Visualization examples with Google Charts

Ouline:

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1.1 Pie Charts

Analyse the file **GCT_ex_01.htm**. See how the main components of visualization are defined. Which interactions are available? Also check the attributes that are defined by default and those that need to be explicitly defined.
Double the dimension of the visualization area and modify also the Pie visualization to be in 3D.
https://developers.google.com/chart/interactive/docs/gallery/piechart

We suggest activating the debugger options of your browser to check the console. (Options->More Tools->Developer Tools or CTRL+SHIFT+I)

1.2 Bar Charts

Based on the previous example, represent the same data using a Bar Chart.
The interval associated to the horizontal axis seems adequate to represent accurately the data? Why? Modify the axis value to provide a visualization less misleading and remove the legend that is redundant.
https://developers.google.com/chart/interactive/docs/gallery/barchart

1.3 Column Charts

Adapt the previous example to show the data in a column Chart instead of a bar chart, perform the necessary customization as in the previous example.
https://developers.google.com/chart/interactive/docs/gallery/columnchart

1.4 Column Charts

Consider the file **DETI_Dados_Candidatos.xlsx** that contains the information relative to the number of candidates to DETI courses (MIEET, MIECT LTSI e LEI) from 2007 to 2012.

['2007', 328, 589, 115, 0],
['2008', 361, 605, 223, 0],
['2009', 400, 365, 152, 0],
['2010', 360, 357, 129, 0],
['2011', 325, 316, 96, 0],
['2012', 394, 344, 93, 0],
['2013', 404, 294, 102, 0],
['2014', 271, 307, 0, 501],
['2015', 402, 291, 0, 843],
['2016', 367, 337, 0, 802],
['2017', 407, 399, 0, 691],

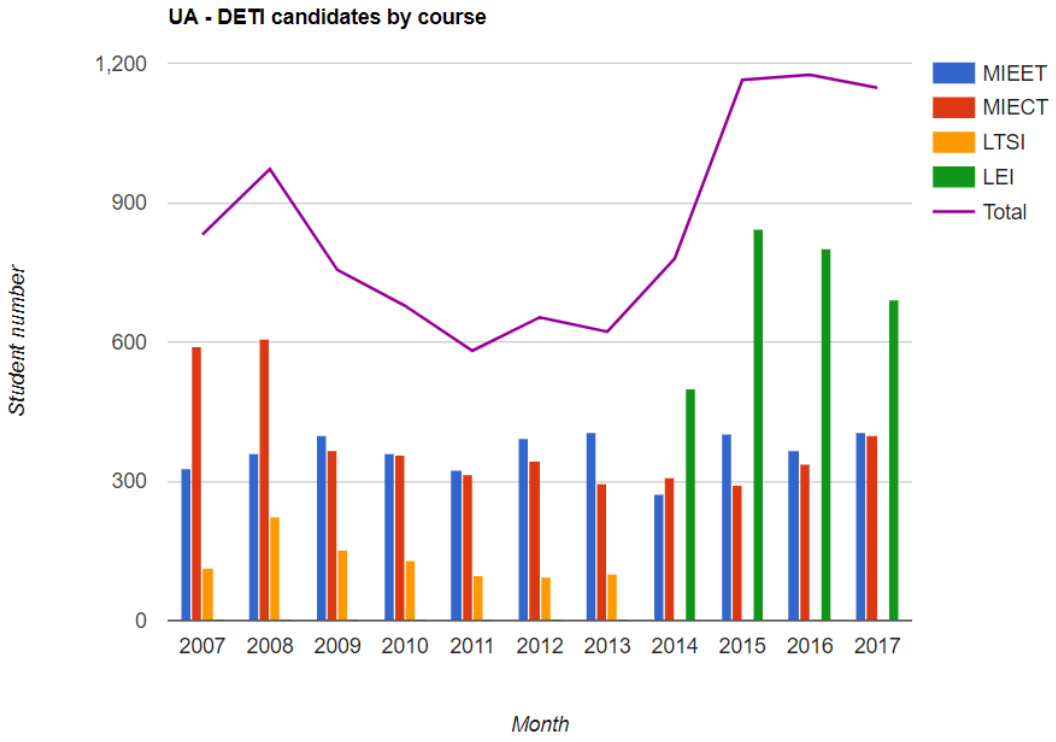
Represent this data using a Bar Chart. In this case since we have several courses a legend should be presented with the chart.

