Java Basic Programs

### **1. Hello World**

**public** **class** HelloWorld {

**public** **static** void main(String[] args) {

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

}

}

### **2. Variables and Data Types**

**Main.java**

**public** **class** Main {

**public** **static** void main(String[] args) {

int myNumber **=** 56; *//2147483647*

long myNum **=** 214L;

float myFloat **=** 3.14f; *//3.4028235E38*

double myDouble **=** 4.5;

char myChar **=** 'A';

boolean myBoolean **=** true;

String myString **=** "Hello, Java";

System.out.println("Integer: " **+** myNumber);

System.out.println("Long: " **+** myNum);

System.out.println("Float: " **+** myFloat);

System.out.println("Double: " **+** myDouble);

System.out.println("Char: " **+** myChar);

System.out.println("Boolean: " **+** myBoolean);

System.out.println("String: " **+** myString);

}

}

**The maximum value an int can hold is 2147483647, and the minimum is -2147483648.**

**->How to calculate maximum value and minimum value?**

**int - 4 byte or 32 bit (1 byte = 8 bit)**

**Minimum value: −2^{31} = -2,147,483,648**

**Maximum value: 2^{31} −1 = 2,147,483,647**

**The maximum value a long can hold is 9223372036854775807, and the minimum is -9223372036854775808.**

**long (64-bit signed integer):**

* **Minimum value: −2^{63} = -9,223,372,036,854,775,808**
* **Maximum value: 2^{63} −1 = 9,223,372,036,854,775,807**

**3.Arithmetic operators**

* Dividing two integers always results in an integer.
* Values like INFINITY and NaN are available **for** floating**-**point numbers but not **for** integers. As a result, dividing an integer by zero will result in an exception. However, **for** a float or double, Java allows the operation.
* You don't have to import anything; the Math class is in the java.lang package, which is imported by default.

**public** **class** Main{

**public** **static** void main(String[] args) {

int a **=** 12;

int b **=** 5;

int addition **=** a **+** b;

System.out.println(a **+** " + " **+** b **+** " = " **+** addition);

int subtraction **=** a **-** b;

System.out.println(a **+** " - " **+** b **+** " = " **+** subtraction);

int multiplication **=** a **\*** b;

System.out.println(a **+** " \* " **+** b **+** " = " **+** multiplication);

int division **=** a **/** b;

System.out.println(a **+** " / " **+** b **+** " = " **+** division);

float fdivision **=** (float)a **/** b;

System.out.println(a **+** " / " **+** b **+** " = " **+** fdivision);

int modulus **=** a **%** b;

System.out.println(a **+** " % " **+** b **+** " = " **+** modulus);

*// Increment operator*

int increment **=** a; *//12*

increment**++**;

System.out.println(a **+** " incremented is " **+** increment);

*// Decrement operator*

int decrement **=** a; *//12*

decrement**--**;

System.out.println(a **+** " decremented is " **+** decrement);

*// Float operations*

float x **=** 15.5f;

float y **=** 4.5f;

*// Addition*

float floatAddition **=** x **+** y;

System.out.println(x **+** " + " **+** y **+** " = " **+** floatAddition);

*// Subtraction*

float floatSubtraction **=** x **-** y;

System.out.println(x **+** " - " **+** y **+** " = " **+** floatSubtraction);

*// Multiplication*

float floatMultiplication **=** x **\*** y;

System.out.println(x **+** " \* " **+** y **+** " = " **+** floatMultiplication);

*// Division*

float floatDivision **=** x **/** y;

System.out.println(x **+** " / " **+** y **+** " = " **+** floatDivision);

*// Modulus*

float floatModulus **=** x **%** y;

System.out.println(x **+** " % " **+** y **+** " = " **+** floatModulus);

}

}

**Typecasting :**

**Type casting in Java is the process of converting a variable from one data type to another. There are two types of casting in Java:**

