A computer program is …

Getting started

In your group, identify one MANAGER, RECORDER, REPORTER, and REFLECTOR as described below. If your group is only three people, identify only the first three.

MANAGER – Will keep the group on track. Will secure any needed material.
RECORDER – Will write down the answers to the questions on the worksheet.
REPORTER – Will report back to the class during discussion time.
REFLECTOR – Will record the exit pass information at the end of the session.

Manager – Get a stack of sticky notes for your team to use along with one piece of paper, one pen, and one pencil. Pick up one exit pass for your team.

Objectives

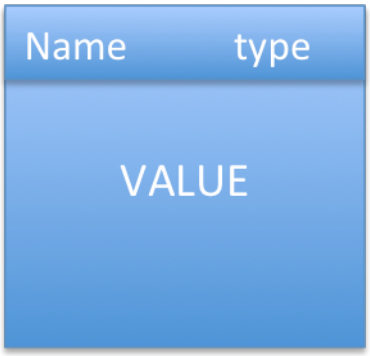
- Identify the role of variables in computer programs
- Identify which operations can change the value of variables in computer programs
- Describe the role of the declaration, assignment, and input/output operations in a computer program
- Identify the Java structures corresponding to the above operations

Model

Your group is going to simulate a small computer program today.

Sticky notes are "containers" used to store values. The table top is the computer memory.
The "input device" is the workshop leader. Request input when you need it.
The "output device" is a blank piece of paper. Write on it when you need to output.

Sticky notes can be variable containers or constant containers. Variables can be changed (in pencil). Constants cannot (in pen). See the sample container below.



The "computer" program, YardsToFeet

1. Create a variable container named numberOfYards that can hold integers.

2. Read the first number from the input device and store (write in pencil) the value in the container named numberOfYards.

3. Create a constant container named YARDS_TO_FEET that holds an integer.

4. Write the value 3 in pen in the container named YARDS_TO_FEET.

5. Create a variable container named numberOfFeet that can hold integers.

6. Write the value 0 into the container numberOfFeet.

7. Multiply the value found in numberOfYards to the value found in YARDS_TO_FEET and write the result IN PENCIL in the container labeled numberOfFeet.

8. Output the value found in the following containers (in the order specified) onto your output device:

    a. the container named numberOfYards
    b. the value " yards is equal to "
    c. the container named numberOfFeet
    d. the value " feet."

Reviewing the model

"Execute" the computer program above by carrying out the steps.

1. What was output to your output device?

Exploring the model – converting to Java

The following java statements correspond to steps in the model. Identify which statement matches the following java statements.

2. Declaration statements

_____ int numberOfYards;

_____ final int YARDS_TO_FEET;

_____ int numberOfFeet;

3. Assignment statements

_____ YARDS_TO_FEET = 3;

_____ numberOfFeet = 0;

4. Input statement

_____ numberOfYards = input.nextInt(); (some details have been hidden in this model)

5. Calculation and assignment

_____ numberOfFeet = numberOfYards * YARDS_TO_FEET;

6. Output statement

_____ System.out.println(numberOfYards + " yards is equal to " + numberOfFeet + " feet.");

7. In your own words, what is the role of a declaration statement?

8. In your own words, what is the role of the assignment statement?

9. Do you think that the assignment statement YARDS_TO_FEET = 7 would be allowed after the statement YARDS_TO_FEET = 3? Why or why not?

10. Do you think that the assignment statement numberOfFeet = 22 would be allowed after the input statement from item 2 in the model? Why or why not?

Extending the model

1. Write an output statement that would print out the statement: "Good, we're done!"