MARCH 20, 2019

AD-AUCTION BOARD INCREMENT 2

GROUP 13

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KEY DESIGN ARTIFACTS AND CHOICES

To begin with, we began the development of application using **Java 8**. For the project we have decided to use **Swing and AWT** for the UI of the application as most of the team members are familiar with these technologies and this way everybody can easily make contribution. However, we have decided to migrate and use other technologies:

- **Maven –** dependency manager
    - The project can be easily ported on every machine
    - Loads all needed dependencies for compiling and working on the application
- **JavaFX –** manages the User Interface.
    - Allows applying better styles using **Cascading Style Sheets (CSS).**
    - Encourages the usage of **Model-View-Controller (MVC)** Design Pattern.
    - Manage concurrency in a better way so that the application remains responsive while doing resource-consuming tasks in the background.
- **JFreeCharts-FX –** charting
    - Library specifically built for creating charts
    - Supports different types of charts
    - Can be easily used to Plot data
- **JFoenix –** library for JavaFX
    - Support Material Design
    - Makes looks more pleasing to the eye and help with implementing accessibility features
- **Junit –** writing unit tests
    - Helps the team ensure that whenever a new feature is implemented, everything works as expected and does not introduce bugs

The reason we decided to migrate to using these new technologies are explained with the bullet points above. It is important to note that these new technologies bring value to the application and therefore to the customer. Furthermore, it allows the development team to maintain the application easier as well as easily introduce new features.

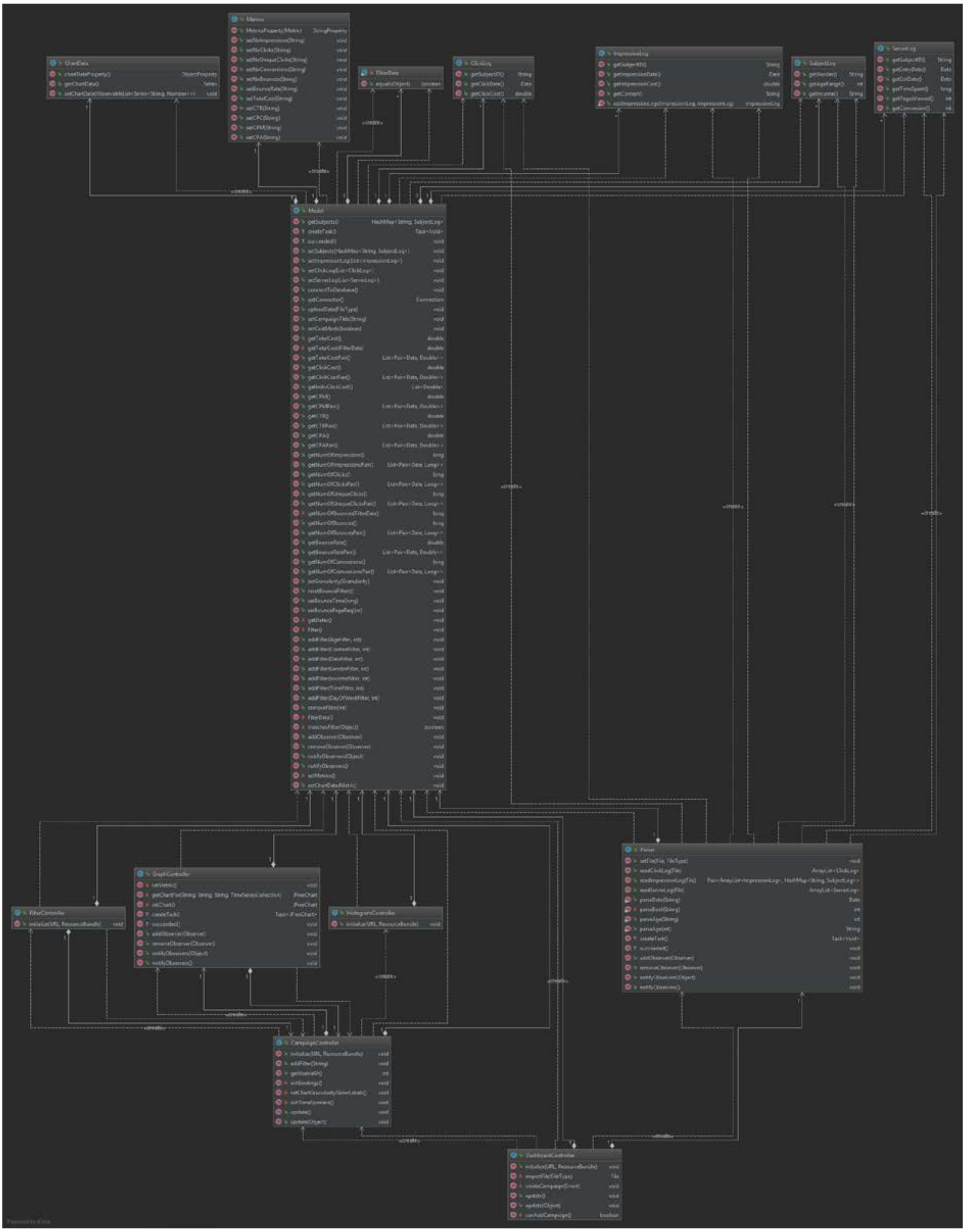
We have prioritized implementing filters which allow the user to interpret the data better and more efficiently.

Another thing that we fixed from the previous Increment was the display of the information. It is now in a more human-readable account so that the user can easily understand it.

We have introduced dark mode for the charting as some people might find easier to work this way. It helps as it reduced the strain on the eyes.

