

Lending Club Case Study

Submitted by:

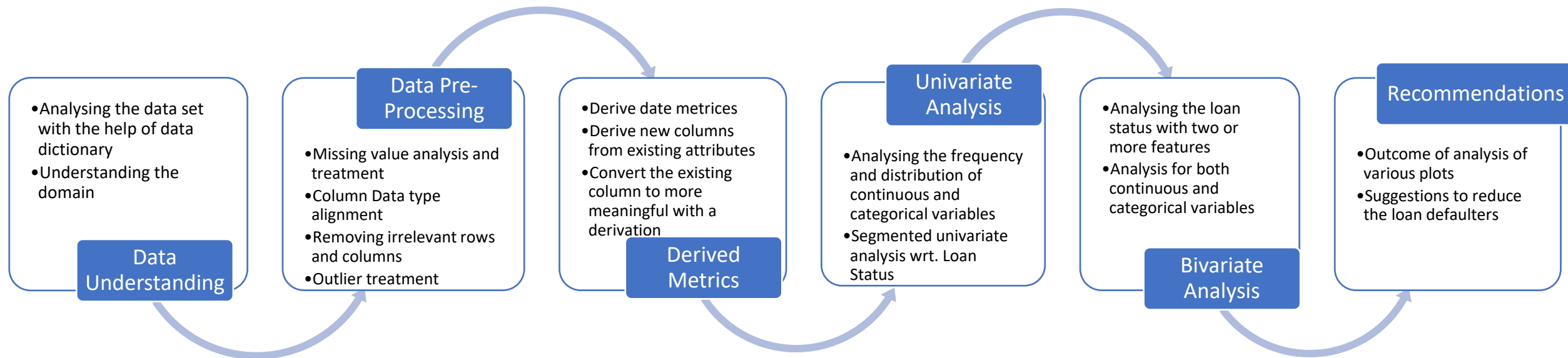
Ambily M

Subhash G

Problem Statement

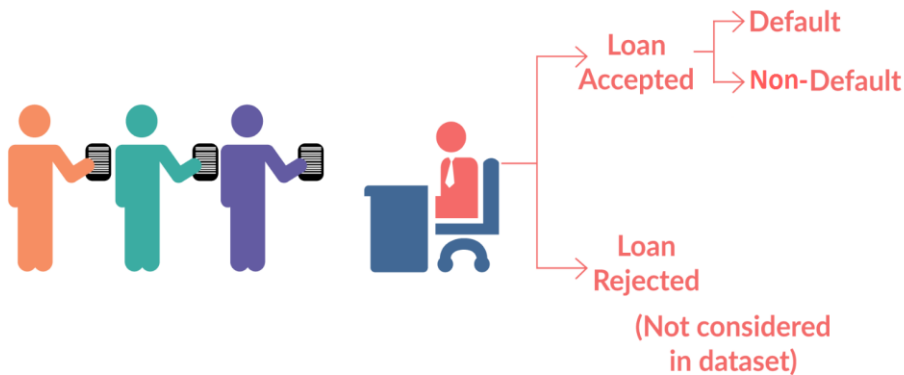
- A consumer finance company specialises in lending various types of loans to urban customers. When the company receives a loan application, the company has to make a decision for loan approval based on the applicant's profile.
- Two types of risks are associated with the bank's decision:
 - If the applicant 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 from the given dataset 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.

Process Overview



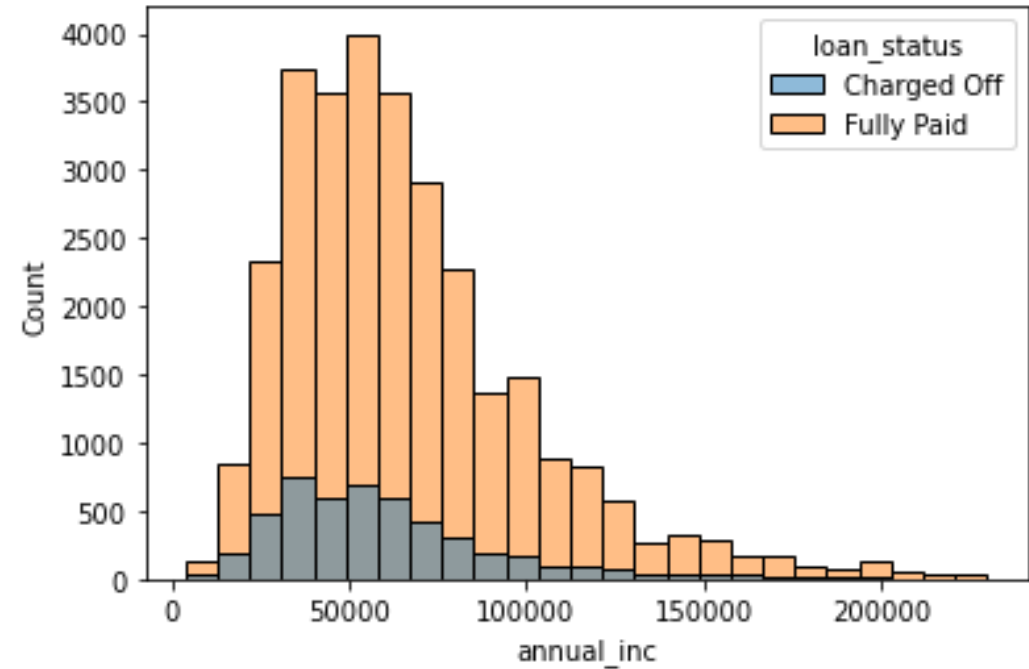
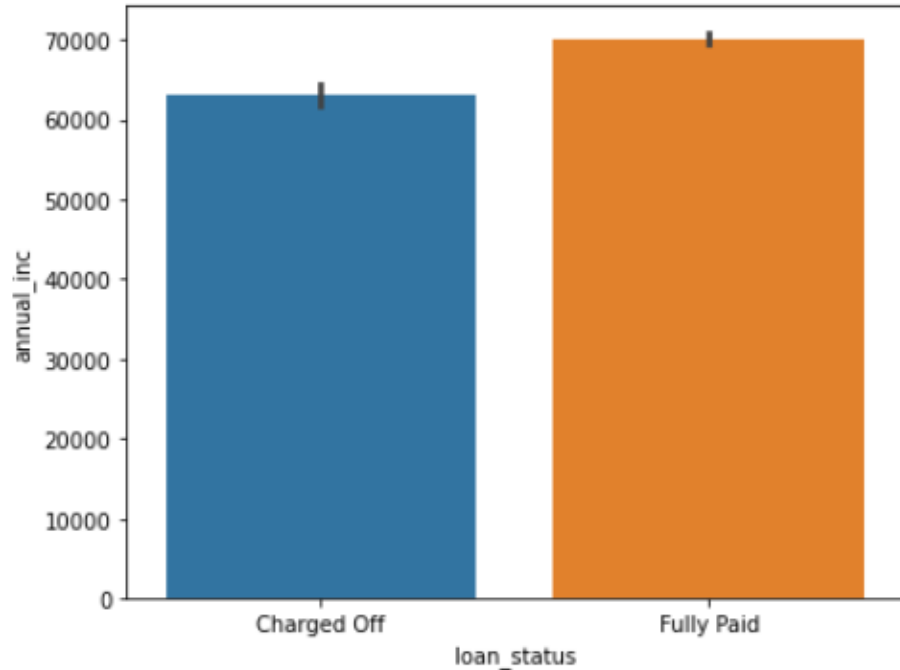
Data Set

