Chapter 12 Exception Handling and Text I/O

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Program # 1 (Exercise 12.3 p.488 ArrayIndexOutOfBoundsException)

Write a program that meets the following requirements:
- Creates an array with 100 randomly chosen integers.
- Prompts the user to enter the index of the array, then displays the corresponding element value. If the specified index is out of bounds, display the message Out of Bounds.

Program # 2 (Exercise 12.5 p.488 IllegalTriangleException)

Programming Exercise 11.1 defined the Triangle class with three sides. In a triangle, the sum of any two sides is greater than the other side. The Triangle class must adhere to this rule. Create the IllegalTriangleException class, and modify the constructor of the Triangle class to throw an IllegalTriangleException object if a triangle is created with sides that violate the rule, as follows:

```
/** Construct a triangle with the specified sides */
public Triangle(double side1, double side2, double side3)
  throws IllegalTriangleException {
  // Implement it
}
```

Program # 3 (Exercise 12.24 p.491 Create large dataset)

Create a data file with 1,000 lines. Each line in the file consists of a faculty member's first name, last name, rank, and salary. The faculty member's first name and last name for the ith line are FirstNamei and LastNamei. The rank is randomly generated as assistant, associate, and full. The salary is randomly generated as a number with two digits after the decimal point. The salary for an assistant professor should be in the range from 50,000 to 80,000, for associate professor from 60,000 to 110,000, and for full professor from 75,000 to 130,000. Save the file in Salary.txt. Here are some sample data:

```
FirstName1 LastName1 assistant 60055.95
FirstName2 LastName2 associate 81112.45
. . .
FirstName1000 LastName1000 full 92255.21
```

Program # 4 (Exercise 12.25 p.491 Process large dataset)

A university posts its employees' salaries in a file named Salary.txt. Each line in the file consists of a faculty member's first name, last name, rank, and salary (see Programming Exercise 12.24). Write a program to display the total salary for assistant professors, associate professors, full professors, and all faculty, respectively, and display the average salary for assistant professors, associate professors, full professors, and all faculty, respectively.

```
Total salary for assistant professor is 22,721,191.80
Total salary for associate professor is 24,865,800.52
Total salary for full professor is 36,546,827.98
Total salary for all professors is 84,133,820.30
Average salary for assistant professor is 65,103.70
Average salary for associate professor is 84,290.85
Average salary for full professor is 102,659.63
Average salary for all professors is 84,133.82
```