

Lending Club Case Study

Case Study

Name:

1. Ruchin Chaudhary

Introduction.

The purpose of Lending Club Case Study is to assess the risk associated with the loan approval decision and to identify the cause that lead a borrower to default on a loan.

The study will facilitate the Consumer finance company to make correct risk assessment decisions.

- 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.

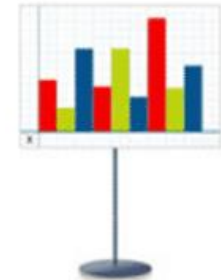
The analysis will eventually help in mitigating the risk of issuing loans that borrower have high potential to default.

Lending Club Work Flow.

Borrower applies for loan.

Borrower get fund.

Borrower re-pay automatically.

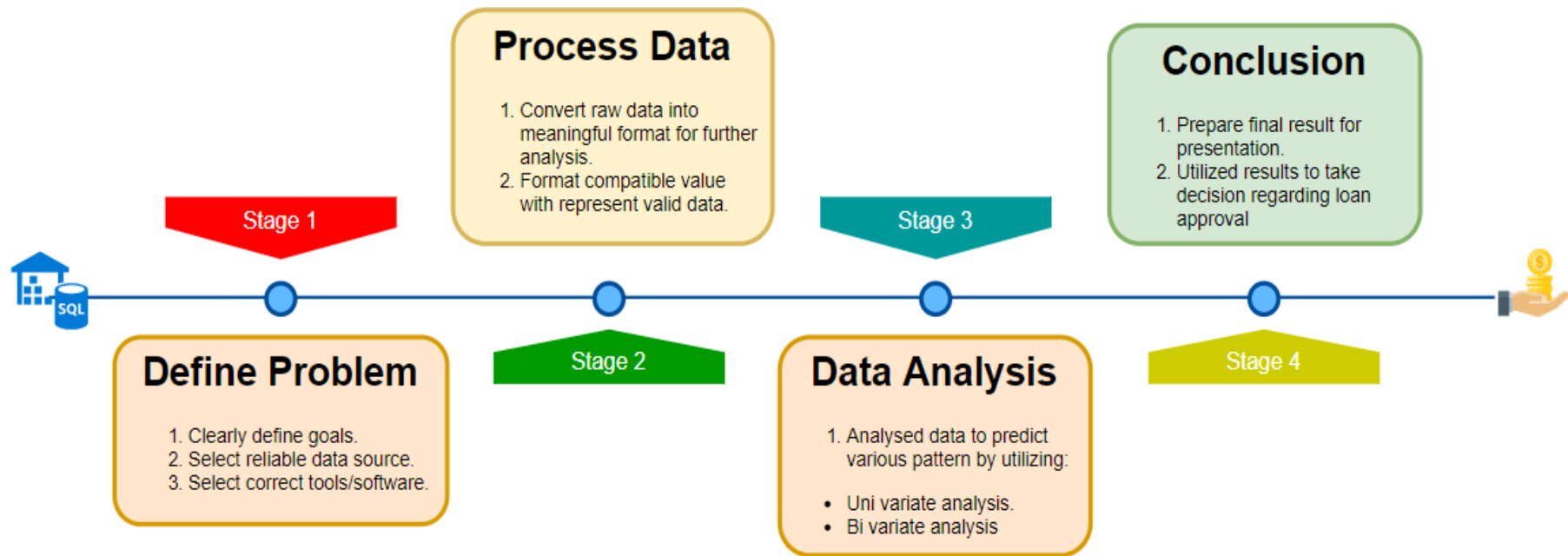


Investor open an account.

Investor built a portfolio

Investor earn and reinvest

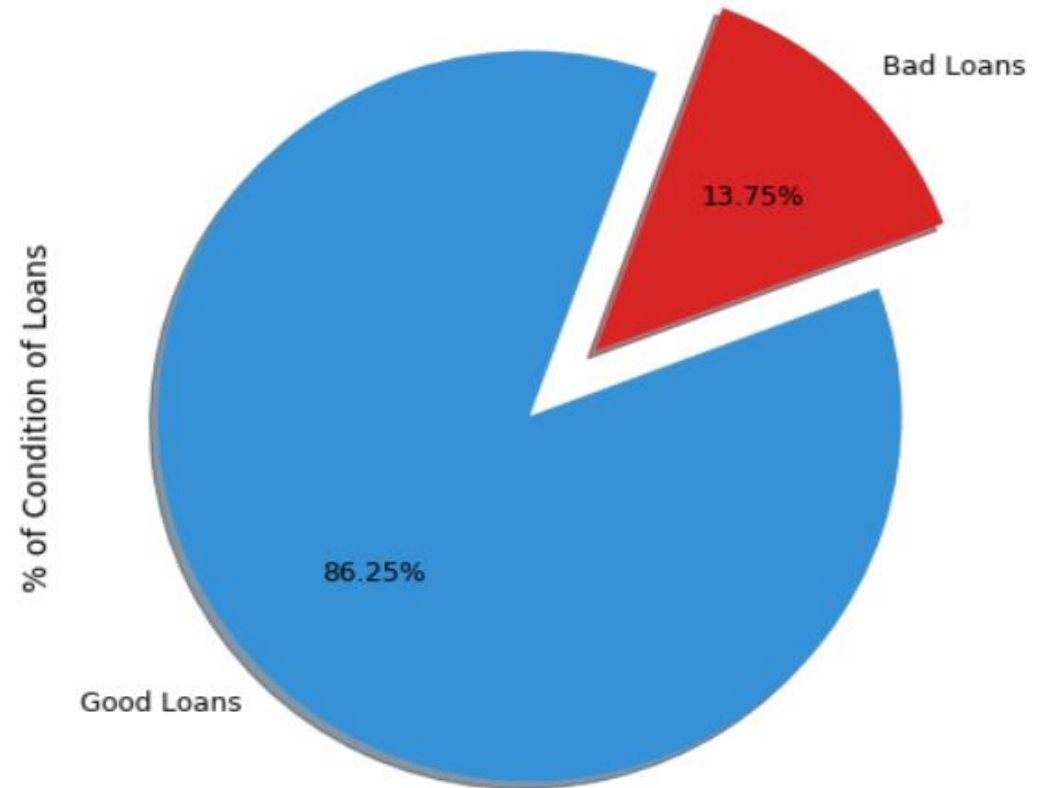
Problem solving methodology.



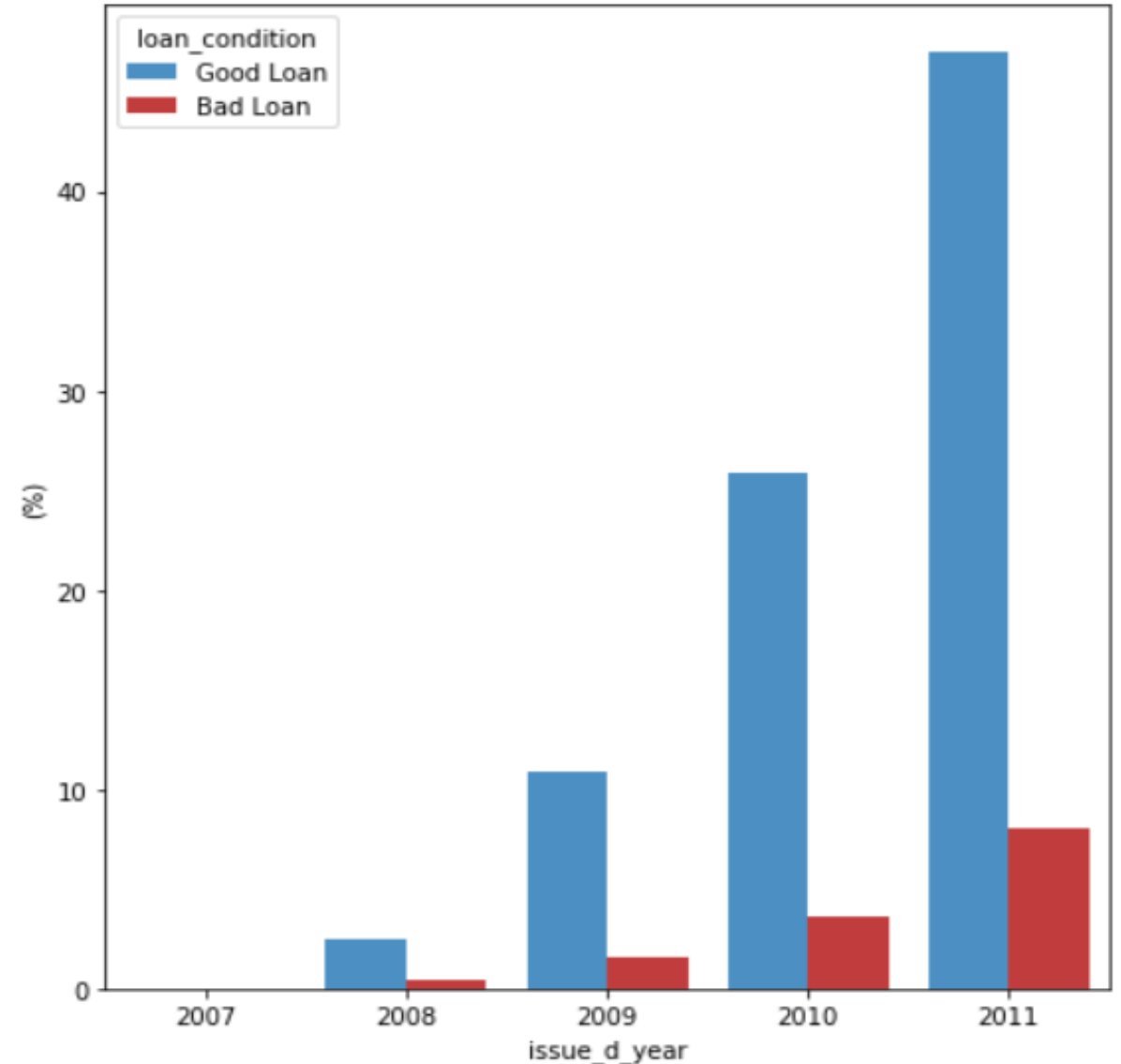
Data Statistics.

The loan data set contains vital information about loan's issued through the time period 2007 to 2011. Key fields such as loan amnt, loan status is utilized to identify **driving factors** behind loan default. Refer below details:

- Total Loan Application : 39717 (Approx.)
- Good Loans : 86.25 %
- Bad Loans : 13.75 %
- Maximum default in 36 month tenure.
- Maximum default in CA county.
- Maximum default are not verified.
- Maximum loan applied for Debit Consolidation.
- Maximum loans issued in the year 2011.

