

Programming Design and Implementation Assignment

“It always seems impossible until it’s done.”

Nelson Mandela

Overview

This assignment forms a major part of your assessment (30%) within PDI. Please

Assignment Outcomes

Upon successful completion of this assignment you will be able to:

- Design a solution to a given problem using pseudocode (ULO 2,3,4);
- Identify the datatypes required within the designed solution (ULO 1,2,4);
- Create simple classes to aid in the designed solution (ULO 2,4);
- Use programming skills to implement your design in Java (ULO 1,2,3,4); and
- Construct well structured and documented Java code (ULO 1,2,3,4,5).

keep up to date with announcements within Blackboard to ensure that all that is required is submitted at the appropriate time.

Background

Data in large quantities is available for download from all of the World Wide Web from many different organisations and governments. This data is freely available and can be used by the public. In this assessment you will use data that comes from Belgium in the European Union. The data is about COVID-19 cases through Belgium.

The Big Picture

For this assignment you will develop a program that takes information about COVID-19 cases throughout Belgium, confirmed cases by date, age, sex and province.

You will have a date made up of a day, month and year and then a specific COVID-19 occurrence that will contain the country, province, region, age group, sex and the number of cases.

COVID19BE_CASES_AGESEX_updated.csv > No Selection

```

1 DAY,MONTH,YEAR,COUNTRY,PROVINCE,REGION,AGEGROUP,SEX,CASES
2 1,3,2020,Belgium,Antwerpen,Flanders,40-49,M,1
3 1,3,2020,Belgium,Brussels,Brussels,10-19,F,1
4 1,3,2020,Belgium,Brussels,Brussels,10-19,M,1
5 1,3,2020,Belgium,Brussels,Brussels,20-29,M,1
6 1,3,2020,Belgium,Brussels,Brussels,30-39,F,1
7 1,3,2020,Belgium,Brussels,Brussels,40-49,F,1
8 1,3,2020,Belgium,Brussels,Brussels,50-59,M,1
9 1,3,2020,Belgium,Liège,Wallonia,40-49,M,3
10 1,3,2020,Belgium,Limburg,Flanders,70-79,M,1
11 1,3,2020,Belgium,OostVlaanderen,Flanders,50-59,F,1
12 1,3,2020,Belgium,VlaamsBrabant,Flanders,10-19,F,2
13 1,3,2020,Belgium,VlaamsBrabant,Flanders,10-19,M,1
14 1,3,2020,Belgium,VlaamsBrabant,Flanders,40-49,F,1
15 1,3,2020,Belgium,VlaamsBrabant,Flanders,40-49,M,1
16 1,3,2020,Belgium,VlaamsBrabant,Flanders,50-59,M,1
17 1,3,2020,Belgium,VlaamsBrabant,Flanders,60-69,M,1
18 2,3,2020,Belgium,Antwerpen,Flanders,40-49,M,1
19 2,3,2020,Belgium,BrabantWallon,Wallonia,10-19,F,1
20 2,3,2020,Belgium,BrabantWallon,Wallonia,10-19,M,1
21 2,3,2020,Belgium,Brussels,Brussels,10-19,F,1
22 2,3,2020,Belgium,Brussels,Brussels,40-49,M,1
23 2,3,2020,Belgium,Brussels,Brussels,50-59,F,1
24 2,3,2020,Belgium,Brussels,Brussels,70-79,M,1
25 2,3,2020,Belgium,Liège,Wallonia,60-69,F,1

```

Sample of the data in the data file (<https://epistat.wiv-isp.be/covid/>)

Your program will allow the user to perform various calculations given different parameters and display the results to the user. Your program will need to do things such as:

- Read data from a file and write data back to a file;
- Receive input from the user about a specific things related to the data;
- Calculate statistics about a specific region;
- Calculate statistics about a specific age group;
- Calculate statistics about a the number of cases;
- Compare different generated statistics using different parameters.

Your program will create knowledge by generating statistics in response to user requests, using the data within the provided .csv file. The data will need to be processed through the creation of objects and then the appropriate calculations performed.

The Tasks

1. The Data

Here is a screen capture showing a sample of the data that is in the .csv file to be processed. The data will be extracted from the file and loaded into your program for processing. The data will need to be processed through the creation of objects and then the appropriate calculations performed.

The data file you have been provided with has been modified. That is, some data has been slightly changed. Hence, if you were to download the data yourself, it will not match the dataset provided here. For this assignment, please use the dataset provided.