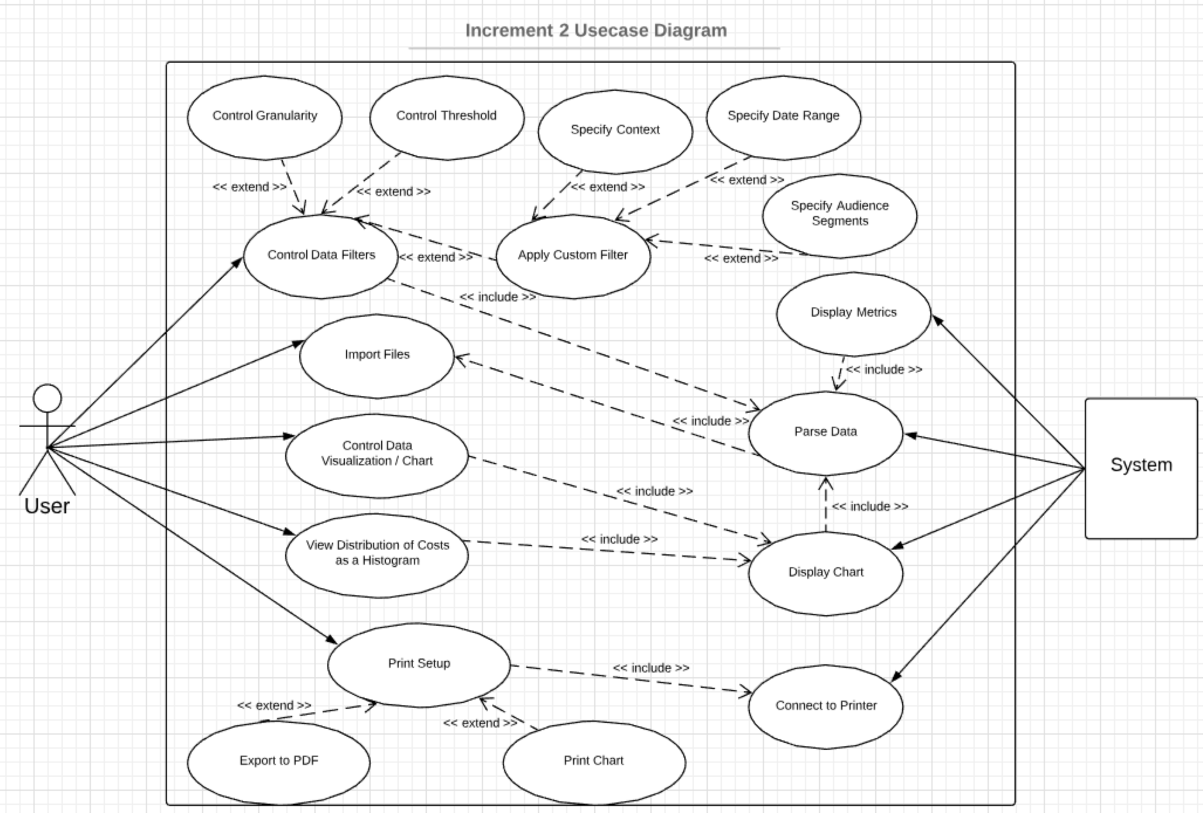
KEY STORYBOARDS

The **UML Class Diagram** describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects. We used it for general conceptual modeling of the structure of the application, and for detailed modeling translating the models into programming code. The UML Diagram can be seen in a separate file if needed for better readability. The file can be found after the attached picture below.

