Tutorial 3

Question 1

```java
public class Tut3Q1 {
    public static void main(String[] args) {
        // Using for loop
        System.out.println("Using for loop:");
        for (int i = 0; i <= 14; i += 2) {
            if (i == 6 || i == 8) {
                continue;
            }
            System.out.println(i);
        }

        // Using while loop
        System.out.println("Using while loop:");
        int j = 0;
        while (j <= 14) {
            if (j == 6 || j == 8) {
                j += 2;
                continue;
            }
            System.out.println(j);
            j += 2;
        }
    }
}
```

Question 2

```java
public class Tut3Q2 {
    public static void main(String[] args) {
        printPattern1();
        System.out.println();
        printPattern2();
    }

    public static void printPattern1() {
        for (int i = 1; i <= 5; i++) {
            for (int j = 1; j <= i; j++) {
                System.out.print(i);
            }
            System.out.println();
        }
    }

    public static void printPattern2() {
        int rows = 5;
```

```
        int stars = 1;
        int spaces = 4;

        for (int i = 1; i <= rows; i++) {
            // Print spaces
            for (int j = 1; j <= spaces; j++) {
                System.out.print(" ");
            }

            // Print stars
            for (int j = 1; j <= stars; j++) {
                System.out.print("*");
            }

            System.out.println();
            spaces--;
            stars += 2;
        }
    }
}
```

Question 3

```
import java.util.*;
public class Tut3Q3 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Get the number of times to print the letter
        System.out.print("Enter a number: ");
        int n = scanner.nextInt();

        // Get the letter to print
        System.out.print("Enter a letter: ");
        char letter = scanner.next().charAt(0);

        System.out.print("Output: ");

        // Print the letter n times
        int i = 0;
        while (i < n) {
            System.out.print(letter);
            i++;
        }

        scanner.close();
    }
}
```

Question 4

```java
import java.util.*;
public class Tut3Q4 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter a positive integer: ");
        int number = scanner.nextInt();

        int factorial = 1;

        if (number == 0) {
            System.out.println("Factorial of 0 is 1.");
        } else {
            System.out.print("Factorial of " + number + " = ");

            for (int i = number; i >= 1; i--) {
                if (i == number) {
                    System.out.print(i);
                } else {
                    System.out.print(" x " + i);
                }
                factorial *= i;
            }

            System.out.println(" = " + factorial);
        }

        scanner.close();
    }
}
```

Question 5

```java
import java.util.*;
public class Tut3Q5 {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        double number_1 = 0;
        double number_2 = 0;
        String operator = "";
        boolean validInput = false;

        // Input validation for the first number
        while (!validInput) {
            System.out.print("Enter the first number: ");
            if (scanner.hasNextDouble()) {
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                number_1 = scanner.nextDouble();
                validInput = true;
            } else {
                System.out.println("Invalid input. Please enter a valid
number.");
                scanner.next(); // Clear the invalid input
            }
        }

        validInput = false;

        // Input validation for the second number
        while (!validInput) {
            System.out.print("Enter the second number: ");
            if (scanner.hasNextDouble()) {
                number_2 = scanner.nextDouble();
                validInput = true;
            } else {
                System.out.println("Invalid input. Please enter a valid
number.");
                scanner.next(); // Clear the invalid input
            }
        }

        validInput = false;

        // Input validation for the operator
        while (!validInput) {
            System.out.print("Enter the operator (+, -, *, /): ");
            operator = scanner.next();

            if (operator.equals("+") || operator.equals("-") ||
operator.equals("*") || operator.equals("/")) {
                validInput = true;
            } else {
                System.out.println("Invalid operator. Please enter one of the
following operators: +, -, *, /");
            }
        }

        // Performing the calculation and handling division by zero
        try {
            double result = 0;
            switch (operator) {
                case "+":
                    result = number_1 + number_2;
                    break;
                case "-":
                    result = number_1 - number_2;
                    break;
                case "*":
                    result = number_1 * number_2;
                    break;
                case "/":
                    if (number_2 == 0) {
                        throw new ArithmeticException("Division by zero is
not allowed.");
```

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                    }
                    result = number_1 / number_2;
                    break;
            }
            System.out.println("The result is: " + result);
        } catch (ArithmeticException e) {
            System.out.println(e.getMessage());
        }

        scanner.close();
    }
}
```