



# Database Programming/Analysis

ADVANCED STORED PROCEDURE EXERCISE

PHASE 0 - 2 TASKS

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# Task 1

2

- ▶ Create StoredProcedure `jsonTransform` that creates new tables for
  - ▶ YuanClass
  - ▶ XiaClass

```
MySQL 8.0 Command Line Client

mysql> describe yuanclass;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| Observation | int           | NO   | PRI | NULL    | auto_increment |
| ELength     | decimal(10,4) | YES  |     | NULL    |                |
| EBeam       | decimal(10,4) | YES  |     | NULL    |                |
| EDraft      | decimal(10,4) | YES  |     | NULL    |                |
| Pressure    | decimal(10,4) | YES  |     | NULL    |                |
| Vortex      | decimal(10,4) | YES  |     | NULL    |                |
| Magnetic    | decimal(10,4) | YES  |     | NULL    |                |
| Light       | decimal(10,4) | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)

mysql> describe yuanclassjson;
+-----+-----+-----+-----+-----+-----+
| Field      | Type | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| Observation | int  | NO   | PRI | NULL    | auto_increment |
| OBV_DATA    | json | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)

mysql>
```

yuanClass

yuanClassJSON

```
MySQL 8.0 Command Line Client

mysql> describe xiaclass;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| Observation | int           | NO   | PRI | NULL    | auto_increment |
| ELength     | decimal(10,4) | YES  |     | NULL    |                |
| EBeam       | decimal(10,4) | YES  |     | NULL    |                |
| EDraft      | decimal(10,4) | YES  |     | NULL    |                |
| Pressure    | decimal(10,4) | YES  |     | NULL    |                |
| Vortex      | decimal(10,4) | YES  |     | NULL    |                |
| Magnetic    | decimal(10,4) | YES  |     | NULL    |                |
| Light       | decimal(10,4) | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)

mysql> describe xiaclassjson;
+-----+-----+-----+-----+-----+-----+
| Field      | Type | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| Observation | int  | NO   | PRI | NULL    | auto_increment |
| OBV_DATA    | json | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)

mysql>
```

xiaClass

xiaClassJSON

# Task 2

3

Create the following functions:

- ▶ `minValue(JA JSON)`
  - ▶ Accepts a JSON Array containing only numbers of any length and returns the minimum of the numbers.
- ▶ `maxValue(JA JSON)`
  - ▶ Accepts a JSON Array containing only numbers of any length and returns the maximum of the numbers.
- ▶ `sumValue(JA JSON)`
  - ▶ Accepts a JSON Array containing only numbers of any length and returns the sum of the numbers.
- ▶ `muValue(JA JSON)`
  - ▶ Accepts a JSON Array containing only numbers of any length and returns the mean of the numbers.

Create the following functions:

- ▶ `sigma2Value(JA JSON)`
  - ▶ Accepts a JSON Array containing only numbers of any length and returns the variance of the numbers.
- ▶ `sigmaValue(JA JSON)`
  - ▶ Accepts a JSON Array containing only numbers of any length and returns the standard deviation of the numbers.
- ▶ `rangeValue(JA JSON)`
  - ▶ Accepts a JSON Array containing only numbers of any length and returns the range of the numbers.
- ▶ `euclidean(O JSON, T JSON)`
  - ▶ Accepts a two JSON Arrays containing only numbers (which represent vectors) of the same length and returns the euclidean distance between the two.

# Task 3

4

- ▶ Create StoredProcedure `jsonTransformNorm` that creates new tables of normalized data for
  - ▶ YuanClassJSON
  - ▶ XiaClassJSON

```
MySQL 8.0 Command Line Client
mysql> describe yuanclassjsonnorm;
+-----+-----+-----+-----+-----+-----+
| Field          | Type | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| Observation    | int  | NO   | PRI | NULL    | auto_increment |
| OBV_NORM      | json | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.01 sec)

mysql> describe xiaclassjsonnorm;
+-----+-----+-----+-----+-----+-----+
| Field          | Type | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| Observation    | int  | NO   | PRI | NULL    | auto_increment |
| OBV_NORM      | json | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)

mysql>
```

# Task 4

5

- Create the Stored Procedure `meanFeatureVector` that creates the Template for each submarine class

```
MySQL 8.0 Command Line Client
mysql> describe yuantemplate;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| Sub_Class  | varchar(20)   | NO   | PRI | NULL    |       |
| E_Length   | decimal(10,2) | YES  |     | NULL    |       |
| E_Beam     | decimal(10,2) | YES  |     | NULL    |       |
| E_Draft    | decimal(10,2) | YES  |     | NULL    |       |
| E_Pressure | decimal(10,2) | YES  |     | NULL    |       |
| E_Vortex   | decimal(10,2) | YES  |     | NULL    |       |
| E_Magnetic | decimal(10,2) | YES  |     | NULL    |       |
| E_Light    | decimal(10,2) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)

mysql> describe xiemplate;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| Sub_Class  | varchar(20)   | NO   | PRI | NULL    |       |
| E_Length   | decimal(10,2) | YES  |     | NULL    |       |
| E_Beam     | decimal(10,2) | YES  |     | NULL    |       |
| E_Draft    | decimal(10,2) | YES  |     | NULL    |       |
| E_Pressure | decimal(10,2) | YES  |     | NULL    |       |
| E_Vortex   | decimal(10,2) | YES  |     | NULL    |       |
| E_Magnetic | decimal(10,2) | YES  |     | NULL    |       |
| E_Light    | decimal(10,2) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
```

# Task 5

6

- ▶ Create the Stored Procedure `euclideanCalculator` that creates a table for each submarine class that contains the Euclidean distance between the individual observation (normalized) and the Template for that submarine class.
- ▶ `yuanClassEuclidean`
- ▶ `xiaClassEuclidean`

```
MySQL 8.0 Command Line Client
mysql> describe yuanClassEuclidean;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| Observation | int           | NO   | PRI | NULL    | auto_increment |
| OBV_NORM    | json          | YES  |     | NULL    |                |
| C_TEMPLATE  | json          | YES  |     | NULL    |                |
| O_DISTANCE  | decimal(10,2) | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.01 sec)

mysql> describe xiaClassEuclidean;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| Observation | int           | NO   | PRI | NULL    | auto_increment |
| OBV_NORM    | json          | YES  |     | NULL    |                |
| C_TEMPLATE  | json          | YES  |     | NULL    |                |
| O_DISTANCE  | decimal(10,2) | YES  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.00 sec)

mysql>
```