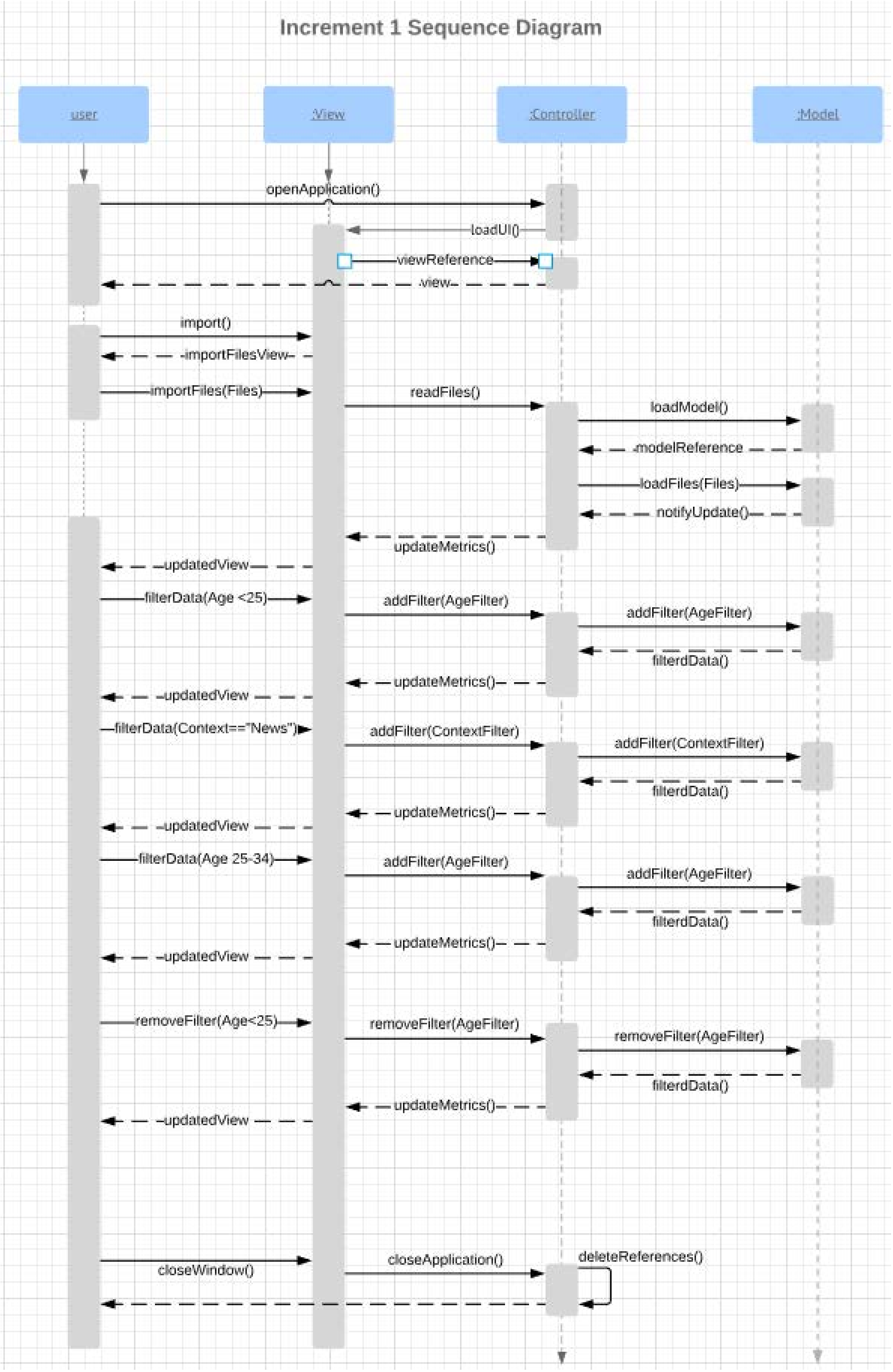


UML Class Diagram.png

We have built a **UML Usecase Diagram** in order to get an overview of the system and how it would perform. It assisted us in picturing the interaction between the user and the system. The user can: Import Files, Control Data Filters and Visualization. Some of the actions do depend on others. For instances, in order for the user to be able to work with the data, it needs first to be parsed. However, in order for the system to parse the data in needs to be imported from files.



It was useful to build a **UML Sequence Diagram** as well to describe potential actions a user might take. This way we were able to implement needed features with a better understanding of the system and how it is supposed to behave.



KEY TEST OUTPUTS

Writing **Junit Tests** helps us prove the accuracy of the application. We have manually computed the expected results of certain operations using other tools and then tested these against the output of our program. As it can be seen from the picture (refer to the tests.ModelTests.java file for more details), the software passes all the written tests. However, as pointed by the supervisor these are not needed by the client so we use them just for development purposes. They said that the client is interested in the table below.

Another testing we did was the UI Testing where we ran the application and went through the actions a user would do and confirm that the expected result aligns with the actual result we get from the application. The table with these tests can be seen below.

Action Taken	Expected Outcome	Actual Outcome
Click “Import” under “Import impression log”	Directory browser should be displayed in a separate panel	Directory browser displayed in separate panel
Impression log selected	Import button should change to “Change File” button	Import button changes to “Change File”
Click “Import” under “Import click log”	Directory browser should be displayed in a separate panel	Directory browser displayed in separate panel
Click log selected	Import button should change to “Change File” button	Import button changes to “Change File”
Click “Import” under “Import server log”	Directory browser should be displayed in a separate panel	Directory browser displayed in separate panel
Server log selected	Import button should change to “Change File” button	Import button changes to “Change File”
Click “New campaign” button	UI should be initialized with no key metric selected, and the bounce rate automatically set	UI is initialized with no key metrics selected, and the bounce rate is automatically set

UI test #1

Importing correct files

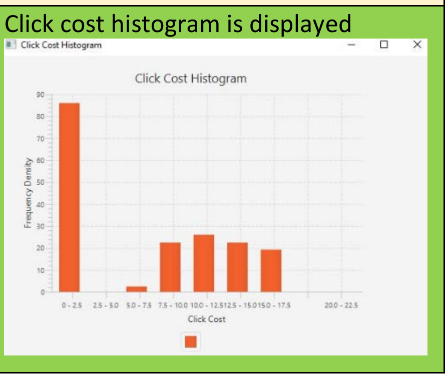
UI test #2

Importing incorrect files

Action Taken	Expected Outcome	Actual Outcome
Click “Import” under “Import impression log”	Directory browser should be displayed in a separate panel	Directory browser displayed in separate panel
Click log selected	Import button should remain unchanged, no file is loaded	Import button doesn’t change, no file is loaded
Click “Import” under “Import click log”	Directory browser should be displayed in a separate panel	Directory browser displayed in separate panel
Server log selected	Import button should remain unchanged, no file is loaded	Import button doesn’t change, no file is loaded
Click “Import” under “Import Server log”	Directory browser should be displayed in a separate panel	Directory browser displayed in separate panel
Impression log selected	Import button should remain unchanged, no file is loaded	Import button doesn’t change, no file is loaded

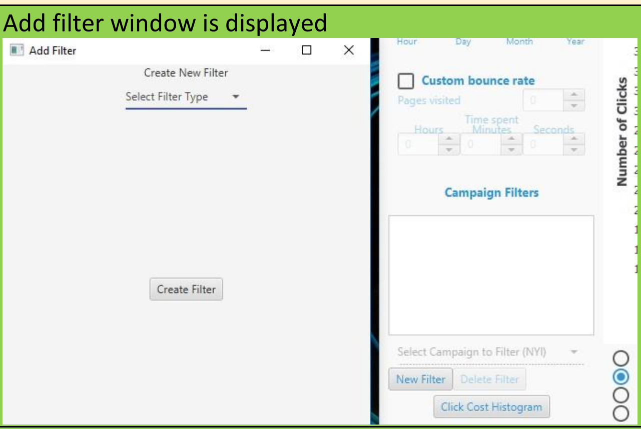
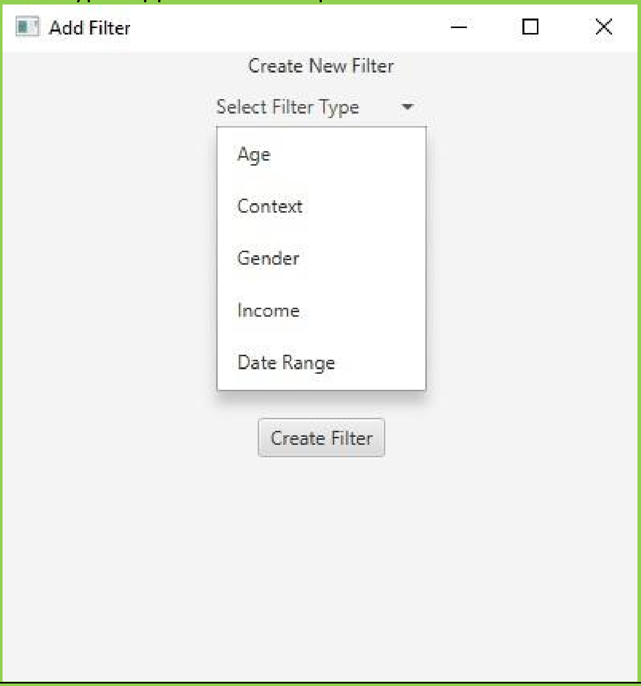
UI test #3

