

Lab 2

Algorithms and Program Structure

The following exercises are to be completed during lab class. If you do not have time to finish during lab, they must be completed before the beginning of the following lab session.

Set-Up

- Create a new project in your Eclipse workspace named: **Lab02**
- In the *src* folder, create a package named: **edu.ilstu**

Group Work

Work in small groups to write the algorithms to solve the following problems. Once the algorithm is written, walk through it to test it for correctness. Type your answers in a Word document labeled with the name of everyone in the group.

Problem 1

Given a bag of cards with numbers on them, find the card in the bag that has the largest number on it. You cannot dump the bag on the table and lay out all of the cards. You must get one card out of the bag at a time and can only look at the numbers of two cards at any one time. When done with a number, put it aside. Do not put it back in the bag. You cannot look at the discard pile again once a card is put in it.

Problem 2

Write the algorithm that determines the change to be dispensed from a vending machine. An item in the machine can cost between 25 cents and a dollar, in 5-cent increments (25, 30, 35, . . . 90, 95, or 100), and the machine accepts only a single dollar bill to pay for the item. For example, a possible dialogue with the user might be:

```
Enter price of item
(from 25 cents to a dollar, in 5-cent increments): 45
```

```
You bought an item for 45 cents and gave me a dollar,
so your change is
2 quarters,
0 dimes, and
1 nickel.
```

Individual Work

Problem 3

- Create a new Java class named **FirstClass**.
- Complete the comment blocks as required for every program. In the comment block for the class, write "A first program rearranging statements."
- Type in your answer to pre-lab question 1. (**Remember: *your* name** should be replaced with your actual name.) Run the program and make any needed corrections. Be sure the output matches the Expected Output.

Problem 4

- Create a new Java class called **DistanceCalculator**. In this class, convert the following algorithm to Java code:

Store 20 in the *speed* variable.

Store 10 in the *time* variable.

Multiply speed by time and store the result in a variable called *distance*

Display the contents of the variable *distance*.

- Be sure to include the appropriate comment blocks.

To Be Submitted

The following files should be zipped together into a file called Lab02.zip and submitted to ReggieNet by the beginning of your next lab.

- Algorithms
 - Type in Word
 - Include everyone's name in the group on the paper.
 - Email the document to the other members of the group.
 - Each person should submit the same word document.
- FirstClass.java
- DistanceCalculator.java