1. (**10 points**) Design and implement a *normalized OLTP database* based on the rextracted Accidents and Vehicles data. **You will then develop 2 Views and 5 useful SQL queries. At least two of the 5 SQL queries must use one or more of these views. At least two of the 5 SQL queries must employ aggregations. At least three of the 5 SQL queries must involve JOINS ort sub-queries**

VIEWS QUERIES

1. View_Accident Summary

This view provides a summary of accidents, including details about the driver and vehicle involved.

```
CREATE VIEW View_AccidentSummary AS
SELECT
    ad.Accident_Index,
    ad.Date,
    ad.Time,
    ad.Accident_Severity,
    ad.Number_of_Casualties,
    d.Age_Band_of_Driver,
    d.Sex_of_Driver,
    v.Vehicle_Type,
    v.Make,
    v.Model
FROM Accident_Details ad
JOIN Driver d ON ad.Accident_Index = d.Accident_Index
JOIN Vehicle v ON ad.Accident_Index = v.Accident_Index;
```

Results Messages

	Accident_Index	Date	Time	Accid...	Num...	Age_Band_o...	Sex_of_Dr...	Vehicle_Type	Make	Model
1	200501BS00002	2005-01-05	17:36:00.0000...	Slight	1	36 - 45	Male	Bus or coach (...	DENNIS	NULL
2	200501BS00004	2005-01-07	10:35:00.0000...	Slight	1	46 - 55	Female	Car	NISSAN	ALMERA
3	200501BS00016	2005-01-18	05:01:00.0000...	Slight	1	26 - 35	Male	Car	MCC	SMART F
4	200501BS00017	2005-01-18	11:15:00.0000...	Slight	2	36 - 45	Male	Motorcycle ove...	BMW	K 1200 G
5	200501BS70001	2005-02-01	18:20:00.0000...	Slight	1	26 - 35	Female	Motorcycle ove...	HONDA	NULL
6	200501BS70008	2005-02-03	22:55:00.0000...	Slight	2	Data missing...	Male	Car	FORD	FIESTA F
7	200501BS70017	2005-02-08	20:00:00.0000...	Slight	1	36 - 45	Male	Taxi/Private hir...	LONDON ...	TX1 BRO
8	200501BS70019	2005-02-07	11:30:00.0000...	Slight	1	66 - 75	Male	Car	HONDA	BALLADE
9	200501BS70038	2005-02-22	14:43:00.0000...	Slight	1	56 - 65	Male	Car	RENAULT	KANGOO
10	200501BS70043	2005-02-28	18:14:00.0000...	Slight	1	26 - 35	Not known	Car	MERCED...	A140 ELE
11	200501BS70075	2005-03-08	13:36:00.0000...	Slight	1	Data missing...	Male	Bus or coach (...	VOLVO	NULL
12	200501BS70076	2005-03-06	01:05:00.0000...	Slight	1	46 - 55	Male	Bus or coach (...	VOLVO	NULL
13	200501BS70077	2005-03-08	12:20:00.0000...	Slight	1	36 - 45	Female	Car	LAND RO...	DISCOVE
14	200501BS70080	2005-03-09	15:35:00.0000...	Slight	2	26 - 35	Male	Car	VOLKSW...	PASSAT
15	200501BS70088	2005-03-15	09:40:00.0000...	Serious	1	46 - 55	Male	Bus or coach (...	DENNIS	NULL

2. View_LocationWeather

This view combines accident details with location and external condition information to analyze environmental factors.

```
CREATE VIEW View_LocationWeather AS
SELECT
    ad.Accident_Index,
    ad.Date,
    l.Latitude,
    l.Longitude,
    l.Road_Type,
    ec.Weather_Conditions,
```

```
    ec.Light_Conditions,
    ec.Road_Surface_Conditions
FROM Accident_Details ad
JOIN Location l ON ad.Accident_Index = l.Accident_Index
JOIN External_Conditions ec ON ad.Accident_Index = ec.Accident_Index;
```

