CMP2003 Data Structures and Algorithms (C++)
Term Project

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-- Online Retail Top-Ten Analyzer—

1. Main Requirements

You are expected to write a c++ console application which reads a csv file that consists of transactions occurring between 01/12/2010 and 09/12/2011 for a UK-based and registered non-store online retail. An example part is given below from OnlineRetail.csv dataset:

InvoiceNo	StockCode	Description	Quantity	InvoiceDate	UnitPrice	CustomerID	Country
536365	85123A	WHITE HANGING HEART T-LIGHT HOLDER	6	1.12.2010 08:26	2,55	17850	United Kingdom
536365	71053	WHITE METAL LANTERN	6	1.12.2010 08:26	3,39	17850	United Kingdom
536365	84406B	CREAM CUPID HEARTS COAT HANGER	8	1.12.2010 08:26	2,75	17850	United Kingdom
536365	84029G	KNITTED UNION FLAG HOT WATER BOTTLE	6	1.12.2010 08:26	3,39	17850	United Kingdom
536365	84029E	RED WOOLLY HOTTIE WHITE HEART.	6	1.12.2010 08:26	3,39	17850	United Kingdom
536365	22752	SET 7 BABUSHKA NESTING BOXES	2	1.12.2010 08:26	7,65	17850	United Kingdom
536365	21730	GLASS STAR FROSTED T-LIGHT HOLDER	6	1.12.2010 08:26	4,25	17850	United Kingdom
536366	22633	HAND WARMER UNION JACK	6	1.12.2010 08:28	1,85	17850	United Kingdom
536366	22632	HAND WARMER RED POLKA DOT	6	1.12.2010 08:28	1,85	17850	United Kingdom
…	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…

Your program must be able to store individual products (given with StockCode) from csv file and insert it into a suitable data structure. If that product is already inserted into the structure, its counter must be increased by the quantity of the order.

After reading and processing is over, your program must list the “top 10” products ordered by individuals.

Sample output:

```
Product (StockCode)          Description                          #TotalQuantity
1- 85123A              WHITE HANGING HEART T-LIGHT HOLDER              101
2- 84029E              RED WOOLLY HOTTIE WHITE HEART.                  100
3- 21730               GLASS STAR FROSTED T-LIGHT HOLDER               99
4- 22633               HAND WARMER UNION JACK                          98
5- 22632               HAND WARMER RED POLKA DOT                       97
6- 71053               WHITE METAL LANTERN                             96
    .                        .                                          .
    .                        .                                          .
    .                        .                                          .

Total Elapsed Time: X seconds
```

Whole application can be implemented with console facilities (you do not need advanced GUI elements). The project consists of two parts.

A. Implementation of data structure.

This will be a proper C++ class. You must be able to create many instances of this class.
(Please use no third party libraries and C++ STL, Boost etc.) However, you can use, **iostream**, **ctime**, **fstream**, **string** like IO and string classes.

B. The main program itself. The program must create a list instance, put new products from the csv file to the list or increase their quantities there. Your program must calculate the elapsed time starting from reading OnlineRetail.csv file to the end and prints top 10 ordered products. There is no need to ask user input.

2. Submission

You are expected to submit

a. All header (.h) and source files(.cpp) of your project.

b. A small project report on:

- Which data structure, sorting-searching algorithms you used
- Execution output (top ten result) and elapsed time of your run.

!!! Do not submit OnlineRetail.csv file with your work.!!!

The project is at most 3 PERSON size.

The deadline is set **30 December 2019 11:59 pm.** Submit your files from itslearning system.
Presentations will be scheduled and announced later.

If you don't come to the scheduled presentation day, you will get 0.

Late submissions will get lower grade by 20% for each day.

3. Cheating Policy.

You are not supposed to use each other's source code. Also please do not use source code from internet, another person or your book's examples.

All the source codes will be filtered through a similarity analysis tool, which is known to be effective against many types of code copying and changing tricks. These projects will be graded as 0.

4. Evaluation

The most part (**60%**) of evaluation criterion will be the amount of your work you did and your understanding of the concepts involved.
10% of evaluation will be graded from your project report.
We will order all projects according to their running times, and you will get remaining (**30%**) grade from this gradation.

Any lack of items mentioned in submission (source code and header files (if your code depends on any headers) and project report) may cause you to get low grades.

In the demonstrations all the group members must be present. All the members will be asked questions and a common grade will be given to all group members. Therefore, wrong or inconsistent answers will affect all group member's grade.

5. Bonuses

You can get bonuses for extra efforts:

* Good coding styles and OO programming skills

* Making the sort function parameterizable with a generic comparison class. (Hence you can sort your list according to any criterion)

* Or any other nice feature you can think of.

Please mention such extra efforts.