

HW1 Task1 Report

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Time used

Five hours.

Task 1a

There are a few advantages of MongoDB over traditional relational database.

The first one is that MongoDB has large volumes of structured, semi-structured, and unstructured data. MongoDB is a document database in which one collection holds different documents. Number of fields, content and size of the document can differ from one document to another. In our application, different users have different amount of data fields. Therefore, if we are using traditional database, we will waste a lot of memory.

The second advantage is that MongoDB has deep query-ability. Therefore, we don't have to worry about losing the powerful SQL queries in relational database. Also, we can have different types of indexing which can help us improve the performance of our application.

The third advantage is the MongoDB is easy to scale out. When the number of users of our application grows, we can easily scale out our database to distributed system.

Last but not the least, MongoDB uses fast in-place updates and it fits well into agile sprints which allows quick iteration and frequent code pushes.

Task1b

Comments on improving the design of the database: we may want to have a API for our database. This helps us control the behavior of users accessing and update the content. Also, we may want to have indexes for primary key and important attributes.

Query output

Number of employees in AggieFit database: 9

Active Employee List

```
{u'_id': ObjectId('5a78cd1ba609e60d303ac41f'),
  u'division': u'HR',
  u'employeeID': 111001111,
  u'gender': u'male',
  u'goal': {u'activityGoal': u'NA', u'stepGoal': 10000, u'weekGoal': 5},
  u'height': u'5ft10in',
  u'stepCount': [6010,
                 8900,
                 10141,
                 7543,
                 6364,
                 4901,
                 351,
                 204,
                 5371,
                 3454,
                 6574,
                 7856,
                 9365,
                 9646],
  u'tags': [u'active', u'stepOnly'],
  u'uid': 1003,
  u'weight': u'172lbs'}
{u'_id': ObjectId('5a8e3841731125159d984740'),
  u'activityDuration': [56, 62, 48, 54],
  u'age': 50,
  u'gender': u'male',
  u'goal': {u'activityGoal': u'45min', u'stepGoal': 8000, u'weekGoal': 3},
  u'stepCount': [6792, 7832, 5876, 6453],
  u'tags': [u'active'],
  u'uid': 1005}
```

Employees that have a goal step count greater than 5000 steps

```
{u'_id': ObjectId('5a78cd1ba609e60d303ac41d'),
  u'activityDuration': [20, 45, 35, 40],
  u'age': 30,
  u'goal': {u'activityGoal': u'75min', u'stepGoal': 8000, u'weekGoal': 3},
  u'height': u'5ft10in',
  u'stepCount': [2034, 5432, 3056, 4302],
  u'tags': [u'ambitious'],
```

```
u'uid': 1001,
u'weight': u'190lbs'}
{u'_id': ObjectId('5a78cd1ba609e60d303ac41f'),
u'division': u'HR',
u'employeeID': 111001111,
u'gender': u'male',
u'goal': {u'activityGoal': u'NA', u'stepGoal': 10000, u'weekGoal': 5},
u'height': u'5ft10in',
u'stepCount': [6010,
               8900,
               10141,
               7543,
               6364,
               4901,
               351,
               204,
               5371,
               3454,
               6574,
               7856,
               9365,
               9646],
u'tags': [u'active', u'stepOnly'],
u'uid': 1003,
u'weight': u'172lbs'}
{u'_id': ObjectId('5a8e3841731125159d984740'),
u'activityDuration': [56, 62, 48, 54],
u'age': 50,
u'gender': u'male',
u'goal': {u'activityGoal': u'45min', u'stepGoal': 8000, u'weekGoal': 3},
u'stepCount': [6792, 7832, 5876, 6453],
u'tags': [u'active'],
u'uid': 1005}
{u'_id': ObjectId('5a8e3841731125159d984743'),
u'activityDuration': [72, 75, 78, 45, 79, 86],
u'competitors': [1009],
u'goal': {u'activityGoal': u'90min', u'stepGoal': 12000, u'weekGoal': 5},
u'gymDuration': [62, 61, 64, 0, 67, 69],
u'height': u'5ft10in',
u'stepCount': [10439, 10456, 10458, 3423, 10807, 11232],
u'tags': [u'regular', u'sportsman', u'gymGoer', u'competitor'],
u'uid': 1008,
u'weight': u'178lbs'}
{u'_id': ObjectId('5a8e3841731125159d984744'),
u'activityDuration': [73, 68, 83, 79, 34, 86],
u'competitors': [1008],
u'goal': {u'activityGoal': u'90min', u'stepGoal': 12000, u'weekGoal': 5},
u'gymDuration': [60, 58, 64, 62, 0, 64],
```

u'height': u'5ft8in',
u'stepCount': [10439, 10216, 11342, 11278, 4323, 11762],
u'tags': [u'regular', u'sportsman', u'gymGoer', u'competitor'],
u'uid': 1009,
u'weight': u'183lbs'}

Total activity duration for each employee:

```
{u'_id': ObjectId('5a78cd1ba609e60d303ac41d'),  
  u'total_activity_duration': 140,  
  u'uid': 1001}  
{u'_id': ObjectId('5a78cd1ba609e60d303ac41e'),  
  u'total_activity_duration': 276,  
  u'uid': 1002}  
{u'_id': ObjectId('5a78cd1ba609e60d303ac41f'),  
  u'total_activity_duration': 0,  
  u'uid': 1003}  
{u'_id': ObjectId('5a8e3841731125159d98473f'),  
  u'total_activity_duration': 501,  
  u'uid': 1004}  
{u'_id': ObjectId('5a8e3841731125159d984740'),  
  u'total_activity_duration': 220,  
  u'uid': 1005}  
{u'_id': ObjectId('5a8e3841731125159d984741'),  
  u'total_activity_duration': 0,  
  u'uid': 1006}  
{u'_id': ObjectId('5a8e3841731125159d984742'),  
  u'total_activity_duration': 132,  
  u'uid': 1007}  
{u'_id': ObjectId('5a8e3841731125159d984743'),  
  u'total_activity_duration': 435,  
  u'uid': 1008}  
{u'_id': ObjectId('5a8e3841731125159d984744'),  
  u'total_activity_duration': 423,  
  u'uid': 1009}
```