



PROJECT ON BANK LOAN

*Comprehensive Analysis of
Bank Loan Performance Using
SQL*

DISTINCT LOAN STATUS

```
SELECT DISTINCT  
    LOAN_STATUS  
FROM  
    BANK_LOAN;
```

Result Grid	
	LOAN_STATUS
▶	Charged Off
	Fully Paid
▶	Current

TOTAL LOAN APPLICATIONS

```
SELECT  
    COUNT(ID) AS TOTAL_APPLICATION  
FROM  
    BANK_LOAN;
```

Result Grid	
	TOTAL_APPLICATION
▶	38576

Distinct Loan Statuses: The database contains three unique loan statuses, indicating the different states a loan can be in (Charged Off, Fully Paid, Current).

Total Loan Applications: The database has recorded a total of 38,576 loan applications. This number provides a sense of the volume of loans handled or processed by the bank. These results help in understanding the diversity of loan statuses and the total number of loans managed by the financial institution.

TOTAL FUNDED AMOUNT

```
SELECT  
    SUM(LOAN_AMOUNT) / 1000000 AS 'TOTAL_FUND_(MILLIONS)'  
FROM  
    BANK_LOAN;
```

Result Grid	
Filter Rows:	
	TOTAL_FUND_(MILLIONS)
▶	435.7571

TOTAL PAYMENT RECEIVED

The result indicates that the bank has funded a total of about 435.76 million dollars in loans. In return, the bank has received approximately 473.07 million dollars in payments. This suggests that the bank has received more in payments than it has funded in loans, which may include repayments of principal, interest, and possibly fees. This financial overview highlights the bank's funding and revenue from its loan portfolio.

```
SELECT  
    SUM(TOTAL_PAYMENT) / 1000000 AS 'TOTAL_PAYMENT_(MILLIONS)'  
FROM  
    BANK_LOAN;
```

Result Grid	
Filter Rows:	
	TOTAL_PAYMENT_(MILLIONS)
▶	473.0709

AVERAGE INTEREST RATE

```
SELECT  
    PURPOSE, ROUND(AVG(INT_RATE), 2) AS AVG_INT  
FROM  
    BANK_LOAN  
GROUP BY PURPOSE  
ORDER BY AVG_INT DESC;
```

PURPOSE	AVG_INT
Debt consolidation	0.13
small business	0.13
credit card	0.12
educational	0.12
house	0.12
medical	0.12
moving	0.12
other	0.12
wedding	0.12
car	0.11
home improvement	0.11
major purchase	0.11
renewable_energy	0.11
vacation	0.11

Average Interest Rate: The results indicate that loans for debt consolidation and small businesses have the highest average interest rate (0.13), followed by loans for credit card purposes, educational expenses, houses, medical expenses, moving, other, and weddings, all at 0.12. The lowest average interest rates (0.11) are seen in loans for cars, home improvement, major purchases, renewable energy, and vacations.

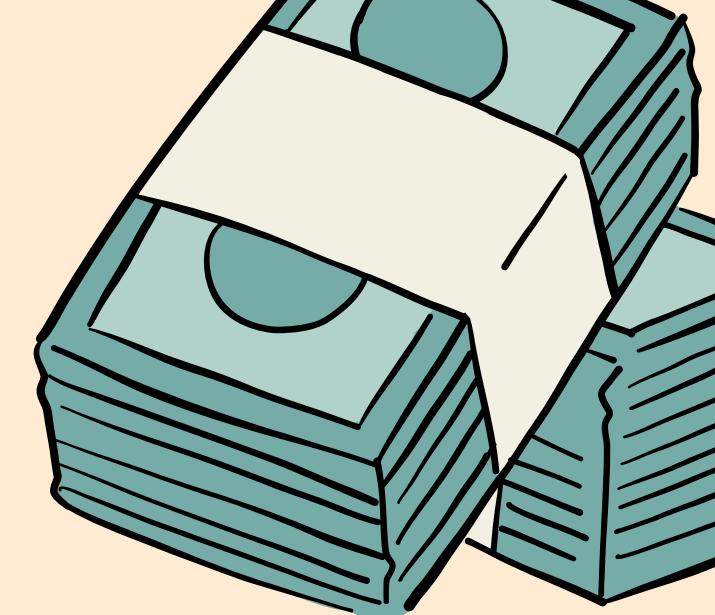
Average DTI: The results show that loans for credit card purposes have the highest average debt-to-income ratio (0.15), followed by debt consolidation (0.14), and medical expenses (0.12). The lowest average DTI (0.11) is seen in loans for small businesses, major purchases, houses, home improvement, educational expenses, and cars. These insights can help understand the risk profiles and cost structures associated with different loan purposes, potentially guiding loan approval and interest rate policies.

