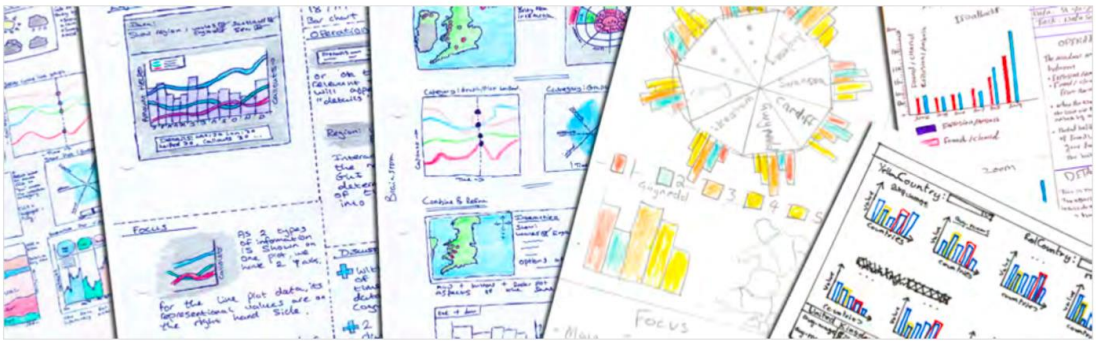
FIT3179 Data Visualisation

2nd Semester, 2018

Tutorial Week 3: The Five Sheet Design Methodology



Overview

To paraphrase Linus Pauling (a Nobel prize winning chemist), there are lots of different ways to make good ideas and throw away bad ones. Today we're going to create a visualisation using a professionally recognised visualisation design practice.

This tutorial is based on the Five Design Sheet methodology (FDS). This framework for creating visualisations has its own website (and research papers, see the bottom of this tutorial if you want some fun reading). This framework will also be an important part of your assignment report.

http://fds.design/

On the website is a 1-page and 3-page summary of what we're doing today. Feel free to read these if you like, it covers the material of the tutorial today.

Let's Begin

FDS uses a lot of 5-step processes. Let's create a summary table of the steps.

Stage 1	You need 5 sheets of paper, a data source and a goal/task that the user/client want to obtain. Consider the data and goals (with the client or just reflect on this yourself). 1 What parts of the data are **variables**? 2 What **types of data** are present and how is it stored? 3 What **categories of data** are present? 4 Temporal: Is the data **continuous or discrete**? 5 Range: What is the **distribution of data**? Lots of data or sparse data? Evenly spread, sparse or dense?
Stage 2	Brainstorm your visualisation on SHEET 1 1 **Ideas**: Generate lots of small 'mini-ideas'. 2 **Filter** out duplicates, irrelevant and impossible ideas. 3 **Categorise**: Group similar ideas together and add categories that you might have missed. 4 **Combine** all of the mini-ideas together and look for complementary visualisation concepts or different visualisation approaches. Refine all of the ideas. 5 Question: **Reflect** on the advantages and disadvantages of each approach. Pick the three best different ideas for Stage 3.
Stage 3	Sketch and plan three designs on SHEET 2, SHEET 3 and SHEET 4. The content of each of these sheets are similar and should contain: 1 Layout of the design, showing a sketched screenshot of what the visualisation will look like. 2 Meta-Information, including titles, authors, date and task. 3 Focus of the visualisation explicitly described, with a clear goal for the user's exploration of the data. 4 Operations that the user may take, or controls of the visualisation. 5 Discussion of the advantages and disadvantages of the visualisation approach, layout, focus and operations.
Stage 4	Consider the three designs (with the client or just reflect on this yourself). What works best to satisfy the user's goals/tasks?
Stage 5	Generate the final design realisation on SHEET 5. 1 Layout of the design, showing a detailed sketch of what the visualisation will look like 2 meta-Information, including titles, authors, date and task.

