31268 Web Systems

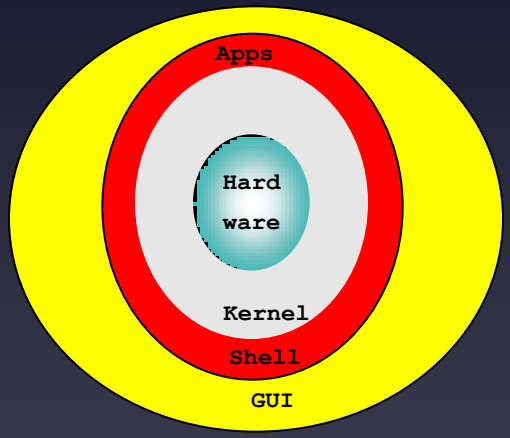
Week 2: Operating Systems

Part 2: File Systems

31268 Web Systems

UNIVERSITY OF TECHNOLOGY SYDNEY
Faculty of Information Technology

Week 2

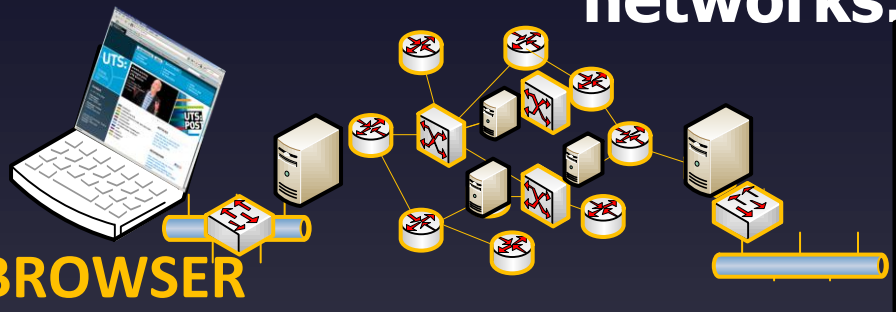


Operating Systems
File Systems

The web…

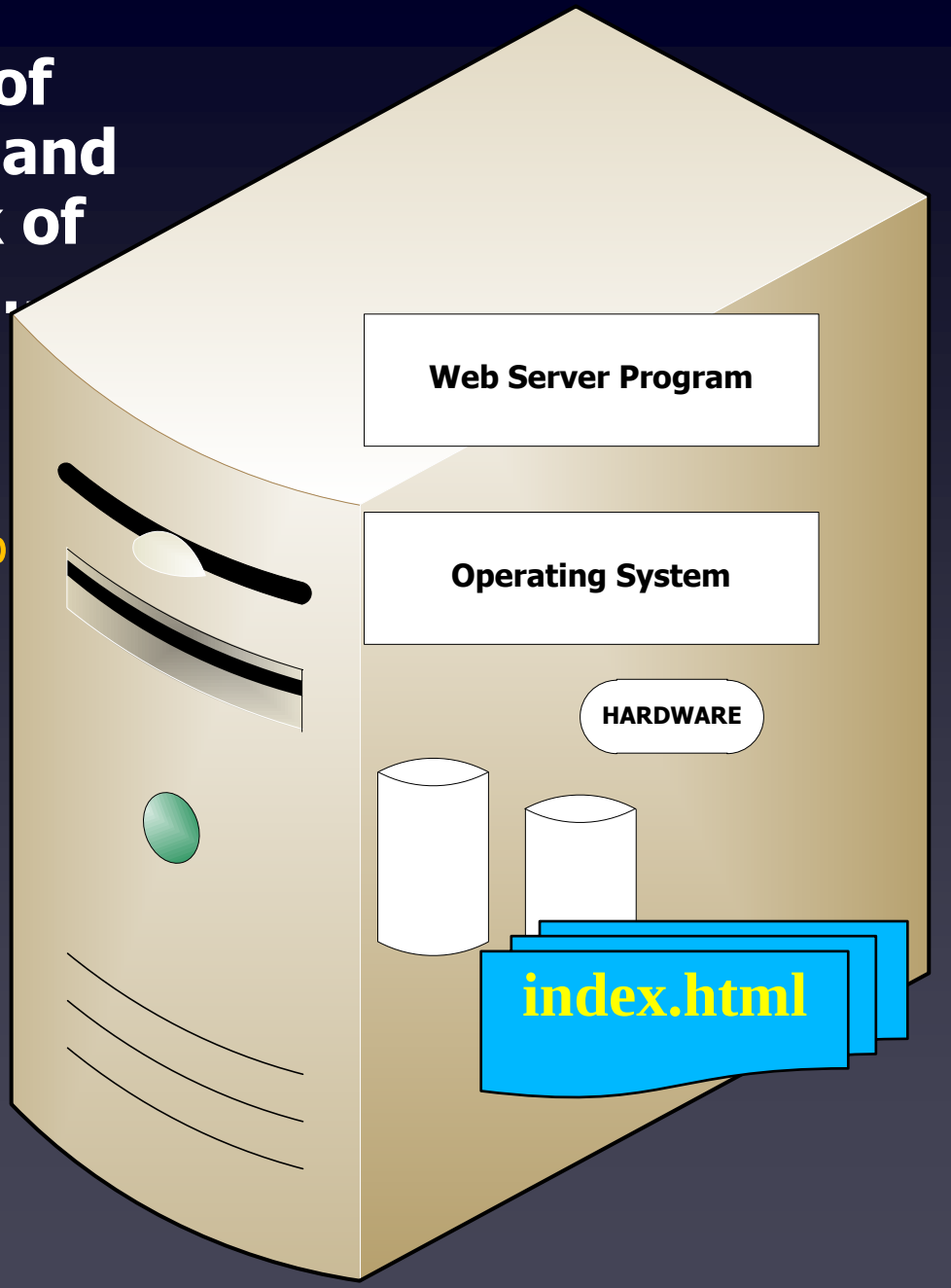
- Is It …

A bunch of computers and a network of networks.



BROWSER

… and a whacking **big** computer running the **web site program** on an **operating system** running on **HARDWARE**



The Web

WWW ++

