Submission 3: The Database

Task 3a: Database Creation

1) Screenshot of create and use commands:

create database UP858871db;
use UP858871db;

2) Screenshots of table creation

Table **DeliveryCollection**

```
MariaDB [UP858871db]> CREATE TABLE DeliveryCollection(
    ->     delColl_ID int auto_increment primary key,
    ->     delColl_Date date not null,
    ->     delColl_veh_RegNo varchar(30) not null,
    ->     delColl_staff_ID int not null,
    ->     foreign key (delColl_veh_RegNo) references Vehicle(veh_RegNo),
    ->     foreign key (delColl_staff_ID) references Staff(staff_ID)
    -> );
Query OK, 0 rows affected (0.05 sec)
```

```
MariaDB [UP858871db]> describe DeliveryCollection;
+-------------------+-------------+------+-----+---------+----------------+
| Field             | Type        | Null | Key | Default | Extra          |
+-------------------+-------------+------+-----+---------+----------------+
| delColl_ID        | int(11)     | NO   | PRI | NULL    | auto_increment |
| delColl_Date      | date        | NO   |     | NULL    |                |
| delColl_veh_RegNo | varchar(30) | NO   | MUL | NULL    |                |
| delColl_staff_ID  | int(11)     | NO   | MUL | NULL    |                |
+-------------------+-------------+------+-----+---------+----------------+
4 rows in set (0.00 sec)
```

Table **Outlet Order**

```
MariaDB [UP858871db]> CREATE TABLE OutletOrder(
    ->     outOrd_ID int auto_increment primary key,
    ->     outOrd_outlet_ID int not null,
    ->     outOrd_delColl_ID int not null,
    ->     foreign key (outOrd_outlet_ID) references Outlet(outlet_ID),
    ->     foreign key (outOrd_delColl_ID) references DeliveryCollection(delColl_ID)
    -> );
Query OK, 0 rows affected (0.04 sec)
```

```
MariaDB [UP858871db]> describe OutletOrder;
+-------------------+---------+------+-----+---------+----------------+
| Field             | Type    | Null | Key | Default | Extra          |
+-------------------+---------+------+-----+---------+----------------+
| outOrd_ID         | int(11) | NO   | PRI | NULL    | auto_increment |
| outOrd_outlet_ID  | int(11) | NO   | MUL | NULL    |                |
| outOrd_delColl_ID | int(11) | NO   | MUL | NULL    |                |
+-------------------+---------+------+-----+---------+----------------+
3 rows in set (0.00 sec)
```

Table **Outlet Return**

```
MariaDB [UP858871db]> CREATE TABLE OutletReturn (
    ->     outRtn_ID int auto_increment primary key,
    ->     outRtn_outlet_ID int not null,
    ->     outRtn_delColl_ID int not null,
    ->     foreign key (outRtn_outlet_ID) references Outlet(outlet_ID),
    ->     foreign key (outRtn_delColl_ID) references DeliveryCollection(delColl_ID)
    -> );
Query OK, 0 rows affected (0.08 sec)
```

```
MariaDB [UP858871db]> describe OutletReturn;
+-------------------+---------+------+-----+---------+----------------+
| Field             | Type    | Null | Key | Default | Extra          |
+-------------------+---------+------+-----+---------+----------------+
| outRtn_ID         | int(11) | NO   | PRI | NULL    | auto_increment |
| outRtn_outlet_ID  | int(11) | NO   | MUL | NULL    |                |
| outRtn_delColl_ID | int(11) | NO   | MUL | NULL    |                |
+-------------------+---------+------+-----+---------+----------------+
3 rows in set (0.00 sec)
```

