

EECS E6893 Big Data Analytics - Fall 2021

Homework 3: Data visualization

Due Friday, November 5th, 2021 by 5:00pm

In this homework, you are required to use the data we have provided to do some visualization with d3.js.

Part I Tasks:

In this part you are going to answer some basic problems of D3 first. Then you should modify a sample code to get a simple bar chart.

Problem 1 (35%)

1. Answer these questions in simple words. (These ideas will help you to finish the followed ng problems). **(4*5%)**

1.1 What's the difference between SVG Coordinate Space and Mathematical / Graph Coordinate Space?

1.2 What is `enter()` and `exit()` in d3.js?

1.3 What is `transform` and `translate` in SVG?

1.4 Try to understand the idea of anonymous function and its use in d3.js. If there is a list $a = [a, c, b, d, e]$, what is the return value of this anonymous function: `a.map(function(d,i) {return i+5})` (It should be a list)

2. Modify the sample code (`part1_samplecode.html`) to get the same figure as below: **(15%)**

2.1 You **must** have the same width and paddings of 5px as this given bar-chart.

Hint: As the `svg_width` and `bar_padding` is given, you can divide the width equally to get the width of bar.

2.2 The label **must** locate 2px above the middle of each bar.

2.3 You **must** use `transform` to **display the bars instead of the `attr(x),(y)` in sample code.**

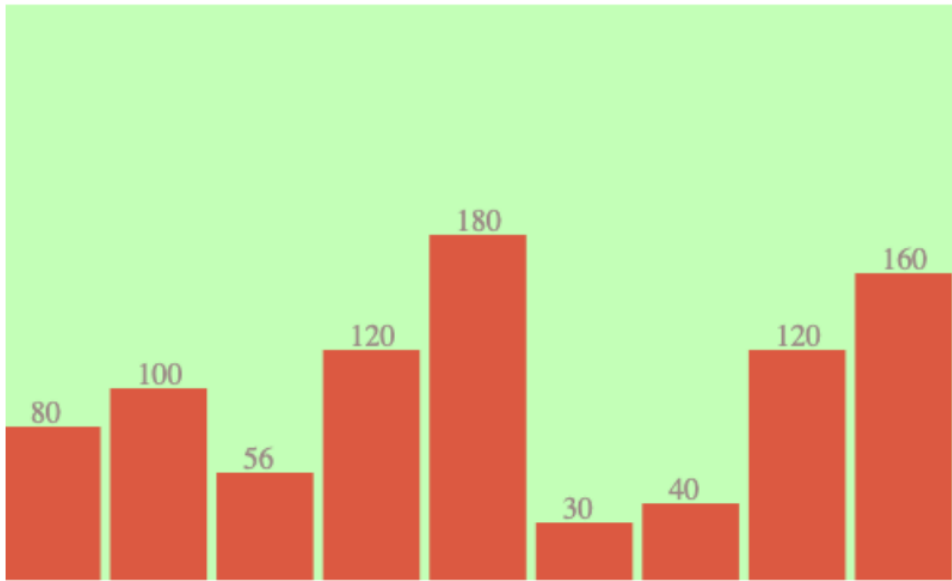
You can use `attr(x),(y)` to display the text, but it is recommend to use `transform` to do this too.

2.4 You should write the javascript in a single file (`.js`), separated with the structure file (`.html`). **(You can get this idea from problem 2,3)**

Hint: add another elements "text" to display the labels.
(You can use any color you like).

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Your answer should include both screenshots of your codes and the output bar-chart.



Part II Task:

After finishing problem 1, you will get some basic ideas of d3.js. Now have a look at the tutorial to get a brief idea of Django. Then you are required to query the data and use Django to build a simple web application for visualization.

You can either do this on your computer or create a VM (compute engine) on GCP or even use App Engine to do this. However, the tutorial is for localhost and there is no additional tutorial for finishing this homework on Google cloud, you should search for how to do this on cloud by yourself if you want.

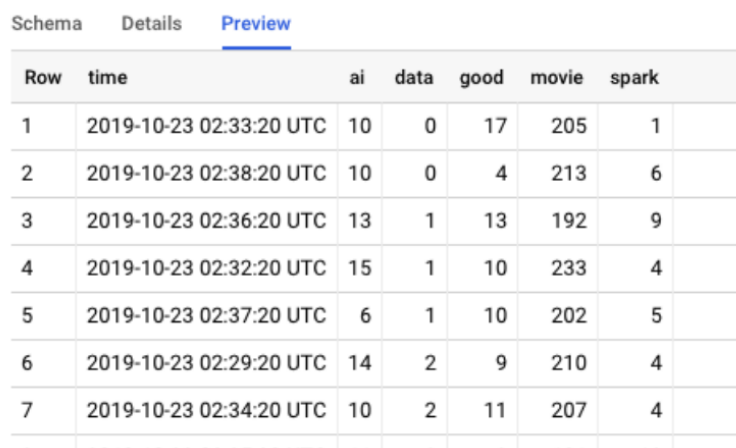
Use the sample code (`part2_samplecode`) to finish Step 3 of Problem 2 and all steps of Problem 3.