AVERAGE DTI

```
SELECT  
    PURPOSE, ROUND(AVG(DTI), 2) AS AVG_DTI  
FROM  
    BANK_LOAN  
GROUP BY PURPOSE  
ORDER BY AVG_DTI DESC;
```

PURPOSE	AVG_DTI
credit card	0.15
Debt consolidation	0.14
medical	0.12
moving	0.12
other	0.12
renewable_energy	0.12
vacation	0.12
wedding	0.12
car	0.11
educational	0.11
home improvement	0.11
house	0.11
major purchase	0.11
small business	0.11

AVERAGE DTI GROUP BY MONTH



```
SELECT  
    YEAR(ISSUE_DATE) AS 'YEAR',  
    MONTH(ISSUE_DATE) AS 'MONTH',  
    ROUND(AVG(DTI), 2) AS AVG_DTI  
FROM  
    BANK_LOAN  
WHERE  
    YEAR(ISSUE_DATE) = 2021  
GROUP BY YEAR(ISSUE_DATE) , MONTH(ISSUE_DATE)  
ORDER BY AVG_DTI DESC;
```

YEAR	MONTH	AVG_DTI
2021	12	0.14
2021	2	0.13
2021	1	0.13
2021	7	0.13
2021	11	0.13
2021	6	0.13
2021	9	0.13
2021	8	0.13
2021	10	0.13
2021	5	0.13
2021	3	0.13
2021	4	0.13

December 2021 had the highest average DTI ratio of 0.14. This indicates that, on average, borrowers in December had a higher debt-to-income ratio compared to other months in 2021. February 2021 had the next highest average DTI ratio at 0.13, followed by January, July, November, June, September, August, October, May, March, and April 2021, all with an average DTI ratio of 0.13.

The average DTI ratios are quite close, with most months having an average DTI of 0.13, showing a relatively stable debt-to-income ratio throughout the year. The minor variation suggests that there wasn't a significant fluctuation in the debt-to-income ratio for borrowers over the course of 2021, with December being a slight outlier. Overall, the data indicates a consistent level of debt-to-income ratios across the months of 2021, with a slight increase in December.

GOOD LOAN APPLICATIONS

```
SELECT  
    COUNT(ID) AS TOTAL_APPLICATION,  
    COUNT(CASE  
        WHEN LOAN_STATUS IN ('FULLY PAID' , 'CURRENT') THEN ID  
    END) AS GOOD_LOAN  
FROM  
    BANK_LOAN;
```

TOTAL_APPLICATION	GOOD_LOAN
38576	33243

```
SELECT  
    ROUND(COUNT(CASE  
        WHEN LOAN_STATUS IN ('FULLY PAID' , 'CURRENT') THEN ID  
    END) * 100 / COUNT(ID),  
    2) AS 'GOOD LOAN IN %'  
FROM  
    BANK_LOAN;
```

	GOOD LOAN IN %
▶	86.18

```
SELECT  
    CONCAT(ROUND(SUM(LOAN_AMOUNT) / 1000000, 2),  
          ' ',  
          'MILLION') AS TOTAL_GOODLOAN_AMOUNT  
FROM  
    BANK_LOAN  
WHERE  
    LOAN_STATUS IN ('FULLY PAID' , 'CURRENT');
```

TOTAL_GOODLOAN_AMOUNT
370.22 MILLION

Out of 38,576 total loan applications, 33,243 are categorized as "good loans," meaning they are either fully paid or currently active. This accounts for 86.18% of the total applications. The total amount involved in these good loans is 370.22 million dollars, highlighting the bank's substantial portfolio of reliable loans.

