

Data Visualization & Advanced MongoDB Data Analytics

Tutorial – 4

CSP 584 - Enterprise Web Application

Dr. Atef Bader

Illinois Institute of Technology

TA- Prakhar Nag



2. Mongo DB – Download(Recap)

- Go to <https://www.mongodb.com/>, hover on the ‘Products’ button and click on community edition.
- Select Mongo DB Community Server and click download
- (Direct Link : <https://www.mongodb.com/try/download/community>)

The screenshot shows the MongoDB website's product selection interface. On the left, a sidebar lists various MongoDB products: MongoDB Atlas, MongoDB Enterprise Advanced, MongoDB Community Edition, MongoDB Community Server (which is highlighted with a white box), MongoDB Community Kubernetes Operator, Tools, and Atlas SQL Interface. The main content area has a dark header bar with the command '\$ brew install mongodb-atlas' and '\$ atlas setup'. Below this are dropdown menus for 'Version' (set to 7.0.1 (current)), 'Platform' (set to Windows x64), and 'Package' (set to msi). At the bottom, there are three buttons: 'Download' (green), 'Copy link' (dark blue), and 'More Options' (grey).

https://www.mongodb.com/try/download/community

Mongo DB Find/Query Data:

- Use ‘find’ method to query MongoDB to retrieve data from a collection
- ‘find’ can be used with a single collection.
- Using queries, you can either return;
 - All the documents in a collection
 - Only the documents that match a certain filter/criteria



Find all documents in a collection:

- In order to find all the documents in a collection, use the ‘find’ query without any parameters
- dbCursor - is a variable of type DBCursor, this variable can be used as an iterator and print all the values from the collection
- myReviews - Collection that has been used in the Application.
- find() - is an empty query, this will return all the documents from the given collection
- Example:
 - DBCursor dbCursor = myReviews.find();



Create a ‘query’

- A query can be created in the following way;

```
BasicDBObject query = new BasicDBObject();
```

- Now, once the query object is created, you can add multiple conditions in the following way;

```
query.put(Key, Value);
```

In order to find specific documents in a collection, use find along with some query values

- Example : Return the documents where the product name is ‘XBOX_ONE’ :

```
query.put("productName", "XBOX_ONE");
```

```
DBCursor dbCursor = myReviews.find(query);
```



Operators

- You can use different operators to conveniently filter the data based on different requirements
- Suppose, we want to filter only those reviews from our collection which have a rating of more than 3, we need to use '\$gt' (greater than)
- Example Return the documents where the review rating is above 3

```
BasicDBObject query = new BasicDBObject();
query.put("reviewRating", new BasicDBObject("$gt", 3));
DBCursor dbCursor = myReviews.find(query);
```

- Please refer this link for more information:
<https://docs.mongodb.org/manual/reference/operator/query/>



Limit and Sort

- ‘limit()’ accepts an integer value
- ‘sort()’ accepts an object of type DBObject
- Example: Return top 5 products based on maximum rating

```
int returnLimit = 5;
```

Created a new sort object

```
DBObject sort = new BasicDBObject();
```

Specify the field that you want to sort on, and the direction of the sort(1 is for ascending order and -1 is for descending order. The default value is 1)

```
sort.put("reviewRating",-1);
```

```
dbCursor = myReviews.find(query).limit(returnLimit).sort(sort);
```



Aggregation in MongoDB:

- Aggregation operations process multiple documents and return computed results.
You can use aggregation operations to:
 - Group values from multiple documents together.
 - Perform operations on the grouped data to return a single result.
 - Analyse data changes over time.
 - An aggregation pipeline consists of one or more stages that process documents:



Stages in Aggregation – \$match

- \$match - This is similar to ‘Where’ in SQL
- Example Match the documents where rating is 5:
 - DBObject match = new BasicDBObject("\$match", new BasicDBObject("reviewRating", 5));
- Matching stage is optional



Stages in Aggregation – \$group

- \$group - This is similar to SQL's 'GROUP BY' clause

- Example grouping based on retailer city:

```
DBObject groupFields = new BasicDBObject("_id", 0);
groupFields.put("_id", "$retailerCity");
groupFields.put("count", new BasicDBObject("$sum", 1))
DBObject group = new BasicDBObject("$group", groupFields);
```

Group by is done on retailer city fields using _id as key to group by

Increment the count by 1 using \$sum command



Stages in Aggregation – \$project

- \$project - This is similar to ‘SELECT’ in SQL
- Vertically Slicing Data from the Original Database.

