CST8132 Lab8 Access Array Exercise

Warmup Exercises

A number of practice questions to help you prepare for doing this lab are provided in the file "Lab7_warmup_exercises.pdf

Due Date and Demonstration

This Lab Exercise is worth 10 marks, and must be demonstrated to your lab instructor. See Blackboard for the due date. **Do not forget to do the Follow-Up Question and Activity!**

The problem of this Lab Exercise is divided into six parts:
1. Lab Objectives
2. Description of the Problem
3. Required Output
4. Provided source code
5. Instructions
6. Problem-Solving Tips
7. Follow-Up Question and Activity

The program template represents a complete working Java program with one or more key lines of code replaced with comments. Read the problem description and examine the sample output, then study the template code. Using the problem-solving tips as a guide, replace the `/* */` comments with Java code. Compile and execute the program. Compare your output with the sample output provided. Then answer the follow-up question. The source code for the template is provided for you.

Lab Objectives

This lab was designed to reinforce programming concepts from Chapter 11 (Exception Handling: A Deeper Look) of *Java How to Program: 10/e*. In this lab, you will practice:

- Using exception handling to determine valid inputs.
- Using exception handling to write more robust and more fault-tolerant programs.

The follow-up activity also will give you practice:

- Creating your own exception type and throwing exceptions of that type.

Description of the Problem

Write a program that allows a user to input integer values into a 10-element array and search the array. The program should allow the user to retrieve values from the array by index or by specifying a value to locate. The program should handle any exceptions that might arise when inputting values or accessing array elements. The program should throw a `NumberNotFoundException` if a particular value cannot be found in the array during a search. If an attempt is made to access an element outside the array bounds, catch the `ArrayIndexOutOfBoundsException` and display an appropriate error message.

Required Output

```
==>sending array test1
Invalid number
==>sending array test2
Array out of bounds
==>sending array test3
```

```
==>index for: aaa
Invalid number
==>index for: 12
Number not found
==>index for: 4
4, index: 3
==>value for: aaa
Invalid number
==>value for: -1
Array out of bounds
==>value for: 5
index 5:6
```

Provided source Code

The following java code is provided in lab7.zip

- ArrayAccessIf.java
- ArrayAccessTest.java
- NumberNotFoundException.java

Instructions

The following is the recommended steps for this assignment:

- Create a package called "lab7", and copy all the files from lab7.zip.
- Create ArrayAccess class that implements ArrayAccessIf.
- Implement the methods in ArrayAccess as described in ArrayAccessIf.
- Implement printing messages as per "Required Output".
- If you are printing in try block, use "System.out" stream.
- If you are printing in catch block, ensure you use "System.err" stream.
- Run the provided ArrayAccessTest.java – and compare with required result.

Problem-Solving Tips

1. When you search the array for a value, you should define a `boolean` value at the beginning of the `try` block and initialize it to `false`. If the value is found in the array, set the `boolean` value to `true`. This will help you determine whether you need to `throw` an exception due to a search key that is not found.
4. If you have any questions as you proceed, ask your lab instructor for assistance.

Follow-Up Activity

1. Create a copy of your project (highlight the project in Eclipse and ctrl-C ctrl-V), and in the copy, create another exception class called `DuplicateValueException` that will be thrown if the user inputs a value that already resides in the array. Modify the copy your lab exercise solution to use this new exception class to indicate when a duplicate value is input, in which case an appropriate error message should be printed. During your demonstration, your lab instructor may ask to see either the original solution, or the modified copy.