- How big is the internet??
  - 1.003 Billion web sites? ++
    - http://news.netcraft.com/archives/category/web-server-survey/

→ But each website consists of many html pages and images??

The Web

What about google?

- Est 2014 indexed 200 TB
- Data warehouse:>15 exabytes ≈15 Million TB
- But this is estimated 0.004% of the internet

https://en.wikipedia.org/wiki/Orders_of_magnitude_(data)

What about uts.edu.au?

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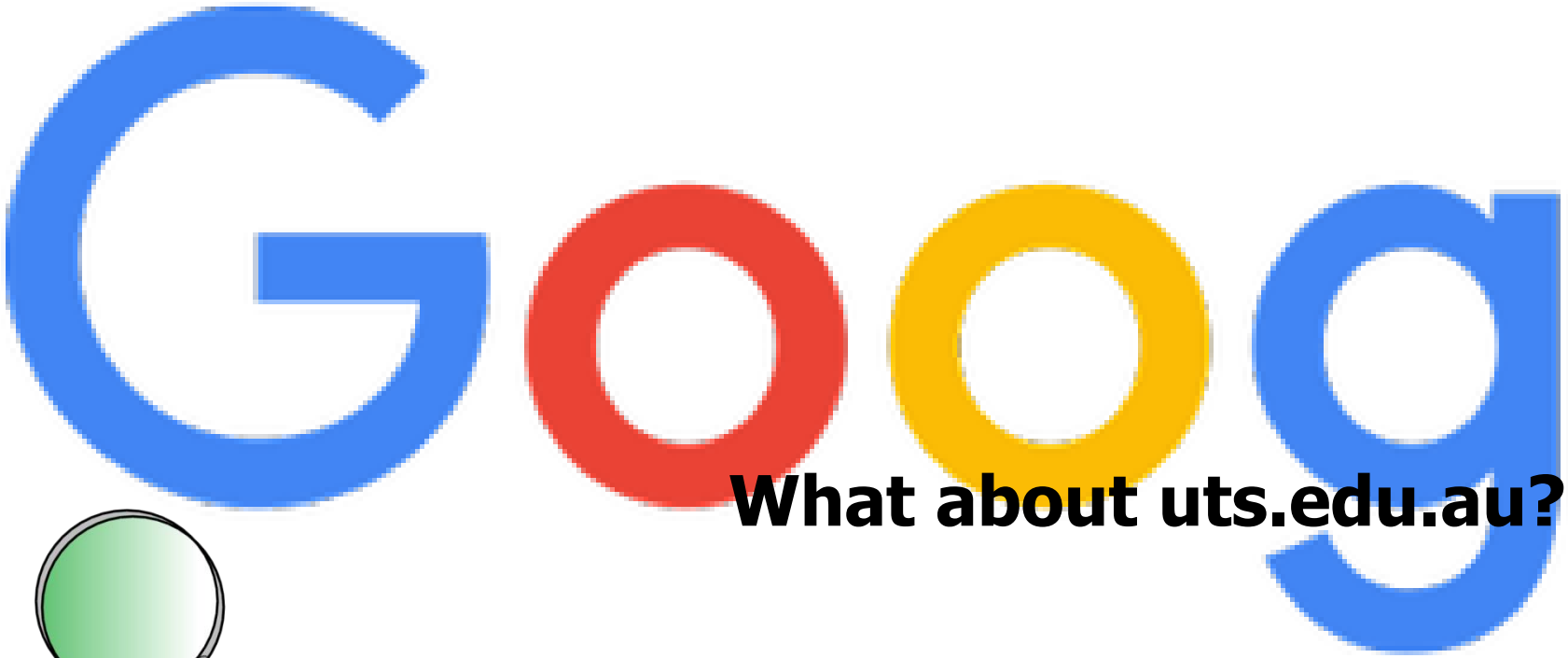
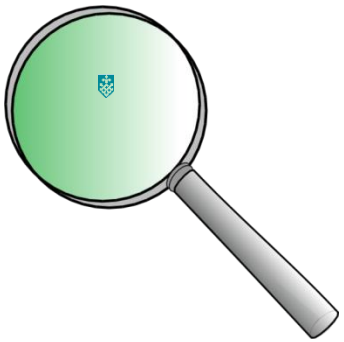