- Example Getting count based on retailer city :

```
DBObject projectFields = new BasicDBObject("_id", 0);
projectFields.put("city", "$_id");
projectFields.put("Review Count", "$count");
DBObject project = new BasicDBObject("$project", projectFields);
```

Project Fields which
we want to display in
the output



Stages in Aggregation – \$limit and \$sort

Example: Return top 5 products based on maximum rating;

```
DBObject sort = new BasicDBObject();
```

Specify the field that you want to sort on, and the direction of the sort

```
sort.put("reviewRating",-1);
```

```
DBObject limit=new BasicDBObject();
```

```
DBObject orderby=new BasicDBObject();
```

Adding sort object in DbObject

```
orderby=new BasicDBObject("$sort",sort);
```

```
limit=new BasicDBObject("$limit",5);
```

```
aggregate = myReviews.aggregate(group,project,orderby,limit);
```



Final Stage in Aggregation:

- Now that we are done with the different stages, it is time to run the query
- Example;

```
AggregationOutput aggregate = myReviews.aggregate(match,group,project,orderby,limit);
for (DBObject result : aggregate.results()) {
    BasicDBObject bobj = (BasicDBObject) result;
    System.out.println(bobj.getString("City"));
    System.out.println(bobj.getString("Review Count"));
}
```
- Once the aggregate function is run, you can iterate through the result and print the required fields
- More information on aggregation can be found here:
<https://docs.mongodb.com/manual/aggregation/>



Data Analytics:

- We can use complex queries in Mongo DB to perform data analysis on the collection.
- This tutorial will demonstrate a few scenarios where you can construct dynamic queries and display the result.
- All the queries are created dynamically based on the filters selected on the screen.



Trending link:

Clicking on the trending button will take us to the page where we will display

- Top five most liked products,
- Top five most reviewed products regardless of the rating
- Top 5 zip code based on no of products reviewed

The screenshot shows the homepage of the Game Speed website. The header features a green game controller icon, the text "Game Speed", a search bar with placeholder "Search Product: search here..", and a navigation menu with links: Home, Consoles, Games, Tablets, Trending (which is highlighted with a red box), ViewOrder, Hello,Customer, Account, Logout, and Cart(0). On the left, there are three sidebar boxes: "Consoles" listing Microsoft, Sony, and Nintendo; "Games" listing Electronic Arts, Activision, and Take-Two Interactive; and "Tablets" listing Apple. The main content area has a title "Welcome to GameSpeed" and displays three game controllers: a PS4 controller on a blue background, an Xbox One controller on a green background, and a Wii U controller on a blue background. Below the controllers is a slogan: "The world trusts us to deliver SPEEDY service for video gaming fans".

Trending link for user – Query Outputs :



Game Speed

Home Consoles Games Tablets Trending ViewOrder Hello,Pnag Account Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

- Apple
- Microsoft
- Samsung

Accessories

- Microsoft Accessories
- Sony Accessories
- Nintendo Accessories

Search Product:
search here..

Best Products	
Surface	5
PS4	5
g4	4
XBOX Speeding Wheel	3
XBOX Speeding Wheel	2

Most Sold Products by Zipcode	
55555	2
61616	1
60000	1
44444	1

Most Sold Products	
XBOX Speeding Wheel	2
g4	1
Surface	1
PS4	1

Data Analytics (By Manager)

- Clicking on the data analytics link will take us to data analytics page where we can perform analytics required

The screenshot shows a web application with a purple header and a white content area. The header features a green game controller icon and the text "Game Speed". It includes a search bar with placeholder text "Search Product: search here..". Below the header is a navigation menu with links: Home, Consoles, Games, Tablets, Trending, Addproduct, Updateproduct, Deleteproduct, Trending, DataAnalytics (which is circled in red), Hello,Sm, Logout, and Cart(0). The main content area has a yellow sidebar on the left with three sections: "Consoles" listing Microsoft, Sony, and Nintendo; "Games" listing Electronic Arts, Activision, and Take-Two Interactive; and "Tablets". The main content area displays a welcome message "Welcome to GameSpeed" above three images of game controllers: a black PS4 controller, a black Xbox One controller, and a white Wii U controller.

