CMPN302: Design and Analysis of Algorithms

Lecture 00: Course Introduction

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Fall 2020

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Overall Aims of The Course

Learn:

- Designing and developing efficient algorithms
- Evaluating time and space complexities of any algorithm
- Choosing between different algorithms based on case problem

Enhance:

- Thinking skills in tackling any algorithmic problem through design strategies

LOs

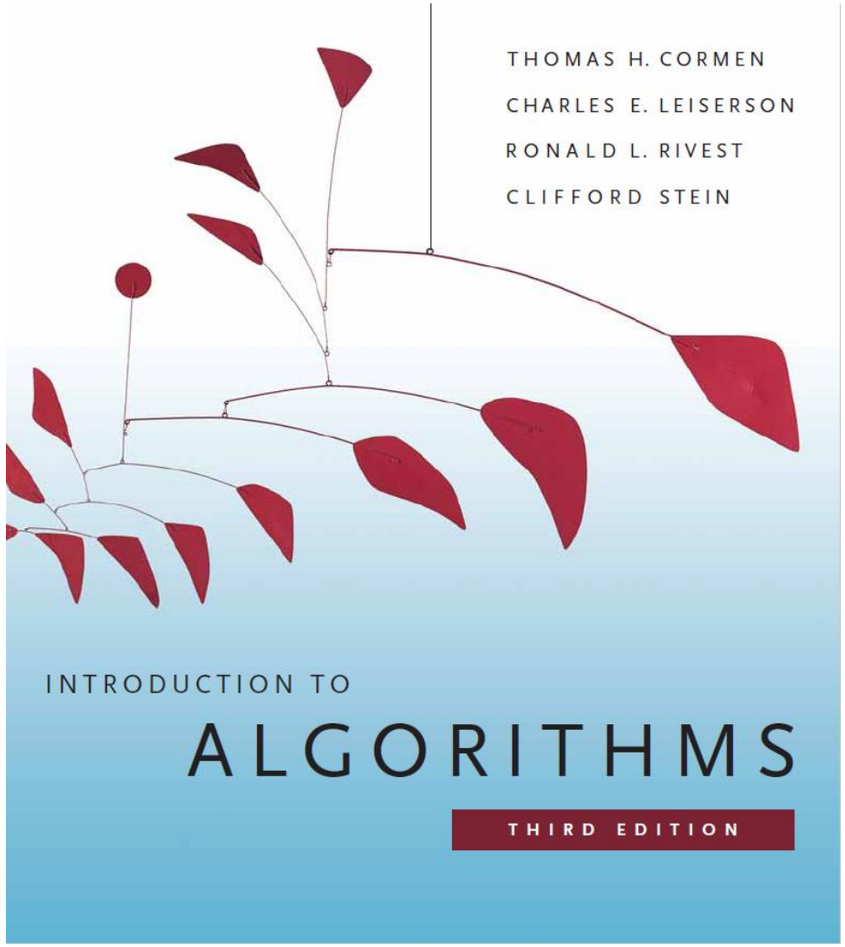
1. Essential facts, concepts, principles and theories of algorithms.
2. Principles of design strategies (incremental, divide-and-conquer, greedy and dynamic programming) for solving computer problems.
3. Demonstrate a high level of competence in identifying the right strategy and solving of computer problems.
4. Evaluate different strategies for solving computer problems in terms of time and space complexities.
5. Use appropriate programming and scripting languages for the problem.
6. Write computer programs.
7. Work in stressful environment and within constraints.
8. Effectively manage tasks, time, and resources.

Topics

- Introduction
- Fundamentals of the analysis of algorithm efficiency
- Sorting + Medians
- Hashing
- Binary search tree algorithms (traversing algorithms , AVL trees, red-black trees)
- Dynamic programming
- Greedy algorithms
- Graph algorithms (BFS, DFS, Topological sorting, connected components, shortest path algorithms)
- String matching algorithms
- NP-completeness
- Flow networks

Textbook

- Introduction to Algorithms, Thomas H. Cormen Charles E. Leiserson Ronald L. Rivest Clifford Stein, Third Edition.



