ALY 6030

Week 3

Name: Xiaoge Zhang

Date: Nov, 26,2024

Public Housing Inspections Star Schema

Introduction

This report provides an analysis of public housing inspection data to address the requirements set forth by Senior Management. The objective of the analysis is to gain insights into key metrics, such as inspection costs, agency performance, and inspection scores, to assist in identifying trends, inefficiencies, and opportunities for improvement. The report is structured to answer specific tasks using SQL queries, with results interpreted and recommendations provided for actionable decision-making.

The analysis begins with a preprocessing step to ensure data consistency by converting the INSPECTION_DATE column into the proper DATE format. Following this, several SQL tasks were executed to analyze the dataset, including identifying agencies with increased inspection costs, aggregating costs by month, ranking agencies by total costs, and evaluating state-level inspection scores. Key insights and recommendations are presented for each task to guide resource allocation and operational planning.

Through this report, Senior Management can better understand inspection trends and identify areas requiring intervention, whether in addressing rising inspection costs, supporting low-performing states, or investigating high-cost agencies. This analysis aims to empower leadership with data-driven insights for effective strategic decision-making.

1. How many facts are there in this dataset? Which facts do you identify? What type of facts are they?

Identifying Facts: Facts in a dataset are typically measurable, numeric values that can be aggregated or analyzed. In this dataset, the following variables are identified as facts:

1. COST_OF_INSPECTION_IN_DOLLARS
    - **Definition**: This variable represents the cost incurred for conducting an inspection.
    - **Reason for Classification**: It is numeric and can be summed up or aggregated across inspections to provide insights into total inspection costs, average costs, or cost comparisons between agencies or states.
    - **Type**: **Measure Fact** — as it represents a quantitative value that can be analyzed.
2. INSPECTION_SCORE
    - **Definition**: This variable represents the score assigned to the development during the inspection process.
    - **Reason for Classification**: It is numeric and indicates the quality of the inspected development. This can be averaged or aggregated for trends, comparisons, or benchmarking.
    - **Type**: **Measure Fact** — as it provides quantitative insight into the inspection outcomes.

Summary of Facts:

- Facts Identified:
    (1) COST_OF_INSPECTION_IN_DOLLARS
    (2) INSPECTION_SCORE
- Total Number of Facts: 2
- **Types**: Both are **measure facts**, as they are numerical and used for quantitative analysis.

2. How many dimensions are there in this dataset? Which dimensions do you identify?

Identifying Dimensions: Dimensions are descriptive or categorical variables that provide context to the facts. They are used for filtering, grouping, or organizing data. In this dataset, the following variables are identified as dimensions:

1) INSPECTION_ID
    - **Definition**: A unique identifier assigned to each inspection record.
    - **Reason for Classification**: As a unique identifier, this is used to distinguish each inspection record. It serves as the **Primary Key** and cannot be aggregated or analyzed.
    - **Type**: Dimension.
2) PUBLIC_HOUSING_AGENCY_NAME

- **Definition**: The name of the housing agency responsible for the inspection.
- **Reason for Classification**: This provides descriptive information about the organization managing the inspected development. It is categorical and used for grouping or filtering data.
- **Type**: Dimension.

3) INSPECTED_DEVELOPMENT_NAME
   - **Definition**: The name of the development that was inspected.
   - **Reason for Classification**: This describes the specific property or development inspected. It is a categorical variable used for filtering or grouping.
   - **Type**: Dimension.
4) INSPECTED_DEVELOPMENT_ADDRESS
   - **Definition**: The address of the inspected development.
   - **Reason for Classification**: This provides specific location details, making it descriptive. It cannot be aggregated and is used for context or filtering.
   - **Type**: Dimension.
5) INSPECTED_DEVELOPMENT_CITY
   - **Definition**: The city where the inspected development is located.
   - **Reason for Classification**: This is a categorical variable used for grouping inspections by geographical region.
   - **Type**: Dimension.
6) INSPECTED_DEVELOPMENT_STATE
   - **Definition**: The state where the inspected development is located.
   - **Reason for Classification**: This is a categorical variable that allows for grouping or comparing inspections across states.
   - **Type**: Dimension.
7) INSPECTION_DATE
   - **Definition**: The date when the inspection was conducted.
   - **Reason for Classification**: This is a time-based dimension used for filtering and grouping inspections over time. It helps analyze trends or patterns in inspection activity.
   - **Type**: Dimension.