1.5 Line Charts

Represent the same information using a Line chart. If you are interested in the evolution of the number of student in each course, which chart seems more adequate, a column or a line chart? On the other side which chart would you use to compare the number of student between courses?
https://developers.google.com/chart/interactive/docs/gallery/linechart

1.6 Combo Charts

Modify the previous example to present a combo chart like the following figure. Notice that in this visualization we also present the total of candidates in each year.
https://developers.google.com/chart/interactive/docs/gallery/combochart



1.7 World cup example - ScatterChart

Consider the file world_cup.csv containing information about world cup according to the following table:

attendance	team1	team2	goals	tie	pk	stage	rounc	year	date	time	stadium	referee	url
25000	Italy	USA	1-7	False	FALSE	FIRST ROUND	FALSE	1934	27-05-1934	16:00	Stadio Nazionale del PNF (Rom	RenÍŒ© Mercet (SWI)	1934_ITALY_FS.htm
16000	Austria	France	2-3	False	FALSE	FIRST ROUND	FALSE	1934	27-05-1934	16:30	Benito Mussolini (Torino)	John van Moorsel (NED)	1934_ITALY_FS.htm
8000	Germany	Belgium	2-5	False	FALSE	FIRST ROUND	FALSE	1934	27-05-1934	16:30	Giovanni Berta (Firenze)	Francesco Mattea (ITA)	1934_ITALY_FS.htm
9000	Czechoslova	Romania	1-2	False	FALSE	FIRST ROUND	FALSE	1934	27-05-1934	16:30	Stadio del Littorio (Trieste)	Jean Langenus (BEL)	1934_ITALY_FS.htm
33000	Switzerland	Netherlands	2-3	False	FALSE	FIRST ROUND	FALSE	1934	27-05-1934	16:30	San Siro (Milano)	Ivan Eklind (SWE)	1934_ITALY_FS.htm
14000	Sweden	Argentina	2-3	False	FALSE	FIRST ROUND	FALSE	1934	27-05-1934	16:30	Stadio Littoriale (Bologna)	Erwin Braun (AUT)	1934_ITALY_FS.htm
21000	Spain	Brazil	1-3	False	FALSE	FIRST ROUND	FALSE	1934	27-05-1934	16:30	Luigi Ferraris (Genova)	Alfred Birlem (GER)	1934_ITALY_FS.htm
9000	Hungary	Egypt	2-4	False	FALSE	FIRST ROUND	FALSE	1934	27-05-1934	16:30	Giorgio Ascarelli (Napoli)	Rinaldo Barlassina (ITA)	1934_ITALY_FS.htm
23000	Austria	Hungary	1-2	False	FALSE	1/4 FINAL	FALSE	1934	31-05-1934	16:30	Stadio Littoriale (Bologna)	Francesco Mattea (ITA)	1934_ITALY_FS.htm
12000	Czechoslova	Switzerland	2-3	False	FALSE	1/4 FINAL	FALSE	1934	31-05-1934	16:30	Benito Mussolini (Torino)	Alois Beranek (AUT)	1934_ITALY_FS.htm
15000	Germany	Sweden	1-2	False	FALSE	1/4 FINAL	FALSE	1934	31-05-1934	16:30	San Siro (Milano)	Rinaldo Barlassina (ITA)	1934_ITALY_FS.htm
35000	Italy	Spain	1-1	False	FALSE	1/4 FINAL	FALSE	1934	31-05-1934	16:30	Giovanni Berta (Firenze)	Louis Baert (BEL)	1934_ITALY_FS.htm
43000	Italy	Spain	1-0	False	FALSE	1/4 FINAL	FALSE	1934	1-06-1934 (	16:45	Giovanni Berta (Firenze)	RenÍŒ© Mercet (SWI)	1934_ITALY_FS.htm
60000	Italy	Austria	1-0	False	FALSE	1/2 FINAL	FALSE	1934	3-06-1934 (	16:30	San Siro (Milano)	Ivan Eklind (SWE)	1934_ITALY_FS.htm
15000	Czechoslova	Germany	1-3	False	FALSE	1/2 FINAL	FALSE	1934	3-06-1934 (	16:30	Stadio Nazionale del PNF (Rom	Rinaldo Barlassina (ITA)	1934_ITALY_FS.htm
7000	Germany	Austria	2-3	False	FALSE	PLACES 3-4	FALSE	1934	7-06-1934 (	17:30	Giorgio Ascarelli (Napoli)	Albino Carraro (ITA)	1934_ITALY_FS.htm

Inspect the code available in GCT_ex_07.htm to load the data. Notice that this code is using the external library (jquery and jquery.csv) to load the data from the file.

Python server

Since the file is loading data from a file in the disk the browser blocks the loading. You will need to run local server to render the visualizations. You can start a local server using Python. Navigate to the directory that contains all the files and then type python -m SimpleHTTPServer in the command line. If you type localhost:8000 into the address bar of your browser, then you should see the files that you can display in the web page.

If you're in an environment running Python 3 instead of Python 2, you can use python -m http.server to start up the local server instead.
Run the example and try to understand the code. Namely the line where the data is loaded and selection of the columns to display in each axis.
What data is displayed in the chart? How is this specified.

