

# Submission 3 - The Database

## Task 3a - Database Creation

### Create and Use Database

```
create database UP850844db;
use UP850844db;
```

### Create and Describe Each Table

#### publicationInRestockOrder

```
CREATE TABLE publicationInRestockOrder(
  pubRestock_DateTime DATETIME NOT NULL PRIMARY KEY,
  pubRestock_Qty INT,
  pubRestock_restock_ID INT,
  pubRestock_public_ID INT,

  CONSTRAINT fk01 FOREIGN KEY
    (pubRestock_restock_ID) REFERENCES RestockOrder (restock_ID),
  CONSTRAINT fk02 FOREIGN KEY
    (pubRestock_public_ID) REFERENCES Publication (public_ID)
);
```

```
MariaDB [UP850844db]> describe publicationInRestockOrder;
```

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

4 rows in set (0.00 sec)

## DeliveryCollection

```
CREATE TABLE DeliveryCollection(
  delColl_ID INT NOT NULL auto_increment PRIMARY KEY,
  del_Coll_Date DATE,
  delColl_veh_RegNo VARCHAR(20),
  delColl_Staff_ID INT,

  CONSTRAINT fk03 FOREIGN KEY
  (delColl_veh_RegNo) REFERENCES Vehicle (veh_RegNo),
  CONSTRAINT fk04 FOREIGN KEY
  (delColl_Staff_ID) REFERENCES Staff (staff_ID)
);
```

MariaDB [UP850844db]> describe DeliveryCollection;

Field	Type	Null	Key	Default	Extra
delColl_ID	int(11)	NO	PRI	NULL	auto_increment
del_Coll_Date	date	YES		NULL	
delColl_veh_RegNo	varchar(20)	YES	MUL	NULL	
delColl_Staff_ID	int(11)	YES	MUL	NULL	

4 rows in set (0.00 sec)

## Contract

```
CREATE TABLE Contract(
  contract_ID INT NOT NULL auto_increment PRIMARY KEY,
  contract_StartDate DATE,
  contract_EndDate DATE,
  contract_public_ID INT,
  contract_publish_ID INT,
  contract_outlet_ID INT,

  CONSTRAINT fk05 FOREIGN KEY
  (contract_public_ID) REFERENCES Publication (public_ID),
  CONSTRAINT fk06 FOREIGN KEY
  (contract_publish_ID) REFERENCES Publisher (publish_ID),
  CONSTRAINT fk07 FOREIGN KEY
  (contract_outlet_ID) REFERENCES Outlet (outlet_ID)
);
```

```
MariaDB [UP850844db]> describe Contract;
```

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

6 rows in set (0.00 sec)

## OutletOrder

```
CREATE TABLE OutletOrder(
  outOrd_ID INT NOT NULL auto_increment PRIMARY KEY,
  outOrd_outlet_ID INT,
  outOrd_delColl_ID INT,

  CONSTRAINT fk08 FOREIGN KEY
    (outOrd_outlet_ID) REFERENCES Outlet (outlet_ID),
  CONSTRAINT fk09 FOREIGN KEY
    (outOrd_delColl_ID) REFERENCES DeliveryCollection (delColl_ID)
);
```

```
MariaDB [UP850844db]> describe OutletOrder;
```

Field	Type	Null	Key	Default	Extra
outOrd_ID	int(11)	NO	PRI	NULL	auto_increment
outOrd_outlet_ID	int(11)	YES	MUL	NULL	
outOrd_delColl_ID	int(11)	YES	MUL	NULL	

3 rows in set (0.00 sec)

## OutletReturn

```
CREATE TABLE OutletReturn(
  outRtn_ID INT NOT NULL auto_increment PRIMARY KEY,
  outRtn_outlet_ID INT,
  outRtn_delColl_ID INT,

  CONSTRAINT fk10 FOREIGN KEY
    (outRtn_outlet_ID) REFERENCES Outlet (outlet_ID),
  CONSTRAINT fk11 FOREIGN KEY
    (outRtn_delColl_ID) REFERENCES DeliveryCollection (delColl_ID)
);
```



```
MariaDB [UP850844db]> describe OutletReturn;
```

