Software Engineering Group 3

Project Envisioning

Advertising Auction Dashboard

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User Understanding

# Stakeholders

|  |  |  |
| --- | --- | --- |
| **Stakeholder** | **Role** | **Description** |
| Marketing Agency | Primary | Creates custom advertising campaigns for their Clients, these are served by the Advert Networks so they are viewed by Advert Viewers. They want to be able to create campaigns using the product, and give limited access to the product to their Client. They want to succeed by producing engaging campaigns, which help improve their clients’ brands. |
| Agency Client | Primary | Commissions the marketing agency to create a custom advertising campaign. The Agency Client interacts with the product to evaluate the success of their campaign. They expect to see key “performance metrics over time, and within particular audience segments or contexts”. This will be used to study emerging trends, to help them to effectively spread their brand. |
| Advert Network | Secondary | Efficiently serves the Advertising Campaigns designed by the Marketing Agency for their Clients to Viewers. Their marketplaces are complex, usually with a bidding mechanism to ensure maximum profit. The Advertising Agency handles the interaction between their Client and their Campaign, in order to maximise the effectiveness, as well as providing the input log files used by the product. |
| Advert Viewer | Tertiary | Visits web pages and is served adverts via the Ad Network. When the Ad Network serves an ad designed by the Marketing Agency, they create an impression, these impressions are fed into the product to build up key performance metrics. The Viewer cannot be trusted and may install scripts to block the agency’s adverts, or maliciously perform Click Fraud. The product needs to be able to account for this, so that the data and trends drawn are accurate. |
| Software Developer | Facilitating | Creates and maintains the product developed for the marketing agency, to facilitate clients evaluating the success of their individual ad campaigns. The product is to be used by the Marketing Agency to compare and contrast different advertising campaigns, so in the future, they can design more effective campaigns and grow their business. As well as by their Clients to inform them of the costs and “key metrics” of the ad campaign. |

# Personas

Photo’s have been taken from <http://librestock.com/> and are all available under CC0 (They are all Public Domain).

