Welcome to:

CSCI3150
Intro. to Operating Systems

Lecturer and Tutors

- **Lecturer:** Dr. Zili SHAO

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- **Tutors**

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About me

- **Research**
  - Big data systems
  - Storage systems
  - Embedded systems and software

  http://www.cse.cuhk.edu.hk/~shao/

- **I love and enjoy computer system research**
  - Join my group if you have interests

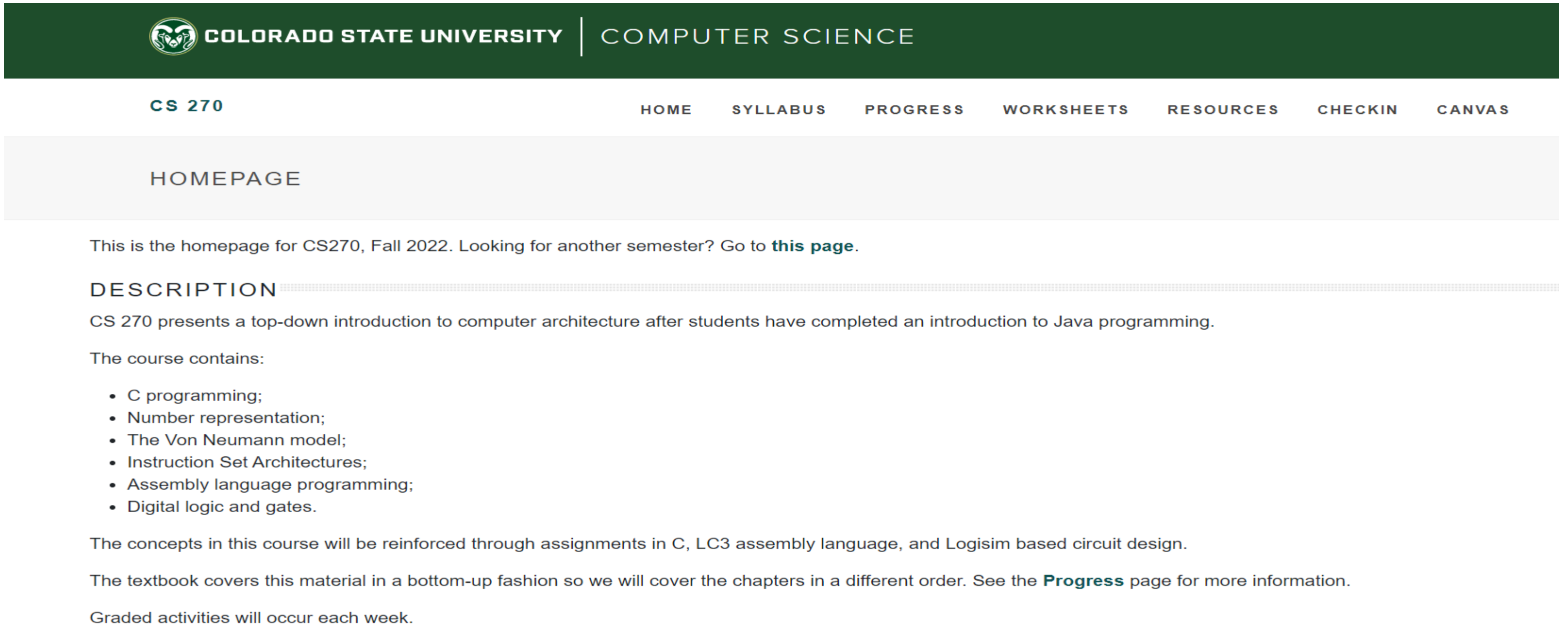
About the course

- **Course website**

  https://blackboard.cuhk.edu.hk
- **Textbook: Operating Systems: Three Easy Pieces**
  - A free online OS book
  - http://pages.cs.wisc.edu/~remzi/OSTEP/
  - Authors: Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau
- **Reference book: Operating System Concepts, 2018**
  - http://codex.cs.yale.edu/avi/os-book/OS10/index.html
  - Authors: Avi Silberschatz, Peter Baer Galvin, and Greg Gagne

More References

- Introduction to Computing Systems: From Bits and Gates to C and Beyond, Authors: Yale N. Patt and Sanjay J. Patel
- A Computer Organization Course from Colorado State University



HOMEPAGE

This is the homepage for CS270, Fall 2022. Looking for another semester? Go to this page.

DESCRIPTION

CS 270 presents a top-down introduction to computer architecture after students have completed an introduction to Java programming.