Table **PublicationInOrder**

```
MariaDB [UP858871db]> CREATE TABLE PublicationInOrder (
    ->     pubInOrd_DateTime datetime primary key,
    ->     pubInOrd_Qty int not null,
    ->     pubInOrd_public_ID int not null,
    ->     pubInOrd_outOrd_ID int not null,
    ->     foreign key (pubInOrd_public_ID) references Publication(public_ID),
    ->     foreign key (pubInOrd_outOrd_ID) references OutletOrder(outOrd_ID)
    -> );
Query OK, 0 rows affected (0.07 sec)
```

```
MariaDB [UP858871db]> describe PublicationInOrder;
+--------------------+----------+------+-----+---------+-------+
| Field              | Type     | Null | Key | Default | Extra |
+--------------------+----------+------+-----+---------+-------+
| pubInOrd_DateTime  | datetime | NO   | PRI | NULL    |       |
| pubInOrd_Qty       | int(11)  | NO   |     | NULL    |       |
| pubInOrd_public_ID | int(11)  | NO   | MUL | NULL    |       |
| pubInOrd_outOrd_ID | int(11)  | NO   | MUL | NULL    |       |
+--------------------+----------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

Table **PublicationInReturn**

```
MariaDB [UP858871db]>
MariaDB [UP858871db]> CREATE TABLE PublicationInReturn (
    ->     pubInRtn_DateTime datetime primary key,
    ->     pubInRtn_Qty int not null,
    ->     pubInRtn_outRtn_ID int not null,
    ->     pubInRtn_public_ID int not null,
    ->     foreign key (pubInRtn_outRtn_ID) references OutletReturn(outRtn_ID),
    ->     foreign key (pubInRtn_public_ID) references Publication(public_ID)
    -> );
Query OK, 0 rows affected (0.03 sec)
```

```
MariaDB [UP858871db]> describe PublicationInReturn;
+--------------------+----------+------+-----+---------+-------+
| Field              | Type     | Null | Key | Default | Extra |
+--------------------+----------+------+-----+---------+-------+
| pubInRtn_DateTime  | datetime | NO   | PRI | NULL    |       |
| pubInRtn_Qty       | int(11)  | NO   |     | NULL    |       |
| pubInRtn_outRtn_ID | int(11)  | NO   | MUL | NULL    |       |
| pubInRtn_public_ID | int(11)  | NO   | MUL | NULL    |       |
+--------------------+----------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

Table **PublicationInRestockOrder**

```
MariaDB [UP858871db]> CREATE TABLE PublicationInRestockOrder (
    ->     pubRestock_DateTime datetime primary key,
    ->     pubRestock_Qty int not null,
    ->     pubRestock_restock_ID int not null,
    ->     pubRestock_public_ID int not null,
    ->     foreign key (pubRestock_restock_ID) references RestockOrder(restock_ID),
    ->     foreign key (pubRestock_public_ID) references Publication(public_ID)
    -> );
Query OK, 0 rows affected (0.05 sec)
```

```
MariaDB [UP858871db]> describe PublicationInRestockOrder;
+-----------------------+----------+------+-----+---------+-------+
| Field                 | Type     | Null | Key | Default | Extra |
+-----------------------+----------+------+-----+---------+-------+
| pubRestock_DateTime   | datetime | NO   | PRI | NULL    |       |
| pubRestock_Qty        | int(11)  | NO   |     | NULL    |       |
| pubRestock_restock_ID | int(11)  | NO   | MUL | NULL    |       |
| pubRestock_public_ID  | int(11)  | NO   | MUL | NULL    |       |
+-----------------------+----------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

Table **Contract**

```
MariaDB [UP858871db]> CREATE TABLE Contract (
    ->     contract_ID int auto_increment primary key,
    ->     contract_StartDate date not null,
    ->     contract_EndDate date not null,
    ->     contract_public_ID int not null,
    ->     contract_publish_ID int not null,
    ->     contract_outlet_ID int not null,
    ->     foreign key (contract_public_ID) references Publication(public_ID),
    ->     foreign key (contract_publish_ID) references Publisher(publish_ID),
    ->     foreign key (contract_outlet_ID) references Outlet(outlet_ID)
    ->
    -> );
Query OK, 0 rows affected (0.06 sec)
```

