Operating System - CS3600

Spring 2022

Operating System

- Instructor : Ranjidha Rajan

- Virtual Office Hours:
  - **Monday/Wednesday: 9 am to 11:30 am**
  - **OR by email appointment**
  - **Please make use of MS Teams individual chat window**

- **Email:** rranjidh@msudenver.edu , please make sure to have "CS3600 Sp22 " in the subject line for course related mails.

CANVAS

- **Learning Materials & Assignment:** All class announcements, course syllabus, policy, weekly schedule, materials and assessments will be available in Canvas.

- All supporting materials, assignments, quizzes, HomeWorks for the course will be posted in Canvas.

CANVAS

- Home
- Announcements
- Syllabus
- Modules
- Assignments
- Grades
- People
- New Analytics
- YuJa
- Rubrics

Schedule of Activities

The table below provides an "at-a-glance" overview of the course topics, readings, and activities, etc. You might want to print it and use it as a planning tool and checklist to help stay on track throughout the course.

Week #	Date	Day	Topics to be Covered	Chapters Covered /Readings /Modules	Slides and Programs	Assignments
1	01/18/22	T	Introduction	Module 0 Course Policy Summary		
	01/20/22	Th	OS Overview and Role	Module1_Introduction to OS (1.1)		
2	01/25/22	T	OS Structure	Module1_Introduction to OS (1.2)		
	01/27/22	Th	Process Concepts, Lab 0	Module 2 Process, Threads & Resources (2.1)		

Textbook

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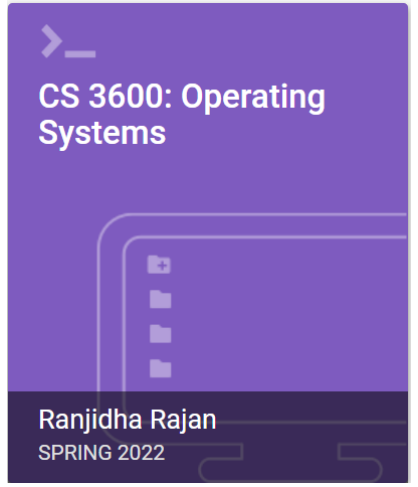
Required Materials:

Zybook for Operating Systems

Click on this link to see the steps to subscribe and access Zybook

A subscription is **$39 for this semester**.

Please make sure to take notes as the subscription end on Jun 11, 2022.



Other Readings (Not to purchase): –

Operating System Concepts, 10th Edition, by Abraham Silberschatz, Greg Gagne **ISBN-13: 978-1119456339**

OER Material

http://pages.cs.wisc.edu/~remzi/OSTEP/

C program links

https://www.cprogramming.com/tutorial/c-tutorial.html

http://users.cs.cf.ac.uk/Dave.Marshall/C/CE.html

Course Description

- This course introduces modern computer operating systems, their use, design, development, and implementation.

- Required to write programs that implement some operating system functions.

- **Prerequisites:** CS 2050, CS 2400, and CS 3250, all with grades of "C-" or better

Grading Policy

	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
Average Grade %	92-100	90 - 91.9	88 - 89.9	82 - 87.9	80 - 81.9	78 - 79.9	72 - 77.9	70 - 71.9	68 - 69.9	62 - 67.9	60-61.9	<=59.9

