**1. Variables and Data Types**

**Exercise 1:**  
Declare variables to store the following information and print them:

* Your name (String)
* Your age (int)
* Your height in meters (double)
* Whether you are a student (boolean)

**Solution:**

public class PersonalInfo {

public static void main(String[] args) {

String name = "Alice";

int age = 25;

double height = 1.68;

boolean isStudent = true;

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

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

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

System.out.println("Is a student: " + isStudent);

}

}

**2. Arithmetic Operations**

**Exercise 2:**  
Calculate the sum, difference, product, and quotient of two numbers.

**Solution:**

public class ArithmeticOperations {

public static void main(String[] args) {

int num1 = 20;

int num2 = 5;

int sum = num1 + num2;

int difference = num1 - num2;

int product = num1 \* num2;

int quotient = num1 / num2;

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

System.out.println("Difference: " + difference);

System.out.println("Product: " + product);

System.out.println("Quotient: " + quotient);

}

}

**3. Type Casting**

**Exercise 3:**  
Convert a double to an int and display both values.

**Solution:**

public class TypeCastingExample {

public static void main(String[] args) {

double originalValue = 9.75;

int convertedValue = (int) originalValue;

System.out.println("Original (double): " + originalValue);

System.out.println("Converted (int): " + convertedValue);

}

}

**4. String Concatenation**

**Exercise 4:**  
Concatenate first and last names and display the full name.

**Solution:**

public class FullName {

public static void main(String[] args) {

String firstName = "John";

String lastName = "Doe";

String fullName = firstName + " " + lastName;

System.out.println("Full Name: " + fullName);

}

}

**5. Constants**

**Exercise 5:**  
Declare a constant for the value of Pi and calculate the circumference of a circle with a given radius.

**Solution:**

public class CircleCircumference {

public static void main(String[] args) {

final double PI = 3.14159;

double radius = 4.5;

double circumference = 2 \* PI \* radius;

System.out.println("Radius: " + radius);

System.out.println("Circumference: " + circumference);

}

}

**6. String Concatenation**

**Exercise 6:**  
Create two String variables: one for your first name and another for your last name. Concatenate them to form your full name and print it.

**Solution:**

public class FullName {

public static void main(String[] args) {

String firstName = "John";

String lastName = "Doe";

String fullName = firstName + " " + lastName;

System.out.println("Full Name: " + fullName);

}

}

**7. Arithmetic Operations**

**Exercise 7:**  
Declare two int variables, assign them values, and calculate their sum, difference, product, and quotient. Print all the results.

**Solution:**

public class ArithmeticOperations {

public static void main(String[] args) {

int num1 = 20;

int num2 = 5;

int sum = num1 + num2;

int difference = num1 - num2;

int product = num1 \* num2;

int quotient = num1 / num2;

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

System.out.println("Difference: " + difference);

System.out.println("Product: " + product);

System.out.println("Quotient: " + quotient);

}

}

**8. Type Casting**

**Exercise 8:**  
Declare a double variable with a decimal value and cast it to an int. Print both values to observe the difference.

**Solution:**

public class TypeCasting {

public static void main(String[] args) {

double decimalValue = 9.75;

int intValue = (int) decimalValue;

System.out.println("Double Value: " + decimalValue);

System.out.println("Int Value after casting: " + intValue);

}

}

**9. Constants with final**

**Exercise 9:**  
Declare a constant value for Pi using final and calculate the area of a circle with radius 5. Print the result.

**Solution:**

public class CircleArea {

public static void main(String[] args) {

final double PI = 3.14159;

double radius = 5;

double area = PI \* radius \* radius;

System.out.println("Area of the circle: " + area);

}

}

**10. Character Data Type**

**Exercise 10:**  
Declare a char variable to store the first letter of your name and print its ASCII value.

**Solution:**

public class CharExample {

public static void main(String[] args) {

char initial = 'A';

int asciiValue = initial;

System.out.println("Initial: " + initial);

System.out.println("ASCII Value: " + asciiValue);

}

}

**11. Accepting String Input**

**Exercise 11:**  
Ask the user to enter their **name** and print a greeting message.

**Solution:**

import java.util.Scanner;

public class GreetUser {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

String name = scanner.nextLine();

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

}

}

**12. Accepting Integer Input**

**Exercise 12:**  
Ask the user to enter their **age** and print it.

**Solution:**

import java.util.Scanner;

public class DisplayAge {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

int age = scanner.nextInt();

System.out.println("Your age is: " + age);

}

}

**13. Adding Two Numbers**

**Exercise 13:**  
Ask the user to enter two numbers and print their **sum**.

**Solution:**

import java.util.Scanner;

public class SumNumbers {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

int num1 = scanner.nextInt();

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

int num2 = scanner.nextInt();

int sum = num1 + num2;

System.out.println("The sum is: " + sum);

}

}

**14. Calculating Area of a Rectangle**

**Exercise 14:**  
Ask the user to enter the **length** and **width** of a rectangle. Calculate and print the **area**.

**Solution:**

import java.util.Scanner;

public class RectangleArea {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter the length of the rectangle: ");

double length = scanner.nextDouble();

