

# Guide2Code - Java Programming Roadmap

## ◆ Phase 1: Beginner Level

### 📌 Topics to Learn:

1. Introduction to Java (Installation, JDK, JVM, IDEs)
2. Basic Syntax & Structure (main method, variables, comments)
3. Data Types (int, float, char, boolean, String, etc.)
4. Operators (arithmetic, relational, logical, bitwise)
5. Control Statements (if-else, switch-case)
6. Loops (for, while, do-while, break, continue)
7. Methods (function declaration, return values, recursion)
8. Arrays & Strings (1D, 2D arrays, String methods)
9. Exception Handling (try-catch, finally, throw, throws)
10. File Handling (reading, writing, appending files)

### 🚀 Beginner Project Ideas:

- 🧮 **Simple Calculator** – Perform basic arithmetic operations
- 📊 **Student Grade Calculator** – Input marks and display grades
- 🎲 **Number Guessing Game** – User guesses a number, program gives hints
- 📅 **Age Calculator** – Calculate age based on birth year
- 🌡️ **Temperature Converter** – Convert Celsius ↔ Fahrenheit
- 🏦 **Bank Account System** – Basic deposit and withdrawal operations







## ◆ Phase 2: Intermediate Level

### 📌 Topics to Learn:

1. Object-Oriented Programming (Classes, Objects, Encapsulation, Inheritance, Polymorphism)
2. Collections Framework (ArrayList, LinkedList, HashMap, HashSet, TreeMap)
3. Multithreading (Thread class, Runnable, Synchronization)
4. JDBC (Java Database Connectivity) – MySQL & PostgreSQL

5. Lambda Expressions & Streams API
6. File I/O Streams (BufferedReader, BufferedWriter, FileInputStream)
7. Regular Expressions (Pattern Matching, Matcher Class)
8. Debugging & Logging (Log4j, Java Debugger)

### **Intermediate Project Ideas:**






-  **Library Management System** – Store and manage books
-  **Contact Management System** – Add, edit, delete contacts
-  **To-Do List App** – Task management with Java GUI
-  **Bank Management System** – Manage user accounts and transactions
-  **Tic-Tac-Toe Game** – Playable in the console or GUI
-  **Web Scraper** – Extract information from websites using JSoup

### **Phase 3: Advanced Level**

#### **Topics to Learn:**

1. Java Networking (Sockets, Client-Server Communication)
2. Advanced OOP Concepts (Abstract Classes, Interfaces, Generics)
3. JavaFX & Swing (Building GUI Applications)
4. Spring Framework (Spring Boot, Spring MVC, Hibernate)
5. Microservices & REST API Development
6. Security in Java (Authentication, Authorization, Hashing)
7. Cloud Computing with Java (AWS, Google Cloud, Azure)
8. JVM Internals & Performance Optimization

### **Advanced Project Ideas:**

-  **Chat Application** – Real-time messaging using sockets
-  **E-commerce Website** – Full-fledged shopping platform with Spring Boot
-  **Stock Market Prediction** – Machine Learning with Java
-  **Secure Login System** – Authentication using JWT and Spring Security
-  **Face Recognition System** – AI-based image processing in Java