



[BANK LOAN PERFORMANCE ANALYSIS]

[Power BI]



POWER BI - BANK LOAN PERFORMANCE ANALYSIS

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Project Title: Bank Loan Performance Analysis

Transformation Using Power Query:

Data Cleaning:

Handling Missing Values and Duplicates:

- Replace missing values (null) in the 'emp_length' column of the "BorrowerDetails" table with '0 year'.

The screenshot shows the Power Query Editor interface with the 'BorrowerDetails' query selected. The table has 11 columns and 999+ rows. The 'emp_length' column is being modified. The 'APPLIED STEPS' pane shows the 'Replaced Value' step.

- Remove rows with missing values in the 'last_pymnt_d' and 'delinq_2yrs' columns.

The screenshot shows the Power Query Editor interface with the 'BorrowerDetails' query selected. The table has 11 columns and 999+ rows. The 'last_pymnt_d' and 'delinq_2yrs' columns now only contain valid values. The 'APPLIED STEPS' pane shows the 'Filtered Rows' step.

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- Remove duplicate rows in the 'id' column of the "LoanDetails" table.

The screenshot shows the Power Query Editor interface with the 'LoanDetails' table selected. The table has 11 columns and 999+ rows. The 'Properties' pane indicates the table is named 'LoanDetails'. The 'Applied Steps' pane shows the step 'Removed Duplicates' was applied.

Dealing with Inconsistencies:

- Ensure words in the 'purpose' column are separated by spaces instead of underscores (e.g., "credit card" instead of "credit_card").

The screenshot shows the Power Query Editor interface with the 'LoanDetails' table selected. The table has 11 columns and 999+ rows. The 'Properties' pane indicates the table is named 'LoanDetails'. The 'Applied Steps' pane shows the step 'Replaced Value' was applied.

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➤ Format the 'purpose' and 'home_ownership' columns to proper case.

The screenshot shows the Power Query Editor interface with two queries: 'BorrowerDetails' and 'LoanDetails'. The 'LoanDetails' query is currently selected. A formula bar at the top shows: `Table.TransformColumns(#"Replaced Value", {"purpose", Text.Proper, type text})`. The 'APPLIED STEPS' pane on the right lists the step: `Capitalized Each Word`.

L2	Installment	A ₂ grade	A ₂ sub_grade	Issue_d	A ₂ loan_status	A ₂ purpose
1	9.65	162.87 B	B2	01-12-2018	Fully Paid	Credit Card
2	5.27	59.83 C	C4	01-12-2018	Charged Off	Car
3	5.96	64.33 C	C5	01-12-2018	Fully Paid	Small Business
4	3.49	339.31 C	C1	01-12-2018	Fully Paid	Other
5	7.69	67.79 B	B5	01-12-2018	Current	Other
6	7.9	156.46 A	A4	01-12-2018	Fully Paid	Wedding
7	5.96	170.08 C	C5	01-12-2018	Current	Debt Consolidation
8	9.64	109.43 E	E1	01-12-2018	Fully Paid	Car
9	1.28	152.39 F	F2	01-12-2018	Charged Off	Small Business
10	2.69	121.45 B	B5	01-12-2018	Charged off	Other
11	1.65	153.45 C	C3	01-12-2018	Fully Paid	Debt Consolidation
12	2.69	402.54 B	B5	01-12-2018	Fully Paid	Debt Consolidation
13	3.49	305.38 C	C1	01-12-2018	Charged Off	Debt Consolidation
14	9.91	96.68 B	B1	01-12-2018	Fully Paid	Credit Card
15	7.65	325.74 B	B2	01-12-2018	Charged off	Other
16	5.29	35.31 D	D1	01-12-2018	Fully Paid	Debt Consolidation
17	5.27	347.98 C	C4	01-12-2018	Fully Paid	Home Improvement
18	5.03	109.57 A	A1	01-12-2018	Fully Paid	Major Purchase
19	1.71	198.46 B	B3	01-12-2018	Fully Paid	Medical
20	5.03	280.01 A	A1	01-12-2018	Fully Paid	Debt Consolidation
21	5.27	484.63 C	C4	01-12-2018	Fully Paid	Debt Consolidation
22	2.42	701.73 B	B4	01-12-2018	Charged Off	Debt Consolidation
23	<					

The screenshot shows the Power Query Editor interface with two queries: 'BorrowerDetails' and 'LoanDetails'. The 'BorrowerDetails' query is currently selected. A formula bar at the top shows: `Table.TransformColumns(#"Filtered Rows1", {"home_ownership", Text.Proper, type text})`. The 'APPLIED STEPS' pane on the right lists the step: `Capitalized Each Word`.