LOAN DATASET



- Loan dataset consists of 5 years credit history of borrowers of lending club for all the approved loans.
- The rejected loan data is not provided.
- Approved borrowers are categorized as 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
- Current applicants are removed from further analysis, as their attributes doesn't give indication of default
- Data set consists of attributes categorising the borrower as well as the sanctioned loan.

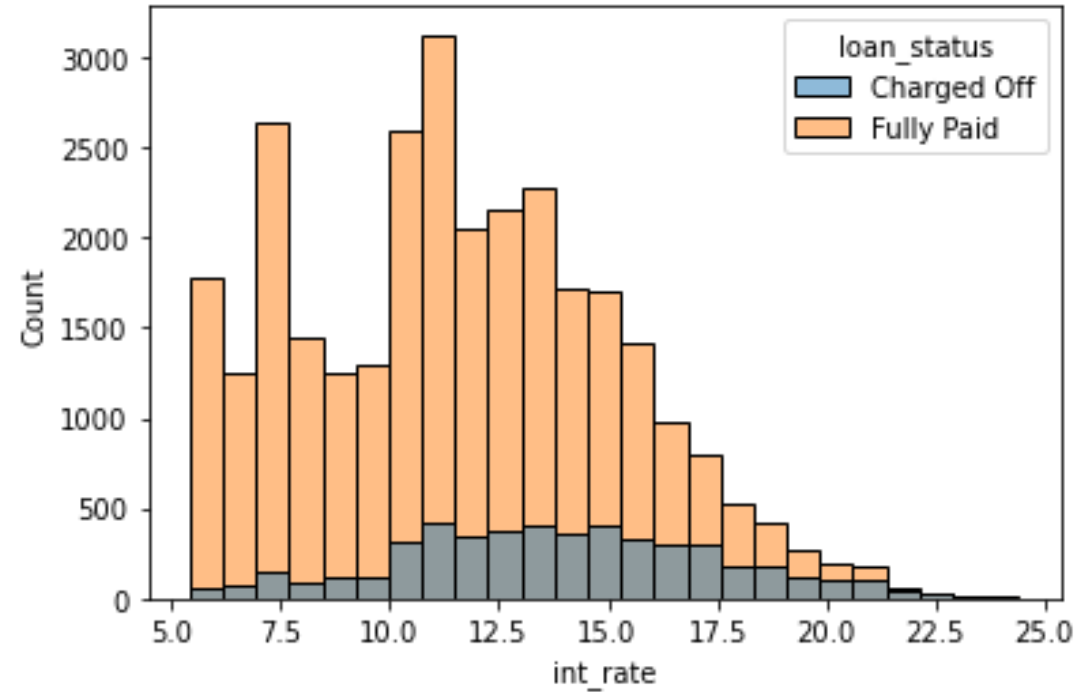
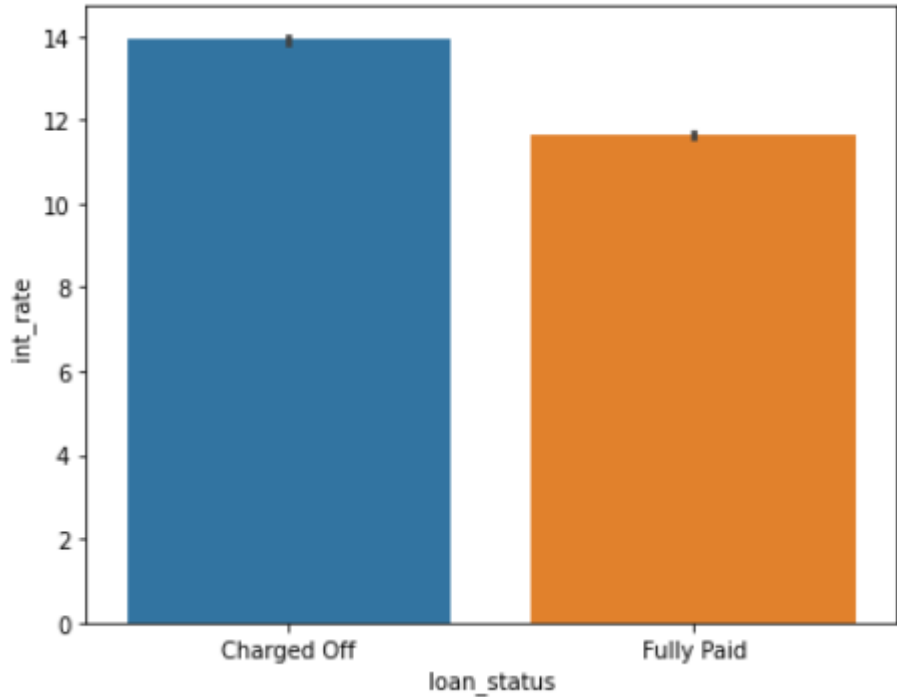
Analysis – Annual Income



Observations:

- More borrowers are having lesser annual income and are prone to default.