```
+--------------------+---------+------+-----+---------+----------------+
| Field              | Type    | Null | Key | Default | Extra          |
+--------------------+---------+------+-----+---------+----------------+
| contract_ID        | int(11) | NO   | PRI | NULL    | auto_increment |
| contract_StartDate | date    | NO   |     | NULL    |                |
| contract_EndDate   | date    | NO   |     | NULL    |                |
| contract_public_ID | int(11) | NO   | MUL | NULL    |                |
| contract_publish_ID| int(11) | NO   | MUL | NULL    |                |
| contract_outlet_ID | int(11) | NO   | MUL | NULL    |                |
+--------------------+---------+------+-----+---------+----------------+
6 rows in set (0.00 sec)
```

3) Screenshots of table population (top 10 records)

Table **DeliveryCollection**

```
MariaDB [UP858871db]> select * from DeliveryCollection;
+------------+--------------+-------------------+------------------+
| delColl_ID | delColl_Date | delColl_veh_RegNo | delColl_staff_ID |
+------------+--------------+-------------------+------------------+
|          1 | 2017-03-21   | AB18 TRW          |                1 |
|          2 | 2018-10-08   | AB19 TRW          |                3 |
|          3 | 2018-09-18   | AB19 TRW          |                3 |
|          4 | 2017-02-18   | AB17 TRW          |                5 |
|          5 | 2018-03-09   | AB19 TRW          |                1 |
|          6 | 2018-09-17   | AB19 TRW          |                1 |
|          7 | 2018-02-23   | AB16 TRW          |                3 |
|          8 | 2017-08-16   | AB18 TRW          |                4 |
|          9 | 2017-04-07   | AB16 TRW          |                1 |
|         10 | 2017-10-16   | AB17 TRW          |                3 |
+------------+--------------+-------------------+------------------+
10 rows in set (0.00 sec)
```

Table **OutletOrder**

```
MariaDB [UP858871db]> select * from OutletOrder;
+-----------+------------------+--------------------+
| outOrd_ID | outOrd_outlet_ID | outOrd_delColl_ID |
+-----------+------------------+--------------------+
|         1 |                8 |                  9 |
|         2 |                9 |                  8 |
|         3 |                6 |                  8 |
|         4 |                3 |                  9 |
|         5 |                7 |                  1 |
|         6 |                9 |                  3 |
|         7 |                6 |                  9 |
|         8 |                8 |                  5 |
|         9 |                7 |                  1 |
|        10 |                4 |                  5 |
+-----------+------------------+--------------------+
10 rows in set (0.00 sec)
```

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Table **OutletReturn**

```
MariaDB [UP858871db]> select * from OutletReturn;
+-----------+------------------+-------------------+
| outRtn_ID | outRtn_outlet_ID | outRtn_delColl_ID |
+-----------+------------------+-------------------+
|         1 |                8 |                 7 |
|         2 |                3 |                 9 |
|         3 |                9 |                 2 |
|         4 |                4 |                 9 |
|         5 |                1 |                 3 |
|         6 |                5 |                 2 |
|         7 |                4 |                 3 |
|         8 |                9 |                 4 |
|         9 |                3 |                 2 |
|        10 |                6 |                 7 |
+-----------+------------------+-------------------+
10 rows in set (0.00 sec)
```

Table **PublicationInOrder**