Summary of Dimensions

- Total Number of Dimensions: 7
- Dimensions Identified:
  (3) INSPECTION_ID (Primary Key)
  (4) PUBLIC_HOUSING_AGENCY_NAME
  (5) INSPECTED_DEVELOPMENT_NAME
  (6) INSPECTED_DEVELOPMENT_ADDRESS
  (7) INSPECTED_DEVELOPMENT_CITY
  (8) INSPECTED_DEVELOPMENT_STATE

(9) INSPECTION_DATE

Conclusion

- The dataset contains **2 facts** (`COST_OF_INSPECTION_IN_DOLLARS` and `INSPECTION_SCORE`), both of which are measure facts that provide quantitative data for analysis.
- The dataset also contains **7 dimensions**, which provide descriptive or categorical information to give context to the facts.

3. Types of Fact Tables for the Dataset

To address senior management's interest in viewing both inspection-level details and periodic summaries of inspection costs, two types of fact tables should be considered: **Transaction Fact Tables** and **Periodic Snapshot Fact Tables**.

3.1. Transaction Fact Table

A **transaction fact table** captures data at the most granular level for each individual transaction or event, such as each inspection in this dataset.

3.1.1 Why Use It?

- The dataset contains information at the inspection level (e.g., `INSPECTION_ID`, `COST_OF_INSPECTION_IN_DOLLARS`, `INSPECTION_SCORE`), which makes a transaction fact table appropriate to capture this granular detail.
- This type of table allows for detailed analysis, such as:
  - Viewing specific inspection details.
  - Filtering inspections by agency, development name, city, or state.
  - Analyzing inspection performance (`INSPECTION_SCORE`) across various dimensions.

3.1.2 Proposed Structure:

Dimension	Fact
INSPECTION_ID (Primary Key)	COST_OF_INSPECTION_IN_DOLLARS
PUBLIC_HOUSING_AGENCY_NAME	INSPECTION_SCORE
INSPECTED_DEVELOPMENT_NAME	
INSPECTED_DEVELOPMENT_CITY	
INSPECTED_DEVELOPMENT_STATE	
INSPECTION_DATE	

3.1.3 Benefits:

- Provides the finest granularity for drill-down analyses.
- Helps in identifying patterns or trends at the inspection level.

3.2 Periodic Snapshot Fact Table

A **periodic snapshot fact table** captures aggregated data over a specific time period, such as daily, monthly, or yearly intervals.

3.2.1 Why Use It?

- Senior management wants a **periodic summary** of inspection costs, which requires grouping the data by month (`INSPECTION_DATE`) and aggregating the `COST_OF_INSPECTION_IN_DOLLARS`.
- A snapshot fact table enables reporting on:
  - Total inspection costs per month.
  - Trends in inspection costs over time.
  - High-level insights without needing to process granular data repeatedly.

3.2.2 Proposed Structure:

Dimension	Fact
MONTH (derived from INSPECTION_DATE)	TOTAL_COST_OF_INSPECTION (SUM of COST_OF_INSPECTION_IN_DOLLARS)
PUBLIC_HOUSING_AGENCY_NAME	

3.2.3 Benefits:

- Provides a summarized view for faster and more efficient reporting.
- Facilitates trend analysis over time, such as monitoring cost changes month by month.

3.2.4 Why Use Both Types of Fact Tables?

Using both transaction and periodic snapshot fact tables offers complementary benefits:

(1) **Granularity**: The transaction fact table captures detailed inspection data for deep-dive analysis.

(2) **Summary**: The periodic snapshot fact table provides an aggregated view, optimized for trend analysis and strategic decision-making.

