Getting Started With Java

Output of Strings & Numbers Together

Recognizing Text vs Numbers

```java
class PrintTextNumbers
{
  public static void main(String[] args)
  {
    System.out.println("2 + 3");
    System.out.println(2 + 3);
    System.out.println("2" + "3");
  }
}
```

Output:

What do you think is the result of each line?

Recognizing Text vs Numbers
"2 + 3"

In this case, everything is between quotation marks. The whole expression is a string (text), including the plus sign.

Therefore, no math is performed.

```
System.out.println("2 + 3")
```

Output:

```
2 + 3
```

Recognizing Text vs Numbers
2 + 3

Now we have no quotation marks. The program will treat each symbol in the most sensible way possible.

Therefore, the '2' and '3' stand for numbers 2 and 3.

The symbol '+' means mathematical addition.

```
System.out.println(2 + 3)
```

Output:

5

Recognizing Text vs Numbers

"2" + "3"

Finally, we have quotes around the 2 and 3. This means they are strings, or text. They don't have numeric values, but instead are just the characters from your keyboard.

On the other hand, the '+' doesn't have quotes. So how do we 'add' two strings? The answer is to join them together, which is called concatenation.

```
System.out.println("2" + "3")
```

Output:

```
23
```

Combining Text & Numbers

```
class PrintTextNumbers
{
  public static void main(String[] args)
  {
    System.out.print("2 + 3 = ");
    System.out.println(2+3);
  }
}
```

Output:

```
2 + 3 = 5
```

Combining Text & Other Values

```java
class PrintTextNumbers
{
  public static void main(String[] args)
  {
    System.out.println("2 + 3 = " + 2 + 3);
  }
}
```

Output:

```
2 + 3 = 23
```

Combining Text & Other Values

So why are these so different?

```
System.out.println(2 + 3);
System.out.println("2 + 3 = " + 2 + 3);
```

The `print` and `println` commands are, in general, for output of <u>strings</u> to the display.

In the first example, we have only numbers, so Java understands that the + is an arithmetic operation.

In the second example, we have a string and numbers, so the + is used to join strings together.

Combining Text & Other Values

When Java sees:
```
System.out.println("2 + 3 = " + 2 + 3);
```

it actually interprets it as:
```
System.out.println("2 + 3 = " + "2" + "3");
```

The solution(s):

1.
```
System.out.print("2 + 3 = ");
System.out.println(2 + 3);
```

or

2.
```
System.out.println("2 + 3 = " + (2 + 3));
```