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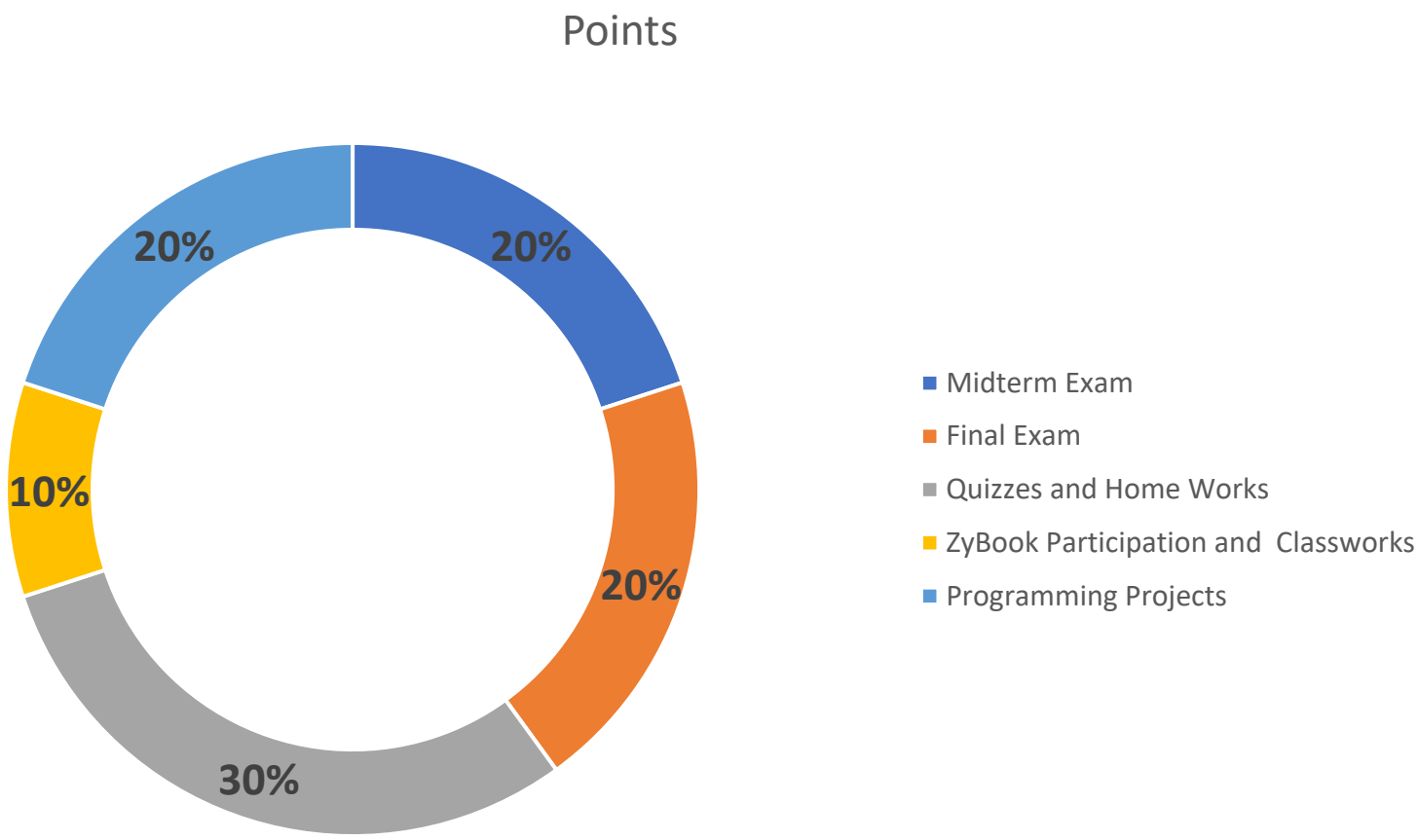
Grading based on



Assignments, Quizzes and Classwork

- Homework is due by midnight of the due date and must be substantially complete and correct, else the work will be returned for further corrections (and will be considered late).

- Homework or projects received after the due date will receive only a maximum of 75%. Submissions after April 30th, 2022, will receive only a maximum of 50%. After April 30th, no late assignments will be accepted. Grading will be based on the correctness, completeness, and presentation of the work assigned to each student.