What about uts.edu.au?



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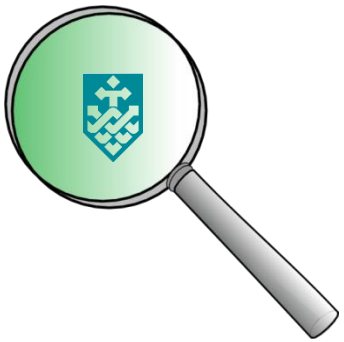


What about uts.edu.au?

→ 3,270,000 pgs
(google site:uts.edu.au)

How many files on your laptop?

(assume 1 drive on windows: dir c: /s & wait..)

Chris' Laptop: 400,311 files/directories = 178Gb

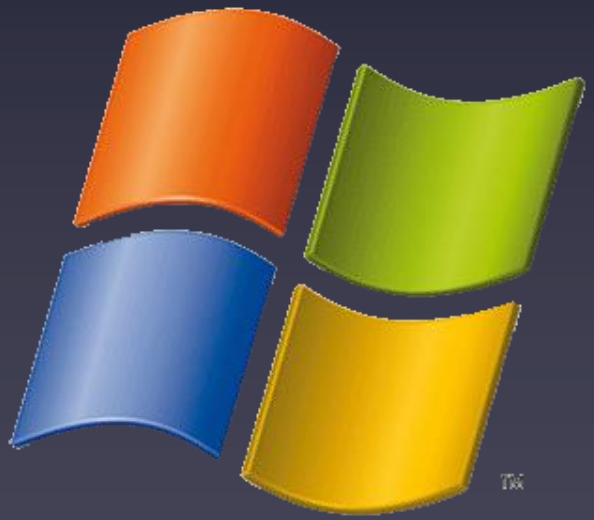
The Web

- So many files!
- Question: Does the web, or google, or UTS, or your laptop store all the files in 1 single directory?

```
C:\> dir   web:\
934,856,356,384,959,437,893,947,373,248,094,
837,833,417,456,885,789,347,567,890  file(s)
1 dir(s)
∞ bytes free
```