L2	v ₂ member_id	v ₂ loan_id	A ₂ emp_length	A ₂ home_ownership	L2 annual_inc	A ₂ verification_status	L2 dt
1	1294539	1062474	1 year	Mortgage	\$4000	Verified	
2	1304764	1069657	2 years	Rent	\$5000	Not Verified	
3	1304678	1069799	10+ years	Mortgage	\$10000	Not Verified	
4	1303150	1068547	10+ years	Rent	\$6000	Verified	
5	1302235	1067874	< 1 year	Rent	\$10000	Source Verified	
6	1302467	1069106	1 year	Rent	\$90000	Not Verified	
7	1270159	1068092	0 years	Mortgage	\$60000	Source Verified	
8	1302434	1068078	6 years	Mortgage	\$87000	Not Verified	
9	1247741	1067918	1 year	Mortgage	\$55000	Not Verified	
10	1294027	1062177	2 years	Mortgage	\$44000	Source Verified	
11	1301822	1067434	2 years	Rent	\$225000	Verified	
12	1301744	1067364	5 years	Rent	\$55000	Not Verified	
13	1301459	1067084	2 years	Mortgage	\$168000	Verified	
14	1300806	1066617	10+ years	Mortgage	\$144000	Verified	
15	1300072	1065929	7 years	Mortgage	\$14400	Not Verified	
16	1300402	1066434	10+ years	Mortgage	\$80000	Not Verified	
17	1300323	1066364	10+ years	Mortgage	\$50000	Not Verified	
18	1299834	1065717	1 year	Rent	\$150000	Not Verified	
19	1299755	1065649	10+ years	Rent	\$15500	Verified	
20	1299469	1065572	2 years	Rent	\$50964	Verified	
21	1279118	1047987	2 years	Mortgage	\$35004	Verified	
22	1298959	1064908	4 years	Rent	\$45000	Source Verified	
23	<						

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Data Transformation:

Column Transformation:

- Change the data type of the 'total_pymnt' column to 'Fixed decimal number'.

The screenshot shows the Power Query Editor interface with the following details:

- Home ribbon:** Close & Apply, New Source, Recent Sources, Enter Data, Data source settings, Manage Parameters, Refresh Preview, Advanced Editor, Properties, Choose Columns, Remove Columns, Keep Rows, Remove Rows, Sort, Split Column, Group By, Replace Values, Transform, Data Type: Fixed decimal number.
- Query Settings pane:**
 - Name: BorrowerDetails
 - Applied Steps: Changed Type1 (highlighted)
- Table View:** Shows a table with columns: verification_status, delinq_2yrs, last_pymnt_d, total_pymnt, and total_pnrcp. The 'total_pymnt' column is being transformed.
- Applied Steps pane:** Shows the step 'Changed Type1' which converted the column to a fixed decimal number.
- System status bar:** 27°C, Partly sunny, ENG IN, 11:06, 01-01-2025.

- Round off the numbers in the 'funded_amnt' column to 2 decimal places.

The screenshot shows the Power Query Editor interface with the following details:

- Home ribbon:** Close & Apply, New Source, Recent Sources, Enter Data, Data source settings, Manage Parameters, Refresh Preview, Advanced Editor, Properties, Choose Columns, Remove Columns, Keep Rows, Remove Rows, Sort, Split Column, Group By, Replace Values, Transform, Data Type: Decimal Number.
- Query Settings pane:**
 - Name: LoanDetails
 - Applied Steps: Rounded Off (highlighted)
- Table View:** Shows a table with columns: id, loan_amnt, funded_amnt, term, int_rate, installment, and grad. The 'funded_amnt' column is being rounded.
- Applied Steps pane:** Shows the step 'Rounded Off' which rounded the values.
- System status bar:** 29°C, Partly sunny, ENG IN, 11:08, 01-01-2025.

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Column Renaming:

- Rename the column 'issue_d' to 'issue_date'.