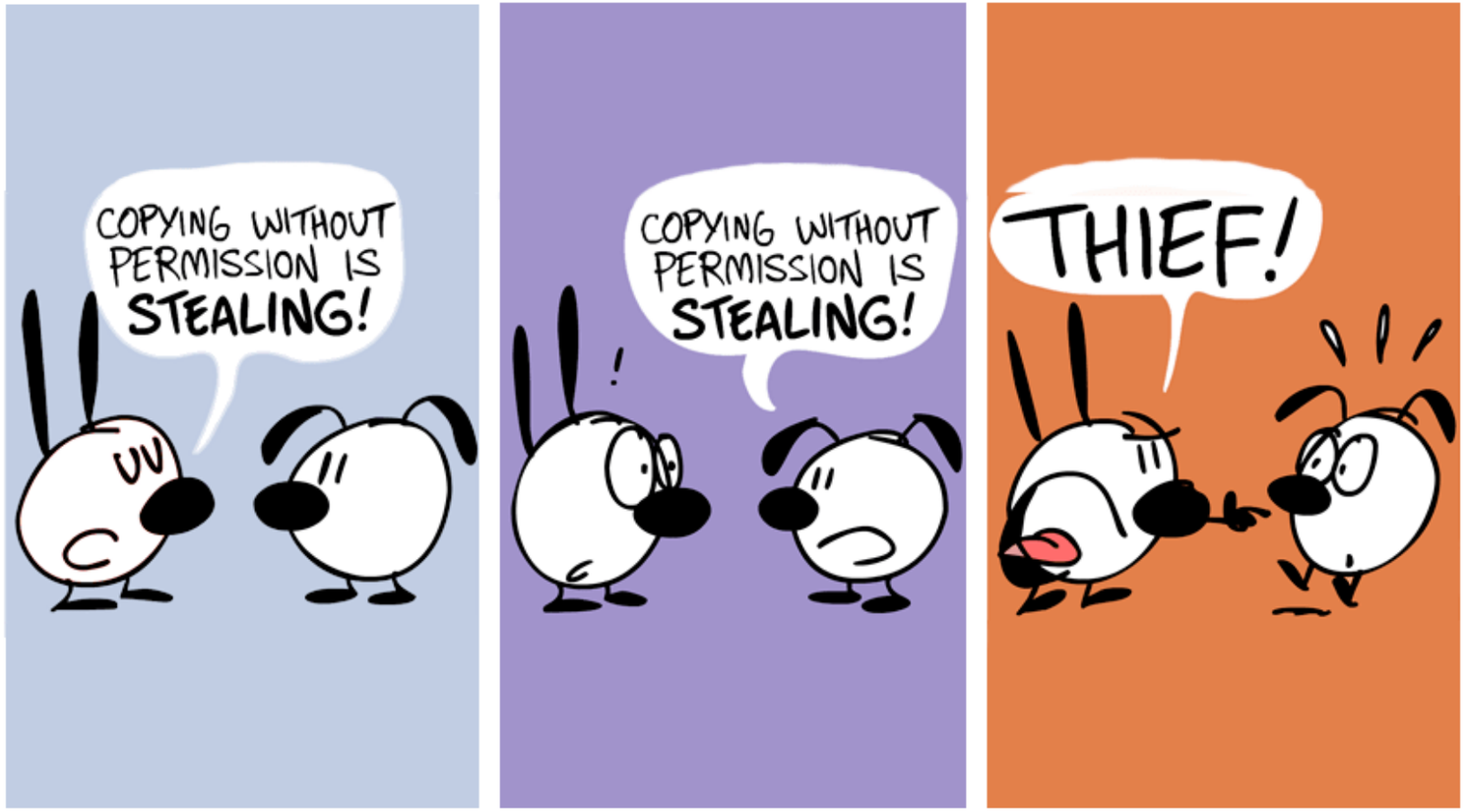
Grading

Final	**40**
Coursework	**60:**
Midterm	**20**
Programming assignments	**30**
Labs	**10**
Total	**100**

Programming assignments

- Goals:
  - Enhance algorithmic skills
  - Enhance programming skills
- Policy:
  - NO collaboration in implementation
  - NO internet searching for implementations
  - Copying results in ZERO grade in up-to all of programming assignments or labs. No exceptions!

What is Plagiarism??



Courtesy of top-papers.com

No plagiarism

- We'll run plagiarism checking for each submission against all submissions and against all internet solutions.
- If you can't solve it or have no time, your other coursework will help you pass.
- If you copy:
  - You won't learn
  - You will get zero in the rest of your coursework, so you'll fail.
- You choose!!

Quizzes

- Will cover the lecture content only. No previous content.

- Cheating in one = ZERO.

Policies

- Talking policy
- Entering/leaving lecture policy
- Asking/answering policy

Questions?