

Welcome to CS 241 Systems Programming at Illinois

Robin Kravets and
Indranil Gupta

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The Team

- Robin Kravets
 - Office: 3114 SC
 - Office Hours
 - Monday 11-12
 - SC 3114
 - rhk@cs.uiuc.edu
- Indranil Gupta
 - Office: 3112 SC
 - Office Hours
 - Wednesday 11-12
 - SC 3112
 - indy@cs.uiuc.edu
- TAs
 - Wade Fagen, Liping Chen, Alejandro Gutierrez
 - Office hours and locations TBA
- Discussion Sections
 - 6 sessions (Thursdays 10, 11, 12, 2, 3, 4)
 - All sections in SC 1111
 - Thursday 1 pm will be discontinued after first week

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News and Email

- news
 - class.cs241
 - All class questions
 - This is your one-stop help-line!
 - Will get answer < 24 hours
 - class.cs241.announce
 - All class announcements (staff only)
- e-mail
 - cs241help-fa08@cs.uiuc.edu
 - Personal questions not postable on the news group

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The Textbook

- Introduction to Systems Concepts and Systems Programming
 - University of Illinois Custom Edition
 - Copyright © 2007
 - Pearson Custom Publishing
 - ISBN 0-536-48928-9
- Taken from:
 - Operating Systems: Internals and Design Principles, Fifth Edition, by William Stallings
 - UNIX™ Systems Programming: Communication, Concurrency, and Threads, by Kay A. Robbins and Steven Robbins
 - Computer Systems: A Programmer's Perspective, by Randal E. Bryant and David R. O'Hallaron

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Your CS 241 “Mission”

- Come to class
 - MWF, 10-10:50am
 - Please participate actively...
 - Attend 1 discussion section per week
- Read textbook
 - Reading assignments posted on webpage
- Homework (3)
- Programming assignments (7)
 - Group size specified per MP
- Midterm (October 13th in class)
- Final (December 19th at 8:00am)

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Grading

■ Final Exam:	30%
■ Mid-term Exam:	20%
■ Homework (three total):	15%
■ Machine Problems (7 total):	30%
■ Participation:	5%
○ Lecture quizzes	

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Deadlines

- Homework
 - Deadlines are strict
 - Late submissions will not be considered
- MPs
 - Please respect posted deadlines to ensure quick grading
 - Late MPs will be penalized 2% for each late hour (rounded off to the higher hour)
 - No submissions past 48 hours

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Regrades

- Within one week of posting of grades for a quiz, homework, MP or exam
- Regrades must be submitted in writing on a separate piece of paper
 - Please do not write on your quiz, homework, MP or Exam

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Academic Honesty

- Your work in this class **must** be your own.
- If students are found to have collaborated excessively or to have blatantly cheated (e.g., by copying or sharing answers during an examination or sharing code for the project), **all** involved will at a minimum receive grades of 0 for the first infraction and reported to the academic office.
- Further infractions will result in failure in the course and/or recommendation for dismissal from the university.

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Course Questions

- What is an operating system?
- What is it for?
- How do I use it?
- What is concurrency?
- What is system programming?

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Course Objectives

- By the end of this course, you should know about operating systems
 - Identify the basic components of an operating system
 - Describe their purpose
 - Explain how they function
- Use the system effectively
 - Write, compile, debug, and execute C programs
 - Correctly use system interfaces provided by UNIX (or a UNIX-like operating system)

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General Course Outline

- Understand the Basics (week 1-2)
 - Use UNIX system calls correctly from within C programs
- Make the OS do tasks (week 3-8)
 - Create and manage processes and threads on UNIX
 - Control OS scheduling policy parameters
 - Exploit OS semaphores and mutexes
 - Take advantage of OS signals and signal handlers
 - Set OS timers and clocks
- Manage machine resources (week 9-12)
 - Manage memory
 - Manage files and I/O on UNIX
- Write networked applications (week 13-15)
 - Use communication protocols (TCP/IP) and interfaces (Sockets)
 - Write distributed multi-threaded apps that talk across a network

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General Course Outline

- Understand the Basics (week 1-2)

MP1	C Pointers and Strings
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- Make the OS do tasks (week 3-8)

MP2	Processes and Threads
-----	-----------------------

MP3	Scheduling
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MP4	Synchronization
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 - Take advantage of OS signals and signal handlers
 - Set OS timers and clocks

Midterm	
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- Manage machine resources

MP5	Memory Management
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MP6	File Systems
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- Write networked applications (week 13-15)

MP7	Networking
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 - (Sockets)
 - Write distributed multi-threaded apps that talk across a network

Final	
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Complete Schedule

- See class webpage
- <http://www.cs.uiuc.edu/class/cs241>
 - Schedule is dynamic
 - Check regularly for updates

