Level 2 Practice Programs

Q1) Write a program to create a basic calculator that can perform addition, subtraction, multiplication, and division. The program should ask for two numbers (floating point) and perform all the operations

Code:

```
public class Calculator { // Start of the Calculator class

    public static void main(String[] args) { // Start of the main method

        // 1. Creating a Scanner object to get user input
        Scanner input = new Scanner(System.in);
        // Scanner is like a tool to read what the user types.
        // System.in means "read from the standard input" (the keyboard).

        // 2. Getting the first number from the user
        System.out.print("Enter the first number: "); // Display a message to the user
        double number1 = input.nextDouble(); // Read the number the user types and store
it in the variable number1.  nextDouble() is used because we expect a decimal number.

        // 3. Getting the second number
        System.out.print("Enter the second number: ");
        double number2 = input.nextDouble();

        // 4. Performing calculations
        double sum = number1 + number2; // Add the two numbers and store the result in
sum
        double difference = number1 - number2; // Subtract
        double product = number1 * number2; // Multiply
        double quotient; // We declare the quotient variable here

        // 5. Handling division by zero
        if (number2 == 0) { // Check if the second number is zero
            System.out.println("Division by zero is not allowed."); // Print an error message
            return; // Exit the program immediately.  'return' in main means to stop the
program.
        } else {
```

```
        quotient = number1 / number2; // If number2 is not zero, calculate the quotient.
    }

    // 6. Formatting the output (making it look nice)
    DecimalFormat df = new DecimalFormat("0.00"); // Create a DecimalFormat object
to format to 2 decimal places.

    // 7. Printing the results
    System.out.println("The addition, subtraction, multiplication, and division value of "
+
        number1 + " and " + number2 + " is " +
        df.format(sum) + ", " + df.format(difference) + ", " +
        df.format(product) + ", and " + df.format(quotient));
    // We use df.format() to format the numbers before printing.

    input.close(); // Very important! Close the Scanner to release resources.
  } // End of the main method
} // End of the Calculator class
```

Output:

```
F:\STEP\level 2 week 2>java Calculator.java
Enter the first number: 2
Enter the second number: 8
The addition, subtraction, multiplication, and division value of 2.0 and 8.0 is 10.00, -6.00, 16.00, and 0.25
```

Q2)Write a program that takes the base and height to find area of a triangle in square inches and square centimeters.

Code:
```
public class TriangleArea { // Start of the TriangleArea class

  public static void main(String[] args) { // Start of the main method

    // 1. Create a Scanner object to get input from the user
    Scanner input = new Scanner(System.in);

    // 2. Get the base of the triangle from the user (in inches)
    System.out.print("Enter the base of the triangle (in inches): ");
```

```java
        double base = input.nextDouble(); // Read a double (decimal number) and store it
in the 'base' variable

        // 3. Get the height of the triangle from the user (in inches)
        System.out.print("Enter the height of the triangle (in inches): ");
        double height = input.nextDouble();

        // 4. Calculate the area in square inches
        double areaInches = 0.5 * base * height; // Formula: Area = 1/2 * base * height

        // 5. Convert inches to centimeters (1 inch = 2.54 cm)
        double baseCm = base * 2.54; // Convert base to centimeters
        double heightCm = height * 2.54; // Convert height to centimeters

        // 6. Calculate the area in square centimeters
        double areaCm = 0.5 * baseCm * heightCm; // Calculate area using cm values

        // 7. Format the output to two decimal places
        DecimalFormat df = new DecimalFormat("0.00");

        // 8. Print the results
        System.out.println("The area of the triangle is " + df.format(areaInches) + " square
inches.");
        System.out.println("The area of the triangle is " + df.format(areaCm) + " square
centimeters.");
        input.close(); // Close the Scanner to release resources (very important!)

    } // End of the main method
} // End of the TriangleArea class
```

Output:

```
F:\STEP\level 2 week 2>javac TriangleArea.java

F:\STEP\level 2 week 2>TriangleArea.class

F:\STEP\level 2 week 2>java TriangleArea.java
Enter the base of the triangle (in inches): 12
Enter the height of the triangle (in inches): 15
The area of the triangle is 90.00 square inches.
The area of the triangle is 580.64 square centimeters.

F:\STEP\level 2 week 2>
```

Q3)Write a program to find the side of the square whose parameter you read from user

Code:

```
import java.util.Scanner;

public class SquareSide {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.print("Enter the perimeter of the square: ");
        double perimeter = input.nextDouble();

        double side = perimeter / 4; // Calculate side (perimeter / 4)

        System.out.printf("The length of the side is %.2f whose perimeter is %.2f%n", side,
perimeter);

        input.close(); // Close the Scanner (important!)
    }
}
```

Output:

```
F:\STEP\level 2 week 2>java SquareSide.java
Enter the perimeter of the square: 40
The length of the side is 10.00 whose perimeter is 40.00
```

Q4) Write a program the find the distance in yards and miles for the distance provided by user in feets.

Code:

```
public class DistanceConverter {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);

        // Input: Distance in feet
        System.out.print("Enter the distance in feet: ");
        double distanceInFeet = scanner.nextDouble();

        // Converting feet to yards and miles
        double distanceInYards = distanceInFeet / 3;
        double distanceInMiles = distanceInYards / 1760;

        // Output: Distance in yards and miles
        System.out.println("Distance in yards: " + distanceInYards);
        System.out.println("Distance in miles: " + distanceInMiles);

        // Input: Height in feet
```

```
System.out.print("Enter your height in feet: ");
double heightInFeet = scanner.nextDouble();


// Converting feet to inches and centimeters
double heightInInches = heightInFeet * 12;
double heightInCm = heightInInches * 2.54;


// Output: Height in cm, feet, and inches
System.out.println("Your height in cm is " + heightInCm + " while in feet is " + heightInFeet
+ " and inches is " + heightInInches);
scanner.close();  }}
```

Output:

```
F:\STEP\level 2 week 2>java DistanceConverter.java
Enter the distance in feet: 45
Distance in yards: 15.0
Distance in miles: 0.008522727272727272
Enter your height in feet: 100
Your height in cm is 3048.0 while in feet is 100.0 and inches is 1200.0

F:\STEP\level 2 week 2>
```

Q5) Write a program to input the unit price of an item and the quantity to be bought. Then, calculate the total price.