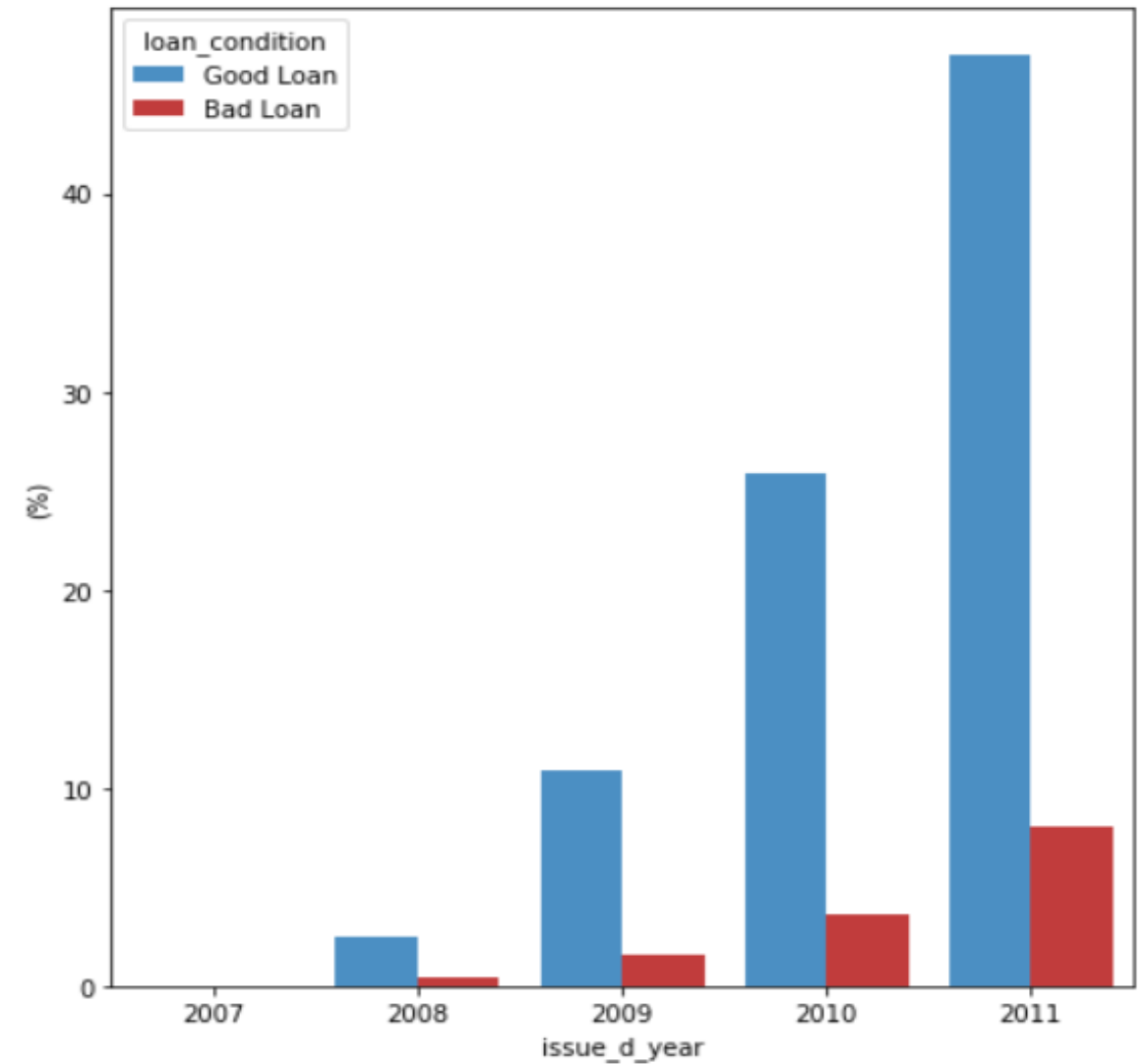
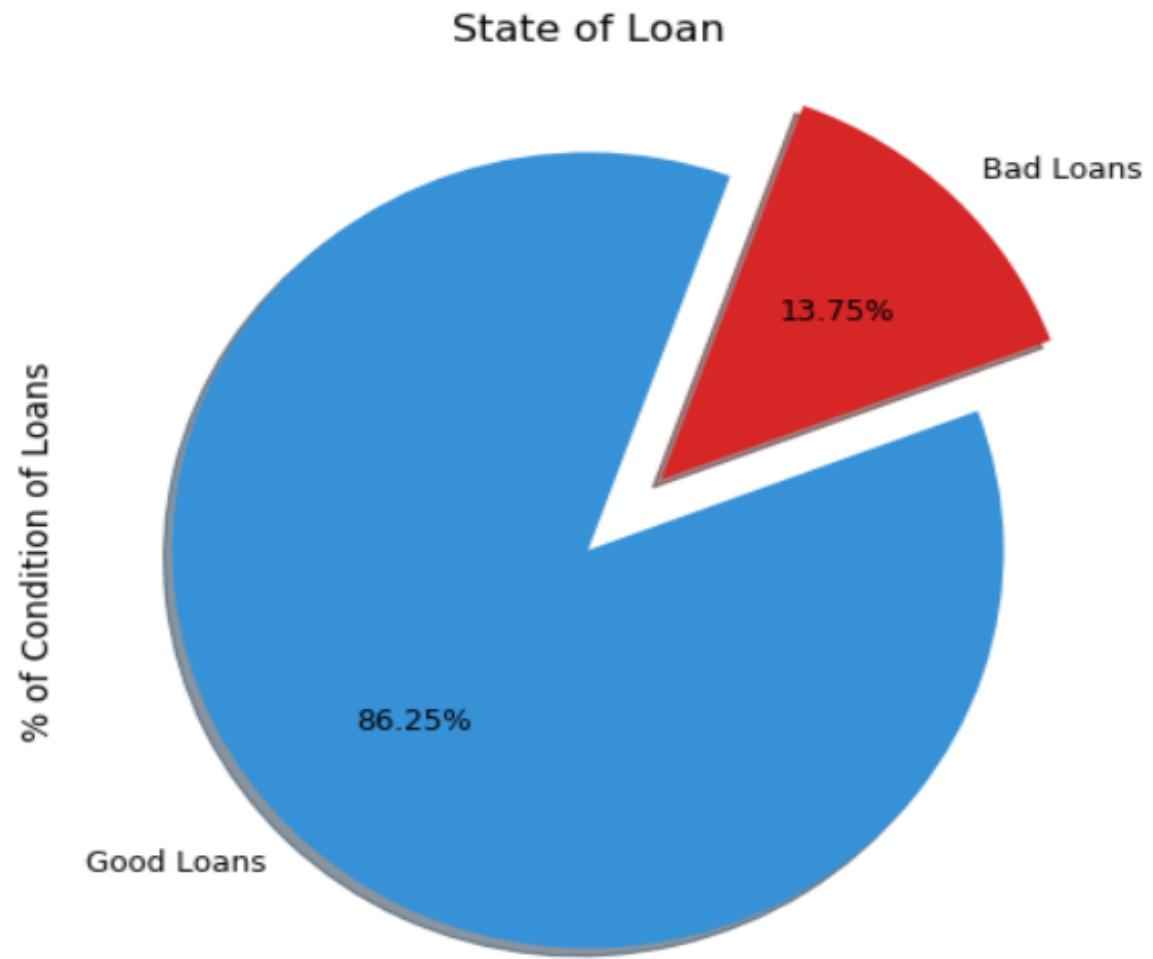


- Good to Bad loan ratio peaked around 2009, 2010.
- Borrower with **Low income category** had a slightly higher chance of becoming a bad loan.
- Loans with **higher interest rate** are more likely to become a **bad loan**.



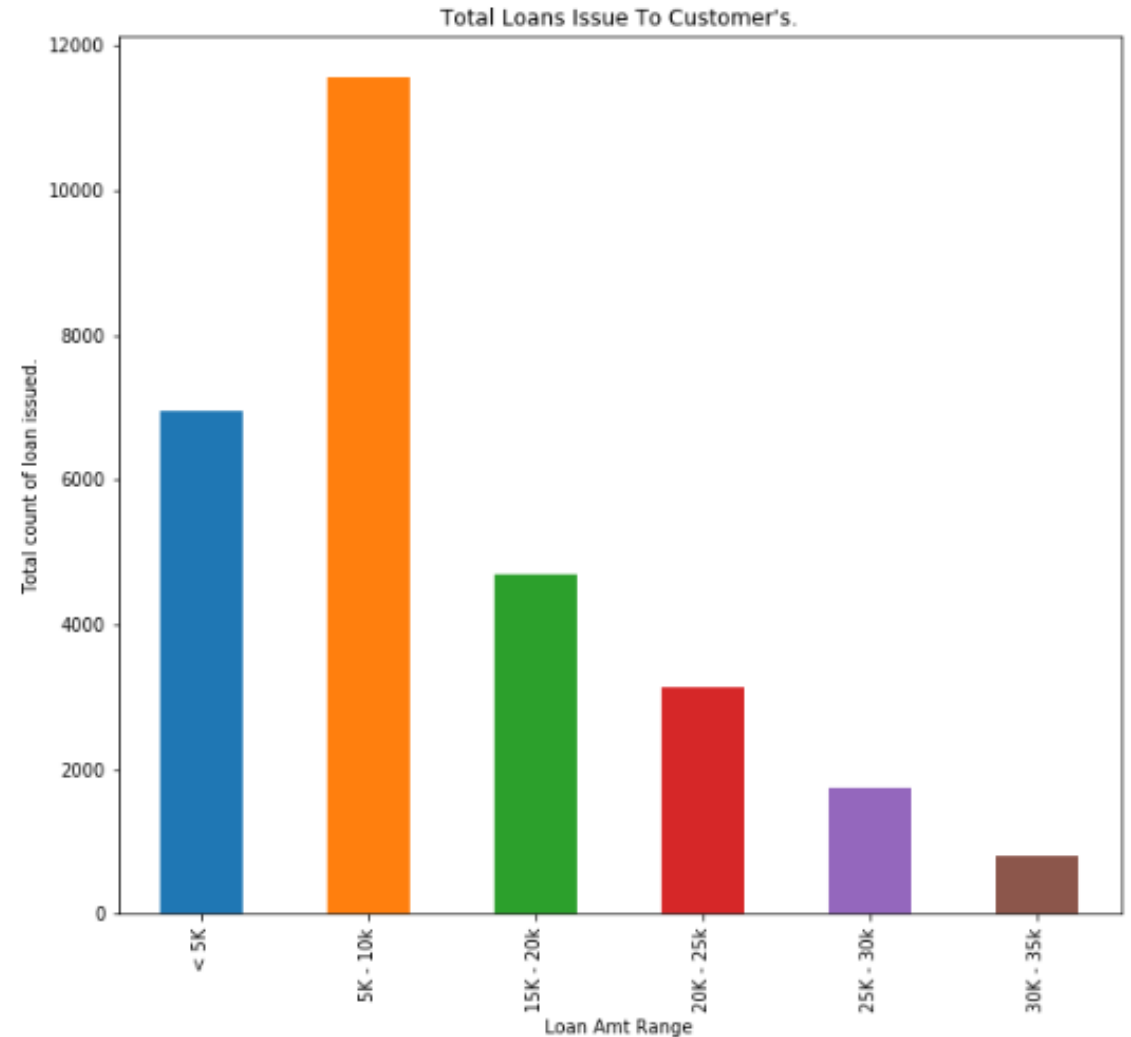
Uni-Variant Analysis.

