

LENDING CLUB CASE STUDY

Group Members:

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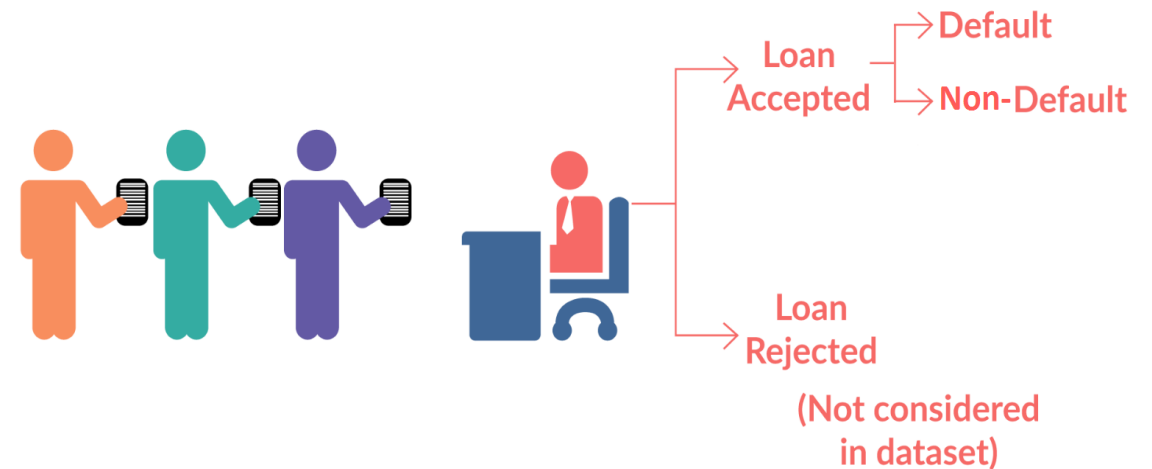
Clinton Gomes

Problem Statement

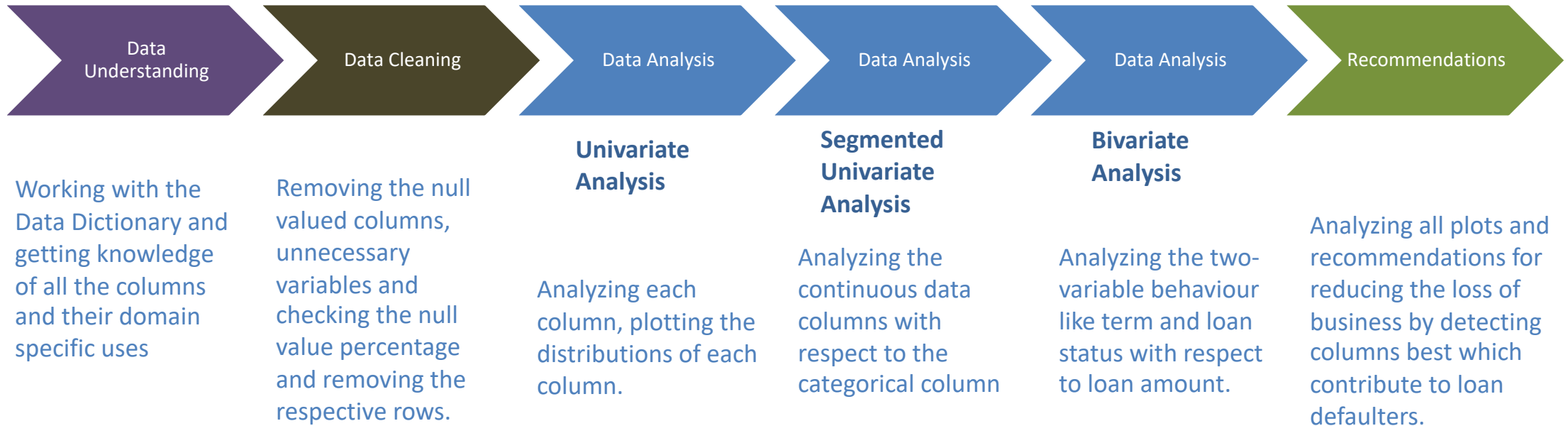
- A consumer finance company specialises in lending various types of loans to urban customers. When the company receives a loan application, it has to make a decision for loan approval based on the applicant's profile. Two types of risks are associated with the bank's decision:
 - If the applicant is likely to repay the loan, then not approving the loan results in a loss of business to the company
 - If the applicant is not likely to repay the loan, i.e. he/she is likely to default, then approving the loan may lead to a financial loss for the company
- The aim is to identify patterns which indicate if a person is likely to default, which may be used for taking actions such as denying the loan, reducing the amount of loan, lending (to risky applicants) at a higher interest rate, etc.

Loan Dataset

- When a person applies for a loan, there are two types of decisions that could be taken by the company:
 - ✓ Loan accepted: If the company approves the loan, there are 3 possible scenarios described below:
 - Fully paid: Applicant has fully paid the loan (the principal and the interest rate)
 - Current: Applicant is in the process of paying the instalments, i.e. the tenure of the loan is not yet completed. These candidates are not labelled as 'defaulted'.
 - Charged-off: Applicant has not paid the instalments in due time for a long period of time, i.e. he/she has defaulted on the loan
 - ✓ Loan rejected: The company had rejected the loan (because the candidate does not meet their requirements etc.). Since the loan was rejected, there is no transactional history of those applicants with the company and so this data is not available with the company (and thus in this dataset)



