CDAC MUMBAI
Lab Assignment

SECTION 1: Error-Driven Learning Assignment: Loop Errors

Instructions:

Analyze each code snippet for errors or unexpected behavior. For each snippet, determine:

1. Why does the error or unexpected behavior occur?
2. How can the code be corrected to achieve the intended behavior?

Snippet 1:

```
public class InfiniteForLoop {
    public static void main(String[] args) {
        for (int i = 0; i < 10; i--) {
            System.out.println(i);
        }
    }
}
// Error to investigate: Why does this loop run infinitely? How should the loop control variable be adjusted?
```

Snippet 2:

```
public class IncorrectWhileCondition {
    public static void main(String[] args) {
        int count = 5;
        while (count = 0) {
            System.out.println(count);
            count--;
        }
    }
}
// Error to investigate: Why does the loop not execute as expected? What is the issue with the condition in the
`while` loop?
```

Snippet 3:

```
public class DoWhileIncorrectCondition {
    public static void main(String[] args) {
        int num = 0;
        do {
            System.out.println(num);
            num++;
        } while (num > 0);
```

```
    }
}
// Error to investigate: Why does the loop only execute once? What is wrong with the loop condition in the `do-while` loop?
```

Snippet 4:

```
public class OffByOneErrorForLoop {
    public static void main(String[] args) {
        for (int i = 1; i <= 10; i++) {
            System.out.println(i);
        }
        // Expected: 10 iterations with numbers 1 to 10
        // Actual: Prints numbers 1 to 10, but the task expected only 1 to 9
    }
}
// Error to investigate: What is the issue with the loop boundaries? How should the loop be adjusted to meet the expected output?
```

Snippet 5:

```
public class WrongInitializationForLoop {
    public static void main(String[] args) {
        for (int i = 10; i >= 0; i++) {
            System.out.println(i);
        }
    }
}
// Error to investigate: Why does this loop not print numbers in the expected order? What is the problem with the initialization and update statements in the `for` loop?
```

Snippet 6:

```
public class MisplacedForLoopBody {
    public static void main(String[] args) {
        for (int i = 0; i < 5; i++)
            System.out.println(i);
            System.out.println("Done");
    }
}
// Error to investigate: Why does "Done" print only once, outside the loop? How should the loop body be enclosed to include all statements within the loop?
```

Snippet 7:

```
public class UninitializedWhileLoop {
    public static void main(String[] args) {
        int count;
```

```
        while (count < 10) {
            System.out.println(count);
            count++;
        }
    }
}
// Error to investigate: Why does this code produce a compilation error? What needs to be done to initialize the loop variable properly?
```

Snippet 8:

```
public class OffByOneDoWhileLoop {
    public static void main(String[] args) {
        int num = 1;
        do {
            System.out.println(num);
            num--;
        } while (num > 0);
    }
}
// Error to investigate: Why does this loop print unexpected numbers? What adjustments are needed to print the numbers from 1 to 5?
```

Snippet 9:

```
public class InfiniteForLoopUpdate {
    public static void main(String[] args) {
        for (int i = 0; i < 5; i += 2) {
            System.out.println(i);
        }
    }
}
// Error to investigate: Why does the loop print unexpected results or run infinitely? How should the loop update expression be corrected?
```

Snippet 10:

```
public class IncorrectWhileLoopControl {
    public static void main(String[] args) {
        int num = 10;
        while (num = 10) {
            System.out.println(num);
            num--;
        }
    }
}
// Error to investigate: Why does the loop execute indefinitely? What is wrong with the loop condition?
```

Snippet 11:

```
public class IncorrectLoopUpdate {
   public static void main(String[] args) {
      int i = 0;
      while (i < 5) {
         System.out.println(i);
         i += 2; // Error: This may cause unexpected results in output
      }
   }
}
// Error to investigate: What will be the output of this loop? How should the loop variable be updated to achieve the desired result?
```

Snippet 12:

```
public class LoopVariableScope {
   public static void main(String[] args) {
      for (int i = 0; i < 5; i++) {
         int x = i * 2;
      }
      System.out.println(x); // Error: 'x' is not accessible here
   }
}
// Error to investigate: Why does the variable 'x' cause a compilation error? How does scope
```

SECTION 2: Guess the Output

Instructions:

1. **Perform a Dry Run:** Carefully trace the execution of each code snippet manually to determine the output.
2. **Write Down Your Observations:** Document each step of your dry run, including the values of variables at each stage of execution.
3. **Guess the Output:** Based on your dry run, provide the expected output of the code.
4. **Submit Your Assignment:** Provide your dry run steps along with the guessed output for each code snippet.

Snippet 1:

```
public class NestedLoopOutput {
   public static void main(String[] args) {
      for (int i = 1; i <= 3; i++) {
         for (int j = 1; j <= 2; j++) {
            System.out.print(i + " " + j + " ");
         }
         System.out.println();
```