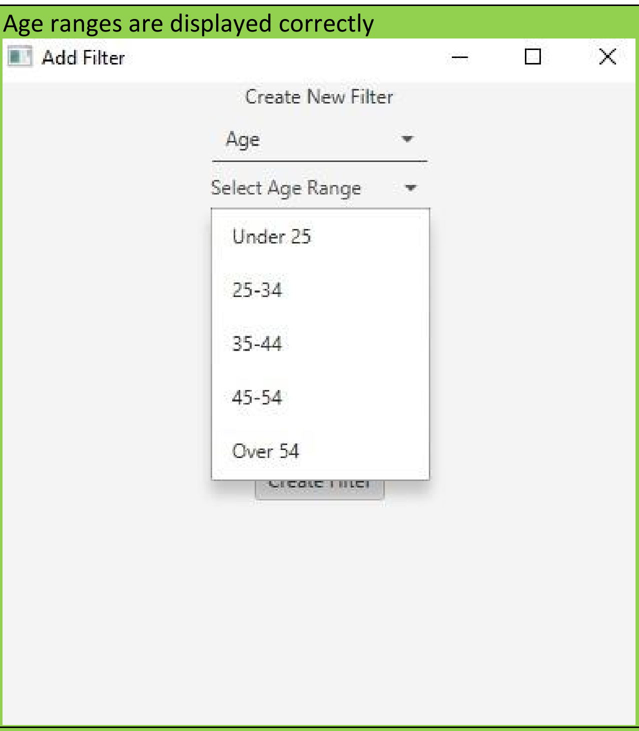
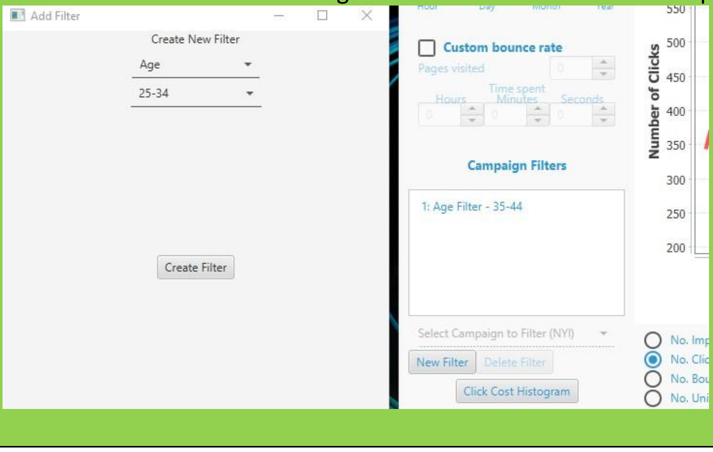
Histogram test

Action Taken	Expected Outcome	Actual Outcome
Click “Click Cost Histogram” 	New window displaying the Click Cost Histogram should appear	Click cost histogram is displayed  Click Cost Histogram Click Cost Histogram Frequency Density 0 10 20 30 40 50 60 70 80 90 0 - 2.5 2.5 - 5.0 5.0 - 7.5 7.5 - 10.0 10.0 - 12.5 12.5 - 15.0 15.0 - 17.5 20.0 - 22.5 Click Cost

UI test #4

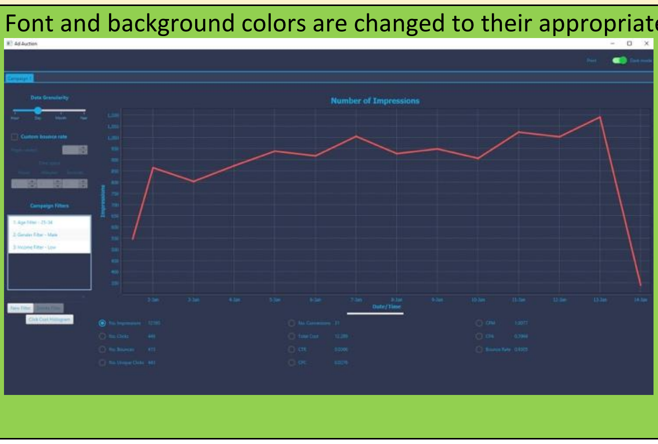
Filtering test

Action Taken	Expected Outcome	Actual Outcome
Click “New Filter” button	Add filter window should be displayed	Add filter window is displayed  Add Filter Create New Filter Select Filter Type Create Filter Hour Day Month Year □ Custom bounce rate Pages visited Time spent Hours Minutes Seconds Campaign Filters Select Campaign to Filter (NYI) New Filter Delete Filter Click Cost Histogram Number of Clicks
Click “Select Filter Type” dropdown bar	Filter types: “Age”, “Context”, “Gender”, “Income”, “Date Range” should be displayed	Filter types appear in the dropdown bar  Add Filter Create New Filter Select Filter Type Age Context Gender Income Date Range Create Filter
Select “Age”	“Select Age Range” dropdown menu should appear closed	Select Age Range dropdown menu appears closed

Click “Select Age Range”	Age ranges: “Under 25”, “25-34”, “35-44”, “45-54”, “Over 54” should appear	Age ranges are displayed correctly  Add Filter Create New Filter Age Select Age Range Under 25 25-34 35-44 45-54 Over 54
Select a range and click “Create Filter”	Filter should be added to the list “Campaign Filters”, displayed with a number before it. Create new filter window should remain open	Filter is created with numbering. Create new filter window still open.  Add Filter Create New Filter Age 25-34 Create Filter □ Custom bounce rate Pages visited Time spent Hours Minutes Seconds Campaign Filters 1: Age Filter - 35-44 Select Campaign to Filter (NYI) New Filter Delete Filter Click Cost Histogram Number of Clicks ○ No. Imp ● No. Clic ○ No. Bou ○ No. Uni

