String and char

- **String** is a *class*: `java.lang.String`
  
  ```java
  String s1 = "Hello"; // ok
  String s2 = "H";    // ok
  String s3 = "";     // empty string is ok
  ```

- **char** is a *primitive type*:
  
  ```java
  char c = 'H';      // ok
  char c = 'Hello';  // Syntax ERROR
  char c = '';       // Syntax ERROR
  ```

```java
String str = "x=" + x;
```
**Quiz: System.out.println**

The Java statement: `System.out.println("Hello");`

a) Displays "Hello" by creating a `System` object.

b) Displays "Hello" by creating a `System.out` object.

c) Displays "Hello" by creating a `System.out.println` object.

d) Creates the class "Hello" and sends it to the default display device.

e) Calls the method `println` of the object `System.out` with the argument "Hello".

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**String Concatenation**

```java
1) public static void main(String[] args)  
2) { String a = "Eragon";  
3) String b = "Shadeslayer";  
4) String c = a + b;  
5) System.out.println(a);  
6) System.out.println(c);  
7) System.out.println(a + " " + b);  
10} }
```

Output: Eragon
EragonShadeslayer
Eragon Shadeslayer
**Overloaded Operator: ‘+’**

1. `public class Hello`
2. `{ public static void main(String[] args)`
3. `{ int a = 5;
4.    int b = 7;
5.    System.out.println(a + b);
6.    System.out.println("Sum is" + a + b);
7.    System.out.println("Sum is" + (a + b));
8.    System.out.println(a + b + "boo");
9. }
10.}`

**Output:**
- 12
- Sum is 57
- Sum is 12
- 12boo

**Quiz: What is the Output?**

1) `public class Toy_2_2`
2) `{ public static void main(String[] args)`
3) `{`
4) `int a = 3;
5)    a = 2*a+1;
6)    int b = 2;
7)    System.out.println(`
8)    a + "/" + b + ": " + a/b);`
9) `}
10.}`

**Options:**
- a) 7/2= 3.5
- b) 7/2= 3
- c) a/b=3.5
- d) a / b= 3.5
- e) a/b= a/b
Every String object has data and methods.
In the example below, str1 is a String object.
The data in str1 is "Orik"
str1 has the method length() which returns an int equal to the number of characters in its data.

```java
1) String str1 = "Orik";
2) String str2 = "Durza";
3) System.out.println(
4)   str1.length() + ", " + str2.length());
```

Output: 4, 5
1) public class Hello
2) { public static void main(String[] args)
3) {
4) String a = "Brom";
5) String b = "Saphira";
6) System.out.println(a.length());
7) System.out.println(b +
8) " has a length of " + b.length() +
9) " characters");
10) }
11} } Without space characters, output will run together.

Output:
4
Saphira has a length of 7 characters

java.lang
Class String

Every String object has the method:

char charAt(int index)

Type of method's return value

Type of argument

When .charAt is used, int is NOT part of the argument list.

1) String name = "Orik";
2) int idx = 1;
3) char letter;
4) letter = name.charAt(idx);
5) System.out.println(letter);
Using a String object's `charAt(int i)`

```java
public class Hello {
    public static void main(String[] args) {
        String a = "Orik";
        System.out.println(a.length());
        System.out.println(a.charAt(1));
        System.out.println(a.charAt(3));
        System.out.println(a.charAt(4));
    }
}
```

Error:
```
java.lang.StringIndexOutOfBoundsException: String index out of range: 4
```

Class String

```java
public class Hello {
    public static void main(String[] args) {
        String str = "Angela";
        System.out.println(str); //Angela
        System.out.println(str.toUpperCase()); //Angela
        str.toUpperCase();
        System.out.println(str); // Angela
        str = str.toUpperCase();
        System.out.println(str); // ANGELA
    }
}
```
String's `toUpperCase()` - another example

```java
1) public class Hello
2) { public static void main(String[] args)
3) {
4)     String str = "Hrothgar";
5)     System.out.print(str.toUpperCase());
6)     System.out.println(" " + str);
7) }
8) }

Output: HROTHGAR Hrothgar
```

Quiz: String's `toUpperCase()`

```java
1) public class Hello
2) { public static void main(String[] args)
3) {
4)     String str = "Hrothgar";
5)     str.toUpperCase();
6)     System.out.println(str);
7) }
8) }
```

What would be the output of the above Java code?

a) Hrothgar  
b) HROTHGAR  
c) hrothgar  
d) hROTHGAR  
e) Hrothgar HROTHGAR
1) String name1 = "Firesword";
2) String name2 = "Shade Slayer";
3) String name3 = name1.substring(2);
4) String name4 = name2.substring(2);
5) String name5 = name1.substring(4);
6) System.out.println(name1);
7) System.out.println(name2);
8) System.out.println(name3);
9) System.out.println(name4);
10) System.out.println(name5);

Output:
Firesword
Shade Slayer
resword
ade Slayer
sword

Quiz: substring: What Is The Output?

1) public class StringExample
2) {
3)   public static void main(String[] args)
4)   {
5)       String name1 = "Brom";
6)       name1.substring(2);
7)   }
8)   System.out.println(name1);
9) }
10)

a) m
b) om
c) rom
d) ro
e) Brom
substring: What Is The Output?

1) public class StringExample
2) {
3)   public static void main(String[] args)
4)   {
5)     String name1 = "Brom";
6)     name1.substring(2);
7)     String name2 = name1.substring(2);
8)     System.out.println(name2);
9)     System.out.println(name1);
10) } }