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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E. **Semester: VII**
Branch: Computer Science And Engineering **Duration: 3 hrs.**
Course Code: 21CS7PENSD **Max Marks: 100**
Course: NoSQL Database

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may suitably assumed.

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Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1 a) Define Scalability. Explain different types of Scalabilities. **6**

b) Consider a mongodb database called "Prefs". The database has a collection called "Location". Write a Java/Python program that connects to MongoDB, lists all the collections in the prefs database, and then lists all the documents within the location collection. **6**

c) List and explain various NoSql databases with an example for each type. **8**

UNIT - II

2 a) The NYC Data Mine public raw data on parking spaces available consists of following fields license_number, facility_type, entity_name, camis_trade_name, address_bldg, address_street_name, address_location, address_city, address_state, address_zip_code, telephone_number, number_of_spaces.In Redis for each parking facility the attributes are stored in a hash, which is identified by the key of the form parking_facility:<license_number>. **6**

Write the queries in redis to do the following with respect to license number 1105006

i) See all keys in the hash associated with license number
ii) Print out all the keys and the corresponding values in a hash for licence number
iii) print out only the address_city and the address_zip_code
iv) To get a count of the number of keys
v) Check if address_city was one of these
vi) Print out all values using the HVALS command

b) Consider MOVIELENS dataset with three Files **6**

- movies.dat - <MovieID>::<Title>::<Genres> -
- ratings.dat- UserID::MovieID::Rating::Timestamp
- users.dat- UserID::Gender::Age::Occupation::Zip-code

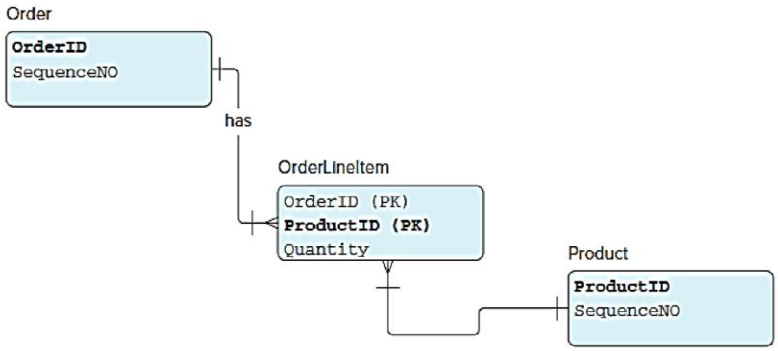
Write a map reduce function in mongodb to calculate the average rating for each movie in the ratings collection

c) Compare and contrast the storage architecture of RDBMS and Column Oriented databases with necessary tables. **8**

OR

3 a) Consider a table named emp. It has two column families: “personal_data” and “professional_data”. Personal_data has columns name and city. Professional data has coloumns designation and salary. Assuming that the data already exists in the tables write a java/python program to get the name and city data from 1st row key. **6**

b) Consider the following retail system --which creates and manages order records. Each person’s purchase at this fictitious store is an order. An order consists of a bunch of line items. Each order line item includes a product (an item) and number of units of that product purchased. A line item also has a price attribute, which is calculated by multiplying the unit price of the product by the number of units purchased **6**



Write queries in mongodb

i) To create and save Order and Product Collections with unit price stored in product collection
ii) Get all the documents in the orders collection
iii) Get all the orders after October 25, 2010, that is, with order_date greater than October 25, 2010.
iv) To get all documents from the orders collection where line item name is latte

c) Demonstrate the distributed storage architecture of Hbase with a neat diagram **8**

UNIT - III

4 a) Write queries in GQL for the following **6**

i) Create a Class called Employee with properties Emp_ID, Emp_Name, Joining_Date, DeptName
ii) Create two objects of the class Employee with key name Emp 1 and Emp2 . Emp 2 do not have a join date
iii) Retrieve two Employee entities with joining date is 1st feb 1992 and print the Name of the same in ascending order
iv) Traverse through the employee names of entire result set

b) Design a recommendation system on a simple file, named ratings.csv to get the top 5 recommendations. Each line of this file has user_id, item_id, ratings. **6**

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c) Write a simple java program that interacts with SimpleDB using the AWS SDK. Exclude all import statements. **8**

UNIT - IV

5 a) Consider a tag synonyms store. Such a store would have a tag as the key. All tags that have similar or the same meaning as the key tag would constitute the value. Write a program in java to access this tag synonyms data store from Spring using a redis template. **6**

b) List the drawbacks of Using Memcached with MySQL. Demonstrate how HandlerSocket plugin for MySQL is beneficial over Memcached with MySQL **6**

c) Demonstrate Mongodb Wire Protocol along with the operations allowed with a neat diagram. **8**

UNIT - V

6 a) Write the Mongodb queries using PHP driver for the following **6**

i) Connect to a database called ‘contacts ‘ and a collection called ‘people’. Insert a document with following attributes :FirstName, LastName, Address(Array), Email(Array),Phone,Age
ii) Print the details of a person whose last name is ‘Moran’
iii) Sort the contacts based on their age in ascending order

b) Write the Mongodb queries using pymongo driver for the following **6**

i) Insert an item document into a collection called items with following attributes- Type, itemnumber, status, location, tags
ii) Print the itemnumber and location based on sorted itemnumber
iii) To search for any document that has a key/value pair of "Type" : "Desktop"—and then update each document that matches the query by setting an additional key/value pair of "Status" : "In repair”

c) Consider a blog applications which contains the following pair of collections: **8**

• posts: Contains the posts added to the database with attributes Title, Author, Date, Message and Comments
• authors: Contains any information related to the posts’ authors, assuming there is more than one author. Attributes are Name, Email, and Interests.

i) Write a PHP code to list the 10 most recent posts on the frontpage
ii) Assume more than 10 posts have been added. Obviously, the first posts added will no longer be displayed, so you will need to make sure that older posts remain visible in case you want to find these later. Demonstrate how to achieve this by using paging concept

OR

7 a) It is possible that your data will be left in a damaged or incomplete state if your server unexpectedly reboots or your MongoDB server crashes for any reason. List out the indications that your data has been compromised Also write the code to perform MongoDB backup operation. **6**

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b) Illustrate the following operations by writing queries in Mongodb with python **6**
   i) Adding a Value to an Array with $push
   ii) Adding a Value to an Existing Array with $addToSet
   iii) Removing an Element from an Array with $pop
   iv) Retrieving Items from an Array with $slice

c) Demonstrate how to create a reference and retrieve the information using DBRef with PHP driver in mongodb with an example **8**

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