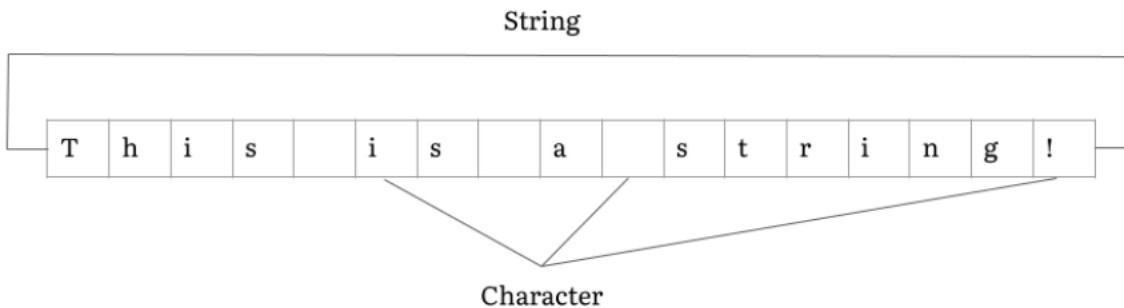# Strings

String Basics

- **String** in Computer Programming is an Object storing a sequence of character
- It is a data structure, implemented as **arrays**
- Examples of String **:-**
  - "Sky is the limit"
  - "12345"

In this module, we will be looking at how strings are handled in Java, C++, Python. Refer:

- JAVA - https://www.w3schools.com/java/java_strings.asp
- C++ - https://www.tutorialspoint.com/cplusplus/cpp_strings.htm
- Python - https://www.w3schools.com/python/python_strings.asp

String Creation

JAVA

There are two ways to create a String object :-

1. Using the new keyword
   - String str = new String("Hello World");
2. Without using the new keyword
   - String str = "Hello World"

- If data array in the above example is modified after the string object str is created, then str remains unchanged.
- Construct a string object by passing another string object.
  - String str2 = new String(str);

C++

There are 2 ways to handle strings in C++

1. The C-style character string originated within the C language and continues to be supported within C++.
   - This string is actually a one-dimensional array of characters which is terminated by a **null** character '\0'.
     Example - char greeting[6] = {'H', 'e', 'l', 'l', 'o', '\0'};
   - If you follow the rule of array initialization, then you can write the above statement as follows −
     char greeting[] = "Hello";
2. The String Class in C++
   The standard C++ library provides a **string** class type that supports all the operations mentioned above, additionally much more functionality.
   - string str1 = "Hello

Python

Strings in python are surrounded by either single quotation marks, or double quotation marks.
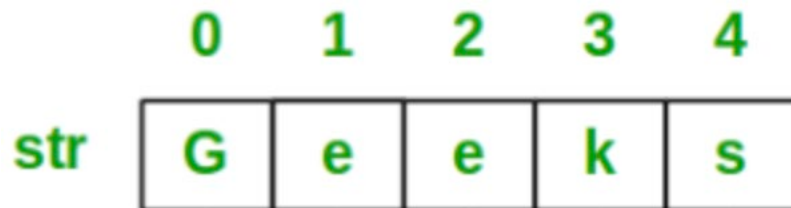
- 'hello' is the same as "hello".

Assigning a string to a variable is done with the variable name followed by an equal sign and the string:

- a = "Hello"

String Indexing

- Characters of a string are numbered with **0-based indexes**
- The **first character's** index is always **0**
- The **last character's** index is 1 less than the string's length (**length - 1**)

String Methods

Description	JAVA	C++	Python
number of characters in this string	length()	length()	len(str)
Substring	substring(index1, index2)	substr(pos, len)	str[index1::index2]
a new string with all lowercase letters	toLowerCase()	toLower(str)	lower()
a new string with all uppercase letters	toUpperCase()	toUpper()	upper()

More String methods

- JAVA - https://www.w3schools.com/java/java_ref_string.asp
- C++ - https://www.tutorialspoint.com/cplusplus/cpp_strings.htm
- Python - https://www.w3schools.com/python/python_ref_string.asp

Strings As User Input

JAVA

- Scanner's next method reads a word of input as a String.
    - Scanner console = new Scanner(System.in);
      System.out.print("What is your name? ");
      String name = console.next();
      name = name.toUpperCase();
      System.out.println(name + " has " + name.length() + " letters and starts with " + name.substring(0, 1));
    - Output:
      What is your name? **Madonna**
      MADONNA has 7 letters and starts with M
- The **nextLine** method reads a line of input as aString.
    - System.out.print("What is your address? ");
      String address = **console.nextLine();**

C++

Use the extraction operator $>>$ on cin to display a string entered by a user:

string firstName;
cout $<<$ "Type your first name: ";

```
cin >> firstName; // get user input from the keyboard
cout << "Your name is: " << firstName;
```

Python

```
name = input("Enter name: ")

print("Name is: " + name)
```