

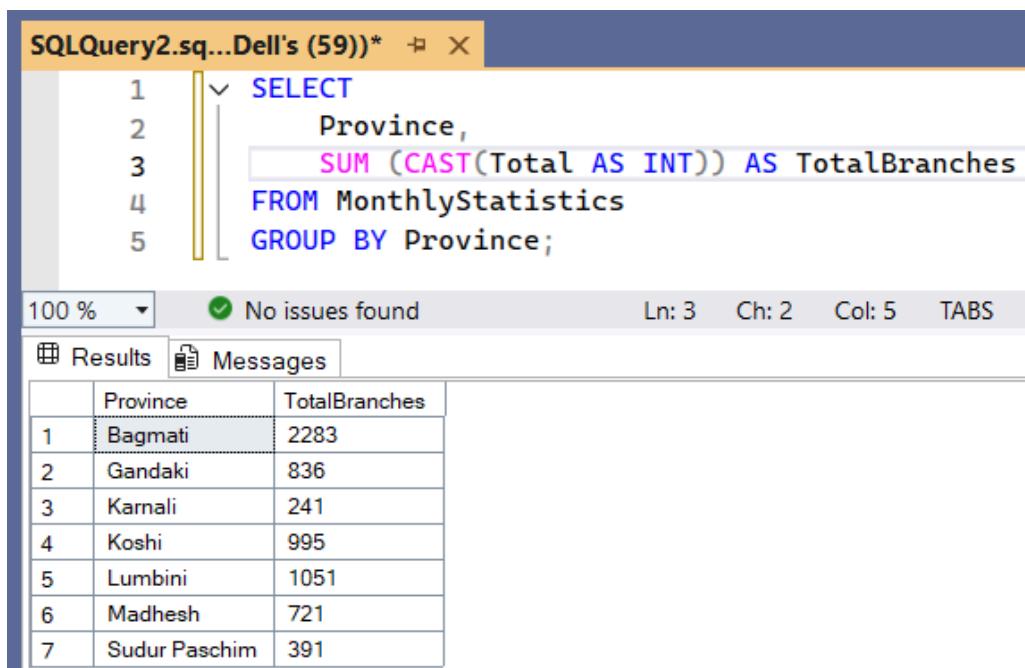
Lab Work 6: Data Aggregation and Reporting with SQL Stored Procedures

Objective:

Learn how to aggregate, analyze, and report branch and population data by writing SQL queries and automating them within a stored procedure. Understand key SQL concepts like grouping, aggregation, filtering, unions, and ranking.

Steps:

- 1. Total Branches by Province:** Write a query to calculate the total number of branches in each province by summing the "Total" column grouped by province.



The screenshot shows a SQL Server Management Studio (SSMS) window titled "SQLQuery2.sq...Dell's (59)*". The query pane contains the following T-SQL code:

```
1  SELECT
2      Province,
3      SUM (CAST(Total AS INT)) AS TotalBranches
4  FROM MonthlyStatistics
5  GROUP BY Province;
```

The status bar at the bottom indicates "No issues found". The results pane displays a table with the following data:

	Province	TotalBranches
1	Bagmati	2283
2	Gandaki	836
3	Karnali	241
4	Koshi	995
5	Lumbini	1051
6	Madhesh	721
7	Sudur Paschim	391

- 2. Average Population per Branch by Province:** Write a query to find the average population per branch for each province using the "Pop_Per_Branch" column.

The screenshot shows a SQL query window titled "SQLQuery2.sq...Dell's (59)*". The query is:

```
7  SELECT
8      Province,
9      AVG(TRY_CAST(NULLIF(Pop_Per_Branch, '-') AS FLOAT)) AS AvgPopPerBranch
10     FROM Monthlystatistics
11     GROUP BY Province;
```

The results pane shows a table with columns "Province" and "AvgPopPerBranch". The data is:

	Province	AvgPopPerBranch
1	Bagmati	4270.0486187575
2	Gandaki	2993.23130230006
3	Karnali	7028.24690251451
4	Koshi	5120.27694262528
5	Lumbini	5832.68588140653
6	Madhesh	8701.90903835927
7	Sudur Paschim	8135.21102056991

- 3. Identify Districts with Inconsistent Branch Counts:** Find districts where the sum of Class_A, Class_B, and Class_C does not match the value in the "Total" column, indicating data inconsistency.