2. Required Classes and Class Fields

For this program you are required to write two classes:

1. Date
2. CovidCase

The Date class will have the following class fields (instance variables):

- dayOfMonth
- monthOfYear
- year

The CovidCase class will have the following class fields (instance variables):

- Country;
- Province;
- Region;
- AgeGroup;
- Sex;
- Cases; and
- Date.

Please note: CovidCase class contains a Date object as one of its class fields.

You are required to design these classes in pseudocode and implement them in Java to be used within your program. You may want to create a test harness to ensure they function correctly.

3. Menu System

As you have done in the practical worksheets, you will implement a menu system(s) that provides the user with the options to carry out different types of analysis on the data.

The opening menu will ask users for which grouping they would like to interrogate.

```
Welcome to the COVID-19 Data Analysis Program. Make a selection
from the menu below regarding the information you would like to
see.
```

```
Please select from the menu below
> 1. Statistics of entire nation
> 2. Statistics or regions
> 3. Exit the program.
Your choice: < >
```

Menu Option 1 will then display the following menu

```
Statistics for the entire nation: select from the menu below:
> 1. Display the total number of COVID-19 cases.
> 2. Display the number of COVID-19 cases: Males.
> 3. Display the number of COVID-19 cases: Females.
> 4. Display the number of COVID-19 cases: 0-9 age group.
> 5. Display the number of COVID-19 cases: 10-19 age group.
> 6. Display the number of COVID-19 cases: 20-29 age group.
> 7. Display the number of COVID-19 cases: 30-39 age group.
> 8. Display the number of COVID-19 cases: 40-49 age group.
> 9. Display the number of COVID-19 cases: 50-59 age group.
> 10. Display the number of COVID-19 cases: 60-69 age group.
> 11. Display the number of COVID-19 cases: 70-79 age group.
> 12. Display the number of COVID-19 cases: 80-89 age group.
> 13. Display the number of COVID-19 cases: 90+ age group.
Your choice: < 4 >
Total number of cases for 0-9: < >
Would you like to make another selection (Y or N)? < >
```

Selecting yes displays the Menu Option 1 again.

Selecting no takes the user back to the opening menu to select from.

Menu Option 2 will then display the following menu

Statistics by Region: select from the menu below:

Which region would you like statistics for?

1. Flanders

2. Brussels

3. Wallonia

4. Unknown

Your choice: < >

Total number COVID-19 cases for <REGION> is: < >

Total number COVID-19 male cases for <REGION> is: < >

Total number COVID-19 female cases for <REGION> is: < >

Total number COVID-19 cases in 0-9 age group for <REGION> is: < >

Total number COVID-19 cases in 10-19 age group for <REGION> is: < >

Total number COVID-19 cases in 20-29 age group for <REGION> is: < >

Total number COVID-19 cases in 30-39 age group for <REGION> is: < >

Total number COVID-19 cases in 40-49 age group for <REGION> is: < >

Total number COVID-19 cases in 50-59 age group for <REGION> is: < >

Total number COVID-19 cases in 60-69 age group for <REGION> is: < >

Total number COVID-19 cases in 70-79 age group for <REGION> is: < >

Total number COVID-19 cases in 80-89 age group for <REGION> is: < >

Total number COVID-19 cases in 90+ age group for <REGION> is: < >

Would you like to make another selection (Y or N): < >

Selecting yes displays the Menu Option 2 again.

Selecting no takes the user back to the opening menu to select from.

Menu Option 3 will exit the program.

4. Loading Data into the Application, Writing Data from the Application.

- The application, when launched, will automatically load the data from the file.
- Each row from the file is a CovidCase object.
- It is strongly suggested that you create an array of CovidCase objects.
- The output to the user must also be written to a log file.
- The log file is created by the Application and all output that is displayed on screen is written to the log file.

5. Things to Note.

- Your application should be designed in pseudocode and implemented in Java;
- Your pseudocode needs to follow the **CLUCC** principles: Clear, Logical, Understandable, Consistent; and Correct;
- Your Java code needs to comply with the Coding Standard and be well documented;
- Your application should handle exceptions;
- Your code should ensure that the data is valid, that is: day, month, year (2020, 2021), age group, sex and cases. Country, province, region do not need to be validated in this assignment;
- **DO NOT** open the data file using a spreadsheet application (Excel, Numbers etc.)! If you do, it will corrupt some data in the file.

Assignment Submission Details

Due Date and Time: Friday 15 Oct 2021 @23:59 (AWST)

Deliverables:

- Signed Student Declaration of Originality of the work;
- The pseudocode from the entire program;
- The Java code from the entire program;
- A maximum of 2 minute narrated screen capture demonstrating your application in use in .mp4 format (viewable in VLC).

Where to submit:

- Blackboard submission point.