Game Speed

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Sm Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

Welcome to GameSpeed

PS4 XBOX ONE Wii U

Data Analytics – Store Manager

- This page will contain all fields for selection by which we can perform data analytics



Game Speed

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Sm Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

Data Analytics on Review

Select Product Name:

Select Product Price:

Select Review Rating:

Select Retailer City:

Select Retailer Zip code:

Group By

Equals Greater Than Less Than

Equals Greater Than

Count Detail

Find Data

Query 1 – Print the list of all the reviews

- Press the find data button without any selection and you will get list of all reviews



Game Speed

Search Product:
search here..

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Sm Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

Data Analytics on Review

Select Product Name: All Products ▾

Select Product Price: 0 ▾

Select Review Rating: 1 ▾

Select Retailer City:

Select Retailer Zip code:

Group By City ▾

Equals
 Greater Than
 Less Than

Equals
 Greater Than

Count
 Detail

Find Data

Result 1 - Print the list of all the reviews



Game Speed

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Manager Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

- Apple
- Microsoft
- Samsung

Accessories

- Microsoft Accessories
- Sony Accessories
- Nintendo Accessories

Search Product:
search here..

Data Analytics on Review

Review	
Name:	XBOX Speeding Wheel
Rating:	2
Price:	89
Retailer City:	chicago
Date:	2023-09-15
Review Text:	not that great
RetailerZipCode:	55555
Review	
Name:	g4
Rating:	4
Price:	50
Retailer City:	atlanta
Date:	2023-09-18
Review Text:	great game.....
RetailerZipCode:	61616
Review	
Name:	Surface
Rating:	5
Price:	299
Retailer City:	texas
Date:	2023-09-18

Query 2 – Print a list of reviews where rating is more than 3

- Select the filter for rating and option greater than

The screenshot shows the Game Speed web application interface. At the top, there is a navigation bar with links for Home, Consoles, Games, Tablets, Trending, Addproduct, Updateproduct, Deleteproduct, Trending, DataAnalytics, Hello,Manager, Logout, and Cart(0). On the left side, there are four categories: Consoles, Games, Tablets, and Accessories, each with a list of brands. The Consoles category lists Microsoft, Sony, and Nintendo. The Games category lists Electronic Arts, Activision, and Take-Two Interactive. The Tablets category lists Apple, Microsoft, and Samsung. The Accessories category is partially visible. In the center, there is a form titled "Data Analytics on Review". The form includes fields for Product Name (dropdown menu), Product Price (text input), Review Rating (dropdown menu set to 3), Retailer City (text input), Retailer Zip code (text input), and Group By (dropdown menu set to City). To the right of the form, there are three sets of radio buttons for filtering: Equals (selected), Greater Than (selected), and Less Than; Equals (selected), Greater Than (selected); and Count (selected) or Detail (radio button). A "Find Data" button is located at the bottom right of the form area.

Game Speed

Search Product:
search here..

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Manager Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

- Apple
- Microsoft
- Samsung

Accessories

Data Analytics on Review

Select Product Name: All Products

Select Product Price: 0

Select Review Rating: 3

Select Retailer City:

Select Retailer Zip code:

Group By City

Equals
Greater Than
Less Than

Equals
Greater Than

Count
Detail

Find Data

Result 2 - Print a list of reviews where rating is more than 3

Only reviews with rating greater than 3 will be displayed

The screenshot shows a web application interface for 'Game Speed'. The top navigation bar includes links for Home, Consoles, Games, Tablets, Trending, Addproduct, Updateproduct, Deleteproduct, Trending, DataAnalytics, Hello, Manager, Logout, and Cart(0). A search bar is also present. The left sidebar contains four categories: Consoles (Microsoft, Sony, Nintendo), Games (Electronic Arts, Activision, Take-Two Interactive), Tablets (Apple, Microsoft, Samsung), and Accessories (Microsoft Accessories, Sony Accessories, Nintendo Accessories). The main content area displays a table titled 'Data Analytics on Review' containing three rows of review data, each with a 'Review' section header:

Review	
Name:	g4
Rating:	4
Price:	50
Retailer City:	atlanta
Date:	2023-09-18
Review Text:	great game.....
RetailerZipCode:	61616
Review	
Name:	Surface
Rating:	5
Price:	299
Retailer City:	texas
Date:	2023-09-18
Review Text:	good tablet!!!
RetailerZipCode:	60000
Review	
Name:	PS4
Rating:	5
Price:	349
Retailer City:	boston
Date:	2023-09-18

Query 3 - Get a list of products that got review rating 5 and price more than 200



Game Speed

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Manager Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

- Apple
- Microsoft
- Samsung

Accessories

Data Analytics on Review

Select Product Name:

Select Product Price: Equals Greater Than Less Than

Select Review Rating: Equals Greater Than

Select Retailer City:

Select Retailer Zip code:

Group By Count Detail

Find Data

Result 3 - Get a list of products that got review rating 5 and price more than 200

Data will be displayed with the reviews which we added that has price greater than 200 and rating 5



Game Speed

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Manager Logout Cart(0)

Consoles	
■ Microsoft	
■ Sony	
■ Nintendo	

Games	
■ Electronic Arts	
■ Activision	
■ Take-Two Interactive	

Tablets	
■ Apple	
■ Microsoft	
■ Samsung	

Accessories	
■ Microsoft Accessories	
■ Sony Accessories	

Search Product:
search here..

Data Analytics on Review

Review	
Name:	Surface
Rating:	5
Price:	299
Retailer City:	texas
Date:	2023-09-18
Review Text:	good tablet!!!
RetailerZipCode:	60000
Review	
Name:	PS4
Rating:	5
Price:	349
Retailer City:	boston
Date:	2023-09-18
Review Text:	very good console
RetailerZipCode:	44444

Query 4 - Print a list of how many reviews for every product

Select the group by filter to get count based on products



Game Speed

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Sm Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

- Apple
- Microsoft
- Samsung

Accessories

Data Analytics on Review

Select Product Name:

Select Product Price:

Select Review Rating:

Select Retailer City:

Select Retailer Zip code:

Group By

Equals Greater Than Less Than

Equals Greater Than

Count Detail

Find Data

Result 4 - Print a list of how many reviews for every product



Game Speed

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Manager Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

- Apple
- Microsoft
- Samsung

Accessories

- Microsoft Accessories
- Sony Accessories
- Nintendo Accessories

Search Product:

Data Analytics on Review

Name	Count
XBOX Speeding Wheel	2
g4	1
PS4	1
Surface	1

Query 5 - Get the list of reviews for shoppers in Chicago



Game Speed

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Manager Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

- Apple
- Microsoft
- Samsung

Accessories

- Microsoft Accessories
- Sony Accessories
- Nintendo Accessories

Search Product:
search here..

Data Analytics on Review

Select Product Name: All Products

Select Product Price: Equals Greater Than Less Than

Select Review Rating: Equals Greater Than

Select Retailer City:

Select Retailer Zip code:

Group By Count Detail

Result 5 - Get the list of reviews for shoppers in Chicago



Game Speed

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics HelloManager Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

- Apple
- Microsoft
- Samsung

Accessories

- Microsoft Accessories
- Sony Accessories
- Nintendo Accessories

Data Analytics on Review

Review	
Name:	XBOX Speeding Wheel
Rating:	2
Price:	89
Retailer City:	chicago
Date:	2023-09-15
Review Text:	not that great
RetailerZipCode:	55555
Review	
Name:	XBOX Speeding Wheel
Rating:	3
Price:	89
Retailer City:	chicago
Date:	2023-09-19
Review Text:	soo good
RetailerZipCode:	55555

Sample Code: Top five zip-codes where maximum number of products sold

```
pw.print("<table id='bestseller'>");  
    groupFields = new BasicDBObject("_id", 0);  
    groupFields.put("count",new BasicDBObject("$sum",1));  
    groupFields.put("_id", "$zipCode");  
    group = new BasicDBObject("$group", groupFields);  
    sort = new BasicDBObject();  
    projectFields.put("value", "$_id");  
    projectFields.put("ReviewValue", "$count");  
    project = new BasicDBObject("$project", projectFields);  
    sort.put("ReviewValue", -1);  
    orderby=new BasicDBObject("$sort",sort);  
    limit=new BasicDBObject("$limit",5);  
    aggregate = myReviews.aggregate(group,project,orderby,limit);  
    constructGroupByContent(aggregate,pw);  
pw.print("</table>");
```



