Variables

1. Variables and boxes

Variables are special things for storing data. Any data. All data in Java is stored using variables. One of the best ways to conceive of a variable is as a box: a completely ordinary *box*.

For example, let's say that you write the number 13 on a piece of paper and put it in a box. Now we can say that "the box stores the value 13".

Every variable in Java has three important properties: *type*, *name*, and *value*.

The *name* is used to distinguish one variable from another. It's like a *label on a box*.

The *type* of a variable determines the type of *values/data* that can be stored in it. We store a cake in a cake box, shoes in a shoe box, etc.

The *value* is some object or the data stored in the variable.

Every object in the Java language has its own *type*. For example, we can have the following data types: *integer*, *fractional number*, *text*, *Cat*, *House*, etc.

Each *variable* (box) also has its own *type*. A variable can only store values that correspond to its type. Different boxes are used to store different things: a box of chocolates, a carton for a dozen eggs, etc. It's just like in real life.

2. Creating a variable

In the Java language, we create a variable using a command that takes this form:

```
type name;
```

Declaring a variable

where *type* is the type of the variable (which corresponds to the type of the values that the variable can store), and *name* is the name of the variable.

Examples:

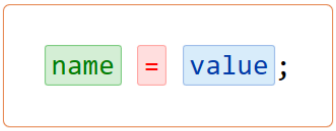
Creating a variable: first the type, then the name.	Description
`int a;`	Create a variable named `a` whose type is `int`.
`String s;`	Create a variable named `s` whose type is `String`.
`double c;`	Create a variable named `c` whose type is `double`.

The two types most commonly used are *integers* (denoted by `int`) and *text* (denoted by `String`). The `double` type is also popular. It represents fractional (real) numbers.

3. Assignment

As mentioned above, a variable has a name, type, and value. We already considered the name and type, but what about the value? How do I put a value into a variable?

To assign a value to a variable, we have the *assignment operator*.
It copies a value from one variable to another. It does not move the value.
It copies. Like a file on disk. Assignment looks like this:



Assignment operator

where `name` is the name of the variable and `value` is the value that will be put into the variable. The value can be a literal value, the name of another variable, or even some expression that includes variables.

Examples:

Code	Description

`int i;`
`int a, b;`
`int x;`
	The `i` variable is created
	The `a` and `b` variables are created
	A `x` variable is created

`i = 3;`	The `i` variable is set to the value `3`.
`a = 1;` `b = a + 1;`	The `a` variable is set to the value `1`. The `b` variable is set to the value `2`.
`x = 3;` `x = x + 1;`	The `x` variable is set to the value `3`. On the next line, the value of `x` is increased by `1`. `x` is now `4`.

The assignment operator is the `=` symbol. This is not a comparison. It is nothing more or less than the command to copy the value to the right of the *equals* sign into the *variable*, which is on the left. For a *comparison* operation, Java uses double equals: `==`.

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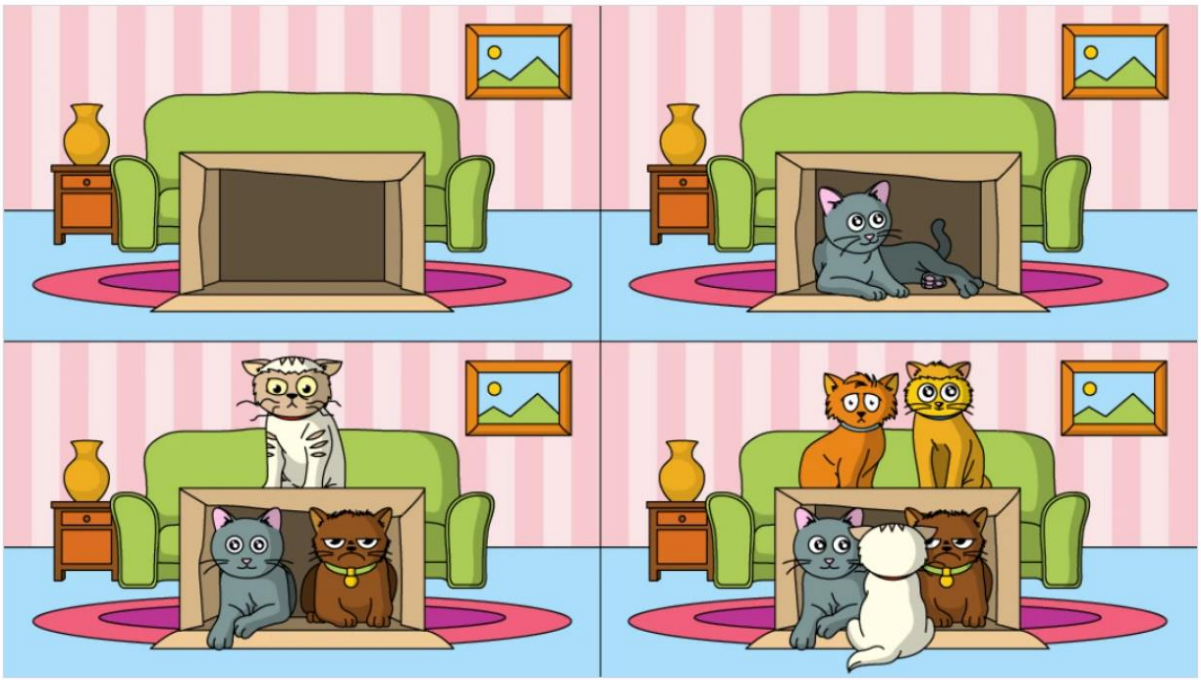
4. Cats and boxes



How to catch a cat:

1. Take an empty box.
2. Wait.

That's a joke 😳

Of course, you may be able to fit a dozen cats into a box, but only one *value* can be put into a *variable*. This is related to next task.