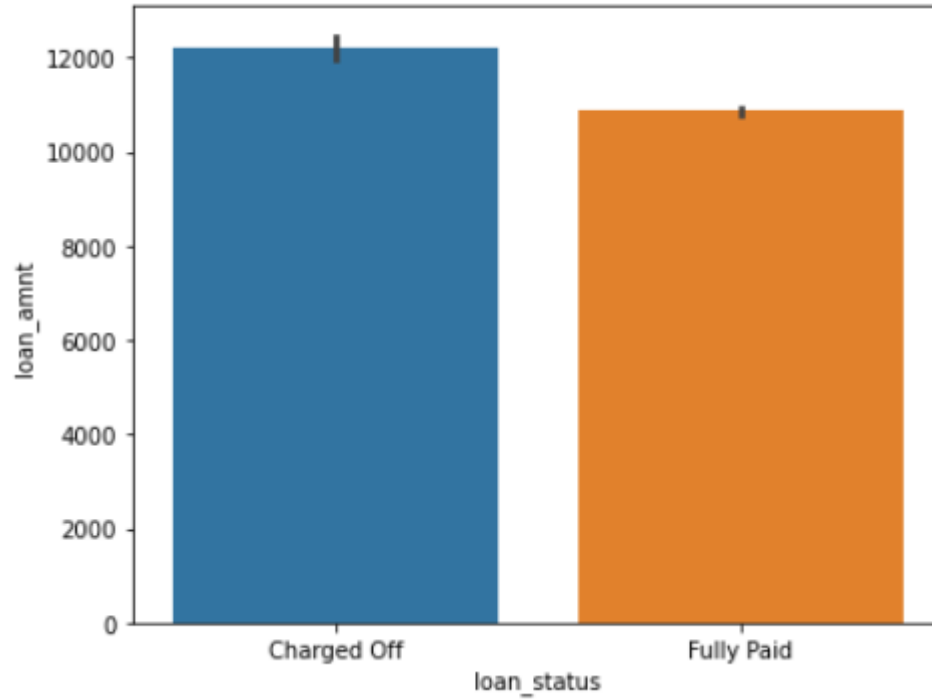
Analysis – Rate of Interest



Observations:

- Borrowers taking loan at less interest are repaying the loan.
- As interest rate increases ($\geq 11\%$) the borrowers are prone to default.

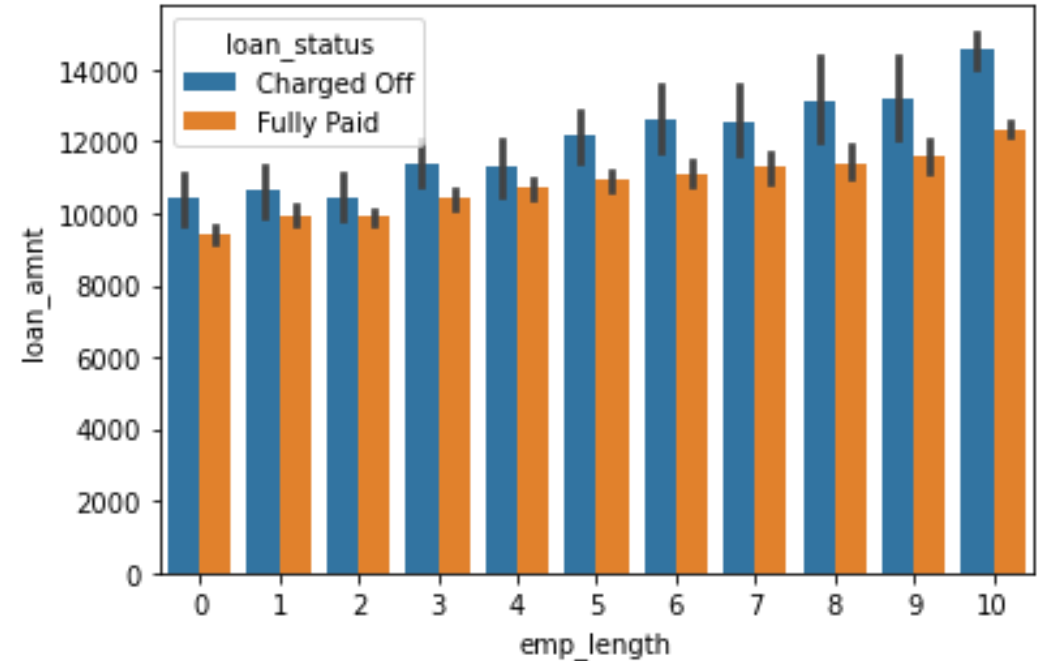
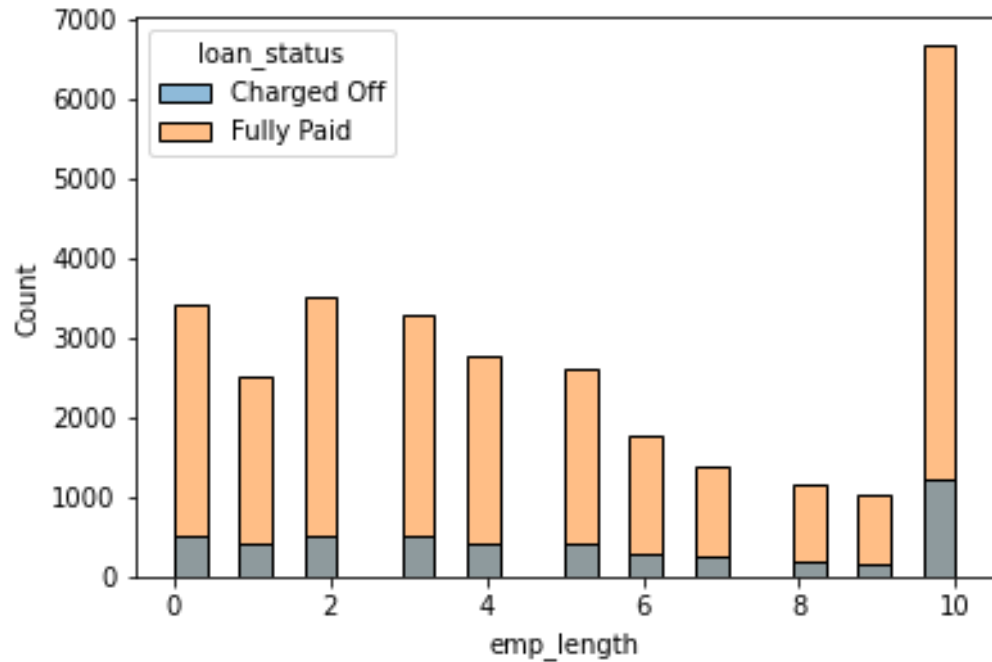
Analysis – Loan Amount



