ĐẠI HỌC ĐÀ NẴNG
TRƯỜNG ĐẠI HỌC CÔNG NGHỆ THÔNG TIN VÀ TRUYỀN THÔNG VIỆT - HÀN
VIETNAM - KOREA UNIVERSITY OF INFORMATION AND COMMUNICATION TECHNOLOGY
한-베정보통신기술대학교

Nhân bản – Phụng sự – Khai phóng

Data Structures & Algorithms

Course Introduction

OUTLINE

- Course Information
- Objectives
- Contents
- Assignments and Labs
- Grading Information
- Textbook and References

- **Prerequisite**
  - Programming in C/C++
- **Number of credits: 03**
  - Theory sessions: 02 credits
  - Practice sessions: 01 credits
- **Plan for 15 weeks**
  - 2 theory periods / session / week
  - 2 practice periods / session / week

Objectives

- Understand and present data structures and algorithms
- Understand graph representations and algorithms
- Understand algorithm analysis
- Be able to translate high-level, abstract data structure and algorithm descriptions into concrete code
- Be able to apply data structures and algorithms to solve problems
- Develop communication, thinking and problem solving skills
- Develop professional attitude

Contents

- Course introduction
- C/C++ Review
- Algorithm Analysis
- Linked List
- Stack
- Queue
- Searching & Sorting Algorithms
- Binary Tree
- Binary Search Tree
- Heap
- Graph
- Hash

- **Assignments**
  - Assignments are given after theory session, students should do in class
- **Labs**
  - **8 labs** will be done
  - Solving some problems by using data structures and algorithms

Grading Information

- **Participation, Attendance: 10%**
- **Assignments, Labs: 20%**
- **Midterm exam: 20%**
  - Written test
- **Final exam: 50%**
  - Multiple choice test

- **Textbook**
  - M.A. Weiss, Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson, 1997

- **References**
  - Jiman Hong, Nguyễn Văn Lợi, Nguyễn Phương Tâm, Ninh Khánh Chi, Cấu trúc dữ liệu, Nhà xuất bản TT&TT, 2019
  - Đỗ Xuân Lôi, Cấu trúc dữ liệu và giải thuật, ĐHQG Hà Nội, 2006

What this course is about?

- Data structures: conceptual and concrete ways to organize data for **efficient storage** and **efficient manipulation**
- Employment of this data structures in the design of **efficient algorithms**
- **Analysis** of the algorithms complexity

Why do we need them?

- **Requirements for a good software**
  - Good detailed design
  - Easy maintenance
  - Reliable
  - Easy to use
  - Reusable

⇨ **Efficient data structure**

⇨ **Efficient algorithms**

Example

- **We want to develop a program to manage students including some functions:**
  - Adding new students
  - Modifying student information
  - Searching and sorting students
  - Storing student information

⇨**How can you solve this problem?**

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Enjoy the Course…!