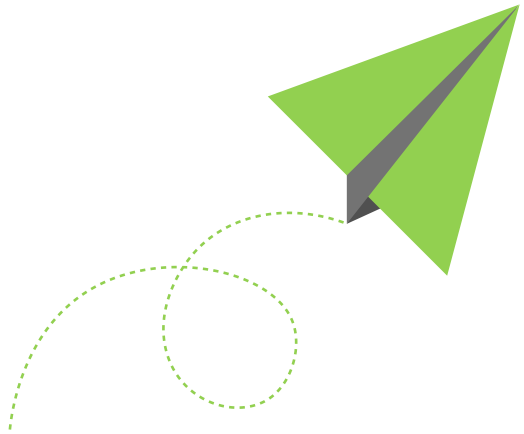
- Weekly Quiz will have unlimited attempts and highest grade will be counted. [The first attempt should be on or before the given due date of the quiz]. Class works are graded only for participation.

Make-up Exams:

- If a student absolutely cannot make a on any medical emergency or any other unavoidable situations make up test are allowed.
- No student may make up the exams, unless you have a genuine reason with supporting proof.
- Arrangements for making-up a missed exam should be made before the next class meeting following the exam. A make-up exam is not allowed once the answer sheets are returned.
- A grade of zero will be recorded for all other missed exams.

Communication is the key

- Please Email me ahead of time
  - If not able to come to class
  - If you need help on a topic
  - If not able to take quiz or test
  - If you didn’t turn your assignment on time.



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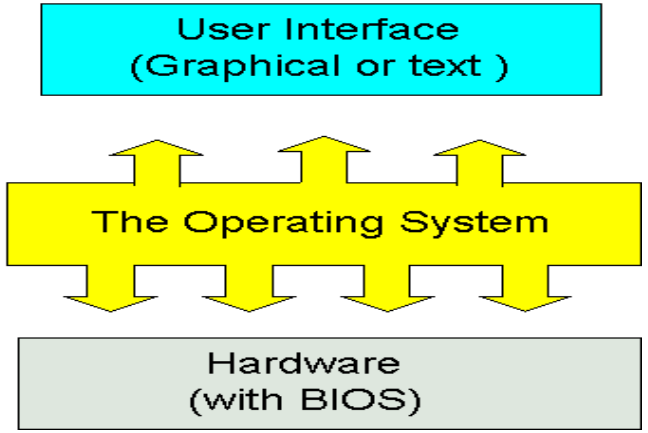
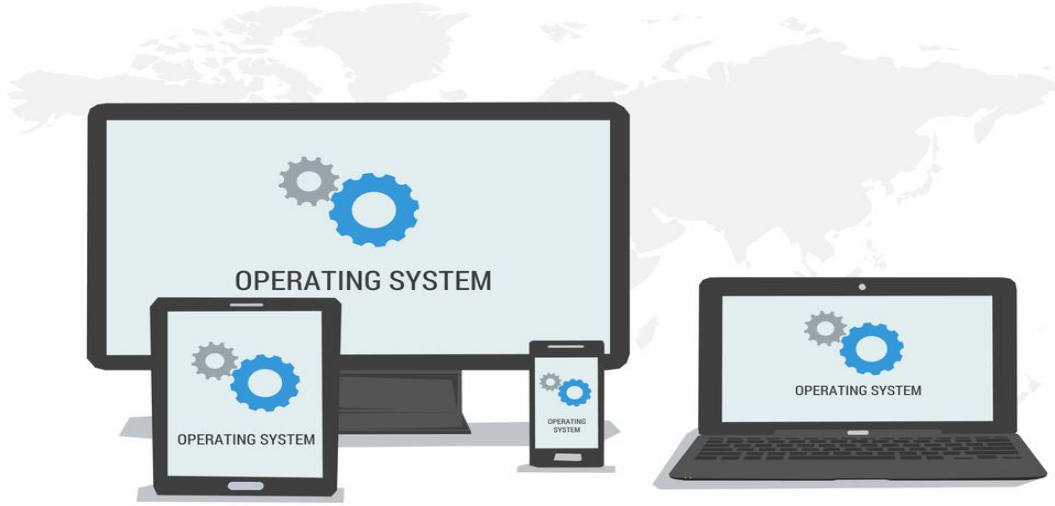
Attendance

- Attendance is recommended to complete the course successfully.
- If not able to attend classes , still you have to do the assigned work.
- Please email / chat in MS Teams channel if not attending the class.