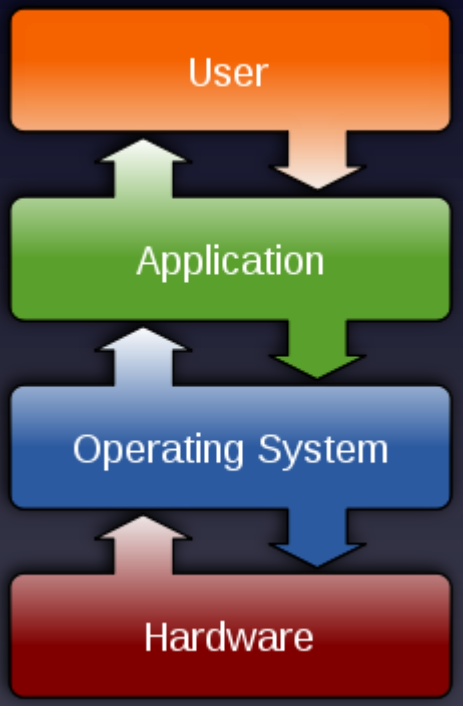
What is an Operating System ?

Definition: An operating system is a piece of software that sits between all programs and the computer's hardware.



What is an Operating System?

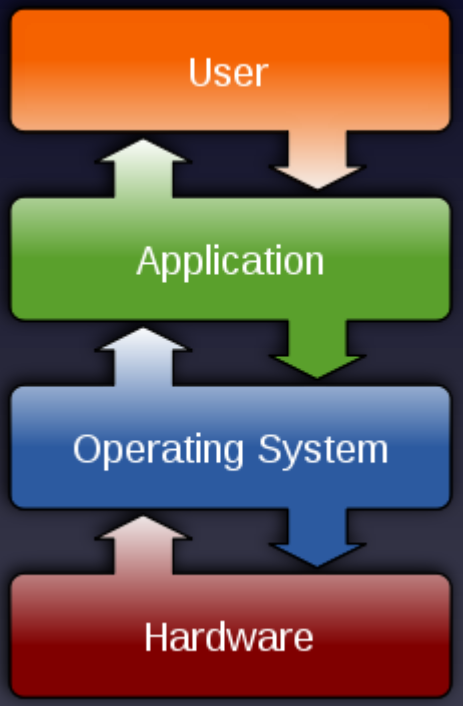
- Manages your computer
- Runs programs
- Interface between user and hardware
- Provides services to programs & users
- Protects users and programs from each other….



wikipedia

What is an Operating System?

- Manages your computer
- Runs programs
- Interface between user and hardware
- Provides services to programs & users
- Protects users and programs from each other….
- Manages resources e.g. File System



wikipedia

File systems

A file system is a part of the operating system that manages data storage and access.

File systems

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Classified into:

- Logical File System

- Physical File System

File systems

- Logical file system
  - User view of a file system
    - files
    - directories/subdirectories
    - partitions

