Elaboration Iteration 2 Report

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1. Objectives:

- Open data represents the idea that certain set of data should be freely provided for public. There are various open data access portals in existence today. The aim of our project is to make the dynamic raw open data available on the city's website more user friendly by making a real time visual analysis of the necessary facts, instead of expecting the user to dig into the data & make analysis.
- Users can explore the updated information from open portal sitting at home. Exploring opportunities, Improving efficiency.
- With the help of open data, user can benefit both economically as well as socially. Public can make their decisions wisely for business purpose which helps in growth and development of society.

1.1 Key Experiments & Results:

In the Elaboration iteration 1 phase, we worked on a prototype which will read the static csv files downloaded from the city's open data website & provide a user interface with various options to get specific information from the huge raw data. For example, a set of open data about road maintenance is read by the software. User selects the option to know which mode was widely used by city residents to report road maintenance requests on city's website, e-mail, web or phone. The data is analyzed & user is provided information about the mode most used.

In the Elaboration iteration 2, we worked on improving the initial prototype to present the requirement of the user in a visual format using charts. This will enable the user to have a quick glimpse of the chart & analyze the data.

2. Keywords

Open Data, CSV, Data Visualization

3. Acknowledgements:

3.1. Nehaben

- Analyzed open data on different data portal such as Toronto, Edmonton, as well as CKAN to see format of data availability as well as usage of data in routine life.
- Prepared 3 artifacts in inception phase report after data referral and decide to work on crime data. In Inception report, worked on vision and business case of project , User case model and Supplementary specification.

- Elaboration - Iteration I provide contribution with some of part in coding such as print csv data on console as well as provide data according to street.
- Prepare report for all Elaboration - Iteration phase I
- Created repository on GitHub
- For final phase created code for graphical representation of chart
- Provided contribution with report

3.2. Chandni

- For Inception report worked on Glossary, Risk list and Risk management plan, Prototype and proof of concepts. Created Prototype.
- Worked on Unit testing and UML diagram creation. Patch test of github and contributed in editing project report on latex.
- Contributed in updating Tester code and on architecture and report editing and presentation.

3.3. Deepti

- Worked on the prototype code for both iterations
- Worked on Report Creation for inception & both iterations
- Updates on Project Task Board
- Worked on Final Project Presentation

4. Introduction

- Problem statement: To provide visual data analysis for users of dynamic open data.
- Motivation: Raw open data is hard to interpret for a lay man. If presented to a city resident in a visual interpretation, it becomes easy to understand.
- Background: To present easy to understand representation of open data for users
- Objectives:
  i. To provide a user-friendly data analysis of raw open data.
  ii. To make use of dynamic open data sets to visualizing data
- Report breakdown description: Refer to Contents

5. Related Work

City of Toronto open data portal has been used as a reference to develop the prototype. In this portal, for every data set there are various options for data users like data preview, data features, download as a csv file, data visualization, & API for developers. This approach is very user friendly as all options are available for users of data sets.

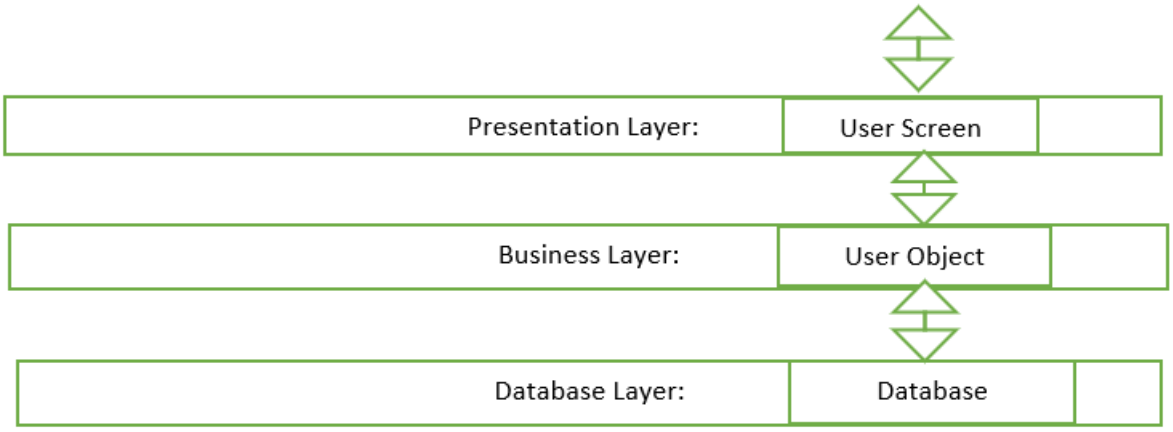
City of Toronto open data portals also has an Add-on which can be used with Google spreadsheets. This enables users to just enable the add-on to their google sheets & data can be accessed directly without a need to access the open data portal.[4]