Problem solving Approach



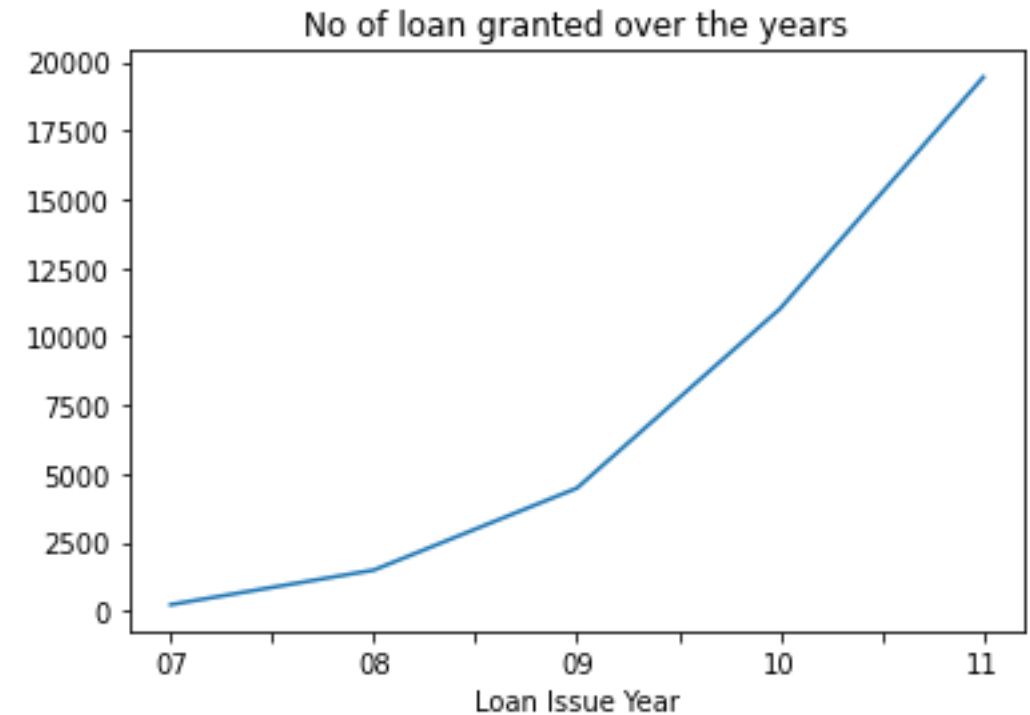
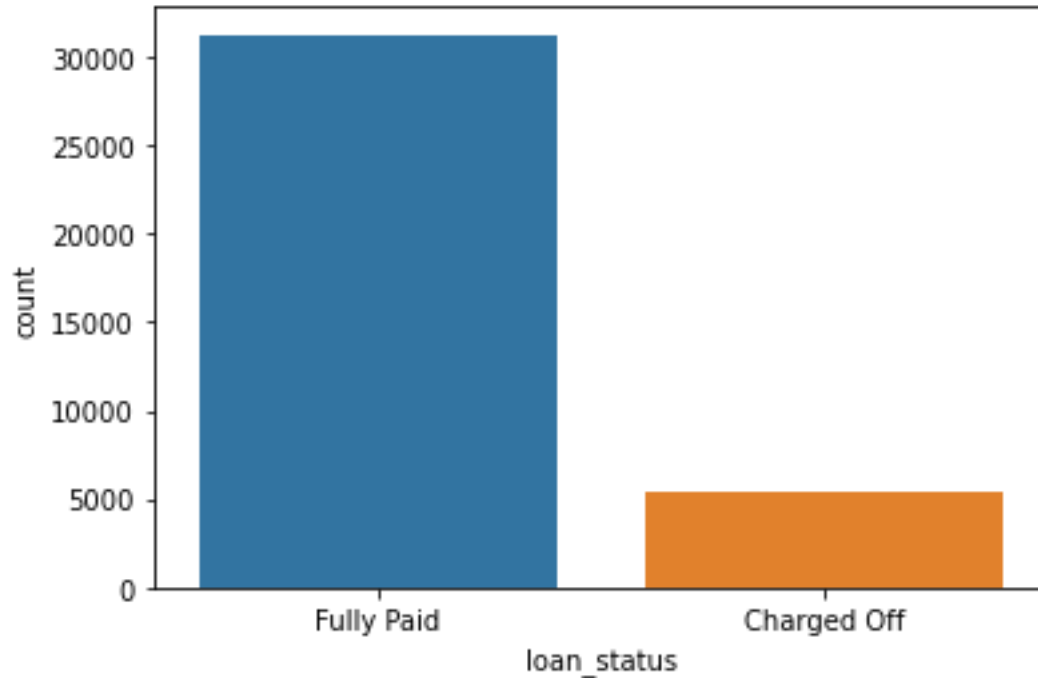
Data Cleaning Steps

- **Delete columns:** Delete unnecessary columns.
- **Remove outliers:** Remove high and low values that would disproportionately affect the results of our analysis.
- **Missing values:** Treat missing values with appropriate approach.
- **Duplicate data:** Remove identical rows, remove rows where some columns are identical.
- **Filter rows:** Filter by segment, filter by date period to get only the rows relevant to the analysis.

Analysis

- The essence of the whole project is to analyse and understand how consumer attributes and loan attributes are influencing the tendency of defaulting.
- We performed **data cleaning and preparation** on the Loan dataset:
 - Dropped unwanted columns
 - Imputed the NA values for the subset of variables
 - Data clean-up and data type transformation
 - Created new columns: Loan Issue Year and Loan Issue Month
- During **univariate analysis** we have created:
 - Histograms and Bar charts to check out the distribution of all the driver variables
 - Box plots to detect the Outliers
 - Performed the Multivariate analysis to understand how different variables interact with each other.

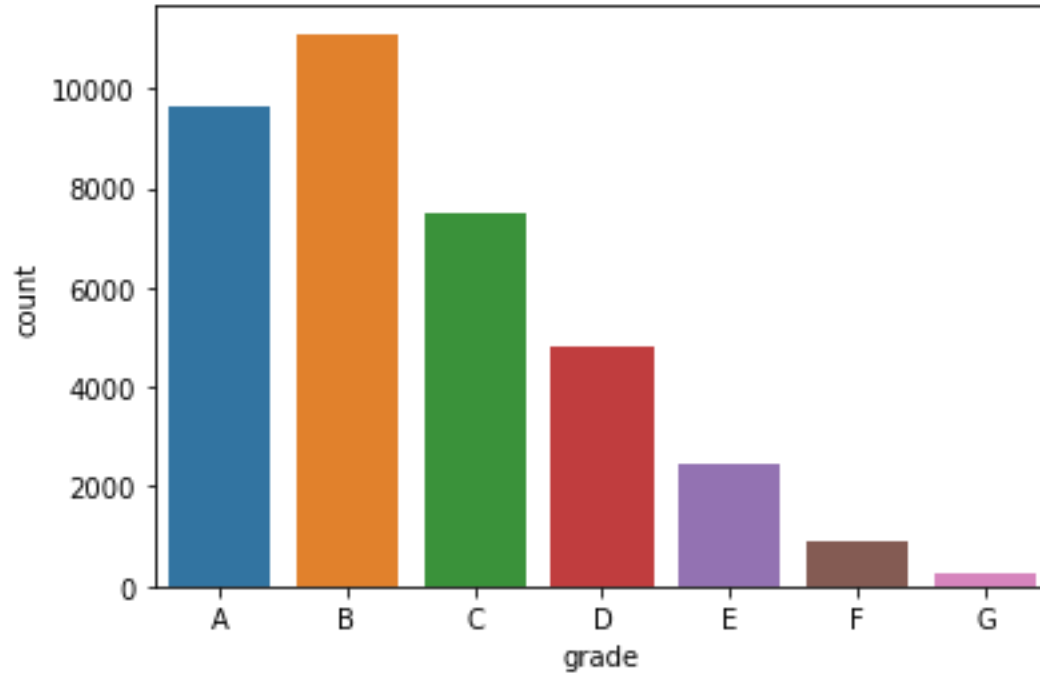
Loan Status Analysis



Observations:

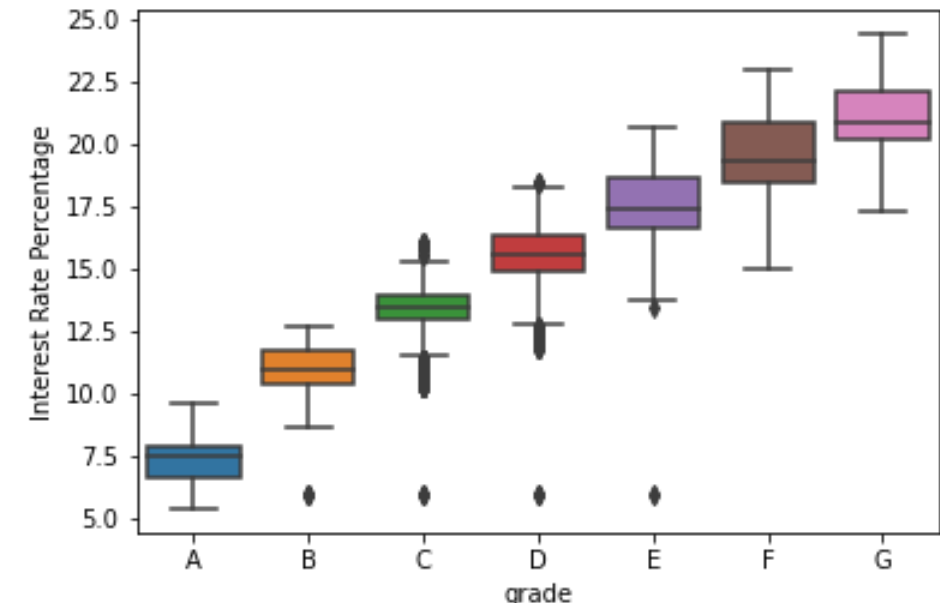
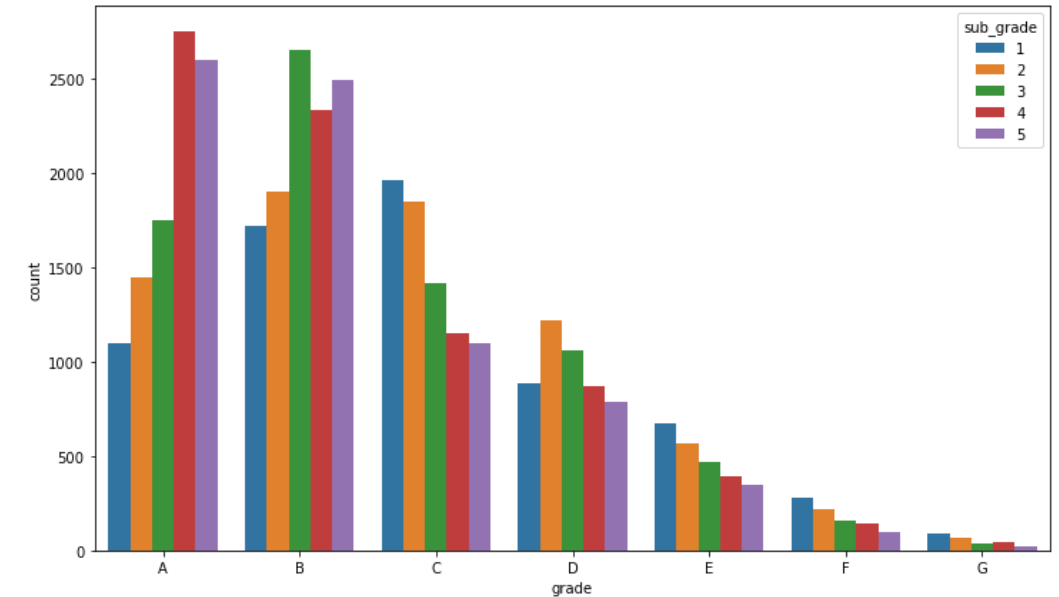
1. Most of the loans are Fully Paid.
2. About (5000) 14% of loans are having status as defaulters.
3. The loans granted has been increasing exponentially over the years.

Loan Grade Analysis

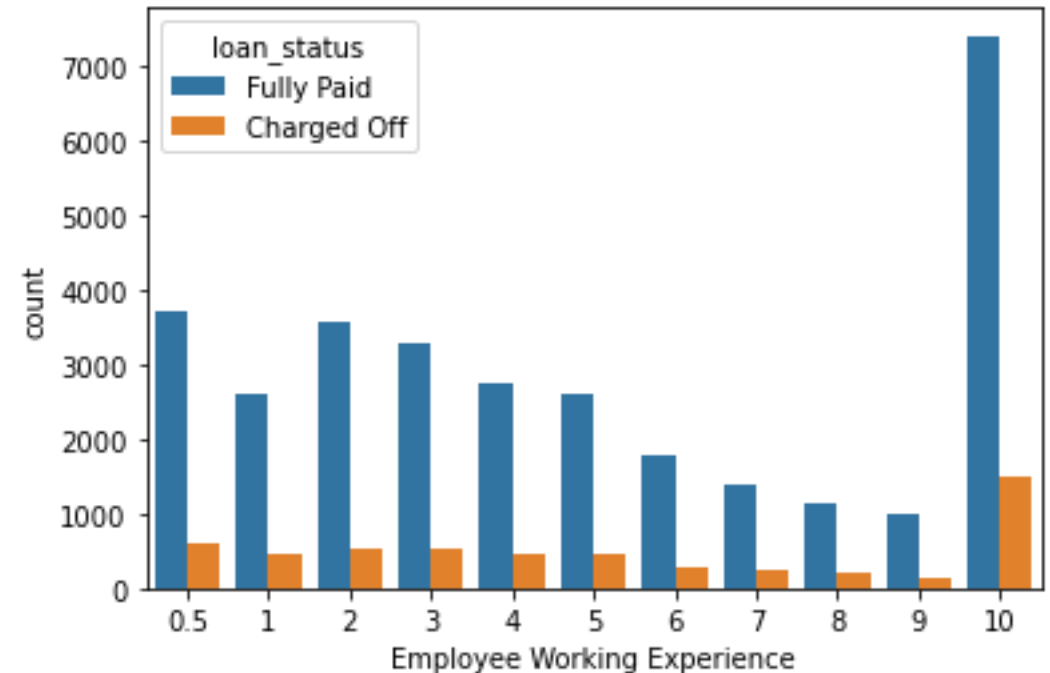
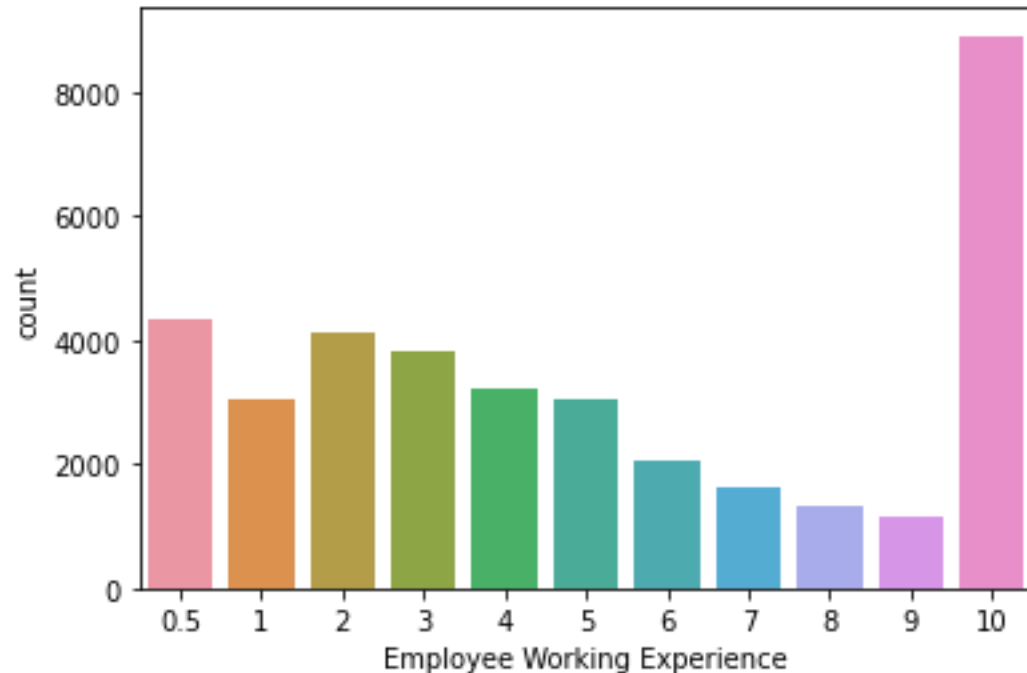