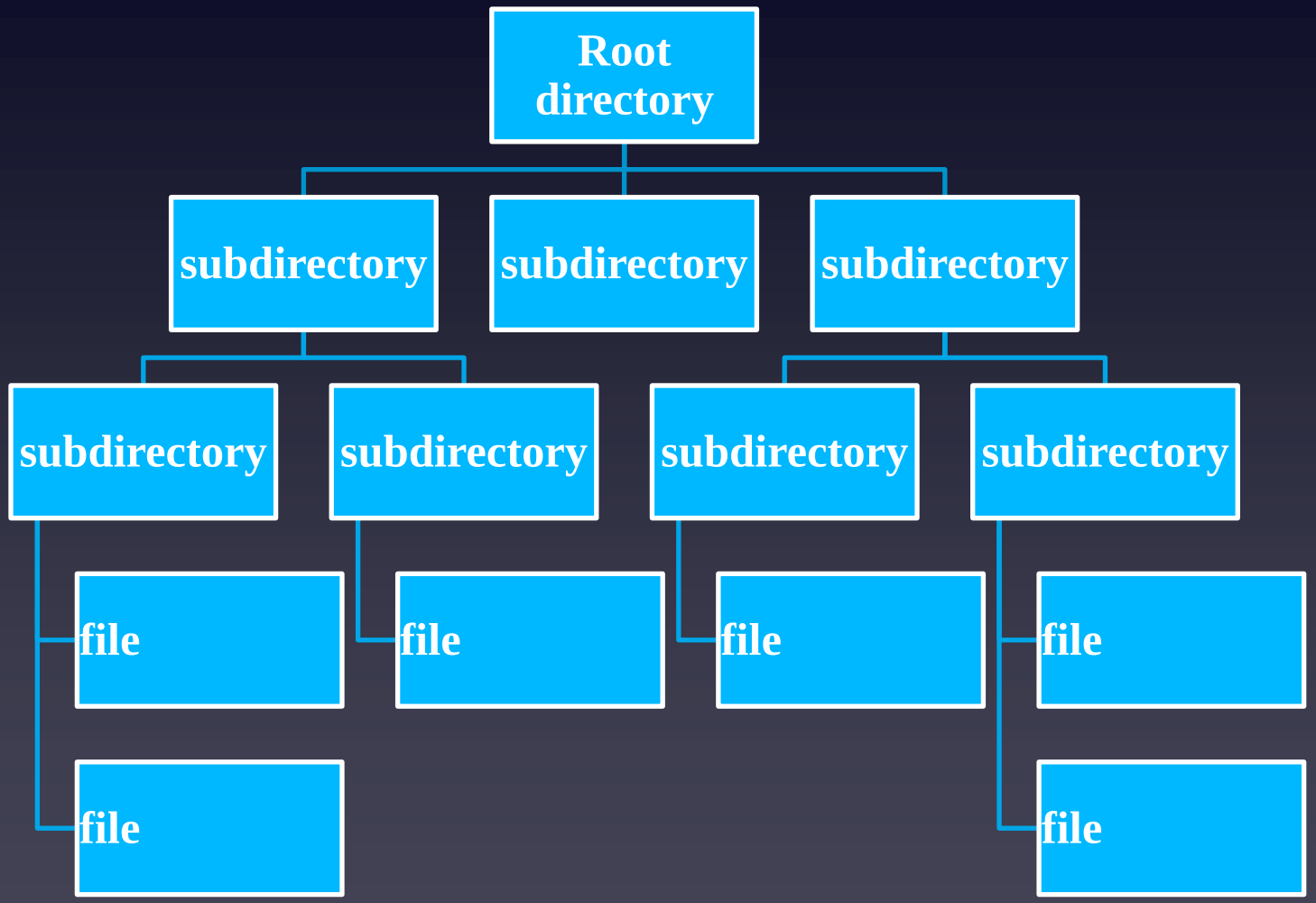
File systems

- Logical file system
  - How we view the file system
    - files
    - directories/subdirectories
    - partitions
- Physical file system
  - How these items are physically represented and stored

Logical File System

- Files
  - Executable files (programs)
  - Data files
- Directories
  - Store files and (usually) subdirectories
  - Often hierarchical ("tree") format
- Partitions
  - Some directories may reside in different partitions from other directories
  - Abstracts physical infrastructure from users
  -

Conceptual Filesystem structure



Directories vs Partitions

- Directories
  - Create logical divisions in the file system
  - For organizational purposes

Directories vs Partitions

- Directories
  - Create logical divisions in the file system
  - For organizational purposes
- Partitions
  - Create physical divisions in the file system
  - Can mount and unmount partitions
    eg: DVD-ROM, Flash Drive
  - Unmounting one partition does not impact others
  - Partitions are independent of each other
    - Back up one without impacting others
    - Place disk quotas on one but not others
  - Microsoft Windows often calls these "drives"

