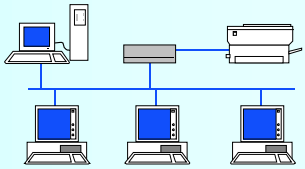


Operating Systems
600.418
Introduction

Department of Computer Science
The Johns Hopkins University

Course Information

- Time: MTW 1pm - 2pm. Shaffer 300
- Yair Amir : yairamir@cs.jhu.edu
- Office hour: Wednesday 10:30 - 11:30, NEB-316
- Tutorial: Theo Schlossnagle : jesus@cs.jhu.edu
- Office : NEB-313
- TA :Xiaoqi Lu (Grace) : xiaoqilu@cs.jhu.edu
- Office hours: Monday 10:30 - 11:30, NEB-332

Problems? E-mail (best), come to office (if needed) , call (only if really really important).

Grading Policy

- A final exam.
- A few written assignments.
- One small programming assignment.
- Two medium scale projects.

30-35% - 20-15% + 10% + (20%+20%) = 100%

The difference between 318 and 418 :

Depth of the assignments and projects.

There is no difference in grading.

Course Overview

Lecture 1

Course Book:

Operating System Concepts (Fifth Edition)
Silberschatz & Galvin
Addison Wesley.

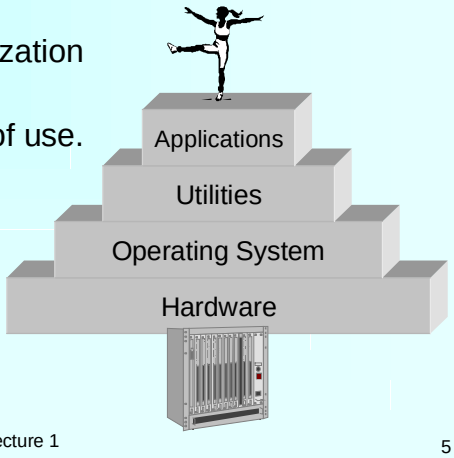
Additional Reading:

Operating Systems, Internals and Design Principles
Stallings (Third Edition)
Prentice Hall

Operating System

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

- **Purpose**
  - Efficiency - better utilization of resources.
  - Convenience - ease of use.
- **Position**



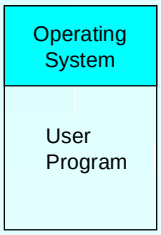
Operating Systems Evolution Path

- Nothing! (bare machine)
- Batch systems
  - Single programming
  - Multiprogramming
- Time sharing systems
- Networked and distributed operating systems

Simple Batch Systems

- Sequence jobs and transfer control automatically from job to job.
  - Saves setup time for jobs.
- Monitor the current job.
  - Resource consumption.
- Device drivers.

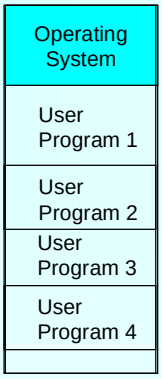
Memory Layout



Multiprogramming Batch Systems

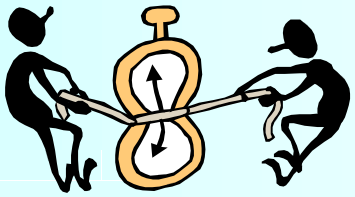
- OS + Several jobs in memory
- When one job waits for the completion of an I/O operation - another is executed.
- Issues:
  - Protection
  - Some scheduling

Memory Layout



Time Sharing Systems

- Interactive use of a computer.
- Several users can share the computer simultaneously.
- Issues:
  - Scheduling!
  - Synchronization
  - file systems
  - …



Question: Which is more efficient, time sharing systems or multiprogramming batch systems?

Comparison

	Batch Multiprogramming	Time Sharing (which include Multiprogramming)
Main Objective	Maximize processor utilization	Minimize response time to user commands
Outcome	Troughput!!!	Interactive work

Distributed Operating Systems

- Distributed file system
  - What is the semantics.
  - Performance and availability.
- Communication between processes in the distributed system.
  - Remote Procedure Call.
  - Group communication.
- Processes
  - Load balancing (static/dynamic).

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Course Content

- Introduction. Sep 11-13
- Process Control & Scheduling. Sep 18-20
- Process Synchronization. Sep 25-27
- Deadlocks. Oct 2-4
- Memory Management. Oct 9-11
- Virtual Memory. Oct 17-18
- The File System. Oct 23-25
- File System and Disk management. Oct 30-Nov 1

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Course Content

- Protection and Security. Nov 6-8
- Distributed Operating Systems. Nov 13-15
- Discussion. Nov 20-22
- Final Exam. Nov 27-29
- Advanced Topics. Dec 4-6

More or less...

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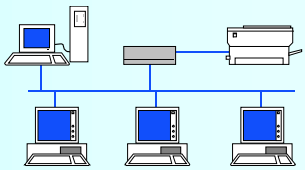
Tutorial



- Presenting and discussing projects.
- Vmware - our basic working environment.
- Linux - our basic operating system.
- Case studies of component implementations in different popular operating systems
- Questions and Answers.