Week 2
Divide-and-Conquer

INFSCI 2591

Spring 2023

Learning Objectives

- Describe the divide-and-conquer approach to solving problems
- Apply the divide-and-conquer approach to solve a problem
- Determine when the divide-and-conquer approach is an appropriate solution approach
- Determine complexity analysis of divide and conquer algorithms
- Contrast worst-case and average-case complexity analysis

Reading Instructions

- Read Chapter 2 Sections 2.1-2.4, 2.8

Binary Search

- You must read the entire Section 2.1 and pay attention to:
  - Algorithm 2.1 (pages 53-56)
  - Analysis of Algorithm 2.1: Worst-Case Time Complexity (Binary Search, Recursive) (pages 56-57)

Mergesort

- You must read the entire Section 2.2 and pay attention to:
  - Algorithm 2.2 (pages 58-59)
  - Algorithm 2.3 (pages 59-60)
  - Analysis of Algorithm 2.3: Worst-Case Time Complexity (Merge) (page 60)
  - Analysis of Algorithm 2.2: Worst-Case Time Complexity (Mergesort) (pages 60-62)
  - Algorithm 2.4 (page 62)
  - Algorithm 2.5 (page 63)

Divide-and-Conquer

- Read Section 2.3 which outlines the steps for the design of divide-and-conquer algorithms (page 64)

Quicksort

- You must read the entire Section 2.4 and pay attention to:
  - Algorithm 2.6 (page 65)
  - Algorithm 2.7 (pages 66-67)
  - Analysis of Algorithm 2.7: Every-Case Time Complexity (Partition) (page 67)
  - Analysis of Algorithm 2.6: Worst-Case Time Complexity (Quicksort) (pages 67-69)

Type of Problems

- Read Section 2.8 for instances where divide-and-conquer should be avoided (page 88)