|  |  |
| --- | --- |
| Marketing Agency: | Lead Designer |
|  | Julian started off working as a marketing team leader for a large company. He was responsible for running the company's advertising campaigns and was very successful in doing so. He has seen an opportunity to start his own company offering his services to smaller companies without the resources to manage their own advertising campaigns. With the knowledge he already gained, he connects advertisers to websites with advertising space.  To be able to sell his services to clients, he wants a tool to be able to measure how effective the advertising campaign is. He also wants his clients to trust that his company is doing a good job. A tool to measure how effective an advertising campaign is will not only strengthen his business, but will also enable his clients to monitor progress too. |
| Agency Client: | Big Business - Head of Advertising |
|  | Su has already been working as Head of Advertising for a decade at a big business. She knows that online advertising is very important nowadays and that it could determine the future of the company. As most of their ads were televised she now has to find an online marketing agency. She knows that could be expensive and she wants to assure that the company will actually benefit from the advertising campaign. She wants a tool that allows her to monitor the success rate of the advertising campaign in order to estimate how well the campaign is doing and whether it was a good investment for the company. |
| Agency Client: | Small Business - Employee |
|  | Gary is an Entrepreneur who has designed a new product which keeps your glasses clean forever. It is his first product and has invested a lot of money in it. He is driven and determined to be successful and knows that a good advertising campaign is needed to make it a success. He is very particular on details and analyses figures and likes measuring success by statistics. He has not got the expertise to manage an advertising campaign so looks for a marketing company to do it for him. He chooses carefully, making sure he can monitor how effective the campaign is himself. He likes to be in control and a tool that can measure performance is essential to him. |
| Agency Client: | Self Employed Photographer |
|  | Klaus is a young freelancer lucky enough to own a stable - if not enormously profitable - photography business. He does a variety of commissioned work for small companies and individuals who need photographic resources, including pictures for use on websites and in marketing campaigns. The work requires him to do a lot of travelling, and requires Klaus to be willing to work even on weekends.  As the only ‘employee’ in the company, Klaus has to manage the finances and his business strategies alone. Though artistically talented, Klaus has no training in the graphic design disciplines required to produce an advertising campaign for his own fledgling business. He wishes to pay our customer to design an advert to increase awareness of his small business, but has to be extremely careful with his expenditures. |
| Advert Viewer: | Average Browser |
|  | Sam is a teenager who is currently in full time education; He uses his laptop, tablet and phone to access the internet for shopping, social media, e-mail, research for school work and watching videos. As an average internet user he accepts that most websites use ad revenue to support their upkeep cost, so he does not have any ad-blocker or privacy browser extensions. This means he will be viewing adverts on the many sites he visits, contributing statistics and data based on what he sees and what adverts that interest him by monitoring his click-through-rate, bounce rate etc...  Sam is the kind of customer these ads are designed towards and his browsing habits are tracked by the tool we are developing to help quantify the success of each ad campaign. |
| Advert Viewer: | Ad Blocker |
|  | Currently in higher education studying for a computer science degree, Amy is a savvy computer user who uses an Ad-blocker extension on her internet browser to avoid seeing annoying and potentially harmful adverts when browsing the internet. Though certain adverts - such as those on google - are not blocked, Amy’s internet traffic is effectively invisible to most adverts attempting to track data on impressions and clicks.  As a student, Amy has little disposable income, and places great value on her limited spare time. She is aware of the purpose of an advertisement, and attempts to not be lead by a single campaign, preferring to base her purchasing habits on reviews and forum posts about the product/service she is interested in. |
| Advert Viewer: | Click Fraud |
|  | Bob directly competes with Gary producing similar, but inferior, products. As Gary has a larger online presence built with online advertising, Bob has decided to sabotage his efforts. Bob goes out of his way to click on Gary’s adverts, so that Gary is charged more for an increasingly useless Advertising Campaign.  It is up to the Advertising Network to ignore people like Bob, and stop them from sabotaging Advertising Campaigns. |
| Advert Network: | A Multi-Billion Company |
|  | Adwire runs a blind ad network, where advertisers pay to have their adverts to be shown on websites determined by Adwire. They have accumulated a sizeable inventory of advert space on large websites, which they distribute adverts to based on how much their clients are paying.  Adwire can only continue trading as long as advertisers want to use their services, so they are directly invested in the success of their clients’ advertising campaigns through the service. |
| Software Developer: | Software Engineer |
|  | After graduating from a Computer Science course Andrea got a job as a software engineer at a small company. She is an ambitious engineer, working on problems to hopefully improve the world. It is her job to develop and maintain systems including the Ad Dashboard.  She wants to create intuitive and valuable systems for her clients, and as part of that it is her responsibility to create a maintainable system that can work for years. She is familiar with legacy code bases full of spaghetti code, and wants to avoid this. |

Requirement Planning

# Project Backlog

|  |  |  |  |
| --- | --- | --- | --- |
| **As** | **I want …** | **so that…** | **MoSCoW** |
| a member of a marketing agency | the tool to be compatible with the data given to us by the advert network | the longevity of the product is increased. | MUST |
| the head of the marketing agency | to be able to view key metrics of the campaign | both I and the client can see how successful the ad campaign is. | MUST |
| an employee in a small business | to filter by demographics and other factors | we can tailor future campaigns towards these users. | MUST |
| a software developer | to write code that is easily extensible | if more functionality is needed the process will be quick and manageable. | MUST |
| a software developer who is part of the testing team | the code's separated into logical segments by functionality | the testing goes smooth and I can report any issues as soon as possible. | MUST |
| a client of the marketing agency | to see the data presented as a graph against time | I can understand how well the campaign went at a glance. | MUST |
| an experienced software developer | the whole coding process to be documented by the team | any of our team members can work on the same classes if necessary. | SHOULD |
| a software developer | to use as many external libraries in the project | we can reduce unnecessary work. | SHOULD |
| CEO of the marketing agency | my employees to provide comparison reports for each advertising campaign | we can compare the revenue quickly. | SHOULD |
| the head of advertising at a small company | the tool to be responsive even with months of advertising data | I don't spend precious time waiting for the results. | SHOULD |
| the head of advertising for a company | to be able to control the time scale of the graphs shown | I can focus on specific data between two points in time. | SHOULD |
| a client of the advertising agency | to be able to see a visual representation of the click costs | I can observe the distribution over a period of time. | SHOULD |
| a website developer | to be able to define the criteria for the bounce rate provided | I can monitor how engaging the website is. | SHOULD |
| an employee who needs to present monthly reports to the owner of the company | the tool to save the graphs to an image or PDF file, then print from the application itself | the chart is nicely formatted and printed without any further work. | COULD |
| a disabled user | accessibility features such as colour blind mode or increased font size | I can use it just as well as my well abled counterparts. | COULD |
| an employee in the advertising agency | to be able to compare the data from separate campaigns | to compare the relative success of a client’s different campaigns. | COULD |
| a client of the advert agency | to see a representation of campaign performance according to time of day/day of week rather than by date | to get a better idea of the browsing habits of our audience. | COULD |
| a software engineer who is interested in app dev | tool on Android/iOS phones for our customers | they can use it even when traveling. | WON'T |