6. Approach

This project was undertaken to enable a better user experience for the users of city's open data portal. Currently, the open data portal is only providing raw data to its users which they need to download & then do analysis on their own means. This might be easy for some but mostly people are not very conversant with handling data & thus are not able to use it in the best manner.

So the initial design of the prototype was built with the intention of preparing an analysis for the raw data. The first step was to prepare a prototype that would provide two major functionalities, first reading the CSV files, second, providing a user interface with various options to analyze the data.

6.1. Architecture



- This architecture is separated into 3 layers Presentation (UI), domain logic (business logic), and data access.
- Once the User screen receives a request to fetch information, it then forwards that request onto the Business layer.
- The User object in the business layer is responsible for aggregating all the information available and needed by the User request from database.
- This is an effective form of modularization as it allows to reduce the scope of attention and think about the three topics relatively independently.
- While working on Business logic layer UI can be completely ignored. It is easier to focus on 1 layer at a time (like refactoring's two hats).

6.2. Following algorithm was developed for the OpenDataCSVReader class:

- Create String ArrayList of ArrayList
- Create constructor of OpenDataCSVReader class with the parameter of a filename with type String. Create a new file object & the a scanner object to read the file. Then create a string array & add the contents of each row of the csv file to the string array, using a while loop. Close the scanner.
- Add public method to check number of rows.
- Add public method to check number of fields in a row.
- Add public method to get a field.

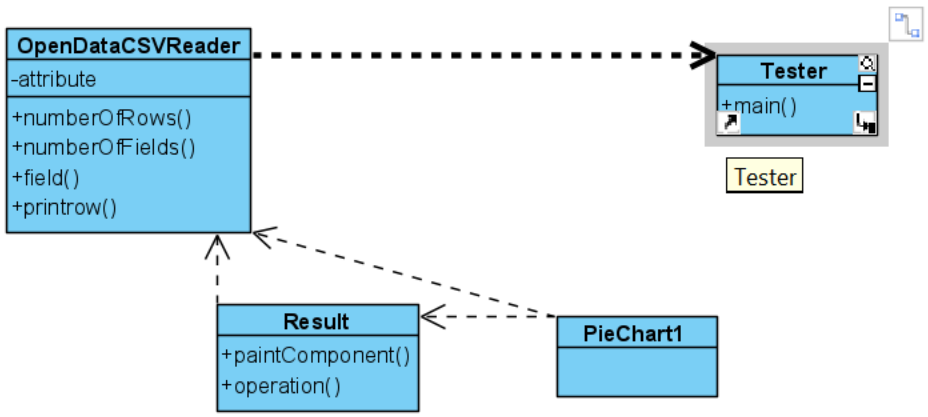
6.3 Following is graphical view class[1]

- Create method paintComponent() method to draw graphics on panel to take graphic object as parameter.
- Find center of panel for x and y axis using function and get radius.
- Create 3 labels to create sections.
- Create 3 different arcs using fill arc will all parameters x axis, y axis, width , height and start and end angle.
- Call setColor() is method to add font color and arc.

6.1. Following algorithm was developed for the driver class, Tester:

- In the main method, create an instance of the OpenDataCSVReader class & take the parameter as the csv file downloaded from the city's open data file.
- A menu is provided to the city resident using switch, where he can select if he wants to know how the road maintenance request was received-phone, web or e-mail.
- User can get to know the total number of requests from any of the above mentioned modes or the total number of requests received till date.
- User can get graphical view of data using part chart

6.2. Following is the Class Diagram for the prototype:



7. Experimental setup or Demonstration

- User selects from a menu to analyze the open data regarding road maintenance requests received by the city, year till date.