Conceptual Filesystem structure

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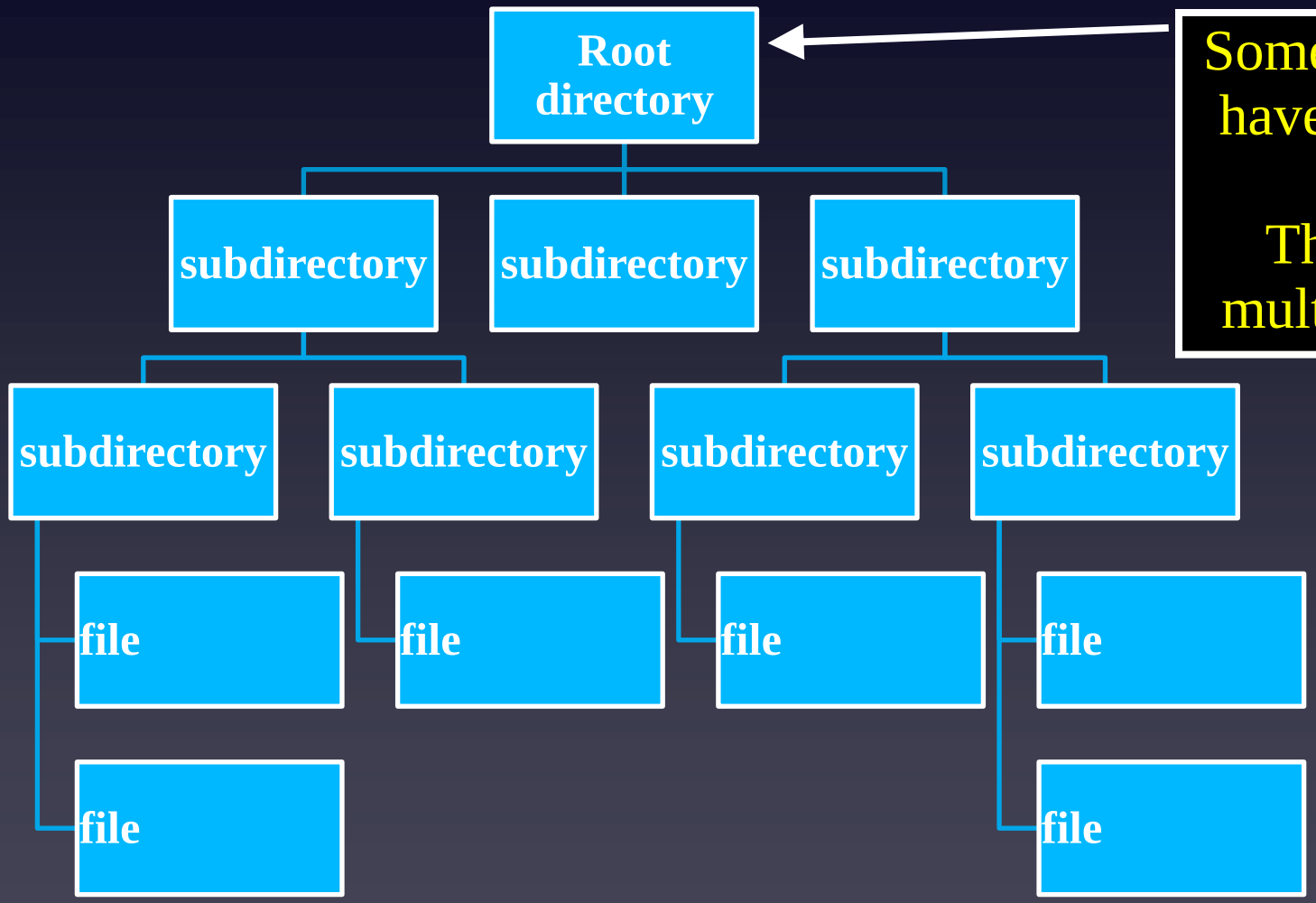

Some filesystems have "drives" as well.
These act as multiple "roots"