Information on Loan Conditions



Loan Amount Range.

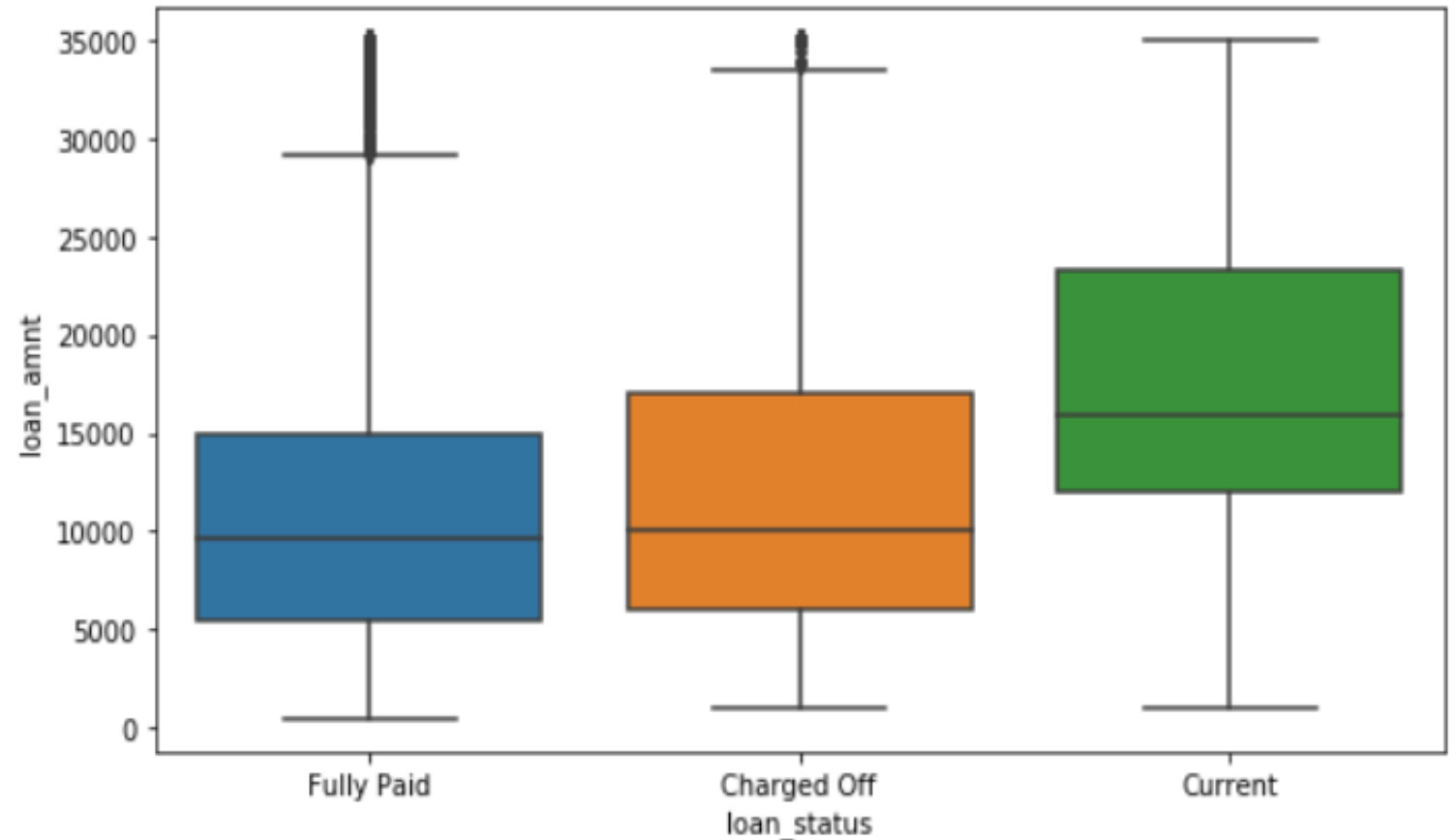
- Most of the **loans issued** were in the range of 5K to 10K \$.
- The lowest range of issued loans were between 30K \$ – 35K \$



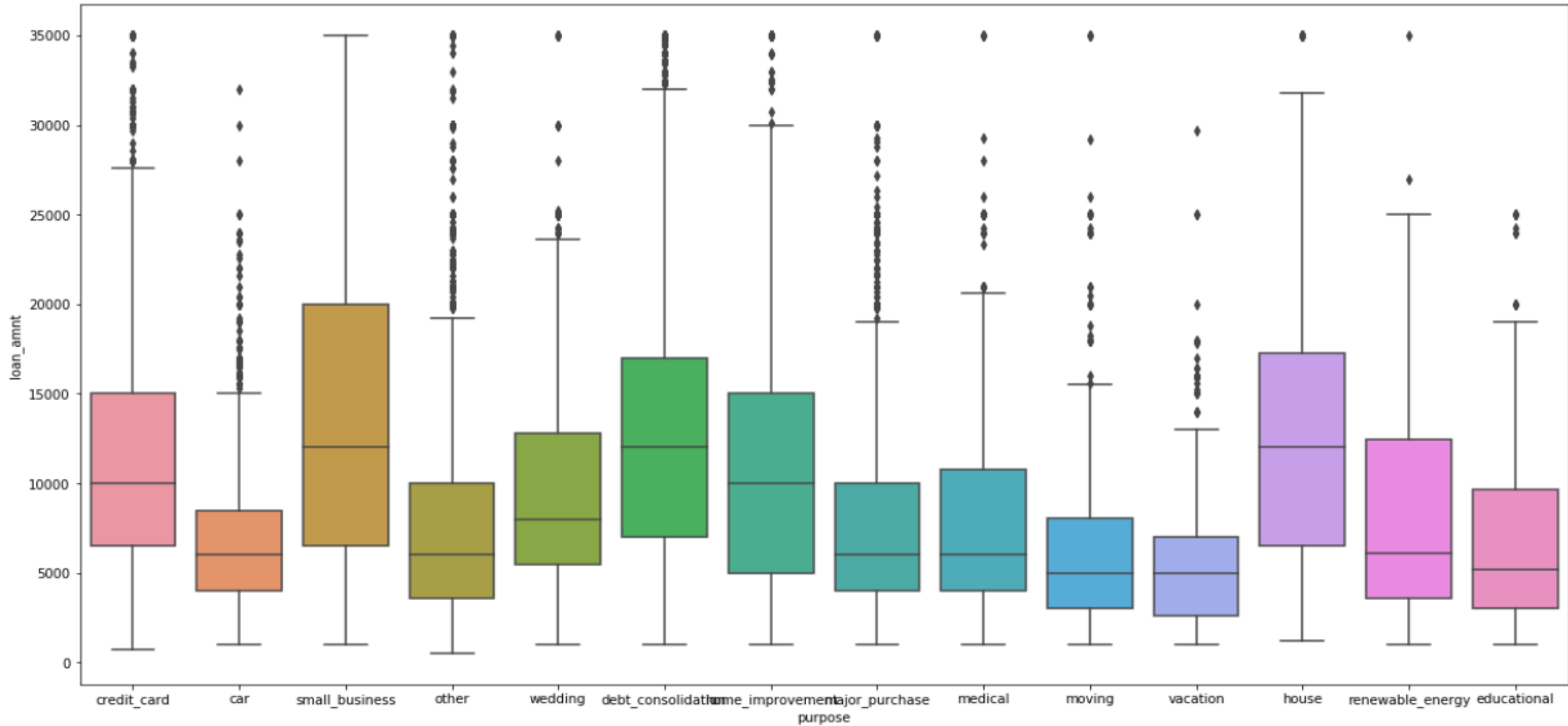
Loan Distribution.

- 'Current loan' are spread-out over a wide range and has the higher probability of loan being default.

Loan Category	Median	Min Value	Max Value
Charged Off	12294	1000	35000
Fully Paid	10966	500	35000
Current	17183	1000	35000

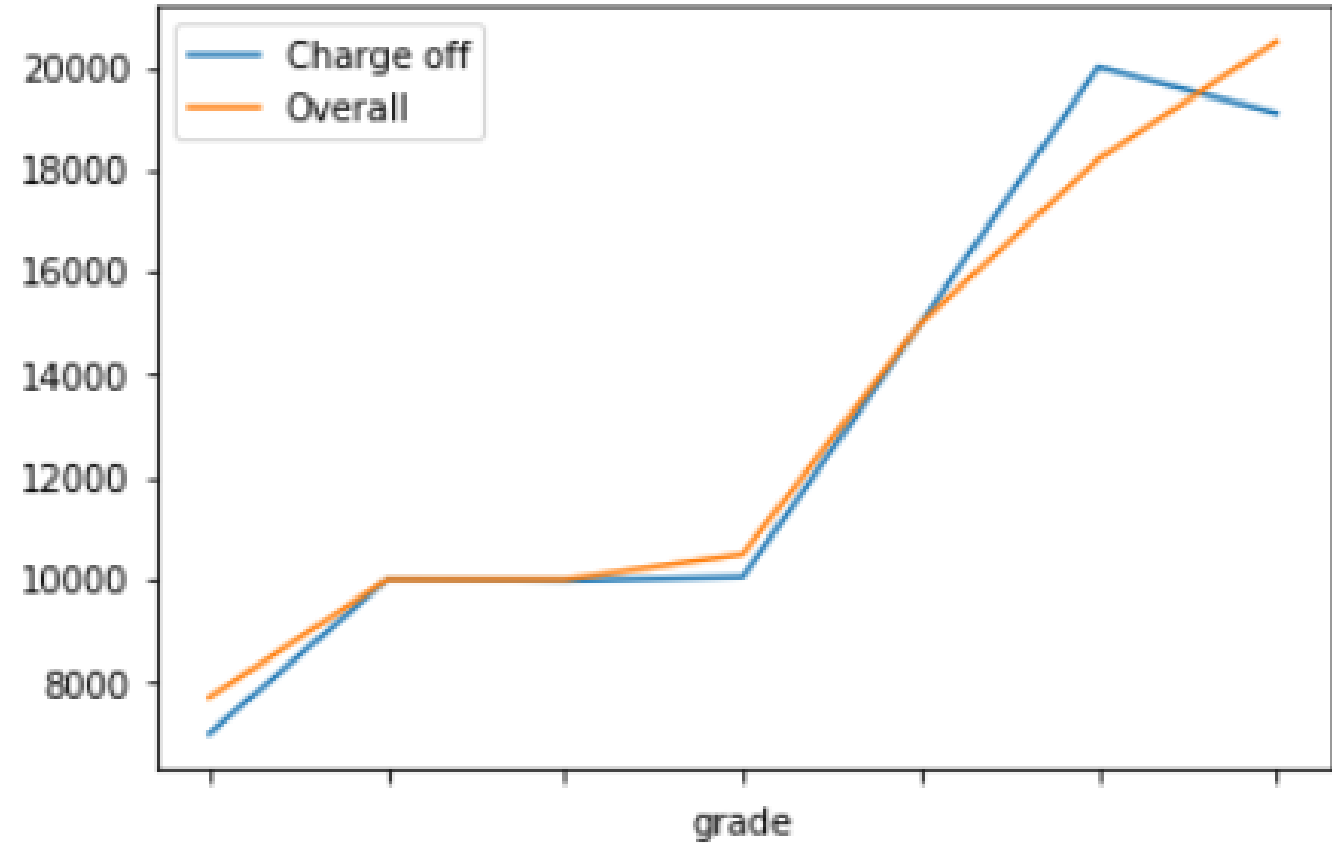


Box plot to depict distribution of loan amount for various purpose.



