



JAVA TRAINING

Data Structures With Java

Master essential data structures and algorithms in Java to build efficient, high-performance applications. Optimize your Java coding skills.

DURATION

40 Hours

LEVEL

Intermediate

FORMAT

Instructor-Led

- Globally Recognized Certification

- Expert-Led Hands-On Training

- Flexible Scheduling

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COURSE OVERVIEW

This intermediate-level course, "Data Structures With Java," is meticulously designed to equip aspiring and professional developers with an in-depth understanding of fundamental data structures and their practical implementations using Java. Mastering data structures is crucial for writing efficient, scalable, and maintainable code, forming the bedrock of advanced software development, algorithm design, and problem-solving. Through this course, participants will learn not just what each data structure is, but crucially, when and how to apply them effectively to real-world computing challenges.

Participants will delve into core technologies such as arrays, linked lists, stacks, queues, trees, graphs, and hash tables, all implemented and analyzed within the robust Java programming environment. The course emphasizes both theoretical comprehension and hands-on application, enabling learners to analyze algorithmic complexity, optimize code performance, and make informed design decisions. You will gain a profound appreciation for how these foundational concepts underpin complex software systems and contribute directly to application efficiency and responsiveness.

Upon completion, you will possess the critical thinking and practical skills necessary to design and implement efficient algorithms, significantly enhancing your problem-solving capabilities. This proficiency is invaluable for excelling in technical interviews, contributing to high-performance Java applications, and advancing your career in various specialized software development roles. It's an essential step for anyone looking to build robust and optimized software solutions.

Duration	40 Hours
Level	Intermediate
Vendor	Java

COURSE CURRICULUM

01 Module 1: Foundations & Introduction to Data Structures

- Introduction to Data Structures: Definition, Importance, and Classification
- Review of Java Fundamentals: Classes, Objects, Inheritance, Interfaces
- Big O Notation: Time and Space Complexity Analysis
- Recursion: Concepts, Recursive Algorithms, and Backtracking

02 Module 2: Linear Data Structures

- Arrays: Static vs. Dynamic Arrays, ArrayList in Java
- Linked Lists: Singly, Doubly, and Circular Linked Lists
- Stacks: LIFO Principle, Array-based vs. Linked List-based Implementation
- Queues: FIFO Principle, Array-based vs. Linked List-based Implementation, Deque

03 Module 3: Non-Linear Data Structures - Trees

- Trees: Terminology, Types of Trees
- Binary Trees: Traversal (In-order, Pre-order, Post-order)
- Binary Search Trees (BST): Insertion, Deletion, Searching
- Balanced Trees: AVL Trees and Red-Black Trees (Introduction and Concepts)
- Heaps: Max Heap, Min Heap, Heapify, PriorityQueue in Java

04 Module 4: Non-Linear Data Structures - Graphs

- Graphs: Terminology, Representations (Adjacency Matrix, Adjacency List)
- Graph Traversal: Breadth-First Search (BFS)

- Graph Traversal: Depth-First Search (DFS)
- Minimum Spanning Trees: Prim's and Kruskal's Algorithms (Concepts)
- Shortest Path Algorithms: Dijkstra's Algorithm (Concepts)

05 Module 5: Hashing and Advanced Topics

- Hashing: Hash Functions, Collision Resolution (Chaining, Open Addressing)
- Hash Tables: Implementation and Use Cases, HashMap and HashSet in Java
- Disjoint Set Union (DSU) / Union-Find Data Structure
- Tries (Prefix Trees): Concepts and Applications

06 Module 6: Algorithms and Problem Solving with Data Structures

- Sorting Algorithms: Merge Sort, Quick Sort, Heap Sort (Implementation and Analysis)
- Searching Algorithms: Binary Search, Interpolation Search
- Dynamic Programming: Introduction and Classic Problems
- Problem-Solving Strategies using Data Structures and Algorithms
- Practical Application: Solving LeetCode/HackerRank style problems

CAREER PATHWAYS

Graduates of this program are prepared for the following roles:

- > **Backend Java Developer specializing in high-performance systems**
- > **Algorithms Engineer focused on optimization and complex problem-solving**
- > **Technical Interview Prep Specialist for major tech companies**

FREQUENTLY ASKED QUESTIONS

Q: What are the prerequisites for enrolling in the 'Data Structures With Java' course?

To get the most out of this intermediate course, participants should have a solid foundational understanding of core Java programming concepts. This includes familiarity with Java syntax, object-oriented programming principles (classes, objects, inheritance, polymorphism), basic control flow (loops, conditionals), and working with primitive data types and arrays. Prior experience with basic algorithm writing is beneficial but not strictly required, as the course will cover complexity analysis from the ground up.

Q: How will mastering data structures in Java, through this course, specifically enhance my performance in technical interviews for Java development roles?

This course is meticulously structured to directly address the types of questions frequently encountered in technical interviews at top tech companies. You will gain hands-on experience implementing a wide array of data structures and algorithms, along with practicing rigorous complexity analysis. This practical skill set, combined with our problem-solving modules, will enable you to confidently approach, analyze, and efficiently solve complex coding challenges using Java, articulate your design choices, and debug effectively, all of which are critical for interview success.

Q: Beyond theoretical knowledge, what kind of practical projects or coding exercises will be part of this 'Data Structures With Java' course?

This course emphasizes practical application. You will engage in numerous hands-on coding exercises, implementing

each data structure from scratch in Java. Beyond basic implementations, you'll tackle challenging problems that require combining multiple data structures and algorithms to find optimal solutions. Examples include building a custom hash map, implementing a simple routing algorithm using graphs, developing a task scheduler with priority queues, and solving classic dynamic programming problems, all aimed at solidifying your understanding and practical coding ability.

ABOUT COMPUTER PRIDE



East Africa's Premier IT Training Center

With over 15 years of excellence, Computer Pride delivers globally recognized certification programs from leading technology vendors. Located on Kenyatta Avenue in Nairobi's CBD, our state-of-the-art facilities and expert instructors have empowered thousands of professionals across East Africa.

15+

Years of Excellence

10,000+

Professionals Trained

50+

Vendor Certifications

READY TO ENROL?

Take the next step in your technology career.

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