Observation:

1. Most of the loans have grade of A and B. Therefore, stating most of the loans are high graded loans.
2. High Quality loans have low interest rate.
3. This infers that higher interest rate have higher tendency to default the loan.



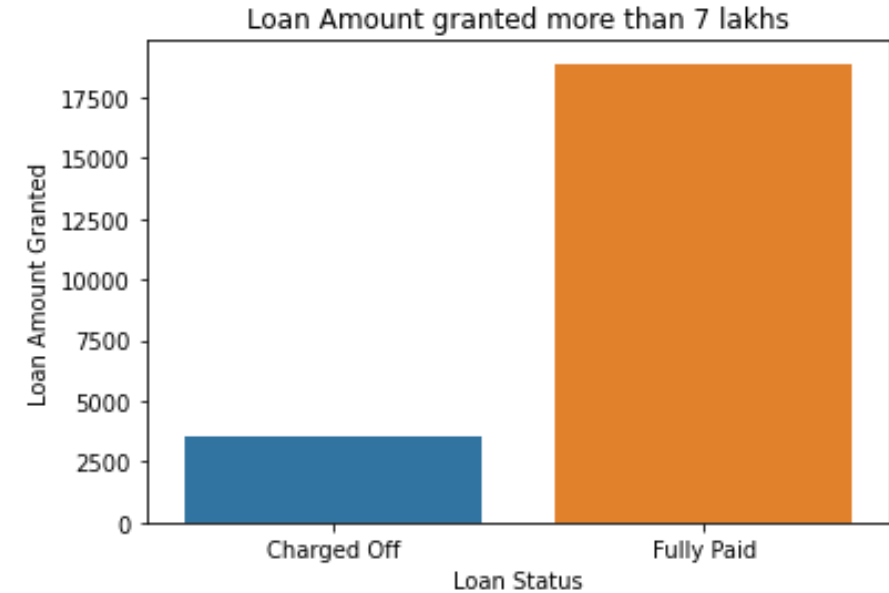
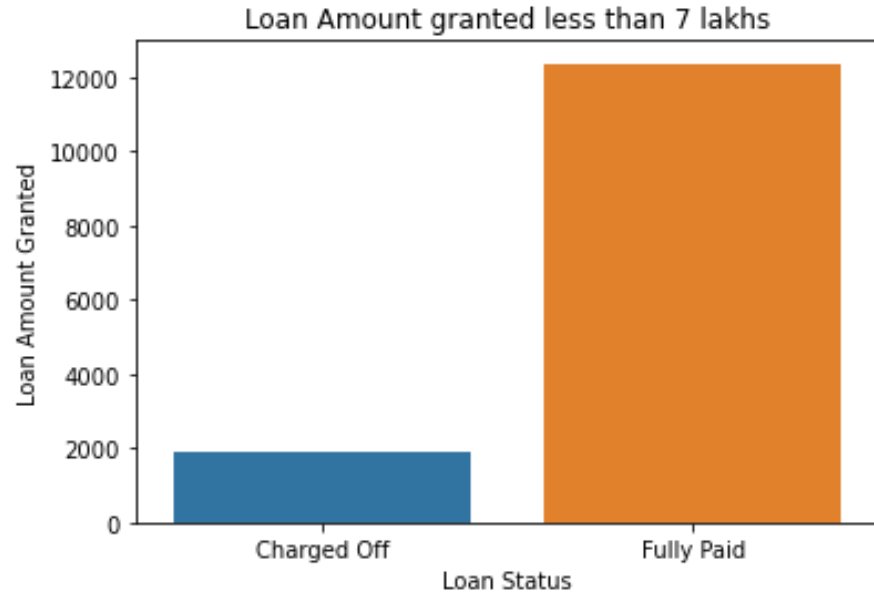
Loan Applicants work Experience Analysis



Observation:

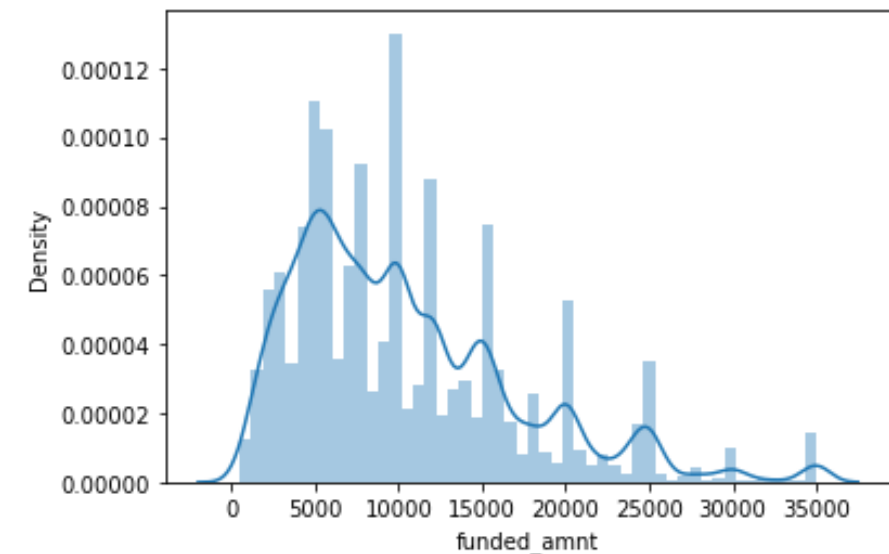
1. Majority of employees applying for the loan have more than 10 years of experience
2. Tendency of person to default the loan with 10 years of experience is also high.