1. **Widening Casting (Automatic Type Conversion):**
   * **This is done automatically when you assign a smaller data type to a larger data type.**
   * **Example: int to long, float to double.**
   * **No data is lost during this conversion.**
2. **Narrowing Casting (Explicit Type Conversion):**
   * **This requires manual conversion because you're assigning a larger data type to a smaller data type.**
   * **Example: double to int, float to byte.**
   * **Data may be lost during this conversion, especially if there are decimal points or if the larger type holds values outside the range of the smaller type.**

**4.String methods**

**public** **class** Main {

**public** **static** void main(String[] args) {

*// Create a string*

String str **=** "Hello, World!";

*// Length of the string*

int length **=** str.length();

System.out.println("Length of the string: " **+** length);

*// Convert to uppercase*

String upperCaseStr **=** str.toUpperCase();

System.out.println("Uppercase string: " **+** upperCaseStr);

*// Convert to lowercase*

String lowerCaseStr **=** str.toLowerCase();

System.out.println("Lowercase string: " **+** lowerCaseStr);

*// Substring from index 7*

String subStr1 **=** str.substring(7);

System.out.println("Substring from index 7: " **+** subStr1);

*// Substring from index 0 to 5 (exclusive)*

String subStr2 **=** str.substring(0, 5);

System.out.println("Substring from index 0 to 5: " **+** subStr2);

*// Replace 'World' with 'Java'*

String replacedStr **=** str.replace("World", "Java");

System.out.println("Replaced string: " **+** replacedStr);

*// Check if the string contains 'World'*

boolean containsWorld **=** str.contains("World");

System.out.println("Contains 'World': " **+** containsWorld);

*// Check if the string starts with 'Hello'*

boolean startsWithHello **=** str.startsWith("Hello");

System.out.println("Starts with 'Hello': " **+** startsWithHello);

*// Check if the string ends with '!'*

boolean endsWithExclamation **=** str.endsWith("!");

System.out.println("Ends with '!': " **+** endsWithExclamation);

*// Trim the string (removing leading and trailing spaces)*

String str1 **=** " Hi ";

String trimmedStr **=** str1.trim();

System.out.println("Trimmed string: '" **+** trimmedStr **+** "'");

*// Split the string by comma*

String[] splitStr **=** str.split(",");

System.out.println("Split string by comma: ");

**for** (String part : splitStr) {

System.out.println(part.trim());

}

*// Find the index of 'World'*

int indexOfWorld **=** str.indexOf("World");

System.out.println("Index of 'World': " **+** indexOfWorld);

*// Concatenate with another string*

String concatenatedStr **=** str.concat(" Welcome to Java!");

System.out.println("Concatenated string: " **+** concatenatedStr);

}

}

**5.Array**

**public** **class** Main {

**public** **static** void main(String[] args) {

int[] intArray **=** {10, 20, 30, 40, 50};

*// int a[] = new int[5];*

*// Print the elements of the array*

System.out.print("Elements of intArray: ");

**for** (int i **=** 0; i **<** intArray.length; i**++**) {

System.out.print(intArray[i] **+** " ");

}

System.out.println();

*// Find the length of the array*

int length **=** intArray.length;

System.out.println("Length of intArray: " **+** length);

*// Accessing elements of the array*

int firstElement **=** intArray[0];

int lastElement **=** intArray[intArray.length **-** 1];

System.out.println("First element: " **+** firstElement);

System.out.println("Last element: " **+** lastElement);

*// Modify an element of the array*

intArray[2] **=** 35;

System.out.print("Elements of intArray after modification: ");

**for** (int i **=** 0; i **<** intArray.length; i**++**) {

System.out.print(intArray[i] **+** " ");

}

System.out.println();

*// Sum of all elements in the array*

int sum **=** 0;

**for** (int i **=** 0; i **<** intArray.length; i**++**) {

sum **+=** intArray[i];

}

System.out.println("Sum of all elements in intArray: " **+** sum);

*// Declare and initialize an array of strings*

String[] strArray **=** {"Java", "is", "fun"};

*// Print the elements of the string array*

System.out.print("Elements of strArray: ");

