The **Recursion** and **Iteration** both repeatedly execute the set of instructions. **Recursion** is when a statement in a function **calls itself repeatedly**. The **iteration** is when a loop **repeatedly executes until the controlling condition becomes false**. The primary difference between recursion and iteration is that **recursion** is a process, always applied to a function and **iteration** is applied to the **set of instructions** which we want to get **repeatedly executed**.

Recursion

- Recursion uses **selection structure**.
- **Infinite recursion** occurs if the recursion step does not reduce the problem in a manner that converges on some condition (**base case**) and Infinite recursion can crash the system.
- Recursion terminates when a **base case** is recognized.
- Recursion is usually **slower than iteration** due to the overhead of maintaining the stack.
- Recursion uses **more memory than iteration**.
- Recursion makes the **code smaller**.

Example

```
public class RecursionExample {

   public static void main(String args[]) {

      RecursionExample re = new RecursionExample();

      int result = re.factorial(4);

      System.out.println("Result:" + result);

   }

   public int factorial(int n) {

      if (n==0) {

         return 1;

      }

      else {

         return n*factorial(n-1);

      }

   }
```

```
}
```

Output

```
Result:24
```

Iteration

- Iteration uses **repetition structure**.
- An infinite loop occurs with iteration if the loop condition test never becomes false and Infinite looping uses CPU cycles repeatedly.
- An iteration **terminates** when the **loop condition fails**.
- An iteration does not use the **stack** so it's **faster than recursion**.
- Iteration consumes **less memory.**
- Iteration makes the **code longer**.

Example

```
public class IterationExample {

   public static void main(String args[]) {

      for(int i = 1; i <= 5; i++) {

         System.out.println(i + " ");

      }

   }

}
```

Output

```
1
2
3
4
5
```

Ref: https://www.tutorialspoint.com/what-are-the-differences-between-recursion-and-iteration-in-java#:~:text=The%20Recursion%20and%20Iteration%20both,the%20controlling%20condition%20becomes%20false.