The screenshot shows the Power Query Editor interface with the 'LoanDetails' query selected. A context menu is open over the 'issue_d' column, with the 'Rename Columns' option highlighted. The 'Applied Steps' pane on the right shows the step 'Renamed Columns' has been applied. The status bar at the bottom indicates the preview was downloaded on Tuesday, January 1, 2025, at 11:10 AM.

- Rename the column 'last_pymnt_d' to 'last_pymnt_date'.

The screenshot shows the Power Query Editor interface with the 'BorrowerDetails' query selected. A context menu is open over the 'last_pymnt_d' column, with the 'Change Type' option highlighted. The 'Applied Steps' pane on the right shows the step 'Renamed Columns' has been applied. The status bar at the bottom indicates the preview was downloaded on Tuesday, January 1, 2025, at 11:09 AM.

Creating New Columns:

- Create a new custom column named 'total_amount_paid' to calculate the total amount paid by each borrower by subtracting 'out_prncp' from 'total_pymnt'.

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The screenshot shows the Power Query Editor interface with the 'BorrowerDetails' query selected. The ribbon has 'Add Column' highlighted. The formula bar displays a custom column definition: `Table.AddColumn(#"Renamed Columns", "total_amount_paid", each [total_pymnt]-[out_prncp])`. The 'APPLIED STEPS' pane on the right lists the steps taken so far, including 'Added Custom'. The main grid shows a table with columns: 'dti', 'delinq_2yrs', 'last_pymnt_date', '\$ total_pymnt', '12 out_prncp', '12 total_amount_paid', and 'delinquency_status'. The 'delinquency_status' column contains values like 'Delinquent' and 'Not Delinquent' based on the custom formula.

➤ Add a new conditional column named 'delinquency_status' to identify if the borrower has any delinquencies. If the number of delinquencies in 'delinq_2yrs' is greater than 0, the status should be "Delinquent", otherwise "Not Delinquent".

The screenshot shows the Power Query Editor interface with the 'BorrowerDetails' query selected. The ribbon has 'Add Column' highlighted. The formula bar displays a conditional custom column definition: `Table.AddColumn(#"Added Custom", "delinquency_status", each if [delinq_2yrs] > 0 then "Delinquent" else "Not Delinquent")`. The 'APPLIED STEPS' pane on the right lists the steps taken so far, including 'Added Conditional Column'. The main grid shows the same table structure as before, but now includes the 'delinquency_status' column which correctly classifies rows as 'Delinquent' or 'Not Delinquent' based on the condition in the formula.

Column Dropping:

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- Remove the 'sub_grade' column as that does not significantly contribute to the analysis.

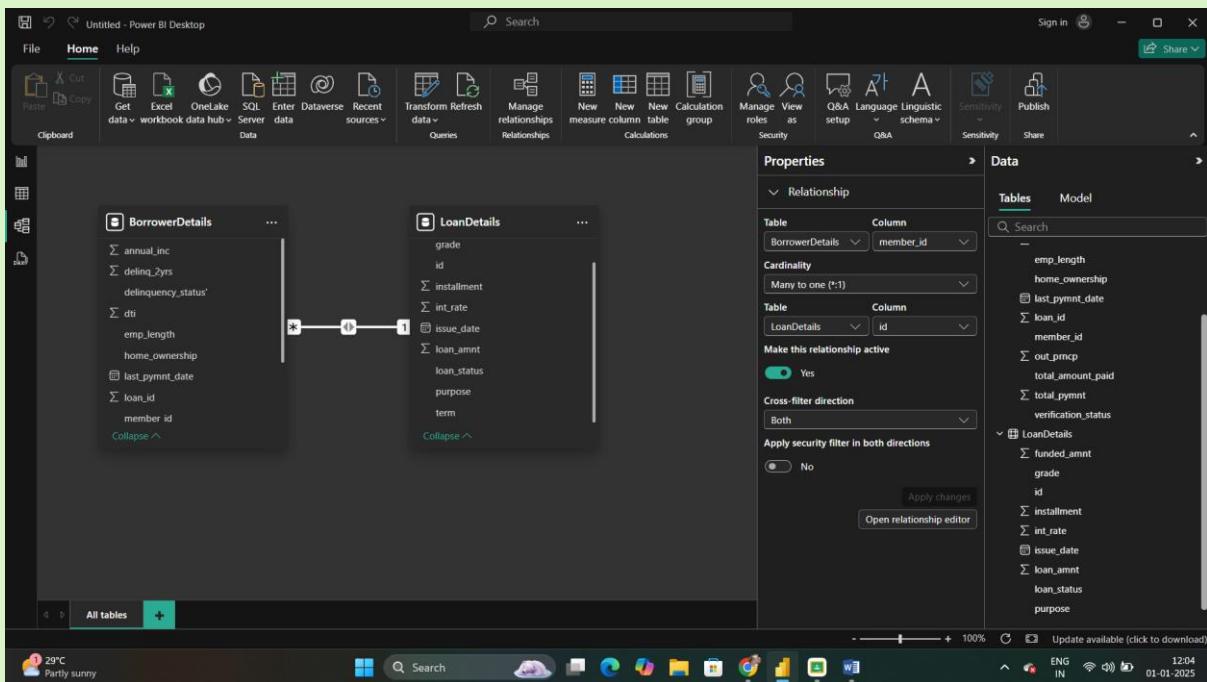
The screenshot shows the Power Query Editor interface with the following details:

- Home Tab:** Selected.
- Transform Tab:** Available.
- Add Column Tab:** Selected.
- View, Tools, Help Tabs:** Available.
- Toolbar:** Includes icons for Column From Examples, Custom Column, Invoke Custom Function, Conditional Column, Index Column, Merge Columns, Extract, Parse, Statistics, Standard, Scientific, Rounding, Trigonometry, Date, Time, Duration, Text, Vision, Azure Machine Learning, and AI Insights.
- Queries [2]:** Shows two queries: 'BorrowerDetails' and 'LoanDetails'.
- LoanDetails Table Preview:** Contains 10 columns and 999+ rows. The columns are: funded_amnt, term, int_rate, installment, grade, issue_date, funded_amnt, term, int_rate, and installment. The 'grade' column is highlighted in red.
- Query Settings Panel:**
 - Properties:** Shows 'Name' set to 'LoanDetails'.
 - Applied Steps:** Shows the steps taken: Source, Navigation, Promoted Headers, Changed Type, Removed Duplicates, Replaced Value, Capitalized Each Word, Rounded Off, Renamed Columns, and the specific step 'Removed Columns' applied to the 'sub_grade' column.
- System Status Bar:** Shows 'PREVIEW DOWNLOADED ON TUESDAY', 'ENG IN 11:38 01-01-2025', and a NIFTY stock icon.

Data Modeling :

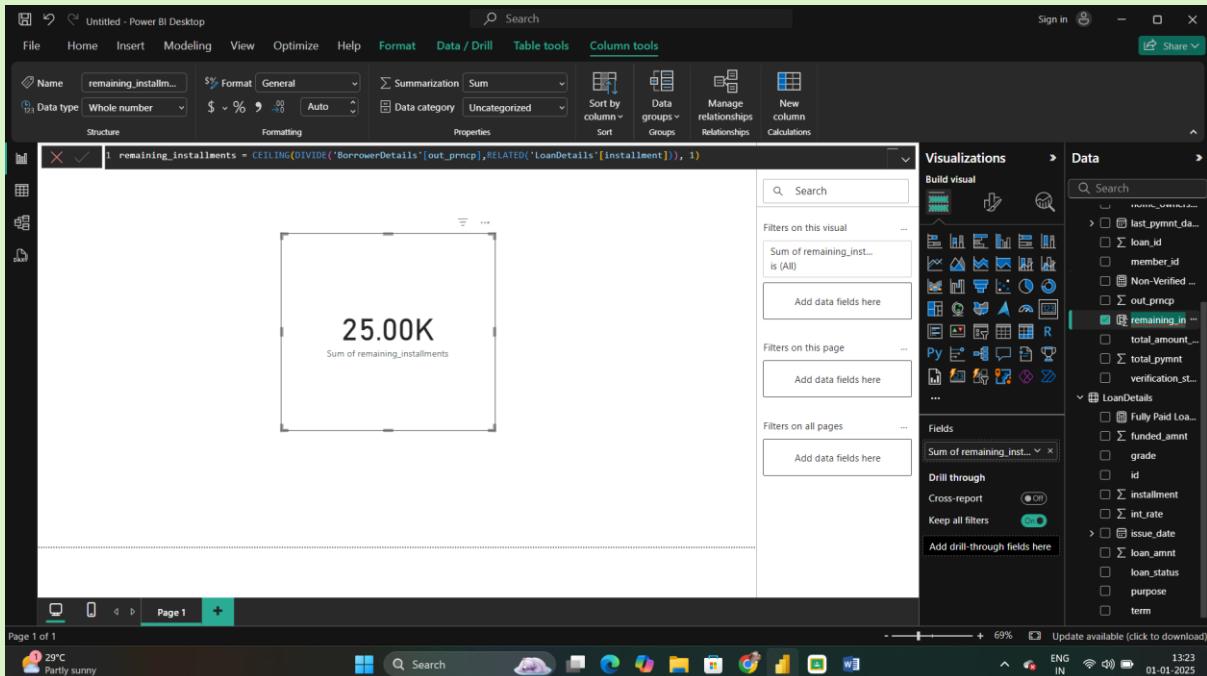
- Identify the common column between both the tables and establish relationships between the two tables. Ensure the cross-filter direction is set to "Both". This step is crucial for enabling cross-table analysis and ensuring data integrity within the dataset.

