ECS36C: Data Structures

Study Guide

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Preface

This study guide is written with the intention to help students review topics easily and quickly before an exam, or a quiz. If you are enrolled in ECS 36C this quarter, please don't use this study guide as your primary means of preparation for an exam. This is only meant to review topics and this will **not** replace a textbook or lecture notes provided by your instructor.

Data Structures and Algorithms is probably one of the most important courses that one would take during their undergraduate life. Because these concepts are used everywhere, they always show up on technical interviews! Since most students will interview for either internship or full-time positions, we will try and indicate what topics we got tested on during interviews.

This study guide goes over each and every topic, and possibly more than what you might see in this course. The topics presented in this guide are well within the scope of this course. We have broken down this study guide into three parts, for ease of understanding: *Data Structures*, *Graph Algorithms*, and *Sorting Algorithms*. Each of these parts are broken down into simpler topics and their use cases are explained in simple terms. Since this is a data structures and algorithms course, you are expected to know the time complexities of the different data structures you study. We have provided these run times along with a detailed explanation/proof for each Data Structure and/or Algorithm you will cover in this class.

This study guide largely makes use of examples and uses examples to illustrate the working of the different Data Structures and Algorithms you will see. Wherever neccessary, we have explained certain concepts using code or pseudocode. We will primarily use *C++* to illustrate such implementations of algorithms.

The authors of this study guide have all previously taken this course and did exceedingly well. Additionally, we have all tutored this class and held review sessions of our own for over 2 years now. We have tutored and helped countless students in this grueling course. We know those trivial tips and tricks that might just help you do better on an exam!

If you spot a typo or a conceptual error, please contact us at `ucdcstutoring [at] gmail {dot} com`. Since this is the first time we are writing a study guide for this course, your suggestions and feedback will be greatly appreciated.

Before we sign this preface and let you get reading with the real material, here's a small piece of information that you should take from this class: *Never ever use a B-Tree in RAM.* If you don't know what that means, you're about to find out soon!

Good Luck,

The CS Tutoring Committee

Chapter 1

Introduction

TODO: Write Intro