	3	Focus of the visalisation with a clear goal for the user's exploration of the data
	4	Operations that the user may take, or controls of the visualisation
	5	Details of the advantages and disadvantages of the visualisation approach, layout, focus and operations

The underlying premise behind this approach is *paper-prototyping*; this methodology is used in User Interaction Design, GUI Design, Game Design, etc., anywhere where we want to get an idea of how effective a design is before building something.

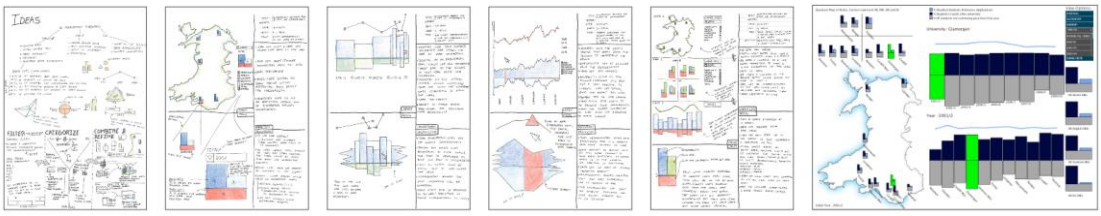


Fig. 6: An example of the FdS are shown on the left, with a picture of the final prototype on the right. Created for the Information Visualization module as part of the MSc course. The student chose to investigate data regarding University access for disabled students.

Examples from http://chrisheadleand.com/wp-content/papercite-data/pdf/roberts2015sketching.pdf

Creation

If you already have a dataset for your semester project, you can use this data for designing a visualisation. If you do not yet have a clear idea about your semester project topic or have not found good data, please use a data set by the Australian Bureau of Statistics (ABS). ABS provide a great deal of data via their website. It includes census data as well as government data.

Population Data can be found on the ABS website, showing all kinds of breakdowns. We will focus on the number of people at each age in Australia in any given year. It can be found here for 2016.

(If the link above does not work, search for “3101.0 - Australian Demographic Statistics, Dec 2016” with Google).

Table 9 with the XLS file is also on the unit page.

This is a good example of data that is difficult to understand in simple tabular form. Let's design a visualisation for this data! We are not providing any guidelines regarding

the type of visualisation to make… you can decide what story to tell. If you are stuck, they have created an interactive visualisation of one aspect, which you can see here.

Stage 1

In groups, look at the data in the file. What kind of data is there?

1. What parts of the data are **variables**?
2. What **types** of data are present and how is it stored?
3. What **categories** of data are present?
4. **Temporal**: Is the data continuous or discrete?
5. **Range**: What is the distribution of data? Lots of data or sparse data? Evenly spread, sparse or dense?

Next you want to decide what kind of exploration of the data would you like. Do you think it useful to know where the population is (spatial exploration)? Do you think it useful to know where the population is changing (temporal exploration)? Do you think the distribution (different ages, different genders) is useful to know? Or even where there are more women than men? Is there any other kind of exploration that might be nice to have? Hint: there are lots of different ways to think about this data! We haven't really considered comparisons, predictions, etc.