**for** (int i **=** 0; i **<** strArray.length; i**++**) {

System.out.print(strArray[i] **+** " ");

}

System.out.println();

}

}

### **6.Conditional Statements**

**public** **class** Conditionals {

**public** **static** void main(String[] args) {

int x **=** 10;

int y **=** 20;

**if** (x **>** y) {

System.out.println("x is greater than y");

} **else** **if** (x **<** y) {

System.out.println("x is less than y");

} **else** {

System.out.println("x is equal to y");

}

}

}

### **7. Loops**

**public** **class** Loops {

**public** **static** void main(String[] args) {

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

System.out.println("i = " **+** i);

}

}

}

**8. for and enhanced for loop**

**public** **class** Main {

**public** **static** void main(String[] args) {

int[] intArray **=** {10, 20, 30, 40, 50};

System.out.print("Elements of intArray using for loop: ");

**for** (int i **=** 0; i **<** intArray.length; i**++**) {

System.out.print(intArray[i] **+** " ");

}

System.out.println();

System.out.print("Elements of intArray using for-each loop: ");

//enhanced for loop

**for** (int element : intArray) {

System.out.print(element **+** " ");

}

}

}

**9. while loop**   
**public** **class** Main {

**public** **static** void main(String[] args) {

int number **=** 1;

**while** (number **<=** 5) {

System.out.println(number);

number**++**;

}

}

}

**10. do while loop**

**public** **class** Main {

**public** **static** void main(String[] args) {

int number **=** 1;

**do** {

System.out.println(number);

number**++**;

} **while** (number **<=** 5);

}

}

**11. Switch**

**public** **class** Main {

**public** **static** void main(String[] args) {

int day **=** 1;

String dayName;

**switch** (day) {

**case** 1:

dayName **=** "Monday";

**break**;

**case** 2:

dayName **=** "Tuesday";

**break**;

**case** 3:

dayName **=** "Wednesday";

**break**;

**default**:

dayName **=** "Invalid day";

**break**;

}

System.out.println("Day " **+** day **+** " is " **+** dayName);

}

}

### **12. Functions**

**public** **class** Functions {

*// Function to add two numbers*

**public** **static** int add(int a, int b) {

**return** a **+** b;

}

**public** **static** void main(String[] args) {

int x **=** 5;

int y **=** 10;

int sum **=** add(x, y);

System.out.println("Sum: " **+** sum);

}

}

### **13. Reading Input from the User**

**13.1 Using console (not used commonly)**

**import** java.io.Console;

**public** **class** Main {

**public** **static** void main(String[] args) {

Console console **=** System.console();

String name **=** console.readLine("Enter your name: ");

char[] password **=** console.readPassword("Enter your password: ");

String passwordString **=** **new** String(password);

System.out.println("Hello, " **+** name **+** "!");

System.out.println("Your password is: " **+** passwordString);

}

}

**13.2 Using Scanner Class**

**import** java.util.Scanner;

**public** **class** UserInput {

**public** **static** void main(String[] args) {

Scanner sc **=** **new** Scanner(System.in);

System.out.print("Enter your name: ");

String name **=** sc.nextLine();

System.out.print("Enter your age: ");

int age **=** sc.nextInt();

System.out.println("Hello, " **+** name **+** ". You are " **+** age **+** " years old.");

}

}

**13.3 Difference between next(),nextLine(),nextInt**

**import** java.util.Scanner;

**public** **class** Main{

**public** **static** void main(String[] args) {

Scanner scanner **=** **new** Scanner(System.in);

*// Reading a single word*

System.out.print("Enter a word: ");

String word **=** scanner.next();

System.out.println("You entered: " **+** word);

*// Reading a line of text*

System.out.print("Enter a sentence: ");

scanner.nextLine(); *// Consume newline left by previous next() call*

String sentence **=** scanner.nextLine();

System.out.println("You entered: " **+** sentence);

*// Reading an integer*

System.out.print("Enter an integer: ");

int number **=** scanner.nextInt();

System.out.println("You entered: " **+** number);