Loan Amount Analysis

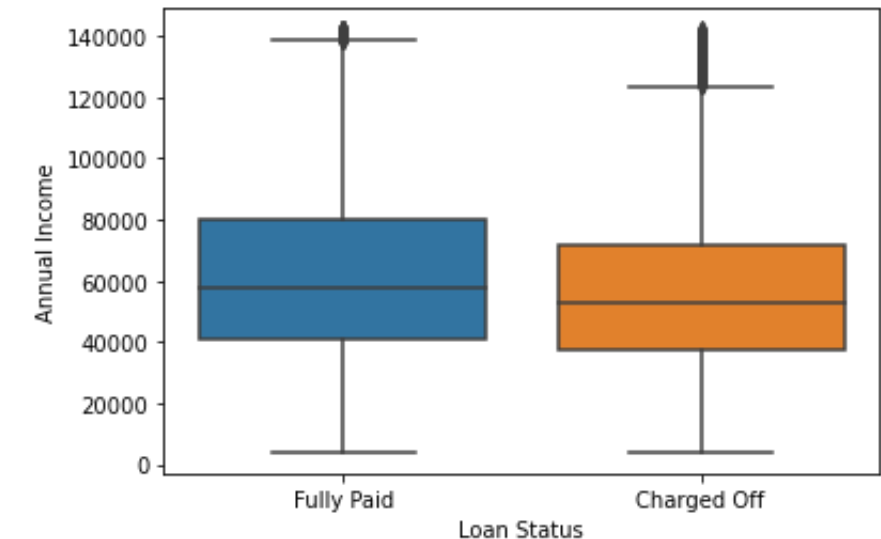
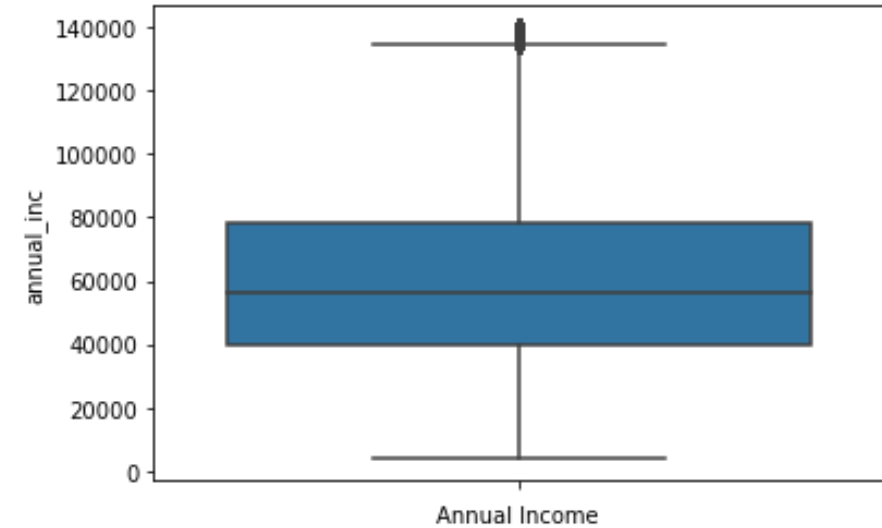
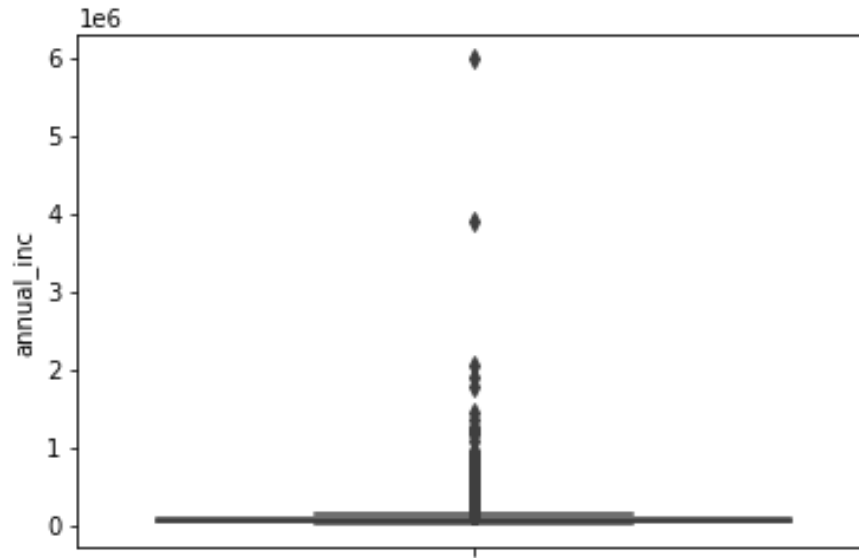


Observation:

1. Funded amount is left skewed. Most of the loan amount given is below 7 lakhs.
2. Probability of people with loan amount greater than 7 lakhs tends to default is more than the people with less than 7 lakh



