

1. Create a program that declares and initializes all primitive data types in Java and prints their default and assigned values.

```
class PrimitiveDefaults {  
  
    // Instance variables to show default values  
  
    byte defaultByte;  
    short defaultShort;  
    int defaultInt;  
    long defaultLong;  
    float defaultFloat;  
    double defaultDouble;  
    char defaultChar;  
    boolean defaultBoolean;  
  
    void displayDefaults() {  
        System.out.println("Default Values:");  
        System.out.println("byte: " + defaultByte);  
        System.out.println("short: " + defaultShort);  
        System.out.println("int: " + defaultInt);  
        System.out.println("long: " + defaultLong);  
        System.out.println("float: " + defaultFloat);  
        System.out.println("double: " + defaultDouble);  
        System.out.println("char: [" + defaultChar + "] (empty if not assigned)");  
        System.out.println("boolean: " + defaultBoolean);  
    }  
}
```

```
public class PrimitiveDataTypes {  
    public static void main(String[] args) {  
        // Display default values  
  
        PrimitiveDefaults defaults = new PrimitiveDefaults();  
        defaults.displayDefaults();  
  
        // Local variables with assigned values  
  
        byte assignedByte = 10;  
        short assignedShort = 1000;  
        int assignedInt = 100000;  
        long assignedLong = 100000000000L;  
        float assignedFloat = 10.5f;  
        double assignedDouble = 99.99;  
        char assignedChar = 'A';  
        boolean assignedBoolean = true;  
  
        // Display assigned values  
  
        System.out.println("\nAssigned Values:");  
        System.out.println("byte: " + assignedByte);  
        System.out.println("short: " + assignedShort);  
        System.out.println("int: " + assignedInt);  
        System.out.println("long: " + assignedLong);  
        System.out.println("float: " + assignedFloat);  
        System.out.println("double: " + assignedDouble);  
        System.out.println("char: " + assignedChar);  
        System.out.println("boolean: " + assignedBoolean);  
    }  
}
```

2. Write a program to convert an int value to double automatically and display both values.

```
public class IntToDoubleConversion {  
    public static void main(String[] args) {  
        int intValue = 50; // Declare and initialize an int variable  
        double doubleValue = intValue; // Automatic conversion from int to double  
  
        // Display both values  
        System.out.println("Integer Value: " + intValue);  
        System.out.println("Converted Double Value: " + doubleValue);  
    }  
}
```

3. Write a program to convert a double value to int using typecasting and explain the data loss.

```
public class DoubleToIntConversion {  
    public static void main(String[] args) {  
        double doubleValue = 99.99; // Declare and initialize a double variable  
        int intValue = (int) doubleValue; // Explicit typecasting from double to int  
  
        // Display both values  
        System.out.println("Double Value: " + doubleValue);  
        System.out.println("Converted Integer Value: " + intValue);  
  
        // Explanation of data loss  
        System.out.println("\nNote: When converting from double to int, the fractional part is lost.");  
        System.out.println("In this case, 99.99 became 99 due to truncation (not rounding).");  
    }  
}
```

4. Write a program to calculate the average of three int numbers using typecasting to display the result in double.

```
public class AverageCalculator {  
    public static void main(String[] args) {  
        int num1 = 10, num2 = 20, num3 = 30; // Declare and initialize three int numbers  
  
        // Calculate average with typecasting to double  
        double average = (double) (num1 + num2 + num3) / 3;  
  
        // Display the result  
        System.out.println("Numbers: " + num1 + ", " + num2 + ", " + num3);  
        System.out.println("Average (as double): " + average);  
    }  
}
```

5. Write a program to demonstrate binary, octal, hexadecimal, and floating-point literals in Java.

```
public class LiteralsDemo {  
    public static void main(String[] args) {  
        // Binary, Octal, and Hexadecimal literals  
        int binaryNum = 0b1010; // Binary literal (10 in decimal)  
        int octalNum = 012; // Octal literal (10 in decimal)  
        int hexNum = 0xA; // Hexadecimal literal (10 in decimal)  
  
        // Floating-point literals  
        float floatNum = 10.5f; // Float literal  
        double doubleNum = 99.99; // Double literal  
  
        // Displaying values  
        System.out.println("Binary Literal (0b1010): " + binaryNum);  
        System.out.println("Octal Literal (012): " + octalNum);  
        System.out.println("Hexadecimal Literal (0xA): " + hexNum);  
        System.out.println("Float Literal (10.5f): " + floatNum);  
        System.out.println("Double Literal (99.99): " + doubleNum);  
    }  
}
```