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Your to-do List

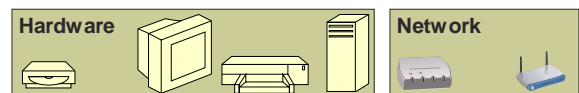
- Visit the class webpage
 - Check out all the info
 - Especially schedule, grading policy, homework & MP hand-in instructions, and resources
 - <http://www.cs.uiuc.edu/class/cs241>
- Familiarize yourself with newsgroups
 - see <http://news.cs.uiuc.edu>
 - Subscribe to: class.cs241 and class.cs241.announce
- Find a reference to refresh your C programming skills
 - <http://www.lysator.liu.se/c/bwk-tutor.html>

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Resources

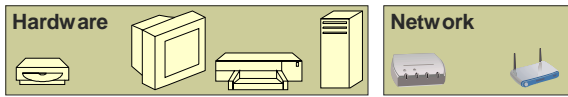
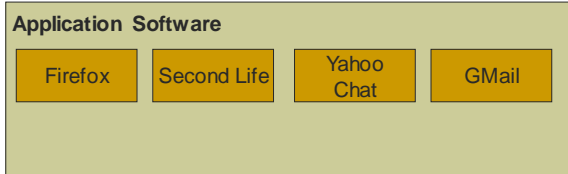


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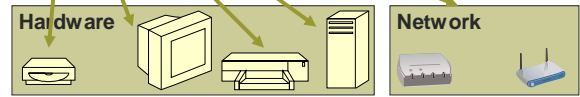
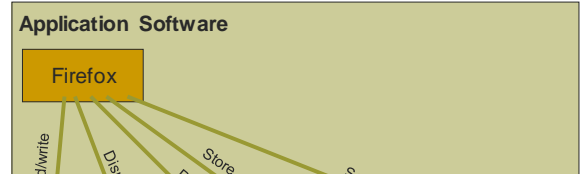
Applications



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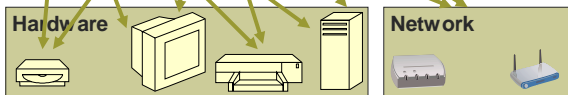
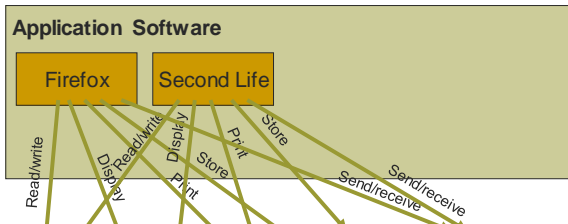
Application Requirements



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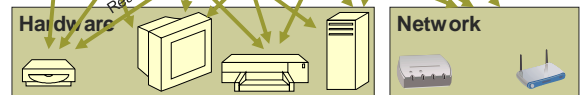
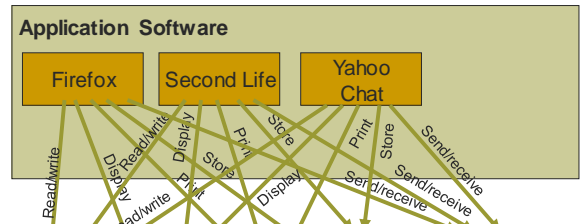
Two Applications?



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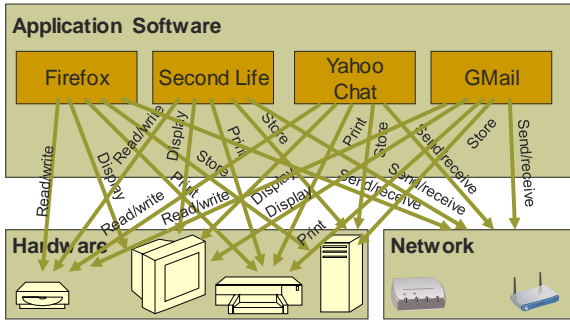
Managing More Applications?



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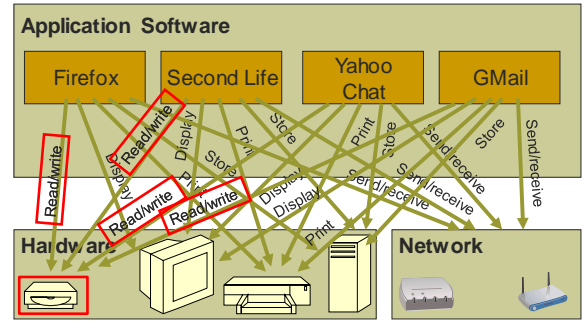
We need help!