Stage 2

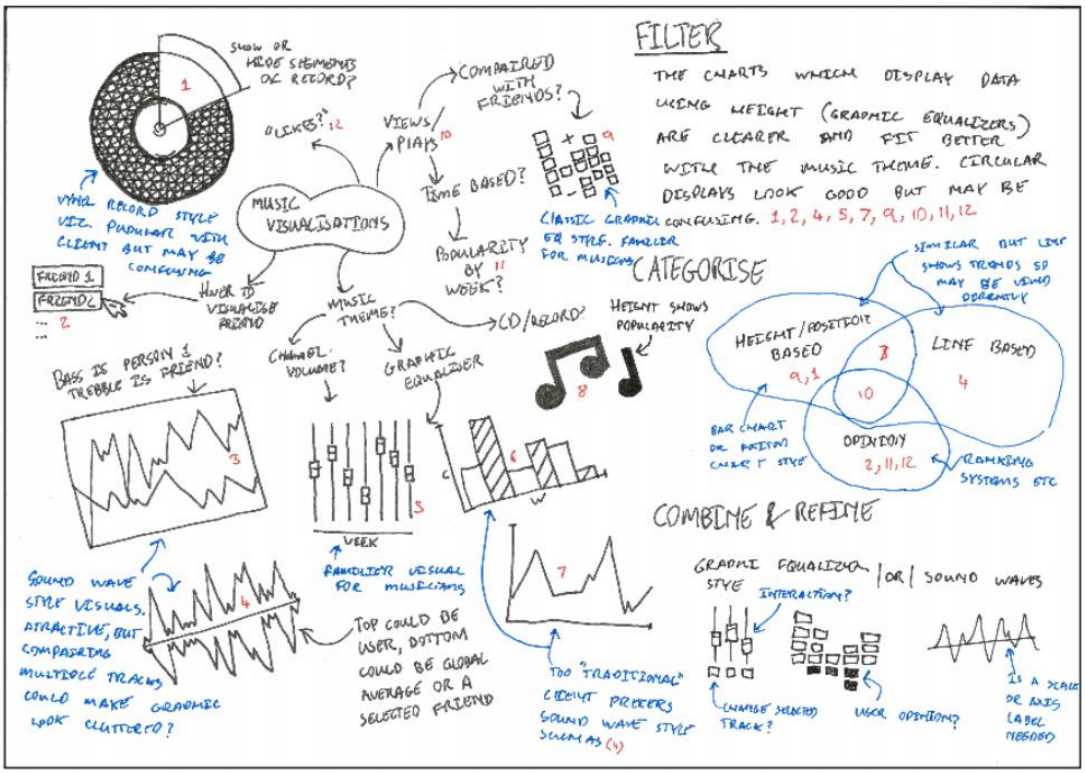
Brainstorm on **SHEET 1** in your group. Use the following steps:

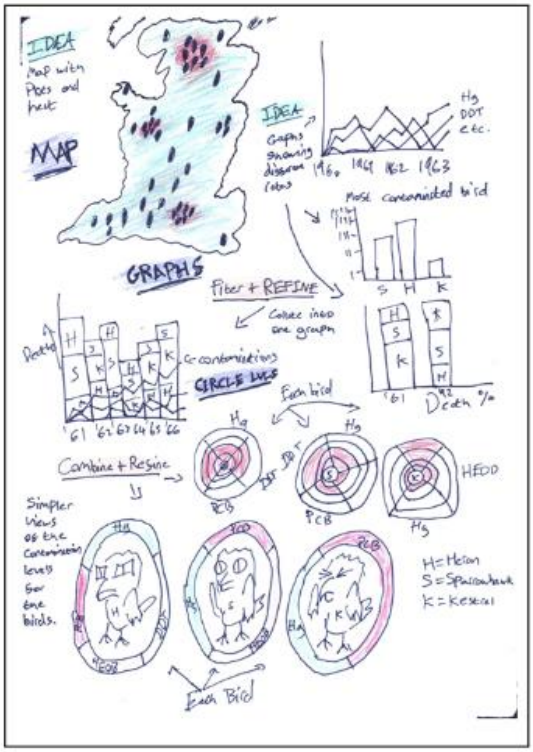
1. **Ideas**: Generate lots of small 'mini-ideas'
2. **Filter** out duplicates, irrelevant and impossible ideas
3. **Categorise**: Group similar ideas together and add an categories that you might have missed
4. **Combine** all of the mini-ideas together and look for complementary visualisation concepts or different visualisation approaches. **Refine** all of the ideas.
5. **Question**: Reflect on the advantages and disadvantages of each approach.