Conceptual Filesystem structure

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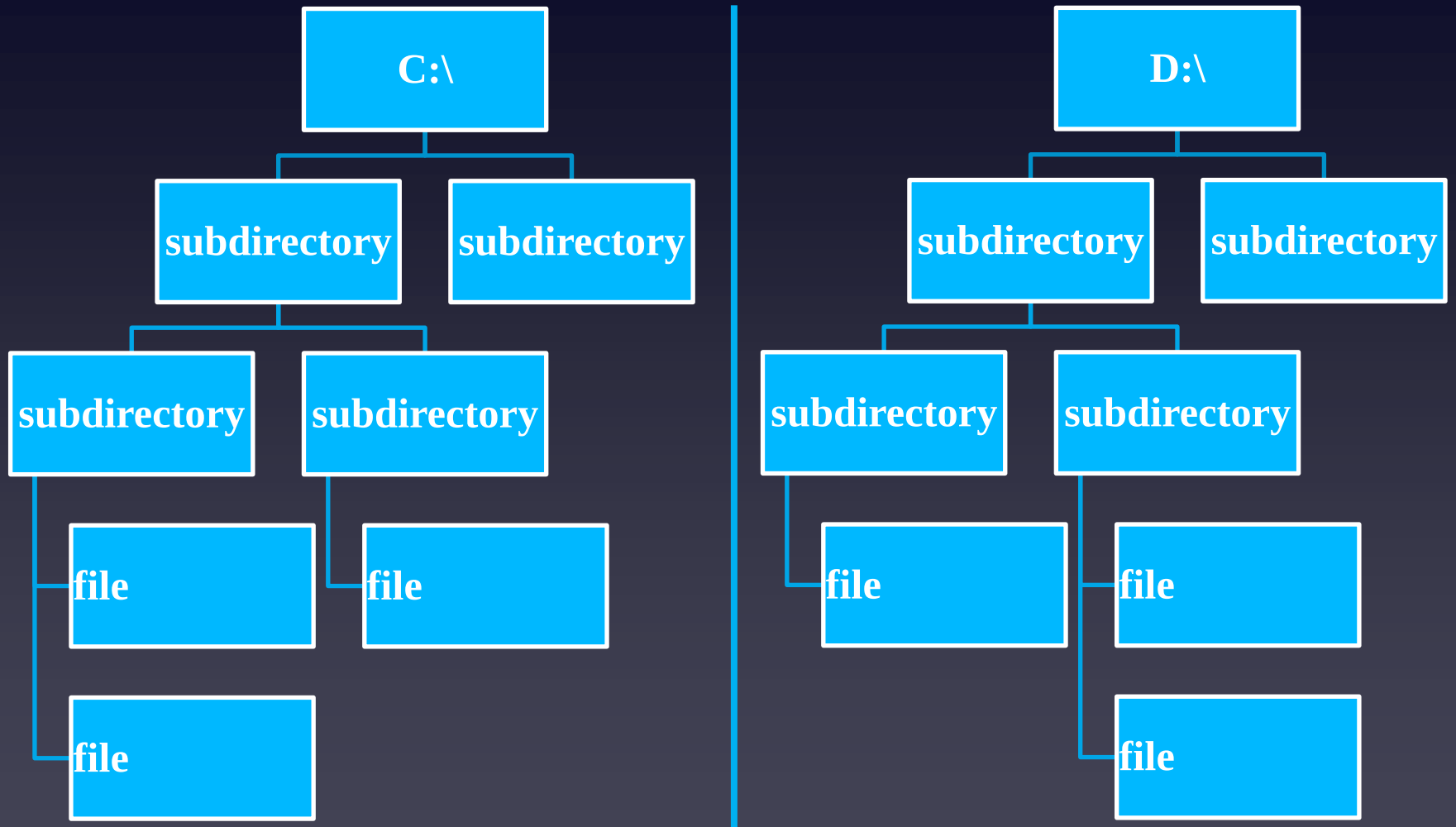
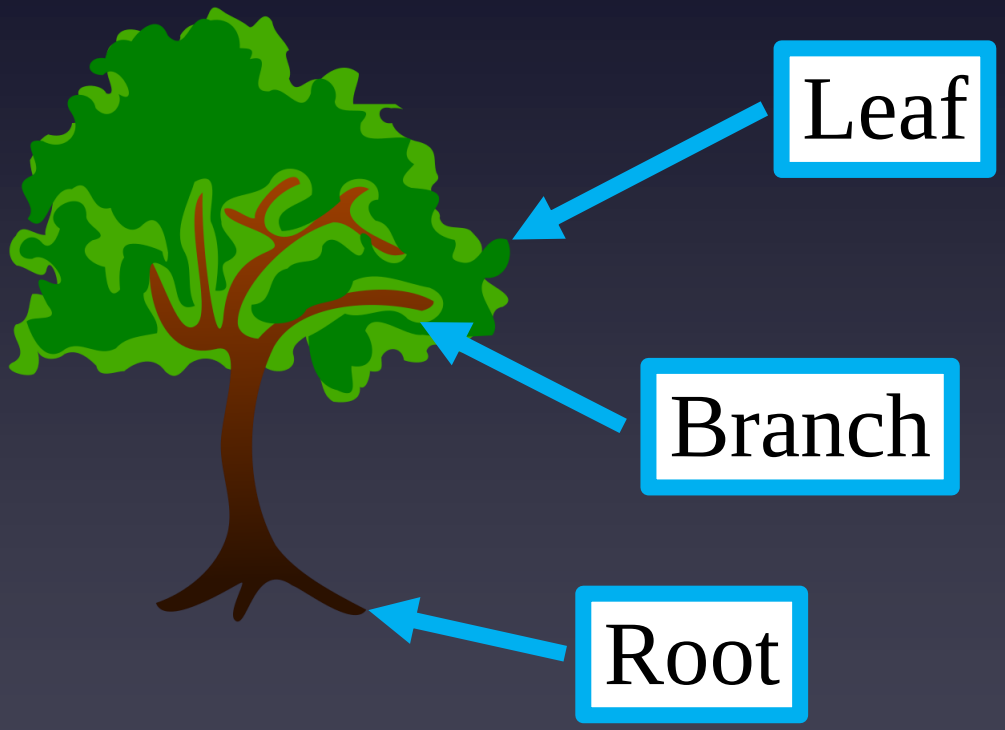