The screenshot shows a SQL query window titled "SQLQuery2.sq...Dell's (59)*". The query is:

```
13  SELECT Province, District, Class_A, Class_B, Class_C, Total
14  FROM Monthlystatistics
15  WHERE (Class_A + ISNULL(Class_B, 0) + ISNULL(Class_C, 0)) <> Total;
```

The results pane shows a table with columns "Province", "District", "Class_A", "Class_B", "Class_C", and "Total". The data is:

	Province	District	Class_A	Class_B	Class_C	Total
1	Koshi	Taplejung	24	0	0	24
2	Koshi	Panchthar	28	3	2	33
3	Koshi	Ilam	38	9	1	48
4	Koshi	Jhapa	139	54	12	205
5	Koshi	Sankhuwasabha	32	1	0	33
6	Koshi	Bhojpur	24	0	1	25
7	Koshi	Terhathum	21	3	0	24
8	Koshi	Dhankuta	28	9	1	38
9	Koshi	Morang	182	61	5	248
10	Koshi	Sunsari	133	39	13	185

- 4. Provinces with More than 10 Branches:** Write a query to list provinces where the total number of branches exceeds 100, using SQL's HAVING clause.

SQLQuery2.sq...Dell's (59)* X

```
16
17     SELECT
18         Province,
19             SUM(CAST(Total AS INT)) AS Total_Branches
20     FROM Monthlystatistics
21     GROUP BY Province
22     HAVING SUM(CAST(Total AS INT)) > 100;
```

91 % ✓ No issues found

Results Messages

	Province	Total_Branches
1	Bagmati	2283
2	Gandaki	836
3	Karnali	241
4	Koshi	995
5	Lumbini	1051
6	Madhesh	721
7	Sudur Paschim	391

- 5. List Provinces and Districts with Type Labels:** Create a combined list of all provinces and districts, tagging each row with a type label — either "Province" or "District".

SQLQuery2.sq...Dell's (59)* X

```
23
24     SELECT Province AS Name, 'Province' AS Type
25     FROM Monthlystatistics
26     GROUP BY Province
27
28     UNION
29     SELECT District, 'District' AS Type
          FROM Monthlystatistics;
```

91 % ✓ No issues found

Results Messages

	Name	Type
1	Bagmati	Province
2	Gandaki	Province
3	Karnali	Province
4	Koshi	Province
5	Lumbini	Province
6	Madhesh	Province
7	Sudur Paschim	Province
8	Achham	District
9	Arghakhanchi	District

- 6. Districts with High Branch Counts in Specific Classes:** Identify districts where Class_A branches exceed 10 or Class_B branches exceed 15, showcasing filtering with OR conditions and UNION.

SQLQuery2.sq...Dell's (59)*

```

31  |> SELECT District, Province, Class_A, Class_B
32  |> FROM Monthlystatistics
33  |> WHERE Class_A > 10
34  |
35  |> UNION
36  |
37  |> SELECT District, Province, Class_A, Class_B
      |> FROM Monthlystatistics
      |> WHERE Class_B > 15;

```

91 % No issues found

Results

	District	Province	Class_A	Class_B
1	Achham	Sudur Paschim	18	3
2	Arghakhanchi	Lumbini	21	7
3	Baglung	Gandaki	50	9
4	Baitadi	Sudur Paschim	22	2
5	Bajhang	Sudur Paschim	21	1
6	Bajura	Sudur Paschim	13	1
7	Banke	Lumbini	82	29
8	Bara	Madhesh	81	13
9	Bardiya	Lumbini	45	26
10	Bhaktapur	Bagmati	125	19

7. District with Highest Population in Each Province: Write a query to find the district(s) with the highest population in every province.

SQLQuery2.sq...Dell's (59)*

```

38
39  |> SELECT m.*
40  |> FROM Monthlystatistics m
41  |> JOIN (
42  |>   SELECT Province, MAX(Population) AS MaxPopulation
43  |>   FROM Monthlystatistics
44  |>   GROUP BY Province
45  |> ) p ON m.Province = p.Province AND m.Population = p.MaxPopulation;

```

91 % No issues found

Results

	Province	District	Class_A	Class_B	Class_C	Total	Population	Pop_Per_Branch	month_year
1	Sudur Paschim	Kailali	132	30	5	167	904666	5417.161676646707	Jestha 2082
2	Madhesh	Dhanusa	89	8	13	110	867747	7888.609090909091	Jestha 2082
3	Lumbini	Kapilbastu	86	18	6	110	682961	6208.736363636363	Jestha 2082
4	Koshi	Jhapa	139	54	12	205	998054	4868.556097560976	Jestha 2082
5	Karnali	Mugu	9	0	0	9	64549	7172.111111111111	Jestha 2082
6	Gandaki	Kaski	205	77	19	301	600051	1993.5249169435217	Jestha 2082
7	Bagmati	Chitawan	165	53	18	236	719859	3050.25	Jestha 2082

8. Top 3 Districts with the Highest Number of Branches Overall: Retrieve the top three districts ranked by total branches across all provinces.