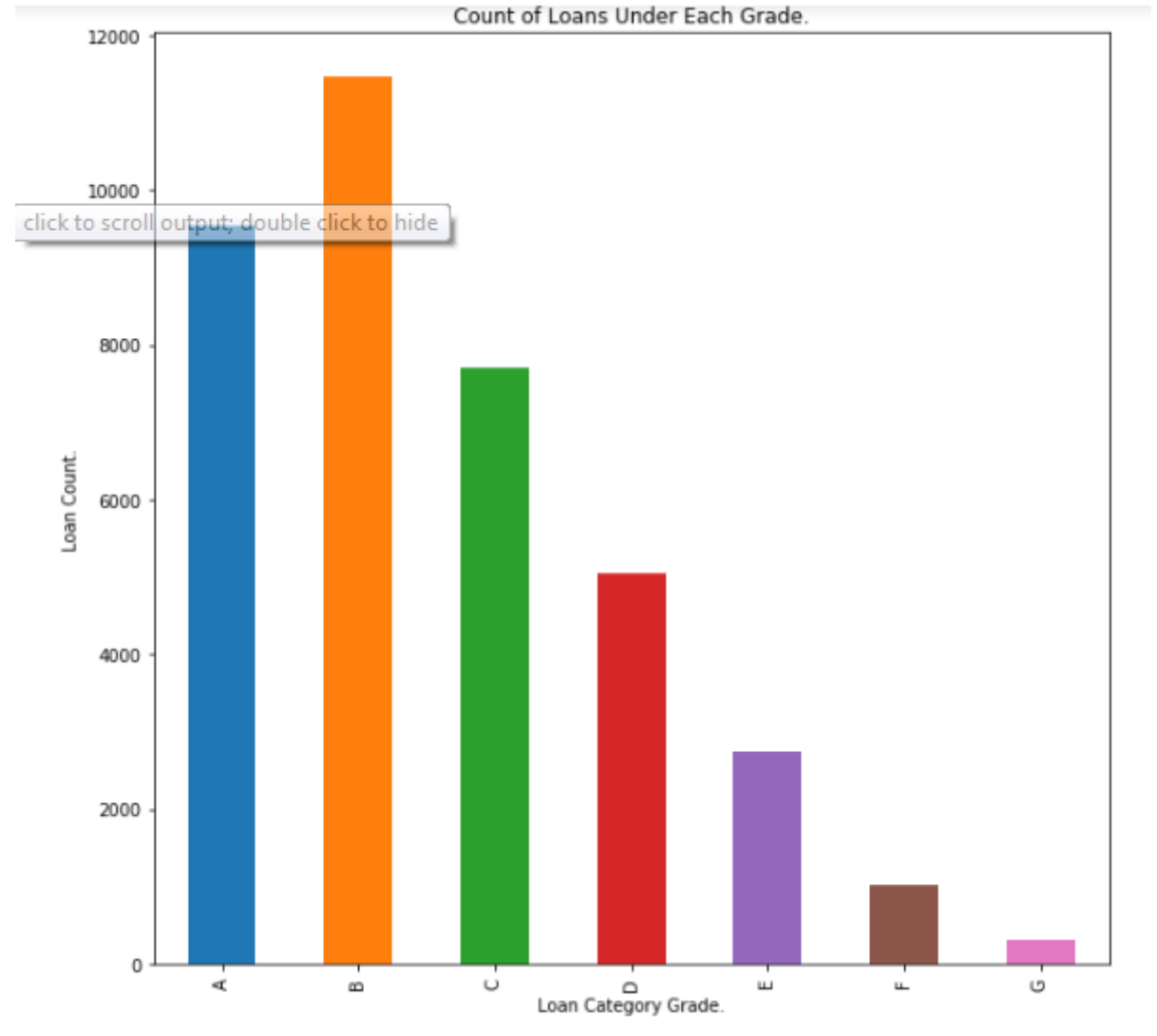
Median Loan Amount Issued Overall vs Charged off Loans

- There is no significant impact of loan amount issued for Charged off loan when compared to Overall loans issued.



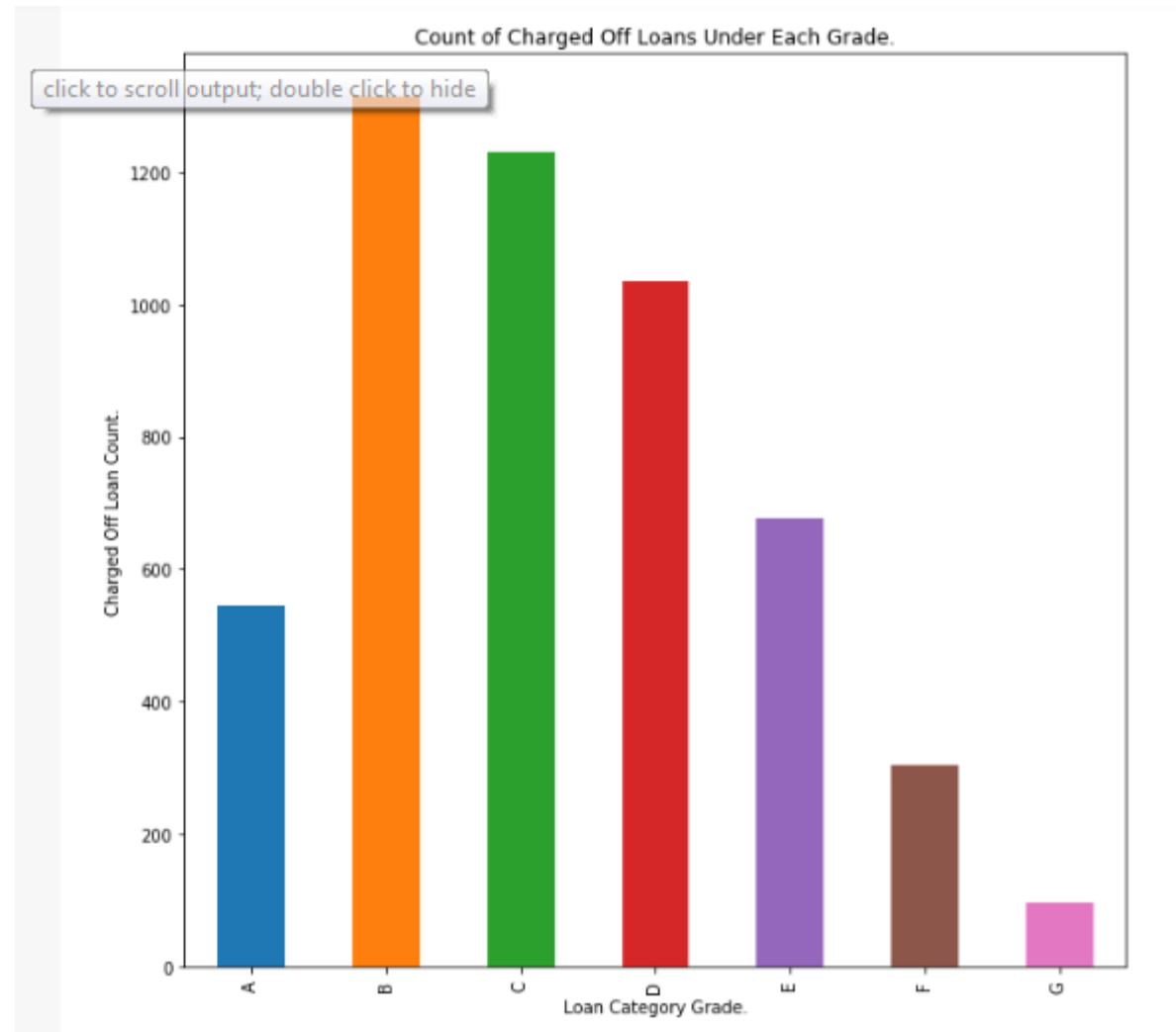
Loans issued across LC Grade

- The highest number of loans are issued for LC grade 'B'
- The lowest number of loans are issued of LC grade 'G'