Operating System

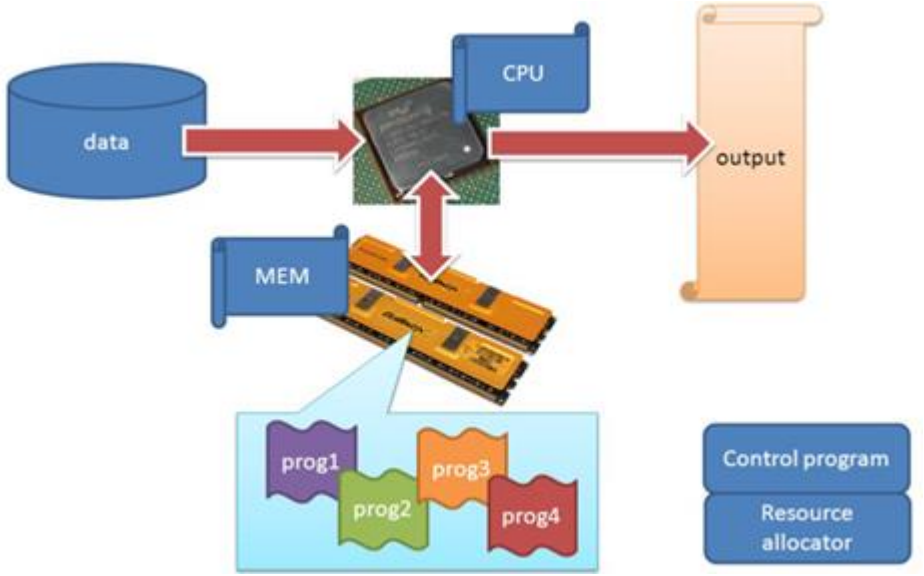




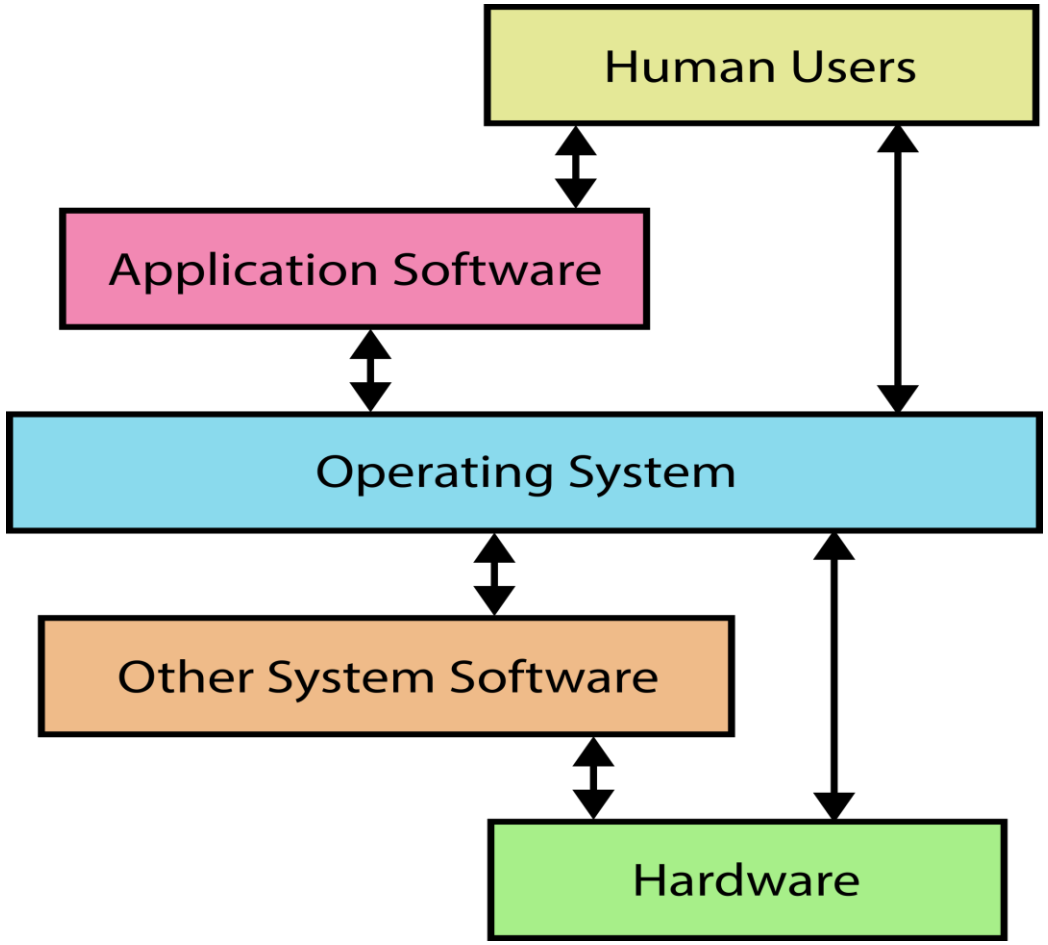
OS –Two Views

USER

SYSTEM



OS :Abstract View



Operating System

- Software that
