Model 1 Assignment

The following eight lines of code are executed one at a time, in order. The boxes on the right show the state of the (same) two variables after each step.

Declaring a variable instructs the computer to reserve space for it in memory:

```
1 int dollars;
2 int cents;
```

dollars [ ]

cents [ ]

Variables cannot be used until they are ***initialized*** (assigned for the first time):

```
3 dollars = 2;
4 System.out.println(dollars);  // OK
5 System.out.println(cents);    // error
```

dollars [2]

cents [ ]

Each time you assign a variable, you are ***updating*** its value stored in memory:

```
6 dollars = 3;
7 dollars = 4;
8 cents = 49;
```

dollars [4]

cents [49]

Questions (10 min) Start time:

1. How many times is each variable in Model 1 assigned?

The variable `dollars` is assigned three times, but `cents` is assigned only once.

2. What is the error in the second `System.out.println` statement? (Don't just repeat the text in Model 1; explain in your own words what the problem is.)

The variable `cents` is not initialized, so Java does not know what value to print.

3. What is the value of `dollars` right before it's assigned for the last time? What is the value of `cents` before it's assigned for the last time?

Just before the `dollars = 4;` statement, `dollars` is 3. And before the `cents = 49;` statement, `cents` is uninitialized.

4. Consider the statement: `cents = dollars;`

a) Compare this code to lines 6–8 in Model 1. What value do you think `cents` and `dollars` will have after running this statement?

The variable `cents` will be 4, and `dollars` will remain unchanged.

b) Which side of the equals sign (left or right) was assigned a new value?

The left side.

5. In Java, the + and - symbols are used to perform addition and subtraction. For example, the statement `dollars = dollars + 1;` adds one to the current value of `dollars`.

a) What is the value of `dollars` (in memory) after running this statement? 5

b) Do you consider the equals sign in Java an operation to be performed? (like +)
If so, explain the operation. If not, explain why not.

Yes; it executes the assignment operation which stores a value in memory.

c) Do you consider the equals sign in mathematics an operation to be performed?
If so, explain the operation. If not, explain why not.

No; it simply states the proposition that two values are equal.

6. In your own words, explain how you should read the = sign in Java. For example, the Java statement `x = a + b;` should be read out loud as "x _____ a plus b."

Answers may include "x *gets* a plus b", "x *becomes* a plus b", etc.