The course contains:

- C programming;
- Number representation;
- The Von Neumann model;
- Instruction Set Architectures;
- Assembly language programming;
- Digital logic and gates.

The concepts in this course will be reinforced through assignments in C, LC3 assembly language, and Logisim based circuit design.

The textbook covers this material in a bottom-up fashion so we will cover the chapters in a different order. See the Progress page for more information.

Graded activities will occur each week.

- Beginning Linux Programming, 4th Edition, 2007, Authors: Neil Matthew and Richard Stones

Topics Covered

- **Focus**
  - **User-level programming (System calls)**
  - **File system**
  - **Process management**
  - **Memory management**
  - **Concurrency**
- Others (briefly introduced with the above)
  - Protection and security
  - Design/implementation methodology
  - Performance evaluation

Background required

- **Basic knowledge**
  - Data structures
  - Programming in C
- **Linux System**
  - Log into a Linux system;
  - Create files using one editor;
  - Basic commands for files/directories;
  - Compile C programs
- **Linux Basic:** https://cuhk-systemgroup.github.io/

Tutorial: http://pages.cs.wisc.edu/~remzi/OSTEP/lab-tutorial.pdf

Linux Environment

- The first step to succeed for this course – have a good Linux environment controlled by yourself
- You are required to follow the tutorial below to create a Linux environment running on VM based on VirtualBox at your own computer (Windows/OS X)

