

15CSE374
INTRODUCTION TO DATA STRUCTURES
AND ALGORITHMS

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Introduction

- How many Students are having permanent address within 30 miles of Ettimadai?
- How many of these students are commuting using college bus?

Introduction

- Information alone isn't enough.
- Get answers in time.
- Representing Information is key.
- Computer programs –Store ,retrieve information as fast as possible.
- DS helps in understanding how to structure information for efficient processing.
- This course-
 - common DS.
 - Trade offs –cost and benefits with every data structure.
 - How to measure the effectiveness of DS or Algo.

Problem solving

- Many approaches.
- Two main goals.
 - An algo –easy- to understand, code & debug.
 - An algo –efficient use of resources.
- First point is not our focus. But second is !!!!
- Implemented in any language.
- Measure efficiency.

Data Structures

- Data structure provides a means of organizing, managing, and storing data efficiently.
- Technological advancements- Powerful computers-Processor speed, memory size.
- Complex problems demand more computation → Efficient programs.
- Better understanding behind efficient program designs.
- DS – Data representation and its associated operations.
- Integers, floating point numbers, arrays – examples of DS.

Efficiency

- Search, print, process data –from stored collection of data items.
- Using any data structure.
 - DIFFERENCE!!!!
- Run the program in few seconds or many days?????
- Solve the problem within the constraints(mainly Resources)
- Resources- Total space and time.
- Efficient solution requires lesser or fewer resources.
- Cost- Amount of resources.

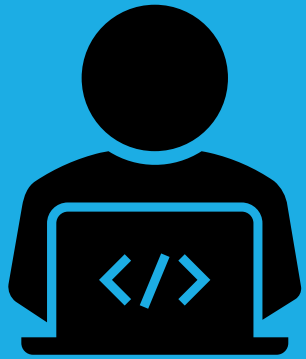
- Analyse the problem.
- Select the right data structure.
- Commonly seen trend- ignore the first step and use DS that we are familiar with(but may be inappropriate for the problem).
- Results in slow/inefficient program.
- Complex method need not always be used- if performance is met using simpler designs.

Selection of data structure

- Determine the basic operation to be supported.
- Quantify the resource constraints
- Select the data structure

Cost and Benefits

- A better data structure than another!!!!
- Depends on situations.
- Existence of multiple DS is the proof.
- DS – space ,time , programming effort.
- But problem defines the constraints.
- Analysis of problem –determine the best data structure.



THANK YOU!!!!!!