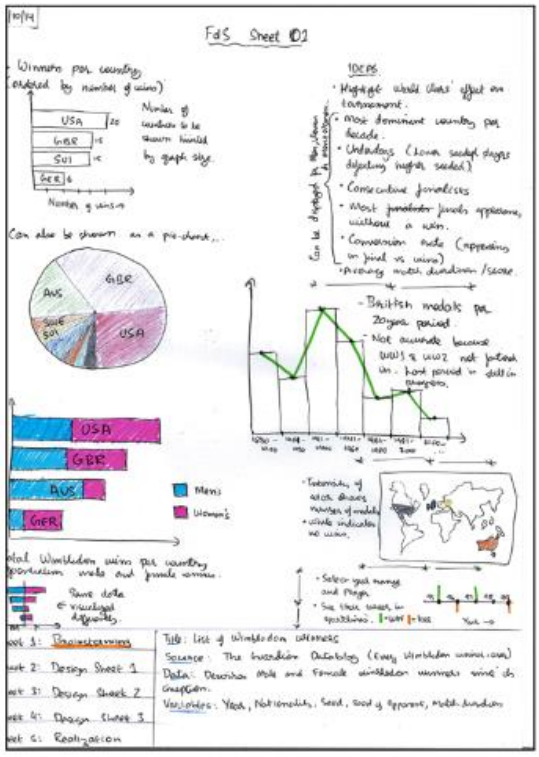
Pick the three best different ideas for Stage 3.

Examples of brainstorming:

Examples from http://chrisheadleand.com/wp-content/papercite-data/pdf/roberts2015sketching.pdf







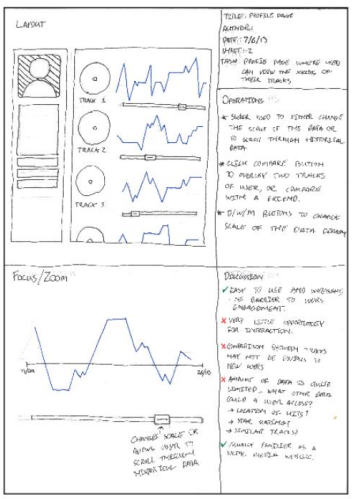
Stage 3

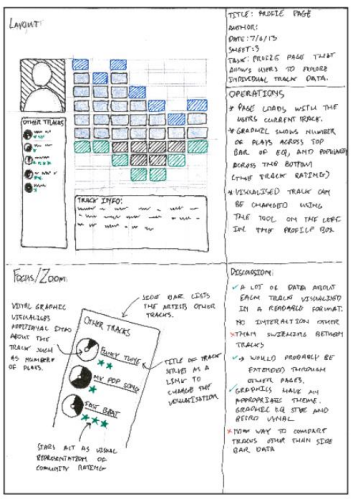
In your group, take three different visualisation concepts from your brainstorming sheet and sketch three different visualisations on **SHEET 2, SHEET 3** and **SHEET 4**. Each sheet should contain:

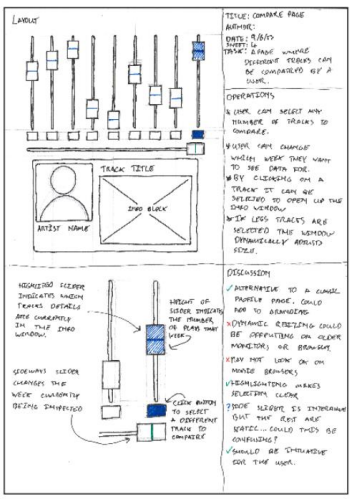
1. **Layout** of the design, showing a sketched screenshot of what the visualisation will look like
2. **Meta-Information**, including titles, authors, date and task.
3. **Focus** of the visualisation explicitly described, with a clear goal for the user's exploration of the data
4. **Operations** that the user may take, or controls of the visualisation
5. **Discussion** of the advantages and disadvantages of the visualisation approach, layout, focus and operations

