**CS301 Database Management Systems  
Spring 2024**Assignment #6

MongoDB Queries and Indexes

**Due: Apr. 15 by 11:59 pm**

**MongoDB Queries**: Write the following eight (8) MongDB queries in a text file named A6query.txt. Place the query number before each query in a comment using //. Do not include the \_id field unless specified otherwise. Make sure to test your answers using the db.CS301 collection,

1. Using the single collection method count, return the number of companies whose founded\_year is before the year of 1980 and category\_code is “music”.
2. List the name, founded\_year, number\_of\_employees and total\_money\_raised for the companies whose founded\_year is after 2000 and whose number\_of\_employees is greater than or equal to 1000. Order the result by founded\_year in ascending order, and for the companies with the same founded\_year, order them by number\_of\_employees in descending order.
3. List the name and founded\_year for the companies whose founded\_year was before 1805 or whose founded\_year was after 2012.
4. For the companies with their founded\_year equal to 1800 and that have at least one named product, list their name, homepage\_url, number\_of\_employees and product names, using the find method.
5. Write the previous query using the aggregate method.
6. List the maximum number\_of\_employees over all companies. Try to answer using both sort and aggregate methods, but enter only one answer here.
7. For the companies that have a list of products, list their names and the number of products (name it as Num\_Prod), using the aggregate method.
8. For each founded\_year after 1990, find the maximum number\_of\_employees (name it as Max\_Emp) among the companies that were founded in that particular year. List the result in descending order of maximum number\_of\_employees. Make sure to rename the \_id key back to the founded\_year, and to eliminate the companies with their founded\_year unknown.

**Indexes:** Using Algorithm 17.3 on Page 626, insert the following key values, 4, 1, 7, 8, 9, 2, 5, 6 into a B+ tree of order p=3 and pleaf=2, starting with an empty tree. Draw the B+ tree after each insertion, like Figure 17.12 on Page 628. Place your answer in a pdf file named A6index.pdf.