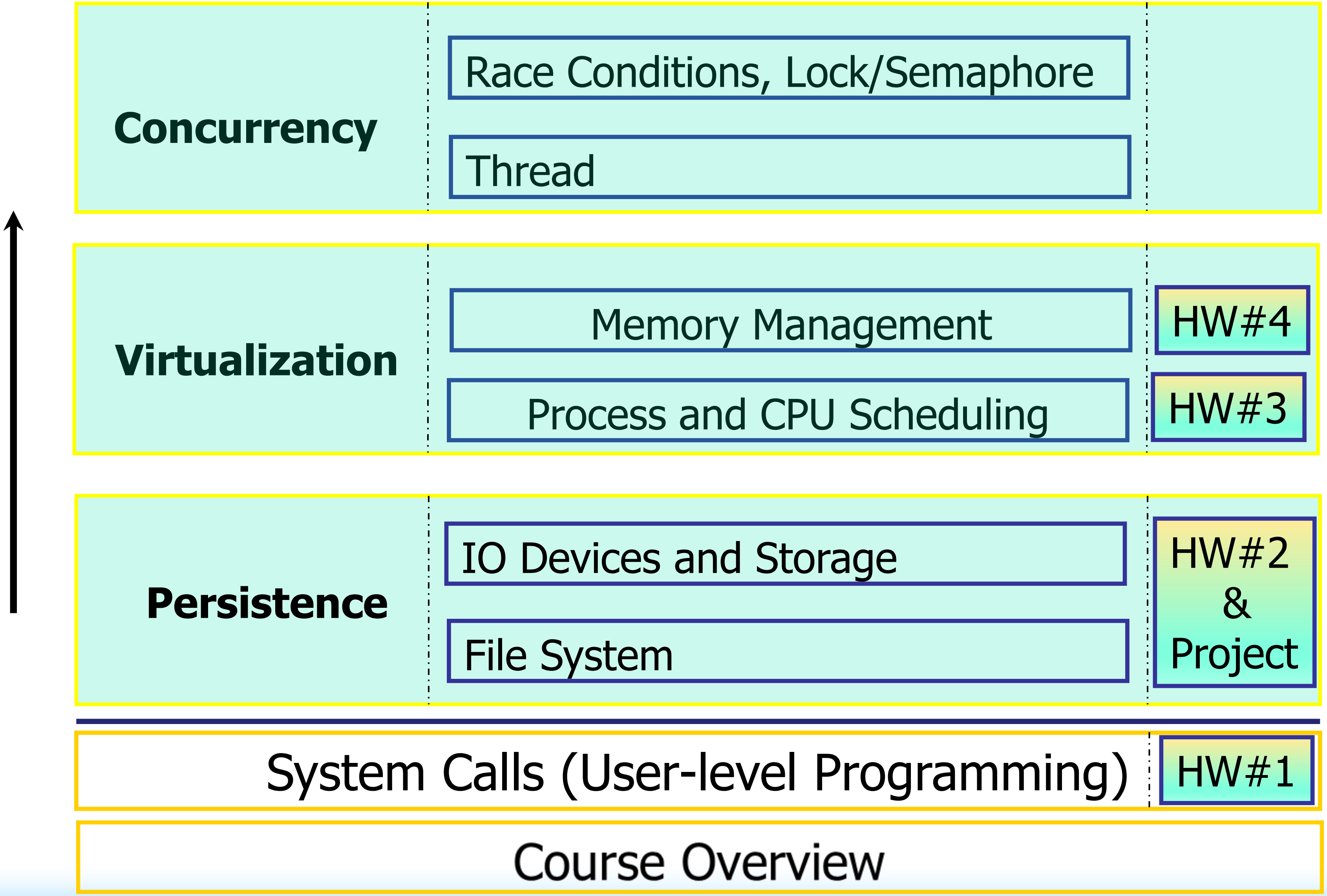
  https://cuhk-systemgroup.github.io/

  The VM image can be downloaded from the link:

  https://www.cse.cuhk.edu.hk/~shao/zili_files/csci3150/3150_XUbuntu.ova

- A lab in Week 2 will be provided to help you on this (Labs will start from Week 2)

The Course Organization (Bottom-up)



Concurrency

Race Conditions, Lock/Semaphore

Thread

Virtualization

Memory Management

HW#4

Process and CPU Scheduling

HW#3

Persistence

IO Devices and Storage

File System

HW#2 & Project

System Calls (User-level Programming)

HW#1

Course Overview

Teaching Plan

	Week	Lecture 1 (Tuesday)	Lecture 2 (Wednesday)	Lab (Thursday)
Sept. 5 - Sept. 10	1	Introduction; Overview	System Calls	
Sept. 11 - Sept. 17	2	System Calls	System Calls	VM, Compile, Make & Run
Sept. 18 - Sept. 24	3	System Calls (HW #1)	System Calls	C Review (structure, memory, file IO)
Sept. 25 - Oct. 1	4	System Calls/File Systems	File Systems	File Systems – Superblock (Lab)
Oct. 2 - Oct. 8	5	Holiday	File Systems	File Systems – inode (Lab)
Oct. 9 - Oct. 15	6	File Systems (HW #2)	File Systems (Project)	File Systems - inode/Directory (Tutorial)
Oct. 16 - Oct. 22	7	Process/CPU Scheduling	Process/CPU Scheduling	CPU Scheduling (Tutorial)
Oct. 23 - Oct. 29	8	Process/CPU Scheduling (HW #3)	Process/CPU Scheduling	CPU Scheduling (Lab)
Oct. 30 - Nov. 5	9	Memory	Memory	Memory (Tutorial)
Nov. 6 - Nov. 12	10	Memory (HW #4)	Memory	Memory (Lab)
Nov. 13 - Nov. 19	11	Concurrency	Concurrency	Concurrency (Lab) - Pthread
Nov. 20 - Nov. 26	12	Concurrency	Concurrency	Congregation (Class Suspended)
Nov. 27 - Dec. 3	13	Concurrency	Concurrency	Concurrency (Lab)– Conditional Variable

Assessment (Total: 110)

- ***Continuous assessment*: 60%**
  - Labs (around 4; programming related; simple) *5%*
  - Four Assignments *40%*
    - Assignment 1 (10%) - Simple Shell (Program, Group)
    - Assignment 2 (10%) - File system (Paper)
    - Assignment 3 (10%) - MLFQ Scheduling (Paper)
    - Assignment 4 (10%) - Memory management (Paper)
  - Project (File System, Program) *15%*

- ***Bonus* 10%**
    - *Bonus Programming Assignment 1 (5%) - MLFQ Scheduling*
    - *Bonus Programming Assignment 2 (5%) - Memory management*

Late submission policy: 20% deduction per day (1 minute or 23 hours no difference)

We only grade based on what you submit in the Blackboard.

- ***Final Exam*: 40%**

Plagiarism & Absence

- **All assignments (except Assignment one) need to be done individually**
  - Discussion is encouraged but you need to implement them yourself
  - It is your responsibility to protect your code (e.g. private github)
- **Plagiarism**
  - Plagiarism check will be conducted extensively for fairness and good culture
  - Processing
    - Rule 1: First incident, **the score of that whole assignment** will be 0 for **all involved persons (i.e.** both solution providers and cheaters)
    - Rule 2: Repeat incident, follow Rule 1, and the case (i.e. all students involved) will be reported to the department
- **Absence**
  - Class attendance is extremely important
    - One class focus: Help on the assignments
  - For the final exam, the makeup one will be **much much much more** difficult