6. Write a program to display character and string literals along with their ASCII values.

```
public class CharStringLiterals {  
    public static void main(String[] args) {  
        // Character literal  
        char charLiteral = 'A';  
        int asciiValue = (int) charLiteral; // Get ASCII value of character  
  
        // String literal  
        String stringLiteral = "Hello, Java!";  
  
        // Display character, its ASCII value, and string literal  
        System.out.println("Character Literal: " + charLiteral);  
        System.out.println("ASCII Value of '" + charLiteral + "': " + asciiValue);  
        System.out.println("String Literal: " + stringLiteral);  
    }  
}
```

7. Write a program that uses boolean literals to control program flow in an if-else statement.

```
public class BooleanLiteralsDemo {  
    public static void main(String[] args) {  
        // Boolean literals  
        boolean isJavaFun = true;  
        boolean isSkyGreen = false;  
  
        // Using boolean literals in if-else statement  
        if (isJavaFun) {  
            System.out.println("Java is fun!");  
        } else {  
            System.out.println("Java is not fun!");  
        }  
  
        if (isSkyGreen) {  
            System.out.println("The sky is green.");  
        } else {  
            System.out.println("The sky is not green.");  
        }  
    }  
}
```

8. Write a program to perform addition, subtraction, multiplication, division, and modulus operations on two integer numbers and display the results.

```
public class IntegerOperations {  
    public static void main(String[] args) {  
        int num1 = 20, num2 = 10; // Declare and initialize two integer numbers  
  
        // Perform arithmetic operations  
        int sum = num1 + num2;  
        int difference = num1 - num2;  
        int product = num1 * num2;  
        int quotient = num1 / num2;  
        int modulus = num1 % num2;  
  
        // Display results  
        System.out.println("Number 1: " + num1);  
        System.out.println("Number 2: " + num2);  
        System.out.println("Addition: " + sum);  
        System.out.println("Subtraction: " + difference);  
        System.out.println("Multiplication: " + product);  
        System.out.println("Division: " + quotient);  
        System.out.println("Modulus: " + modulus);  
    }  
}
```



9. Write a program to perform addition, subtraction, multiplication, division, and modulus operations on two integer numbers and display the results.

```
public class IntegerOperations {  
    public static void main(String[] args) {  
        int num1 = 25, num2 = 5; // Declare and initialize two integer numbers  
  
        // Perform arithmetic operations  
        int sum = num1 + num2;  
        int difference = num1 - num2;  
        int product = num1 * num2;  
        int quotient = num1 / num2;  
        int modulus = num1 % num2;  
  
        // Display results  
        System.out.println("Number 1: " + num1);  
        System.out.println("Number 2: " + num2);  
        System.out.println("Addition: " + sum);  
        System.out.println("Subtraction: " + difference);  
        System.out.println("Multiplication: " + product);  
        System.out.println("Division: " + quotient);  
        System.out.println("Modulus: " + modulus);  
    }  
}
```

10. Write a program to compare two integers using all relational operators (==, !=, >, <, >=, <=) and display the results.

```
public class IntegerOperations {  
    public static void main(String[] args) {  
        int num1 = 25, num2 = 5; // Declare and initialize two integer numbers  
  
        // Perform arithmetic operations  
        int sum = num1 + num2;  
        int difference = num1 - num2;  
        int product = num1 * num2;  
        int quotient = num1 / num2;  
        int modulus = num1 % num2;  
  
        // Display arithmetic results  
        System.out.println("Number 1: " + num1);  
        System.out.println("Number 2: " + num2);  
        System.out.println("Addition: " + sum);  
        System.out.println("Subtraction: " + difference);  
        System.out.println("Multiplication: " + product);  
        System.out.println("Division: " + quotient);  
        System.out.println("Modulus: " + modulus);  
  
        // Perform and display relational operations  
        System.out.println("\nRelational Comparisons:");  
        System.out.println("num1 == num2: " + (num1 == num2));  
        System.out.println("num1 != num2: " + (num1 != num2));  
        System.out.println("num1 > num2: " + (num1 > num2));  
        System.out.println("num1 < num2: " + (num1 < num2));  
        System.out.println("num1 >= num2: " + (num1 >= num2));  
        System.out.println("num1 <= num2: " + (num1 <= num2));  
    }  
}
```

