VIETNAM NATIONAL UNIVERSITY – HOCHIMINH CITY
UNIVERSITY OF SCIENCE
Faculty of Information Technology

Data Structures and Algorithms

Nguyen Thanh Phuong
2023

Schedule

- Time: 7:30 – 11:10

  (22CLC04: Weds., 22CLC08: Thurs.)
- Classroom: 22CLC04: I.42, 22CLC08: I.44
- Duration: 11 weeks
- Midterm: from Jul 10th to Jul 15th (in class)
- Teaching Assistants:

  Dr. Nguyen Ngoc Thao

  M.S. Bui Huy Thong

Topics to be Covered

- General introduction to data structures and algorithms
- Introduction to algorithm analysis
- Introduction to sorting algorithms
  - Basic sorting algorithms: buble sort, selection sort, insertion sort, interchange sort
  - Advanced sorting algorithms: mergesort, heapsort, quicksort
  - Non-comparison-based sorting algorithms: counting sort, radix sort

Topics to be Covered

- Priority queues and Hash tables
- Introduction to trees
  - Binary trees and Binary search trees
  - Balanced trees: AVL trees, Red-Black trees
  - B-trees
- Introduction to graphs
  - Graph definitions and notations
  - Graph representations
  - Graph traversals
  - Some graph algorithms

Textbooks

N. Wirth, *Algorithms + Data Structures = Programs*, Prentice-Hall, 1976

A. Drozdek, *Data Structures and Algorithms in C++*, 4th Edition, Cengage Learning, 2013

D. S. Malik, *C++ Programming: Program Design including Data Structures*, 8th Edition, Cengage Learning, 2017

Prerequisites

- Programming Techniques
  - The syntax of C/C++ including data types, variables, conditionals, loops, functions, and arrays
  - The constructs such as structures, pointers, and multi-dimensional arrays
  - The advanced concepts provided by C/C++ such as data abstraction, dynamic memory allocation, recursion, …

Assessments

- Programming Assignments: 30%
  - All code must be compiled with C++ compiler
  - No credit will be given for code that does not compile
- Project: 10%
- Midterm (in class): 20%
- Final exam: 40%