Field	Type	Null	Key	Default	Extra
outRtn_ID	int(11)	NO	PRI	NULL	auto_increment
outRtn_outlet_ID	int(11)	YES	MUL	NULL	
outRtn_delColl_ID	int(11)	YES	MUL	NULL	

3 rows in set (0.00 sec)

publicationInOrder

```
CREATE TABLE publicationInOrder(
  pubInOrder_DateTime DATETIME NOT NULL PRIMARY KEY,
  pubInOrd_Qty INT,
  pubOrd_public_ID INT,
  pubOrd_outOrd_ID INT,

  CONSTRAINT fk12 FOREIGN KEY
    (pubOrd_public_ID) REFERENCES Publication (public_ID),
  CONSTRAINT fk13 FOREIGN KEY
    (pubOrd_outOrd_ID) REFERENCES OutletOrder (outOrd_ID)
);
```

```
MariaDB [UP850844db]> describe publicationInOrder;
```

Field	Type	Null	Key	Default	Extra
pubInOrder_DateTime	datetime	NO	PRI	NULL	
pubInOrd_Qty	int(11)	YES		NULL	
pubOrd_public_ID	int(11)	YES	MUL	NULL	
pubOrd_outOrd_ID	int(11)	YES	MUL	NULL	

4 rows in set (0.00 sec)

## PublicationInReturn

```
CREATE TABLE PublicationInReturn(
  pubInRtn_DateTime DATETIME NOT NULL PRIMARY KEY,
  pubInRtn_Qty INT,
  pubInRet_outRtn_ID INT,
  pubInRet_public_ID INT,

  CONSTRAINT fk14 FOREIGN KEY
    (pubInRet_outRtn_ID) REFERENCES OutletReturn (outRtn_ID),
  CONSTRAINT fk15 FOREIGN KEY
    (pubInRet_public_ID) REFERENCES Publication (public_ID)
);
```

```
MariaDB [UP850844db]> describe PublicationInReturn;
```

Field	Type	Null	Key	Default	Extra
pubInRtn_DateTime	datetime	NO	PRI	NULL	
pubInRtn_Qty	int(11)	YES		NULL	
pubInRet_outRtn_ID	int(11)	YES	MUL	NULL	
pubInRet_public_ID	int(11)	YES	MUL	NULL	

4 rows in set (0.00 sec)

## Select \* From Each Table

## publicationInRestockOrder

```
MariaDB [UP850844db]> select * from publicationInRestockOrder limit 10;
```

pubRestock_DateTime	pubRestock_Qty	pubRestock_restock_ID	pubRestock_public_ID
2018-01-08 19:15:30	61	7	6
2018-01-09 13:51:26	12	15	30
2018-01-18 05:49:17	60	12	19
2018-02-06 03:41:56	38	5	4
2018-02-08 00:07:30	99	18	26
2018-02-12 16:24:52	14	8	3
2018-03-04 23:37:58	46	11	5
2018-03-07 04:34:56	21	6	12
2018-03-13 00:00:00	5	1	1
2018-03-14 00:00:00	10	2	2

## DeliveryCollection

```
MariaDB [UP850844db]> select * from DeliveryCollection limit 10;
```

delColl_ID	del_Coll_Date	delColl_veh_RegNo	delColl_Staff_ID
1	2018-04-01	AB15 TRW	1
2	2018-04-02	AB16 TRW	1
3	2018-04-03	AB17 TRW	2
4	2018-04-04	AB18 TRW	2
5	2018-04-05	AB19 TRW	3
6	2018-04-06	AB15 TRW	3
7	2018-04-07	AB16 TRW	4
8	2018-04-08	AB17 TRW	4
9	2018-04-09	AB18 TRW	5
10	2018-04-10	AB19 TRW	5