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Creating Measures and Calculated Columns using DAX

- Create a new calculated column named 'remaining_installments' using DAX in the "BorrowerDetails" table to calculate the number of remaining installments by dividing the remaining principal amount ('out_prncp') by the monthly instalment amount ('installment') and round up the result using the CEILING() function to account for any partial payments.

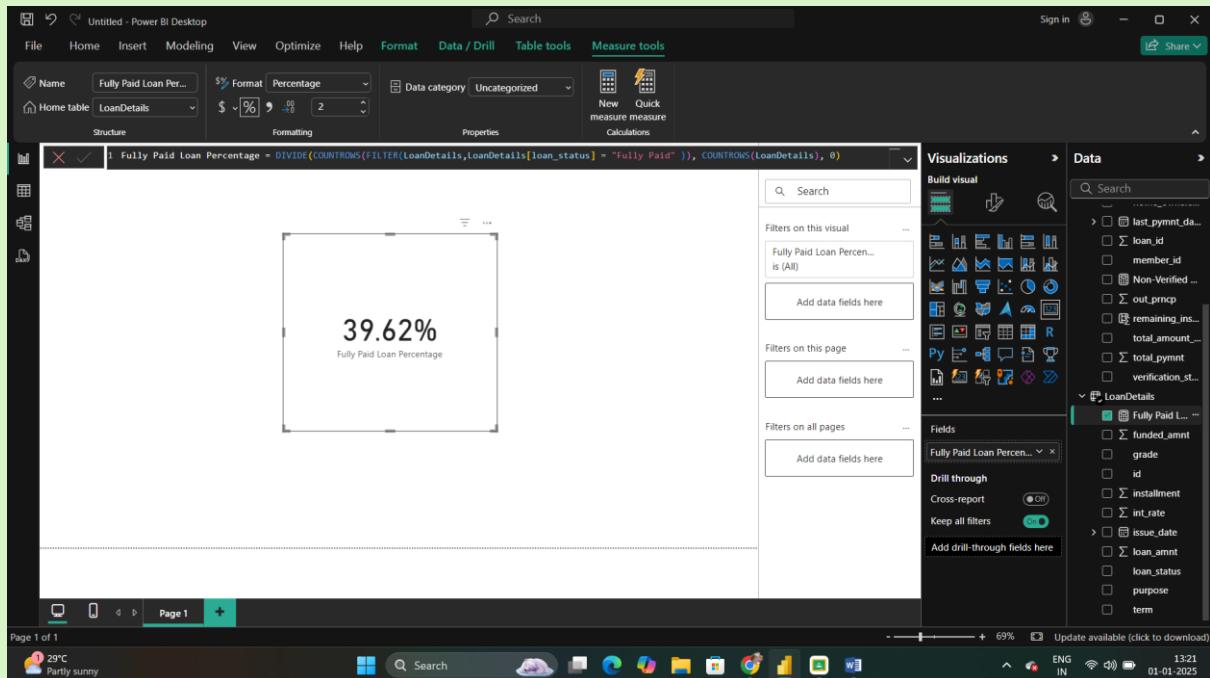


- Create a measure named 'Non-Verified Borrowers Count' using DAX to count the number of loans that have been 'Not Verified'.

