

Detailed Notes

In Java, String is a special class that represents a sequence of characters. Strings are immutable, meaning once created, their values cannot be changed.

String Creation

String literal

```
java
String s = "Hello";
Stored in String Constant Pool.
```

Using new keyword

```
java
String s = new String("Hello");
Creates a new object in heap ignoring the pool.
```

Important Characteristics

Strings are immutable: operations on Strings create new String objects.

The String class provides many useful methods such as `length()`, `substring()`, `indexOf()`, `equals()`, etc.

Strings can be concatenated using `+` or `concat()`.

String Pool and Memory Management

The String pool stores unique String literals for memory efficiency.

If a String literal is already in the pool, new references point to existing String objects.

Common String Methods

Method	Description
<code>length()</code>	Returns length of the string
<code>charAt(int)</code>	Returns character at specified index
<code>substring(int, int)</code>	Returns a substring
<code>equals(String)</code>	Compares two strings for content equality
<code>compareTo(String)</code>	Lexicographically compares two strings
<code>indexOf(char/String)</code>	Returns index of char/String or -1 if not found
<code>toUpperCase()/toLowerCase()</code>	Converts case
<code>trim()</code>	Removes leading and trailing spaces

Sample Programs

Basic String operations:

```
java
String s1 = "Java";
String s2 = "Programming";
String s3 = s1 + " " + s2;
System.out.println(s3); // Output: Java Programming
Comparing strings:
```

```
java
String a = "hello";
String b = "hello";
System.out.println(a == b);           // true (same pool reference)
System.out.println(a.equals(b));      // true (content comparison)
Extract and print substring:
```

```
java
String s = "Hello World";
System.out.println(s.substring(6)); // Output: World
```

Interview Questions and Answers: Strings

What is a String in Java?

A String is an immutable object that represents sequences of characters. Java

uses the `String` class, with special support for creating and manipulating strings efficiently.

How are Strings stored in Java memory?

Strings created as literals are stored in the String Constant Pool to save memory. Strings created with `new` keyword reside in the heap.

Why are Strings immutable?

Immutability ensures thread safety, security, and performance benefits such as String pool reuse and caching hashcodes.

How do you compare two Strings?

Use the `equals()` method to compare contents. Using `==` compares references, which can lead to false negatives if Strings are different objects.

Explain the difference between `StringBuilder` and `StringBuffer`.

Both are mutable alternatives to `String` and are used to modify strings efficiently. `StringBuffer` is synchronized (thread-safe), whereas `StringBuilder` is faster but unsynchronized.

How do you concatenate strings in Java?

Using `+` operator, `concat()` method, or via `StringBuilder/StringBuffer` for multiple concatenations.

What is the String Pool?

A special area in heap memory that stores unique String literals to optimize memory use.

Can Strings be used in switch statements?

Yes, since Java 7, Strings are allowed in switch cases for cleaner code.

What happens if you modify a String?

Modifications create new String objects; the original String remains unchanged.

How to convert String to primitive types?

Use wrapper classes like `Integer.parseInt()`, `Double.parseDouble()`, and so on.