BAD LOAN APPLICATIONS

```
SELECT  
    COUNT(ID) AS BAD_LOAN  
FROM  
    BANK_LOAN  
WHERE  
    LOAN_STATUS = 'CHARGED OFF';
```

BAD_LOAN
5333

```
SELECT  
    CONCAT(ROUND(COUNT(CASE  
        WHEN LOAN_STATUS = 'CHARGED OFF' THEN ID  
        END) * 100 / COUNT(ID),  
        2),  
        '%') AS 'BAD_LOAN_%'  
FROM  
    BANK_LOAN;
```

BAD_LOAN_%
13.82 %

```
SELECT  
    ROUND(SUM(LOAN_AMOUNT) / 1000000, 2) AS BAD_LOAN_AMT_MILLION  
FROM  
    BANK_LOAN  
WHERE  
    LOAN_STATUS = 'CHARGED OFF';
```

BAD_LOAN_AMT_MILLION
65.53

The analysis reveals that out of the total loan applications, 5,333 loans have been classified as "charged off," accounting for 13.82% of the total loan portfolio. The total amount associated with these bad loans is approximately 65.53 million dollars. This data indicates a significant portion of the loan portfolio has defaulted, highlighting potential areas for risk management and collection efforts. The high percentage of charged-off loans underscores the importance of stringent credit assessment and monitoring to mitigate future loan losses.



MONTH OVER MONTH TOTAL AMOUNT RECEIVED

```
WITH MONTHLYTOTALS AS (
    SELECT
        YEAR(ISSUE_DATE) AS 'YEAR',
        MONTH(ISSUE_DATE) AS 'MONTH',
        SUM(TOTAL_PAYMENT) AS 'MONTHLY_TOTAL_PAYMENT_RECEIVED'
    FROM BANK_LOAN
    WHERE YEAR(ISSUE_DATE) = 2021
    GROUP BY YEAR(ISSUE_DATE), MONTH(ISSUE_DATE)),
MONTHOVERMONTH AS (
    SELECT
        T1.YEAR,
        T1.MONTH,
        T1.MONTHLY_TOTAL_PAYMENT_RECEIVED AS 'CURRENT_MONTH_PAYMENT',
        T2.MONTHLY_TOTAL_PAYMENT_RECEIVED AS 'PREVIOUS_MONTH_PAYMENT',
        T1.MONTHLY_TOTAL_PAYMENT_RECEIVED - T2.MONTHLY_TOTAL_PAYMENT_RECEIVED AS 'MONTH_OVER_MONTH_AMOUNT'
    FROM MONTHLYTOTALS T1
    LEFT JOIN MONTHLYTOTALS T2 ON T1.YEAR = T2.YEAR AND T1.MONTH = T2.MONTH + 1
)
SELECT YEAR, MONTH, MONTH_OVER_MONTH_AMOUNT
FROM MONTHOVERMONTH
ORDER BY YEAR, MONTH;
```

YEAR	MONTH	MONTH_OVER_MONTH_AMOUNT
2021	1	NULL
2021	2	138909
2021	3	4546655
2021	4	231133
2021	5	1254990
2021	6	2414010
2021	7	2662687
2021	8	3854998
2021	9	1301730
2021	10	5415619
2021	11	732463
2021	12	7942350

The results reveal fluctuating patterns in payment receipts throughout the year. Notably, there are significant increases observed in March, August, October, and December, suggesting possible seasonal or operational peaks in financial transactions. Conversely, some months show declines compared to the previous month, such as April and November. These fluctuations indicate varying levels of financial activity, possibly influenced by economic factors, borrower behavior, or specific operational cycles within the banking context. Overall, this analysis offers valuable insights into the dynamics of payment inflows, aiding in financial forecasting and strategic decision-making for managing cash flow and resource allocation effectively.

MONTH TO MONTH AVERAGE INTEREST RATE

```
WITH MonthlyInterestRate AS(
    SELECT YEAR(ISSUE_DATE) AS YEAR, MONTH(ISSUE_DATE) AS MONTH,
    ROUND(AVG(INT_RATE)*100,2) as monthly_average_interest_rate
    FROM BANK_LOAN
    WHERE YEAR(ISSUE_DATE) = 2021
    GROUP BY YEAR(ISSUE_DATE), MONTH(ISSUE_DATE)
),
MonthOverMonthInterestRate AS(
    SELECT
        MIR1.Year,
        MIR1.Month,
        MIR1.monthly_average_interest_rate as Current_Month_Interest_Rate,
        MIR2.monthly_average_interest_rate as Previous_Month_Interest_Rate,
        ROUND((MIR1.monthly_average_interest_rate - MIR2.monthly_average_interest_rate),2) as Month_Over_Month_Interest_Rate
    FROM MonthlyInterestRate MIR1
    LEFT JOIN MonthlyInterestRate MIR2
    ON MIR1.Year = MIR2.Year and MIR1.Month = MIR2.Month+1
)
SELECT YEAR, MONTH, Current_Month_Interest_Rate, Previous_Month_Interest_Rate, Month_Over_Month_Interest_Rate
FROM MonthOverMonthInterestRate
ORDER BY YEAR, MONTH;
```