Sample Code: Top five zip-codes where maximum number of products sold

```
public void constructGroupByContent(AggregationOutput aggregate, PrintWriter pw) {  
  
    for (DBObject result : aggregate.results()) {  
        BasicDBObject bobj = (BasicDBObject) result;  
        String tableData = "<tr><td> "+bobj.getString("value")+"</td>&nbsp"  
            + "<td>"+bobj.getString("ReviewValue")+"</td></tr>";  
        pw.print(tableData);  
    }  
}
```



Sample Code for list of reviews where rating greater than 3:

```
int reviewRating = Integer.parseInt(request.getParameter("reviewRating"));
String compareRating = request.getParameter("compareRating");
String[] filters = request.getParameterValues("queryCheckBox");
myReviews=MongoDBDataStoreUtilities.getConnection();
BasicDBObject query = new BasicDBObject();
boolean noFilter = false;
boolean filterByRating = false;
if(filters != null){
    for (int i = 0; i < filters.length; i++) {
        //Check what all filters are ON
        //Build the query accordingly
        switch (filters[i]){
            case "reviewRating":
                filterByRating = true;
                if (compareRating.equals("EQUALS_TO")) {
                    query.put("reviewRating", reviewRating);
                }else{
                    query.put("reviewRating", new BasicDBObject("$gt", reviewRating));
                }
                break;}}
DBCursor dbCursor = myReviews.find(query);
constructTableContent(dbCursor, pw);
```

Sample Code for list of reviews where rating greater than 3

```
public void constructTableContent(DBCursor dbCursor,PrintWriter pw)
{
    String tableData = "";
    pw.print("<table class='gridtable'>");
    while (dbCursor.hasNext())
    {
        BasicDBObject bobj = (BasicDBObject) dbCursor.next();
        tableData = "<tr><td align='center' colspan='2'>Review</td></tr><tr><td>Name:</td><td>" +
bobj.getString("productName") + "</td></tr>" +
                + "<tr><td>Rating:</td><td>" + bobj.getString("reviewRating") + "</td></tr>" +
                + "<tr><td>Date:</td><td>" + bobj.getString("reviewDate") + "</td></tr>" +
                + "<tr><td>Review Text:</td><td>" + bobj.getString("reviewText")+"</td></tr>";
        pw.print(tableData);
    }
    pw.print("</table>");
    //No data found
    if(dbCursor.count() == 0)
    {
        tableData = "<h2>No Data Found</h2>";
        pw.print(tableData);
    }
}
```



Data Visualization Using Google Charts

- Google Charts provides a perfect way to visualize data on your website.
- The most common way to use Google Charts is with simple JavaScript that you embed in your web page.
- Load Google Chart libraries, list the data to be charted, select options to customize the chart, and finally create a chart object with an id that you choose.
- Then, later in the web page, create a <div>with that id to display the Google Chart.
- Charts are exposed as JavaScript classes, and Google Charts provides many chart types - We are interested in Bar Charts.
- All chart types are populated with data using the Data Table class, making it easy to switch between chart types as you experiment to find the ideal appearance
- Visit this page for details:
<https://developers.google.com/chart/interactive/docs/gallery/barchart>



Implementation Details

- **Gson** - is a Java library provided by google that can be used to convert Java Objects into their JSON representation. It can also be used to convert a JSON string to an equivalent Java object.
- You can download the jar file here:
<https://repo1.maven.org/maven2/com/google/code/gson/gson/2.8.8/>
- Make sure to place ‘gson-2.8.8.jar’ jar file in lib folder of Tomcat. And do not forget to include its path while compiling the code.
- Create two new files namely ‘Datavisualization.java’ and ‘Datavisualization.js’ (We need this to draw the chart).