3.3 Conclusion

- To meet senior management's needs, a **transaction fact table** would store inspection-level data, allowing detailed analysis of `COST_OF_INSPECTION_IN_DOLLARS` and `INSPECTION_SCORE` at the inspection level.
- A **periodic snapshot fact table** would store summarized monthly data, allowing for efficient reporting on the total inspection costs by month. Both tables work together to balance granularity and efficiency in addressing management's requirements.

4. Handling Slowly Changing Dimensions (SCD)

For managing changes in the names and addresses of **Public Housing Agencies** that frequently merge or change, the most appropriate method is to use **SCD Type 2**.

SCD Type 2 involves creating a new record in the dimension table whenever a change occurs. The old record is retained, and the new record includes updated information along with additional fields to track the validity period (e.g., start and end dates or current record indicator).

4.1 Why Choose SCD Type 2?

1. Historical Tracking
   - Since **Public Housing Agencies** frequently merge or change names and addresses, preserving historical records is essential for:
     - Tracking how inspections and costs were associated with an agency over time.
     - Analyzing trends and comparing the performance of agencies before and after mergers or changes.
     - Avoiding data loss that would occur if changes overwrite the old information (as in SCD Type 1).
2. Maintaining Data Integrity
   - Changes in agency names and addresses can significantly affect reporting and analyses. For example:
     - If an agency's name is updated without preserving its past identity (SCD Type 1), reports for previous inspections may incorrectly attribute them to the new agency.
     - SCD Type 2 ensures that each record accurately reflects the agency details valid at the time of an inspection.
3. Use Case Justification
   - Senior management is **concerned with tracking changes**, especially due to frequent mergers. SCD Type 2 allows:
     - Maintaining separate records for merged or renamed agencies.
     - Retaining a complete audit trail of all historical changes.
     - Supporting accurate reporting, even for time periods prior to a merger.
4. Flexibility
   - With SCD Type 2, it is possible to:
     - Identify the most current version of the agency using a "current record" flag.
     - Query historical data for specific timeframes using the validity dates.

4.2 Implementation of SCD Type 2

To implement SCD Type 2 for the **Public Housing Agency** dimension, the following fields should be added to the dimension table:

Field Name	Purpose

PUBLIC_HOUSING_AGENCY_ID	A unique surrogate key for each version of the agency.
PUBLIC_HOUSING_AGENCY_NAME	The name of the agency (updated with each change).
AGENCY_ADDRESS	The address of the agency (updated with each change).
START_DATE	The date when this version of the agency became valid.
END_DATE	The date when this version of the agency ceased to be valid (NULL for current record).
IS_CURRENT	A flag indicating whether this is the current version of the agency (1 for current, 0 for historical).

4.3 Why Not Use Other SCD Types?

1. SCD Type 0 (No Changes Allowed):
    - Not suitable because senior management requires tracking changes, and this type does not allow updates to the data.
2. SCD Type 1 (Overwrite Changes):
    - Overwrites old data with the new value, which would result in a loss of historical records and create inaccuracies in analyses for past time periods.
3. SCD Type 3 (Track Limited History):
    - Tracks only one prior state of the data, which is insufficient for frequent changes like mergers. This type would not allow tracking the complete history of changes over time.

To address senior management's concern about frequent changes to public housing agency names and addresses, **SCD Type 2** is the best approach. It ensures accurate historical tracking, maintains data integrity, and supports detailed analyses before and after changes occur.