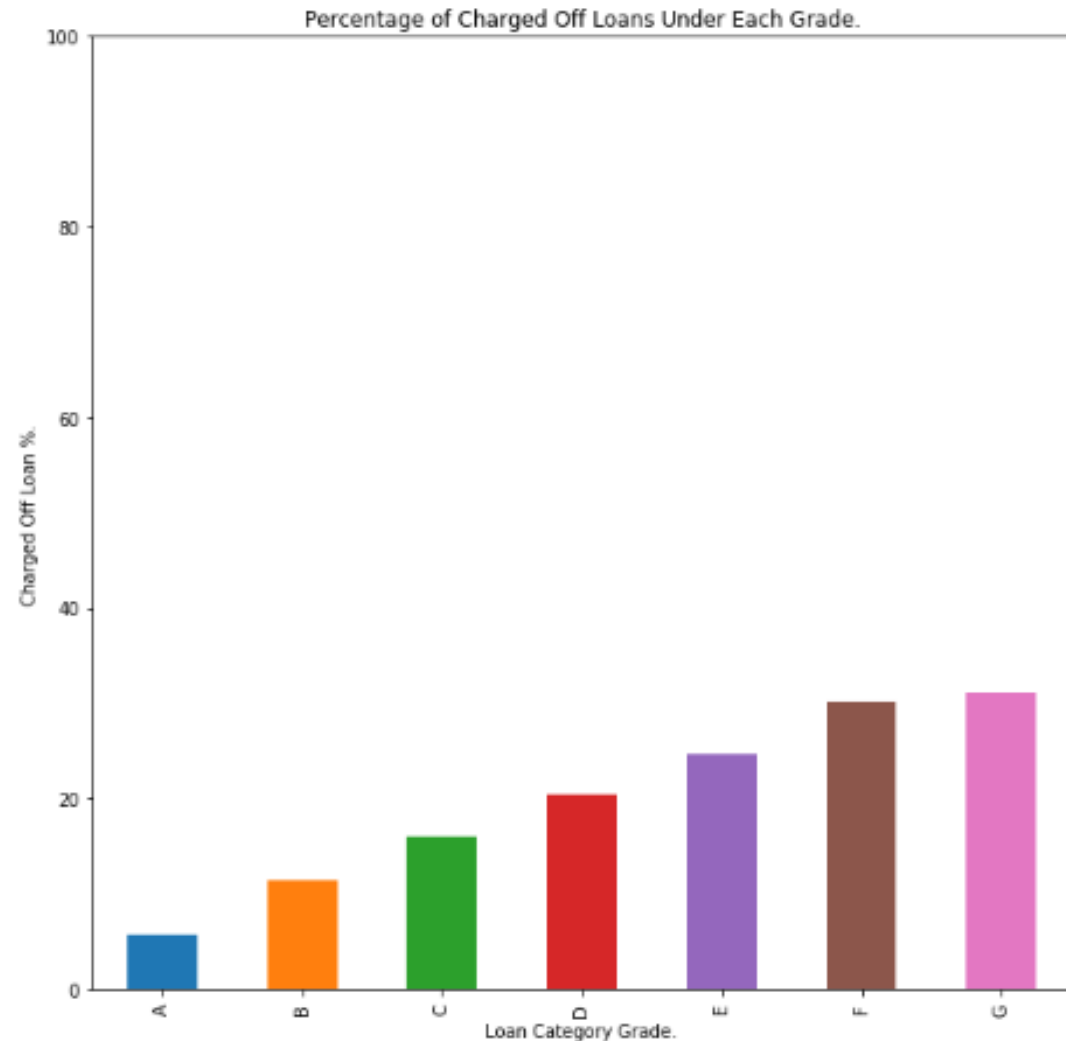
Charged off Loans across LC Grade

- The highest number of loans to default/charged off belong to customers with Loan category grade 'B'
- The least number of loans to default/charged off belong to customers with Loan category grade 'G'



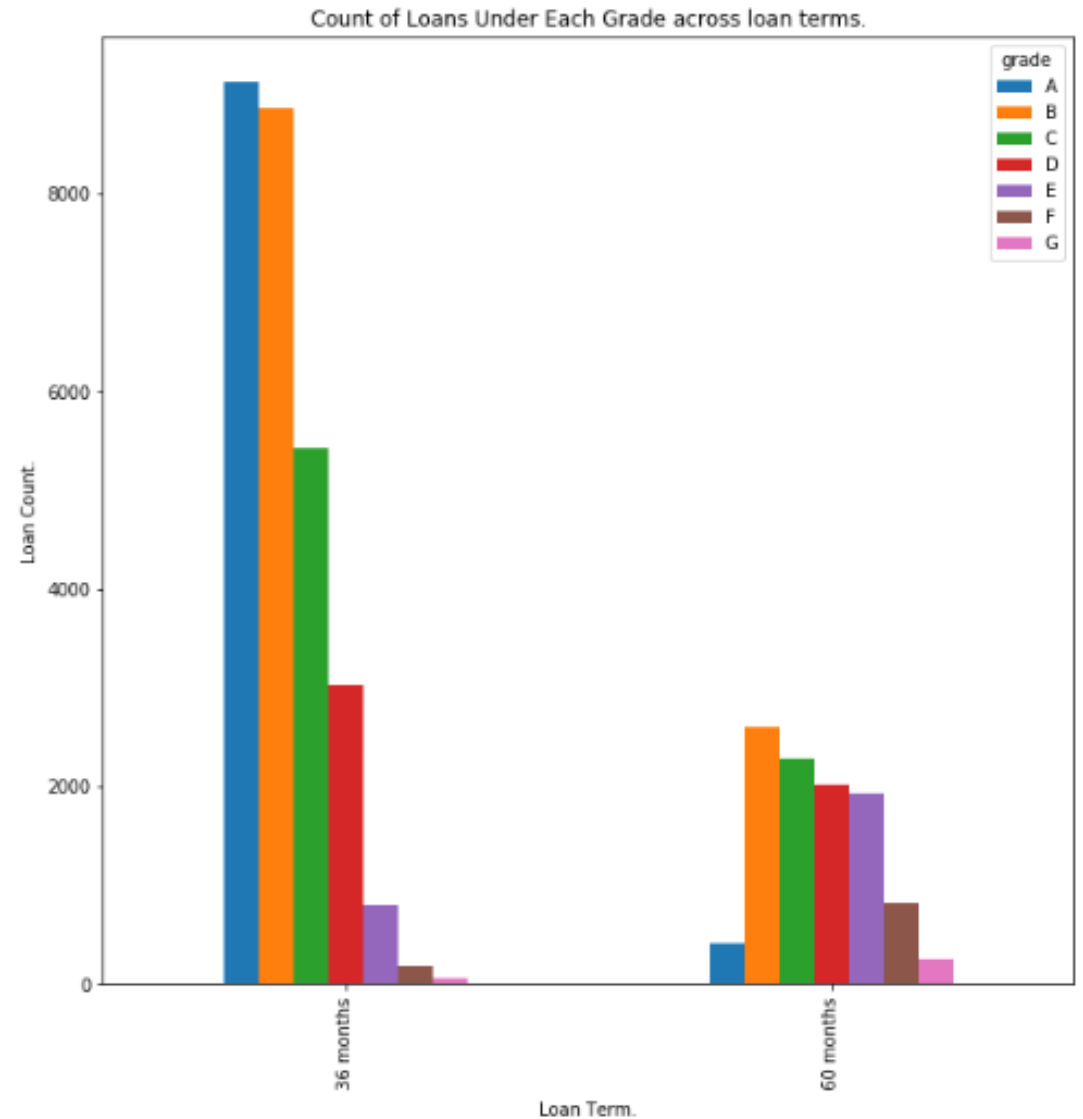
Likelihood of Loan getting Charged Off

- The least likely to be charged off on a loan are customers with Loan category grade 'A'
- The most likely to be charged off on a loan are customers with Loan category grade 'G'



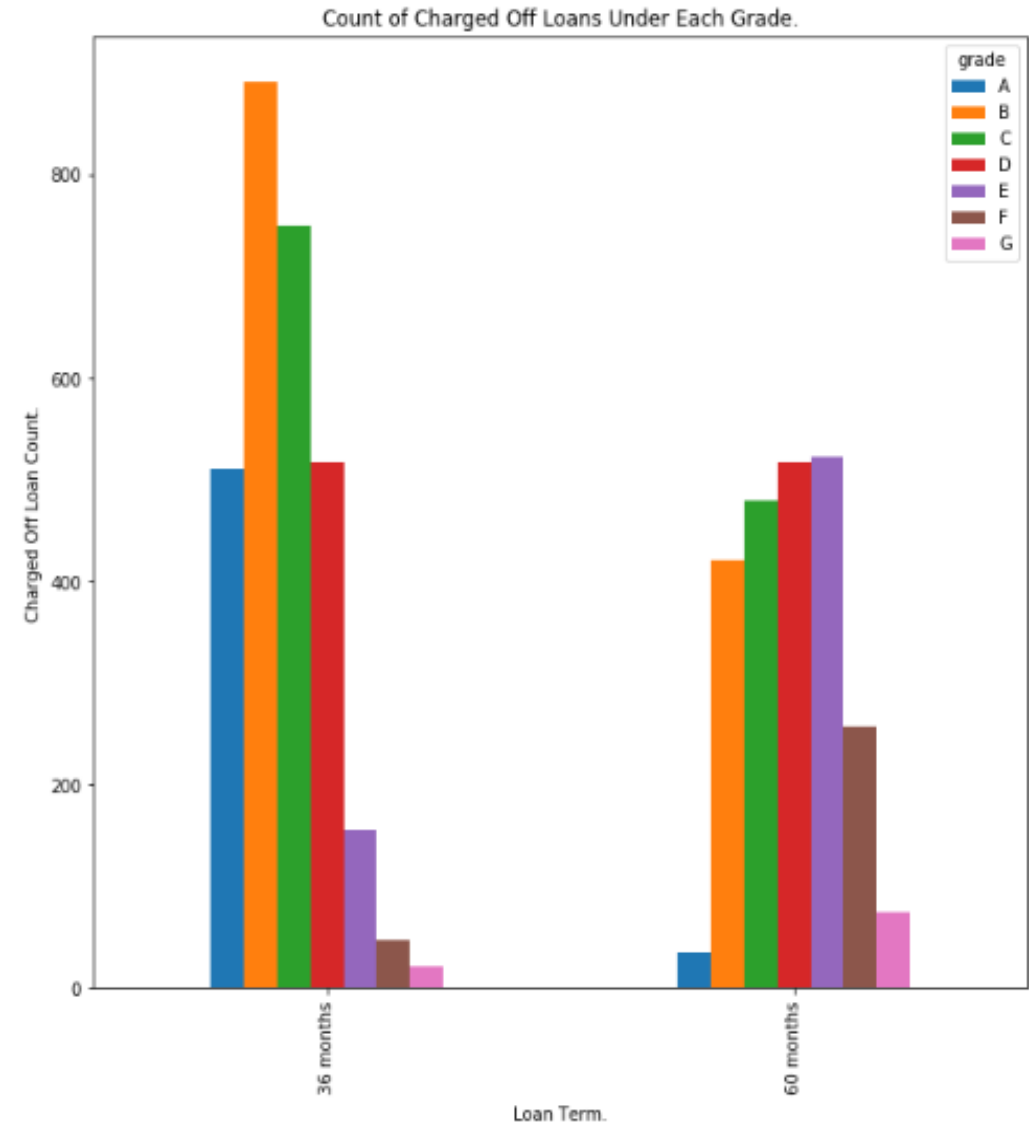
Loans issued across Grade – Month Wise

- For 36 months:
 - ✓ The highest number of loans issued is for LC grade 'A'
 - ✓ The lowest number of loans issues is for LC Grade 'G'
- For 60 months:
 - ✓ The highest number of loans issued is for LC grade 'B'
 - ✓ The lowest number of loans issues is for LC Grade 'G'