Code sample to plot Bar Chart

```
<html>
  <head>
    <script type="text/javascript" src="https://www.gstatic.com/charts/loader.js"></script>
    <script type="text/javascript">
      google.charts.load('current', {'packages':['bar']});
      google.charts.setOnLoadCallback(drawChart);

      function drawChart() {
        var data = google.visualization.arrayToDataTable([
          ['Year', 'Sales', 'Expenses', 'Profit'],
          ['2014', 1000, 400, 200],
          ['2015', 1170, 460, 250],
          ['2016', 660, 1120, 300],
          ['2017', 1030, 540, 350]
        ]);

        var options = {
          chart: {
            title: 'Company Performance',
            subtitle: 'Sales, Expenses, and Profit: 2014–2017',
          },
          bars: 'horizontal' // Required for Material Bar Charts.
        };

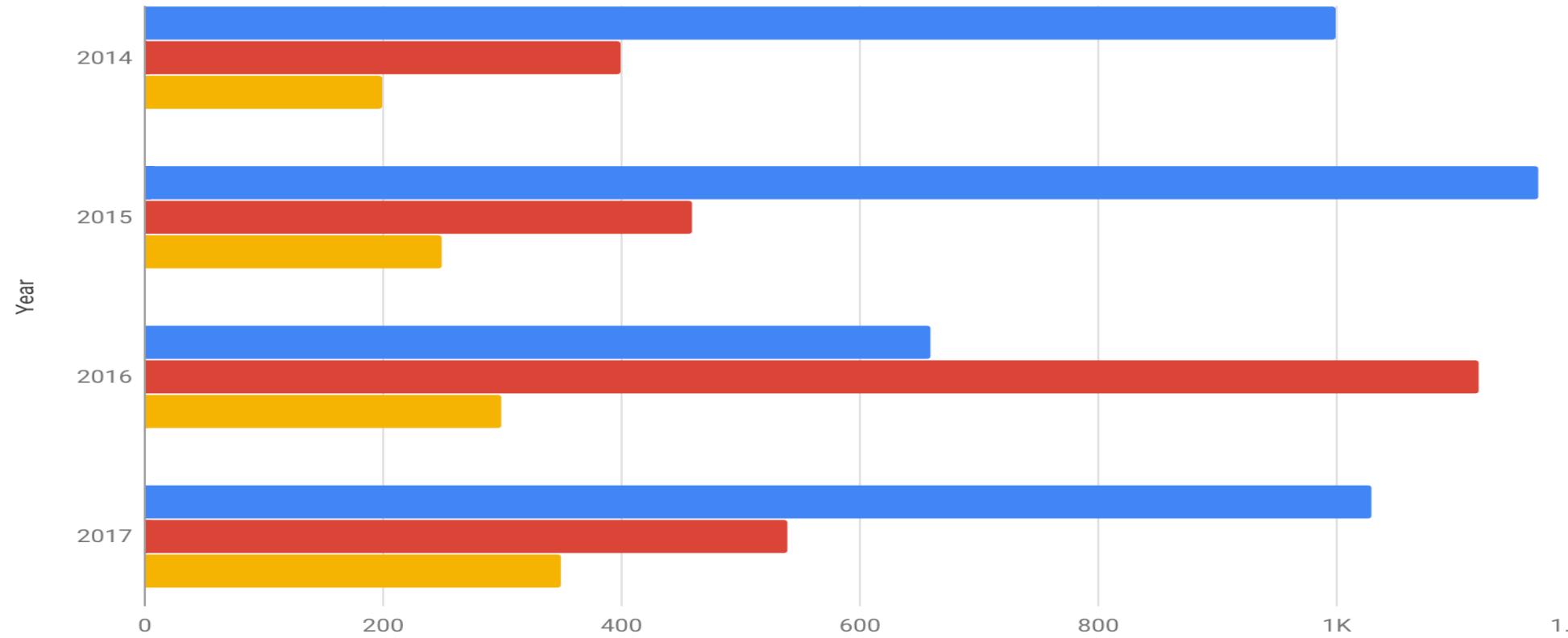
        var chart = new google.charts.Bar(document.getElementById('barchart_material'));

        chart.draw(data, google.charts.Bar.convertOptions(options));
      }
    </script>
  </head>
  <body>
    <div id="barchart_material" style="width: 900px; height: 500px;"></div>
  </body>
</html>
```



