Strings

Strings are sequences of characters used to represent text.
Unlike character arrays, strings end with a special '\0' character in some languages like C.
In most languages like Java, Python, and JavaScript, strings are immutable, meaning they can't be changed after creation. In C++, it is mutable.

You can access each character using its position (called an index), starting from 0.
So in "hello", the character at index 1 is 'e'.

Properties

- Immutable (in many languages): Once created, their content cannot be changed (e.g., Python, JavaScript).
- Indexable: Each character can be accessed by its position (starting from 0).
- Iterable: You can loop through a string character by character.
- Support for Slicing/Substrings: You can extract parts of strings using ranges.
- Unicode Support: Most modern languages support Unicode, allowing international text.

String Operations

Concatenation

Concatenation is the addition of 2 strings and can be done in different languages in the following way:

- Python:
```
str1 = "Hello"
str2 = "World"
result = str1 + " " + str2
```
- C++:
```
string str1 = "Hello";
string str2 = "World";
string result = str1 + " " + str2;
```
- Javascript:
```
let str1 = "Hello";
let str2 = "World";
let result = str1 + " " + str2;
```

Insertion

- Python:

```
s = "hello"
s = s[:2] + "X" + s[2:]
```

- C++:
```
string s = "hello";
s.insert(2, "X");
```
- Javascript:
```
let s = "hello";
s = s.slice(0, 2) + "X" + s.slice(2);// Inserts 'X' at
s[2]
```

- **Deletion**
  - Python:
```
s = "hello"
s = s[:2] + s[3:] # Deletes character at index 2
```
  - C++
```
string s = "hello";
s.erase(2, 1);  // Deletes 1 character at index 2
```
  - Javascript
```
let s = "hello";
s = s.slice(0, 2) + s.slice(3);  // Deletes character at
index 2
```

- **Length**
  - Python:
```
s = "hello"
print(len(s))
```
  - C++:
```
string s = "hello";
cout << s.length();
```
  - Javascript:
```
let s = "hello";
console.log(s.length);
```
- **Substring**
  - Python:
```
s = "hello"
print(s[1:4])  # "ell"
```
  - C++:
```
string s = "hello";
cout << s.substr(1,3);  // "ell"
```

    - Javascript:
      ```
      let s = "hello";
      console.log(s.substring(1, 4));  // "ell"
      ```
- **Finding a Character**
    - Python:
      ```
      s = "banana"
      print(s.find("a"))
      ```
    - C++:
      ```
      string s = "banana";
      cout << s.find("a");
      ```
    - Javascript:
      ```
      let s = "banana";
      console.log(s.indexOf("a"));
      ```
- **Reversing a String**
    - Python:
      ```
      s = "hello"
      print(s[::-1])
      ```
    - C++:
      ```
      #include <algorithm>
      string s = "hello";
      reverse(s.begin(), s.end());
      ```
    - Javascript:
      ```
      let s = "hello";
      console.log(s.split("").reverse().join(""));
      ```

You can also visit:

String in Data Structure | GeeksforGeeks
JavaScript Strings
Python Strings
C++ Strings

Problems

Easy:
Find the Index of the First Occurrence in a String - LeetCode | Solution

Valid Anagram - LeetCode | Solution

Roman to Integer - LeetCode | Solution

Valid Palindrome - LeetCode | Solution

Isomorphic Strings - LeetCode | Solution

Number of Segments in a String - LeetCode | Solution

Repeated Substring Pattern - LeetCode | Solution

Medium:
Fraction to Recurring Decimal - LeetCode | Solution

Longest Palindromic Substring - LeetCode | Solution

Find All Anagrams in a String - LeetCode | Solution

Longest Substring Without Repeating Characters - LeetCode | Solution

Longest Repeating Character Replacement - LeetCode | Solution

Hard:
Substring with Concatenation of All Words - LeetCode | Solution

Smallest K-Length Subsequence With Occurrences of a Letter - LeetCode | Solution

Minimum Window Substring - LeetCode | Solution