Getting Started with Java Using Alice

Use Variables

ORACLE® ACADEMY

Objectives

This lesson covers the following objectives:

- Understand variables and how they are used in programming

Variables

At times, programmers need to store information, and then use that information in animations or in games. For example:

- The number of times a procedure should be executed.
- An object's properties, such as size and color.

A variable is a place in memory where data of a specific type can be stored for later retrieval and use by your program. Each variable is given a unique name to make it easy to find and reference. Once a variable is declared it can be used to store and retrieve data.

Variables Example

Below are the variables and their values for a wolf instance.

Grey color		0.46 meter width

| 1.17 meter height		1.0 opacity
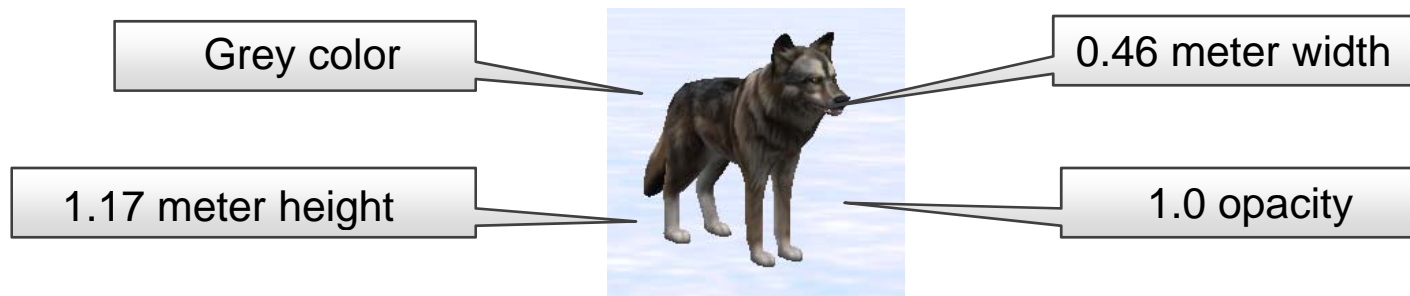
Variables for Data Storage

A variable is like a container that stores a specific type of data for later retrieval and use by your program. Declare a variable by naming it and selecting the type of data to store in it. Then, specify a default value for the variable.

Numbers (1, 0.254)

Boolean values (true or false)

TextString

("Hello World!")

List of objects
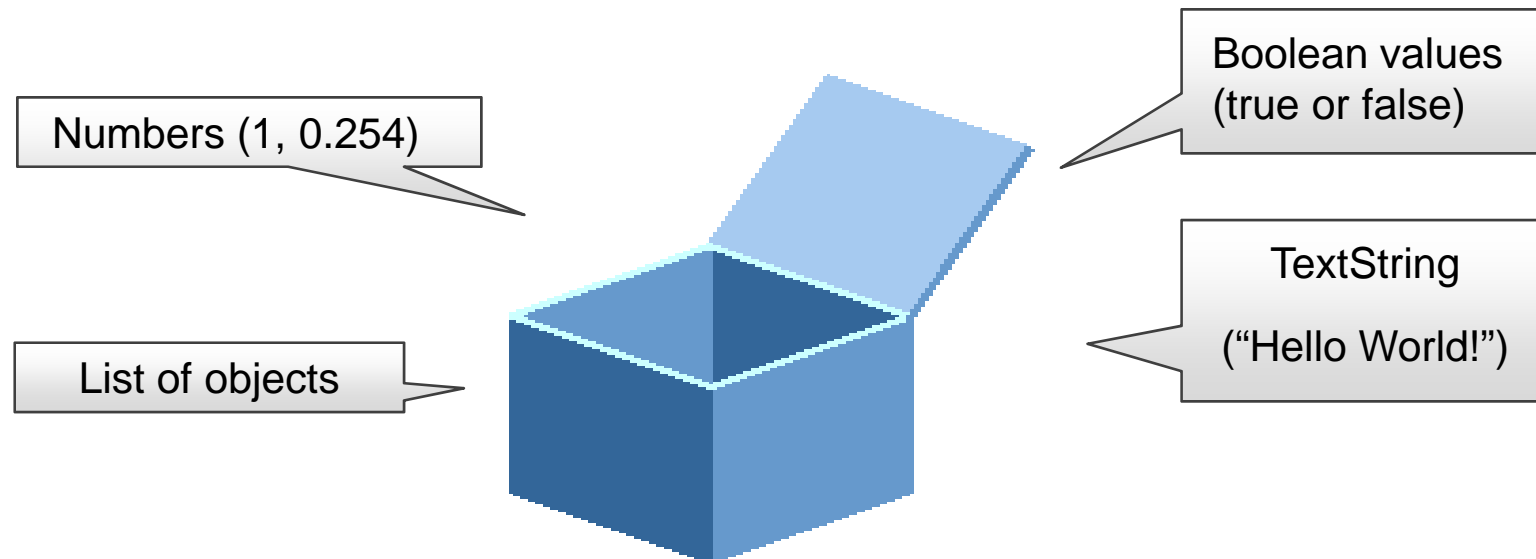
Object Properties

Object properties are variables that store information about the object, such as color, width, height, and depth.