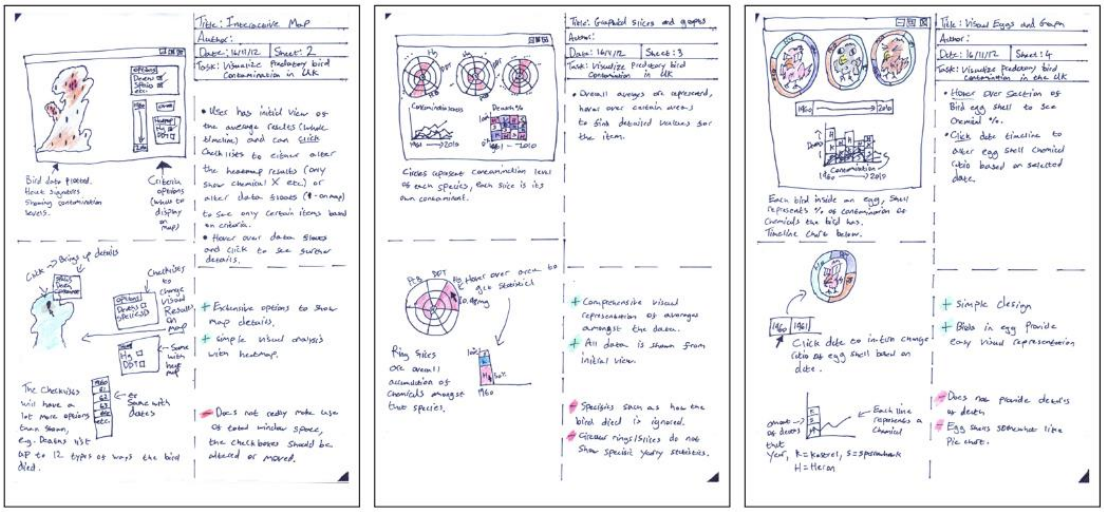
Examples of sketches. Each of these is derived from the brainstorming examples above.

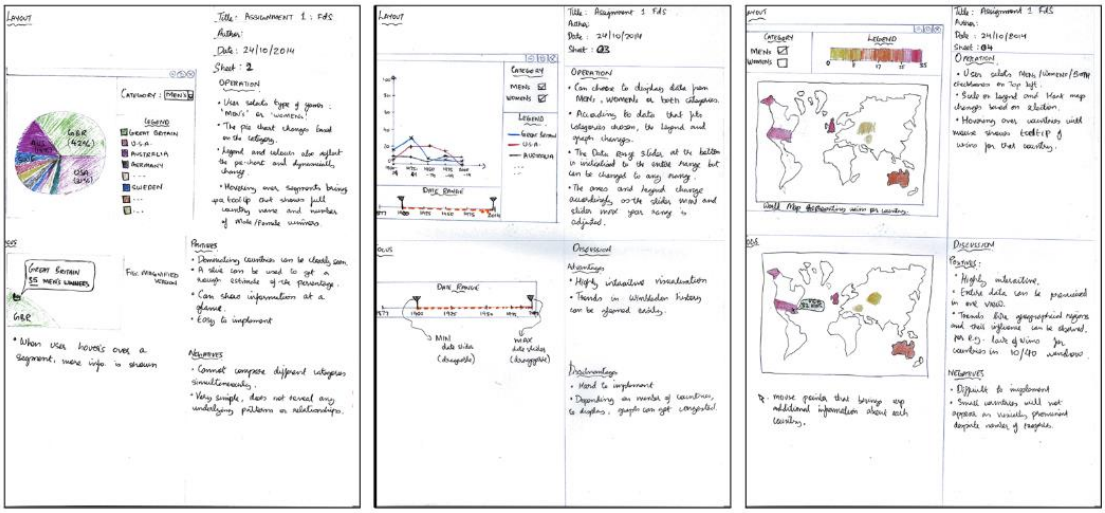
Examples from: *http://chrisheadleand.com/wp-content/papercite-data/pdf/roberts2015sketching.pdf*











Stage 4

In your group, discuss each of the three ideas you've sketched. Can you relate each of the visualisations to the goals you've identified? Will it work well? Compare the advantages and disadvantages of each visualisation. See if you can refine any of the ideas further.