## Contract

```
MariaDB [UP850844db]> select * from Contract limit 10;
```

contract_ID	contract_StartDate	contract_EndDate	contract_public_ID	contract_publish_ID	contract_outlet_ID
1	2018-05-15	2019-05-15	1	1	2
2	2018-05-16	2019-05-16	3	2	4
3	2018-05-17	2019-05-17	5	3	6
4	2018-05-18	2019-05-18	7	4	8
5	2018-05-19	2019-05-19	9	5	10
6	2018-05-20	2019-05-20	11	6	12
7	2018-05-21	2019-05-21	13	7	14
8	2018-05-22	2019-05-22	15	8	16
9	2018-05-23	2019-05-23	17	9	18
10	2018-05-24	2019-05-24	19	10	20

## OutletOrder

```
MariaDB [UP850844db]> select * from OutletOrder limit 10;
```

outOrd_ID	outOrd_outlet_ID	outOrd_delColl_ID
1	3	1
2	6	2
3	9	3
4	12	4
5	15	5
6	18	6
7	21	7
8	24	8
9	27	9
10	30	10

## OutletReturn

```
MariaDB [UP850844db]> select * from OutletReturn limit 10;
```

outRtn_ID	outRtn_outlet_ID	outRtn_delColl_ID
1	30	2
2	27	4
3	24	6
4	21	8
5	18	10
6	15	1
7	12	3
8	9	5
9	6	7
10	3	9



## publicationInOrder

```
MariaDB [UP850844db]> select * from publicationInOrder limit 10;
```

pubInOrder_DateTime	pubInOrd_Qty	pubOrd_public_ID	pubOrd_outOrd_ID
2018-01-05 00:23:35	76	4	35
2018-01-11 09:17:09	31	10	52
2018-01-29 08:05:53	74	9	20
2018-01-30 07:31:47	91	2	54
2018-01-31 03:35:06	2	12	4
2018-02-09 00:00:00	4	14	10
2018-02-10 00:00:00	8	29	9
2018-02-11 00:00:00	12	28	8
2018-02-12 00:00:00	16	27	7
2018-02-13 00:00:00	20	26	6

## PublicationInReturn

```
MariaDB [UP850844db]> select * from PublicationInReturn limit 10;
```

pubInRtn_DateTime	pubInRtn_Qty	pubInRet_outRtn_ID	pubInRet_public_ID
2018-01-01 07:42:54	74	24	8
2018-01-01 18:29:10	48	3	9
2018-01-02 00:00:00	10	1	5
2018-01-03 00:00:00	20	2	10
2018-01-04 00:00:00	30	3	15
2018-01-05 00:00:00	40	4	20
2018-01-06 00:00:00	50	5	25
2018-01-07 00:00:00	60	6	30
2018-01-08 00:00:00	70	7	29
2018-01-09 00:00:00	80	8	19

## Task 3b - General SQL Queries

### Query 1

#### Description and Use:

Which Vehicles are due for a service within the next six months? This will show the range of cars that temporarily not be able to deliver publications thus aiding staff in the scheduling of deliveries, pertaining to individual vehicles.



```
SELECT veh_RegNo AS Registraton,
CONCAT(veh_Make," ", veh_Model) AS VehicleWithServiceWithin6Months,
veh_nextServDate AS Service_Date
FROM Vehicle
WHERE veh_nextServDate BETWEEN '2018-03-26' AND '2018-09-26';
```

Result:

Registraton	Vehicle	Service_Date
AB17 TRW	Ford Transit	2018-04-01
AB18 TRW	Ford Transit	2018-06-01
AB19 TRW	Ford Transit	2018-06-02

## Query 2

Description and Use:

What is the Contact information for a specific (Fareham News) Outlet? Provides a method for an employee to gain the contact information of a manager for a specific (e.g Fareham News) Outlet to discuss any details regarding an order.

```
SELECT outlet_Name AS Outlet,
outlet_Manager AS Manager_Name,
CONCAT(outlet_Street, " ", outlet_City, " ", outlet_PCode) AS Address,
outlet_Phone AS Outlet_Phone_Number,
outlet_Email AS Outlet_Email_Address
FROM Outlet
WHERE outlet_Name = "Fareham News";
```

Result:

Outlet	Manager_Name	Address	Outlet_Phone_Number	Outlet_Email_Address
Fareham News	Mrs Deanna Troi	39 The Dominion Portsmouth PO1 8TR	02392 485 196	333@gmail.com

