Data Structures

# How would you define data structures and classify them?





## 6 Answers

Smit Prakash, Asociate Software Engineer at IBM (2016-present)
Answered Nov 28

Data structures are building blocks of a program. A program built using improper data structures may not work as expected. So as a programmer it is mandatory to choose most appropriate data structures for a program

The term data means a value or set of values. It specifies either the value of a variable or a constant (e.g., marks of students, name of an employee, address of a customer, value of pi, etc.)

While a data item that does not have subordinate data items is categorized as an elementary item, the one that is composed of one or more subordinate data items is called a group item. For example, a student's name may be divided into three sub-items—first name, middle name, and last name—but his roll number would normally be treated as a singl



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**Primitive and Non-primitive Data Structures**

Primitive data structures are the fundamental data types which are supported by a programming language. Some basic data types are integer, real, character, and boolean. The terms ‘data type’, ‘basic data type’, and ‘primitive data type’ are often used interchangeably.

Non-primitive data structures are those data structures which are created using primitive data structures. Examples of such data structures include linked lists, stacks, trees, and graphs. Non-primitive data structures can further be classified into two categories: linear and non-linear data structures.

**Linear and Non-linear Structures**

If the elements of a data structure are stored in a linear or sequential order, then it is a linear data structure. Examples include arrays, linked lists, stacks, and queues. Linear data structures can be represented in memory in two different ways. One way is to have to a linear relationship between elements by means of sequential memory locations. The other way is to have a linear relationship between elements by means of links.

However, if the elements of a data structure are not stored in a sequential order, then it is a non-linear data structure. The relationship of adjacency is not maintained between elements of a non-linear data structure. Examples include trees and graphs.

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Amruta Surve, MBA IT & Analytics, ITM Business School Kharghar (2020)

Answered Jun 20, 2019

**Primitive and Non Primitive Data Structure:** The data structure that are atomic (indivisible) are called primitive. Examples are integer, real and characters. The Data structures that are not atomic are called non-primitive or composite. Examples are records, array and string.

**Linear and Non-Linear Data Structures:** In a linear data structure, the data items are arranged in a linear sequence. For Example: array. In a non-linear data structure, the data items that are not in sequence. For Example: trees and graphs.

**Homogeneous and Non-Homogeneous Data Structures:** In homogeneous data structure, all the elements are of same type. For Example: arrays. In non-homogeneous data structure, the elements may or may not be of the same type. For Example: Records.

**Static and Dynamic Data Structures:** Static data structures are those whose size and structures, associated location is fixed at compile time.Dynamic structures are ones whose ones which expand or shrink as required during the program execution and there associate memory location change.

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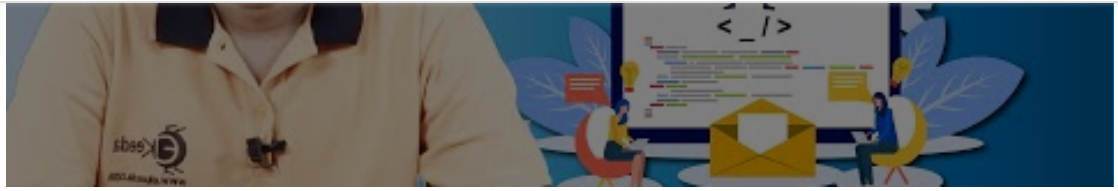

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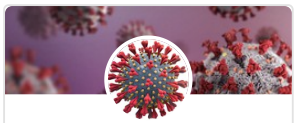

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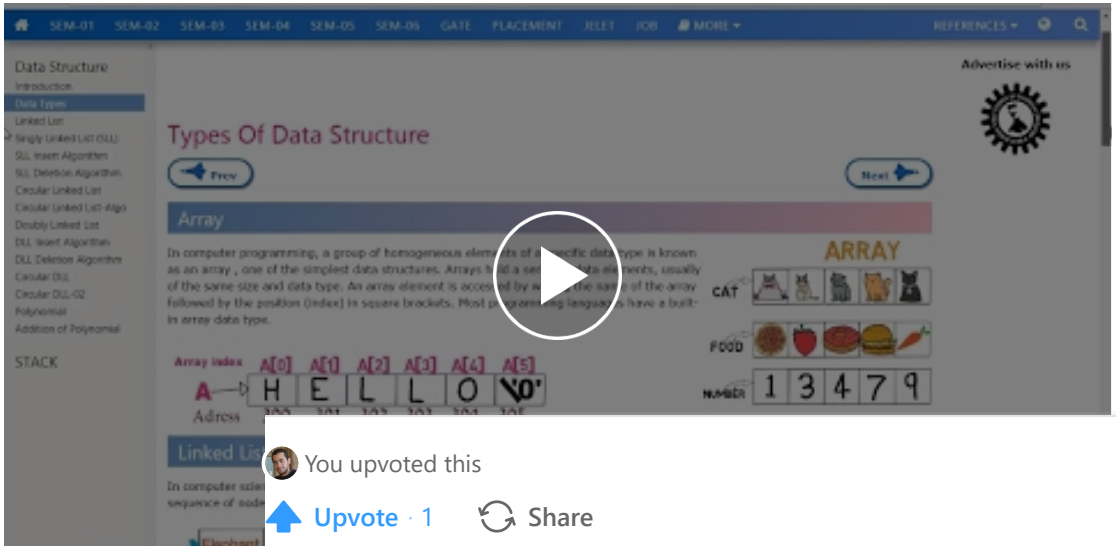


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Define data structure?