Problem 2 (30%)

In this problem you are required to process the data, create a Django project and finish the missing code to draw a dashboard.

Step1: Data processing (5%)

Process the `wordcount` table (`data_wordcount.csv`) to required format below (You use any method to do this, such as create a new table:



Row	time	ai	data	good	movie	spark
1	2019-10-23 02:33:20 UTC	10	0	17	205	1
2	2019-10-23 02:38:20 UTC	10	0	4	213	6
3	2019-10-23 02:36:20 UTC	13	1	13	192	9
4	2019-10-23 02:32:20 UTC	15	1	10	233	4
5	2019-10-23 02:37:20 UTC	6	1	10	202	5
6	2019-10-23 02:29:20 UTC	14	2	9	210	4
7	2019-10-23 02:34:20 UTC	10	2	11	207	4

It must contain 6 columns: time and the 5 words; more than 8 rows. You should combine the data which have the same time, and fill the missing value with 0.

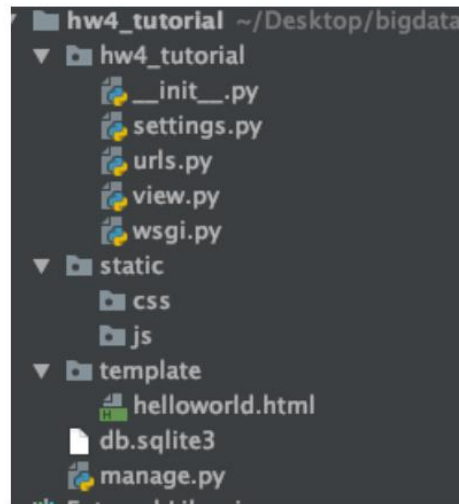
You can use any way to process the data, no matter Pandas or SQL.

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Screenshot of your code of data processing and the preview of the table in BigQuery like above.

Step2: Create Django project (5%)

Follow the tutorial and create a Django project. If you create a project named `hw4_tutorial`, the Directory Structure should look like below:



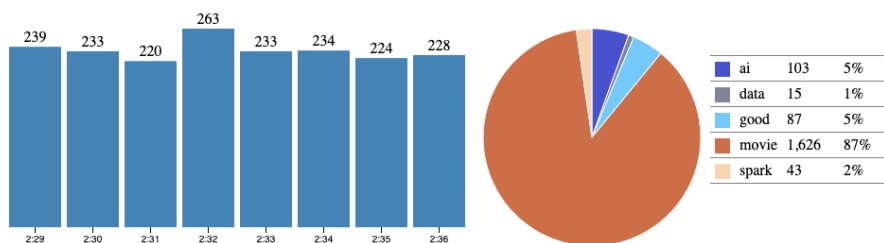
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Screenshot of Directory Structure of your project and a screenshot to show the *helloworld* page.

Step3: Finish the code (20%)

Replace/copy and paste the content in `view.py/urls.py` to the same files in your project. Put the 3 files: `dashboard.html`, `dashboard.css` and `dashboard.js` to the corresponding documents. Modified the code to draw a dashboard like below:

Question 2 - Dashboard



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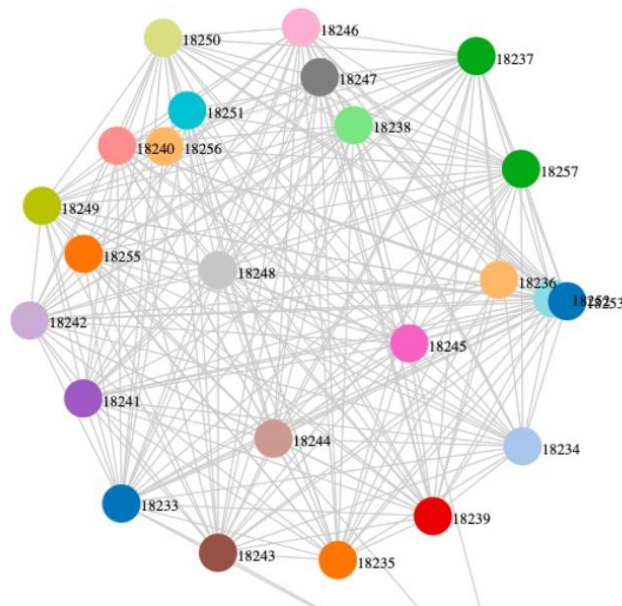
Screenshot of your code and the 2 table in BigQuery.

nodes		
Schema	Details	Preview
Row	node	
1	18233	
2	18234	
3	18235	
4	18236	

Schema	Details	Preview
Row	source	target
1	0	1
2	0	1
3	0	2
4	0	2
5	0	3

Step 2: Finish the code (25%)

Modified the code to draw a figure like below:



In `view.py`, you need to finish 2 SQL to query the 2 table to get data. (2*1pt) Then modified them to the required format. Notice that there **may be some** duplicates of edges' data and you are required to remove them. **The number of unique edges is 452.** (5 pt)

Finish the blanks in `connection.js`. (12*1pt)

Result (6pt)

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Screenshot of your code and the output result.