Name Jordan Wright\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_E03 LAB

**Names and Places**

The goal in this exercise is to develop a program that will print out a list of student names together with other information for each. The *tab character* (an escape sequence) is helpful in getting the list to line up nicely. A program with only two names is in the file *Names.java*.

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// Names.java

// Prints a list of student names with their hometowns

// and intended major

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

public class Names

{

// ------------------------

// main prints the list

// ------------------------

public static void main (String[] args)

{

System.out.println ();

System.out.println ("\tName\t\tHometown");

System.out.println ("\t====\t\t========");

System.out.println ("\tSally\t\tRoanoke");

System.out.println ("\tAlexander\tWashington");

}

}

1. Save *Names.java* to your directory. Compile and run it to see how it works.
2. Modify the program so that your name and hometown and the name and hometown of at least two classmates sitting near you in lab also are printed. Save, compile and run the program. Make sure the columns line up.
3. Modify the program to add a third column with the intended major of each person (assume Sally's major is Computer Science and Alexander's major is Math). Be sure to add a label at the top of the third column and be sure everything is lined up (use tab characters!).

**A Table of Student Grades**

Write a Java program that prints a table with a list of at least five students together with their grades earned (lab points, bonus points, and the total) in the format below.

///////////////////\\\\\\\\\\\\\\\\\\\

== Student Points ==

\\\\\\\\\\\\\\\\\\\///////////////////

Name Lab Bonus Total

---- --- ----- -----

Joe 43 7 50

William 50 8 58

Mary Sue 39 10 49

The requirements for the program are as follows:

1. Print the border on the top as illustrated (using the slash and backslash characters).

2. Use tab characters to get your columns aligned and you MUST use the + operator both for addition and string concatenation. (Joe’s total score of 50 should not be hardcoded.)

3. Make up your own student names and points—the ones shown are just for illustration purposes. You need five names.

**Two Meanings of Plus**

In Java, the symbol + can be used to add numbers or to concatenate strings. This exercise illustrates both uses.

When using a string literal (a sequence of characters enclosed in double quotation marks) in Java the complete string must fit on one line. The following is NOT legal (it would result in a compile-time error).

System.out.println ("It is NOT okay to go to the next line

in a LONG string!!!");

The solution is to break the long string up into two shorter strings that are joined using the *concatenation* operator (which is the + symbol). This is discussed in Section 2.1 in the text. So the following would be legal:

System.out.println ("It is OKAY to break a long string into " +

"parts and join them with a + symbol.");

So, when working with strings the + symbol means to concatenate the strings (join them). BUT, when working with numbers the + means what it has always meant—add!

1. Open Dr. Java and program the following code.

**When finished, what do you notice about the different outputs using the + sign?**

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// PlusTestOne.java

//

// Demonstrate the different behaviors of the + operator

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

public class PlusTestOne

{

// -------------------------------------------------

// main prints some expressions using the + operator

// -------------------------------------------------

public static void main (String[] args)

{

String str;

str = “Roswell “ + “Rocks!”; // be sure to fix “” marks in Dr. Java

System.out.print(str);

str = “Countdown: “ + 5 + 4 + 3 + 2 + 1 + 0;

System.out.print(str);

str = 1 + 2 + 3 + “Go!”;

System.out.print(str);

}

}

2. **Observing the Behavior of +** To see the behavior of + in different settings do the following:

a. Study the program below, which is in file *PlusTest.java.*

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// PlusTestTwo.java

//

// Demonstrate the different behaviors of the + operator

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

public class PlusTestTwo

{

// -------------------------------------------------

// main prints some more expressions using the + operator

// -------------------------------------------------

public static void main (String[] args)

{

System.out.println ("This is a long string that is the " +

"concatenation of two shorter strings.");

System.out.println ("The first computer was invented about" + 55 +

"years ago.");

System.out.println ("8 plus 5 is " + 8 + 5);

System.out.println ("8 plus 5 is " + (8 + 5));

System.out.println (8 + 5 + " equals 8 plus 5.");

}

}

b. Save *PlusTest.java* to your directory.

c. Compile and run the program. For each of the last three output statements (the ones dealing with 8 plus 5) write down what was printed. Now for eachm, explain why the computer printed what it did given that the following rules are used for +. Write out complete explanations.

* If both operands are numbers + is treated as ordinary addition. (NOTE: in the expression a + b the a and b are called the operands.)
* If at least one operand is a string the other operand is converted to a string and + is the concatenation operator.
* If an expression contains more than one operation expressions inside parentheses are evaluated first. If there are no parentheses the expression is evaluated left to right.

13

85

d. The statement about when the computer was invented is too scrunched up. How should that be fixed?

Add ()

2. **Writing Your Own Program With +**

Now write a complete Java program that prints out the following sentence:

Ten robins plus 13 canaries is 23 birds.

Your program must use only one statement that invokes the *println* method. It MUST use the + operator both to do arithmetic and string concatenation.