System.out.print("Enter the width of the rectangle: ");

double width = scanner.nextDouble();

double area = length \* width;

System.out.println("The area of the rectangle is: " + area);

}

}

**15. Simple Interest Calculation**

**Exercise 15:**  
Ask the user to enter the **principal amount**, **rate of interest**, and **time** (in years). Calculate and print the **simple interest** using the formula:  
Simple Interest= principal \* time \* interest / 100

**Solution:**

import java.util.Scanner;

public class SimpleInterest {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

double principal = scanner.nextDouble();

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

double rate = scanner.nextDouble();

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

double time = scanner.nextDouble();

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

System.out.println("The simple interest is: " + interest);

}

}

**16. Calculate the Area of a Rectangle**

**Exercise 16:**  
Ask the user to input the **length** and **width** of a rectangle. Calculate and display the area.

**Solution:**

import java.util.Scanner;

public class RectangleArea {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter the length of the rectangle: ");

double length = scanner.nextDouble();

System.out.print("Enter the width of the rectangle: ");

double width = scanner.nextDouble();

double area = length \* width;

System.out.println("The area of the rectangle is: " + area);

}

}

**17. Swap Two Numbers**

**Exercise 17:**  
Ask the user to input two numbers and swap their values without using a temporary variable. Display the swapped values.

**Solution:**

import java.util.Scanner;

public class SwapNumbers {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

int num1 = scanner.nextInt();

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

int num2 = scanner.nextInt();

num1 = num1 + num2;

num2 = num1 - num2;

num1 = num1 - num2;

System.out.println("After swapping:");

System.out.println("First number: " + num1);

System.out.println("Second number: " + num2);

}

}

**18. Convert Temperature from Celsius to Fahrenheit**

**Exercise 18:**  
Ask the user to input a temperature in Celsius and convert it to Fahrenheit. Display the result.

**Solution:**

import java.util.Scanner;

public class TemperatureConverter {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter temperature in Celsius: ");

double celsius = scanner.nextDouble();

double fahrenheit = (celsius \* 9/5) + 32;

System.out.println("Temperature in Fahrenheit: " + fahrenheit);

}

}

**19. Calculate BMI (Body Mass Index)**

**Exercise 19:**  
Ask the user to input their **weight in kilograms** and **height in meters**. Calculate and display their BMI.

**Solution:**

import java.util.Scanner;

public class BMICalculator {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter your weight in kg: ");

double weight = scanner.nextDouble();

System.out.print("Enter your height in meters: ");

double height = scanner.nextDouble();

double bmi = weight / (height \* height);

System.out.println("Your BMI is: " + bmi);

}

}

**20. Calculate the Total Price with Tax**

**Exercise 20:**  
Ask the user to input the **price of a product** and the **tax rate** (as a percentage). Calculate and display the **total price** including tax.

**Solution:**

import java.util.Scanner;

public class TotalPriceWithTax {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter the product price: ");

double price = scanner.nextDouble();

System.out.print("Enter the tax rate (in %): ");

double taxRate = scanner.nextDouble();

double taxAmount = price \* (taxRate / 100);

double totalPrice = price + taxAmount;

System.out.println("Total Price including tax: " + totalPrice);

}

}

**21. Swap Two Numbers Without Using a Temporary Variable**

**Exercise 21:**  
Ask the user to input two numbers. Swap the values **without using a third (temporary) variable** and display the results.

**Solution:**

import java.util.Scanner;

public class SwapNumbers {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

int num1 = scanner.nextInt();

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

int num2 = scanner.nextInt();

num1 = num1 + num2;

num2 = num1 - num2;

num1 = num1 - num2;

System.out.println("After swapping:");

System.out.println("First number: " + num1);

System.out.println("Second number: " + num2);

}

}

**22. Calculate the Average of Three Numbers**

**Exercise 22:**  
Ask the user to input **three numbers** and calculate their **average**.

**Solution:**

import java.util.Scanner;

public class AverageOfThree {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

double num1 = scanner.nextDouble();

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

double num2 = scanner.nextDouble();

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

double num3 = scanner.nextDouble();

double average = (num1 + num2 + num3) / 3;

System.out.println("The average is: " + average);

}

}

**23. Convert Days into Years, Months, and Days**

**Exercise 23:**  
Ask the user to input the **total number of days**. Convert and display the equivalent in **years**, **months**, and **days** (assuming 1 year = 365 days and 1 month = 30 days).