SQLQuery2.sq...Dell's (59))*

```

46
47   SELECT TOP 3 Province, District, Total
48   FROM Monthlystatistics
49   ORDER BY CAST(Total AS INT) DESC;

```

91 % No issues found

Results Messages

	Province	District	Total
1	Bagmati	Kathmandu	1135
2	Lumbini	Rupandehi	326
3	Gandaki	Kaski	301

9. Number of Districts and Average Population per Province: For each province, calculate the number of districts it contains and the average population across those districts.

SQLQuery2.sq...Dell's (59))*

```

51   SELECT
52     Province,
53     COUNT(District) AS District_Count, AVG(CAST(Population AS BIGINT)) AS Avg_Population
54   FROM Monthlystatistics
55   GROUP BY Province;

```

91 % No issues found

Results Messages

	Province	District_Count	Avg_Population
1	Bagmati	13	470528
2	Gandaki	11	224220
3	Karnali	10	168841
4	Koshi	14	354386
5	Lumbini	12	426839
6	Madhesh	8	764325
7	Sudur Paschim	9	299420

10. Provinces with Average Branches per District Greater Than 20: Identify provinces where the average number of branches per district exceeds 20.

SQLQuery2.sq...Dell's (59))*

```

57   SELECT
58     Province,
59     AVG(CAST(Total AS INT)) AS Avg_Branches
60   FROM Monthlystatistics
61   GROUP BY Province
62   HAVING AVG(CAST(Total AS INT)) > 20;

```

91 % No issues found

Results Messages

	Province	Avg_Branches
1	Bagmati	175
2	Gandaki	76
3	Karnali	24
4	Koshi	71
5	Lumbini	87
6	Madhesh	90
7	Sudur Paschim	43

11. Combine all above queries into a single stored procedure that inserts their results into corresponding summary tables for automated reporting.

```
SQLQuery3.sql - Lab6.sql - DE...U\Dell's (59)
1  CREATE PROCEDURE sp_GenerateMonthlyReports
2  AS
3  BEGIN
4      --Provinces with More than 100 Branches
5      INSERT INTO Prov_Branches_Summary
6          SELECT Province, SUM(CAST(Total AS INT)) AS Total_Branches
7          FROM Monthlystatistics
8          GROUP BY Province
9          HAVING SUM(CAST (Total AS INT)) > 100;
10     --List Provinces and Districts with Type Labels
11     INSERT INTO Prov_Dist_Type
12         SELECT DISTINCT Province AS Name, Province AS Type
13         FROM Monthlystatistics
14         UNION
15         SELECT District AS Name, 'District' AS Type
16         FROM Monthlystatistics;
17     --Districts where Class_A > 10 OR Class_B > 15
18     INSERT INTO High_Class_Branches
19         SELECT District, Province, Class_A, Class_B
20         FROM Monthlystatistics
21         WHERE CAST (Class_A AS INT) > 10
22         UNION
23         SELECT District, Province, Class_A, Class_B
24         FROM Monthlystatistics
25         WHERE CAST(Class_B AS INT) > 15;
26     --District with Highest Population in Each Province
27     INSERT INTO MaxPop_District
28         SELECT m.*
29         FROM Monthlystatistics m
30         JOIN (
31             SELECT Province, MAX(CAST(Population AS BIGINT)) AS MaxPop
32             FROM Monthlystatistics m
33             GROUP BY Province
34         )p ON m.Province = p.Province
35         AND CAST(m.Population AS BIGINT) = p.MaxPop;
36     --Top 3 Districts by Branches
37     INSERT INTO Top3_Branches
38         SELECT TOP 3 District, Province, CAST(Total AS INT) AS Total
39         FROM Monthlystatistics
40         ORDER BY CAST (Total AS INT) DESC;
41     --Number of Districts & Average Population
42     INSERT INTO Prov_Dist_Avg
43         SELECT Province, COUNT(District) AS District_Count,
44             AVG(CAST (Population AS BIGINT)) AS Avg_Population
45         FROM Monthlystatistics
46         GROUP BY Province;
47     --Provinces with Avg Branches > 20
48     INSERT INTO High_Avg_Branches
49         SELECT Province, AVG(CAST(Total AS INT)) AS Avg_Branches
50         FROM Monthlystatistics
51         GROUP BY Province
52         HAVING AVG(CAST(Total AS INT)) > 20
53     END;
```

Messages

Commands completed successfully.

Completion time: 2025-08-28T20:35:46.7083585+05:45

Conclusion

The key takeaways from this lab include the following important aspects:

- Practice creating and managing multiple summary tables.
- Understand how to refresh reports programmatically by truncating and inserting data.
- Learn about SQL Server Agent or other scheduling tools to automate stored procedure execution.
- Reflect on how data automation aids timely and accurate business decision-making.