Salman Ahmad, Software Development Engineer at Aristocrat Gaming (2018-present)
Answered Jul 4, 2017

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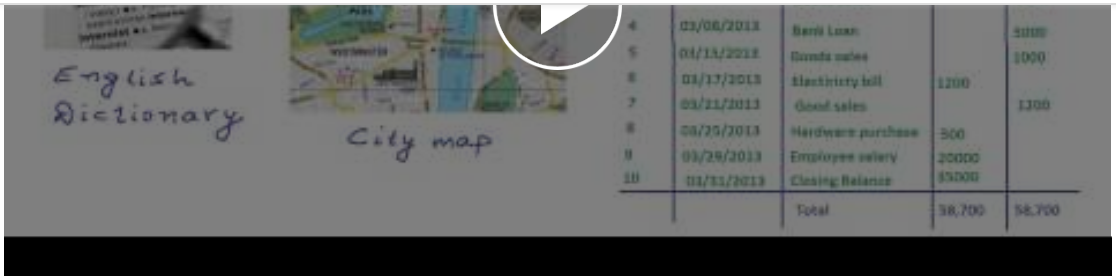


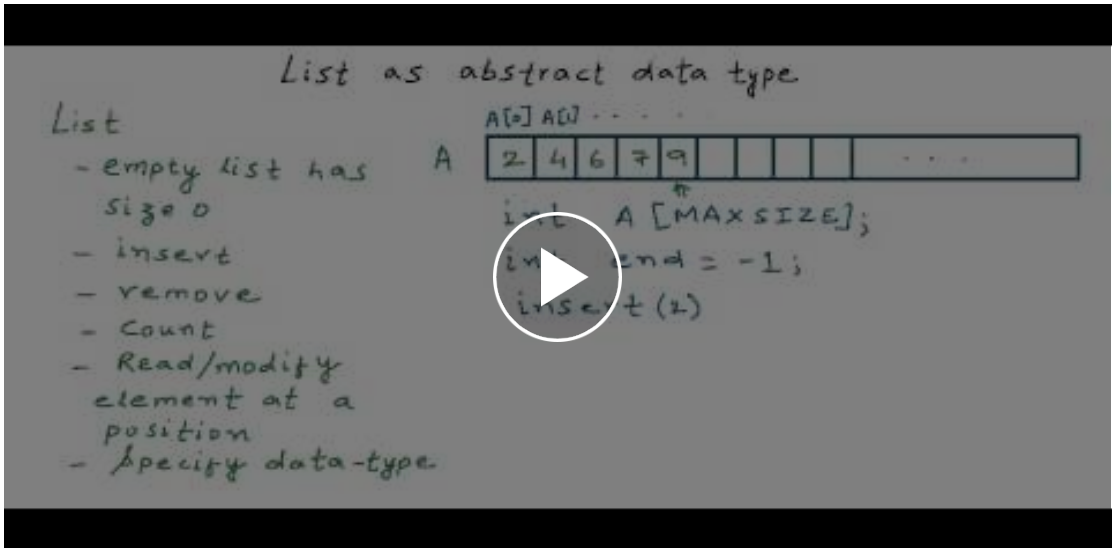


Data structures can implement one or more particular abstract data types (ADT), which specify the operations that can be performed on a data structure and the computational complexity of those operations. In comparison, a data structure is a concrete implementation of the specification provided by an ADT.Data structures provide a means to manage large amounts of data efficiently for uses such as large databases and internet indexing services. Usually, efficient data ...(more)

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A Data Structure, as the name suggests, is a method to store data in a structured way so that it can be easily created, viewed, and managed.[1]

**Classification of Data Structures**[2]

Data Structures are generally classified into two classes:

- **Primitive Data Structures**
- **Non-primitive Data Structures**

**Primitive Data Structures**

Primitive Data Structures are the fundamental data types which are supported by programming language. Examples:

- Integer
- Real(float)
- Characters
- Boolean

**Non-Primitive Data Structures**

Non-primitive Data Structures are created using primitive data structures. These Data Structures can be de... (more)

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Define data structure?

What are the basic operations in data structure?

What is Coastline data-structure?

What are complex data structures?

Why should we assign NULL to the elements (pointer) after freeing them?

What is garbage collection in a data structure?

What are the important data structures?

Where are data structures actually used?

What exactly is a data structure?

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