Width Variable
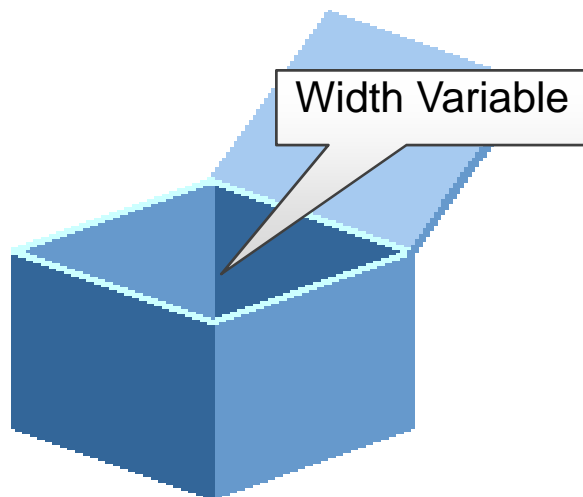
Variable Data Types in Alice 3

Data Type	Description
Decimal Number	• Perform arithmetic and set the value of a procedure's arguments. • Examples: 0.1, 2.25, 98.6.
Whole Number	• Perform arithmetic and set the value of a procedure's arguments. • Examples: 1, 459, 30.
Boolean	• One of two values: true or false. • Usually is the result of tests that compare one thing to another.
Classes	• The classes of objects that are available in your animation. • Examples: Biped, Scene, Quadruped.
TextString	• A String of characters such as "hello" and "goodbye".
Other	• Sounds, colors, shapes, and other special values.

Declaring Variables

To declare (or "create") a variable is to give a variable a name and to define the type of data the variable will contain. Variables are declared in the Code editor. They are useful because they allow you to:

- Assign the same value to multiple procedures, such as a distance to move.

- Simultaneously update the value of all arguments in a program that reference the variable.

- Pass information from one procedure to another.

- Simplify programming statements using many functions and math expressions.

Initializing Variables

To initialize a variable is to assign it a value. Variables are initialized in the Code editor at the same time that they are declared; this is its initial (first assigned) value.

- Variable values can be changed as often as you like.
- The word "initialize" means "assign a value to".

Variable Example

A "Spins" variable is declared and initialized to a whole number with an initial value of 3. This variable is dragged into the distance argument of each bunny's turn procedure. Each bunny spins three times. If the initialized value of "Spins" is changed to 4, all of the procedures will spin based on the value of the variable, which is now 4.

Steps to Declare a Variable

1. Drag the variable tile into the Code editor.

2. Select the value type and name the variable.

3. Initialize the variable (set the first value that the variable will hold) and click OK.

4. Note that the preview of the variable, above the thin line, displays the variable settings.
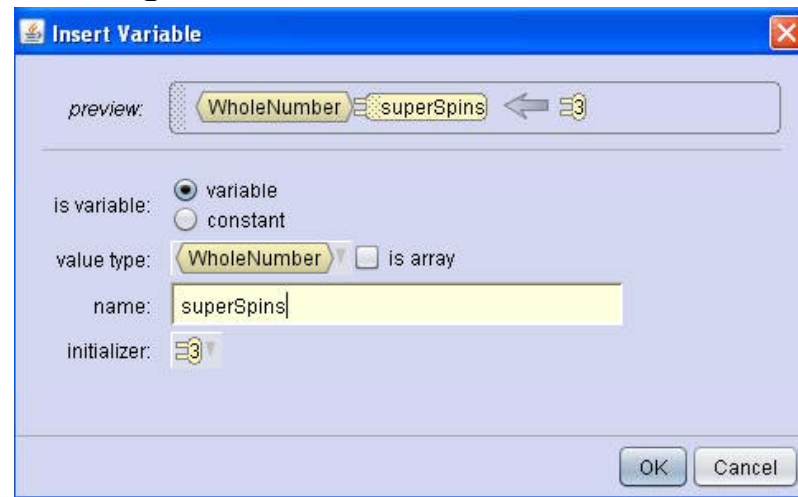
Changing Initialized Value

Remember, the initial value you specify for the variable can be considered a placeholder value, and changed at a later time.