  - Abstracts and Arbitrates

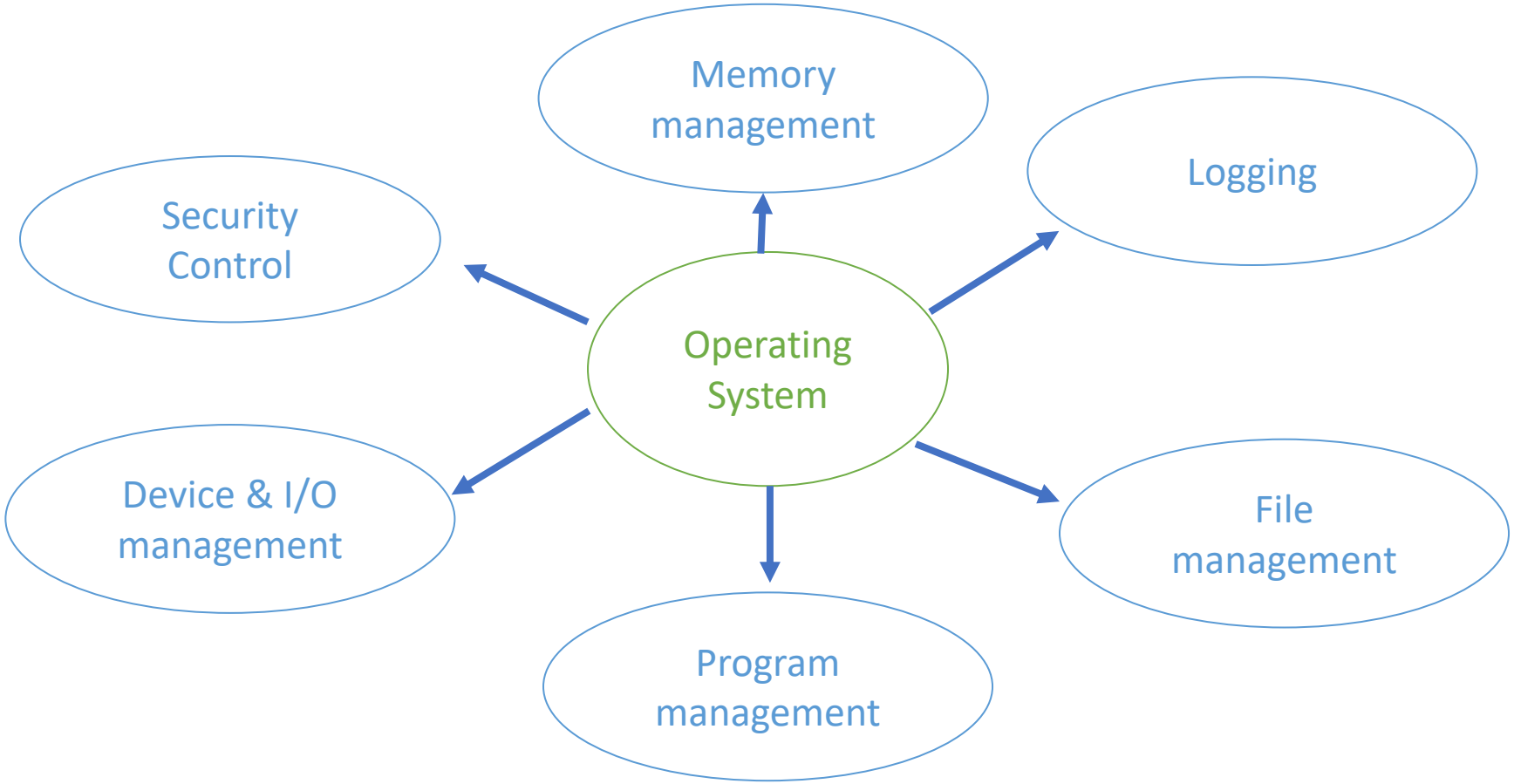
- OS is a **control program**
  - Controls execution of programs to prevent errors and improper use of the computer.

