

VIETNAM NATIONAL UNIVERSITY – HOCHIMINH CITY

UNIVERSITY OF SCIENCE

Faculty of Information Technology

# Data Structures and Algorithms

Nguyen Thanh Phuong

2025

# Schedule

- Time: 7:30 – 11:10, Tuesdays
- Classroom: I.44
- Duration: 11 weeks
- Midterm: from Mar. 3<sup>rd</sup> to Mar. 8<sup>th</sup> (in class)
- Teaching Assistants:

Dr Nguyen Ngoc Thao

BSc Nguyen Thanh Tinh

# Topics to be Covered

- General introduction to data structures and algorithms
- Recursion (self-study)
- Introduction to algorithm analysis
- Introduction to sorting algorithms
  - Basic sorting algorithms
  - Advanced sorting algorithms
  - Non-comparison-based sorting algorithms
- Link lists (review)

# Topics to be Covered

- Priority Queues and Hash Tables
- Introduction to Trees
  - Binary trees and Binary search trees
  - Balanced 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++*, 4<sup>th</sup>  
Edition, Cengage Learning, 2013

D. S. Malik, *C++ Programming: Program Design including  
Data Structures*, 8<sup>th</sup> 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, ...

# Assessments

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