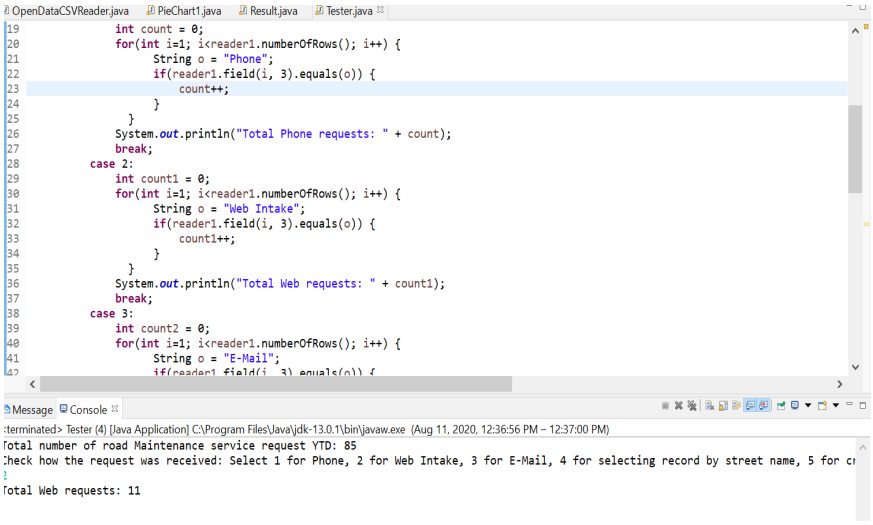
The menu options are as follows:

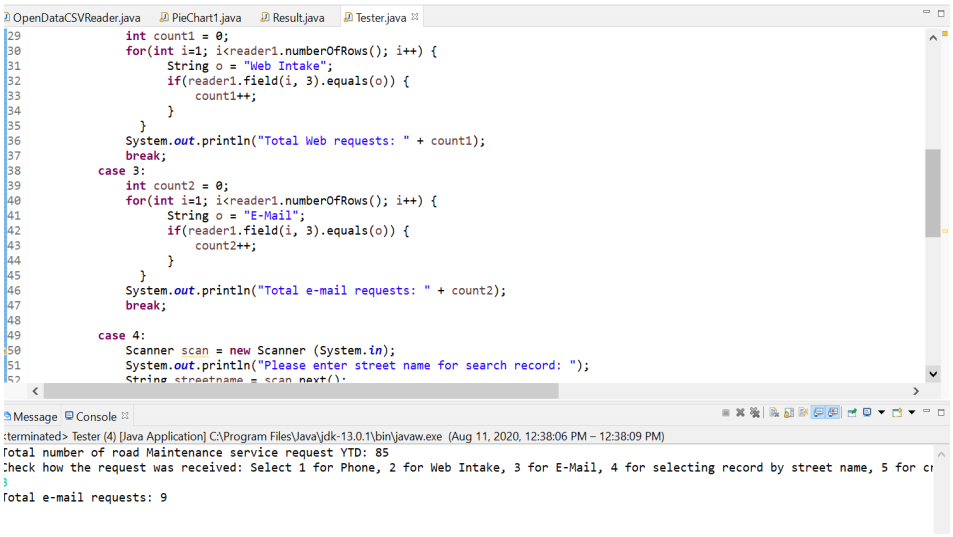
i. Number of requests received by Phone
ii. Number of requests received by Web Intake
iii. Number of requests received by Email
iv. Select a record by Street name
v. Create a visual representation of how requests were received
vi. Print all records

- If User selects option 1, the total number of phone requests are displayed. Similarly, option 2 & 3 display web & email requests.