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Results | Messages

	Accident_Index	Date	Latitude	Longitude	Road_Type	Weather_C...	Light_Conditions	Road_Surface_Conditions
1	200501BS00002	2005-01-05	51.520075	-0.211708	Dual carriagew...	Fine no hig...	Darkness - lights lit	Dry
2	200501BS00004	2005-01-07	51.482442	-0.173862	Single carriage...	Fine no hig...	Daylight	Dry
3	200501BS00016	2005-01-18	51.492622	-0.157753	One way street	Raining no ...	Darkness - lights lit	Wet or damp
4	200501BS00017	2005-01-18	51.495429	-0.176224	Dual carriagew...	Fine no hig...	Daylight	Dry
5	200501BS70001	2005-02-01	51.494902	-0.182872	Dual carriagew...	Raining no ...	Darkness - lights lit	Wet or damp
6	200501BS70008	2005-02-03	51.514951	-0.217674	Single carriage...	Fine no hig...	Darkness - lights lit	Dry
7	200501BS70017	2005-02-08	51.488776	-0.176346	Single carriage...	Fine no hig...	Darkness - lights lit	Dry
8	200501BS70019	2005-02-07	51.4849	-0.181542	Single carriage...	Fine no hig...	Daylight	Dry
9	200501BS70038	2005-02-22	51.481822	-0.174463	Dual carriagew...	Fine no hig...	Daylight	Wet or damp
10	200501BS70043	2005-02-28	51.491273	-0.186618	Single carriage...	Fine no hig...	Darkness - lights lit	Wet or damp
11	200501BS70075	2005-03-08	51.482775	-0.177882	Single carriage...	Fine no hig...	Daylight	Dry
12	200501BS70076	2005-03-06	51.509377	-0.194258	Single carriage...	Fine no hig...	Darkness - lights lit	Dry
13	200501BS70077	2005-03-08	51.514716	-0.208171	Single carriage...	Fine no hig...	Daylight	Dry
14	200501BS70080	2005-03-09	51.507588	-0.194905	Single carriage...	Fine no hig...	Daylight	Dry
15	200501BS70088	2005-03-15	51.497125	-0.204539	Dual carriagew...	Fine no hig...	Daylight	Dry
16	200501BS70104	2005-05-05	51.482076	-0.173445	Single carriage...	Fine no hig...	Daylight	Dry

OTHER QUERIES

Query 1: List Accident Summary by Severity. This uses the View_AccidentSummary view and involves an aggregation as instructed.

```
SELECT
    Accident_Severity,
    COUNT(*) AS Total_Accidents,
    AVG(Number_of_Casualties) AS Avg_Casualties
FROM View_AccidentSummary
GROUP BY Accident_Severity;
```

Query 2: Count of Accidents by Vehicle Type and Gender of Drive. This uses the View_AccidentSummary view and employs aggregation as instructed.

```
SELECT
    Vehicle_Type,
    Sex_of_Driver,
    COUNT(*) AS Accident_Count
FROM View_AccidentSummary
GROUP BY Vehicle_Type, Sex_of_Driver;
```

Results | Messages

	Vehicle_Type	Sex_of_Driver	Accident_Count
1	Motorcycle over 125cc and up to 500cc	Male	1949
2	Data missing or out of range	Not known	49
3	Goods vehicle - unknown weight	Male	100
4	Ridden horse	Female	11
5	Motorcycle over 500cc	Male	7148
6	Taxi/Private hire car	Female	203
7	Motorcycle 50cc and under	Male	1767
8	Other vehicle	Not known	80
9	Taxi/Private hire car	Male	4244
10	Goods vehicle - unknown weight	Female	6
11	Agricultural vehicle	Male	508
12	Ridden horse	Male	2
13	Pedal cycle	Female	402
14	Minibus (8 - 16 passenger seats)	Not known	21
15	Motorcycle 50cc and under	Female	369
16	Tram	Not known	1
17	Goods over 3.5t. and under 7.5t	Not known	65
18	Motorcycle 125cc and under	Female	568

