Day 1

What is Java?

- Java is a programming language that helps developers build software applications. It follows an object-oriented approach, meaning it organizes code into reusable objects.

Types of Programming Languages

Programming languages can be grouped based on how they're structured:

1. **Structured Programming Languages:**
    - Examples: C, Python
    - These languages use a logical flow of commands.
2. **Object-Based Programming Languages:**
    - Examples: Visual Basic (VB), VBScript, Python
    - They support some object-oriented programming (OOP) ideas like classes and objects, but not inheritance.
3. **Object-Oriented Programming (OOP) Languages:**
    - Examples: C++, Java, C#, Python
    - These languages support all OOP concepts.

OOP (Object Oriented Programming) Concepts

1. Class
2. Object
3. Polymorphism
4. Inheritance
5. Abstraction
6. Encapsulation

Java Features

1. **Platform Independent:** Java can run on any device with Java Runtime Environment (JRE), making it versatile.
2. **Case Sensitive:** Java treats uppercase and lowercase letters as different (e.g., a is not the same as A).

Java Components

1. **JDK (Java Development Kit):** Tools for developing Java applications.
2. **JRE (Java Runtime Environment):** Needed to run Java applications.
3. **JVM (Java Virtual Machine):** Runs the Java code on your device.

Core Java vs. Advanced Java

- **Core Java:** Focuses on the basics (Java SE).
- **Advanced Java:** Covers more specialized topics (Java EE), like web services and databases.

Java Versions

- **JDK 8:** Created by Sun Microsystems, now managed by Oracle.
- **Latest Version:** JDK 22.
- **Recommended Version:** JDK 11+ for most uses.
- **Java Distributions:**
    - **Community Edition:** Free and open-source (OpenJDK).
    - **Licensed Edition:** Commercial with long-term support (Oracle JDK).

JDK Download & Installation (Refer the installation document)

- Download and Install JDK
- Set Java Path inside environment variables
- Verify Installation inside command prompt

Eclipse IDE Download & Installation (Refer the installation document)

- Download Eclipse IDE and install it.
- Launch eclipse and create new java project.

Setting Up a Java Project in Eclipse

1. **Create a New Java Project:** File → New → Java Project
2. **Create a New Package:** Right-click on src → New → Package
3. **Create a New Class:** Right-click on the package → New → Class

Java Naming Conventions

1. Start with an uppercase letter (e.g., MyClass).
2. Class names shouldn't begin with numbers.
3. Underscores (_) are allowed in class names.
4. Avoid using special characters.
5. Numbers are allowed but not as the first character.

Comments in Java

- **Single-Line Comment:** // This is a comment
- **Multi-Line Comment:** /* This is a multi-line comment */

Keyboard Shortcuts

- **Auto-Complete System Output:** Type Syso then press Ctrl + Space (or CMD + Space on Mac).
- **Single-Line Comment:** Press Ctrl + /
- **Multi-Line Comment:** Press Ctrl + Shift + /