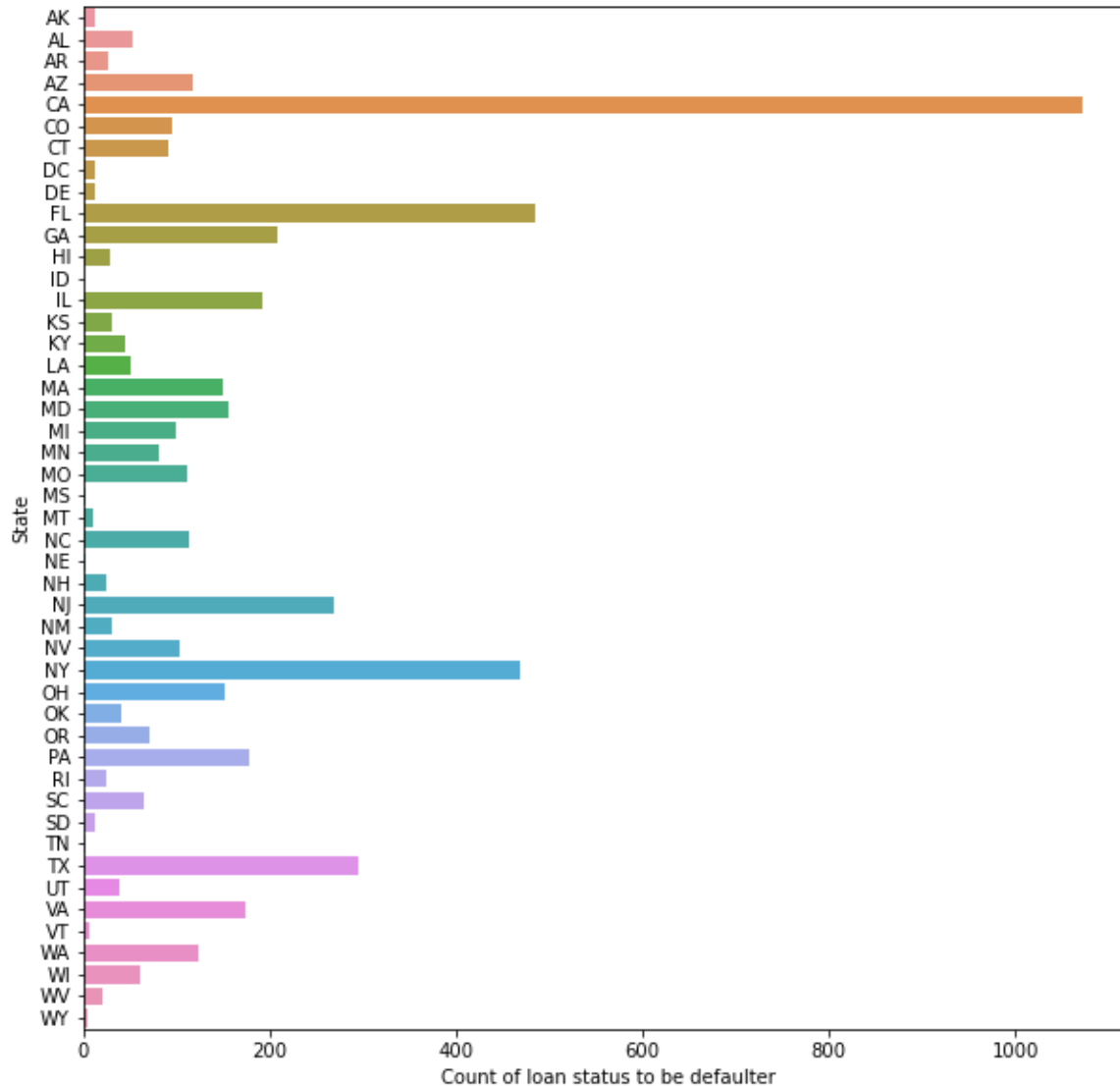
Income Analysis for the loan applicants



Observation:

1. Most of the applicants have income between 40k to 80k.
2. There are two applicants having income above 30 lakhs

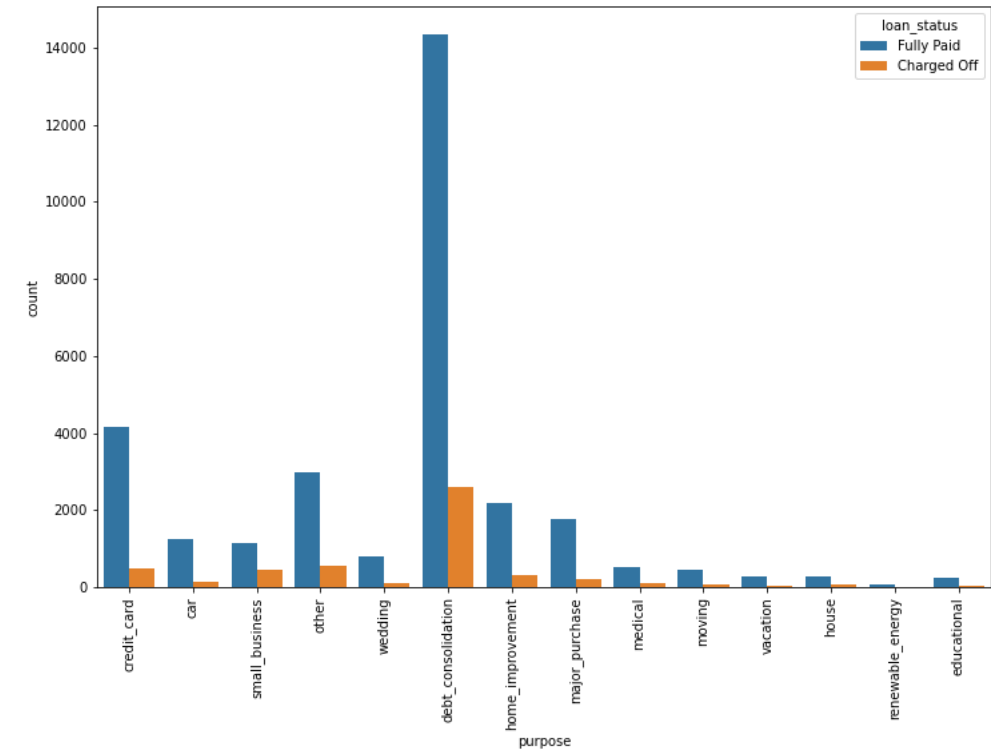
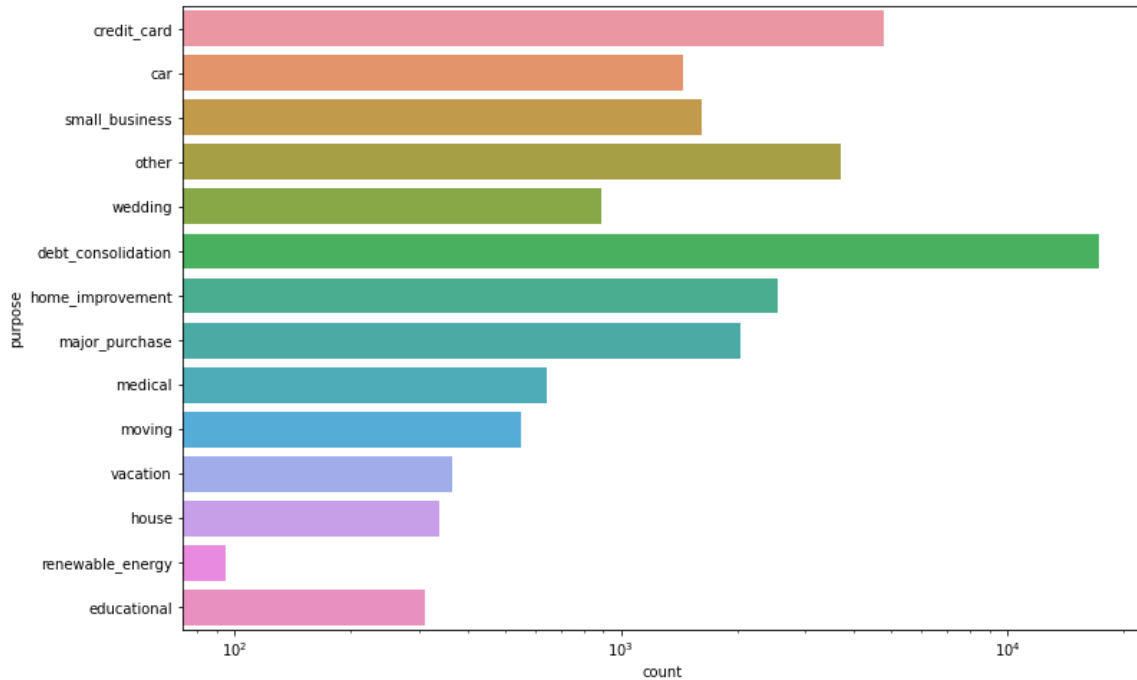
Loan Defaulters by State Analysis