Once you are happy with your designs, show them to your tutor. Pick the best design and move to the last stage.

Stage 5

In your group, take the best ideas from your three sketch sheets and draw the final visualisation idea on **SHEET 5**. The final realisation can be one of the ideas you had, or a combination of several ideas from different sheets.

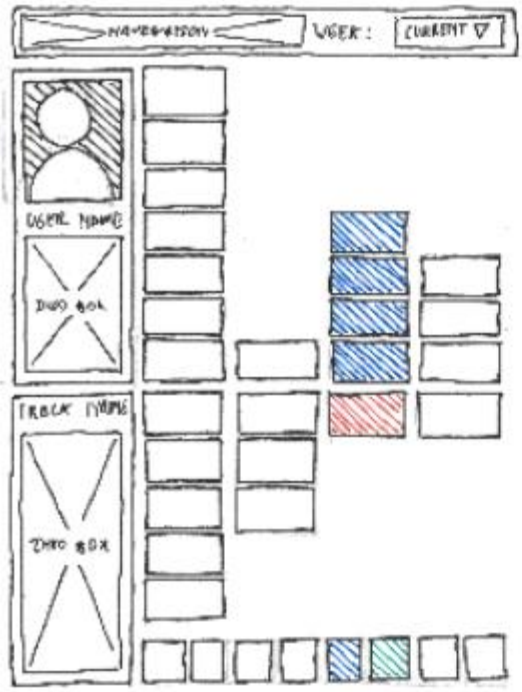
Your final concept sketch should contain:

1. **Layout** of the design, showing a detailed sketch of what the visualisation will look like
2. **Meta-Information**, including titles, authors, date and task.
3. **Focus** of the visualisation with a clear goal for the user's exploration of the data
4. **Operations** that the user may take, or controls of the visualisation
5. **Details** of the advantages and disadvantages of the visualisation approach, layout, focus and operations

Examples of sketches. Each of these are derived from the sketch examples above. Note that some of these are clearly derived from one sketch, while others are based on several different ideas.

Examples from: *http://chrisheadleand.com/wp-content/papercite-data/pdf/roberts2015sketching.pdf*