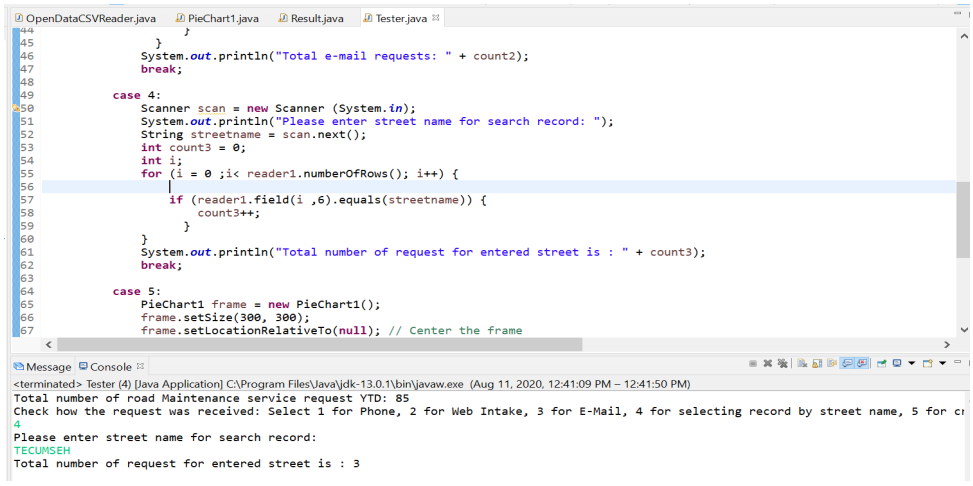
```
public static void main(String[] args) {

    OpenDataCSVReader reader1 = new OpenDataCSVReader("C:\\Users\\dips9\\eclipse-workspace\\COMP 3220\\src\\finalPrototype\\R

    System.out.println("Total number of road Maintenance service request YTD: " + reader1.numberOfRows());

    System.out.println("Check how the request was received: Select 1 for Phone, 2 for Web Intake, 3 for E-Mail, 4 for selecti
    Scanner in = new Scanner(System.in);
    int selection = in.nextInt();

    switch(selection) {
      case 1:
          int count = 0;
          for(int i=1; i<reader1.numberOfRows(); i++) {
              String o = "Phone";
              if(reader1.field(i, 3).equals(o)) {
                  count++;
              }
          }
          System.out.println("Total Phone requests: " + count);
          break;
      case 2:
          int count1 = 0;
          for(int i=1; i<reader1.numberOfRows(); i++) {
```

```
Message  Console
<terminated> Tester (4) [Java Application] C:\Program Files\Java\jdk-13.0.1\bin\javaw.exe  (Aug 11, 2020, 12:34:36 PM – 12:35:11 PM)
Total number of road Maintenance service request YTD: 85
Check how the request was received: Select 1 for Phone, 2 for Web Intake, 3 for E-Mail, 4 for selecting record by street name, 5 for cr
1
Total Phone requests: 64
```

