

CSCI 2170 OLA 4

This lab practices one dimensional array, as well as search and sort on 1D array. Write a C++ program named “boxes.cpp” for this lab.

An organization that your little cousin belongs to is selling low-fat cookies. If your cousin's class sells more cookies than any other class, the teacher has promised to take the whole class on a picnic. Of course, your cousins volunteered you to keep track of all the sales and determine the winner.

Each class has an identification name, for example Dragon or Panda. Each sales slip has the class identification name and the number of boxes sold. Here is a sample of the data:

Class Name	Boxes Sold
Dragon	23
Panda	8
Tiger	13
Tiger	7
Dragon	5
Panda	6
Peacock	18
...	...

← this is the first line of the data file

Create two 1D arrays: one array named “**classNames**” to hold the identification names; and the other array named “**boxes**” to record the number of boxes sold. These two arrays are parallel arrays: the i^{th} element in the “**classNames**” array stores the class name whose total number of boxes sold is stored in the i^{th} element in the “**boxes**” array.

Here is how to process the data file and add up the total number of boxes sold for each class: the first time a class name is read, store it in the next available element in the “**classNames**” array, and initialize the corresponding element in the “**boxes**” array by the number of boxes sold on that sales slip. Each subsequent time that class name is encountered, add the number of boxes sold to the corresponding array element in “**boxes**” array.

With the data shown above, the two arrays would look like this once processed:

classNames:

Dragon	Panda	Tiger	Peacock					
--------	-------	-------	---------	--	--	--	--	--

boxes:

28	14	20	18					
----	----	----	----	--	--	--	--	--

After all the sales slips are processed, scan the “**boxes**” array to look for the largest value. The class name in the corresponding element in the “**classNames**” array is the name of the class that wins.

Your program should output in a table format the number of boxes sold by each class, and output a message showing the winning class name.

Implementation requirements: your program should have at least the following 3 user defined functions:

- **ReadData:** reads the sales information from **boxes.dat**, and performs the appropriate accumulations of boxes sold
 - **Input :** the input file stream, the empty array “**classNames**” and the empty array “**boxes**”
 - **Output:** the filled array “**classNames**”, the filled array “**boxes**”, the number of distinct classes processed

- **FindWinner:** scans the total number of boxes sold by each class, and finds the class that sold the most boxes
 - **Input:** the filled array “classNames”, the filled array “boxes”, the number of distinct classes processed
 - **Output:** The winning class name
- **DisplayResults:** prints the number of boxes sold by all the classes in table format and displays a message showing which class wins
 - **Input:** the filled array “classNames”, the filled array “boxes”, the number of distinct classes processed
 - **Output:** none

Write your program and run it using data file **boxes.dat**. Download the data file into your project folder.

Here is an example output of the program:

The final results are:

<i>Eagle</i>	<i>5068</i>
<i>Moose</i>	<i>5776</i>
<i>Lion</i>	<i>4338</i>
<i>Kangaroo</i>	<i>6141</i>
<i>Micky</i>	<i>6130</i>
<i>Tiger</i>	<i>6953</i>
<i>Peacock</i>	<i>5245</i>
<i>Dragon</i>	<i>5752</i>
<i>Husky</i>	<i>5381</i>
<i>Panda</i>	<i>5537</i>

The winner is Tiger sold 6953 boxes.

Extra Credit: (10 pts)

Add a sorting function to your program such that the output of the program is as shown below. Note, if you choose to do the extra credit programming, you still need to have the function “FindWinner” that will scan through the values in the array and look for the largest number of boxes sold. This function may not assume that the array values are sorted.

The final results are:

<i>Lion</i>	<i>4338</i>
<i>Eagle</i>	<i>5068</i>
<i>Peacock</i>	<i>5245</i>
<i>Husky</i>	<i>5381</i>
<i>Panda</i>	<i>5537</i>
<i>Dragon</i>	<i>5752</i>
<i>Moose</i>	<i>5776</i>
<i>Micky</i>	<i>6130</i>
<i>Kangaroo</i>	<i>6141</i>
<i>Tiger</i>	<i>6953</i>

The winner is Tiger sold 6953 boxes.