Partition 1

Partition 2

Directories, Subdirectories, Trees

- File systems typically organised as a "tree"



Theory of Trees

Definition: a ***tree*** is a collection of nodes along with a relation (parenthood)

- An edge is a "*branch*" of the tree.
  a → **b** means **a** is the parent of **b**.

- Every node in a tree (except the root) has exactly one parent. The root has no parent.

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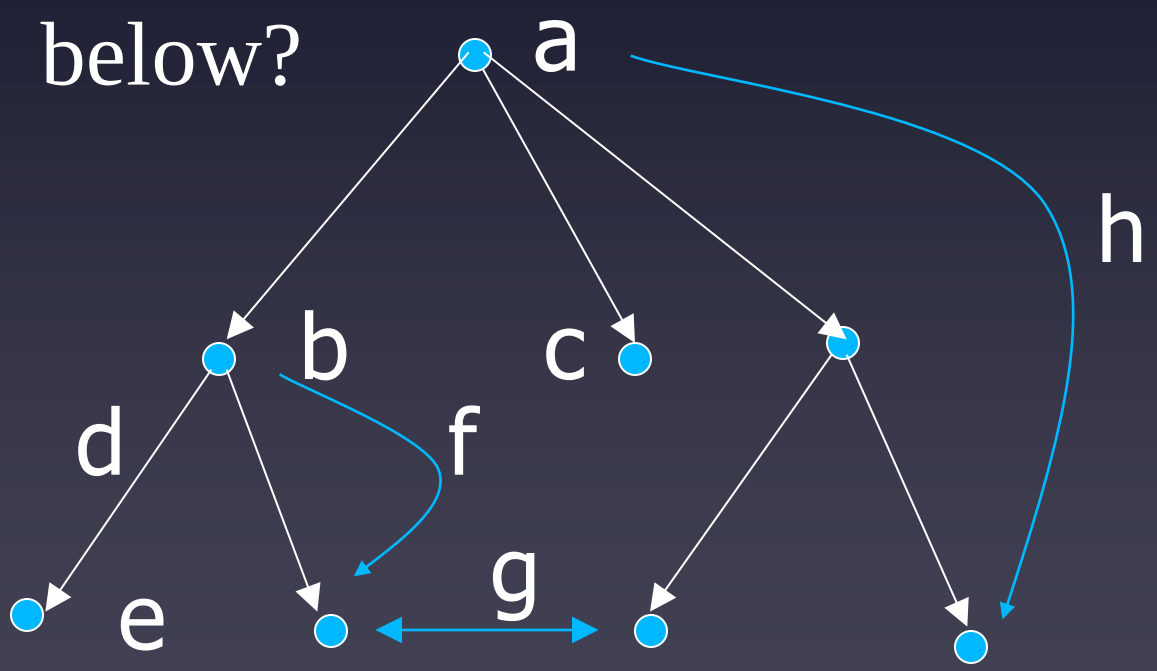
- A ***leaf*** is a node that has no children.

- *Siblings* are nodes which have the same parent

VoxPOP: The Student Aborist!

What are the characteristics of the labelled dots below?



Node?
Root?
Leaf?
Edge?
Parent?
Sibling?

Unix filesystem is a Tree

- / means root of the file system
- /home means a "branch" of the file system
- . means "current directory" (node)
- .. means "parent of current directory"

Next module…

- We will continue with operating systems
- Topic = file storage