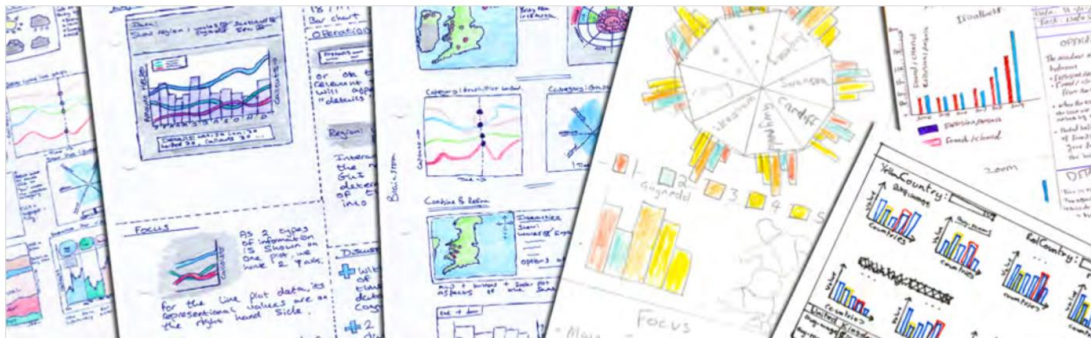# FIT3179 Data Visualisation

Tutorial Week 3: Designing Visualisation with 5 Design Sheet Methodology

Semester 2, 2019

Overview

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 it will also be an important part of your project 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.

The Five Design Sheet methodology uses a lot of 5-step processes. Here is a summary table of the steps.

Stage 1: Defining Scope

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).

- What parts of the data are variables?
- What types of data are present and how is it stored?
- What categories of data are present?
- Temporal: Is the data continuous or discrete?
- Range: What is the distribution of data? Lots of data or sparse data? Evenly spread, sparse or dense?

Stage 2: Brainstorming

Brainstorm your visualisation on SHEET 1

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

Stage 3: Alternative Designs

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:

Layout of the design, showing a sketched screenshot of what the visualisation will look like.

- Meta-Information, including titles, authors, date and task.
- Focus of the visualisation explicitly described, with a clear goal for the user's exploration of the data.
- Operations that the user may take, or controls of the visualisation.

- Discussion of the advantages and disadvantages of the visualisation approach, layout, focus and operations.

Stage 4: Reflection / Discussion

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: Realisation Design

Generate the final design realisation on SHEET 5.

- Layout of the design, showing a detailed sketch of what the visualisation will look like
- Meta-Information, including titles, authors, date and task.
- Focus of the visalisation with a clear goal for the user's exploration of the data
- Operations that the user may take, or controls of the visualisation
- 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.

Example

Please take a quick look at the example of student's work provided on Week 3 Moodle page.

The implementation of the design can be found at https://liliesterw.github.io.

Let's Begin

It is time for you to practice the 5DS methodology to create a visualisation. We have provided the dataset that you will explore and visualise (remember, this is a low fidelity design, you do not need to implement it).

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 Moodle 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, the Australian Bureau of Statistics 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.

