

CS323 Operating Systems

Yuanyuan Zhou
Lecture 1
Jan 22, 2003

Content of this lecture

- Course information (personnel, policy, schedule, misc.)
- What is OS? What does it do?
- History of OS
- Summary

2

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Who am I?

- Yuanyuan (YY) Zhou
- Princeton-2000
- Research: operating systems, memory management, file/storage systems, system architecture, databases
- Why?
 - Interesting
 - Useful
 - "I know what's going on with your system!"

3

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Overview

- *Office Assistant:* Sheila Clark
- *Teaching Assistants:*
 - Jeff Carlyle
 - Alexander Kramnik
 - Pierre Salverda
- *Required Textbook:*
Modern Operating Systems, Andrew Tanenbaum, Prentice Hall, second edition, 2001
- *Class Website*
<http://www-courses.cs.uiuc.edu/~cs323/>
- *Newsgroup:* uiuc.class.cs323

4

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Course Information

- Prerequisites
 - CS225, cs232 or ECE291
- Laboratory Facilities
 - CSIL-suna cluster
- Office hours: available in web page
 - YY: Wed, Fri, 10-11am
 - Jeff, Wed, Fri, 10-11am
 - Alex: Tue, Thur, 12:30-1:30pm
 - Pierre: Mon, Wed 12:30-1:30pm

5

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Why are you here?

- Fulfill the requirement
- Prerequisite for other courses
 - Network
 - Distributed systems
 - Real-time systems
 - Multimedia systems
- Future plans
 - Graduate schools for CS
 - Employment

6

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About this course...

Principles

- System concepts
- OS design
- Some theory
- Rationale
- Practice

Goals

- Understand OS decisions
- Basis for future learning
- Get hands dirty

7

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Expect (Some) Pain

Fast pace
Many hard material
Lots of MPs (programming)
Lots of quizzes

But....

Not end of the world – students
survived last semester's cs323!



8

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Why so many grades?

Intended to reduce pressure/anxiety
More data points = less noise

- Final exam: 35%
- Mid-exam1: 15%
- Mid-exam2: 15%
- 5 Quizzes: 5%
- 5 MPs: 30%
- Final grade: based on mean/deviation
 - Mean corresponding to B
 - Graduate students are separated from undergraduates

9

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Grading policy

- Available on web page
- Gradebook
- Late policy
 - 2% lower each hour the assignment is late
 - 2 hours: 4% lower, 24 hours: 48% lower
 - No late quizzes!
- It is your responsibility!
 - Check announcements in lectures, newsgroups, or web pages

10

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Re-grading policy

- Students have 1 week (after the grade for a quiz/MP/exam is released into gradebook) to request for re-grading
- Re-grading requests need to be in writing and submitted after lecture
- After the re-grading period, no re-grading request will be granted for this quiz/MP/exam.

11

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Cheating Policy

- Academic integrity
- Your work in this class must be your own - we have a zero tolerance policy towards cheating of any kind and any student who cheats will get a failing grade in the course.
- Both the cheater and the student who aided the cheater will be held responsible for the cheating

12

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Lecture Format

- Help you understand important and hard OS concepts
 - Group discussions
 - Animation
 - Real life examples
- Lectures do not cover everything
 - Not all questions in quizzes or exams are from lectures
- Students responsibility
 - Attend lectures
 - Read textbooks
 - Quiz, MP, Exam
 - Periodically check web page
 - Read/utilize newsgroup

13

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MPs

2/14, 11:59pm CDT	MP1	Thread scheduling
3/7, 11:59pm CDT	MP2	Synchronization
4/4, 11:59pm CDT	MP3	Virtual Memory
4/25, 11:59pm CDT	MP4	File system
5/7, 11:59pm CDT	MP5	Network/Distribute Sys.