1.8 Grouping data

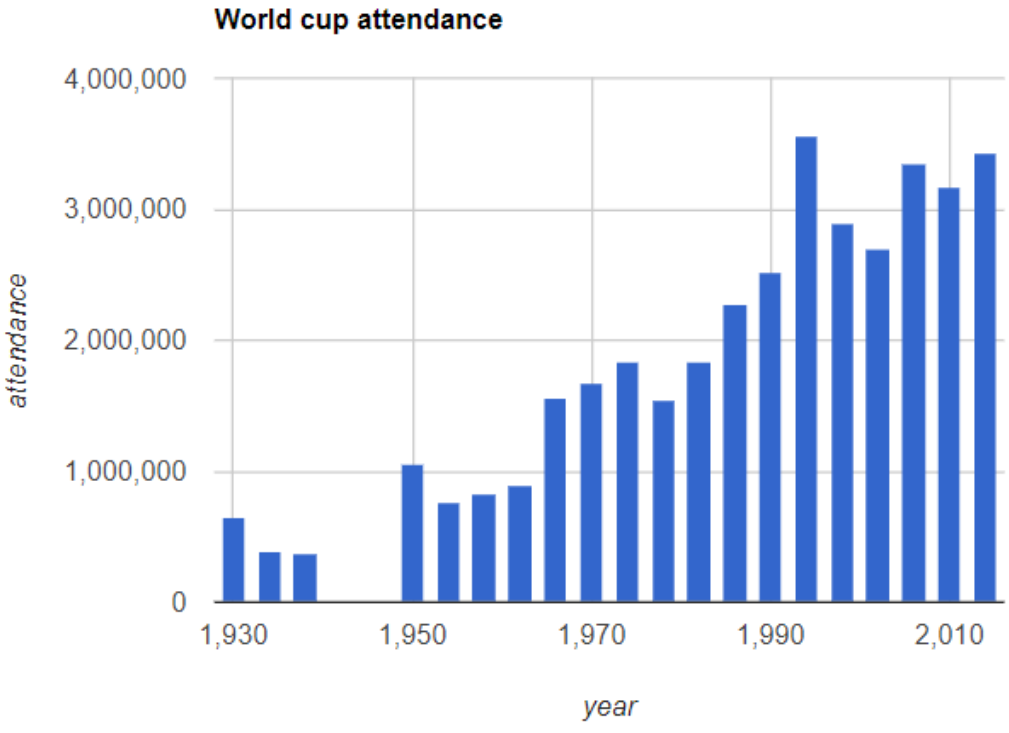
Imagine you would like to see the total attendance in each year, you would need to sum the attendance of all the games of a given year. This can be done in Google Charts using a function as follow:

```
// This call will group the table by column 0 values.
// It will also show column 8, which will be a sum of
// values in that column for that row group.

// Grouping of data
var result = google.visualization.data.group(
      data,
      [8],
      [{'column': 0, 'aggregation' : google.visualization.data.sum, 'type'
: 'number'}]
);
```

The resulting data of the grouping will have two columns: year (column 0) and total attendance attendance (column 1).
https://developers.google.com/chart/interactive/docs/reference#data-manipulation-methods

Modify the code to visualize the following ColumnChart.



Do you notice any particular effect on the data?
Do you think a ColumnChart is the best representation for this data? Why.

1.9 Line Chart

Modify the previous chart to present the data in a line chart. On one side the evolution of the attendance to the games is clearer, on the other side, the WWII effect has disappeared. Use the point options to show a marker at each data showing at the same time the line (evolution) and a marker of your choice to represent the data (each 4 years and WWII effect).
https://developers.google.com/chart/interactive/docs/points

1.10 Geo Charts

Consider the file **Censos_2011_Densidade_Populacional.xls** containing, for each portuguese province, the number of habitants per Km^2 according to the 2011 Portuguese population survey.
Complete the **GCT_ex_11.htm** example to represent the information relative to the 20 provinces with larger population density (add 5 provinces from the file).
Test the various interaction functionalities available in the example.

1.11 Tree Map Charts / Org chart

Build an **Org chart** representing the internal structure of the DETI. The final visualization should use the abbreviates as labels and the size to map the number of persons in each group. Use the following data:

```
                                DETI(549)
Teaching (400)
   Undergraduate (200)
   Masters (200)
Research (149)
   IEETA - Institute of Electronics and Informatics Engineering of Aveiro (87)
   IT - Telecomunication Institute (62)
```

Visualize in the same window, below the ***Org chart*** a ***Tree map*** representing the same structure.
https://developers.google.com/chart/interactive/docs/gallery/orgchart
https://developers.google.com/chart/interactive/docs/gallery/treemap