

APS 105 – Computer Fundamentals

Lab #2: Simple Java Programs

Fall 1999

(To be completed in your lab period, week of September 20)

Objective

In this lab you will be writing some simple programs in order to get a feel for the language and to become more familiar with the JDK. These programs, using variables, arithmetic operators, and predefined methods, will perform input, calculate results using the input, and output these results. In the lectures, as well as in the textbook, several examples of simple Java programs were presented and discussed. Using these examples as a basis, you are to write four simple Java programs from scratch. These programs will be compiled and executed in the same manner as Hello.java was in lab #1.

1 Basic Output

The first program you are to write will print your name and home address on several lines. Your name will occur on the first line, with your street address on the second line, the city on the third line, the province (state or county) on the fourth line and the country on the fifth line. The following example illustrates the format you should use.

```
skule.ecf% java Address
John Doe
123 College Street West
Toronto
Ontario
Canada
```

2 Text Patterns

For the second program, create a copy of the source code (the .java file) for the program you just wrote, and modify it so that it surrounds your name and address in a box made of asterisks (* symbols). Do not modify the original program since you need to be able to demonstrate it to the marker. When executed, your output should look something like the example on the next page. Note that the asterisks must be correctly aligned vertically on the two sides of the box.

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```
skule.ecf% java Square
*****
*
* John Doe
*
* 123 College Street West *
* Toronto
* Ontario
* Canada
*
*****
```

3 Basic Floating Point Calculations

For the next two programs, you will need to use the StdIn class, which can be found in:

```
/share/copy/aps105/StdIn.java
```

You must copy this file to the directory where you are currently working before compiling your program.

In the third program, you are to have the user input a floating point number, of type double in Java, and then to emit some properties of this number. Specifically, for an input value of x , you are to output, one item per line:

1. $\frac{1}{x}$
2. \sqrt{x}
3. x^2
4. x^{100}
5. $\sin x$
6. $\cos x$

Assume that numbers to be input are all within the range that can be stored by a variable of type double.

4 Making Change

The fourth program calculates the coinage required to make up a specific monetary value. It will accept as input two integer values, one for dollars and the other for cents, and will print as output the number of Tonies (\$2 coins), Loonies (\$1 coins), Quarters (25 cent coins), Dimes (10 cent coins), Nickels (5 cent coins), and Pennies (1 cent coins) where the sum of the coins is the value input. You must use as many of each type of coin as you can, starting with the largest denomination coin possible.

You do not need to worry about changing the coin name so that English grammar of the output is correct in the case of a single coin. That is, it is acceptable to have 1 Loonie instead of the more grammatically correct 1 Loonie. You can also assume that users will enter numbers which are within the correct range (i.e., cent values between 0 and 99). The following example illustrates the format required for the output.

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```
skule.ecf% java Coins
How many dollars? 5
How many cents? 99

You will need 2 Toonies
You will need 1 Loonies
You will need 3 Quarters
You will need 2 Dimes
You will need 0 Nickels
You will need 4 Pennies
```

Hint: Use modulo arithmetic on **integers** to determine the number of each coin that you will need.

After you have all four programs working, you are ready to have your lab marked. Ensure that each program works correctly by testing it on a full range of input prior to marking.