

Java Data Structures: Trees, Graphs & Sorting

Learn to implement core Java data structures and algorithms, from arrays and linked lists to trees, graphs and sorting.

13

MODULES

37

TOPICS

COURSE OVERVIEW

This course covers foundational data structures concepts alongside a review of core Java programming constructs. It progresses through arrays, linked lists, stacks and queues before introducing trees, graphs, hashing and heaps. Sorting and searching algorithms are then examined, including comparisons between different techniques. The course closes with time and space complexity analysis using Big O notation.

WHO THIS COURSE IS FOR

Java Developers

Software Engineers

Computer Science Students

Backend Developers

Algorithm Enthusiasts

LEARNING OBJECTIVES

- Describe the purpose and importance of data structures
- Apply Java control structures, variables and methods
- Implement arrays, linked lists, stacks and queues in Java
- Build binary trees and binary search trees in Java
- Compare graph representations and traversal methods such as DFS and BFS
- Explain hashing, hash functions and collision resolution
- Apply heap operations using min heaps and max heaps
- Analyse sorting and searching algorithms using Big O notation

13 Modules, 37 Topics

01

Introduction to Data Structures

TOPICS

What are Data Structures? · Importance of Data Structures

02

Overview of Java Programming

TOPICS

Variables, Data Types, and Operators · Control Structures (if, else, loops) · Functions and Methods

03

Arrays in Java

TOPICS

Declaring and Initializing Arrays · Accessing Array Elements · Array Operations and Manipulation

04

Linked Lists

TOPICS

Singly Linked Lists · Doubly Linked Lists · Implementing Linked Lists in Java

05

Stacks

TOPICS

Basics of Stacks · Stack Operations (push, pop, peek) · Implementing Stacks in Java

06

Queues

TOPICS

Basics of Queues · Queue Operations (enqueue, dequeue, peek) · Implementing Queues in Java

07

Trees

TOPICS

Introduction to Trees · Binary Trees · Binary Search Trees (BST)

08

Graphs

TOPICS

- Basics of Graphs
- Graph Representations (adjacency matrix, adjacency list)
- Traversing Graphs (DFS and BFS)

09

Hashing

TOPICS

Introduction to Hashing · Hash Functions · Hash Tables and Collision Resolution

10

Heaps

TOPICS

Basics of Heaps · Min Heaps and Max Heaps · Heap Operations

11

Sorting Algorithms

TOPICS

Bubble Sort, Selection Sort, Insertion Sort · Merge Sort and Quick Sort · Radix Sort or Bucket Sort

12

Searching Algorithms

TOPICS

Linear Search and Binary Search · Hash based Searching · Searching in Trees and Graphs

13

Time and Space Complexity Analysis

TOPICS

- Big O Notation
- Analyzing Data Structure and Algorithm Efficiency

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

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Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

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