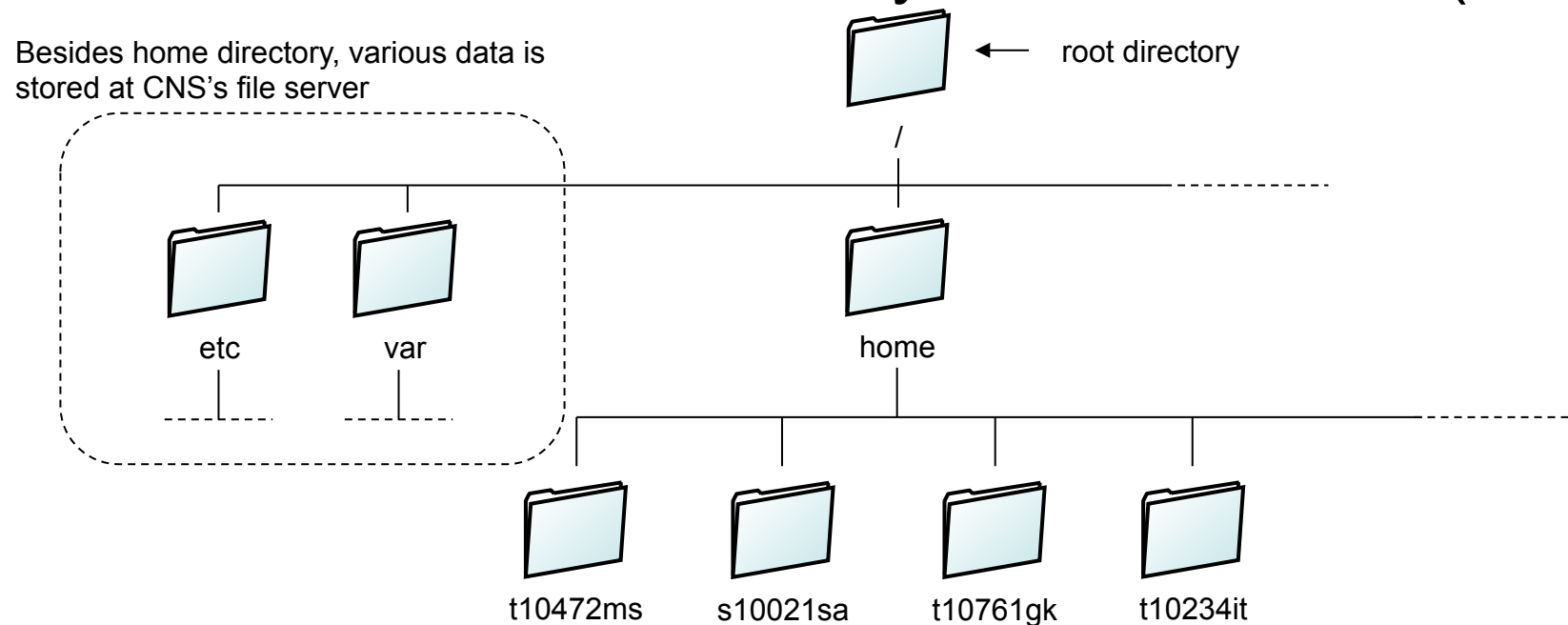
- In CNS computer, each user is given a directory similar to their login, which is used as home directory
- Private data (ex: report files, mail) is stored at home directory and its sub-directories
- Student should organize his home directory well



They can also be called as home folder, however because CNS use Unix's file server so the name "directory" is used more often

# Root Directory

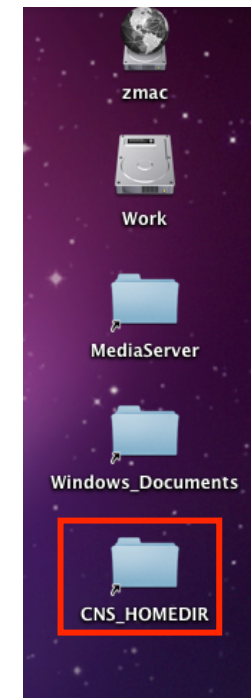
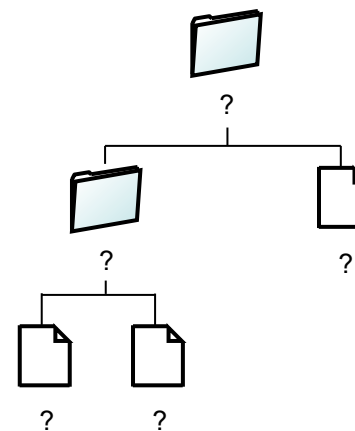
- The directory at the root of the structure's tree has no name
- It is called as root directory and shown as / (slash)