Observations:

- Higher the loan amount, borrowers are prone to default

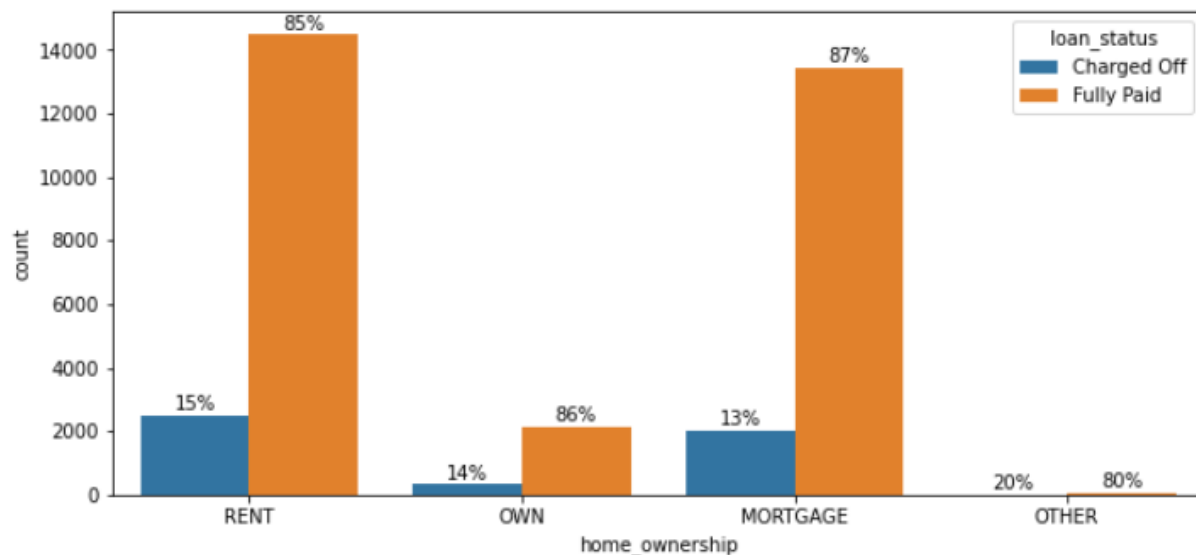
Analysis – Experience Level



Observations:

- Most of the borrowers have experience of ≥ 10 years and are prone to default.
- Borrowers with higher experience are given higher loan amount, hence are prone to default.

