Assignment (Part 6)
Arrays and ArraysLists

68. **(Sales Commissions)** Use a one-dimensional array to solve the following problem: A company pays its salespeople on a commission basis. The salespeople receive $200 per week plus 9% of their gross sales for that week. For example, a salesperson who grosses $5000 in sales in a week receives $200 plus 9% of $5000, or a total of $650. Write an application (using an array of counters) that determines how many of the salespeople earned salaries in each of the following ranges (assume that each salesperson's salary is truncated to an integer amount):

(a) $200–299
(b) $300–399
(c) $400–499
(d) $500–599
(e) $600–699
(f) $700–799
(g) $800–899
(h) $900–999
(i) $1000 and over

Summarize the results in tabular format.

69. **(Duplicate Elimination)** Use a one-dimensional array to solve the following problem:
Write an application that inputs five numbers, each between 10 and 100, inclusive. As each number is read, display it only if it's not a duplicate of a number already read. Provide for the "worst case," in which all five numbers are different. Use the smallest possible array to solve this problem. Display the complete set of unique values input after the user enters each new value.

70. **(Variable-Length Argument List)** Write an application that calculates the product of a series of integers that are passed to method `product` using a variable-length argument list. Test your method with several calls, each with a different number of arguments.

71. **(Test Score)** Write a program that reads a file consisting of students' test scores in the range 0-200. It should then determine the number of students having score in each of the following ranges: `0-24, 25-49, 50-74, 75-99, 100-124, 125-149, 150-174, and 175-200.` Output the score ranges and the number of students.

Run your program with the following data:
```
76, 89, 150, 135, 200, 76, 12, 100, 150, 28, 178, 189, 167, 200, 175,
150, 87, 99, 129, 149, 176, 200, 87, 35, 157, 189
```

72. **(Highest and Lowest Temperatures)** Write a program that uses a two-dimensional array to store the highest and lowest temperatures for each month of the year. The program should output the average high, average low, and the highest and lowest temperatures for the year. Your program must consist of the following method:

(a) `getData`: method to reads and stores data in the two-dimensional array
(b) `averageHigh`: method to calculates and returns the average high temperature for the year
(c) `averageLow`: method to calculates and returns the average low temperature for the year
(d) `indexHighTemp`: method to returns the index of the highest high temperature in the array
(e) `indexLowTemp`: method to returns the index of the lowest low temperature in the array

73. **(Total Sales)** Use a two-dimensional array to solve the following problem: A company has four salespeople (1 to 4) who sell five different products (1 to 5). Once a day, each salesperson passes in a slip for each type of product sold. Each slip contains the following:

(a) The salesperson number
(b) The product number
(c) The total dollar value of that product sold that day

Thus, each salesperson passes in between 0 and 5 sales slips per day. Assume that the information from all the slips for last month is available. Write an application that will read all this information for last month's sales and summarize the total sales by salesperson and by product. All totals should be stored in the two-dimensional array sales. After processing all the information for last month, display the results in tabular format, with each column representing a salesperson and each row representing a particular product. Cross-total each row to get the total sales of each product for last month. Cross-total each column to get the total sales by salesperson for last month. Your output should include these cross-totals to the right of the totaled rows and to the bottom of the totaled columns.

74. **(Uppercase Program)** Write a program that prompts the user to input a string and outputs the string in uppercase letters. *(Hint: use a character array to store the string)*

75. **(Calculate Votes)** Write a program that allows the user to enter the last names of five candidates in a local election and the number of votes received by each candidate. The program should then output each candidate's name, the number of votes received, and the percentage of the local votes received by the candidate. Your program should also output the winner of the election. A sample output is:

```
Candidate           Votes Received            % of Total Votes
Johnson             5000                            25.91
Miller              4000                            20.73
Duffy               6000                            31.09
Robinson            2500                            12.95
Ashtony             1800                             9.33
Total               19300

The Winner of the Election is Duffy
```

76. **(Airline Reservations System)** A small airline has just purchased a computer for its new automated reservations system. You've been asked to develop the new system. You're to write an application to assign seats on each flight of the airline's only plane (capacity: 10 seats). Your application should display the following alternatives: `Please type 1 for First Class` and `Please type 2 for Economy`. If the user types `1`, your application should assign a seat in the firstclass section (seats 1–5). If the user types `2`, your application should assign a seat in the economy section (seats 6–10). Your application should then display a boarding pass indicating the person's seat number and whether it's in the first-class or economy section of the plane.

Use a one-dimensional array of primitive type `boolean` to represent the seating chart of the plane. Initialize all the elements of the array to `false` to indicate that all the seats are empty. As each seat is assigned, set the corresponding element of the array to `true` to indicate that the seat is no longer available.

Your application should never assign a seat that has already been assigned. When the economy section is full, your application should ask the person if it's acceptable to be placed in the first-class section (and vice versa). If yes, make the appropriate seat assignment. If no, display the message `"Next flight leaves in 3 hours."`

77. **(Sets of Positive Numbers)** Write a program that reads in a set of positive integers and outputs how many times a particular number appears in the list. You may assume that the data set has at most `100` numbers and `-999` marks the end of the input data. The numbers must be output in increasing order. For example, for the data:

```
15   40   28   62   95   15   28   13   62   65   48   95   65   62   65
95   95
```

The output is:

```
Number       Count
13           1
15           2
28           2
40           1
48           1
62           3
65           3
95           4
```

78. **(Array I)** Write a Java program that declares an array `alpha` of 50 components of type `double`. Initialize the array so that the first 25 components are equal to the square of the index variable, and the last 25 components are equal to three times the index variable. Output the array so that 10 elements per line are printed.

79. **(Array II)** Write a Java method, `smallestIndex`, that takes as parameters an `int` array and its size, and returns the index, of the first occurrence, of the smallest element in the array. Also, write a program to test the method.

80. **(Array III)** Write a Java method, `lastLargestIndex`, that takes as parameters an `int` array and its size, and returns the index, of the last occurrence, of the largest element in the array. Also, write a program to test the method.