Department of Computer Engineering
Faculty of Engineering

Kasetsart University

HW# NoSQL & MongoDB

In this homework, you should create an evidence of your work such as picture with description in PDF and submit the Github link of your homework. Make sure that your Github link is public.

1) You're creating a database to contain a set of sensor measurements from a two-dimensional grid. Each measurement is a time-sequence of readings, and each reading contains ten labeled values. Should you use the relational model or MongoDB? Please justify your answer

MongoDB is the best choice here because the data can be changed or add more field, Moreover MongoDB is more flexible which is suit for this data.

2) For each of the following applications
   a. IoT
   b. E-commerce
   c. Gaming
   d. Finance

   Propose an appropriate Relational Model or MongoDB database schema. For each application, clearly justify your choice of database.

a. MongoDB

//Temperature collection

{"_id": 2, "sensor_id": 12345, "temperature": 30}

{"_id": 3, "sensor_id": 12345, "temperature": 40}

{"_id": 4, "sensor_id": 12345, "temperature": 50}

b. Relational Model

Product (product_id, type, description, price)

Customer (customer_id, name, address, phone)

Order (order_id, product_id, customer_id, date, total_price)

Payment (payment_id, payment_type, order_id)

c. Relational Model

Player (player_id, username, email)

Server (server_id, player_id)

Region (server_id)

d. Relational Model

User (user_id, name, email, address, phone)

Account (account_id, user_id, type, balance)

Transactions (transaction_id, account_id, amount, date)

3) Create MongoDB database with following information.

1) ({"name":"Ramesh","subject":"maths","marks":87})

2) ({"name":"Ramesh","subject":"english","marks":59})

3) ({"name":"Ramesh","subject":"science","marks":77})

4) ({"name":"Rav","subject":"maths","marks":62})

5) ({"name":"Rav","subject":"english","marks":83})

6) ({"name":"Rav","subject":"science","marks":71})

7) ({"name":"Alison","subject":"maths","marks":84})

8) ({"name":"Alison","subject":"english","marks":82})

9) ({"name":"Alison","subject":"science","marks":86})

10) ({"name":"Steve","subject":"maths","marks":81})

11) ({"name":"Steve","subject":"english","marks":89})

12) ({"name":"Steve","subject":"science","marks":77})

13) ({"name":"Jan","subject":"english","marks":0,"reason":"absent"})

Give MongoDB statements (with results) for the following queries

- Find the total marks for each student across all subjects.
- Find the maximum marks scored in each subject.
- Find the minimum marks scored by each student.
- Find the top two subjects based on average marks.

- Find the total marks for each student across all subjects.

```
db.collection.aggregate([{$group:{_id:"$name", total_marks:{$sum:"$marks"}}}])
```

- Find the maximum marks scored in each subject.

```
db.collection.aggregate([{$group:{_id:"$subject", max_marks:{$max:"$marks"}}}])
```

- Find the minimum marks scored by each student.

```
db.collection.aggregate([{$group:{_id:"$name", min_marks:{$min:"$marks"}}}])
```

- Find the top two subjects based on average marks.

```
db.collection.aggregate([{$group:{_id:"$subject", avg_marks:{$avg:"$marks"}}}, {$limit:2}])
```