LAYOUT

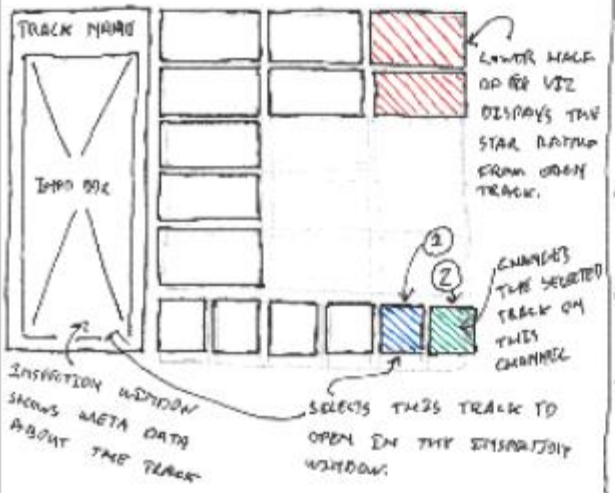


TITLE: PROFILE / CHART PAGE
AUTHOR:
DATE: 13/6/13
SHEET: 5
TASK: PROFILE PAGE FOR USERS TO COMPARE TRACK DATA

OPERATIONS

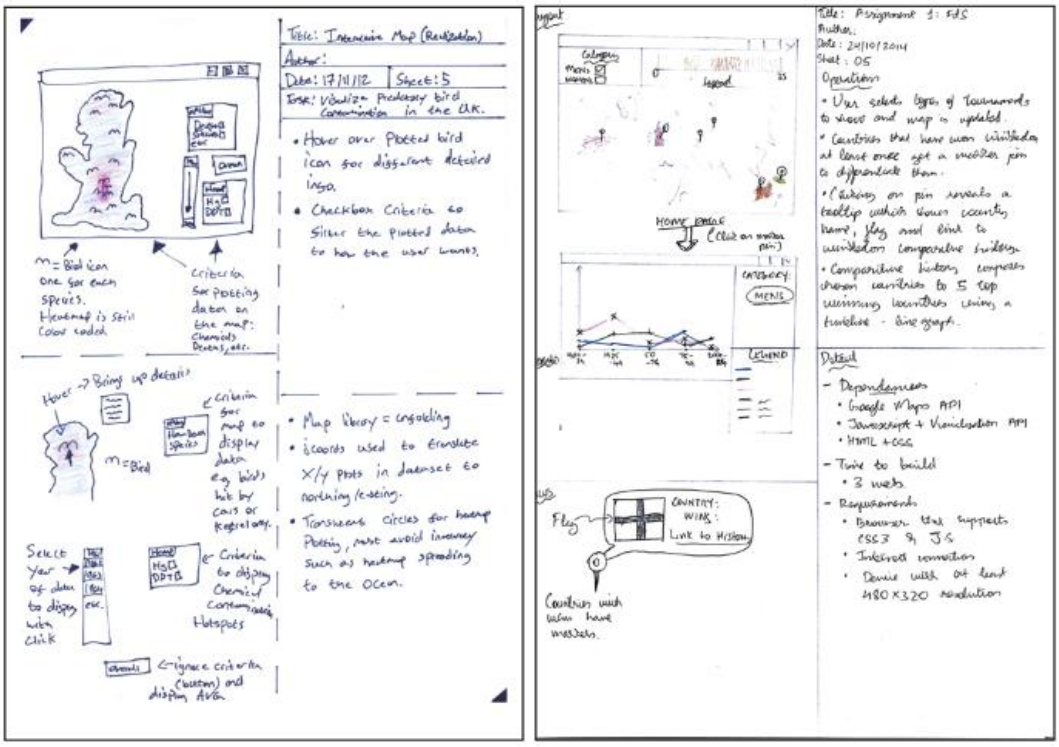
* WEEK OF DISPLAYED DATA CAN BE CHANGED USING A DROP DOWN LIST
* TRACKS CAN BE SELECTED FOR INSPECTION USING BUTTON (1)
* VISUALISED TRACK CAN BE CHANGED USING BUTTON (2)
* DATA ACCESSED FROM A MYSQL DATABASE VIA AJAX QUERY
* TOP LEFT DISPLAYS PROFILE OF THE CURRENT USER
* TOP DISPLAYS NUMBER OF PLAYS BOTTOM DISPLAYS STAR RATING

FOCUS / ZOOM



DETAIL

* REQUIRES DYNAMIC ACCESS TO DATABASE VIA AJAX
* JAVASCRIPT PLOTTING .. MIX OF JQUERY & GOOGLE PLOTTING TOOLKIT
* DEPENDENT ON BACK-END INFRASTRUCTURE BEING BUILT BEFORE DEVELOPMENT
* REQUIRES LOCAL COPY OF JQUERY LIBRARY FOR BUILD TIME ESTIMATE
* BUILD TIME ESTIMATED AS 4 WEEKS



Analysis

We will whizz around the room to see what each group has created. Each group will be expected to provide just a quick few-minutes discussion on the design choices made. Constructive comment appreciated (although we will take it easy… it is only our first tute!).

Publications related to the Five Design Sheet methodology

http://chrisheadleand.com/wp-content/papercite-data/pdf/roberts2015sketching.pdf

http://pages.bangor.ac.uk/~pas601/papers/FdS-Roberts-2011.pdf