Data Structures

SYBTech(CSE)

Unit – 1

Introduction

PPT-3

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Unit 1 [6 hrs]

Introduction:

Data,

Data types,

Data structure,

Abstract Data Type (ADT),

Representation of Information,

Characteristics of algorithm,

Program,

Analyzing programs.

Representation of Information:

Digital representation means that everything is represented by numbers only.

- **Something (sound, pictures, text, instructions, ...) is converted into numbers by some mechanism.**
- **Numbers can be stored, retrieved, processed, transmitted.**

Analog versus Digital:

- **Analog: "analogous"**

- **Smoothly or continuously varying values.**

  Ex: Volume control,
  Dimmer,
  Faucet,
  Steering wheel.

- **Value varies smoothly with something else.**

- **Small change in one implies small change in another.**

- **Infinite number of possible values.**

- **Digital: Discrete values**
- **Only a finite number of different values.**
- **A change in something results in sudden change from one discrete value to another.**

  Ex: Digital speedometer,

  Digital watch,

  Push-button radio tuner, …
- **Values are represented as numbers.**

- **A bit is the smallest unit of information.**
- **Bit represents 2-way decision.**

  Ex: yes/no, true/false, on/off, …
- **Abstraction of all of these is represented as 0/1.**

Ex:

1. Chips: high voltage/low voltage,

current flowing/not flowing

2.RAM, Flash: Electrical charge present/not present

- **Representation of data as bit patterns**
- **Binary number system and the hexadecimal notation for binary number patterns.**
- **How characters and numbers are stored in binary form.**
- **Representation of +ve and –ve integers in a fixed-length using**

  2's complement and

  sign magnitude representation.

- **Shift functions: logical and arithmetic shifts.**
- **Use and nature of the ASCII character set.**
- **Nature and uses of floating point form.**
- **Truncation and rounding (accuracy).**
- **Causes of overflow and underflow.**