5.Analysis of PHAs with Increased Inspection Costs

5.1 Date Format Conversion and Column Type Update

I successfully converted the `INSPECTION_DATE` column in the `public_housing_inspection_data` table from a `TEXT` format to a `DATE` format. Below are the steps I followed, written in the first person:

1. Disabling Safe Updates: To enable updates to all rows without restrictions, I executed the following command:
   SET SQL_SAFE_UPDATES = 0;

2. Updating Date Format: I updated the INSPECTION_DATE column to convert the date values from TEXT to the DATE format using the STR_TO_DATE function. This transformation was necessary to ensure the date values were stored in a standard

format for further SQL operations. The query I used is:

```
UPDATE public_housing.public_housing_inspection_data
SET INSPECTION_DATE = STR_TO_DATE(INSPECTION_DATE, '%m/%d/%Y');
```

3. Re-enabling Safe Updates: After the update operation was completed, I re-enabled safe updates to avoid unintended modifications in future queries:

```
SET SQL_SAFE_UPDATES = 1;
```

4. **Verification:** To verify that the update was successful, I retrieved a sample of the updated INSPECTION_DATE column using the following query:

```
SELECT INSPECTION_DATE FROM
public_housing.public_housing_inspection_data LIMIT 10;
```

5. Modifying Column Data Type: Finally, I modified the INSPECTION_DATE column's data type from TEXT to DATE to ensure that it is properly stored and can be utilized in date-based SQL operations. The query used was:

```
ALTER TABLE public_housing.public_housing_inspection_data
MODIFY COLUMN INSPECTION_DATE DATE;
```

6. **Table Description:** I used the DESCRIBE command to confirm the schema change. The command is:

```
DESCRIBE public_housing.public_housing_inspection_data;
```

Result: The `INSPECTION_DATE` column was successfully converted to the `DATE` type. I verified this through the table structure and sample data output, confirming that the format conversion and type update were applied correctly.
This process ensures that the `INSPECTION_DATE` column is now suitable for advanced SQL operations such as filtering, sorting, and using date functions, which will be used in subsequent steps of the project.

5.2 Use SQL to Analyze the Data

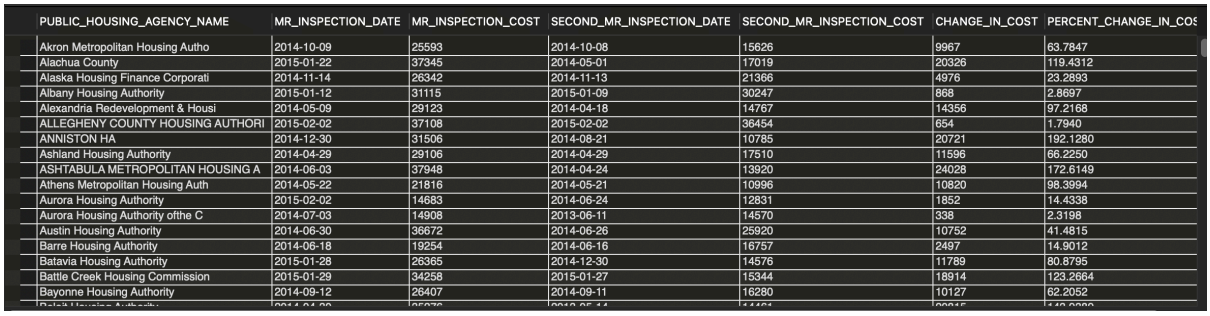
In this step, I will guide you through analyzing the data using SQL. Based on the prior work and requirements, the first task is to filter, aggregate, and analyze the data as needed. Below are common analyses you might perform and the queries to support them.