Using Variables in Procedures

To use a variable that has been declared in a procedure, drag the variable tile onto the procedure's argument value. The argument is replaced with the variable's initialized value. Alice 3 helps you visualize the locations you can place a variable by darkening the screen and highlighting the values that can be replaced by the variable.
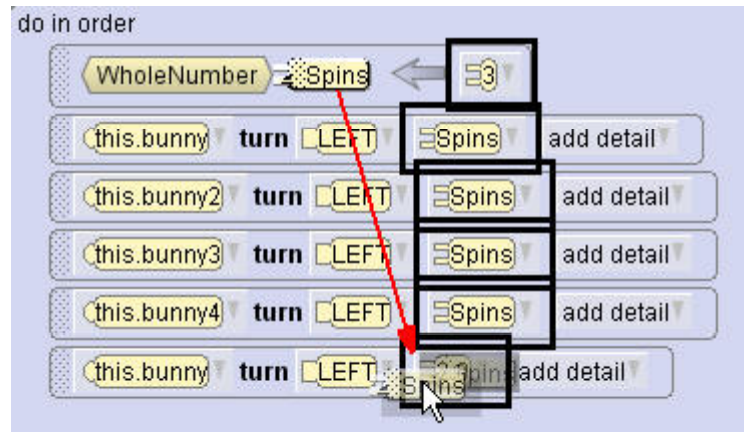
Using Variables in Procedures (cont.)

Be aware that a variable must be declared and initialized before it can be referenced by any other statement in your code. If you try to reference a variable before it exists, your program will encounter an error at run-time.

Caution: Alice highlights all arguments that might potentially reference the selected variable, including those arguments that precede the variable's existence.

Using Variables in Math Calculations

Note that variables can also be created and used in math calculations.

You can drag a declared variable onto any value within a math expression.

Changing an Initialized Value

You can change the initialized value of a variable using the drop-down list.

- The new value of all arguments using the variable will change when the initialized value is changed.

- If one of the default values listed on the drop-down is not what you need, use the CustomWholeNumber menu option to specify another value.

Changing an Initialized Value Display

You can change the initialized value of a variable using the drop-down list.
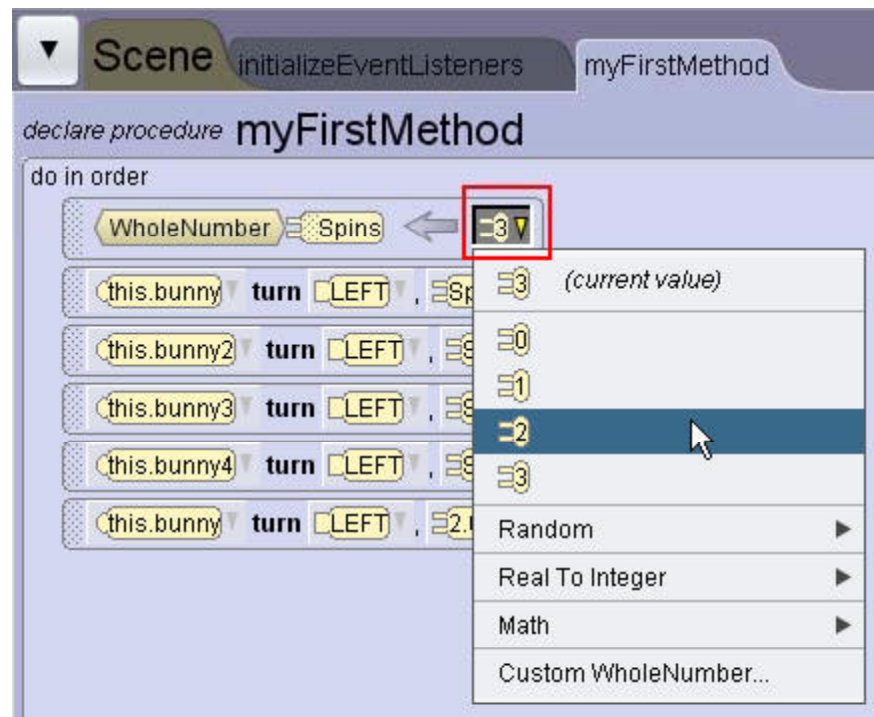
Steps to Randomize an Initialized Value

1. Click the down arrow next to the initialized value.

2. Select Random from the drop-down list.

3. Choose either the option to randomize using a predefined range or the option to randomize based on values you establish.

4. If you choose the option to randomize based on values you establish, select the starting and ending values for the range using the cascading menus.

Remember, argument values can always be changed. Randomization of variable values can add value to an animation or game by creating random behavior.

Randomize an Initialized Value Display

Below shows how to randomize an initialized value.

Summary

In this lesson, you should have learned how to:

- Understand variables and how they are used in programming