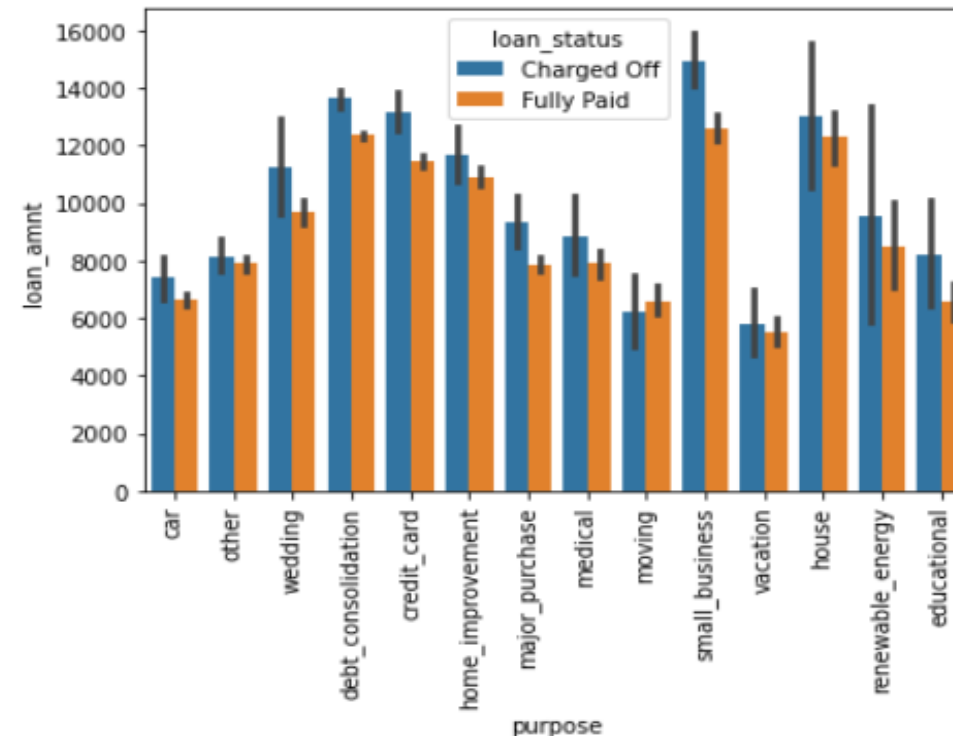
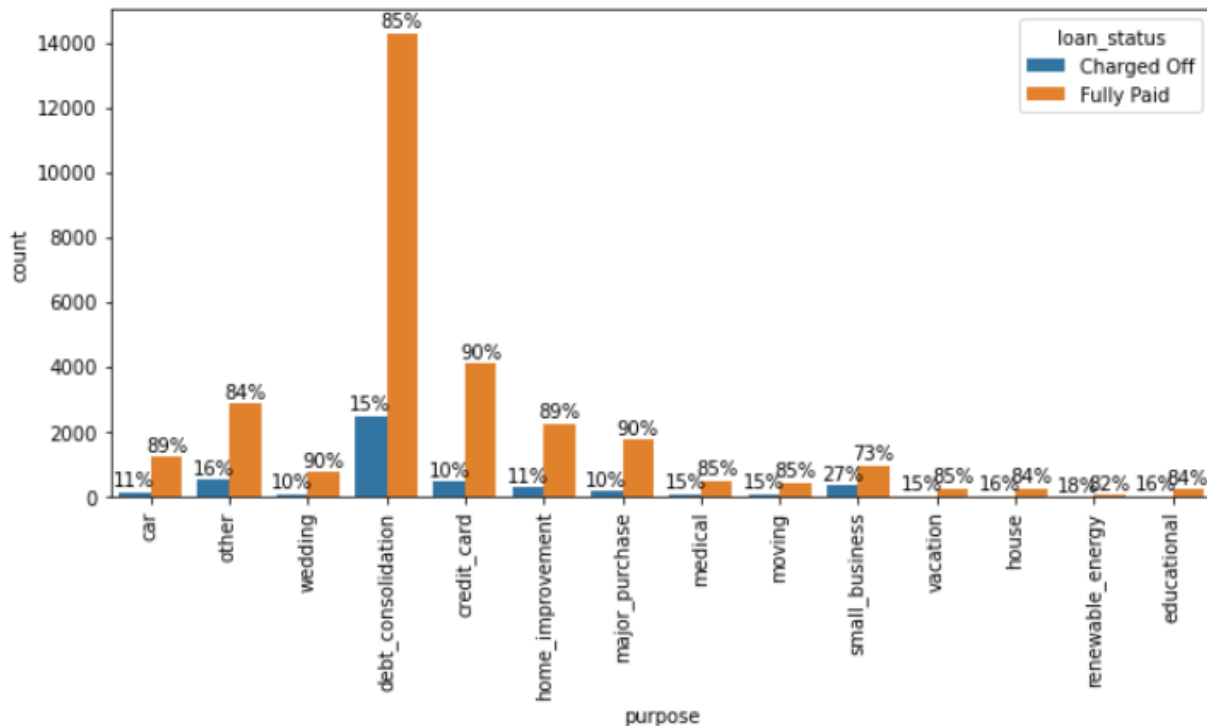
Analysis – Home Ownership



Observations:

- Most of the borrowers have rented house or house which is mortgaged.
- Higher loan amount sanctioned for borrowers with Mortgaged houses or houses in Other category are prone to default, compared to the borrowers with own or rented house