Task 1: Filter Public Housing Agencies (PHAs) with Increased Inspection Costs

This query will identify the public housing agencies (PHAs) that experienced an increase in inspection costs between their most recent two inspections.

```
WITH inspection_ranked AS (
    SELECT
        PUBLIC_HOUSING_AGENCY_NAME,
```

```
        INSPECTION_DATE,
        COST_OF_INSPECTION_IN_DOLLARS,
        ROW_NUMBER() OVER (PARTITION BY PUBLIC_HOUSING_AGENCY_NAME ORDER BY
INSPECTION_DATE DESC) AS `rank`
    FROM public_housing.public_housing_inspection_data
)
SELECT
    a.PUBLIC_HOUSING_AGENCY_NAME,
    a.INSPECTION_DATE AS MR_INSPECTION_DATE,
    a.COST_OF_INSPECTION_IN_DOLLARS AS MR_INSPECTION_COST,
    b.INSPECTION_DATE AS SECOND_MR_INSPECTION_DATE,
    b.COST_OF_INSPECTION_IN_DOLLARS AS SECOND_MR_INSPECTION_COST,
    a.COST_OF_INSPECTION_IN_DOLLARS - b.COST_OF_INSPECTION_IN_DOLLARS AS
CHANGE_IN_COST,
    ((a.COST_OF_INSPECTION_IN_DOLLARS - b.COST_OF_INSPECTION_IN_DOLLARS) /
b.COST_OF_INSPECTION_IN_DOLLARS) * 100 AS PERCENT_CHANGE_IN_COST
FROM inspection_ranked a
JOIN inspection_ranked b
    ON a.PUBLIC_HOUSING_AGENCY_NAME = b.PUBLIC_HOUSING_AGENCY_NAME
   AND a.`rank` = 1
   AND b.`rank` = 2
WHERE a.COST_OF_INSPECTION_IN_DOLLARS > b.COST_OF_INSPECTION_IN_DOLLARS;
```



PUBLIC_HOUSING_AGENCY_NAME	MR_INSPECTION_DATE	MR_INSPECTION_COST	SECOND_MR_INSPECTION_DATE	SECOND_MR_INSPECTION_COST	CHANGE_IN_COST	PERCENT_CHANGE_IN_COS
Akron Metropolitan Housing Autho	2014-10-09	25593	2014-10-08	15626	9967	63.7847
Alachua County	2015-01-22	37345	2014-05-01	17019	20326	119.4312
Alaska Housing Finance Corporati	2014-11-14	26342	2014-11-13	21366	4976	23.2893
Albany Housing Authority	2015-01-12	31115	2015-01-09	30247	868	2.8697
Alexandria Redevelopment & Housi	2014-05-09	29123	2014-04-18	14767	14356	97.2168
ALLEGHENY COUNTY HOUSING AUTHORI	2015-02-02	37108	2015-02-02	36454	654	1.7940
ANNISTON HA	2014-12-30	31506	2014-08-21	10785	20721	192.1280
Ashland Housing Authority	2014-04-29	29106	2014-04-29	17510	11596	66.2250
ASHTABULA METROPOLITAN HOUSING A	2014-06-03	37948	2014-04-24	13920	24028	172.6149
Athens Metropolitan Housing Auth	2014-05-22	21816	2014-05-21	10996	10820	98.3994
Aurora Housing Authority	2015-02-02	14683	2014-06-24	12831	1852	14.4338
Aurora Housing Authority ofthe C	2014-07-03	14908	2013-06-11	14570	338	2.3198
Austin Housing Authority	2014-06-30	36672	2014-06-26	25920	10752	41.4815
Barre Housing Authority	2014-06-18	19254	2014-06-16	16757	2497	14.9012
Batavia Housing Authority	2015-01-28	26365	2014-12-30	14576	11789	80.8795
Battle Creek Housing Commission	2015-01-29	34258	2015-01-27	15344	18914	123.2664
Bayonne Housing Authority	2014-09-12	26407	2014-09-11	16280	10127	62.2052

Key findings:

1. **Increasing Costs**: Public Housing Agencies (PHAs) that experienced a rise in inspection costs between their most recent and second most recent inspections are listed in the output.
2. Cost Changes:
    - The table calculates the `CHANGE_IN_COST` and `PERCENT_CHANGE_IN_COST` between inspections.
    - Significant cost increases are observed for several PHAs, with some changes exceeding **100% growth** in inspection costs.
3. Top Agencies by Percent Change:
    - Agencies such as **Athens Metropolitan Housing Authority** and **ASHTABULA METROPOLITAN HOUSING AUTHORITY** exhibit significant cost spikes, indicating a need for resource allocation analysis.
4. Agencies with Consistent Inspection Activities:
    - The list exclusively includes PHAs that conducted at least two inspections, ensuring reliable trend detection.