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The screenshot shows the Power BI Desktop interface. A measure named "Non-Verified Borrowers Count" is displayed in a card visual, showing the value "26K". The measure is defined in the formula bar as `COUNTROWS(FILTER(BorrowerDetails,BorrowerDetails[verification_status] = "Not Verified"))`. The "Measure tools" ribbon tab is selected. The "Data" pane on the right shows the "LoanDetails" table with various fields like "Fully Paid Lo...", "funded_amnt", "grade", etc.

➤ Create a measure named 'Fully Paid Loan Percentage' to calculate the percentage of fully paid loans. Divide the number of loans with a "Fully Paid" loan status by the total number of loans and then format this measure as Percentage.



The screenshot shows the Power BI Desktop interface. A measure named "Fully Paid Loan Percentage" is displayed in a card visual, showing the value "39.62%". The measure is defined in the formula bar as `DIVIDE(COUNTROWS(FILTER(LoanDetails,LoanDetails[loan_status] = "Fully Paid")), COUNTROWS(LoanDetails), 0)`. The "Measure tools" ribbon tab is selected. The "Data" pane on the right shows the "LoanDetails" table with various fields like "Fully Paid Lo...", "funded_amnt", "grade", etc.

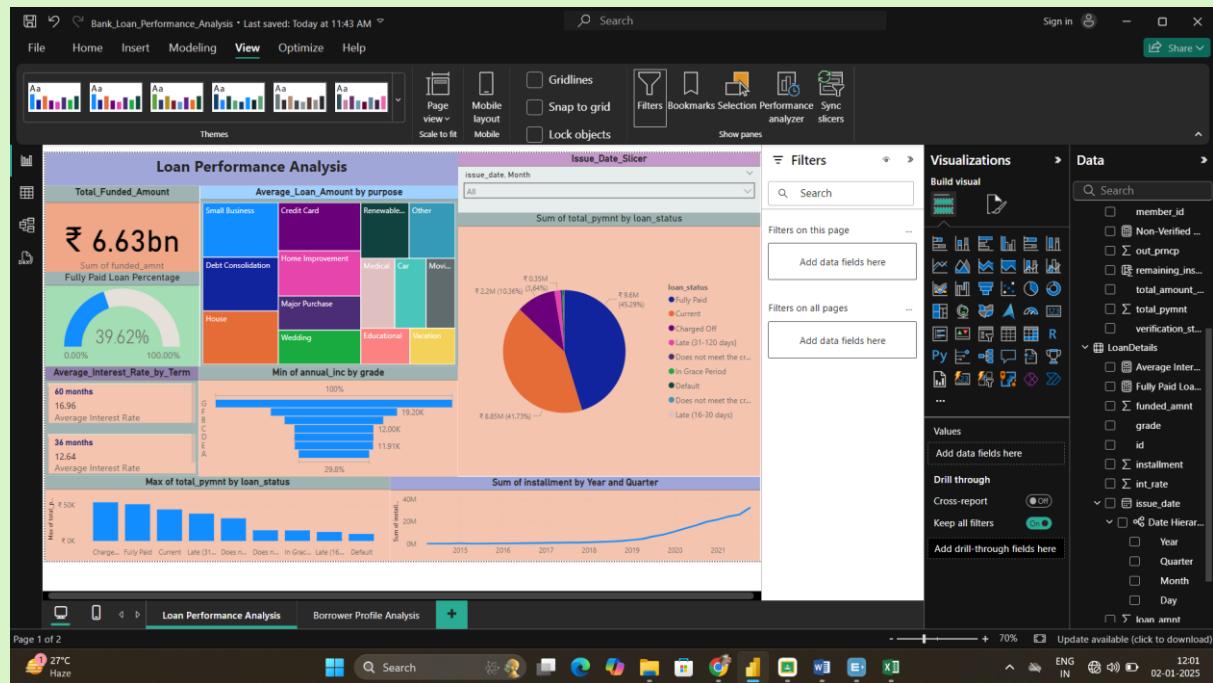
Creating Comprehensive Reports

General Instructions for Report:

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➤ Create two insightful reports:

★ Report 1: Loan Performance Analysis



★ Report 2: Borrower Profile Analysis