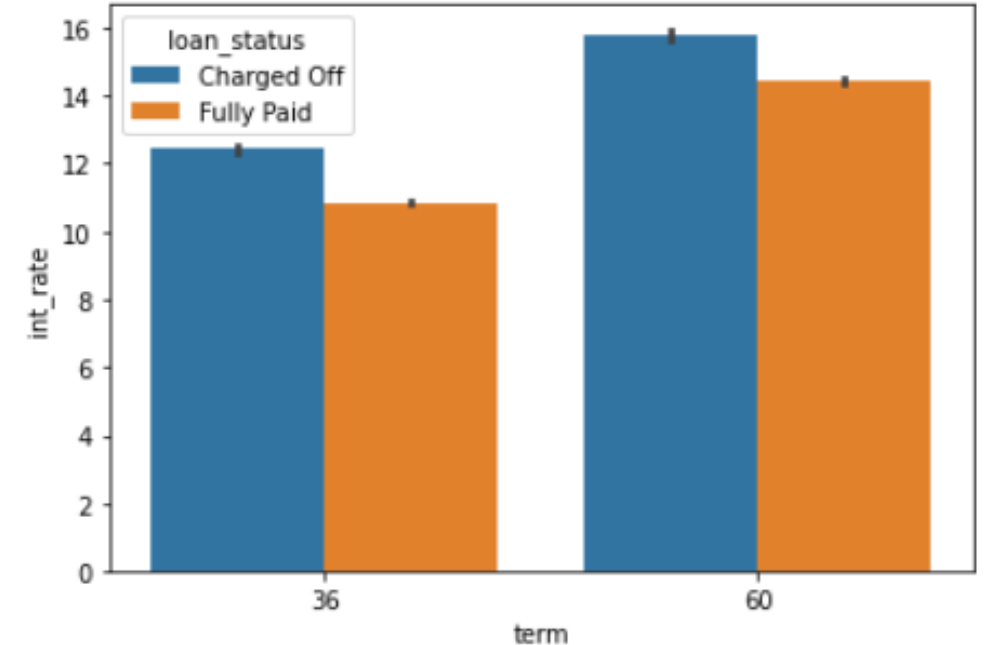
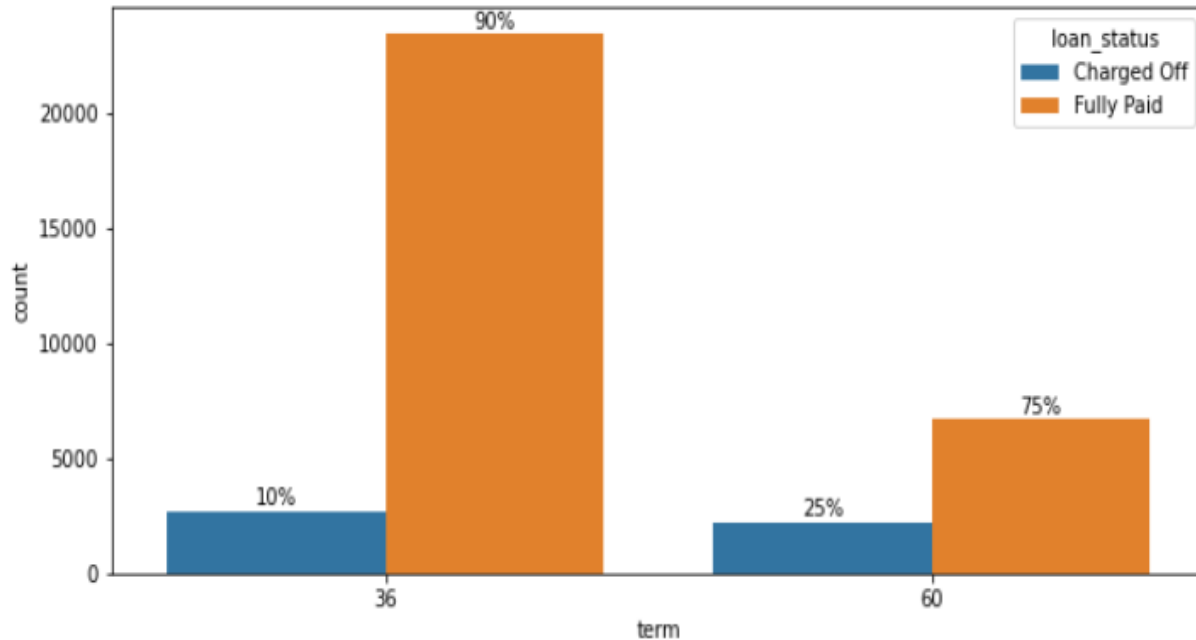
Analysis – Purpose of Loan



Observations:

- Most of the borrowers apply loan for debt consolidation and has higher number of defaulters.
- Higher loan amount given for small business purpose are less likely to repay loan.

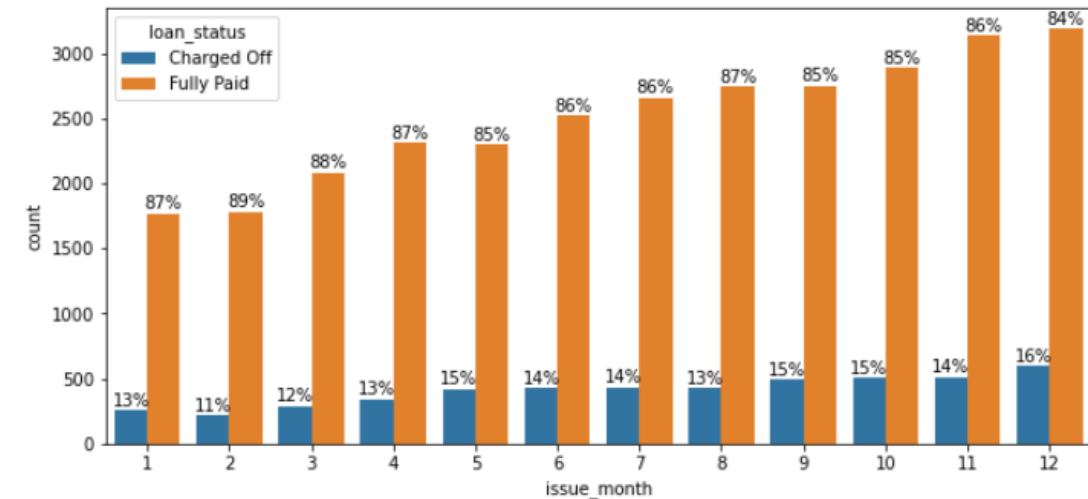
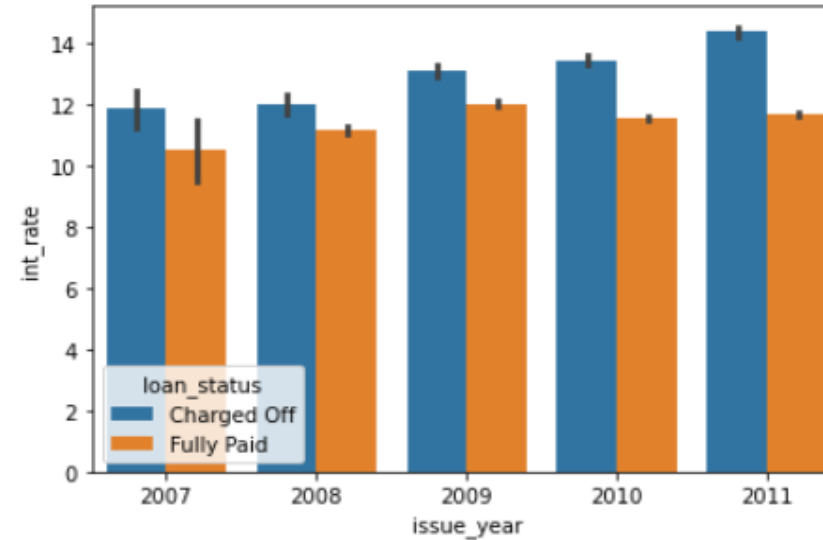
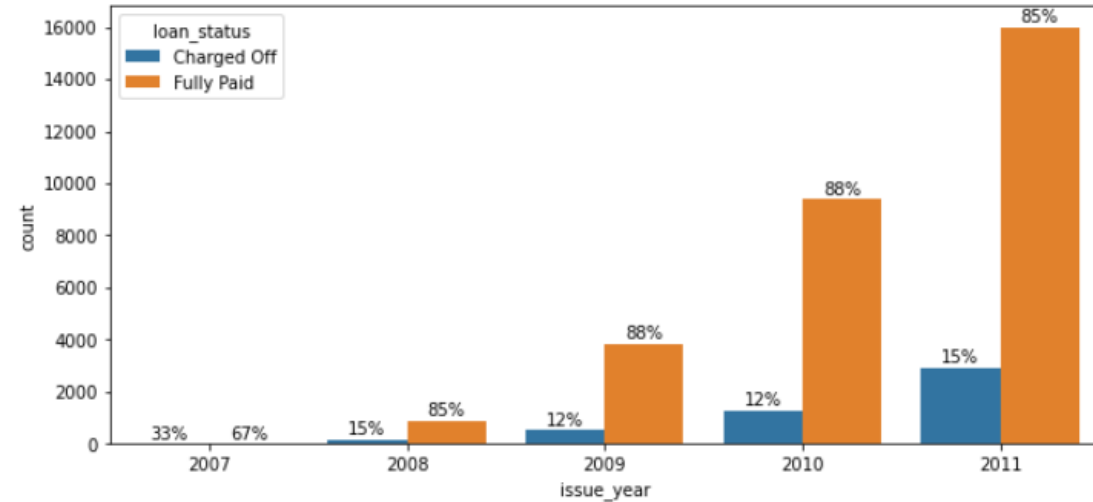
Analysis – Loan Tenure