Observation:

Applicants from state CA have higher defaulter rate than the rest of the states

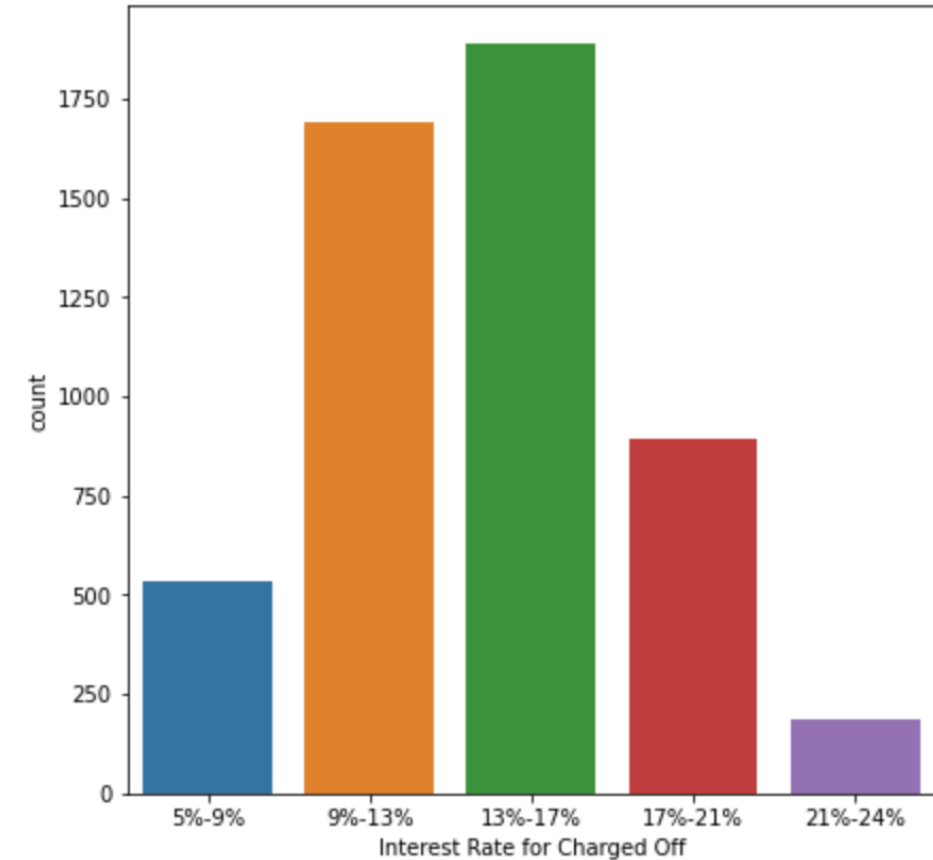
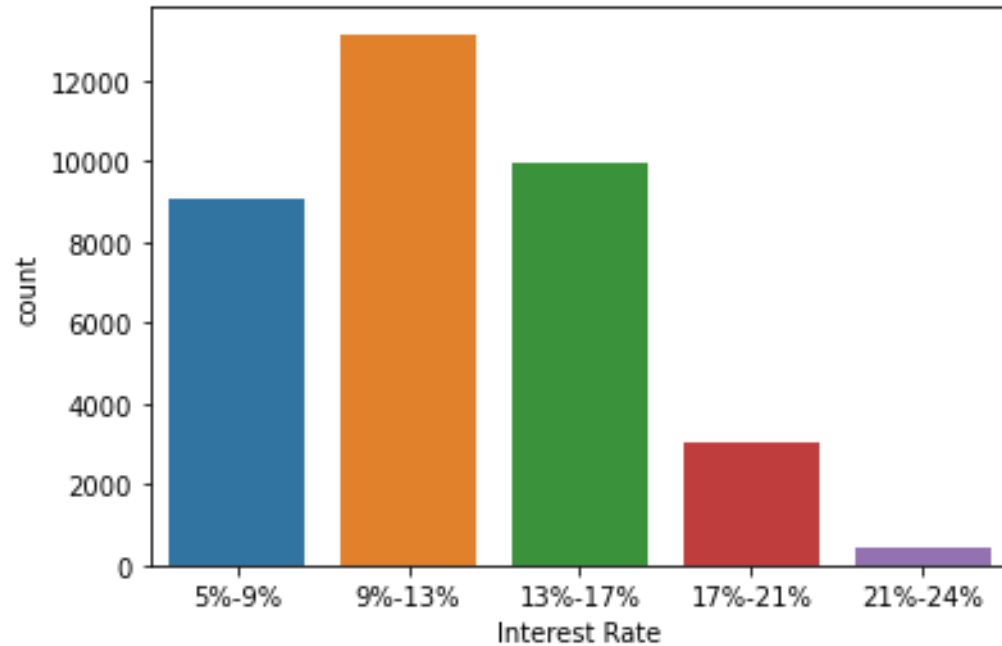
Purpose for applying Loan Analysis



Observation:

1. Most of the loans are granted were for debt consolidation.
2. The charge-offs are more as well for debt consolidation.

