Unit 2 Programming Problems Worksheet

Programming Problem 1 – Girl Scout Cookie Sales

A troop of Girl Scouts is selling boxes of cookies. The leader of the Girl Scout troop wants to know how many girl scouts sold boxes of cookies in the following ranges:

a. 0 to 10 boxes

b. 11 to 20 boxes

c. 21 to 30 boxes

d. 31 to 40 boxes

e. 41 or more boxes

The program should use an array of counters to keep track of the number of Girl Scouts selling boxes of cookies in each of these ranges. The number of boxes sold for each Girl Scout will be entered at the keyboard. The total number of girls in the troop selling cookies will also be entered at the keyboard. After the total boxes for each girl in the troop has been entered, the resulting statistics for the number of boxes should be printed out to the console in the following format:

TOTAL BOXES	NUMBER OF GIRL SCOUTS
0 to 10	13
11 to 20	8
21 to 30	5
31 to 40	1
41 or more	1

Note that these values are just for formatting purposes. Your program needs to work for any number of girls in the troop and any number of boxes of cookies sold.

Directions:

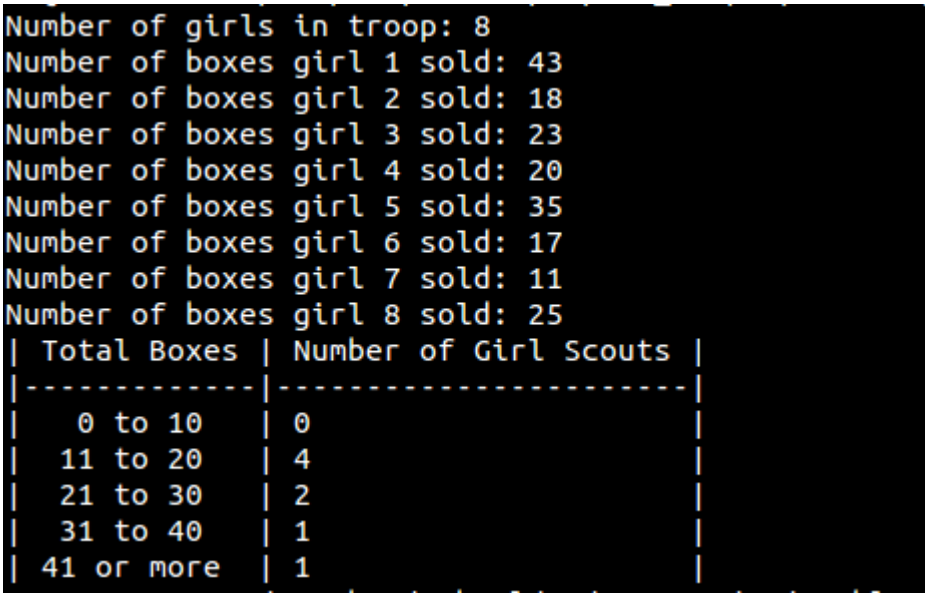
- Create a main method that will solve the previous problem statement.
- You may only use statements that are discussed in the book through Chapter 6.
- You must not use any Array class or Array method included in the Java libraries to solve this problem.
- Use the following input values for the final test of this program:
    - Total number of girls in the troop 8

- Boxes of cookies for girl #1 43
- Boxes of cookies for girl #2 18
- Boxes of cookies for girl #3 23
- Boxes of cookies for girl #4 20
- Boxes of cookies for girl #5 35
- Boxes of cookies for girl #6 17
- Boxes of cookies for girl #7 11
- Boxes of cookies for girl #8 25

Grading Rubric

Task	Points
Creation and initialization of the array	2
Console input valid number of Girl Scouts selling cookies	2
Console input of valid number of boxes of cookies for each Girl Scout	2
Increment of array values for appropriate ranges of boxes of cookies	2
Console output of results	2
Total	**10**

Screenshots



Programming Problem 2 - Diving

In the sport of diving, seven judges award a score between 0 and 10, where each score may be a floating-point value. The highest and lowest scores are thrown out and the remaining scores are added together. The sum is then multiplied by the degree of difficulty for that dive. The degree of difficulty ranges from 1.2 to 3.8 points. The total is then multiplied by 0.6 to determine the diver's score. Write a computer program that will ultimately determine the diver's score. This program must include the following methods:

- A method name inputValidScore that inputs one valid score for one judge for one diver. This method will return the valid score.
- A method named inputAllScores that creates an array to store the scores for all judges for the diver. This method will fill the array with a valid score from each judge. This method does not take input arguments, but it does return the array of scores.
- A method named inputValidDegreeOfDifficulty that inputs a valid degree of difficulty for the dive. The valid degree of difficulty will be returned from the method.
- A method named calculateScore that will calculate the score for the diver based on the scores from all judges and the degree of difficulty. The score will be returned from the method.
- A main method that uses the previous methods to determine the score for the diver and then prints out the score to the console.