```
MariaDB [UP858871db]> select * from PublicationInOrder;
+---------------------+-------------+--------------------+--------------------+
| pubInOrd_DateTime   | pubInOrd_Qty | pubInOrd_public_ID | pubInOrd_outOrd_ID |
+---------------------+-------------+--------------------+--------------------+
| 2017-08-25 19:43:40 |         400 |                  8 |                  9 |
| 2018-01-13 21:51:59 |         740 |                  6 |                  6 |
| 2018-01-16 11:59:25 |         926 |                  7 |                  4 |
| 2018-02-20 19:08:24 |         881 |                  6 |                  6 |
| 2018-04-14 10:34:48 |         837 |                  4 |                  8 |
| 2018-06-25 16:41:47 |         812 |                  6 |                  5 |
| 2018-07-18 06:24:53 |         482 |                  4 |                  2 |
| 2018-09-24 11:48:35 |         882 |                  8 |                  4 |
| 2018-10-27 07:43:42 |         140 |                  5 |                  5 |
| 2018-12-20 04:21:48 |         766 |                  1 |                  2 |
+---------------------+-------------+--------------------+--------------------+
10 rows in set (0.00 sec)
```

Table **PublicationInReturn**

```
+--------------------+----------+------+-----+---------+-------+
| Field              | Type     | Null | Key | Default | Extra |
+--------------------+----------+------+-----+---------+-------+
| pubInRtn_DateTime  | datetime | NO   | PRI | NULL    |       |
| pubInRtn_Qty       | int(11)  | NO   |     | NULL    |       |
| pubInRtn_outRtn_ID | int(11)  | NO   | MUL | NULL    |       |
| pubInRtn_public_ID | int(11)  | NO   | MUL | NULL    |       |
+--------------------+----------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

Table **PublicationInRestockOrder**

Field	Type	Null	Key	Default	Extra
pubRestock_DateTime	datetime	NO	PRI	NULL	
pubRestock_Qty	int(11)	NO		NULL	
pubRestock_restock_ID	int(11)	NO	MUL	NULL	
pubRestock_public_ID	int(11)	NO	MUL	NULL	

4 rows in set (0.00 sec)

Table **Contract**

Field	Type	Null	Key	Default	Extra
contract_ID	int(11)	NO	PRI	NULL	auto_increment
contract_StartDate	date	NO		NULL	
contract_EndDate	date	NO		NULL	
contract_public_ID	int(11)	NO	MUL	NULL	
contract_publish_ID	int(11)	NO	MUL	NULL	
contract_outlet_ID	int(11)	NO	MUL	NULL	

6 rows in set (0.00 sec)

Task 3b: General SQL Queries

Query 1

Query Description and why it's of use to JM: This query shows the vehicles that are due for their next MOT and Service dates along with the size of the vehicle to show people what capacity vehicles they have available that aren't being serviced.

MariaDB [**UP858871db**]> Select veh_regNo, veh_nextServDate, veh_NextMOTdate, veh_capacity as Vehicle_size

from Vehicle

group by veh_RegNo;

Screenshot of results:

```
+-----------+------------------+-----------------+--------------+
| veh_regNo | veh_nextServDate | veh_NextMOTdate | Vehicle_size |
+-----------+------------------+-----------------+--------------+
| AB15 TRW  | 2018-02-01       | 2018-02-01      |         4516 |
| AB16 TRW  | 2018-03-01       | 2018-03-01      |         2845 |
| AB17 TRW  | 2018-04-01       | 2018-04-01      |         4516 |
| AB18 TRW  | 2018-06-01       | NULL            |         2845 |
| AB19 TRW  | 2018-06-02       | NULL            |         4516 |
+-----------+------------------+-----------------+--------------+
5 rows in set (0.00 sec)
```

Query 2

MariaDB [**UP858871db**]> select public_ID, public_WholesalePrice as 'Highest Cost' from Publication
group by public_WholesalePrice
order by public_ID DESC;

Query Description and why it's of use to JM: This query is used to remove records that are repeating by grouping them by single figures, this makes it easy for JM to easily see records without having multiple repeated records rendering it harder to search through.