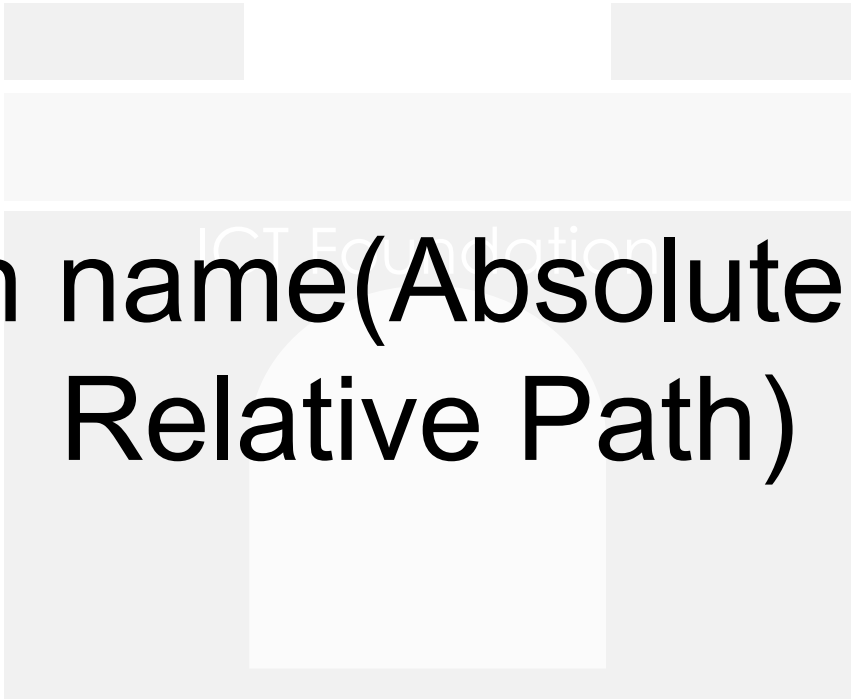
# Ex 1: Let's have a look at CNS's file server

---

- Start from your home directory, let's have a look around CNS's file server
- Draw the structure of directories in file server
- To access CNS's file server click on CNS\_HOMEDIR icon on your Desktop







