**Basics of Java**

**Java why?**

**JRE, JVM, JDK**

Step1:

Install Eclipse.

Location:

<https://www.eclipse.org/downloads/packages/release/2025-06/r/eclipse-ide-java-developers>?

Click Download -> Select One time \_> eclipse will download

Extract the folder -> You can find eclipse ready

**(Optional)Run the installer** (eclipse-inst-jre-win64.exe) and select **Eclipse IDE for Java Developers** when prompted.

**(Optional)Install a 64-bit JDK**, if you haven't already, to ensure compatibility.

**Launch Eclipse**, choose or create a workspace, and you're ready to start coding!

**Class 3:**

**Basic Java Program Structure**

Here’s a simple program that prints "Hello World":

class HelloWorld {

public static void main(String[] args) {

System.out.println("Hello World");

}

}

**Explanation:**

* class HelloWorld → Defines a class named HelloWorld.
* public static void main(String[] args) → Starting point of the program.
* System.out.println() → Prints output to the screen.

### Program 1: Print "Hello World"

class HelloWorld {

public static void main(String[] args) {

System.out.println("Hello World");

}

}

### Program 2: Print your name

class PrintName {

public static void main(String[] args) {

System.out.println("My name is Suresh");

}

}

### Program 3: Print multiple lines

class PrintLines {

public static void main(String[] args) {

System.out.println("Java is powerful.");

System.out.println("It is platform independent.");

System.out.println("Let's start learning!");

}

}

**Java Data Types**

Java is **strongly typed**, meaning every variable must have a type.

**Primitive Data Types**

| **Data Type** | **Size** | **Example** |
| --- | --- | --- |
| byte | 1 byte | 127 |
| short | 2 bytes | 32767 |
| int | 4 bytes | 2147483647 |
| long | 8 bytes | 9223372036854775807 |
| float | 4 bytes | 3.14f |
| double | 8 bytes | 3.14159 |
| char | 2 bytes | 'A' |
| boolean | 1 bit | true/false |

**Non-Primitive Data Types**

* Strings
* Arrays
* Classes
* Interfaces

**Variables**

Variables store data.

### ****Types of Variables:****

1. **Local Variables** – Inside methods.
2. **Instance Variables** – Inside a class, but outside methods.
3. **Static Variables** – Shared among all objects.

**Example:**

int age = 25;

String name = "Suresh";

System.out.println("My name is " + name + " and I am " + age + " years old.");

### Program 1: Display different data types

class DataTypesDemo {

public static void main(String[] args) {

int age = 25;

float height = 5.9f;

char grade = 'A';

boolean isJavaFun = true;

String name = "Suresh";

System.out.println("Name: " + name);

System.out.println("Age: " + age);

System.out.println("Height: " + height);

System.out.println("Grade: " + grade);

System.out.println("Java Fun? " + isJavaFun);

}

}

### Program 2: Swap two numbers

class SwapNumbers {

public static void main(String[] args) {

int a = 10, b = 20;

System.out.println("Before swapping: a = " + a + ", b = " + b);

int temp = a;

a = b;

b = temp;

System.out.println("After swapping: a = " + a + ", b = " + b);

}

}

**Operators**

| **Type** | **Example** |
| --- | --- |
| Arithmetic | + - \* / % |
| Relational | > < >= <= == != |
| Logical | `&& |
| Assignment | = += -= \*= |
| Increment/Decrement | ++ -- |

**Example:**

int a = 5, b = 3;

System.out.println(a + b); // Output: 8

### Program 1: Arithmetic operations

class ArithmeticDemo {

public static void main(String[] args) {

int a = 15, b = 4;

System.out.println("Addition: " + (a + b));

System.out.println("Subtraction: " + (a - b));

System.out.println("Multiplication: " + (a \* b));

System.out.println("Division: " + (a / b));

System.out.println("Modulus: " + (a % b));

}

}

### Program 2: Relational operators

class RelationalDemo {

public static void main(String[] args) {

int a = 10, b = 20;

System.out.println(a == b); // false

System.out.println(a != b); // true

System.out.println(a > b); // false

System.out.println(a < b); // true

}

}

### Program 3: Logical operators

class LogicalDemo {

public static void main(String[] args) {

boolean x = true, y = false;

System.out.println("x && y: " + (x && y));

System.out.println("x || y: " + (x || y));

System.out.println("!x: " + (!x));

}

}

**Control Structures in Java**

Control structures in Java are used to control the **flow of execution** of a program. They allow you to make decisions, repeat tasks, and control how and when certain parts of the code run.

