# DESIGN AND ANALYSIS OF ALGORITHMS

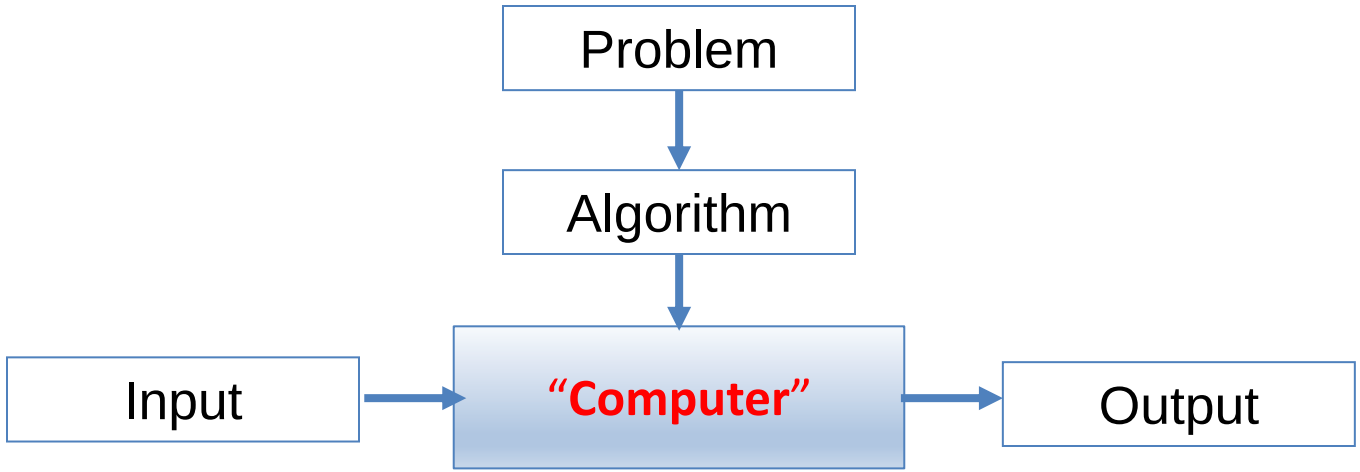
## COURSE INTRODUCTION

# Course overview

From: internet

# Course overview

- Why we need the algorithms?
  - Problems in life.
  - Problems in science.
  - Specialize in Computer and Information Science.



# Course overview

- Emphasizes on **Design** and **Analysis** of Algorithms:
  - Design Algorithm:
    - How to make algorithm for solving a given problem?
  - Analysis off Algorithm
    - The designed algorithm is good or not?
    - Benchmark: time and resource.

# Course overview

- Topics covered
  - Basic principles of algorithm design and analysis
  - Some techniques for designing algorithm:
    - Recursive; Devide and Conquer; Trial and Error; Greedy; Dynamic Programming.
  - How to analyze algorithms using both mathematical tools and basic experiments.
  - How to transform new problems into well-known algorithmic problems with efficient solutions.

# Objective

Main goals of this course:

- Knowledge: Know how to make problem specification; grasp the basic techniques for algorithm design and assessment their complexities.
- Skills: Ability to build algorithm for specific problems, give the complexity of the algorithm.
- Attitude: Having a serious learning attitude, ability to self-study and thinking in developing application for real problems.

# Lecture schedules

- Semester 2, AY 2022-2023
- Credits: 3 (2 class + 2 lab + 5 seft-study)
- Class: Monday, 7:00-8:50, room 208-T5

  Thursday, 7:00-8:50, room 202-T4

  Friday, 7:00-8:50, room 202-T4
- Lab: Computer room T5
- Course language: Vietnamese, English

# Assessments

- Weekly (homework, attendances): 20%
- Midterm (homework, essay): 20%
- Final (exam, project): 60%

# Lecturer and tutor

- Lecturer
  - Assoc.Prof. Nguyễn Thị Hồng Minh
  - 0904101065 (phone, zalo, viber)
  - minhnth@hus.edu.vn (mail)
  - nth_minh@yahoo.com (mail, facebook)
- Tutors
  - BSc., MSc. student Đặng Trung Du (098.464.0898)
  - BSc., MSc. student Trần Bá Tuấn (032.745.7300)
  - BSc., MSc. student Trịnh Cẩm Nhung (038.462.4498)