- A tutorial before each MP due date
- MP releases and tutorial date will be announced in course web page

14

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Quizzes & Exams

1/27-1/31, 5pm CDT	Quiz0 (test quiz)
2/3-2/7, 5pm CDT	Quiz1
2/24-2/28, 5pm CDT	Quiz2
3/5, 9-9:50am, 1320 DCL	Mid-exam1
3/17-3/21, 5pm CDT	Quiz3
4/7-4/11, 5pm CDT	Quiz4
4/16, 9-9:50am, 1320 DCL	Mid-exam1
4/28-5/2, 5pm CDT	Quiz5
5/7, 11:59pm CDT	Final-exam

- Announcement in web page
- No makeup quizzes
- No makeup exams unless with documented medical emergency

15

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¼ Unit Project: graduate student

- Final grade is decided upon ¼ unit performance
- No ¼ unit project: fail
- Individual or group
- Choices
 - Implementation project
 - Animation project
 - Survey
- Proposal due: 2/24, Monday, 5pm, by email
- Details in web page

16

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What Is an OS? Real life example?

- 2-3 persons group discussion
- 2 minutes

17

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What Is an OS?

"Code" that:

- Sits between programs & hardware
- Sits between different programs
- Sits between different users

But what does it do?

to provide an orderly and controlled allocation of the processors, memories and I/O devices among the various programs competing for them

Real life example:

- Government?

18

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What Is an OS?

Resources

- Allocation
- Protection
- Reclamation
- Virtualization

Services

- Abstraction
- Simplification
- Convenience
- Standardization

Makes computers simpler

19
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What Is an OS?

Resources

- Allocation
- Protection
- Reclamation
- Virtualization

Finite resources
Competing demands

Examples:

- CPU
- Memory
- Disk
- Network

Government

Limited budget,
Land,
Oil,
Gas,

Linux or Windows? Democrat or Republic?

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What Is an OS?

Resources

- Allocation
- Protection
- Reclamation
- Virtualization

You can't hurt me
I can't hurt you

Implies some degree of
safety & security

Government

Law and order

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What Is an OS?

Resources

- Allocation
- Protection
- Reclamation
- Virtualization

The OS giveth
The OS taketh away

Voluntary at run time
Implied at termination
Involuntary
Cooperative

Government

Income Tax

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What Is an OS?

Resources

- Allocation
- Protection
- Reclamation
- Virtualization

illusion of infinite, private
resources

Memory versus disk
Timeshared CPU

More extreme cases
possible (& exist)

Government

Social security

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History of Operating Systems (1)

- First generation 1945 – 1955 (Anarchy)
 - vacuum tubes, plug boards
- Second generation 1955 – 1965 (Monarchy)
 - transistors, batch systems
- Third generation 1965 – 1980 (Feudalism)
 - ICs and multiprogramming
- Fourth generation 1980 – present (Capitalism or Communism)
 - personal computers

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History of Operating Systems (Anarchy)

(a) Early batch system

- bring cards to 1401
- read cards to tape
- put tape on 7094 which does computing
- put tape on 1401 which prints output

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History of Operating Systems (Monarchy)

- Structure of a typical FMS job – 2nd generation

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History of Operating Systems (Feudalism)

- Multiprogramming system
 - three jobs in memory – 3rd generation

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The Operating System Zoo (Capitalism or Communism)

- Mainframe operating systems
- Server operating systems
- Multiprocessor operating systems
- Personal computer operating systems
- Real-time operating systems
- Embedded operating systems
- Smart card operating systems

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Historical Comparison

	Mainframe	Mini	Micro
System \$/ Worker Salary	10:1 – 100:1	10:1 – 1:1	1:10-1:100
Goal	System utilization	Overall cost	Productivity
Target	Capacity	Features	Ease of Use

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Summary

- Course overview
- Policy and requirement
- What is OS?
- OS history
- Next lecture: system overview (chapter 1)

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After this lecture...

- Reading assignment: chapter 1
- Start next Monday with Chapter 2
- Browse the web site
- Subscribe newsgroup
- Login to csil machines
- Tutorial for Nacho and MP1: 1/27
- Try out test quiz (quiz0)
- Think about what are the criteria to evaluate an OS? (or what are the criteria to evaluate a government)?

31

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By the way

- Sorry for the accent
- But you need to listen carefully, otherwise...
- You will miss my jokes!

32

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