There are **three main types** of control structures in Java:

| **Control Structure Type** | **Examples** |
| --- | --- |
| Conditional Statements | if, if-else, if-else-if, switch |
| Looping Statements | for, while, do-while |
| Jump Statements | break, continue, return |

**1. Conditional (Decision-Making) Statements**

These are used to **make decisions** in the program based on conditions.

**a) if Statement**

Executes a block of code **only if** a given condition is true.

**Syntax:**

if (condition) {

// Code executes if condition is true

}

**Example:**

public class IfExample {

public static void main(String[] args) {

int age = 20;

if (age >= 18) {

System.out.println("You are eligible to vote.");

}

}

}

**b) if-else Statement**

Executes one block if the condition is true, otherwise executes another block.

**Syntax:**

if (condition) {

// Code if condition is true

// Code if condition is true

// Code if condition is true

}

else {

// Code if condition is false

}

**Example:**

public class IfElseExample {

public static void main(String[] args) {

int number = 5;

if (number % 2 == 0) {

System.out.println("Even number");

} else {

System.out.println("Odd number");

}

}

}

**c) if-else-if Ladder (Nested if)**

Used when there are **multiple conditions** to check.

**Syntax:**

if (condition1) {

// Code if condition1 is true

} else if (condition2) {

// Code if condition2 is true

} else {

// Code if none of the above is true

}

**Example:**

public class IfElseIfExample {

public static void main(String[] args) {

int marks = 85;

if (marks >= 90) {

System.out.println("Grade A+");

} else if (marks >= 75) {

System.out.println("Grade A");

} else {

System.out.println("Grade B");

}

int marks2 = 100;

if (marks2 >= 90) {

System.out.println("Grade A+");

} else if (marks2 >= 75) {

System.out.println("Grade A");

} else {

System.out.println("Grade B");

}

int marks3 = 70;

if (marks3 >= 90) {

System.out.println("Grade A+");

} else if (marks3 >= 75) {

System.out.println("Grade A");

} else {

System.out.println("Grade B");

}

}

}

**d) switch Statement**

Used to **replace multiple if-else statements** when comparing a single variable with multiple values.

**Syntax:**

switch (variable) {

case value1:

// Code block

break;

case value2:

// Code block

break;

default:

// Code if none match

}

**Example:**

public class SwitchExample {

public static void main(String[] args) {

int day = 3;

switch (day) {

case 1: System.out.println("Monday"); break;

case 2: System.out.println("Tuesday"); break;

case 3: System.out.println("Wednesday"); break;

default: System.out.println("Invalid day");

}

}

}

**2. Looping (Iteration) Statements**

Used to **repeat a block of code** multiple times.

**a) for Loop**

When the **number of iterations is known**.

**Syntax:**

for (initialization; condition; increment/decrement) {

// Code to be executed

}

**Example:**

public class ForLoopExample {

public static void main(String[] args) {

for (int i = 1; i <= 5; i++) {

System.out.println("Count: " + i);

}

}

}

**b) while Loop**

Used when the **number of iterations is not known** in advance.

**Syntax:**

while (condition) {

// Code to be executed

}

**Example:**

public class WhileLoopExample {

public static void main(String[] args) {

int i = 1;

while (i <= 5) {

System.out.println("Count: " + i);

i++;

}

}

}

**c) do-while Loop**

Executes the code block **at least once**, and then repeats while the condition is true.

**Syntax:**

do {

// Code to be executed

} while (condition);

**Example:**

public class DoWhileExample {

public static void main(String[] args) {

int i = 1;

do {

System.out.println("Count: " + i);

i++;

} while (i <= 5);

}

}

**3. Jump Statements**

Used to **alter the normal flow of execution**.

**a) break**

* Exits the loop or switch immediately.

**Example:**

public class BreakExample {

public static void main(String[] args) {

for (int i = 1; i <= 5; i++) {

if (i == 3) {

break; // Exit loop when i is 3

}

System.out.println(i);

}

}

}

**b) continue**

* **Skips the current iteration** and moves to the next one.

**Example:**

public class ContinueExample {

public static void main(String[] args) {

for (int i = 1; i <= 5; i++) {

if (i == 3) {

continue; // Skip when i is 3

}

System.out.println(i);

}

}

}

**c) return**

* Exits from a method and optionally returns a value.

**Example:**

public class ReturnExample {

static int sum(int a, int b) {

return a + b;

}

public static void main(String[] args) {

System.out.println("Sum is: " + sum(5, 10));

}

}