# Course resources

- Course materials

  Google Classroom

  Google Drive

- Disscusions

  Group zalo

  Email: minhnth@hus.edu.vn

  *Subject begin with:* [MAT35xx].<subject>

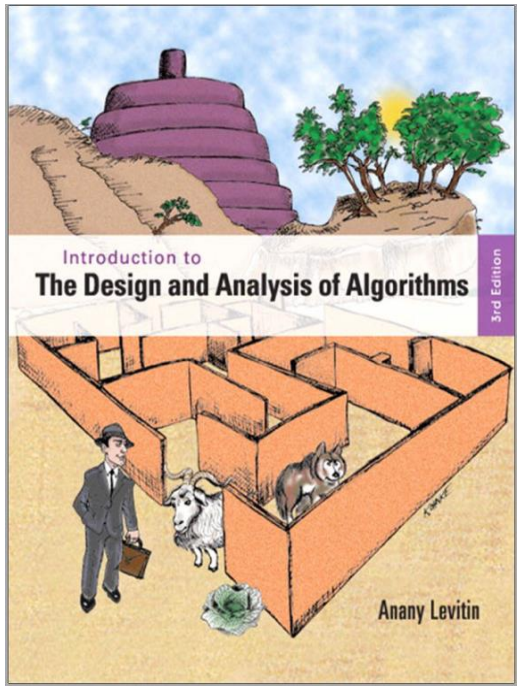
- Software

  Programming language: **Java, C++, Python**

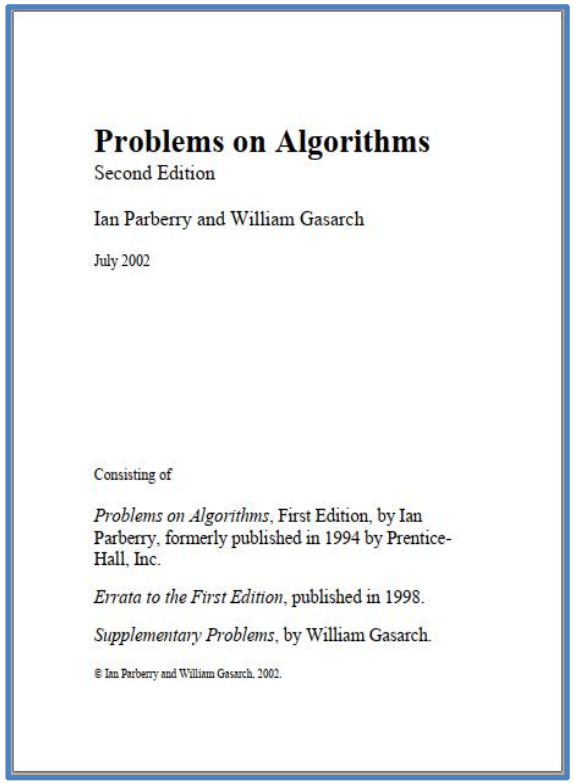
  Interactive app: Google Form, Kahoot! (smart phone, laptop)

# Course resources

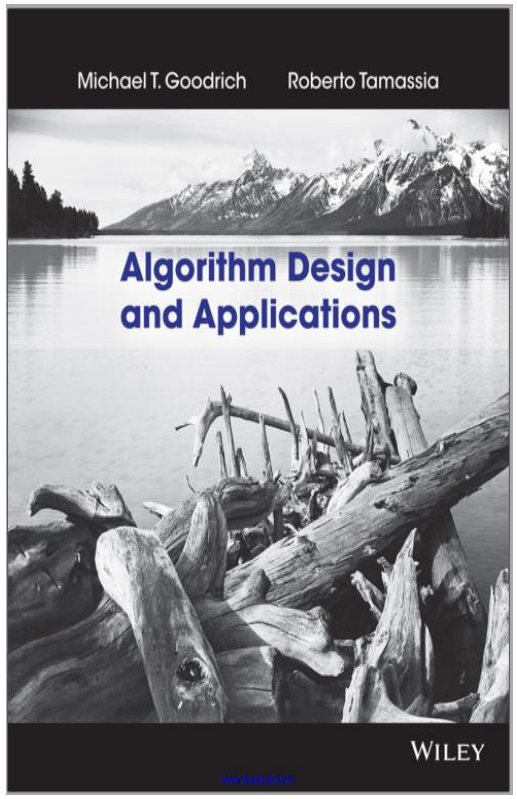
- Reference books:




- The Design and Analysis of Algorithms (3rd), Anany Levitin, Pearson, 2012

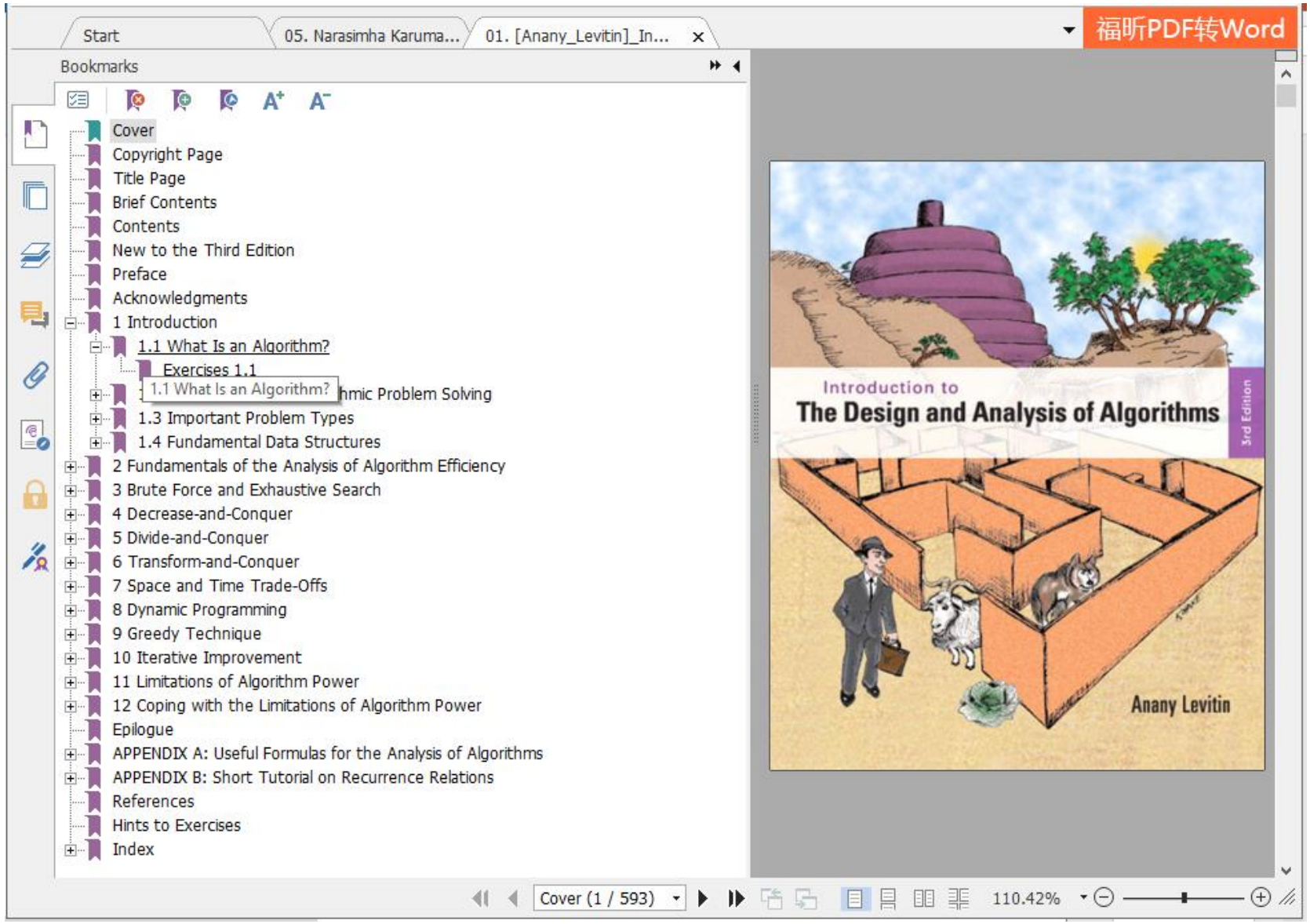



- Problems on lgorithms, Ian Parberry and W. Gasarch, ebook, 2002




- Algorithm Design and Applications, Michael T. Goodrich, R. Tamassia, 2015

# Course resources



# Some Class Rules

- Vệ sinh bảng, phấn. Chuẩn bị máy chiếu.
- Không nói chuyện riêng, nói chuyện điện thoại trong lớp.
- Ra/Vào lớp không làm ảnh hưởng cô và các bạn.

- Điểm danh bất kì.
- NGHIÊM CẤM GIAN LẬN trong làm bài tập, kiểm tra.

# Expected results

- Complete the course with the best score;
- Subject material folder: lectures, documents, assignments;
- Ideas for projects, applications;
- Memorable classroom experience.
- …


From: https://www.insightoftheday.com/motivational-quote-by-robert-collier-10-31-2019

# Thank you for going together!

**Assoc. Prof. Nguyen Thi Hong Minh**

Department of Informatics

Faculty of Mathematics, Mechanics and Informatics

VNU University of Science

Bộ môn Tin học

Khoa Toán - Cơ - Tin học

Trường Đại học Khoa học Tự nhiên

Đại học Quốc gia Hà Nội