Sample Bar Chart

Company Performance
Sales, Expenses, and Profit: 2014-2017



‘DataVisualization.js’

```
/* Plot the chart using 2d array and product names as subtitles;
 * data - contains data to be plotted in the form of two dimensional array.
 * productNameArr - An array of product names to be used as subtitles
 */
function drawChart(data, productNameArr) {

    //Invoke google's built in method to get data table object required by google.
    var chartData = google.visualization.arrayToDataTable(data);

    var options = {
        'width':600,
        'height':650,
        chart: {
            title: 'Trending Products Chart',
            subtitle: productNameArr,
        },
        bars: 'horizontal' // Required for Material Bar Charts.
    };

    var chart = new google.visualization.BarChart(document.getElementById('chart_div'));
    chart.draw(chartData, options);
}
```



‘DataVisualization.java’

Make an Ajax call to get the data required to plot the chart. Gson is used here to convert Java collection to JSON.

```
protected void doPost(HttpServletRequest request, HttpServletResponse response)
    throws ServletException, IOException {

    try {
        ArrayList<Review> reviews = MongoDBDataStoreUtilities.selectReviewForChart();
        ArrayList<Review> topReviewsPerCity = getTop3InEveryCity(reviews);

        String reviewJson = new Gson().toJson(topReviewsPerCity);

        response.setContentType("application/JSON");
        response.setCharacterEncoding("UTF-8");
        response.getWriter().write(reviewJson);

    } catch (Exception ex) {
        System.out.println(ex.getMessage());
    }

}
```



‘MongoDBDataStoreUtilities.java’

```
//Get all the reviews grouped by product and zip code;
public static ArrayList<Review> selectReviewForChart() {

    ArrayList<Review> reviewList = new ArrayList<Review>();
    try {

        getConnection();
        Map<String, Object> dbObjIdMap = new HashMap<String, Object>();
        dbObjIdMap.put("retailerpin", "$retailerpin");
        dbObjIdMap.put("productName", "$productName");
        DBObject groupFields = new BasicDBObject("_id", new BasicDBObject(dbObjIdMap));
        groupFields.put("count", new BasicDBObject("$sum", 1));
        DBObject group = new BasicDBObject("$group", groupFields);

        DBObject projectFields = new BasicDBObject("_id", 0);
        projectFields.put("retailerpin", "$_id");
        projectFields.put("productName", "$productName");
        projectFields.put("reviewCount", "$count");
        DBObject project = new BasicDBObject("$project", projectFields);

        DBObject sort = new BasicDBObject();
        sort.put("reviewCount", -1);

        DBObject orderby = new BasicDBObject();
        orderby = new BasicDBObject("$sort", sort);

        AggregationOutput aggregate = myReviews.aggregate(group, project, orderby);
    }
}
```



Login as Store Manager – ‘Trending’ link is displayed

 Game Speed

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Manager Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

- Apple
- Microsoft
- Samsung

Accessories

- Microsoft Accessories
- Sony Accessories
- Nintendo Accessories

Search Product:
search here..

Trending link for visualization

Welcome to GameSpeed



The world trusts us to deliver SPEEDY service for video-gaming fans

We beat our competitors in all aspects.
Price-Match Guaranteed



Click on 'View Chart'

localhost:8080/Tutorial_4/DataVisualization

Notice the URL

Game Speed



Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct DataAnalytics HelloManager Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

- Apple

Search Product:
search here..

Data Visualization

Click on 'View Chart' button to view the chart

[View Chart](#)

Data Visualization – Bar Chart of most liked products in every city by zipcode



Game Speed

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Manager Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