Directions

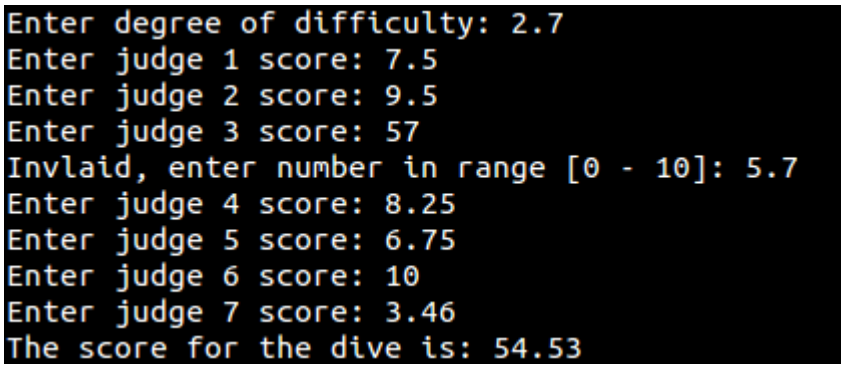
- You may only use statements that are discussed in the book through Chapter 6.

- You must not use any Array class or Array method included in the Java libraries to solve this problem.
- Console input and output must be used to solve this problem.
- Use the following input values for the final test of this program:
    - Degree of difficulty 2.7
    - Judge #1 score 7.5
    - Judge #2 score 9.5
    - Judge #3 score 5.7
    - Judge #4 score 8.25
    - Judge #5 score 6.72
    - Judge #6 score 10.0
    - Judge #7 score 3.46

Grading Rubric

Task	Points
inputAllScores method – create and return array	3
inputValidScore method	2
inputValidDegreeOfDifficulty method	2
calculateScore method	3
main method	3
Console output	2
Total	**15**

Screenshots



Programming Problem 3 - Temperatures

Write a program that uses a two dimensional array to store the highest and lowest temperatures for each month of the calendar year. The temperatures will be entered at the keyboard. This program must output the average high, average low, and highest and lowest temperatures of the year. The results will be printed on the console. The program must include the following methods:

- A method named inputTempForMonth whose purpose is to input a high and a low temperature for a specific month. The month and the array of temperatures will both be passed as input arguments to the method. The method will not have a return value.

- A method named inputTempForYear whose purpose is to input a high and a low temperature for every month of the year. There are no input arguments for this method, but the method does return a completed multidimensional array of temperatures for the year.

- A method named calculateAverageHigh whose purpose is to calculate the average high temperature for the year. This method will take the array of temperatures as input and will return the average high temperature for the year.

- A method named calculateAverageLow whose purpose is to calculate the average low temperature for the year. This method will take the array of temperatures as input and will return the average low temperature for the year.

- A method named findHighestTemp whose purpose is to return the index value of the highest temperature for the year. If the highest temperature of the year occurs more than once in the year, then the method should return the index of the first month that had the temperature. The method will take the array of temperatures as an input argument and return the index of the highest temperature.

- A method named findLowestTemp whose purpose is to return the index value of the lowest temperature for the year. If the lowest temperature of the year occurs more than once in the year, then the method should return the index of the first month that had

the temperature. The method will take the array of temperatures as an input argument and return the index of the lowest temperature.

- A main method that uses the previous methods to determine the average high temperature, average low temperature, and highest and lowest temperatures for the year. The main method must print out these average temperatures as well as the month and temperature for the highest and lowest temperatures for the year.

Directions

- You may only use statements that are discussed in the book through Chapter 7.
- You must not use an ArrayList class from Java libraries to solve this problem.
- Console input and output must be used to solve this problem.
- Use the following input values for the final test of this program:
    - January has a High of 40 and Low of -10
    - February has a High of 55 and Low of 25
    - March has a High of 60 and Low of 40
    - April has a High of 88 and Low of 20
    - May has a High of 72 and Low of 55
    - June has a High of 95 and Low of 80
    - July has a High of 97 and Low of 87
    - August has a High of 110 and Low of 98
    - September has a High of 79 and Low of 68
    - October has a High of 31 and Low of 30
    - November has a High of 58 and Low of -25
    - December has a High of 32and Low of -20

Grading Rubric

Task	Points
inputTempForMonth method	2
input TempForYear method	2
calculateAverageHigh method	2
calculateAverageLow method	2
findHighestTemp method	2
findLowestTemp method	2

Main method		2
Console output		1
	Total	**15**

Screenshots