# Path name(Absolute and Relative Path)

# Path name (Absolute and Relative Path)

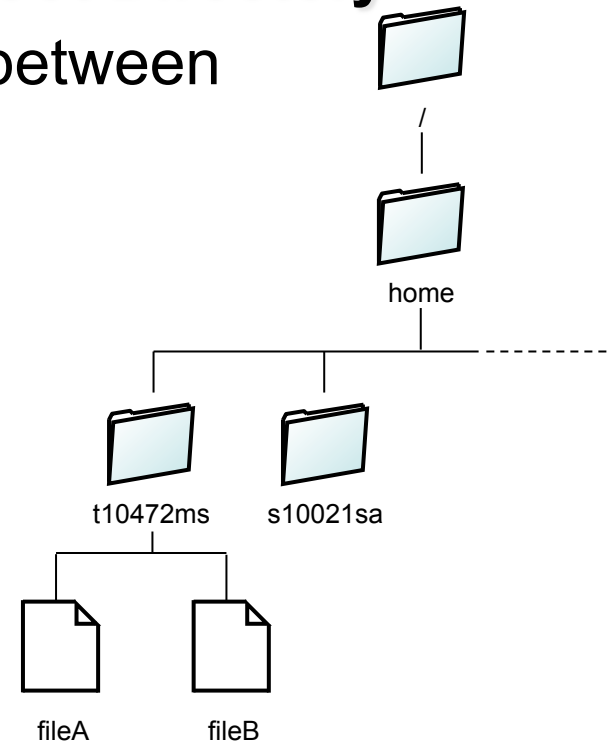
---

- In order to access files and directories, their location (path name) is required
- There are 2 ways to specify path
- Absolute path
  - Specify the absolute location using root directory as landmark
  - Ex: Absolute path is used in Address, for example “Kanagawa Pref, Fujisawa City, Endo 5322”
- Relative path
  - Specify the relative location using another directory as landmark
  - In some case, relative path is shorter than absolute one
  - Ex: Relative path is used in Address, for example “On the right of my house”

# Absolute Path

---

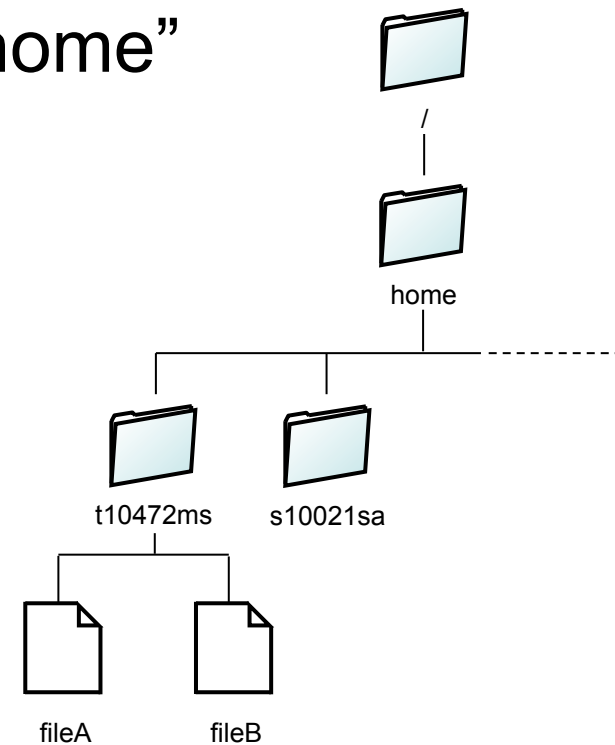
- Absolute path of File A
  - In English **“File A in Directory t10472ms which is in Directory home which is in root Directory”**
  - “/” (slash) is used to separate between two directories in path name**“/home/t10472ms/fileA”**



# Relative Path 1

---

- Relative path of File B from directory “t10472ms”
  - “fileB”
- Relative path of File B from “home”
  - “t10472ms/fileB”



# Relative Path 2

---

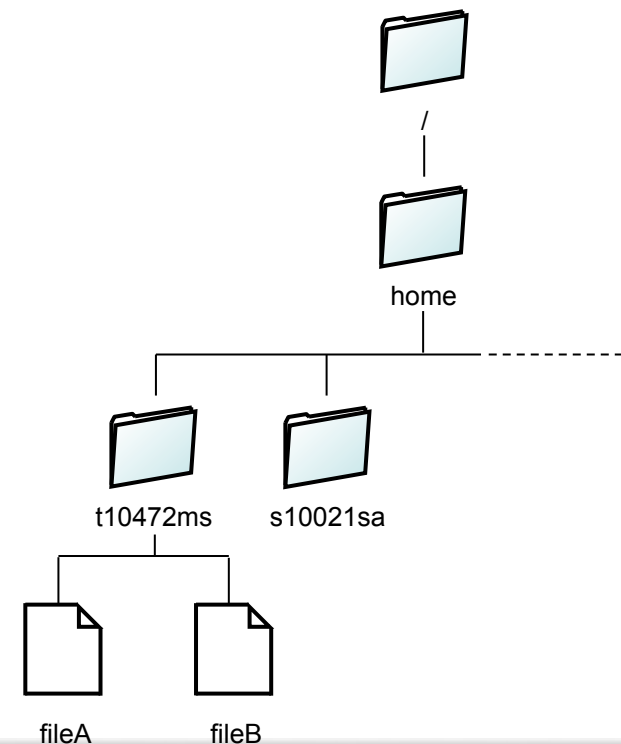
- Parent directory is represented as “..” symbol (double dots)
- Relative path of directory “home” from directory “t10472ms”

- “..”