## Query 3

Description and Use:

What are the details of an order and an order delivery for a given order number that are important to the outlet manager? This provides an outlet manager with the details relevant to an order they have made and let's them schedule for the delivery.

```

SELECT oo.outOrd_ID AS Order_Number,
o.outlet_Name AS Outlet,
dc.del_Coll_Date AS Delivery_Date,
CONCAT(s.staff_FName, " ", s.staff_LName) AS Delivery_Driver,
p.public_Title AS Publication,
pio.pubInOrd_Qty AS Quantity
FROM OutletOrder oo
JOIN Outlet o
ON oo.outOrd_outlet_ID = o.outlet_ID
JOIN publicationInOrder pio
ON pio.pubOrd_outOrd_ID = oo.outOrd_ID
JOIN Publication p
ON pio.pubOrd_public_ID = p.public_ID
JOIN DeliveryCollection dc
ON dc.delColl_ID = oo.outOrd_delColl_ID
JOIN Staff s
ON s.staff_ID = dc.delColl_Staff_ID
WHERE oo.outOrd_ID = 1;

```

Result:

Order_Number	Outlet	Delivery_Date	Delivery_Driver	Publication	Quantity
1	Johnsons & Sons	2018-04-01	John Sheridan	Womens Views	40
1	Johnsons & Sons	2018-04-01	John Sheridan	The Times	76

## Query 4

### Description and Use:

Which five publications have been returned the most over the past year? Highlights the publications which JM may consider ordering in a lower amount to reduce the amount spent on unpopular publications.

```

SELECT p.public_Title AS Publication,
pir.pubInRtn_Qty AS Returned_Quantity
FROM Publication p
JOIN PublicationInReturn pir
ON pir.pubInRet_public_ID = p.public_ID
JOIN OutletReturn outr
ON pir.pubInRet_outRtn_ID = outr.outRtn_ID
WHERE pir.pubInRtn_DateTime BETWEEN "2017-04-13" AND "2018-04-13"
ORDER BY pir.pubInRtn_Qty DESC
LIMIT 5;

```

Result:

Publication	Returned_Quantity
Dogs World	100
Gardening for Beginners	90
Voyager Monthly	80
Cats Today	78
Gardeners Today	74

## Query 5

Description and Use:

Which Outlets have spent over a certain value (e.g £100) on publication orders in the last year? This highlights the Outlets which could be eligible for loyalty rewards. The order sum value and dates are arbitrary and could be exchanged for other values at the will of JM.

```
SELECT o.outlet_Name AS Reward_Eligable_Outlet,
p.public_WholesalePrice*pio.pubInOrd_Qty AS Order_Sum
FROM Outlet o
JOIN OutletOrder oo
ON o.outlet_ID = oo.outOrd_outlet_ID
JOIN publicationInOrder pio
ON oo.outOrd_ID = pio.pubOrd_outOrd_ID
JOIN Publication p
ON pio.pubOrd_public_ID = p.public_ID
WHERE p.public_WholesalePrice*pio.pubInOrd_Qty > 100
AND pio.pubInOrder_DateTime BETWEEN "2017-04-12" AND "2018-04-12"
ORDER BY Order_Sum DESC;
```

Result:

Reward_Eligable_Outlet	Order_Sum
Avalon Stores	150.00
Johnsons & Sons	103.60



## Task 3c - SQL Queries Using Aggregate Function

### Aggregate Query 1

#### Description and Use:

Which publication category is most popular for a given (e.g Portsmouth) city? Highlights the type of publication that could be more effectively marketed in a specific area, thus enabling JM to target the customers more likely to purchase specific publications.

```
SELECT o.outlet_City AS City,
p.public_Category AS Most_Popular_Category,
SUM(pio.pubInOrd_Qty) AS Amount_Ordered
FROM Outlet o
JOIN OutletOrder oo
ON o.outlet_ID = oo.outOrd_outlet_ID
JOIN publicationInOrder pio
ON oo.outOrd_ID = pio.pubOrd_outOrd_ID
JOIN Publication p
on p.public_ID = pio.pubOrd_public_ID
WHERE o.outlet_City = "Portsmouth"
GROUP BY p.public_Category
ORDER BY Amount_Ordered DESC
LIMIT 1;
```

