

Reverse a String:

Input: A string.

Output: The reversed string.

Example:

- Input: "hello"
- Output: "olleh"
- Input: "Java"
- Output: "avaJ"

Solution 1: Reverse a String using a For Loop

Code:

```
import java.util.Scanner;

public class ReverseString {
    // Method to reverse the string using a for loop
    public static String reverseUsingLoop(String input) {
        String reversed = ""; // Initialize an empty string to store the reversed string

        // Loop through the string from the last character to the first
        for (int i = input.length() - 1; i >= 0; i--) {
            reversed += input.charAt(i); // Append each character to the reversed string
        }

        return reversed; // Return the reversed string
    }

    // Main method to take user input and display the reversed string
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Taking user input
        System.out.print("Enter a string: ");
        String input = scanner.nextLine();

        // Reversing and displaying the result
        String reversed = reverseUsingLoop(input);
    }
}
```

```

        System.out.println("Reversed string: " + reversed);

        scanner.close(); // Close the scanner to prevent resource leakage
    }
}

```

Output:

```

Enter a string: Java Exercises
Reversed string: sesicrexE avaJ

```

```

Enter a string: Project
Reversed string: tcejorP

```

Explanation :

- Input: User inputs a string.
- Processing: The program iterates through the string from the last character to the first, appending each character to form a new string.
- Output: The program displays the reversed string.

Solution 2: Reverse a String using Recursion

Code:

```

import java.util.Scanner;

public class RecursiveReverseString {
    // Recursive method to reverse the string
    public static String reverseUsingRecursion(String input) {
        // Base case: If the string is empty, return an empty string
        if (input.isEmpty()) {
            return input;
        }

        // Recursive case: Return the last character + result of the rest of the string
        return reverseUsingRecursion(input.substring(1)) + input.charAt(0);
    }

    // Main method to take user input and display the reversed string
    public static void main(String[] args) {

```

```
Scanner scanner = new Scanner(System.in);

// Taking user input
System.out.print("Enter a string: ");
String input = scanner.nextLine();

// Reversing and displaying the result
String reversed = reverseUsingRecursion(input);
System.out.println("Reversed string: " + reversed);

scanner.close(); // Close the scanner
}
```

Output:

```
Enter a string: RecursiveReverseString
Reversed string: gnirtSesreveRevisruceR
```

```
Enter a string: madam
Reversed string: madam
```

Explanation:

- Input: User enters a string.
- Processing: The recursive function processes the string by taking the last character and calling the function again on the rest of the string, building the reversed string step by step.
- Output: The program prints the reversed string.