

# Introduction to Operating System Concepts

- Books
- Silberschatz, A. (2010). Operating System Concepts; 8th Edition, John Wiley & Sons. ISBN 0470233990
- Ritchie C, Operating Systems: Incorporating UNIX & Windows 4th Edition, ISBN: 0826464165

## Free books

- [Modern Operating Systems](http://it.tdt.edu.vn/~tttin/giangday/HDH/Modern%20Operating%20Systems.pdf) `<http://it.tdt.edu.vn/~tttin/giangday/HDH/Modern Operating Systems.pdf>`
- [The Minix Book](http://it.tdt.edu.vn/~tttin/giangday/HDH/Operating%20Systems%20Design%20&%20Implementation%203rd%20Edition.pdf) `<http://it.tdt.edu.vn/~tttin/giangday/HDH/Operating Systems Design & Implementation 3rd Edition.pdf>`
- directed reading: read up to page 51 in Modern Operating Systems this week.

## Specialist Software for CS2S501

- we will be using GNU/Linux

```
$ sudo apt-get install python gcc gdb make manpages-dev
```

- probably other packages necessary as well
- get a GNU/Linux account from: [here](http://mcgreg.comp.glam.ac.uk/login.html) `<http://mcgreg.comp.glam.ac.uk/login.html>`
  - this url is only available on the campus network and not via the wireless network

# What is an Operating System?

- "A program that acts as an intermediary between a user of a computer and the computer hardware"

Silbershatz, p1

## What is an Operating System?

- "We can view an operating system as a resource allocator. A computer system has many resources (hardware and software) that may be required to solve a problem: CPU time, memory space, file storage space, I/O devices, and so on.

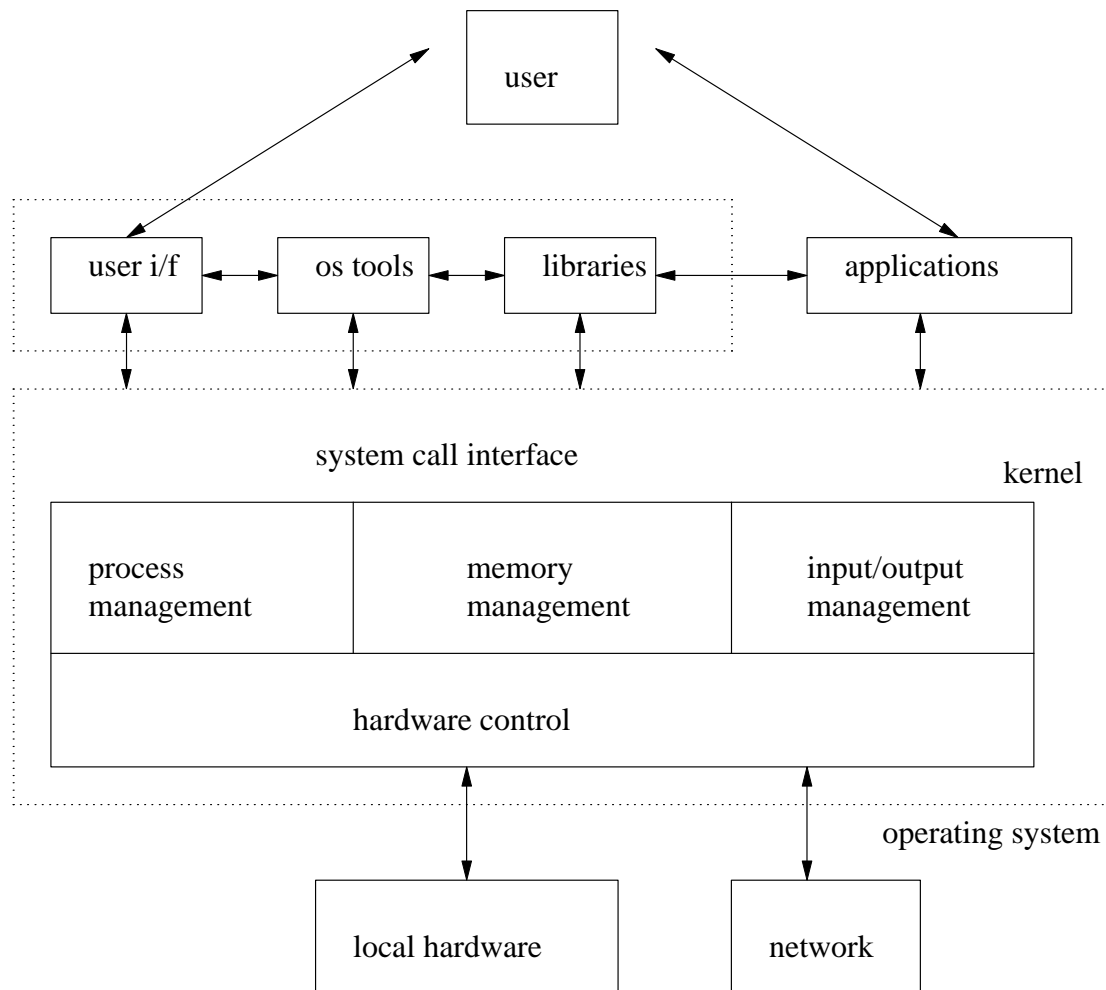
The operating system acts as the manager of these resources and allocates them to specific programs and users as necessary for their tasks. Since there may be many, possibly conflicting requests for resources, the operating system must decide which requests are allocated resources to operate the computer system efficiently and fairly."