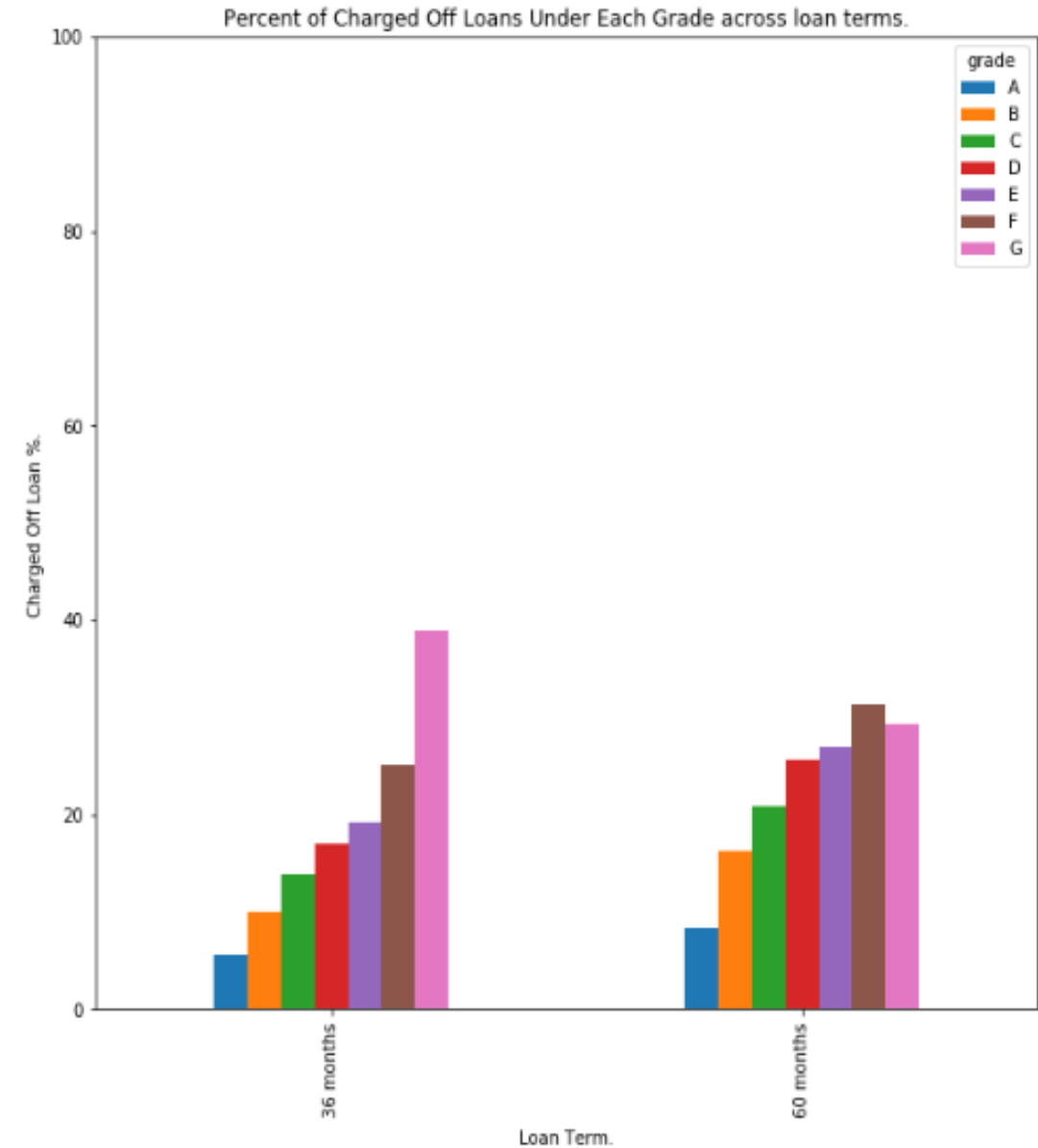
Charged Off Loans across Grade – Month Wise

- For 36 months:
 - ✓ The highest number of loans charged off is for LC grade 'B'
 - ✓ The lowest number of loans issues is for LC Grade 'G'
- For 60 months:
 - ✓ The highest number of loans issued is for LC grade 'E'
 - ✓ The lowest number of loans issues is for LC Grade 'G'

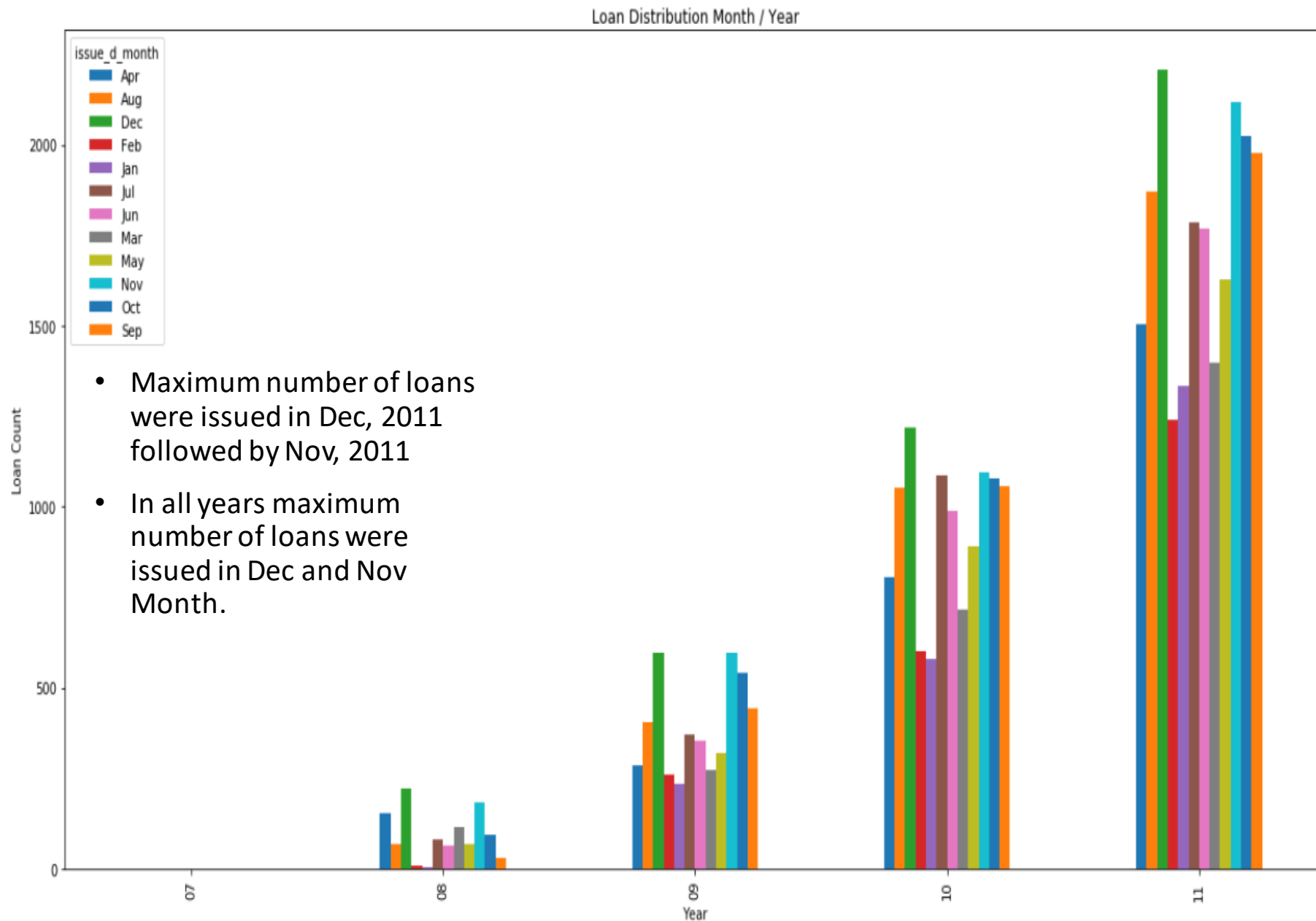


Charged Off Loans across Grade – Month Wise

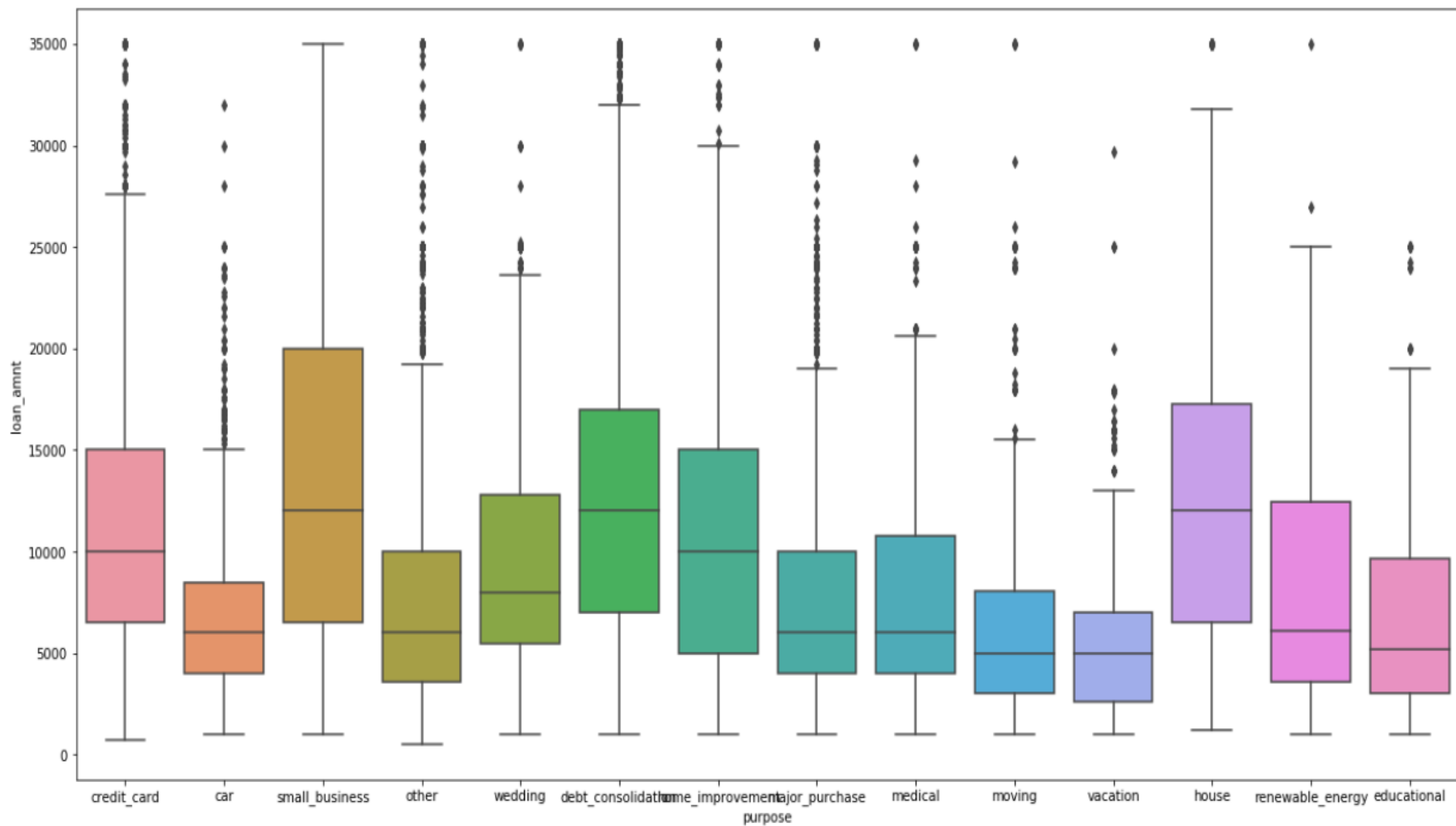
- For 36 months:
 - ✓ The least likely to be charged off on a loan are customers with Loan category grade 'A'
 - ✓ The most likely to be charged off on a loan are customers with Loan category grade 'G'
- For 60 months:
 - ✓ The least likely to be charged off on a loan are customers with Loan category grade 'A'
 - ✓ The most likely to be charged off on a loan are customers with Loan category grade 'F'



