Chapter 2: Methods and Data

Programming with Alice and Java
First Edition

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Objectives

- Write methods to add potential behaviors to objects.
- Declare and set the value of variables.
- Use variables in expressions to calculate new results.
- Generate random numbers in a particular range.
- Design methods to accept parameters.

Methods

- Methods can be added to objects to define additional behaviors for those objects.
- Defining appropriate methods in objects allows you to organize code and create repeatable behaviors.

ready ok Method

- The ready ok method consists of several calls to the set pose method of an object to move a character smoothly into one of several preset poses.

right jump Method

- Custom methods allow you to extend the behavior of the object.
- It is important to break the animation into separate behaviors.

Variables

- A *variable* is a name that represents a value.
- Each variable corresponds to a spot in memory when the value is stored.
- An object's properties are managed using variables.
- Variables can be created inside a method.
- The variable must be declared, which defines the variable's name and type of data it will hold.
- Object properties are available to every method of the object.
- Variable declared in a method is *local* – available only in that method.

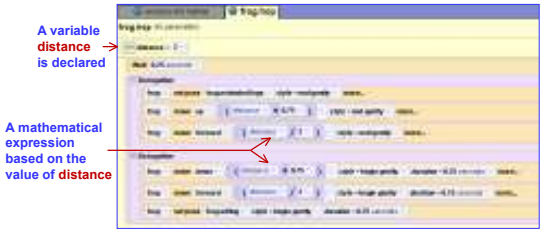
Data Types in Alice

- A variable can hold the following types of data:
  - a number, either an *integer* or *floating point*,
  - a *Boolean* (a true or false value),
  - a character string,
  - any other type of object
- A variable data type defines how much memory is needed to store that variable value.

Example: hop Method

A frog is hopping four times along a fence.

Example: hop Method (continue)



Random Numbers

- Generating random numbers allows objects to behave differently every time.
- Function random number generates a random number in a particular range.
- Function is a method that returns a value when it is called.
- The random number function accepts parameters that:
  - specify the range (minimum and maximum);
  - specify whether the result should be an integer or a floating point.

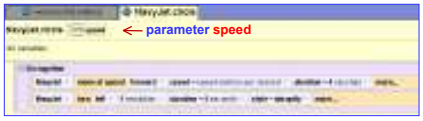
Applying Random Numbers

Parameters

- Methods accept one or more parameters.
- Parameters can be of any type, including objects.
- Appropriately chosen parameters can make the method more versatile – that is, useful in as many situations as possible.

Example: circle Method

Calling the circle method with varying speed



More Environment Features

- Default object names are provided.
- Objects can be renamed.
- Variables and parameters also can be objects and properties.
- It is possible to observe the position of the objects through four different world views – this option is called quad view.
- Objects can be duplicated, then their characteristics can be changed.

Summary

- Methods can be added to objects to define additional behaviors.
- Defining appropriate methods in objects lets us organize our code and allows behaviors to be repeated easily.
- Object properties can be used by any method of the object, a variable declared in a method can only be used in that method. Methods use *local* variables.
- Expressions use current values of variables to calculate new values.
- A function returns a value that can be used by the method that calls it.
- Writing methods so that they are based on the parameter values passed to them makes them more useful and versatile.