**Solution:**

import java.util.Scanner;

public class DaysConverter {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter total number of days: ");

int totalDays = scanner.nextInt();

int years = totalDays / 365;

int remainingDays = totalDays % 365;

int months = remainingDays / 30;

int days = remainingDays % 30;

System.out.println(totalDays + " days = " + years + " years, " + months + " months, and " + days + " days.");

}

}

**24. Calculate the Distance Between Two Points**

**Exercise 24:**  
Ask the user to input the coordinates of two points and calculate the **distance** between them.

**Solution:**

import java.util.Scanner;

public class DistanceCalculator {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter x1: ");

double x1 = scanner.nextDouble();

System.out.print("Enter y1: ");

double y1 = scanner.nextDouble();

System.out.print("Enter x2: ");

double x2 = scanner.nextDouble();

System.out.print("Enter y2: ");

double y2 = scanner.nextDouble();

double distance = Math.sqrt((x2 - x1) \* (x2 - x1) + (y2 - y1) \* (y2 - y1));

System.out.println("Distance between the two points: " + distance);

}

}

**25. Calculate the Compound Interest**

**Exercise 25:**

Ask the user to input the principal amount, rate of interest, time in years, and the number of times interest is compounded annually. Calculate and display the compound interest using the formula:

𝐴 = 𝑃(1+𝑟/𝑛)\*\*𝑛𝑡

Where:

A is the amount of money accumulated after interest.

P is the principal amount.

r is the rate of interest.

n is the number of times interest applied per time period.

t is the time the money is invested for.

**Solution:**

import java.util.Scanner;

public class CompoundInterest {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

double principal = scanner.nextDouble();

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

double rate = scanner.nextDouble();

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

double time = scanner.nextDouble();

System.out.print("Enter the number of times interest is compounded annually: ");

int n = scanner.nextInt();

double amount = principal \* Math.pow((1 + rate / (n \* 100)), n \* time);

double compoundInterest = amount - principal;

System.out.println("Compound Interest: " + compoundInterest);

}

}

**26. Calculate the Area of a Circle**

**Exercise 26:**

Ask the user to input the radius of a circle. Calculate the area using the formula:

Area = 𝜋 × 𝑟\*\*2

Where

r is the radius of the circle.

**Solution:**

import java.util.Scanner;

public class CircleArea {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter the radius of the circle: ");

double radius = scanner.nextDouble();

double area = Math.PI \* radius \* radius;

System.out.println("Area of the circle: " + area);

}

}

**27. Calculate the Square Root of a Number**

**Exercise 27:**

Ask the user to input a positive number and calculate its square root using the Math.sqrt() function. Display the result.

**Solution:**

import java.util.Scanner;

public class SquareRootCalculator {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

double number = scanner.nextDouble();

if (number >= 0) {

double squareRoot = Math.sqrt(number);

System.out.println("Square root of the number: " + squareRoot);

} else {

System.out.println("Please enter a positive number.");

}

}

}

**28. Calculate the Volume of a Cylinder**

**Exercise 28:**

Ask the user to input the radius and height of a cylinder. Calculate its volume using the formula:

Volume = π×r\*\*2×h

Where

r is the radius, and

h is the height.

**Solution:**

import java.util.Scanner;

public class CylinderVolume {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter the radius of the cylinder: ");

double radius = scanner.nextDouble();

System.out.print("Enter the height of the cylinder: ");

double height = scanner.nextDouble();

double volume = Math.PI \* Math.pow(radius, 2) \* height;

System.out.println("Volume of the cylinder: " + volume);

}

}

**29. Calculate the Volume of a Sphere**

**Exercise 29:**  
Ask the user to input the **radius** of a sphere. Calculate its **volume** using the formula:  
Volume= (3/4) ​πr\*\*\*3

Where r is the radius.

**Solution:**

import java.util.Scanner;

public class SphereVolume {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter the radius of the sphere: ");

double radius = scanner.nextDouble();

double volume = (4.0 / 3.0) \* Math.PI \* Math.pow(radius, 3);

System.out.println("Volume of the sphere: " + volume);

}

}

**30. Calculate the Average of Three Numbers**

**Exercise 30:**  
Ask the user to input three numbers. Calculate the **average** of these numbers and display the result.

**Solution:**

import java.util.Scanner;

public class AverageCalculator {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

double num1 = scanner.nextDouble();

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

double num2 = scanner.nextDouble();

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

double num3 = scanner.nextDouble();

double average = (num1 + num2 + num3) / 3;

System.out.println("The average of the three numbers is: " + average);

}

}

**31. Calculate the Circumference of a Circle**

**Exercise 31:**  
Ask the user to input the **radius** of a circle. Calculate the **circumference** using the formula:  
Circumference=2πr  
Where r is the radius.

**Solution:**

import java.util.Scanner;

public class CircleCircumference {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter the radius of the circle: ");

double radius = scanner.nextDouble();

double circumference = 2 \* Math.PI \* radius;

System.out.println("Circumference of the circle: " + circumference);

}

}

**32. Convert Kilometers to Miles**

**Exercise 32:**  
Ask the user to input a distance in **kilometers**. Convert it to **miles** using the conversion factor:  
1 kilometer=0.621371 miles

Display the result.

**Solution:**

import java.util.Scanner;

public class KilometersToMiles {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter distance in kilometers: ");

double kilometers = scanner.nextDouble();

double miles = kilometers \* 0.621371;

System.out.println("Distance in miles: " + miles);

}

}