Project Planning

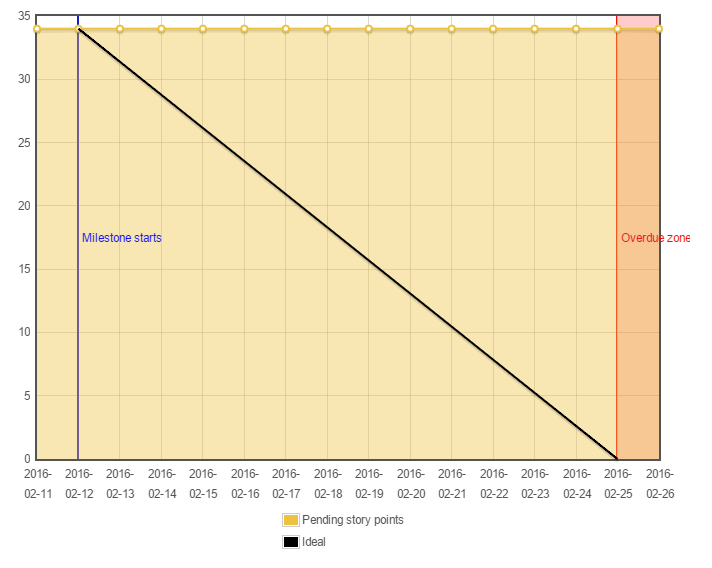
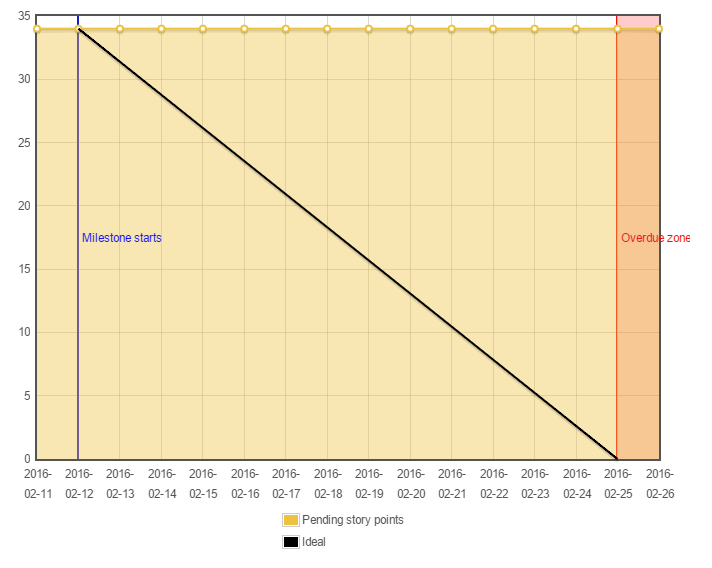
# Increment Plan