Code:

```
public class PurchaseCalculator {
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);
System.out.print("Enter the unit price (INR): ");
double unitPrice = scanner.nextDouble();
System.out.print("Enter the quantity: ");
```

```
int quantity = scanner.nextInt();
double totalPrice = unitPrice * quantity;
System.out.printf("The total purchase price is INR %.2f if the quantity is %d and unit
price is INR %.2f.%n",
totalPrice, quantity, unitPrice);
scanner.close();
}
}
```

Output:

```
F:\STEP\level 2 week 2>javac IntOperation.java

F:\STEP\level 2 week 2>IntOperation.class

F:\STEP\level 2 week 2>java IntOperation.java
Enter the value of a: 50
Enter the value of b: 45
Enter the value of c: 85
The results of Int Operations are 3875, 2335, 86, and 90.
```

Q6) Write a program to take 2 numbers and print their quotient and reminder.

Code:

```
import java.util.Scanner;
public class QuotientRemainderCalculator {
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);
System.out.print("Enter the first number: ");
int number1 = scanner.nextInt();
System.out.print("Enter the second number: ");
int number2 = scanner.nextInt();
if (number2 != 0) {
int quotient = number1 / number2;
int remainder = number1 % number2;
```

```
System.out.printf("The Quotient is %d and Remainder is %d of two numbers %d and
%d.%n",
quotient, remainder, number1, number2);
} else {
System.out.println("Division by zero is not allowed.");
}
scanner.close();
}
}
```

Output:

```
F:\STEP\level 2 week 2>java QuotientRemainderCalculator.java
Enter the first number: 80
Enter the second number: 40
The Quotient is 2 and Remainder is 0 of two numbers 80 and 40.
```

Q7) Write an **_IntOperation_** program by taking a, b, and c as input values and print the following integer operations a + b *c, a * b + c, c + a / b, and a % b + c. Please also understand the precedence of the operators.

Code:
```
import java.util.Scanner;
public class IntOperation {
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);
System.out.print("Enter the value of a: ");
int a = scanner.nextInt();
System.out.print("Enter the value of b: ");
int b = scanner.nextInt();
```

```
System.out.print("Enter the value of c: ");
int c = scanner.nextInt();
int result1 = a + b * c;
int result2 = a * b + c;
int result3 = c + a / b;
int result4 = a % b + c;
System.out.printf("The results of Int Operations are %d, %d, %d, and %d.%n",
result1, result2, result3, result4);
scanner.close();
}
}
```

Output:

```
F:\STEP\level 2 week 2>javac IntOperation.java

F:\STEP\level 2 week 2>IntOperation.class

F:\STEP\level 2 week 2>java IntOperation.java
Enter the value of a: 50
Enter the value of b: 45
Enter the value of c: 85
The results of Int Operations are 3875, 2335, 86, and 90.
```

Q8) Similarly, write the *DoubleOpt* program by taking double values and doing the same operations.
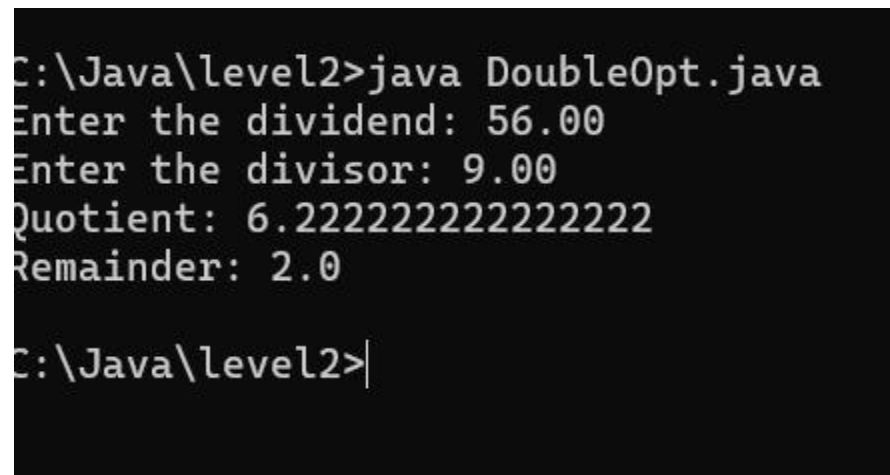
Code:

```
public class DoubleOpt {
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);
System.out.print("Enter the value of a: ");
double a = scanner.nextDouble();
System.out.print("Enter the value of b: ");
double b = scanner.nextDouble();
System.out.print("Enter the value of c: ");
```

```
double c = scanner.nextDouble();
double result1 = a + b * c;
double result2 = a * b + c;
double result3 = c + a / b;
double result4 = a % b + c;
System.out.printf("The results of the double operations are: %.2f, %.2f, %.2f, and
%.2f.%n",
result1, result2, result3, result4);
scanner.close();
}
}
```

Output:

```
C:\Java\level2>java DoubleOpt.java
Enter the dividend: 56.00
Enter the divisor: 9.00
Quotient: 6.222222222222222
Remainder: 2.0

C:\Java\level2>
```