Be clear about what you want to do! Creating a list of key messages is also useful to define the scope of your design.
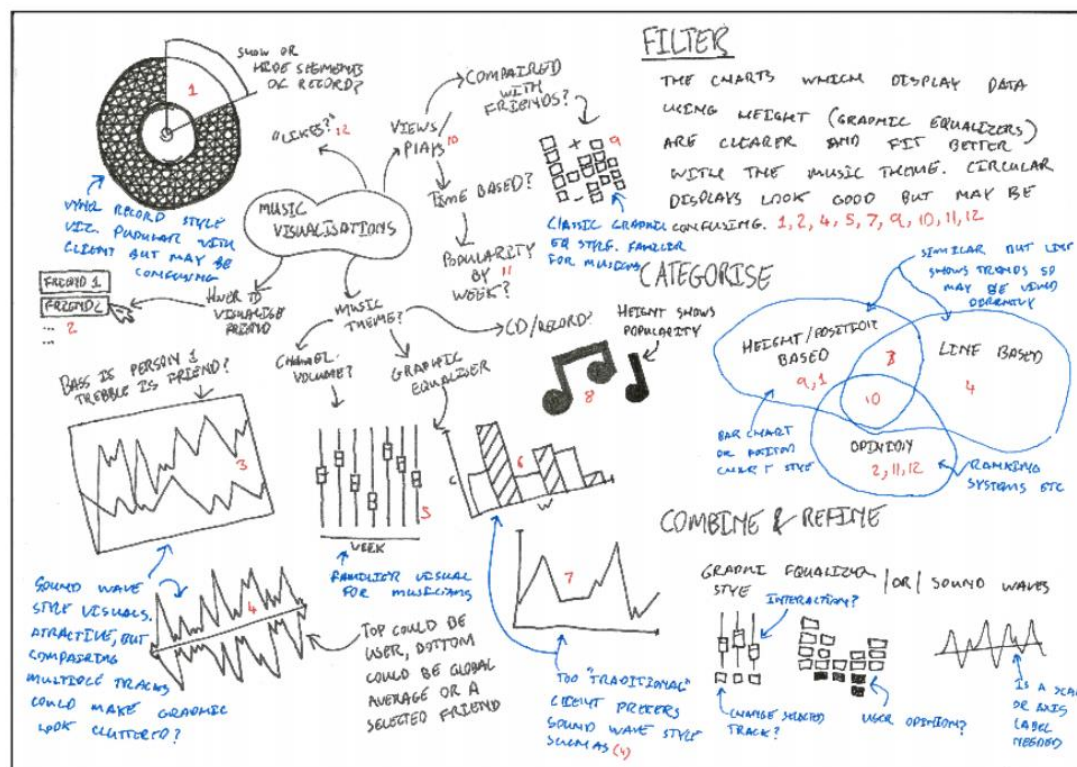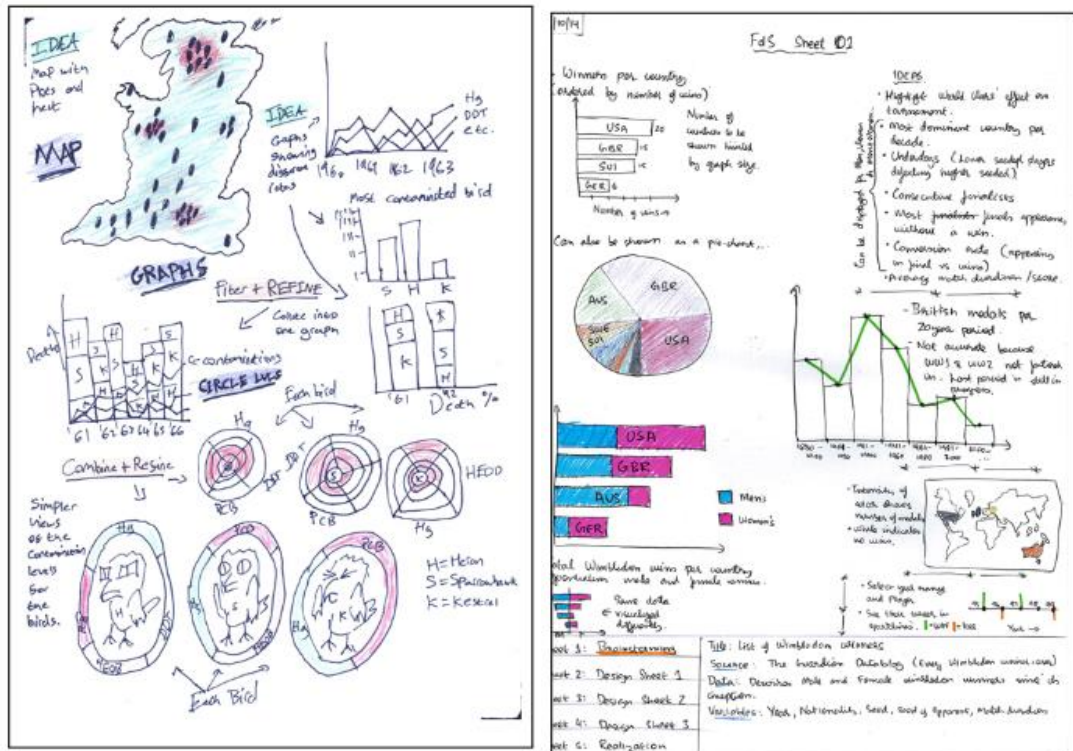
Stage 2