|  |  |  |
| --- | --- | --- |
| **Increment 1** | **Increment 2** | **Increment 3** |
| As a member of the marketing agency I want the tool to be compatible with the data given to us by the advert network so that the longevity of the product is increased. | As the head of the marketing agency I want to be able to view key metrics of the campaign so that both I and the client can see how successful the ad campaign is. | As an experienced software developer, I want the whole coding process to be documented by the team, so that any of our team members can work on the same classes if necessary. |
| As the head of the marketing agency I want to be able to view key metrics of the campaign so that both I and the client can see how successful the ad campaign is. | As an employee in a small business I want to filter by demographics and other factors so that we can tailor future campaigns towards these users. | As a client of the advertising agency, I want to be able to see a visual representation of the click costs, so that I can observe the distribution of click-cost. |
| As an employee in a small business I want to filter by demographics and other factors so that we can tailor future campaigns towards these users. | As a client of the marketing agency I want to see the data presented as a graph against time so that I can understand how well the campaign went at a glance. | As an employee who needs to present monthly reports to the owner of the company, I want the tool to save the graphs to an image or PDF file, then print from the application itself, so that the chart is nicely formatted and printed without any further work. |
| As a software developer I want to write code that is easily extensible so that if more functionality is needed the process will be quick and manageable. | As the CEO of the company I want my employees to provide comparison reports for each advertising campaign so that we can compare the revenue quickly. | As a software developer who is part of the testing team, I want the code's separated into logical segments by functionality, so that the testing goes smooth and I can report any issues as soon as possible. |
| As a client of the marketing agency I want to see the data presented as a graph against time so that I can understand how well the campaign went at a glance. | As a software developer I want to write code that is easily extensible so that if more functionality is needed the process will be quick and manageable. | As the head of advertising for a company, I want to be able to control the time scale of the graphs shown, so that I can focus on specific data between two points in time. |
| As the head of advertising at a small company I want the tool to be responsive even with months of advertising data so that I don't spend precious time waiting for the results. | As a website developer I want to be able to define the criteria for the bounce rate provided so that I can monitor how engaging the website is. |  |
| As an experienced software developer I want the whole coding process to be documented by the team so that any of our team members can work on the same classes if necessary. |  |  |
| A software developer who is part of the testing team I want the code's separated into logical segments by functionality so that the testing goes smooth and I can report any issues as soon as possible. |  |  |
| A software developer I want to use as many external libraries in the project so that we can reduce unnecessary work. |  |  |

# Sprint Plan for next increment

|  |  |  |
| --- | --- | --- |
| **Task** | **Priority (Minor/Major/Blocker)** | **Size (Points)** |
| Read the CSV files into the program | Blocker | 3 |
| Create class diagrams to help evaluate program structure | 3 |
| Calculate a graph of key metrics | Major | 7 |
| Create the main GUI window | 4 |
| Add the read-in data to a database | 3 |
| Ability to filter by context | 3 |
| Create the GUI filter menu | Minor | 3 |
| Display a graph in the GUI | 1 |
| Calculate a graph of impressions against time | 1 |
| Calculate a graph of clicks against time | 1 |
| Calculate a graph of uniques against time | 1 |
| Calculate a graph of bounces against time | 1 |
| Calculate a graph of conversions against time | 1 |
| Filter a graph by a user selected context | 1 |
| Display key metrics numerically on GUI | 1 |