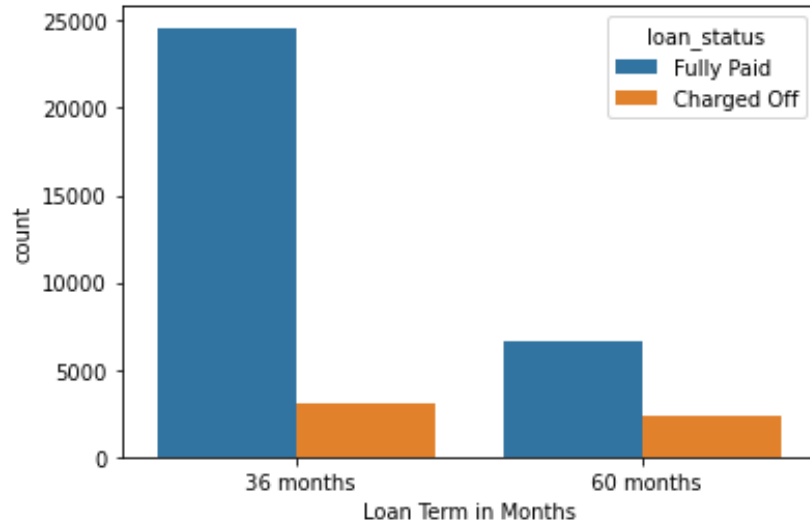
Loan Interest rate Analysis



Observation:

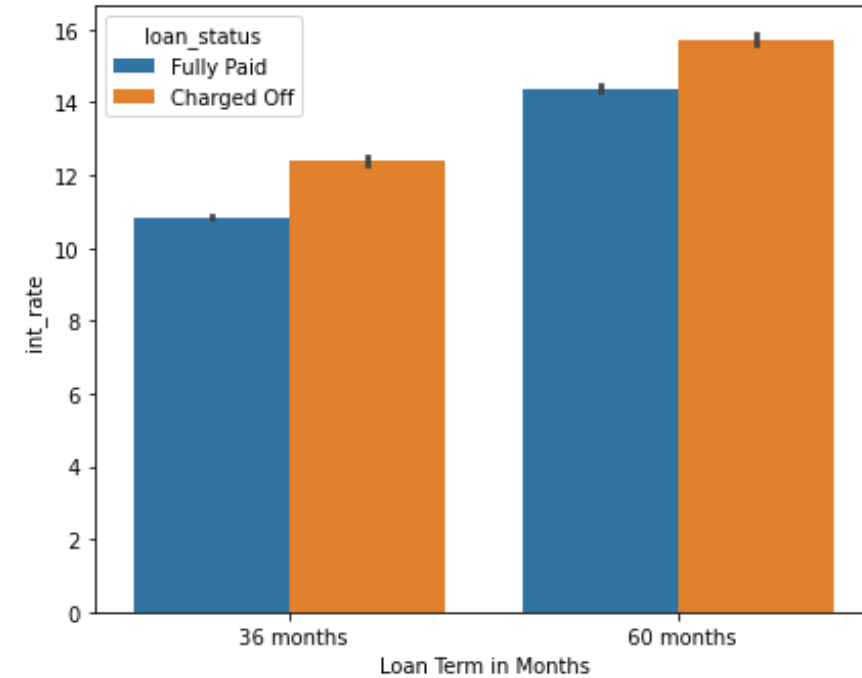
1. Most of the loans has interest rate 9%-13%
2. The charge-offs are more for loans with interest rate 13%-17%

Loan Status vs Loan Tenure

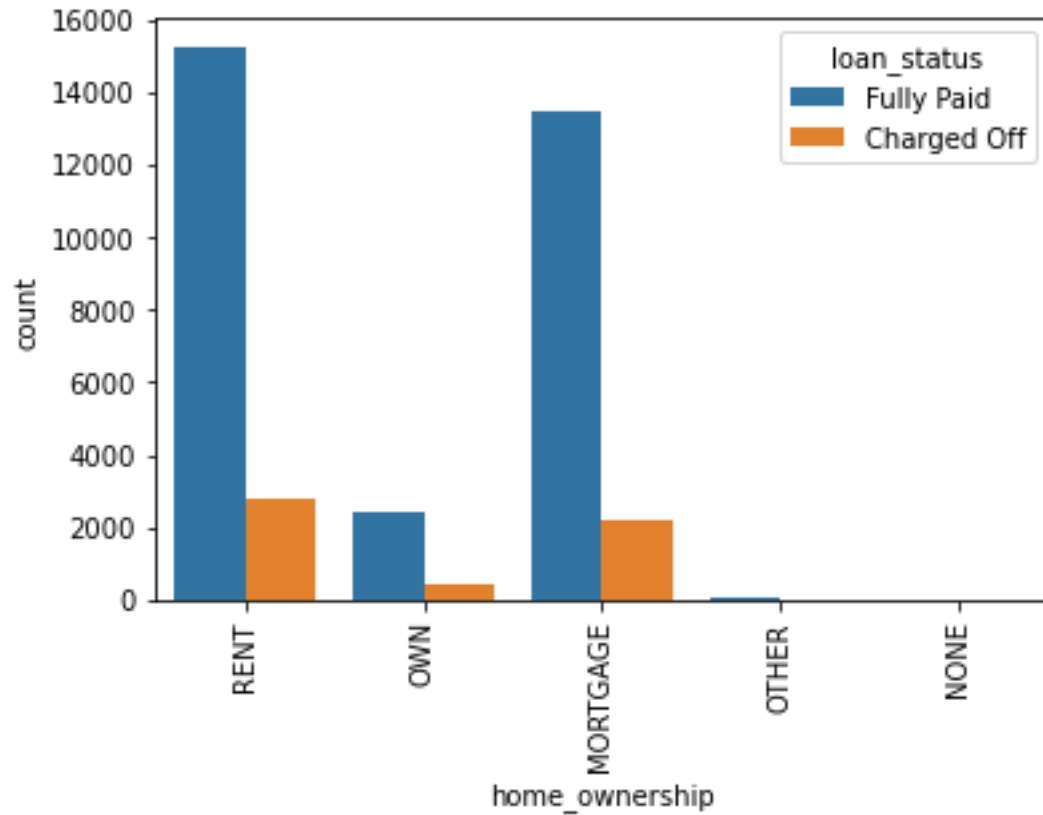


Observation:

1. Most of the loans granted were of 36 months.
2. And loans granted for 36 months have slightly high tendency to default.
3. The charge-off percentage is high for tenure 36 months with interest rate 12% and for 60 months tenure with interest rate 15% and above.



Loan Status by Home Ownership



Observation:

Applicants having their home rented or on mortgage have almost equal tendency to default the loan.

Conclusion

Results

1. Low grade loans have high tendency to default. Grading system is working as expected.
2. Loans having higher interest rate (13%-17%) have more defaulters. Check the background of applicant thoroughly if interest rate is high.
3. Extra scrutiny must be done for the applicants belonging to CA state, as tendency to default is high.
4. When the purpose is "debt consolidation" check applicant thoroughly as it has high tendency to default.
5. Extra caution needed for applicants with home ownership as rented or on mortgage.