}

}

**14. To check odd or even number**

**import** java.util.Scanner;

**public** **class** OddOrEven {

**public** **static** void main(String[] args) {

Scanner scanner **=** **new** Scanner(System.in);

System.out.print("Enter a number: ");

int num **=** scanner.nextInt();

**if** (num **%** 2 **==** 0) {

System.out.println(num **+** " is even.");

} **else** {

System.out.println(num **+** " is odd.");

}

scanner.close();

}

}

**15. Factorial**

**import** java.util.Scanner;

**public** **class** Factorial {

**public** **static** void main(String[] args) {

Scanner scanner **=** **new** Scanner(System.in);

System.out.print("Enter a number: ");

int num **=** scanner.nextInt();

int factorial **=** 1;

**for** (int i **=** 1; i **<=** num; i**++**) {

factorial **\*=** i;

}

System.out.println("Factorial of " **+** num **+** " is " **+** factorial);

scanner.close();

}

}

**16. Simple Interest Calculator**

**import** java.util.Scanner;

**public** **class** SimpleInterest {

**public** **static** void main(String[] args) {

Scanner scanner **=** **new** Scanner(System.in);

System.out.print("Enter principal amount: ");

double principal **=** scanner.nextDouble();

System.out.print("Enter rate of interest: ");

double rate **=** scanner.nextDouble();

System.out.print("Enter time (in years): ");

double time **=** scanner.nextDouble();

double simpleInterest **=** (principal **\*** rate **\*** time) **/** 100;

System.out.println("Simple Interest: " **+** simpleInterest);

scanner.close();

}

}

**17. Sum of array elements**

**import** java.util.Scanner;

**public** **class** SumArray {

**public** **static** void main(String[] args) {

Scanner scanner **=** **new** Scanner(System.in);

System.out.print("Enter the number of elements in the array: ");

int n **=** scanner.nextInt();

int[] array **=** **new** int[n];

System.out.println("Enter the elements of the array:");

**for** (int i **=** 0; i **<** n; i**++**) {

array[i] **=** scanner.nextInt();

}

int sum **=** 0;

**for** (int i **=** 0; i **<** n; i**++**) {

sum **+=** array[i];

}

System.out.println("Sum of array elements: " **+** sum);

scanner.close();

}

}

**18. Palindrome checker**

**import** java.util.Scanner;

**public** **class** PalindromeChecker {

**public** **static** void main(String[] args) {

Scanner scanner **=** **new** Scanner(System.in);

System.out.print("Enter a string: ");

String str **=** scanner.nextLine();

String reversedStr **=** **new** StringBuilder(str).reverse().toString();

**if** (str.equals(reversedStr)) {

System.out.println(str **+** " is a palindrome.");

} **else** {

System.out.println(str **+** " is not a palindrome.");

}

scanner.close();

}

}

**19. Fibonacci series**

**import** java.util.Scanner;

**public** **class** FibonacciSeries {

**public** **static** void main(String[] args) {

Scanner scanner **=** **new** Scanner(System.in);

System.out.print("Enter the number of terms: ");

int n **=** scanner.nextInt();

int a **=** 0, b **=** 1, next;

System.out.print("Fibonacci series: " **+** a **+** " " **+** b);

**for** (int i **=** 2; i **<** n; i**++**) {

next **=** a **+** b;

System.out.print(" " **+** next);

a **=** b;

b **=** next;

}

scanner.close();

}

}

### **20. Basic Object-Oriented Programming**

**class** Dog {

*// Properties*

String name;

int age;

*// Constructor*

Dog(String name, int age) {

**this**.name **=** name;

**this**.age **=** age;

}

*// Method*

void bark() {

System.out.println(name **+** " says: Woof!");

}

}

**public** **class** OOPExample {

**public** **static** void main(String[] args) {

Dog myDog **=** **new** Dog("Buddy", 3);

System.out.println("My dog's name is " **+** myDog.name **+** " and he is " **+** myDog.age **+** " years old.");

myDog.bark();

}

}