Screenshot of results:

public_ID	Highest Cost
28	0.95
26	3.10
23	1.80
18	1.85
16	1.65
15	2.10
14	1.50
11	0.75
10	0.85
9	1.35
8	1.45
7	1.30
6	1.40
5	2.50
4	0.80
3	0.70
2	0.55
1	0.48

18 rows in set (0.00 sec)

Query 3

```
MariaDB [UP858871db]> select pubInOrd_DateTime, pubInOrd_Qty, pubInOrd_public_ID
    -> From PublicationInOrder
    -> Where pubInOrd_DateTime between '2017-01-01' and '2018-01-01';
```

Query Description and why it's of use to JM: This query lists all the publications that have been ordered throughout 2017 to the beginning of 2018, this helps to keep the company updated on what they are selling and how JM is doing in terms of sales.

Screenshot of results:

```
MariaDB [UP858871db]> select pubInOrd_DateTime, pubInOrd_Qty, pubInOrd_public_ID
    -> From PublicationInOrder
    -> Where pubInOrd_DateTime between '2017-01-01' and '2018-01-01';
+---------------------+--------------+--------------------+
| pubInOrd_DateTime   | pubInOrd_Qty | pubInOrd_public_ID |
+---------------------+--------------+--------------------+
| 2017-08-25 19:43:40 |          400 |                  8 |
+---------------------+--------------+--------------------+
1 row in set (0.01 sec)
```

Query 4

Query Description and why it's of use to JM: This query is useful for JM because it enables them to see which contracts are ending soonest, this can then be used to prepare for the decision JM must make of whether to renew the contract or not.

```
MariaDB [UP858871db]> Select contract_EndDate,contract_ID
    -> From Contract
    -> Where contract_EndDate between '2019-01-01' and '2020-01-01'
    -> Order by contract_ID asc;
```

Screenshot of results:

```
MariaDB [UP858871db]> Select contract_EndDate,contract_ID
    -> From Contract
    -> Where contract_EndDate between '2019-01-01' and '2020-01-01'
    -> Order by contract_ID asc;
+------------------+-------------+
| contract_EndDate | contract_ID |
+------------------+-------------+
| 2019-08-25       |           1 |
| 2019-03-26       |           2 |
| 2019-03-14       |           3 |
| 2019-09-07       |           4 |
| 2019-09-27       |           5 |
+------------------+-------------+
5 rows in set (0.00 sec)
```

Task 3c: SQL Queries using Aggregate Function

Query 1

Query Description and why it's of use to JM:

This query counts the number of cars JM has stored in the database, It uses the **count** command to show how many cars are in the Vehicle table. This is useful to JM because it means they can quickly be kept up to date with the amount of cars they have stored.

Screenshot of results:

```
MariaDB [UP858871db]> select count(veh_RegNo) as HowManyCars from Vehicle;
+-------------+
| HowManyCars |
+-------------+
|           5 |
+-------------+
1 row in set (0.02 sec)

MariaDB [UP858871db]> select * from Vehicle;
+-----------+----------+-----------+------------+------------+-------------+--------------+-----------------+------------------+
| veh_RegNo | veh_Make | veh_Model | veh_EngSize | veh_Colour | veh_Mileage | veh_Capacity | veh_NextMOTdate | veh_nextServDate |
+-----------+----------+-----------+------------+------------+-------------+--------------+-----------------+------------------+
| AB15 TRW  | Ford     | Transit   |        2.4 | White      |       65213 |         4516 | 2018-02-01      | 2018-02-01       |
| AB16 TRW  | Ford     | Transit   |        1.4 | White      |       87452 |         2845 | 2018-03-01      | 2018-03-01       |
| AB17 TRW  | Ford     | Transit   |        2.4 | White      |       71236 |         4516 | 2018-04-01      | 2018-04-01       |
| AB18 TRW  | Ford     | Transit   |        1.4 | White      |        1245 |         2845 | NULL            | 2018-06-01       |
| AB19 TRW  | Ford     | Transit   |        2.4 | White      |        6524 |         4516 | NULL            | 2018-06-02       |
+-----------+----------+-----------+------------+------------+-------------+--------------+-----------------+------------------+
5 rows in set (0.00 sec)
```

Query 2

Query Description and why it's of use to JM:

This query shows the minimum and maximum capacity of the smallest and largest vehicles JM has, this information can be used to decide how to efficiently pack the deliveries into these types of vehicles and how to efficiently plan the route for deliveries with multiple delivery destinations.