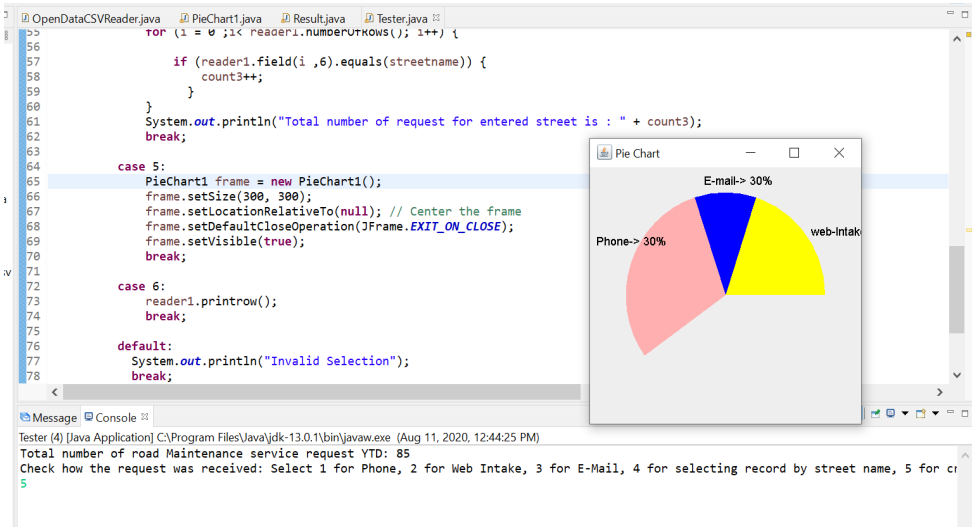




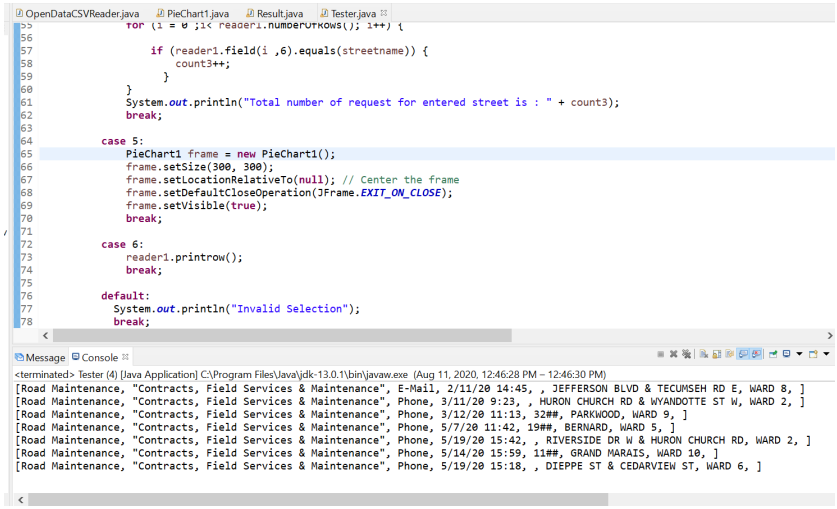
- User selects option 4 to view records for a particular street name



- User selects visual representation of mode of requests



- User selects option 6 to print all records



8. Discussion

The initial prototype was designed to fetch data from the open data portal as a CSV file & then analyzed to present output to the user in a non-visual format. Subsequently, in the present elaboration iteration, an option to present visual output was added to the prototype using demo data from the csv file. The user can look at a pie chart & in one glance get to know the results. In the subsequent iteration, the improvisation plan for the prototype includes fetching the dynamic open data from the portal directly & then using the same to analyze the data. This has the benefit of using the most up to date data. Also, the demo data for the charts will be replaced with fetching the dynamic data from the portal.

Junit testing has been completed for the current prototype.

9. Conclusion

In the current iteration of the project, we were able to achieve a visual functionality to present data to the user. However, the data used for the chart is currently a demo data & not directly fetched from the CSV file available on the open data portal. Design of this code has low coupling as it does not require change for final phase. It just requires additional work update for graphical presentation.

10. Future work

In the next iteration, we plan to incorporate two things that we were unable to cover in the current prototype-first using dynamic CSV files as a feed for the entire software, second, incorporating CSV file reader code for chart creation.

11. References:

[1] https://www.tutorialspoint.com/how-can-we-implement-the-paintcomponent-method-of-a-jpanel-in-java