Observations:

- Borrowers with less loan tenure are fully repaying the loan.
- Longer loan tenure increases the chance of more defaulters.
- Interest rate increases for long tenure loan and is prone to default.

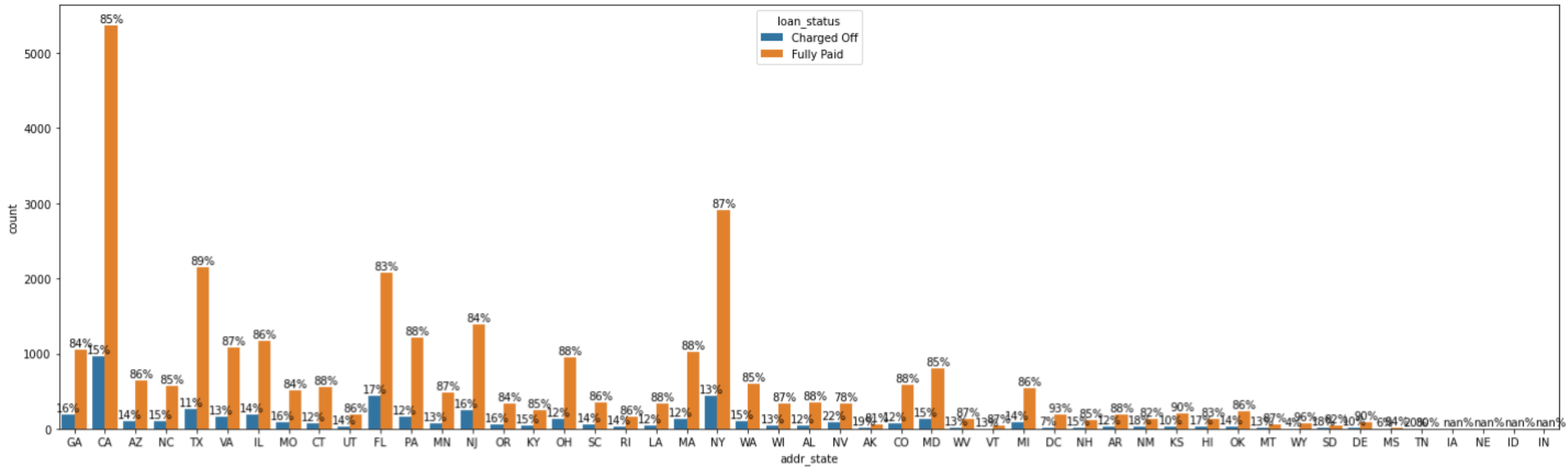
Analysis – Loan Issue Date



Observations:

- Number of borrowers are increasing every month and year, with increase in defaulters.
- Increase in rate of interest yearly basis contributes to loan defaulters.