#### Result:

City	Most_Popular_Category	Amount_Ordered
Portsmouth	Newspaper	252

### Aggregate Query 2

#### Description and Use:

How many deliveries were made during the last financial quarter to a given (e.g Applebys) outlet? This query is useful as it enables JM to track and analyse the way in which outlets make orders on a quarterly basis and provides a record for the deliveries made.

```

SELECT o.outlet_Name AS Outlet,
COUNT(dc.delColl_ID) AS Orders_In_Q1
FROM DeliveryCollection dc
JOIN OutletOrder oo
ON oo.outOrd_delColl_ID = dc.delColl_ID
JOIN Outlet o
ON o.outlet_ID = oo.outOrd_outlet_ID
WHERE o.outlet_Name = "Applebys"
AND del_Coll_Date BETWEEN "2018-01-01" AND "2018-03-31";

```

Result:

Outlet	Orders_In_Q1
Applebys	1

## Aggregate Query 3

Description and Use:

What is the average Outlet Order Cost over the past month? This query is useful with use over time in identifying the effectiveness of short and long-term strategies to increase the average Outlet order cost.

```

SELECT AVG(OrderCosts) AS AverageOrderCostForMarch
FROM
(
  SELECT pio.pubInOrd_Qty * p.public_WholesalePrice AS OrderCosts
  FROM OutletOrder oo
  JOIN Outlet o
  ON oo.outOrd_outlet_ID = o.outlet_ID
  JOIN publicationInOrder pio
  ON pio.pubOrd_outOrd_ID = oo.outOrd_ID
  JOIN Publication p
  ON pio.pubOrd_public_ID = p.public_ID
  WHERE pio.pubInOrder_DateTime BETWEEN "2018-03-01" AND "2018-03-31"
) AS ListOfOrderCosts;

```

Result:

AverageOrderCostForMarch
103.350000

## Aggregate Query 4

Description and Use:

Which employee has made the most deliveries over the past six months? This query gains business usefulness when regarding employee pay bonuses for exceptional work as it can identify the employee who has conducted the most deliveries.

```
SELECT CONCAT(s.staff_FName, " ", s.staff_LName) AS Staff_Member,
MAX(NumberOfDeliveries) AS NumberOfDeliveries
FROM
(
    SELECT delColl_Staff_ID,
    COUNT(*) AS NumberOfDeliveries
    FROM DeliveryCollection
    GROUP BY delColl_Staff_ID
) AS List

JOIN DeliveryCollection dc
ON List.delColl_Staff_ID = dc.delColl_Staff_ID
JOIN Staff s
ON dc.delColl_Staff_ID = s.staff_ID
WHERE dc.del_Coll_Date BETWEEN "2017-10-11" AND "2018-04-11";
```

Result:

StaffMember	NumberOfDeliveries
John Sheridan	15

## Aggregate Query 5

Description and Use:

When is the earliest contract end date for a given outlet? This provides the mechanism for which an employee can check and prepare for a contract renewal for a specific Outlet. If automated, the employee and Outlet could be notified when a contract is about to expire.



```
SELECT c.contract_EndDate AS Next_Contract_End_Date,  
o.outlet_Name AS Outlet_Name,  
p.public_Title AS Publication  
FROM Contract c  
JOIN Outlet o  
ON o.outlet_ID = c.contract_outlet_ID  
JOIN Publication p  
ON c.contract_public_ID = p.public_ID  
WHERE c.contract_EndDate =  
(  
  SELECT MIN(c.contract_EndDate)  
  FROM Contract c  
  JOIN Outlet o  
  ON o.outlet_ID = c.contract_outlet_ID  
  WHERE o.outlet_Name = "Fareham News"  
)  
AND o.outlet_Name = "Fareham News";
```

Result:

Next_Contract_End_Date	Outlet_Name	Publication
2019-01-01	Fareham News	Womens Weekly