Year	Month	Current_Month_Interest_Rate	Previous_Month_Interest_Rate	Month_Over_Month_Interest_Rate
2021	1	11.46	NULL	NULL
2021	2	11.72	11.46	0.26
2021	3	11.86	11.72	0.14
2021	4	11.74	11.86	-0.12
2021	5	12.26	11.74	0.52
2021	6	12.27	12.26	0.01
2021	7	12.24	12.27	-0.03
2021	8	12.3	12.24	0.06
2021	9	12	12.3	-0.3
2021	10	12.02	12	0.02
2021	11	11.94	12.02	-0.08
2021	12	12.36	11.94	0.42

The interpretation shows the fluctuations or stability of the average interest rate applied to loans month-to-month, helping in understanding interest rate trends and their impact on the loan portfolio.



THE TOP THREE STATES WITH THE HIGHEST AVERAGE LOAN AMOUNTS FOR LOANS THAT ARE FULLY PAID

```
SELECT  
    EMP_TITLE, ADDRESS_STATE, AVG(LOAN_AMOUNT) AS AVG_LOAN  
FROM  
    BANK_LOAN  
WHERE  
    LOAN_STATUS = 'FULLY PAID'  
GROUP BY EMP_TITLE , ADDRESS_STATE  
ORDER BY AVG_LOAN DESC  
LIMIT 3;
```

EMP_TITLE	ADDRESS_STATE	AVG_LOAN
giuntas meat farms	NY	35000.0000
Team Health	NJ	35000.0000
DHS/TSA	MD	35000.0000

The analysis identifies the top three states with the highest average loan amounts for loans that have been fully paid off. This highlights regions where borrowers have successfully completed repayment on higher loan amounts, potentially indicating stronger financial health or more favorable economic conditions in those states.



ALL EMPLOYEES WITH LESS THAN 5 YEARS OF EXPERIENCE WHO HAVE A LOWER-THAN-AVERAGE DEBT-TO-INCOME RATIO

```
SELECT  
    EMP_TITLE, EMP_LENGTH, DTI  
FROM  
    BANK_LOAN  
WHERE  
    EMP_LENGTH IN ('< 1 year', '1 year',  
        '2 years',  
        '3 years',  
        '4 years')  
    AND DTI < (SELECT  
        AVG(DTI)  
    FROM  
        BANK_LOAN)  
ORDER BY DTI DESC;
```

EMP_TITLE	EMP_LENGTH	DTI
The Lorton Arts Foundation	2 years	0.1332
Avon Protection Systems, Inc.	2 years	0.1332
Colorado Mountain College	3 years	0.1332
U.S. Trust, Bank of America	3 years	0.1332
Internews Network	3 years	0.1332
Satori Software, Inc.	3 years	0.1332
Equity One, Inc	2 years	0.1332
Liberty Pest Control	2 years	0.1332
Universal Health Services	2 years	0.1332
Famous Daves	1 year	0.1331
pharmathene	3 years	0.1331
Maricopa County Library District	< 1 year	0.1331
Gilbert Public Schools	3 years	0.1331
Great southwestern construc...	2 years	0.1331
Citigroup	4 years	0.1331
Celanese	2 years	0.1331
Homemaker Service of the Me...	2 years	0.1331
Sullivan ARC	3 years	0.1331
Fortier Public Relations	2 years	0.1331
companion hospice	4 years	0.133
Univar USA Inc.	2 years	0.133
Houston NW Medical Center	4 years	0.133
Coca-Cola Refreshments	4 years	0.133
Walmart	< 1 year	0.133
American Diabetes Association	2 years	0.133

The result focuses on the subset of employees with less than five years of experience who also have a lower-than-average debt-to-income ratio, providing insights into a specific demographic of borrowers.