# Burndown Chart for next Increment



Project Setup

# Risk Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Risk** | **Prob.** | **Sev.** | **Exp.** | **Mitigations** |
| Lack of Experience | 5 | 3 | 15 | None of the group members have used JavaFX prior to this project. Seek advice from our Supervisor and self-learn using online materials and books. |
| Size underestimate | 4 | 3 | 12 | *We (probably) haven’t taken on a group project like this before, though we may have experience producing similar software.* Have a clear set of priorities for implementing user stories so that even if we run out of time, all of the MUST criteria have been addressed. |
| Performance Issues | 3 | 4 | 12 | Have two designs, one as a backup. Also carry out stage testing at every sprint and adjust where required. |
| Experienced staff (Group member) leave (becomes ill/is otherwise engaged) before it is finished | 1 | 3 | 3 | Focus on the ‘MUST’ tasks during each sprint should help us to get the core functionality done, even if loss of work hours means that we have to defer implementation of ‘COULD’ tasks to later sprints (or omit them entirely if the situation becomes serious). |
| Relying on third party tools to display graphs (could have a bug) | 1 | 3 | 3 | Test that it can be safely included in a build before work on the actual project begins; if that goes down later on, use a different one. |
| Equipment is damaged, and project data is lost | 1 | 2 | 2 | *Unlikely, but definitely possible during the duration of this project.* Is mitigated by having each member of the group pull a recent copy of the project from the Git repo onto their local machine. This would mean that four of our five members would have to lose all of their systems in order for the project to be irrecoverable. Otherwise, we can clone the surviving copy(ies) and continue with minimal code loss. |
| Data Integrity Issues | 2 | 1 | 2 | Design error checking on input data, to ensure it is in the correct format. |
| Lack of Journal Materials | 1 | 2 | 2 | Ask either our supervisor or our peers for advice. |
| Technology change | 1 | 1 | 1 | Adapt and update to make it work with the new technology. |

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# Project Summary

The reason we have chosen to follow Agile methodologies is not only because it was recommended to us but also because compared to other methodologies such as the Waterfall Methodology it provides room for errors in the initial requirements. Although the project still needs a fair amount of documentation the progress of the code does not rely entirely on it and changes can be made by the product owner to the initial requirements. It also allows the software developers to test their code at any point compared to the Waterfall Method where the product is only tested at the end. Even though Agile methods offers flexibility to a team the coding process is separated into sprints at the end of which the product must be functional. This way the product can be shown to the product owner at any point and the evolution can be observed clearly on Burndown Charts. Finally, our decision relies on the fact that Agile methodology is more likely to succeed and we can present a well designed tool that meets our customer’s requirements at the end of this project. Finally, we have chosen to use the Scrum methodology for this project instead of Extreme Programming for example. We have already had Scrum meetings for the first deliverable in order to talk about whether we have done any changes to the project and so we can decide about our new objectives.

We are using Source Kettle to develop our dashboard, keep track of tasks, and help us manage this software development project. We initially considered using GitHub or BitBucket instead, but settled on Source Kettle after discovering the many features that are tailor made for this project. We are also going to use the most recent release version of Java, which is 1.8. Java is a good choice for the application, as it can be run on any machine with a native JVM. The clients of the Marketing Agency are varied, and will therefore be using suitably varied computing solutions. Therefore, program portability is an important consideration for the users. For fast queries we plan on using SQLite JDBC so that we can import the CSVs into it. We need to use a database as the queries will be handled much faster and thus the program won’t slow down at high amounts of data.

We will be using the Eclipse IDE as our development environment as we all have experience with it after using it for the last two years. It is also a very powerful and feature rich Java IDE with built in tools for JavaDoc, JUnit, and including third party libraries such as SQLite JDBC. For the reports and presentations, we settled on using Google Drive. Not only does it offer feature rich, online collaborative editors, but it is the tool we are most familiar with after using it in previous group projects.

JavaFX is a library for creating desktop applications included in the default JDK. It has support for displaying graphs included, which gives us the option to create a JavaFX application for the project. In contrast, JFreeChart is an external library that we will have to include in the build ourselves. It is specifically designed to generate and display charts, and does so using a type of JFrame. Thus, the application would have to be Swing-based if JFreeChart is used.

To test the relative performance of the two methods, we constructed two programs that generate and display random graphs with a given amount of data points (see *Appendix A*). The backend generation is the same in each case, so the only difference is the UI and graph display code. The JFreeChart program was able to process and display the data points with a much lower delay than the JavaFX version.

The number of data points required to cause the UI to hang for a couple of seconds - thus annoying the user - were:

JavaFX: 104

JFreeChart: 106

However, for the scope of this project, 104 data points are sufficient for showing all of the data, and using JavaFX avoids the need to include an external library in the final build.

Appendix A:

Side by side visual comparison of JavaFX and JFreeChart