Screenshot of results:

```
MariaDB [UP858871db]> select MIN(veh_Capacity) as smallest_vehicle, MAX(veh_Capacity) as largest_vehicle From Vehicle;
+------------------+-----------------+
| smallest_vehicle | largest_vehicle |
+------------------+-----------------+
|             2845 |            4516 |
+------------------+-----------------+
1 row in set (0.00 sec)
```

Query 3

Query Description and why it's of use to JM:

This query combines the delivery data of orders to the member of staff that will be carrying out the delivery. This is useful to JM because it allows them to identify who was delivering in each instance and when it was carried out incase any reports or complaints arise.

```
MariaDB [UP858871db]> select staff_FName, staff_LName, staff_Title, staff_PCode, delColl_ID, delColl_veh_RegNo, delColl_Date
    -> From Staff
    -> JOIN DeliveryCollection
    -> ON Staff.staff_ID = DeliveryCollection.delColl_staff_ID;
```

Screenshot of results:

```
+-------------+-------------+-------------+-------------+------------+-------------------+--------------+
| staff_FName | staff_LName | staff_Title | staff_PCode | delColl_ID | delColl_veh_RegNo | delColl_Date |
+-------------+-------------+-------------+-------------+------------+-------------------+--------------+
| John        | Sheridan    | Mr          | PO3 7ND     |          1 | AB18 TRW          | 2017-03-21   |
| Michael     | Garibaldi   | Mr          | PO6 4DE     |          2 | AB19 TRW          | 2018-10-08   |
| Michael     | Garibaldi   | Mr          | PO6 4DE     |          3 | AB19 TRW          | 2018-09-18   |
| Delenn      | Sheridan    | Mrs         | PO3 6UJ     |          4 | AB17 TRW          | 2017-02-18   |
| John        | Sheridan    | Mr          | PO3 7ND     |          5 | AB19 TRW          | 2018-03-09   |
| John        | Sheridan    | Mr          | PO3 7ND     |          6 | AB19 TRW          | 2018-09-17   |
| Michael     | Garibaldi   | Mr          | PO6 4DE     |          7 | AB16 TRW          | 2018-02-23   |
| Lyta        | Alexander   | Ms          | PO6 2SE     |          8 | AB18 TRW          | 2017-08-16   |
| John        | Sheridan    | Mr          | PO3 7ND     |          9 | AB16 TRW          | 2017-04-07   |
| Michael     | Garibaldi   | Mr          | PO6 4DE     |         10 | AB17 TRW          | 2017-10-16   |
+-------------+-------------+-------------+-------------+------------+-------------------+--------------+
10 rows in set (0.01 sec)
```

Query 4

Query Description and why it's of use to JM: This query shows the minimum and maximum amount of orders that JM recieves within a year. This can help JM to establish the average amount of yearly orders they will receive which can in turn help them to estimate their sales in future years.

Screenshot of results:

```
MariaDB [UP858871db]> select MIN(pubInOrd_Qty)
    -> From PublicationInOrder;
+--------------------+
| MIN(pubInOrd_Qty) |
+--------------------+
|                140 |
+--------------------+
1 row in set (0.01 sec)
```

```
MariaDB [UP858871db]> select MAX(pubInOrd_Qty)
    -> From PublicationInOrder;
+-------------------+
| MAX(pubInOrd_Qty) |
+-------------------+
|               926 |
+-------------------+
1 row in set (0.00 sec)
```