

# Introduction

## CS 32 - Data Structures

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- 1 Solving Problems on a Computer
- 2 Data Structures
- 3 Algorithms
- 4 Final Notes

# Topics

- 1 Solving Problems on a Computer
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# Solving Problems on a Computer

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- Problem Domain

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- Machine Domain

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- Solution Domain

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- Solution Domain
  - Synthesis of high level data representations



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- Machine Domain
- Solution Domain
  - Synthesis of high level data representations
  - Synthesis of algorithms

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# Data Types and Data Structures

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- An **abstract data type (ADT)** is a **set of data elements and the set of operations defined on the data elements**
  - E.g. Stacks and queues
- A **data structure** is an **implementation or realization of an ADT in terms of language data types or other data structures** such that operations on the data structure are expressible in terms of directly executable procedures

# Design and Implementation of ADTs and Data Structures

- Sequential or contiguous design

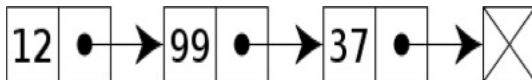


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- Linked design



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  - **Output**
  - **Effectiveness**

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  - Halting problem
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  - Such problems are called **undecidable problems**.
- Some problems although solvable, have solutions that **have infeasible running times**
  - Such are called **intractable problems**.

# END OF LESSON 1