(Only one parent directory exist for each directory, so this parent directory is unique)

- Relative path of File B from directory “s10021sa”

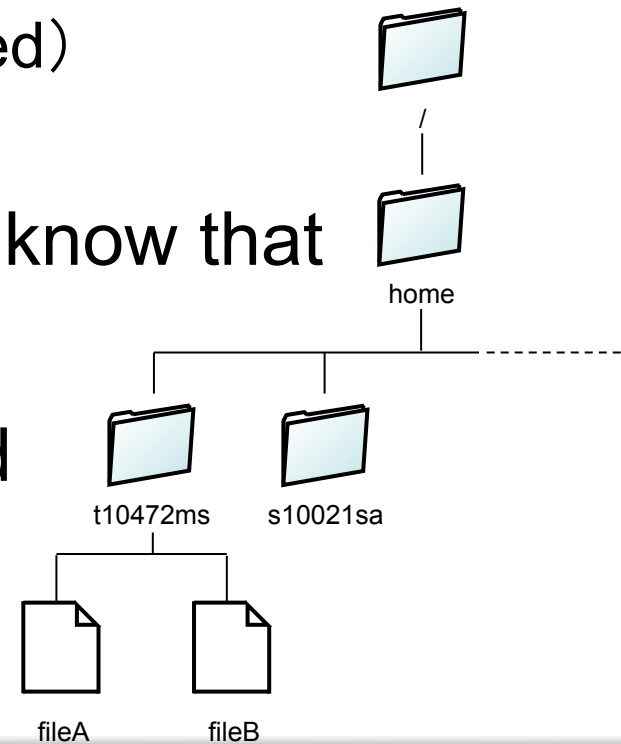
- “../t10472ms/fileB”




# Relative Path 3

---

- The directory which is currently used as landmark is represented as “.” symbol (single dot)
- Relative path of File A from “t10472ms”
  - “./fileA” (with current directory stated)
  - “fileA” (without current directory)
- With current directory stated, you know that it is relative path being used.
- Path name become easier to read