[2] https://data.edmonton.ca

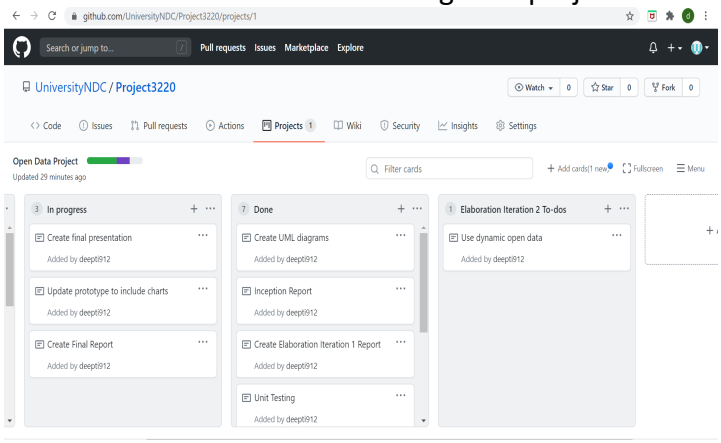
[3] https://ckan.org

[4] https://open.toronto.ca/

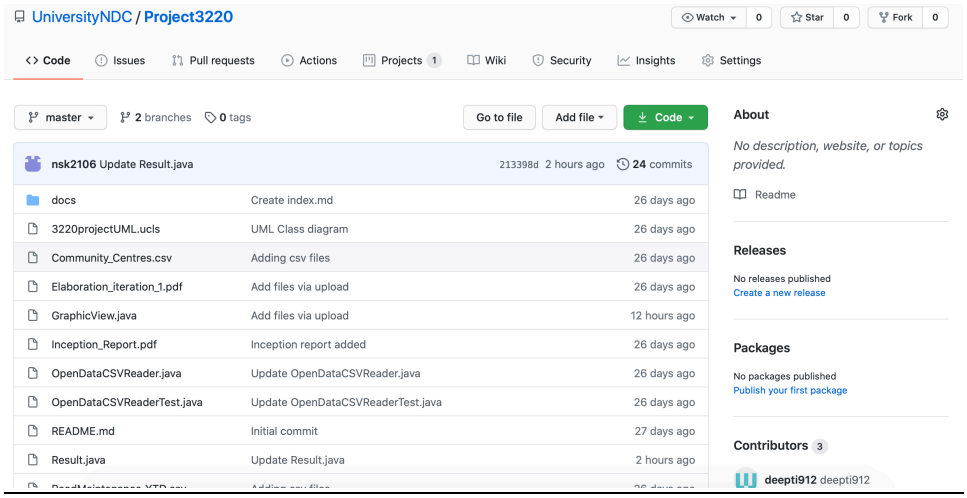
12. Appendix - A Group Work :

https://github.com/UniversityNDC/Project3220/projects/1
Github Projects has been used for collaboration & project management.

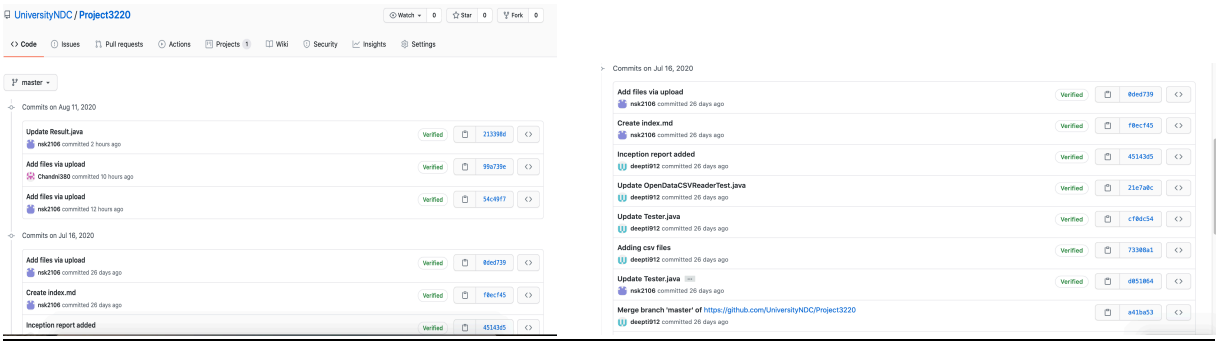
12.1 A Kanban task board has been created to manage the project tasks.



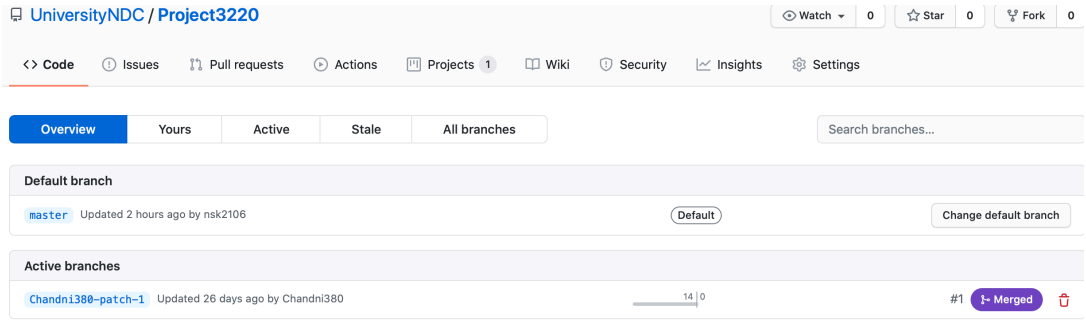
12.2. GitHub main page with Project name & created repository



12.3.Commit created by each member throughout the project



12.4. Branches



12.5 Software version control has been managed by creating a master on GitHub & subsequent updates by commits & pull requests.
Bug & Issue tracking is being done.