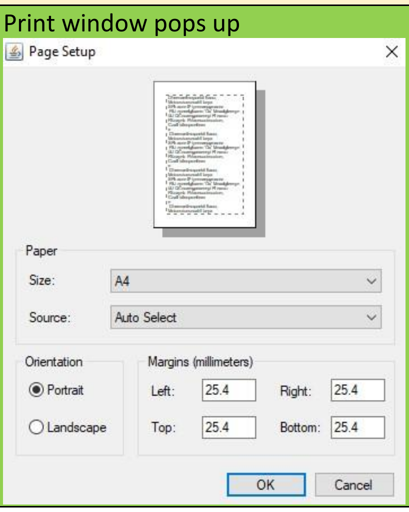
UI test #5

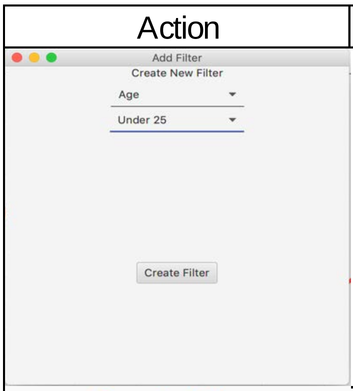
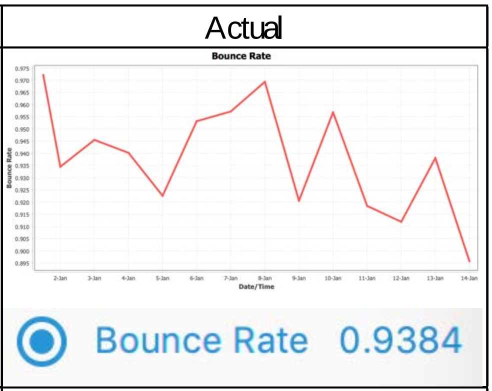
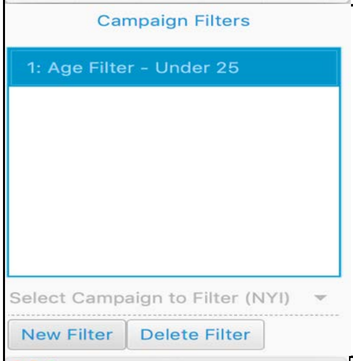
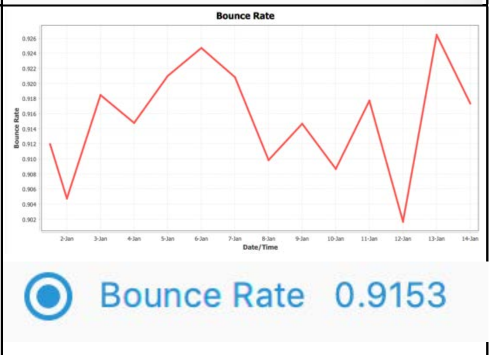
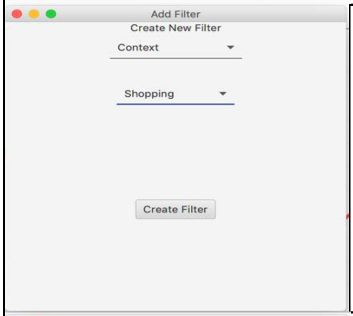
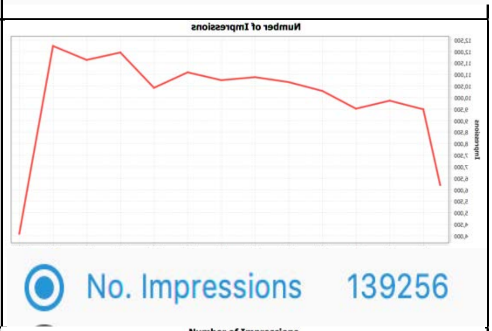
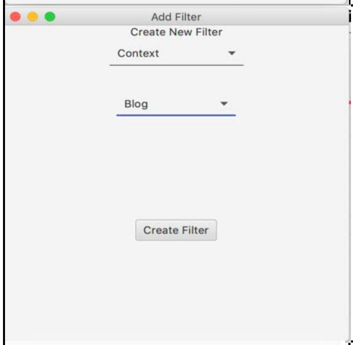
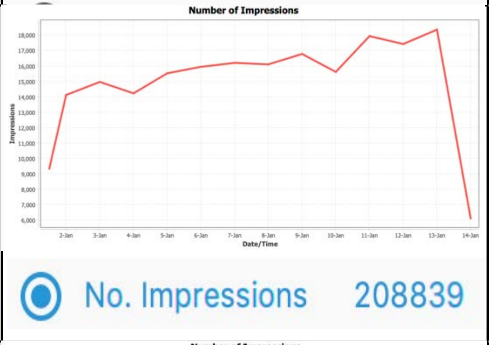
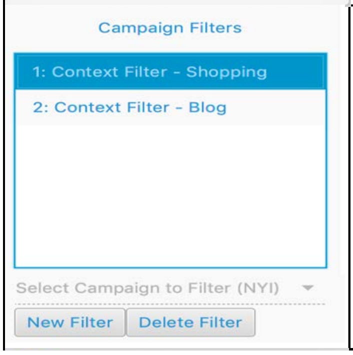
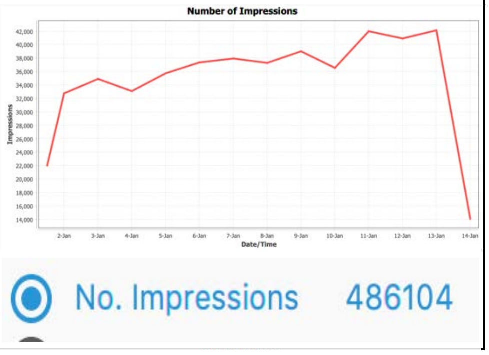
Dark mode test