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
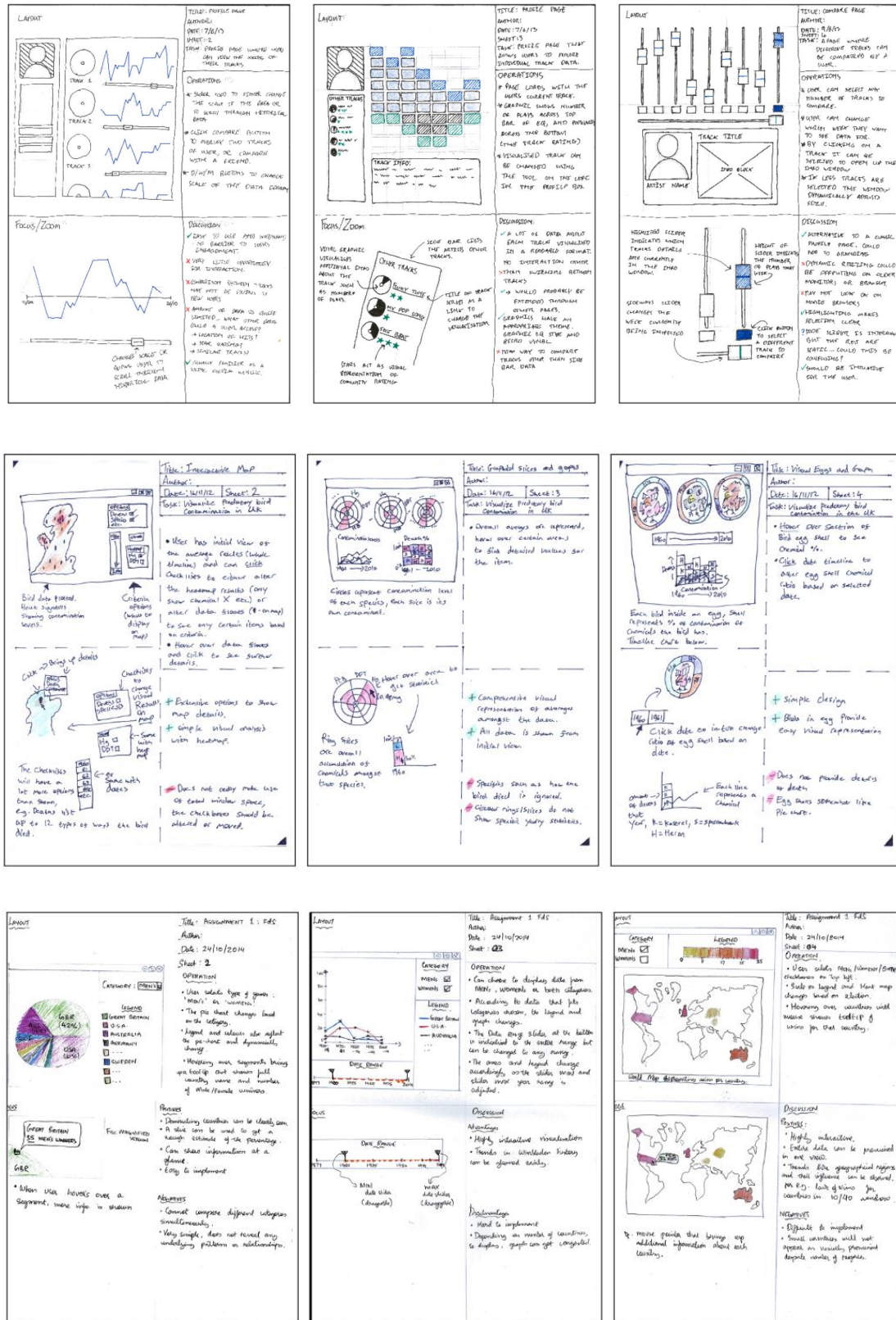
Stage 3

In your group, take three different visualisation concepts from your brainstorming sheet and sketch two different visualisations on **SHEET 2, SHEET 3**. In the actual implementation of 5DS, you need to create at least three alternative designs. Due to time constraint, we only ask you to do two designs in the lab.

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 visalisation 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.

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 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