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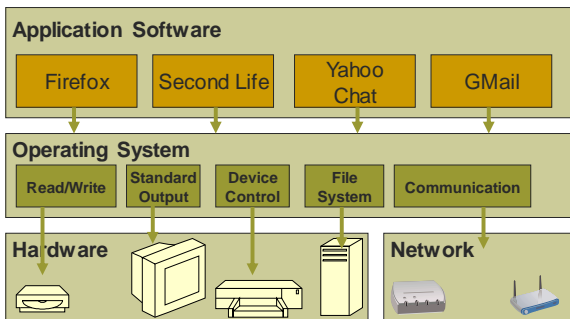
Approach: Find Common Functions



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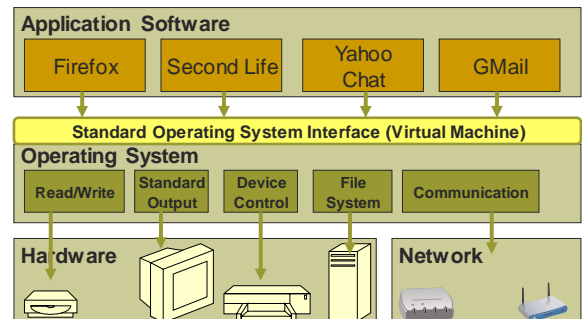
Delegate Common Functions



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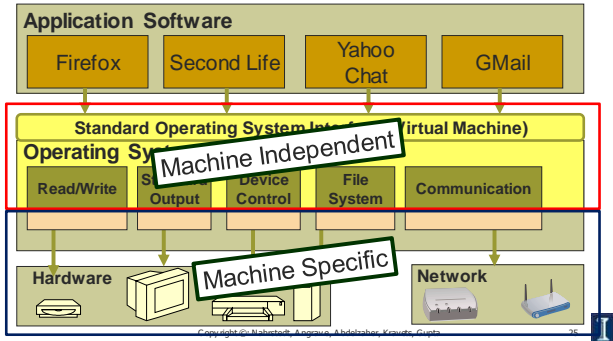
Export a Standard Interface



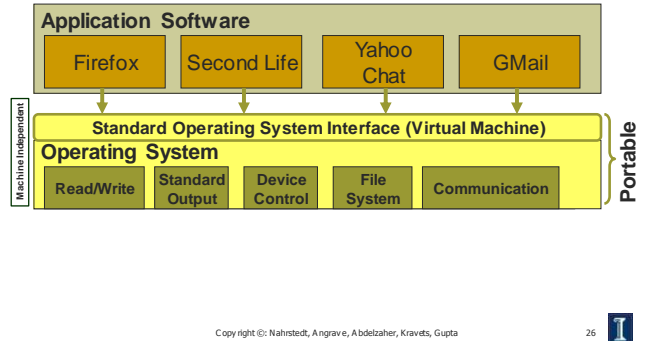
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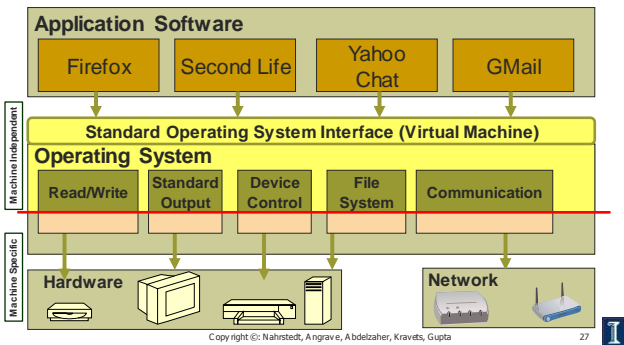
[Goal: Increase Portability]



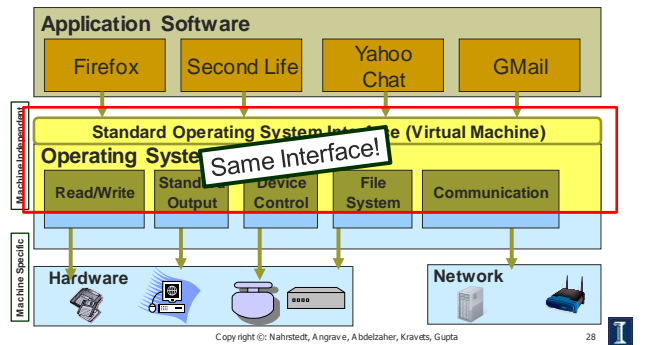
[Machine Independent = Portable]



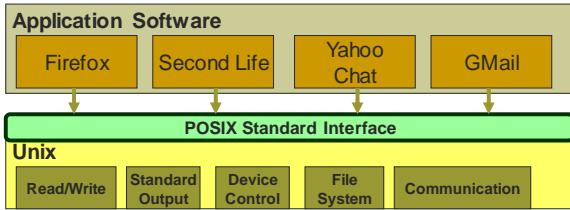
[OS Runs on Multiple Platforms]



[OS Runs on Multiple Platforms]



POSIX The UNIX Interface Standard



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