Month Wise Distribution

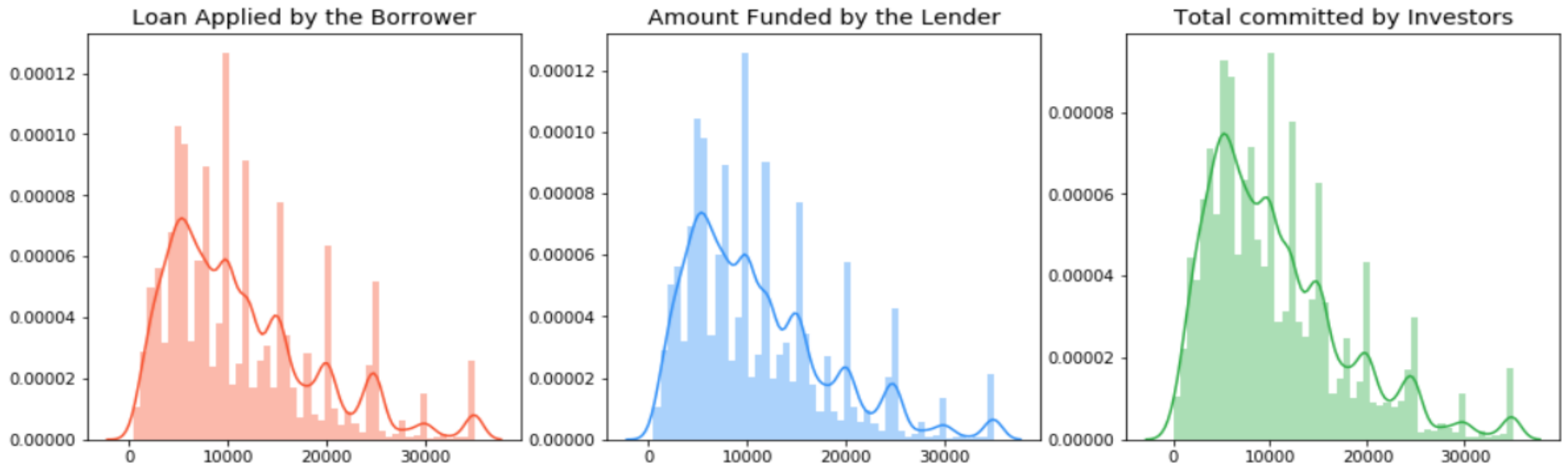


Box Plot - Purpose



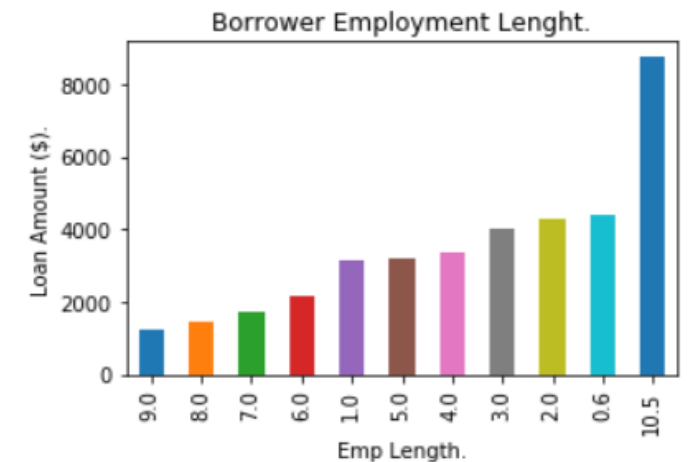
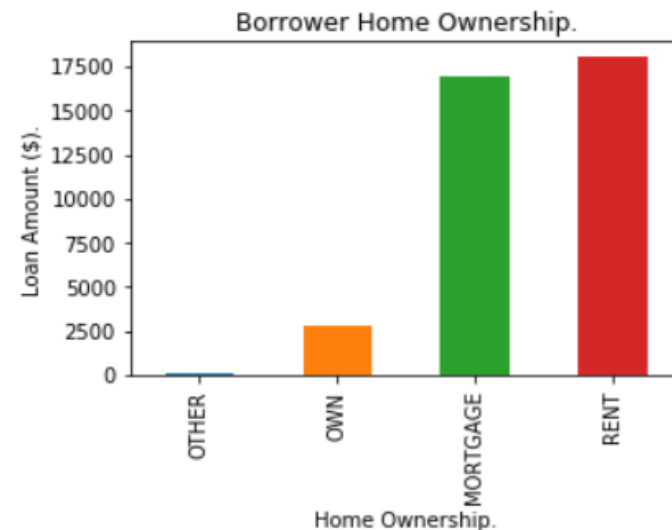
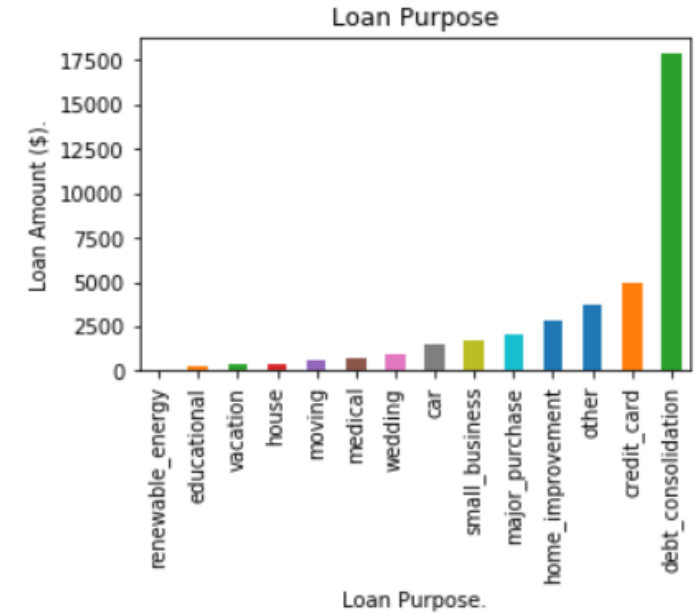
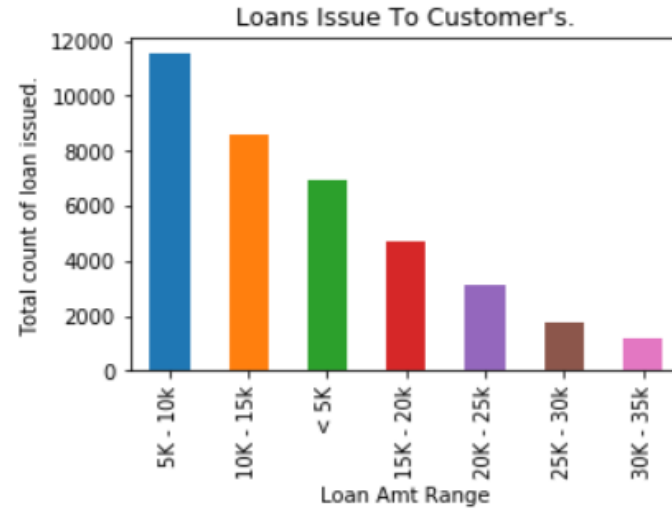
Borrower VS Lender VS Investor distribution.

- The loans **applied** by potential borrowers, the amount **issued** to the borrowers and the amount **funded** by investors are similarly distributed, **meaning** that it is most likely that qualified borrowers are going to get the loan they had applied for.



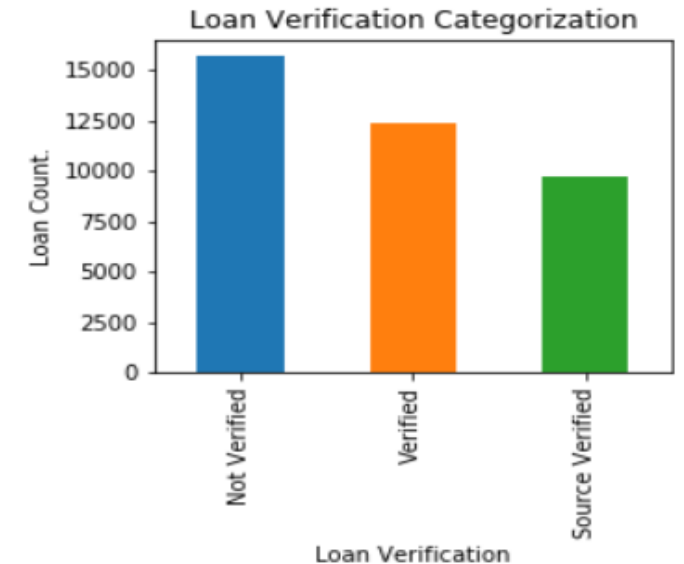
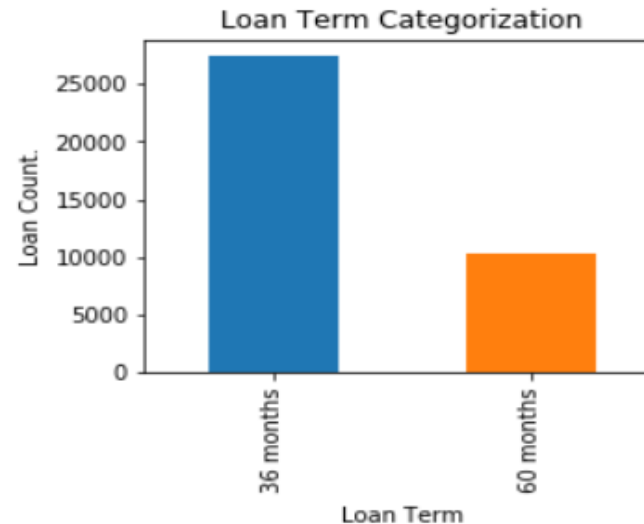
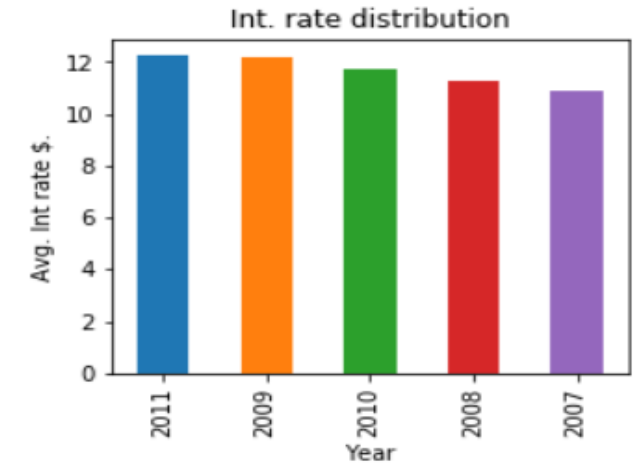
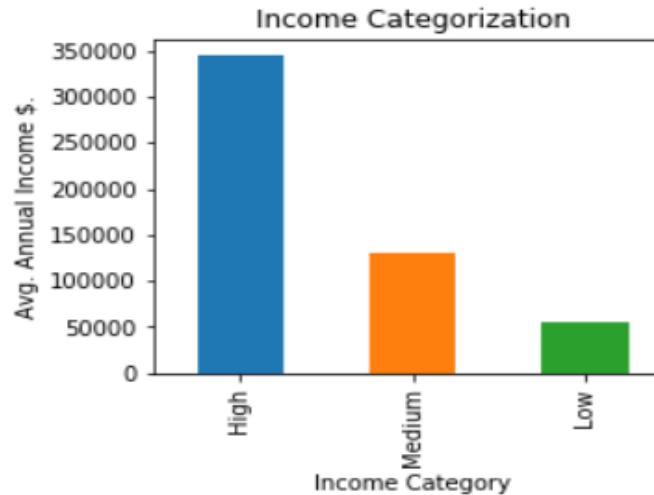
Borrower Behavior Part I.