THE CUMULATIVE TOTAL PAYMENT FOR EACH STATE, ORDERED BY ISSUE_DATE

```
SELECT
    ID,
    ISSUE_DATE,
    ADDRESS_STATE,
    TOTAL_PAYMENT,
    SUM(TOTAL_PAYMENT) OVER(PARTITION BY ADDRESS_STATE ORDER BY ISSUE_DATE) AS CUMULATIVE_PAYMENT
FROM BANK_LOAN;
```

ID	ISSUE_DATE	ADDRESS_STATE	TOTAL_PAYMENT	CUMULATIVE_PAYMENT
371702	2021-01-09	AK	18236	18236
472454	2021-01-10	AK	12157	30393
641299	2021-01-11	AK	7771	73222
638127	2021-01-11	AK	8372	73222
661137	2021-01-11	AK	12907	73222
645876	2021-01-11	AK	13779	73222
664211	2021-02-11	AK	7133	97193
664132	2021-02-11	AK	16838	97193
273432	2021-03-08	AK	14649	111842
384114	2021-03-09	AK	4101	121489
382651	2021-03-09	AK	5546	121489
712665	2021-03-11	AK	2579	174177
711928	2021-03-11	AK	7748	174177
704058	2021-03-11	AK	10737	174177
698976	2021-03-11	AK	13361	174177
709625	2021-03-11	AK	18263	174177
390660	2021-04-09	AK	22592	196769
500985	2021-04-10	AK	15316	229120
501377	2021-04-10	AK	17035	229120
718626	2021-04-11	AK	8265	237385
408835	2021-05-09	AK	17922	255307
513948	2021-05-10	AK	14122	280181
431052	2021-05-10	AK	10752	280181
745597	2021-05-11	AK	6599	319762
743942	2021-05-11	AK	14333	319762

The result shows the cumulative total payments received for loans from each state, ordered by the issue date, giving a temporal and geographical perspective on loan repayments.

TOTAL NUMBER OF LOANS AND THE AVERAGE LOAN AMOUNT FOR EACH EMPLOYMENT LENGTH CATEGORY, WITH A "VERIFIED" STATUS

```
SELECT  
    COUNT(LOAN_AMOUNT) AS LOAN_NUM,  
    ROUND(AVG(LOAN_AMOUNT), 2) AS AVG_LOAN,  
    EMP_LENGTH  
FROM  
    BANK_LOAN  
WHERE  
    VERIFICATION_STATUS = 'Verified'  
GROUP BY EMP_LENGTH  
ORDER BY LOAN_NUM DESC;
```

LOAN_NUM	AVG_LOAN	EMP_LENGTH
3571	17692.66	10+ years
1237	14607.38	2 years
1211	15318.99	3 years
1111	14156.59	< 1 year
1099	15338.76	4 years
1031	15597.41	5 years
851	14742.24	1 year
727	16158.15	6 years
584	15954.20	7 years
504	16095.14	8 years
409	16559.66	9 years

The interpretation presents the total number of loans and the average loan amount for different employment length categories, filtered for those with a "verified" status, offering insights into how employment stability correlates with loan amounts.



COUNT THE NUMBER OF LOANS PER STATE WHERE THE LOAN AMOUNT IS ABOVE THE MEDIAN LOAN AMOUNT OF ALL LOANS IN THE DATASET

```
ADDRESS_STATE,  
COUNT(*) AS LOANS_ABOVE_MEDIAN  
FROM  
BANK_LOAN  
WHERE  
LOAN_AMOUNT > (  
    SELECT  
        LOAN_AMOUNT  
    FROM (  
        SELECT  
            LOAN_AMOUNT,  
            ROW_NUMBER() OVER (ORDER BY LOAN_AMOUNT) AS ROW_NUM,  
            COUNT(*) OVER () AS TOTAL_COUNT  
        FROM  
        BANK_LOAN  
    ) AS RANKED_LOANS  
    WHERE  
    ROW_NUM = FLOOR((TOTAL_COUNT) / 2)  
)  
GROUP BY  
ADDRESS_STATE;
```

ADDRESS_STATE	LOANS_ABOVE_MEDIAN
CA	3063
FL	1129
RI	62
GA	611
NV	200
AZ	363
NJ	840
WA	343
MD	469
UT	111
PA	580
MA	578
AL	186
NY	1632
MN	249
TX	1227
WY	39
CO	341
AR	112
OR	190
VA	641
LA	167
NM	75
NC	339
SC	194

The result counts the number of loans per state where the loan amounts exceed the median loan amount of all loans in the dataset, providing a view of higher-value loans distributed geographically.



THANK YOU