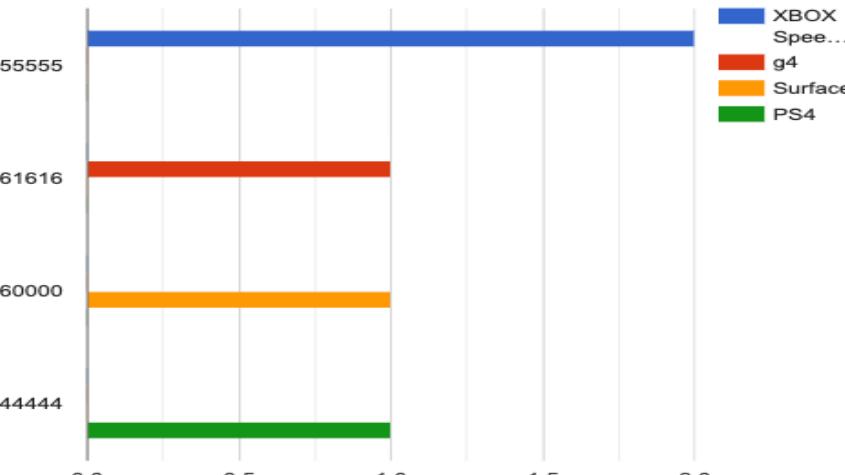
- Apple
- Microsoft
- Samsung

Accessories

- Microsoft Accessories
- Sony Accessories
- Nintendo Accessories

Search Product:
search here..

Data Visualization



City	XBOX	g4	Surface	PS4
55555	2.0	0.0	0.0	0.0
61616	0.0	1.0	0.0	0.0
60000	0.0	0.0	1.0	0.0
44444	0.0	0.0	0.0	1.0

X-axis: Zip Code, Y-axis: Number of reviews



Game Speed

Search Product:
search here..

Home Consoles Games Tablets Trending

Addproduct Updateproduct Deleteproduct Trending DataAnalytics Hello,Manager Logout Cart(0)

Consoles

- Microsoft
- Sony
- Nintendo

Games

- Electronic Arts
- Activision
- Take-Two Interactive

Tablets

- Apple
- Microsoft
- Samsung

Accessories

- Microsoft Accessories
- Sony Accessories
- Nintendo Accessories

Data Visualization

X-axis : Zip code

Hover over each bar to see product name ^ number of reviews.

55555 XBOX Speeding Wheel: 2

55555

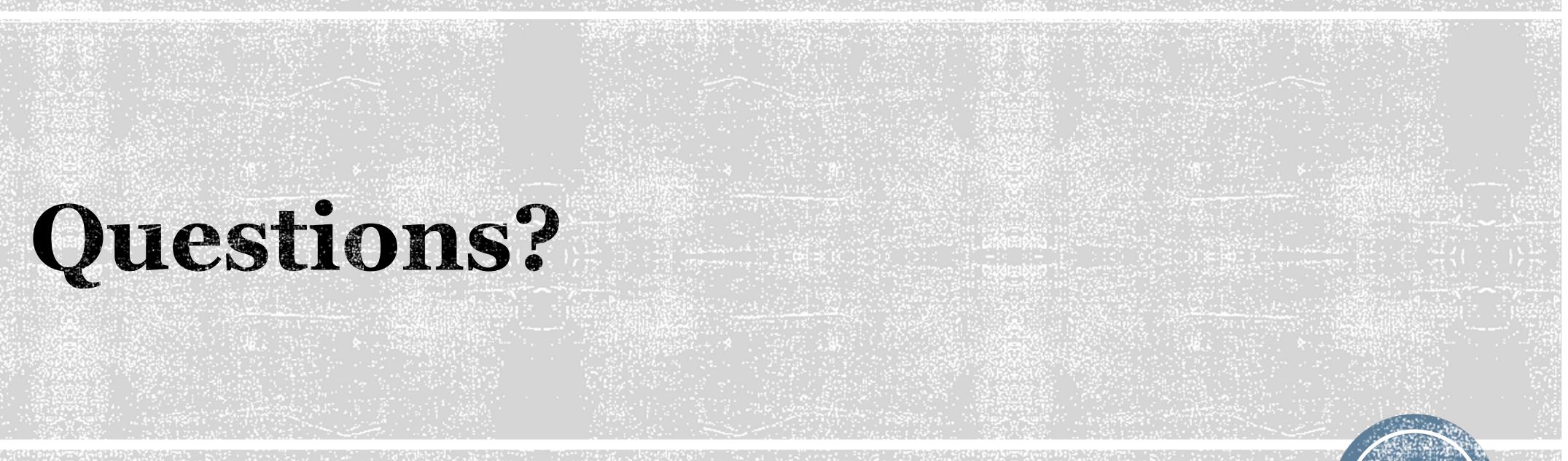
61616

60000

44444

Y-axis : Number of reviews

Zip Code	Product	Number of reviews
55555	XBOX Speeding Wheel	2
61616	g4	1
60000	Surface	1
44444	PS4	1



Questions?

