

Java provides a class called Scanner that allows you to read text input into variables of String, int, and double types.

When the user types and then hits the <return> key, what they typed (including the <return>) goes into an *input buffer*, which is just a fancy name for memory set aside to hold the input data until it gets processed by your program. For example, if the user types the following (and hits <return> at the end of each line):

```
Jane Doe
100 Main Street
Sacramento CA 95819
```

The input buffer would contain the text:

```
"Jane Doe\n100 Main Street\nSacramento CA 95819\n"
```

To understand how the Scanner works, you need to know how each of its methods interact with the input buffer. Let's say "in" is a Scanner object with an input buffer.

in.next() - removes whitespace characters – spaces, tabs, and newlines – from the front of the buffer and then removes and returns the next "token" as a String ¹.

in.nextInt() - same as in.next() except it attempts to interpret the String and return it as an int. If it can't convert it, an error occurs.

in.nextDouble() - same as in.next() except it attempts to interpret the String and return it as a double. If it can't convert it, an error occurs.

in.nextLine() - removes and returns as a String all characters, including whitespace, from the front of the input buffer up to the first newline. The newline is removed from the buffer but is not included in the returned String.

¹ A "token" is a sequence of non-whitespace characters, up to the next whitespace character.

- 1) If Scanner "in" has input buffer "Jane Doe\n100 Main Street\n", what does `in.next()` return? What is in's buffer afterward?
- 2) If Scanner "in" has input buffer "Jane Doe\n100 Main Street\n", what does `in.nextLine()` return? What is in's buffer afterward?
- 3) If Scanner "in" has input buffer "Jane Doe\n100 Main Street\n", what does `in.nextInt()` return? What is in's buffer afterward?
- 4) If Scanner "in" has input buffer "25\nPersonal Trainer\n", what are the values of the two variables after this code? What is in's buffer afterward?

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

Deskcheck the calls very carefully to get the answer right.

- 5) How can you modify the above lines of code to make it behave as the author probably expected?

If the input buffer doesn't have any more input to return, these methods will each pause and wait for the user to type something and hit <return>. That's why your program waits for input on code like the following:

```
System.out.print("Enter your age: ");  
int age = in.nextInt(); // Pauses until token available
```

- 6) Write a sequence of code that prompts the user for their age and stores it as an int variable and then prompts the user for their occupation and stores their whole response as a String variable.
- 7) Write a small program that runs your answer from Problem 6 and then prints

```
"Haha! You're a " + age + " year old " + occupation + "!!"
```