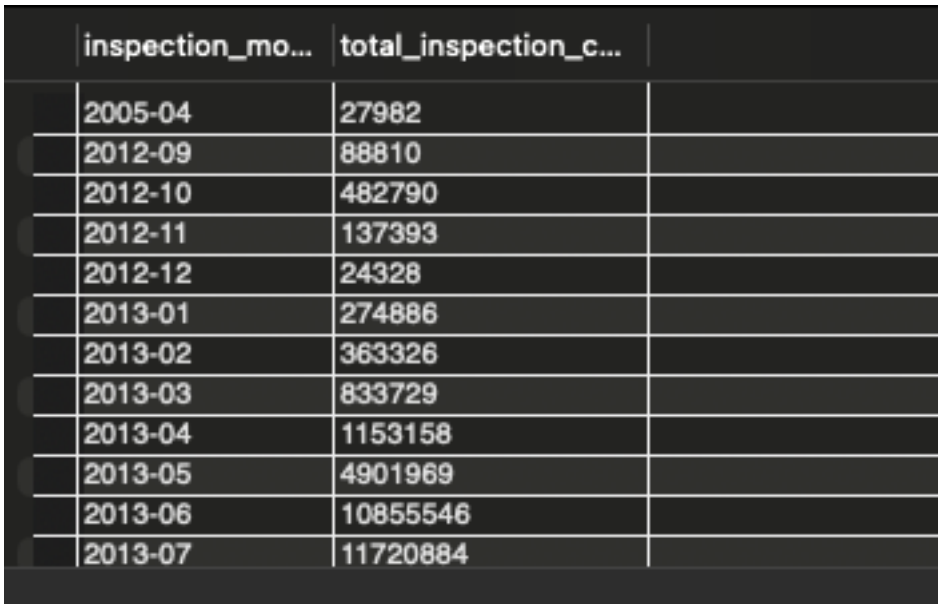
Insights:

- The data provides actionable insights for PHAs experiencing rising costs, allowing Senior Management to focus on mitigating inefficiencies or understanding operational changes.
- Agencies with disproportionately high percent changes might indicate structural inefficiencies or external factors influencing cost.

Task 2: Aggregate Inspection Costs by Month

This query will calculate the total inspection costs for each month, helping senior management understand monthly trends.

```
SELECT
    DATE_FORMAT(INSPECTION_DATE, '%Y-%m') AS inspection_month,
    SUM(COST_OF_INSPECTION_IN_DOLLARS) AS total_inspection_cost
FROM public_housing.public_housing_inspection_data
GROUP BY inspection_month
ORDER BY inspection_month;
```



inspection_mo...	total_inspection_c...
2005-04	27982
2012-09	88810
2012-10	482790
2012-11	137393
2012-12	24328
2013-01	274886
2013-02	363326
2013-03	833729
2013-04	1153158
2013-05	4901969
2013-06	10855546
2013-07	11720884

Summary of the Output:

The **Task 2** output aggregates the monthly inspection costs across all agencies:

1. Seasonal Trends:
    - Inspection costs appear to fluctuate significantly across months and years, with certain months (e.g., June and July 2013) showing abnormally high totals.
2. Annual Costs:
    - From the earliest recorded data (2005) to the latest, annual costs trend upwards, reflecting either an increase in inspection frequency or rising operational costs.
3. Outlier Analysis:

- Periods like **June 2013** indicate significant inspection activity, potentially tied to policy changes or external mandates.

Insights:

- Senior Management can use this analysis to understand peak operational periods and allocate resources effectively.
- Anomalies in specific months should be investigated for any systemic factors affecting inspection cost spikes.