# Operation of File and Directory

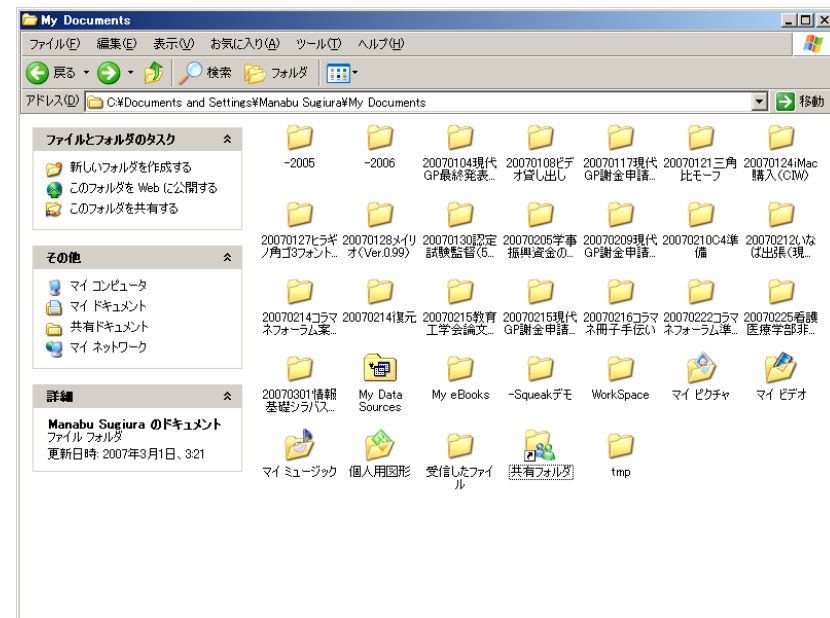
# File Management 1

## Manage file using file manager

---



Finder on Mac



Explorer on Windows



# File Management 2

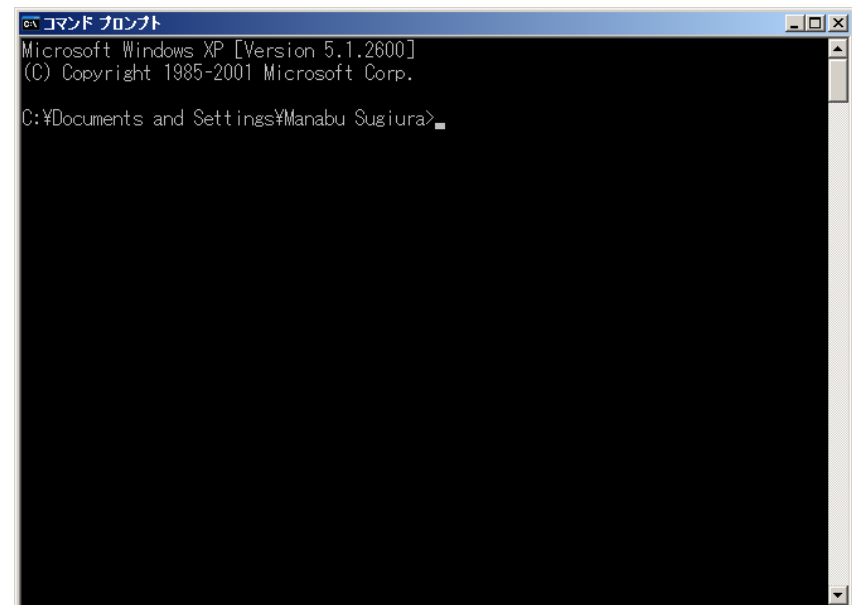
## Manage file using command line

---



```
ターミナル — bash — 80x24
Last login: Sat Apr 3 13:06:54 on console
CreW-iMac:~ manabu$
```

Terminal on Mac



```
コマンド プロンプト
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Manabu Sugiura>
```

Command prompt on Windows

# GUI and CUI

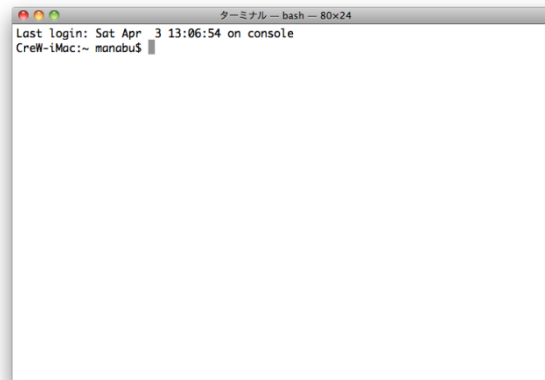
---

- Graphical User Interface (GUI)
  - Basically using mouse and pointing devices to work with icons and menu displayed on the screen
  - Finder(Mac) and Explorer(Windows) are GUI File Managers (Software that has function to manage files)
  - Working intuitively
- Character User Interface (CUI)
  - All operation is performed by instruction input from keyboard which is called command line
  - Terminal(Mac) and Command Prompt(Windows) can be used to operate computer
  - If you are used to command lines and are able to use them effectively, computer operation can be performed more quickly

# Terminal

---

- Terminal is the program to perform command line operation



- How to start
  - Terminal is placed on Dock by default
  - Otherwise
    - Start Finder
    - Select Sidebar Application
    - Click on Terminal on Utility Folder



# Command

- Command is used to send instruction to computer
- In CUI terminal, instead of mouse and button instruction is sent by plain text
- Ex: move a folder

Use mouse with Finder(GUI)



Use text command with Terminal(CUI)

```
% mv 第2回情報基礎課題.doc /Users/ユーザ名/Documents/
```

# Prompt

---

- When terminal is started, % mark is shown
- It is called prompt, which means computer is waiting for command instruction
- After inputting command, press Enter to execute

% コマンド ↵

In this slide Enter key is represented as



# Why we must learn how to operate with command line

---

- To prepare for Programming lectures
  - Use command to compile or run a written program
- You have to use command line to operate in many server
  - To change CNS's password
    - However you can also do it here without using command <https://itcsecure.sfc.keio.ac.jp/accounts/login/>
  - To setup Web server given by provider
  - To manage Server of lab or company
- To perform many work on computer effectively
  - Shell script
  - Wild card

