



CS 149

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Memory Diagrams

Online resource for memory diagrams.

<http://pythontutor.com/java.html> - code=public class YourClassNameHere %7B
_public static void main%28String%5B%5D args%29 %7B

Trinket (experimenting with examples from the textbook)

- <https://books.trinket.io/thinkjava2/>

Both of these "**resources**" are listed on the class website:

https://w3.cs.jmu.edu/molloykp/teaching/cs149/cs149_2019Spring/cs149_Resources.php



Switching Datatypes

I have an integer and I need to store it in a variable that is of type double. Can I do that?

Yes, I can. Because I am not "losing" any information.

Can I make a variable of type double into an integer?

Not automatically, because, you are losing information. We need to tell JAVA we are OK losing some information.

Type casting

```
int x;  
double f = 1.4;  
x = (int) f;
```

What will x be? $x = 1$

```
int x;  
double f = -1.6;  
x = (int) f;
```

What will x be? $x = -1$

To do the type conversion, imagine taking your eraser to everything to the right of the decimal point.

Type casting (continued)

```
String str = "3";  
int x = (int) str;
```

What happens?

Cannot cast from String to int
(compilation error).

However, the JAVA object Integer does provide a way of doing this.

```
String str = "3";  
int x = Integer.parseInt(str);  
System.out.printf("x is %d\n", x);
```



How the Scanner works

```
int age = in.nextInt();  
String name = in.nextLine();
```

4	5	\n	G	r	a	c	e		H	o	p	p	e	r	\n
---	---	----	---	---	---	---	---	--	---	---	---	---	---	---	----

↑

So, after read the integer, the scanner pointer moves

4	5	\n	G	r	a	c	e		H	o	p	p	e	r	\n
---	---	----	---	---	---	---	---	--	---	---	---	---	---	---	----

↑

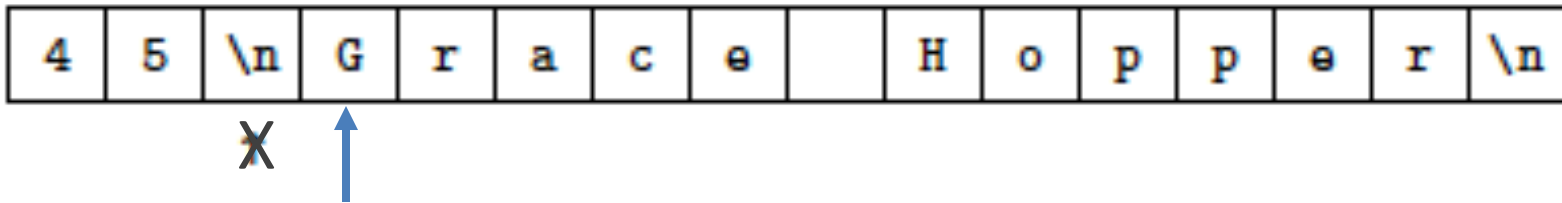
What will name get assigned?

name will be assigned "\n" and the pointer will be "moved" below the "G".

How to Resolve this behavior?

```
int age = in.nextInt();  
in.nextLine();  
String name = in.nextLine();
```

This will move the scanner past the newline character



Common technique is that after reading a number (double or int) that was typed on a line by itself, perform a `nextLine()` call to move past the newline character.



Formatting Output

Need to format numbers (and sometimes text), use `System.out.printf()`

Formatting specifier	What it does		Output
<code>%d</code>	integer	<code>System.out.printf("%d",12345);</code>	12345
<code>%08d</code>	padded to length 8	<code>int x = 12345;</code> <code>System.out.printf("%08d",x);</code>	012345678
<code>%f</code>	floating point	<code>System.out.printf("Hello PI %f", 3.14);</code>	Hello PI 3.14
<code>%.2f</code>	rounded to 2 decimal places	<code>double f = 3.1415</code> <code>System.out.printf("Round %f\n", f);</code>	Round 3.14
<code>%s</code>	String	<code>System.out.printf("Hello %s\n", "Kevin");</code>	Hello Kevin



Formatting Output

The number of parameters that printf takes is equal to the number of format characters ("%") in the format string.

```
String name = "Kevin";
```

```
System.out.printf("Hello %s, I see that you are %d years  
old\n\nYour dog's name is \"Penny\"\n", name,48);
```

How does the output look?

Hello Kevin, I see that you are 48 years old.

Your dog's name is "Penny"