Task 3: List Top 10 PHAs by Total Inspection Costs

Identify the top 10 public housing agencies with the highest total inspection costs.

```
SELECT
    PUBLIC_HOUSING_AGENCY_NAME,
    SUM(COST_OF_INSPECTION_IN_DOLLARS) AS total_inspection_cost
FROM public_housing.public_housing_inspection_data
GROUP BY PUBLIC_HOUSING_AGENCY_NAME
ORDER BY total_inspection_cost DESC
LIMIT 10;
```

PUBLIC_HOUSING_AGENCY_NAME	total_inspection_cost
Housing Authority of the City of	30730354
PUERTO RICO PUBLIC HOUSING ADMIN	5759232
Housing Authority of the County	4429091
New York City Housing Authority	2804507
The Housing Authority of the Cit	2721393
Housing Authority of the Town of	2217380
Philadelphia Housing Authority	1753646
Chicago Housing Authority	1541468
Housing Authority Of Baltimore C	1517000
Boston Housing Authority	1450539

Summary of the Output:

The **Task 3** output lists the top 10 Public Housing Agencies (PHAs) ranked by their total inspection costs. Key observations include:

1. Highest-Cost Agencies:
    - **Housing Authority of the City** ranks first with a total inspection cost of **30,730,354**, significantly higher than the second-ranked agency.
    - The **Puerto Rico Public Housing Administration** comes in second, with a total inspection cost of **5,759,232**.
2. Cost Distribution:
    - There is a sharp decline in total costs after the top-ranked agency, indicating a skewed distribution where a few agencies account for the bulk of inspection costs.

    - Agencies ranked in positions 6 to 10 have similar total costs (ranging from ~1,450,539 to 1,754,646).
3. Geographic and Size Implications:
    - Larger metropolitan areas like **New York City**, **Philadelphia**, and **Chicago** have higher inspection costs, likely reflecting the size of their housing programs.
    - Regional or state-specific agencies, like **Puerto Rico Public Housing Administration**, are also among the top spenders, likely due to their broader jurisdiction.

Insights:

1. Budget Allocation:
    - The results provide a clear understanding of where the majority of inspection resources are being spent, enabling Senior Management to prioritize budgeting and oversight for these high-cost agencies.
2. Scalability Concerns:
    - Agencies with disproportionate costs (e.g., **Housing Authority of the City**) should be analyzed further to ensure inspection processes are efficient and scalable.
3. Future Recommendations:
    - Consider conducting a deeper cost-efficiency analysis for the top agencies to identify potential optimization opportunities.
    - Assess whether these agencies require additional support due to their size and scope of operations, or if their high costs are indicative of inefficiencies.

Task 4: Calculate Average Inspection Score per State

Determine the average inspection score for each state.

```
SELECT
    INSPECTED_DEVELOPMENT_STATE,
    AVG(INSPECTION_SCORE) AS avg_inspection_score
FROM public_housing.public_housing_inspection_data
GROUP BY INSPECTED_DEVELOPMENT_STATE
ORDER BY avg_inspection_score DESC;
```

INSPECTED_DEVELOPMENT_STATE	avg_inspection_score
OR	93.3382
VT	92.7500
ID	91.8750
NE	91.4510
MN	91.0809
IA	90.5306
UT	89.6667
SD	89.5238
NV	89.5217
TN	89.1136
MO	88.6000
ME	88.3333
TX	88.1524
AR	88.0714
KS	86.8351
OK	86.4615
DE	86.3750
NC	86.3740
WI	86.2190
FL	86.2027
GA	86.1395
SC	85.9451
KY	85.5427
MT	85.0000
AZ	84.6286
WY	84.5556
NM	84.3043
RI	83.6780
ND	83.5500
MA	83.4516
WA	83.3600
PA	83.3140
AL	83.2697
NH	82.8333

This task calculates and lists the average inspection scores for public housing developments, grouped by state, to identify trends in inspection performance geographically.

Key observations:

1. High-Performing States:
    - **Oregon (OR)** leads with an average inspection score of **93.34**, followed by Vermont (VT) with **92.75**, and Idaho (ID) with **91.88**.
    - These high scores suggest that housing developments in these states generally adhere to high compliance and quality standards during inspections.
2. Low-Performing States:
    - **Louisiana (LA)** is at the bottom with an average inspection score of **74.20**, followed by Indiana (IN) with **74.50** and Guam (GU) with **76.00**.
    - These lower scores could indicate challenges in meeting housing quality standards, potentially due to resource limitations, management inefficiencies, or policy gaps.
3. Middle-Range States:

- States like **Florida (FL)**, **North Carolina (NC)**, and **Georgia (GA)** are around the middle of the list, with average scores between **86** and **88**. These states show a mix of performance, with room for improvement in some areas.