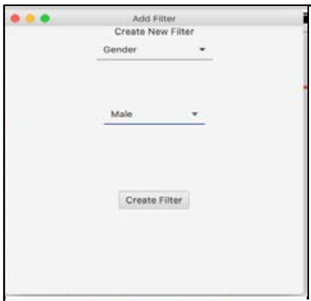
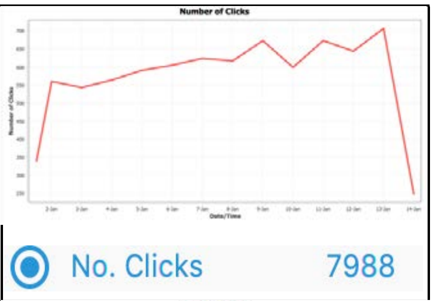
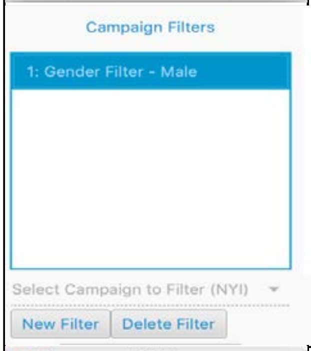
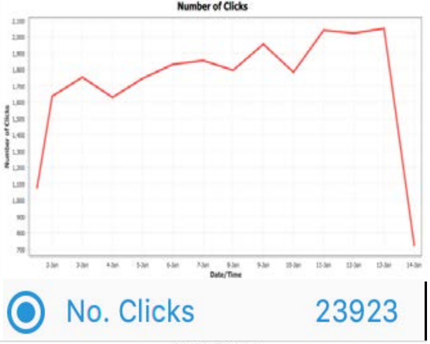
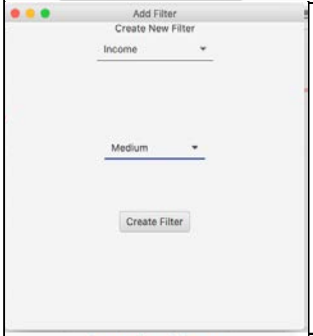
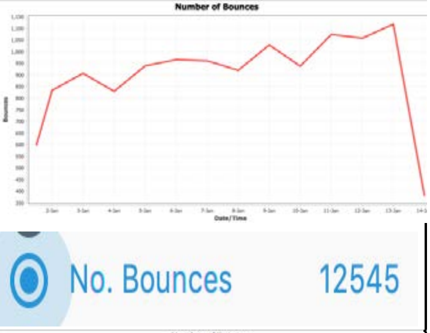
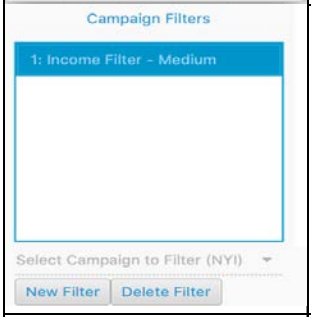
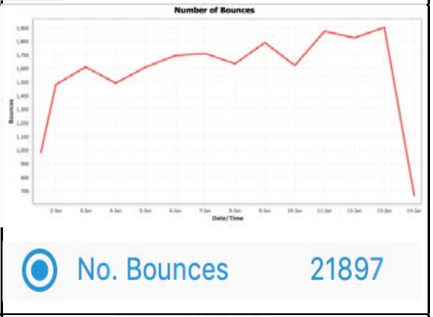
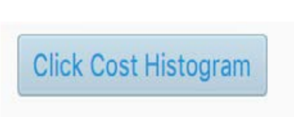
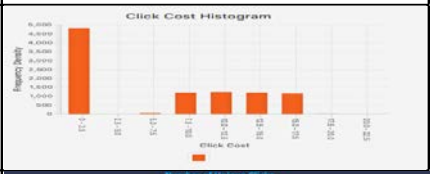
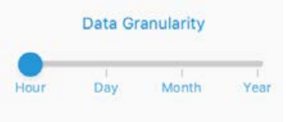
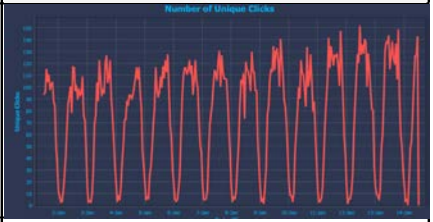
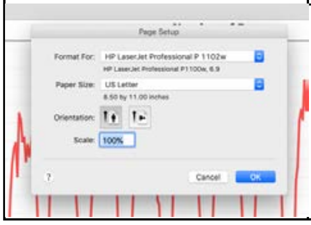
Action Taken	Expected Outcome	Actual Outcome
Toggle “Dark mode” button	Font color should be blue. Main background color should be dark blue. Dark mode toggle should be green. Chart background should be dark blue	Font and background colors are changed to their appropriate colors  Ad Auction Number of Impressions Impressions Date/Time Campaign Filters

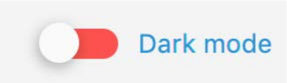
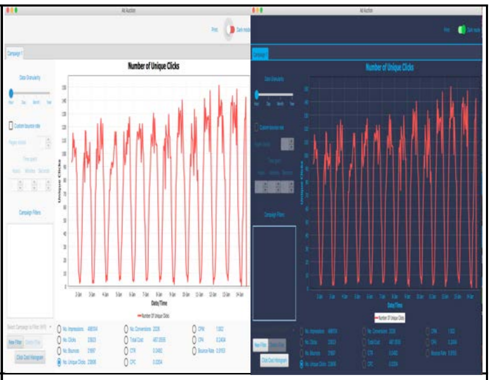
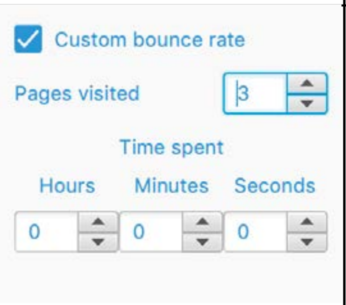
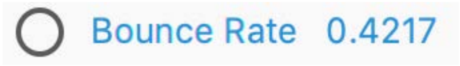
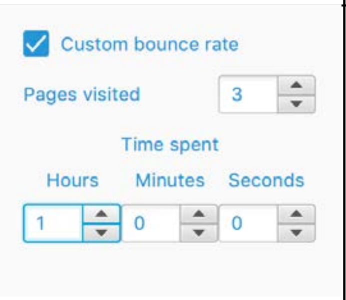
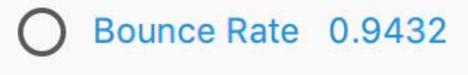
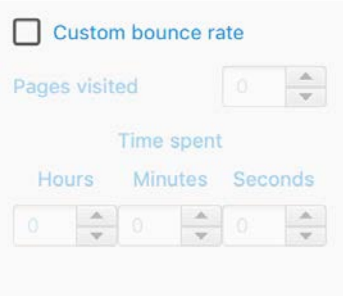
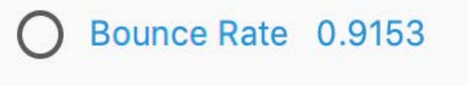
UI test #6

