JAVA STRING

In java, string is basically an object that represents sequence of char values. An array of characters works same as java string.

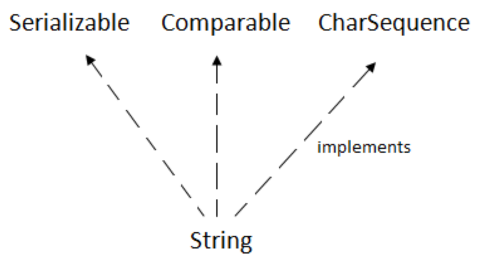
For example:

```
char[] ch={'j','a','v','a','t','p','o','i','n','t'};
String s=new String(ch);
```

is same as: String s="javatpoint";

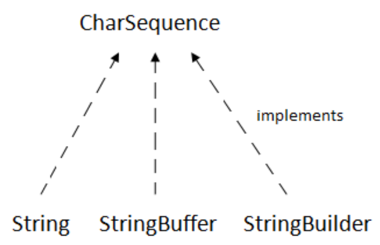
Java String class provides a lot of methods to perform operations on string such as compare(), concat(), equals(), split(), length(), replace(), compareTo(), intern(), substring() etc.

The java.lang.String class implements *Serializable*, *Comparable* and *CharSequence* interfaces.



CharSequence Interface

The CharSequence interface is used to represent sequence of characters. It is implemented by String, StringBuffer and StringBuilder classes. It means, we can create string in java by using these 3 classes.



The java String is immutable i.e. it cannot be changed. Whenever we change any string, a new instance is created. For mutable string, you can use **StringBuffer** and **StringBuilder** classes.

What is String in java?

Generally, string is a sequence of characters. But in java, string is an object that represents a sequence of characters. The java.lang.String class is used to create string object.

How to create String object?

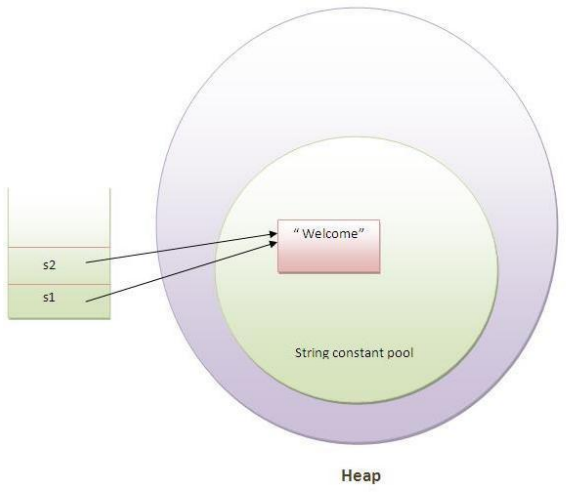
There are two ways to create String object:

1. By string literal
2. By new keyword

1) String Literal: Java String literal is created by using double quotes. *For Example:* **String s="welcome";**

Each time you create a string literal, the JVM checks the string constant pool first. If the string already exists in the pool, a reference to the pooled instance is returned. If string doesn't exist in the pool, a new string instance is created and placed in the pool. For example:

```
String s1="Welcome";
String s2="Welcome";//will not create new instance
```



In the above example only one object will be created. Firstly JVM will not find any string object with the value "Welcome" in string constant pool, so it will create a new object. After that it will find the string with the value "Welcome" in the pool, it will not create new object but will return the reference to the same instance.

Note: String objects are stored in a special memory area known as string constant pool.

Why java uses concept of string literal?

To make Java more memory efficient (because no new objects are created if it exists already in string constant pool).

2) By new keyword

```
String s=new String("Welcome");
//creates two objects and one reference variable
```

In such case, JVM will create a new string object in normal(non pool) heap memory and the literal "Welcome" will be placed in the string constant pool. The variable s will refer to the object in heap(non pool).

Java String Example

```
public class StringExample{
`       public static void main(String args[]){
                String s1="java"; //creating string by java string literal
                char ch[]={'s','t','r','i','n','g','s'};
                String s2=new String(ch); //converting char array to string
                String s3=new String("example"); //creating java string by new keyword
                System.out.println(s1);
                System.out.println(s2);
                System.out.println(s3);
        }
}
```

Java String class methods

NO.	METHOD	DESCRIPTION
1	char charAt(int index)	returns char value for the particular index
2	int length()	returns string length
3	static String format(String format, Object... args)	returns formatted string
4	static String format(Locale l, String format, Object... args)	returns formatted string with given locale
5	String substring(int beginIndex)	returns substring for given begin index
6	String substring(int beginIndex, int endIndex)	returns substring for given begin index and end index
7	boolean contains(CharSequence s)	returns true or false after matching the sequence of char value
8	static String join(CharSequence delimiter, CharSequence... elements)	returns a joined string
9	static String join(CharSequence delimiter, Iterable<? extends CharSequence> elements)	returns a joined string
10	boolean equals(Object another)	checks the equality of string with object

The java.lang.String class provides many useful methods to perform operations on sequence of char values.

