

# IS428 Visual Analytics for Business Intelligence

## Assignment 2

### Part A. Heatmap-based Visualization (Difficulty Level: \*)

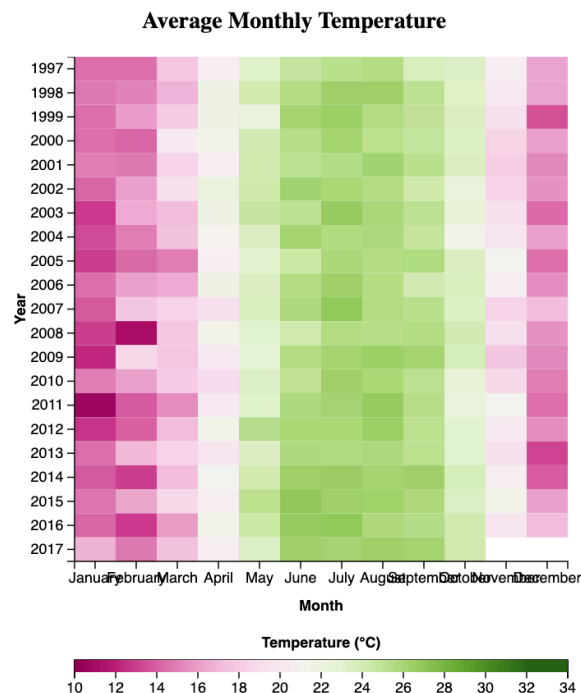
You are provided with a dataset recording the temperature of a city. It consists of two files: “temp\_daily.csv” and “temp\_monthly.csv”, which store the average temperature of each day and each month of this city. You, working as a data scientist, are asked to use D3 to implement a heatmap showing the temperature evolution of the city.

#### Basic requirements:

- 1) You need to implement the x and y axis, where the x-axis indicates the months and the y-axis represents the years.
- 2) Each cell or square shows the average temperature of the corresponding month and year. The color of each cell represents the average temperature of each month. The average temperature corresponds to the average of the max and min values in the specific month.
- 3) A legend is needed to show the mapping between colors and average temperatures.
- 4) You are requested to use D3, Javascript, HTML and CSS to implement the required visualization.

#### Deliverable

- 1) Below is the heatmap implemented by Jeff, please point out two limitations (i.e., visual design issues) of it. **(4 marks)**



2) D3-based implementation **(18 marks)**

- Make sure your implementation avoids the limitations you pointed out in 1), and make sure you do not bring new issues. Partial scores will be deducted if new issues appear in your visualization.
- Please finish all your implementation within a html file called **“PartA.html”** and make sure your code can be directly run by launching a Python web service.
- Make sure you have added appropriate comments in your html file to explain your code.
- Take a screenshot to show your final implementation result and provide a brief description of how you process the data and implement the heatmap (**<= 500 words**). The resulting image(s), the brief description of your implementation, and your comments for 1) should be put in a word file called **“Assign2.doc”**.

## Part B. Heatmap with animation and interaction (Difficulty Level: \*)

The heatmap in Part A is still a static visualization. You are asked to enable interactions and animated transitions for the heatmap. Your implementation for Part B can be built upon that of Part A.

### Basic Requirements:

- 1) **Animation:** Instead of directly showing the whole heatmap when loading the html page, we can show the heatmap cells year by year (or row by row) via animation, i.e., we will first show all the heatmap cells of 1997, then the heatmap cells of 1998, then the heatmap cells of 1999, so on and so forth. The animation duration for each row or year should be 1.5 seconds.
- 2) **Interaction:** When hovering the mouse on each cell, a tooltip should appear to show the date and the temperature value (An example tooltip is shown below), and the border of the corresponding heatmap cell should be highlighted as well (e.g., change the border width and/or color); when the mouse moved away, the tooltip should disappear and the highlighting effect for the border of heatmap cell should also be removed.



### Deliverable

1) D3-based implementation **(10 marks)**

- The code from Part A can be reused for Part B.
- Please finish all your implementation within an html file called **“PartB.html”** and make sure your code can be directly run by launching a Python web service.
- Make sure you have added appropriate comments in your html file to explain your code.

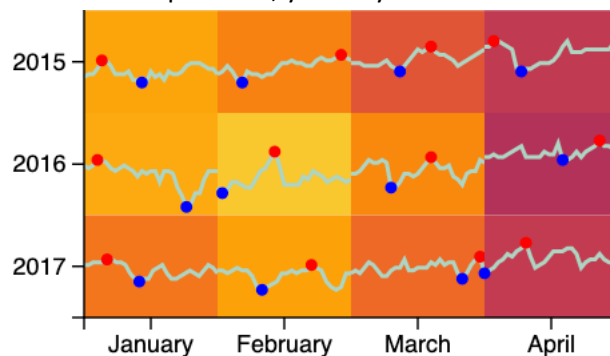
- Take screenshot(s) to show your final implementation result and provide a brief description of how you implement the animations and interactions (**<= 500 words**). The resulting image(s) and the brief description of your implementation should be put in the word file “Assign2.doc”.

## Part C. Heatmap augmented with a line chart (Difficulty Level: \*\*)

The heatmap in Part A can show only the average temperature of each month. The daily average temperature evolution within each month cannot be visualized. You are asked to insert a line chart to each heatmap cell to show the daily average temperature of each month in Part C. You only need to focus on the time range from 1997 to 2006.

### Basic Requirements:

- 1) The code from Part A can be reused for Part C. Also, Part C is independent of Part B, i.e., you do not need to enable interactions and animated transitions in Part C.
- 2) As shown in the figure below, each cell should show a line chart to present the average temperature of each day, informing users of more fine-grained details.
- 3) For the line chart within each cell, you are also asked to add two small circles with different colors (e.g., red and blue) to the line chart, which denotes the minimum and maximum average temperatures within a month. Note: if there are multiple days with a minimum or maximum temperature, you only need to draw the first day. An example is shown below.



**Hint:** Some built-in functions in D3 may be useful here, for example, `d3.min()`, `d3.max()`, `d3.line()`, `selection.each()`.

### Deliverable

- 1) D3-based implementation (**8 marks**)
  - Please finish all your implementation within an html file called “PartC.html” and make sure your code can be directly run by launching a Python web service.

- Make sure you have added appropriate comments in your html file to explain your code, especially the parts that visualize the line charts and draw the two circles within each month.
- Take screenshot(s) to show your final implementation result and provide a brief description of your implementation (**<= 500 words**). The resulting image(s) and the brief introduction to your implementation should be put in the word file "**Assign2.doc**".

## Submission

### 1) Note:

- Put the csv files, the html files and the word file within the same folder, and submit the zipped folder to elearn.
- This assignment must be your independent effort. You should NOT refer to or copy other students' work. **Plagiarism is strictly prohibited.**

### 2) Deadline: Nov. 13<sup>th</sup>, 2022 (Sunday), 11:59pm (mid-night)