CS 341 - Algorithms **Winter 2018**

Lecture 1: January 4, 2018

Lecturer: Bin Ma *Notes By: Harsh Mistry*

1.1 Admin Info

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1.1.1 Mark Breakdown

- Assignments (30 %)
- Midterm - February 27th (25 %)
- Final (45 %)

1.2 Introduction

The goal of the course is to lean to design an algorithm. More specifically, you will learn

- Well-known algorithms
- Skills to analyse complexities
- Skills to adapt existing solutions to new problems
- Skills to design new algorithms

What is a problem?

- A problem defines the format of input desired output
- For the purpose of this course, input size is not bounded
- A problem does not specify an algorithm

What is an algorithm?

- A defined an finite procedure that solves a problem : taking any input of the problem and produces the desired output.

How to evaluate an algorithm?

- Time and Space complexity
- Easiness of implementation

1.2.1 Course contents

- Algorithm analysis : correctness and time complexity
- Algorithm design techniques :
  - Reduction
  - Recursion
  - Divide-and-Conquer
  - Greedy
  - Dynamic programming
  - Exhaustive search
  - local search (not studied in this course)
  - Linear programming (not studied in this course)
- Intractability : Not every problem has an efficient algorithm
- Undecidabiliy : Not every problem has an algorithm