

MS-SQL-Project

3rd ISSUE

Part A:

The task is to write a query whose results are in cube format.

SQL Query:

```
SELECT severity, road_surface_conditions, vehicle_type, Count(accident_id)
Accidents
FROM severity, surface, vehicle, accident
WHERE severity.severity_id=accident.severity_id AND
surface.road_surface_conditions_id=accident.road_surface_conditions_id AND
vehicle.vehicle_type_id=accident.vehicle_type_id
GROUP BY CUBE (severity.severity, road_surface_conditions, vehicle_type)
```

Results:

	severity	road_surface_conditions	vehicle_type	Accidents
1	Fatal	Dry	Click to select the whole column	70
2	Serious	Dry	Agricultural vehicle	367
3	Slight	Dry	Agricultural vehicle	1491
4	NULL	Dry	Agricultural vehicle	1928
5	Fatal	Frost or ice	Agricultural vehicle	1
6	Serious	Frost or ice	Agricultural vehicle	4
7	Slight	Frost or ice	Agricultural vehicle	26
8	NULL	Frost or ice	Agricultural vehicle	31
9	Serious	Snow	Agricultural vehicle	4
10	Slight	Snow	Agricultural vehicle	16
11	NULL	Snow	Agricultural vehicle	20
12	Fatal	Wet or damp	Agricultural vehicle	23
13	Serious	Wet or damp	Agricultural vehicle	111
14	Slight	Wet or damp	Agricultural vehicle	506
15	NULL	Wet or damp	Agricultural vehicle	640
16	NULL	NULL	Agricultural vehicle	2619
17	Fatal	Dry	Bus or coach (17 or more pass seats)	410
18	Serious	Dry	Bus or coach (17 or more pass seats)	4568
19	Slight	Dry	Bus or coach (17 or more pass seats)	33813
20	NULL	Dry	Bus or coach (17 or more pass seats)	38791
21	Serious	Flood over 3cm. deep	Bus or coach (17 or more pass seats)	2
22	Slight	Flood over 3cm. deep	Bus or coach (17 or more pass seats)	12
23	NULL	Flood over 3cm. deep	Bus or coach (17 or more pass seats)	14
24	Fatal	Frost or ice	Bus or coach (17 or more pass seats)	2
25	Serious	Frost or ice	Bus or coach (17 or more pass seats)	37
26	Slight	Frost or ice	Bus or coach (17 or more pass seats)	325
27	NULL	Frost or ice	Bus or coach (17 or more pass seats)	364
28	Fatal	Snow	Bus or coach (17 or more pass seats)	1
29	Serious	Snow	Bus or coach (17 or more pass seats)	15
30	Slight	Snow	Bus or coach (17 or more pass seats)	175
31	NULL	Snow	Bus or coach (17 or more pass seats)	191

The list returns 416 results. It concerns the dimensions severity, road_surface_conditions, and vehicle_type. Each cell of the cube contains the number of accidents for a combination of values (severity, road surface condition, vehicle type). For example, a row that has no NULL returns the total number of accidents of a specific severity in a specific road surface condition for a specific vehicle type.

Different Combinations (where NULL depicts the value ALL)

severity, road_surface_conditions, vehicle_type	(GROUP BY severity, road_surface_conditions, vehicle_type)
• severity, road_surface_conditions, NULL	(GROUP BY severity, road_surface_conditions)
• severity, NULL, vehicle_type	(GROUP BY severity, vehicle_type)
• NULL, road_surface_conditions, vehicle_type	(GROUP BY road_surface_conditions, vehicle_type)
• severity, NULL, NULL	(GROUP BY severity)
• NULL, road_surface_conditions, NULL	(GROUP BY road_surface_conditions)
• NULL, NULL, vehicle_type	(GROUP BY vehicle_type)
• NULL, NULL, NULL	(GROUP BY none)

Part B:

If we assume that the DBMS does not support the CUBE operator for creating the cube above, nor the GROUP BY GROUPING SETS statement, but only the GROUP BY statement, what we need to do is initially create a VIEW in SQL SERVER. We create the VIEW as follows:

Accidents_view

```
CREATE VIEW accidents_view AS
SELECT severity, road_surface_conditions, vehicle_type, Count(accident_id) Accidents
FROM severity, surface, vehicle, accident
WHERE severity.severity_id=accident.severity_id AND
      surface.road_surface_conditions_id=accident.road_surface_conditions_id AND
      vehicle.vehicle_type_id=accident.vehicle_type_id
GROUP BY severity.severity, road_surface_conditions, vehicle_type
```

Next, using the VIEW we created, we utilize accidents_view.severity, accidents_view.road_surface_conditions, and accidents_view.vehicle_type to execute SQL SELECT queries for all the different combinations mentioned in the previous request (e.g., GROUP BY severity, road_surface_conditions, vehicle_type). The Union of all these different combinations will return the same results as the previous issue:

SQL query:

```
SELECT severity,road_surface_conditions,vehicle_type
FROM accidents_view
GROUP BY severity, road_surface_conditions,vehicle_type
UNION
SELECT severity,road_surface_conditions,null
FROM accidents_view
GROUP BY severity, road_surface_conditions
UNION
SELECT severity, null, vehicle_type
FROM accidents_view
UNION
```

```

SELECT null, road_surface_conditions, vehicle_type
FROM accidents_view
GROUP BY road_surface_conditions, vehicle_type
UNION
SELECT severity, null, null
FROM accidents_view
GROUP BY severity
UNION
SELECT null, road_surface_conditions, null
FROM accidents_view
GROUP BY road_surface_conditions
UNION
SELECT null, null, vehicle_type
FROM accidents_view
GROUP BY vehicle_type
UNION
SELECT null, null, NULL
FROM accidents_view

```

Results:

	severity	road_surface_conditions	vehicle_type
1	Serious	NULL	Motorcycle over 500cc
2	Slight	Wet or damp	Car
3	Fatal	Snow	Van / Goods 3.5 tonnes mgw or under
4	Serious	Wet or damp	Agricultural vehicle
5	Serious	Wet or damp	Motorcycle over 500cc
6	Fatal	Wet or damp	Bus or coach (17 or more pass seats)
7	Slight	Wet or damp	Motorcycle 125cc and under
8	Serious	Dry	Motorcycle 50cc and under
9	Slight	Snow	Agricultural vehicle
10	Slight	Wet or damp	Electric motorcycle
11	Fatal	Frost or ice	Other vehicle
12	Serious	Dry	Goods over 3.5t. and under 7.5t
13	Fatal	Dry	Motorcycle over 125cc and up to 50...
14	Fatal	Dry	Minibus (8 - 16 passenger seats)
15	Slight	Dry	Goods vehicle - unknown weight
16	Slight	Snow	NULL
17	Fatal	NULL	Pedal cycle
18	NULL	Frost or ice	Bus or coach (17 or more pass seats)
19	Fatal	NULL	Bus or coach (17 or more pass seats)
20	NULL	Wet or damp	Motorcycle over 500cc
21	NULL	NULL	Motorcycle 125cc and under
22	NULL	NULL	Goods over 3.5t. and under 7.5t
23	NULL	NULL	Motorcycle 50cc and under
24	NULL	Snow	Mobility scooter
25	Slight	NULL	Motorcycle - unknown cc
26	Fatal	NULL	Mobility scooter
27	Fatal	NULL	Motorcycle over 125cc and up to 50...
28	NULL	Snow	NULL
29	Slight	Wet or damp	Motorcycle over 500cc
30	Fatal	Frost or ice	Motorcycle over 125cc and up to 50...

The catalog here, as in the previous request (A), returns 416 results, so this way we bypass the problem that our DBMS does not support the CUBE operator.

