Chapter 0
Course Outline

Data Structures and Algorithms

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Overview

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Learning outcome

By completing this course, students are able to:

- **USE** fundamental data structures like list, stack, queue, tree, graph, and hash table for programming and particular problems

- **EXPRESS** algorithms using pseudocode as well as using C++

- **ANALYZE** the computational complexity of algorithms associated with these data structures.

Contents at a glance

1. Introduction
2. Complexity of algorithms
3. Recursion
4. List: Array-List, Linked List
5. Stack, Queue
6. Tree: Binary
7. AVL, B-Tree
8. Heap
9. Hash
10. Sorting
11. Graph
    $\rightarrow$ Final Exam

Structure

- Lectures: course contents in class

- Readings: course contents at home

- Tutorials: QAs and exercises

- Lab: coding practice

- Assignments: small projects

Distribution

- **Course credit: 4**

- Lectures: 45 period units
- Exercises: 15 period units
- Lab: 15 period units
- Total: 75 period units

Assessment

- Exercises: 15%

- Lab: 10%

- Assignments: 25%

- Final Exam: QAs and Writing, 50%

Assessment

Regulations:

- Any plagiarism act will lead to zero in all tests!
- Final grade of assignment depends on the exam:

$$A_{final} = \frac{A_i + E_i}{2};$$

  where, A_i and E_i are the assignment score and the question in the final exam associated with the assignment A_i

- Detail mapping of exam questions and assignments will be announced during the progress of the course.

References

1. **"Data Structures and Algorithm Analysis"** - Clifford A. Shaffer (Edition 3.2).

2. "Data Structures: a Pseudocode Approach with C++", R.F.Gilberg and B.A. Forouzan, Thomson Learning Inc., 2001.

3. "Data Structures and Algorithms in C++", A. Drozdek, Thomson Learning Inc., 2005.

4. "C/C++: How to Program", 7th Ed. – Paul Deitel and Harvey Deitel, Prentice Hall, 2012.

5. Internet.

Website

- BKe-Learning:
  - Link: http://e-learning.hcmut.edu.vn
  - Course: **Data Structures and Algorithms (CO2003)**

- Any question:
  - LE THANH SACH
  - Email: LTSACH@hcmut.edu.vn

Preparation for the course

- Materials:
  - Slides of this course
  - E-book: **Data Structures and Algorithm Analysis** - Clifford A. Shaffer (Edition 3.2).
    http://people.cs.vt.edu/~shaffer/Book/

- Tools:
  - CodeBlocks (Cross-platform)
  - Visual C++ Express (Windows)
  - XCode (Mac OS)

Methodology

- Outside of lecture room
  - Read slides, books
  - Check BKeL & make discussions
  - Take exercises
  - Implement examples

- During lectures:
  - Listen & Discuss