11. Write a program to check if a number is positive and even using logical operators (&&, ||, !).

```
public class IntegerOperations {  
    public static void main(String[] args) {  
        int num1 = 25, num2 = 5; // Declare and initialize two integer numbers  
  
        // Perform arithmetic operations  
        int sum = num1 + num2;  
        int difference = num1 - num2;  
        int product = num1 * num2;  
        int quotient = num1 / num2;  
        int modulus = num1 % num2;  
  
        // Display arithmetic results  
        System.out.println("Number 1: " + num1);  
        System.out.println("Number 2: " + num2);  
        System.out.println("Addition: " + sum);  
        System.out.println("Subtraction: " + difference);  
        System.out.println("Multiplication: " + product);  
        System.out.println("Division: " + quotient);  
        System.out.println("Modulus: " + modulus);  
  
        // Perform and display relational operations  
        System.out.println("\nRelational Comparisons:");  
        System.out.println("num1 == num2: " + (num1 == num2));  
        System.out.println("num1 != num2: " + (num1 != num2));  
        System.out.println("num1 > num2: " + (num1 > num2));  
        System.out.println("num1 < num2: " + (num1 < num2));  
        System.out.println("num1 >= num2: " + (num1 >= num2));  
        System.out.println("num1 <= num2: " + (num1 <= num2));  
    }  
}
```

```

// Check if a number is positive and even using logical operators
int number = 10; // Change this value to test different numbers

boolean isPositive = number > 0;

boolean isEven = number % 2 == 0;

if (isPositive && isEven) {
    System.out.println("\n" + number + " is positive and even.");
} else if (!isPositive) {
    System.out.println("\n" + number + " is not positive.");
} else if (!isEven) {
    System.out.println("\n" + number + " is not even.");
}
}
}

```

12. Write a program to demonstrate the use of assignment operators (=, +=, -=, \*=, /=, %=) on two integers.

```

public class IntegerOperations {
    public static void main(String[] args) {
        int num1 = 25, num2 = 5; // Declare and initialize two integer numbers

        // Perform arithmetic operations
        int sum = num1 + num2;
        int difference = num1 - num2;
        int product = num1 * num2;
        int quotient = num1 / num2;
        int modulus = num1 % num2;

        // Display arithmetic results
        System.out.println("Number 1: " + num1);
        System.out.println("Number 2: " + num2);
    }
}

```

```

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

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

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

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

System.out.println("Modulus: " + modulus);


// Perform and display relational operations
System.out.println("\nRelational Comparisons:");

System.out.println("num1 == num2: " + (num1 == num2));

System.out.println("num1 != num2: " + (num1 != num2));

System.out.println("num1 > num2: " + (num1 > num2));

System.out.println("num1 < num2: " + (num1 < num2));

System.out.println("num1 >= num2: " + (num1 >= num2));

System.out.println("num1 <= num2: " + (num1 <= num2));


// Check if a number is positive and even using logical operators
int number = 10; // Change this value to test different numbers

boolean isPositive = number > 0;

boolean isEven = number % 2 == 0;


if (isPositive && isEven) {
    System.out.println("\n" + number + " is positive and even.");
} else if (!isPositive) {
    System.out.println("\n" + number + " is not positive.");
} else if (!isEven) {
    System.out.println("\n" + number + " is not even.");
}


// Demonstrate assignment operators
System.out.println("\nAssignment Operators:");

int assignNum = num1; // Assign value

```

```
System.out.println("Initial Value: " + assignNum);  
assignNum += num2;  
System.out.println("After += : " + assignNum);  
assignNum -= num2;  
System.out.println("After -= : " + assignNum);  
assignNum *= num2;  
System.out.println("After *= : " + assignNum);  
assignNum /= num2;  
System.out.println("After /= : " + assignNum);  
assignNum %= num2;  
System.out.println("After %= : " + assignNum);  
}  
}
```