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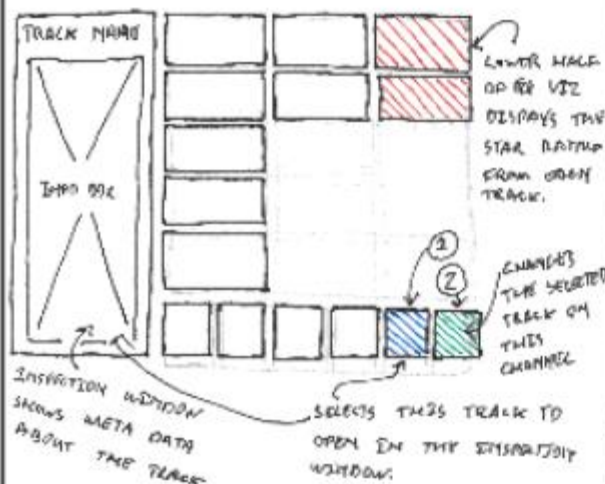
Examples from: *http://chrisheadleand.com/wp-content/papercite-data/pdf/roberts2015sketching.pdf*
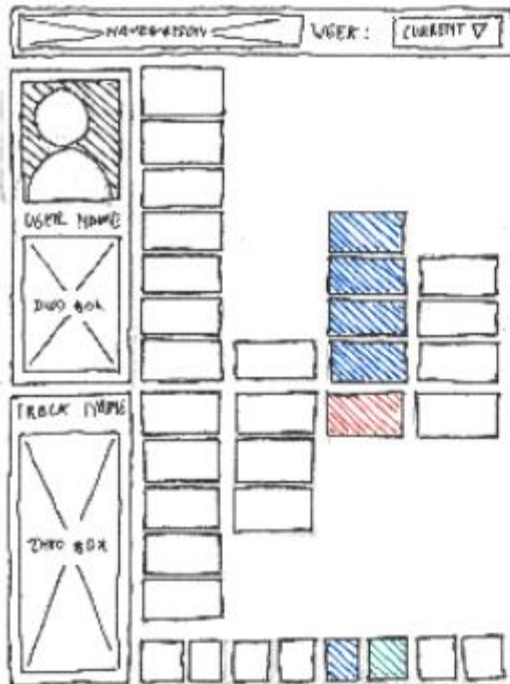
Layout

USER NAME

INFO BOX

TRACK NAME

INFO BOX

NAVIGATION   USER: CURRENT ▽

Operations

* WEEK OF DISPLAYED
  DATA CAN BE CHANGED
  USING 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

TRACK NAME

INFO BOX

LOWER HALF
OF THE VIZ
DISPLAYS THE
STAR RATING
FROM OPEN
TRACK.

CHANGES
THE SELECTED
TRACK ON
THIS
CHANNEL

INSPECTION WINDOW
SHOWS META DATA
ABOUT THE TRACK

SELECTS THIS TRACK TO
OPEN IN THE INSPECTION
WINDOW.

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 UNKNOWN
  JQUERY LIBRARY FOR
  BUILD TIME ESTIMATE

* BUILD TIME ESTIMATED
  AS 4 WEEKS
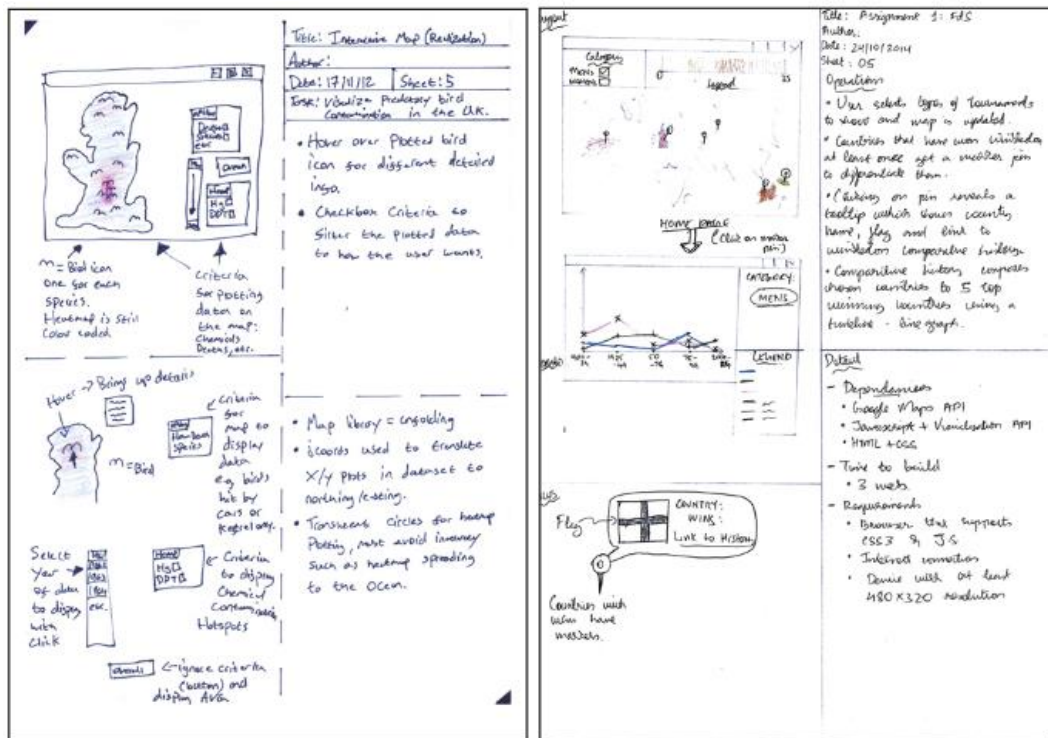
Analysis

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 design practice!).

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