Testing print window

Action Taken	Expected outcome	Actual outcome
Click “Print” button	Printing options window should pop up (in case a printer is connected to the computer)	Print window pops up  Paper Size: A4 Source: Auto Select Orientation ● Portrait ○ Landscape Margins (millimeters) Left: 25.4 Right: 25.4 Top: 25.4 Bottom: 25.4

Action	Expected	Actual
 Add Filter Create New Filter Age Under 25 	Bounce rate should change to 0.96 and graph should change accordingly	 Bounce Rate 0.9384
 Campaign Filters 1: Age Filter - Under 25 Select Campaign to Filter (NYI) 	Bounce rate should change back to 0.95 and chart should return to normal	 Bounce Rate 0.9153
 Add Filter Create New Filter Context Shopping 	Number of impression should change to 139256 and the chart should change accordingly	 No. Impressions 139256
 Add Filter Create New Filter Context Blog 	Number of impression should change to 208839 and the chart should change accordingly	 No. Impressions 208839
 Campaign Filters 1: Context Filter - Shopping 2: Context Filter - Blog Select Campaign to Filter (NYI) 	Number of impression should change back to 486104 and the chart should reset to default	 No. Impressions 486104

 Add Filter Create New Filter Gender Male Create Filter	Number of clicks should change to 7988 and the chart should update accordingly	 Number of Clicks No. Clicks 7988
 Campaign Filters 1: Gender Filter - Male Select Campaign to Filter (NYI) New Filter Delete Filter	Number of clicks should change back to 23923 and the chart should reset to default	 Number of Clicks No. Clicks 23923
 Add Filter Create New Filter Income Medium Create Filter	Number of bounces should change to 13112 and the chart should update accordingly	 Number of Bounces No. Bounces 12545
 Campaign Filters 1: Income Filter - Medium Select Campaign to Filter (NYI) New Filter Delete Filter	Number of bounces should change back to 22819 and the chart should reset to default	 Number of Bounces No. Bounces 21897
 Click Cost Histogram	A histogram on click cost should appear	 Click Cost Histogram
 Data Granularity Hour Day Month Year	Chart should change from smooth curves to oscilations	 Number of Unique Clicks
 Page Setup Format For: HP LaserJet Professional P 1102w Paper Size: US Letter Orientation: Scale: 100% Cancel OK	The entire chart should be printed out	The chart was successfully printed

 Dark mode	The theme should change from light to dark	
 ☑ Custom bounce rate Pages visited 3 Time spent Hours Minutes Seconds 0 0 0	Bounce rate should change to 0.42	 ○ Bounce Rate 0.4217
 ☑ Custom bounce rate Pages visited 3 Time spent Hours Minutes Seconds 1 0 0	Bounce rate should change to 0.94	 ○ Bounce Rate 0.9432
 □ Custom bounce rate Pages visited 0 Time spent Hours Minutes Seconds 0 0 0	Bounce rate should change back to 0.91	 ○ Bounce Rate 0.9153

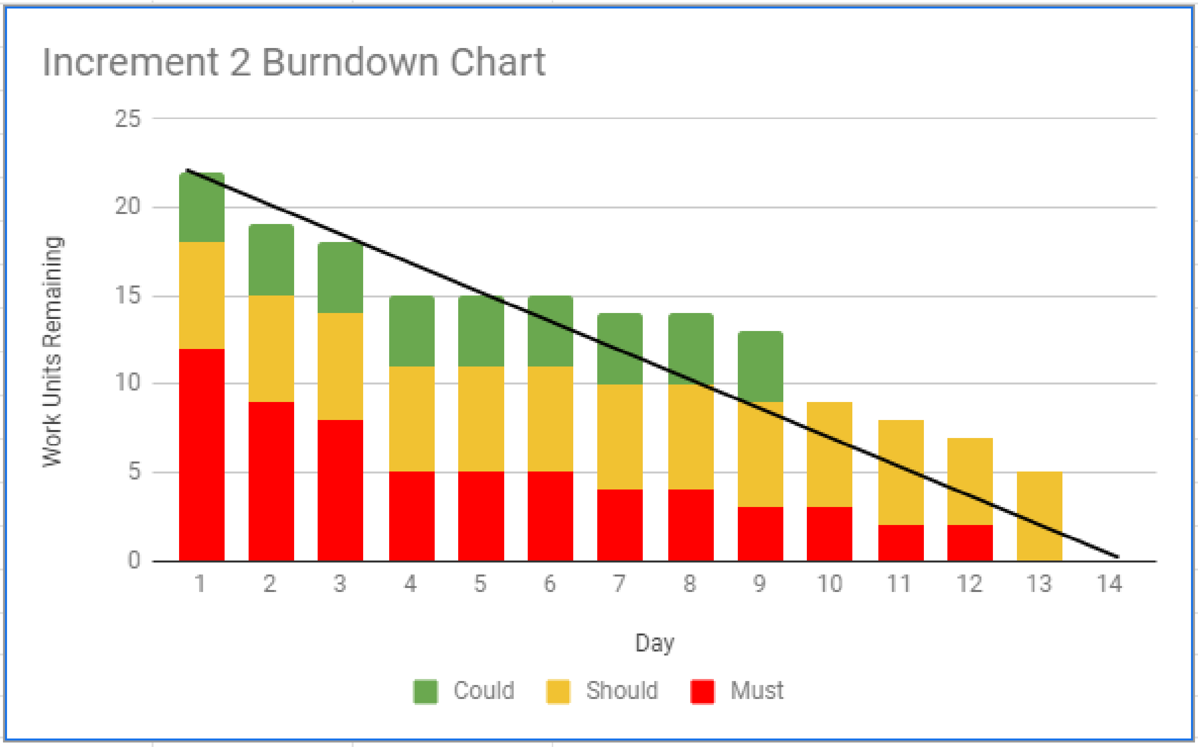
RESPONSES TO FEEDBACK

We were very happy to receive the feedback from the previous review meeting as it helped us identify the issues we had. These include:

- Burndown chart was not in the correct format and design. As the supervisors said it was clear from development point of view but it did not make sense to the client.
  - We have responded to that by using other tools for creating it as suggested by the supervisors.
- Testing was clearly done but it was too technical. From the client's point of view it was difficult to understand. For this reason, they suggested to have pictures and a table with the following structure: **Action | Expected Result | Actual Result.**
  - Our response was to do these for this increment. We now do include this table which can be seen above in the **Key Test Outputs** section.
- UML Diagrams had some concepts that were a bit confusing. For instance, in the Sequence Diagram we need a dashed line only one a value is returned according to the supervisor. The UML Class Diagram was a bit ambiguous because some of the arrows pointed towards the direction of dependence while others pointer to what extends what.
  - Sequence diagram response – we learnt the concepts better and tried our best to follow the specifications of different components.
  - UML Class Diagram – we now have the proper Relationship types on the lines so that they follow the conventions properly and are clear to interpret.

PLANNING

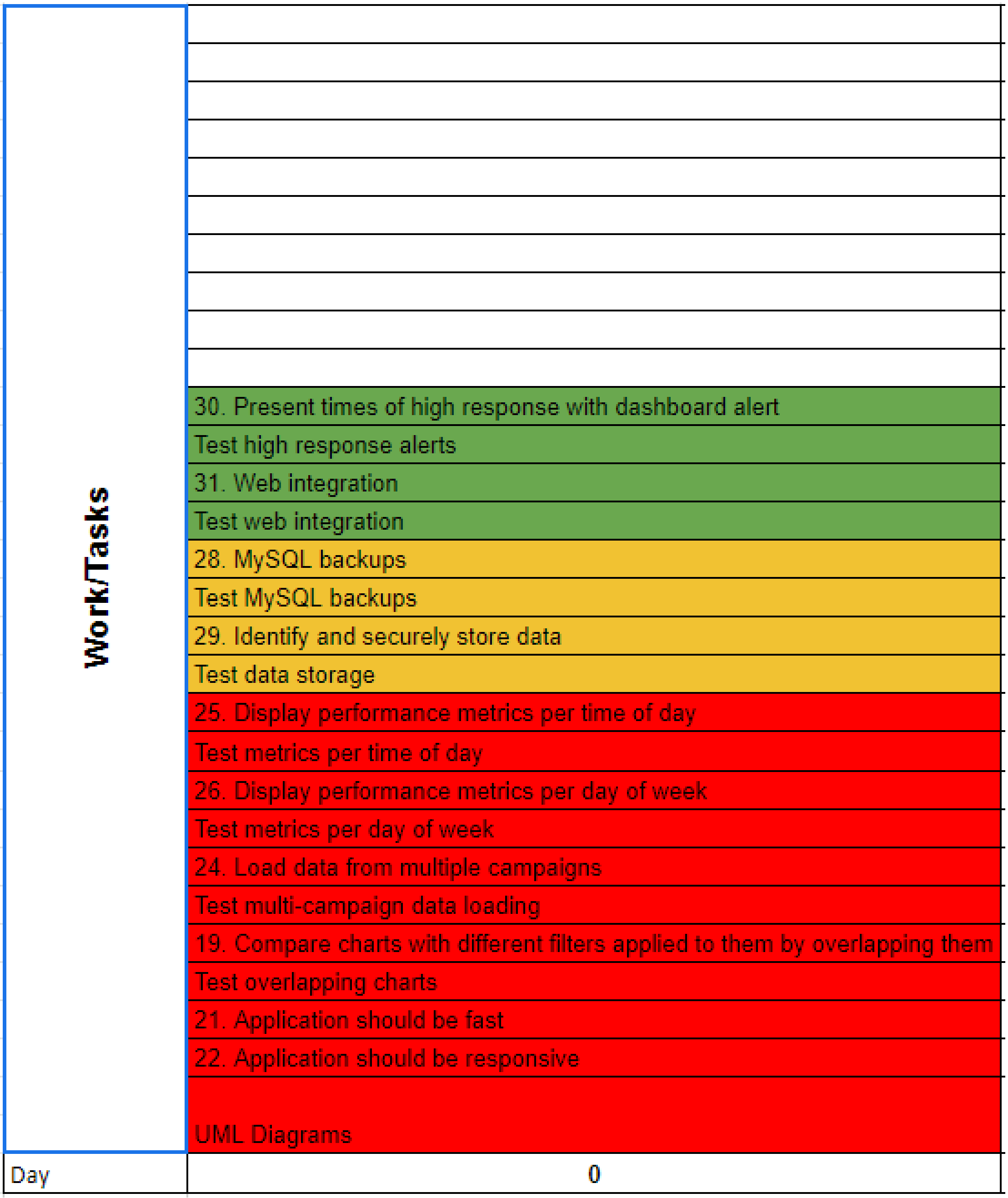
INCREMENT 2 BURNDOWN CHART



During development, we decided to push optimisation of the system forward from increment 3 to this increment. The reason for this was that we felt it would make more sense to optimise the system whilst working on it, rather than delaying it as this would increase the workload.

We also decided to push two of our “Could” and two of our “Should” tasks, 25, 26, 24 & 19 (the time of day granularity, day of week granularity, loading of multiple campaigns, and overlaying of charts), to our third increment. The reason for this was that we felt it would be easier to implement alongside our database implementation. Another factor in our decision was that, due to deciding to push optimisation forward, we didn’t have enough time to fully implement them. Instead, we decided to start implementing some of the accessibility/personalisation features.

INCREMENT 3 BURNDOWN CHART



Work/Tasks	
	30. Present times of high response with dashboard alert
	Test high response alerts
	31. Web integration
	Test web integration
	28. MySQL backups
	Test MySQL backups
	29. Identify and securely store data
	Test data storage
	25. Display performance metrics per time of day
	Test metrics per time of day
	26. Display performance metrics per day of week
	Test metrics per day of week
	24. Load data from multiple campaigns
	Test multi-campaign data loading
	19. Compare charts with different filters applied to them by overlapping them
	Test overlapping charts
	21. Application should be fast
	22. Application should be responsive
	UML Diagrams
Day	0