# Show Date and Calendar

---

- Show date: Use “date” command

```
% date ↵  
2010年04月02日 (金) 10時49分52秒 JST
```

- Show calendar: Use “cal” command

```
% cal ↵  
2010年 4月  
日 月 火 水 木 金 土  
    1  2  3  
  4  5  6  7  8  9 10  
11 12 13 14 15 16 17  
18 19 20 21 22 23 24  
25 26 27 28 29 30
```

# List of commands to work with file and directory

---

- `pwd` → Show the absolute path of current directory
- `ls` → View the content of a directory
- `cd` → Change current directory
- `less` → View the content of a file
- `mkdir` → Make a new directory
- `cp` → Make a copy of a file
- `mv` → Move file or rename file
- `rm` → Remove file
- `rmdir` → Remove directory



# Current Directory

---

- When operating with file and directory using command, it is more convenience to use their relative path
- The directory you are currently working on is called current directory (working directory)
- Relative path from current directory can be used to specify a file
- After starting Terminal, the current directory is 「home directory/CNSiMac」

# Display current directory

---

- pwd (print working directory) command
  - Display absolute path of current directory

```
% pwd  
/a/fs0102a/t10472ms
```

Because CNS's File Server is divided and stored in my machines, therefore the absolute path of home directory should be displayed like `/a/fs0102a/t10472ms` which is the combination of File Server's number and login name

However, it is inconvenience to remember the number of file server where your home directory is stored, therefore the part `"/a/fs102a/"` is shorten and displayed as `"/home"`

# Display the content of a Directory 1

---

- ls (list) command
  - Display the files and directories inside the current directory

```
% ls ↵  
Desktop      Maildir      XPCAppCNS  
Wnn          XPDataCNS
```

# Display the content of a Directory 2

---

- -a option
  - Files that begins with dot are files used for setting of software therefore they are normally not displayed
  - They can be shown by adding -a option to ls command
  - Option values are entered after a space following ls
  - Command are expanded by using these options

```
% ls -a ↵  
.          .gnome2          .w3m  
..         .gnome2_private    .winman  
.ICEauthority  .gstreamer-0.8    .xsession-errors  
.cshrc       .gtkrc-1.2-gnome2 Desktop  
.emacs       .metacity         Maildir  
.emacs.d     .mh_profile       Wnn  
.folders     .mozilla          XPCAppCNS  
.fonts.cache-1 .nautilus        XPDataCNS
```

# Display content of a Directory 3

---

- Directory path can be specified as argument of command
  - If you want to view content of other directory, enter its path after ls
  - The value added after ls and a following space is called argument

```
% ls Maildir ↵  
courierimaphieracl  courierimapuidb  tmp  
courierimapkeywords  cur  
courierimapsubscribed  new
```

# Change current directory

---

- `cd` (change directory) command
  - Specify the target directory's path name to the argument of `cd`
  - Both absolute path and relative path are usable
  - In CNS machine, current directory is set to home directory, and `home/CNSiMac` in Mac machine

```
% cd Maildir ↵  
% pwd ↵  
/a/fs0102a/t10472ms/Maildir
```

```
% cd /home/t10472ms/Maildir ↵  
% pwd ↵  
/a/fs0102a/t10472ms/Maildir
```

# Display content of a File

---

- less command
  - Display content of a text file
  - Specify the target file name in the argument of less
  - Use Space key to scroll inside file
  - Press q key to finish and quit

```
% less signature ↵  
*****  
杉浦 学 Manabu Sugiura  
t10472ms@sfc.keio.ac.jp  
環境情報学部1年 大岩研究会  
*****
```

## Ex 3: Let's play finding treasure

---

- Let's play finding treasure
  - Starting from `/pub/sfc/ipl/ictf/exercise/islands`
  - Use `cd` to change into sub-directories and use `ls` to view their contents
  - Use `less` to view content of the file inside those directories to check whether it is treasure or not
  - If it is not treasure, back to parent directory and search in another sub-directory
  - If you don't know where you are, use `pwd` command to display current working directory
- If you find treasure, draw the treasure map (directory structure graph to the target file)