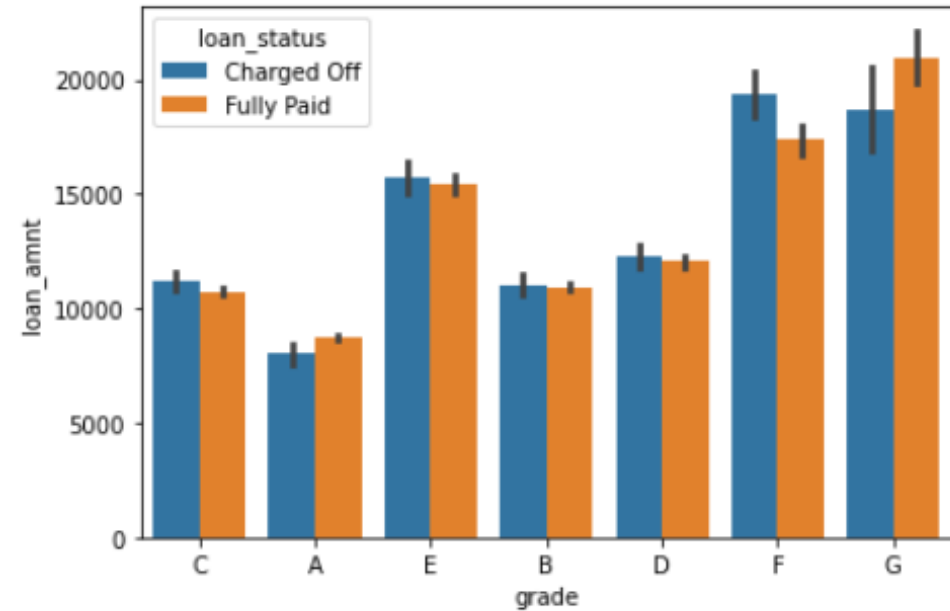
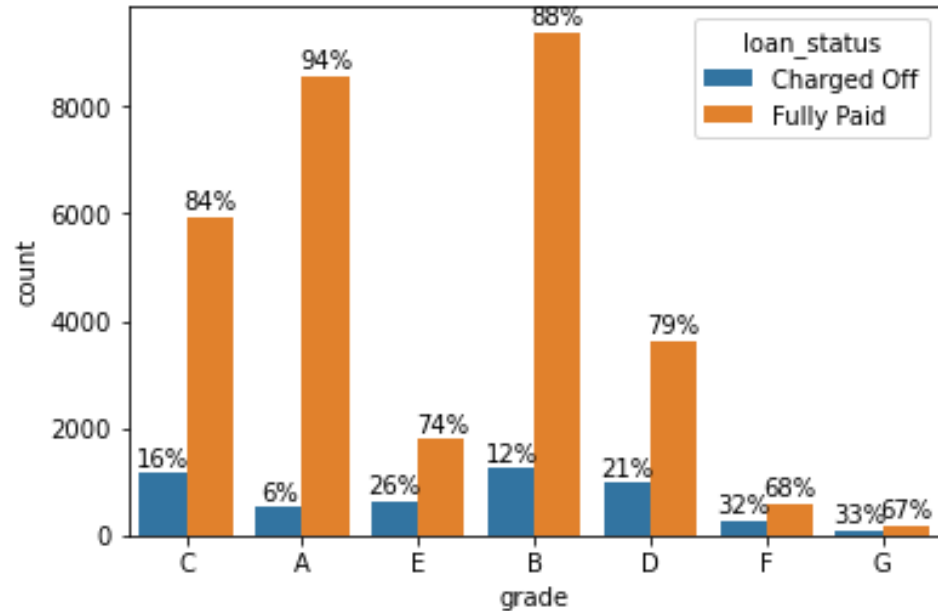
Analysis – State



Observations:

- More borrowers are from State 'CA', 'NY' and 'FL' and hence contributes to more number of defaulters.

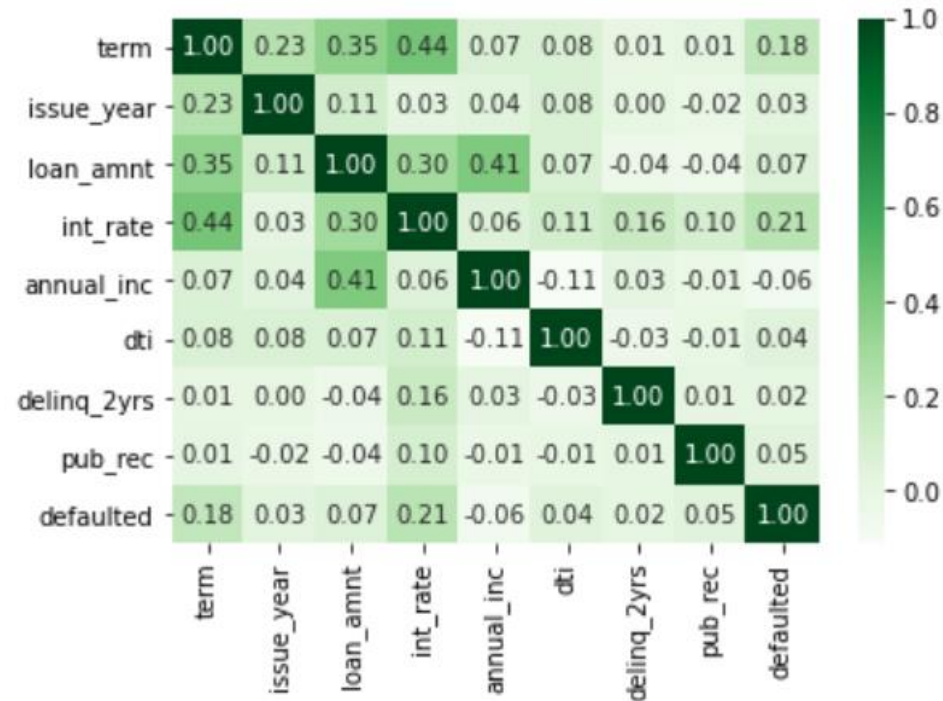
Analysis - Grade



Observations:

- More borrowers are from Grades A,B and C, and their loan amount is less, hence are repaying the loan.
- Higher loan amount given to Grade F and G borrowers are prone to default.

Analysis – Correlation Matrix



Observations:

- Higher the loan tenure and Higher the Interest rate, chances of default
- Higher the annual income, high is the loan amount sanctioned
- Higher the loan tenure, the interest rate and loan amount increases
- As annual income increases, the debt-to-income ratio reduces

Recommendations



Take extra precautions while sanctioning the loans to borrowers in States 'CA', 'NY' and 'FL'.



Try to reduce approving the loans for 60 months tenure period with higher rate of interest.



Approve lesser loan amount for borrowers with home ownership category – 'MORTGAGE' and 'OTHER'.



Reduce the loans sanctioned for borrowers with purpose as 'debt consolidation'. Also take extra precautions while approving the loan, as most of the borrowers tend to default.



Reduce the loan amount for borrowers with purpose as 'Small Business'.



Try to reduce approving the loan with higher amount for borrowers of Grades 'F' and 'G'

Thank You