- OS is a **resource allocator**
  - Manages all resources
  - Decides between conflicting requests for efficient and fair resource use

OS Elements

- Abstraction
  - Process, File, Thread, Socket, Memory Page.
- Mechanism –How to do it?
  - Create, schedule, open, write, allocate.
- Policies –What will be done?
  - Least Recently User, Earliest Deadline First

OS Operations



Review – program execution

Process Management

- Scheduling processes and threads on the CPUs .
- Creating and deleting both user and system processes .
- Suspending and resuming processes .
- Providing mechanisms for process synchronization .
- Providing mechanisms for process communication.

Memory Management

- All data in memory before and after processing
- All instructions in memory in order to execute
- Memory management determines what is in memory when
  - Optimizing CPU utilization and computer response to users
- Memory management activities
  - Keeping track of which parts of memory are currently being used and by whom
  - Deciding which processes (or a part of) and data to move into and out of memory
  - Allocating and deallocating memory space as needed

Device and Storage Management

- OS provides uniform, logical view of information storage
  - Abstracts physical properties to logical storage unit - **file**
  - Each medium is controlled by device (i.e., disk drive, tape drive)
    - Varying properties include access speed, capacity, data-transfer rate, access method (sequential or random)
- File-System management
  - Files usually organized into directories
  - Access control on most systems to determine who can access what
  - OS activities include
    - Creating and deleting files and directories
    - Primitives to manipulate files and directories
    - Mapping files onto secondary storage
    - Backup files onto stable (non-volatile) storage media

Protection and Security

- **Protection** – any mechanism for controlling access of processes or users to resources defined by the OS
- **Security** – defense of the system against internal and external attacks
  - Huge range, including denial-of-service, viruses, identity theft, theft of service.
- Systems generally first distinguish among users, to determine who can do what
  - User identities (**user IDs**, security IDs) include name and associated number, one per user
  - User ID then associated with all files, processes of that user to determine access control
  - Group identifier (g**roup ID**) allows set of users to be defined and controls managed, then also associated with each process, file
  - **Privilege escalation** allows user to change to effective ID with more rights

Announcements on (01/18/22)

- Module 0
  - Read Course Policy page
  - Complete syllabus quiz by this week.
- Next Class
  - Module 1
    - “The role of OS 1.1”.