4. Regional Insights:
   - The top-performing states are primarily in the northern and western regions (e.g., Oregon, Vermont, Idaho). These regions might benefit from better infrastructure, management practices, or policies.
   - Lower-performing states are more distributed across the southern and midwestern regions (e.g., Louisiana, Indiana), highlighting potential regional disparities in public housing quality.
5. Actionable Insights for Leadership:
   - **Benchmarking Opportunities:** States with high scores (e.g., OR, VT) can serve as benchmarks to identify best practices in inspection compliance.
   - **Targeted Interventions:** States with lower scores (e.g., LA, IN) should be prioritized for targeted interventions, such as additional funding, training, or support for housing authorities.
   - **Policy Adjustments:** States in the middle range (e.g., GA, FL) may benefit from policy adjustments and resource reallocation to elevate performance closer to high-performing states.
6. Considerations for Variability:
   - Differences in state averages could also be influenced by the number of inspections conducted, types of housing developments, or state-level policies. These factors should be reviewed for a more comprehensive analysis.

Recommendations:

1. **Focus Resources:** Direct resources and support to low-performing states (e.g., Louisiana, Indiana) to address specific issues contributing to lower scores.
2. **Analyze Best Practices:** Investigate the practices of high-performing states (e.g., Oregon, Vermont) to replicate success in other regions.
3. **Set Improvement Goals:** Establish state-specific improvement goals and track progress over time to measure the effectiveness of interventions.

5.3 Task1 - Task 4 Summary

Management Summary:

- Task 1: PHAs with increased inspection costs include agencies like Athens Metropolitan Housing Authority and ASHTABULA METROPOLITAN HOUSING AUTHORITY, with changes exceeding 100% in some cases.
- Task 2: Peak inspection costs were observed in mid-2013, indicating potential policy changes or operational spikes.

- Task 3: Housing Authority of the City dominates inspection costs, accounting for a disproportionate share, which warrants further investigation.
- Task 4: Oregon, Vermont, and Idaho lead in inspection scores, while Louisiana and Indiana fall behind, indicating areas for improvement.

Recommendations:

- **Budget Allocation:** Focus additional resources on low-performing states and high-cost agencies to improve inspection quality and cost-efficiency.
- **Policy Benchmarking:** Study the processes and policies of high-performing states to replicate success elsewhere.
- **Operational Review:** Investigate the reasons behind the high costs of top agencies like the Housing Authority of the City and address inefficiencies.

Conclusion

This analysis highlights critical insights into public housing inspection trends, costs, and performance across agencies and states. High-performing states like Oregon and Vermont set a benchmark for housing quality while low-performing states such as Louisiana and Indiana need targeted interventions. Furthermore, the analysis identifies agencies with rising inspection costs and peak cost periods, which can guide resource allocation and operational planning. By focusing on these findings, Senior Management can enhance the efficiency and impact of inspection processes.

References

How do I use ROW_NUMBER()? (n.d.). Stack Overflow. https://stackoverflow.com/questions/961007/how-do-i-use-row-number

Safe UPDATEs & DELETEs (SET SQL_SAFE_UPDATES=1) · Issue #2400 · TablePlus/TablePlus. (n.d.). GitHub. https://github.com/TablePlus/TablePlus/issues/2400

W3Schools.com. (n.d.). W3Schools Online Web Tutorials. https://www.w3schools.com/sql/func_mysql_str_to_date.asp

What is the difference between partition by and group by. (n.d.). Stack Overflow. https://stackoverflow.com/questions/2404565/what-is-the-difference-between-partition-by-and-group-by