Silbershatz, p5

# What is an Operating System?

- user view vs. system view

# Operating system structure



## Operating System kernel

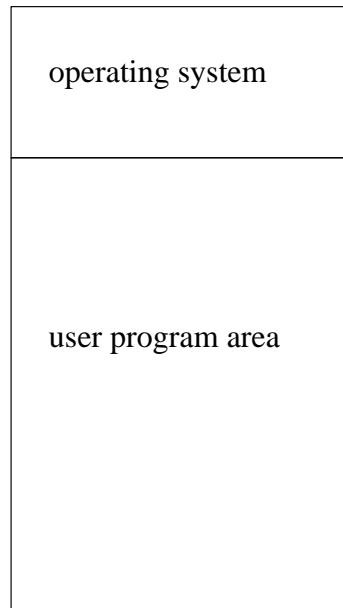
- kernel - memory resident part of an operating system which provides low level functions including interrupt handling, process scheduling, memory management, file system support, I/O management, communication, ...



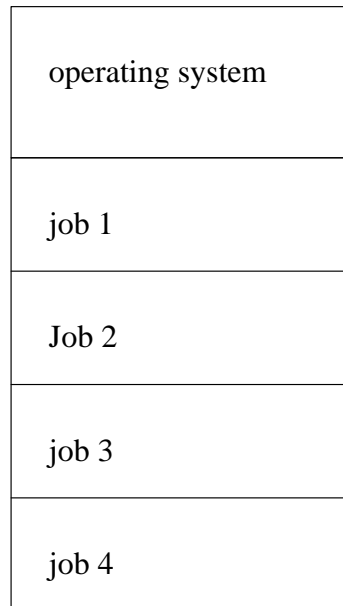
# Mainframe Systems

- batching concept - similar jobs (programs) gathered together
  
- automatic job sequencing - automatically transfers control from one job to another
  - first rudimentary operating system

# Memory Layout for a Simple System



# Memory Layout for Batch Systems



## Operating Systems features needed for multiprogramming

- memory and disk management
- CPU scheduling
- allocation of devices

## Operating Systems features needed for multiprogramming

- CPU is time multiplexed among several jobs that are kept in memory and on disk
  - (CPU is allocated to a job only if the job is in memory)
- jobs are swapped in and out of memory to disk
- on-line communication between the user and the system is provided;
  - when the operating system finishes the execution of an operation, it seeks the next operation from the user

## Desktop System Revolution

- personal computers - computer system dedicated to a single user
- user convenience and responsiveness - sole use of computer
- adaptation of technology developed for larger operating systems
- different types of operating systems (Windows, Mac OS X, Unix, GNU/Linux) - many variations of all these

# Computing Environments

- traditional computing
- web-based computing
- mobile / ubiquitous computing

# Traditional Computing

- many operating system developments are products of older, traditional technologies
- mainframes / terminal access
- PC with/without network connections
- workstations, servers



# Web/Internet - based computing

- Characteristics
- Advantages
- Disadvantages
- Operating Systems issues?

# Mobile/Ubiquitous Computing

- Characteristics
- Advantages
- Disadvantages
- Operating Systems issues?

## Further watching

- **Mainframes and the Unix Revolution** (<http://www.youtube.com/watch?v=-rPPqm44xLs>)