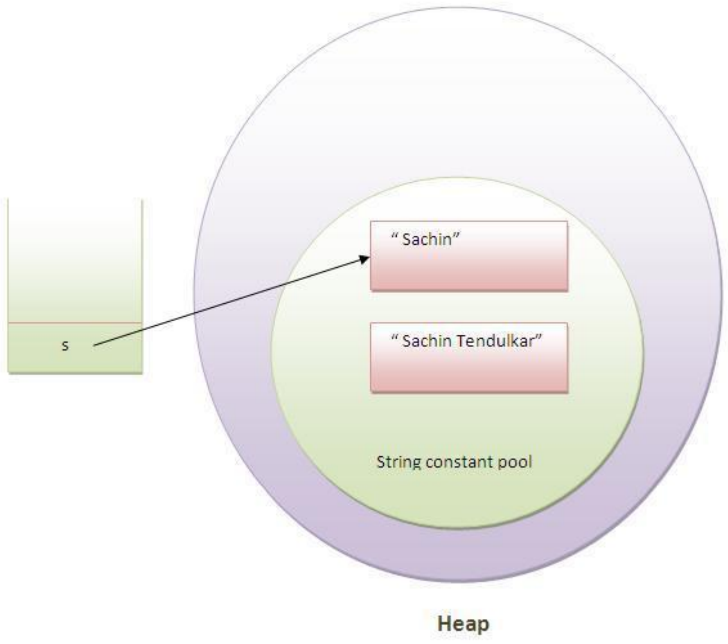
NO.	METHOD	DESCRIPTION
11	boolean isEmpty()	checks if string is empty
12	String concat(String str)	concatinates specified string
13	String replace(char old, char new)	replaces all occurrences of specified char value
14	String replace(CharSequence old, CharSequence new)	replaces all occurrences of specified CharSequence
15	static String equalsIgnoreCase(String another)	compares another string. It doesn't check case.
16	String[] split(String regex)	returns splitted string matching regex
17	String[] split(String regex, int limit)	returns splitted string matching regex and limit
18	String intern()	returns interned string
19	int indexOf(int ch)	returns specified char value index
20	int indexOf(int ch, int fromIndex)	returns specified char value index starting with given index
21	int indexOf(String substring)	returns specified substring index
22	int indexOf(String substring, int fromIndex)	returns specified substring index starting with given index
23	String toLowerCase()	returns string in lowercase.
24	String toLowerCase(Locale l)	returns string in lowercase using specified locale.
25	String toUpperCase()	returns string in uppercase.
26	String toUpperCase(Locale l)	returns string in uppercase using specified locale.
27	String trim()	removes beginning and ending spaces of this string.
28	static String valueOf(int value)	converts given type into string. It is overloaded.

Immutable String in Java

In java, **string objects are immutable**. Immutable simply means unmodifiable or unchangeable. Once string object is created its data or state can't be changed but a new string object is created.

Example:

```
class Testimmutablestring{
 public static void main(String args[]){
   String s="Sachin";
   s.concat(" Tendulkar"); //concat() method appends the string at the end
   System.out.println(s); //will print Sachin because strings are immutable objects
 }
}
        Output:Sachin
```



As you can see in the above figure that two objects are created but s reference variable still refers to "Sachin" not to "Sachin Tendulkar".

But if we explicitly assign it to the reference variable, it will refer to "Sachin Tendulkar" object. For example:

```
class Testimmutablestring1{
 public static void main(String args[]){
   String s="Sachin";
   s=s.concat(" Tendulkar");
   System.out.println(s);
 }
}
```

```
Output:Sachin Tendulkar
```

In such case, s points to the "Sachin Tendulkar". Please notice that still sachin object is not modified.

***Why string objects are immutable in java*?**

Because java uses the concept of string literal. Suppose there are 5 reference variables, all refers to one object "sachin". If one reference variable changes the value of the object, it will be affected to all the reference variables. That is why string objects are immutable in java.