Query 3: Show the detailed Accident Information on Specific Date. This involves a join and uses the View_LocationWeather.

```
SELECT
    aws.Accident_Index,
    aws.Date,
    aws.Time,
    aws.Vehicle_Type,
    lw.Weather_Conditions,
    lw.Light_Conditions
FROM View_AccidentSummary aws
JOIN View_LocationWeather lw ON aws.Accident_Index = lw.Accident_Index
WHERE aws.Date = '2005-01-01';
```

Results Messages

	Accident_Index	Date	Time	Vehicle_Type	Weather_Conditions	Light_Conditions
1	200501QK00025	2005-01-01	20:05:00.0000000	Car	Fine no high winds	Darkness - lights lit
2	200501ZT80026	2005-01-01	17:40:00.0000000	Car	Fine no high winds	Darkness - lights lit
3	200504A000405	2005-01-01	09:18:00.0000000	Motorcycle 125cc and under	Fine no high winds	Daylight
4	200505ET00001	2005-01-01	00:30:00.0000000	Car	Fine no high winds	Darkness - lights lit
5	200522CD45427	2005-01-01	12:02:00.0000000	Car	Fine no high winds	Daylight
6	200522EJ30979	2005-01-01	15:30:00.0000000	Car	Raining no high winds	Daylight
7	2005330500196	2005-01-01	21:01:00.0000000	Car	Raining no high winds	Darkness - no lighting
8	200550C21C003	2005-01-01	15:30:00.0000000	Car	Raining + high winds	Daylight
9	200550E31A097	2005-01-01	12:38:00.0000000	Car	Raining + high winds	Daylight

Query 4: Find Accidents with Specific Weather and Road Conditions. This involves sub-queries.

```
SELECT
    ad.Accident_Index,
    ad.Date,
    ad.Time,
    ec.Weather_Conditions,
    ec.Road_Surface_Conditions
FROM Accident_Details ad
JOIN External_Conditions ec ON ad.Accident_Index = ec.Accident_Index
WHERE EXISTS (
    SELECT 1 FROM External_Conditions ec2
    WHERE ec2.Accident_Index = ad.Accident_Index
    AND ec2.Weather_Conditions = 'fog or mist'
    AND ec2.Road_Surface_Conditions = 'Snow'
);
```

Results Messages

	Accident_Index	Date	Time	Weather_Conditions	Road_Surface_Conditions
1	20074100E0512	2007-11-20	06:37:00.0000000	Fog or mist	Snow
2	2010030000442	2010-03-02	08:52:00.0000000	Fog or mist	Snow
3	2010170M30090	2010-01-09	11:11:00.0000000	Fog or mist	Snow
4	2010210000374	2010-01-14	15:30:00.0000000	Fog or mist	Snow
5	2010460194943	2010-12-22	02:40:00.0000000	Fog or mist	Snow
6	2012120019372	2012-02-06	10:07:00.0000000	Fog or mist	Snow
7	201231B021312	2012-02-05	23:32:00.0000000	Fog or mist	Snow
8	201337EA68883	2013-01-16	00:10:00.0000000	Fog or mist	Snow

Query 5: Calculate the Average Number of Casualties in Urban vs Rural Area. This involves a join and aggregation

```sql
SELECT
    ec.Urban_or_Rural_Area,
    AVG(ad.Number_of_Casualties) AS Avg_Casualties
FROM Accident_Details ad
JOIN External_Conditions ec ON ad.Accident_Index = ec.Accident_Index
GROUP BY ec.Urban_or_Rural_Area;
```

	Urban_or_Rural_Area	Avg_Casualties
1	Unallocated	1
2	Urban	1
3	Rural	1