- Highest number of issued loans are between \$ 5k – \$ 10K.
- Highest number of loans were issued for 'Debit Consolidation'
- Maximum number of borrower has rented apartment.
- Highest number of borrowers are with an employee length of 10+ years



Borrower Behavior Part 2.

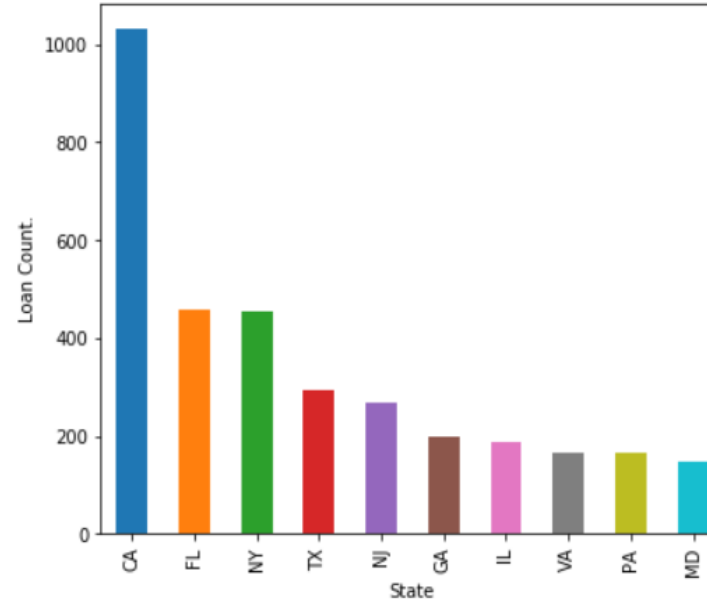
- Highest number of borrower belong to high income group i.e. 200000 \$
- Interest rate is increasing on yearly basis.
- Maximum number of borrower loan belong to 36 month tenure.
- Maximum number of loans are not certified.



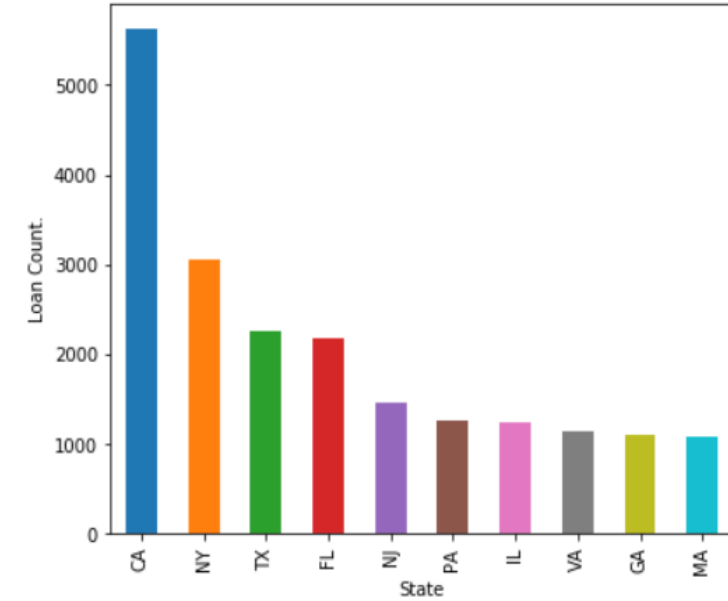
State-wise loan distribution.

- Highest number of loans were issued in CA, NY, FL and TX.
- Maximum number of defaulter are from CA. However NY and FL are at second place.
- Maximum number of paid loan is also from CA, NY and TX.

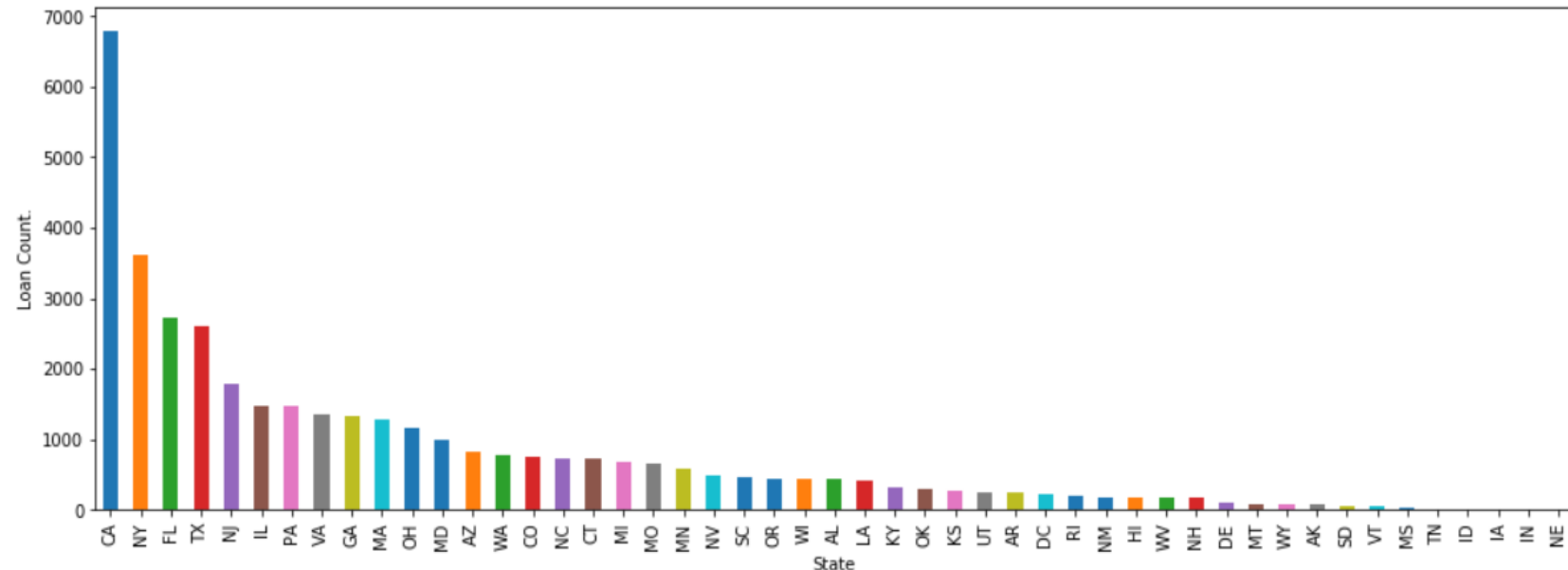
Top 10 State [Charge Off Loans].



Top 10 State [Paid Off Loans].



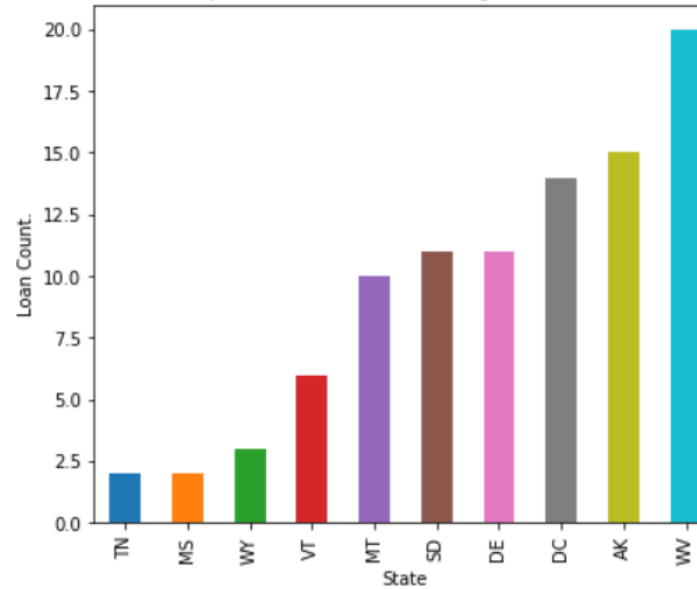
Statewise Loan Distribution



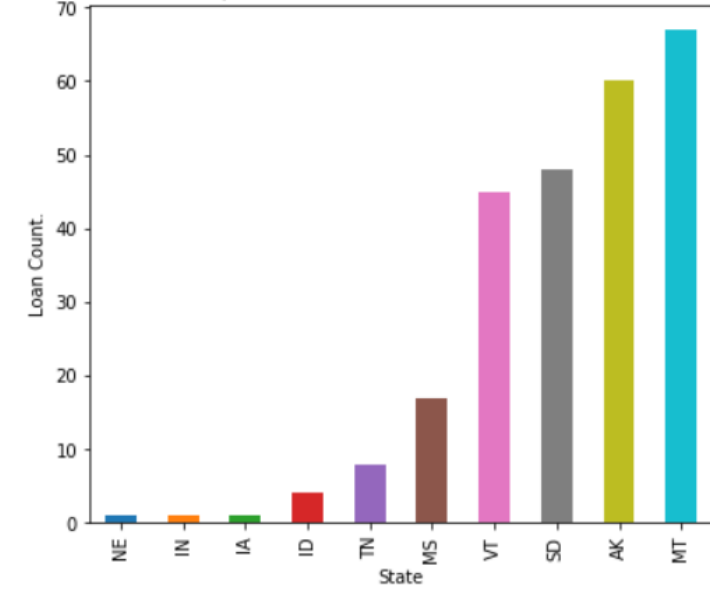
State-wise loan distribution.

- Lowest number of loans were issued in NE, IN, IA i.e. 1 loans each.
- Lowest number of defaulter are from TN. However MS is at second place.
- Loans issue in NE, IN, IA were paid off.

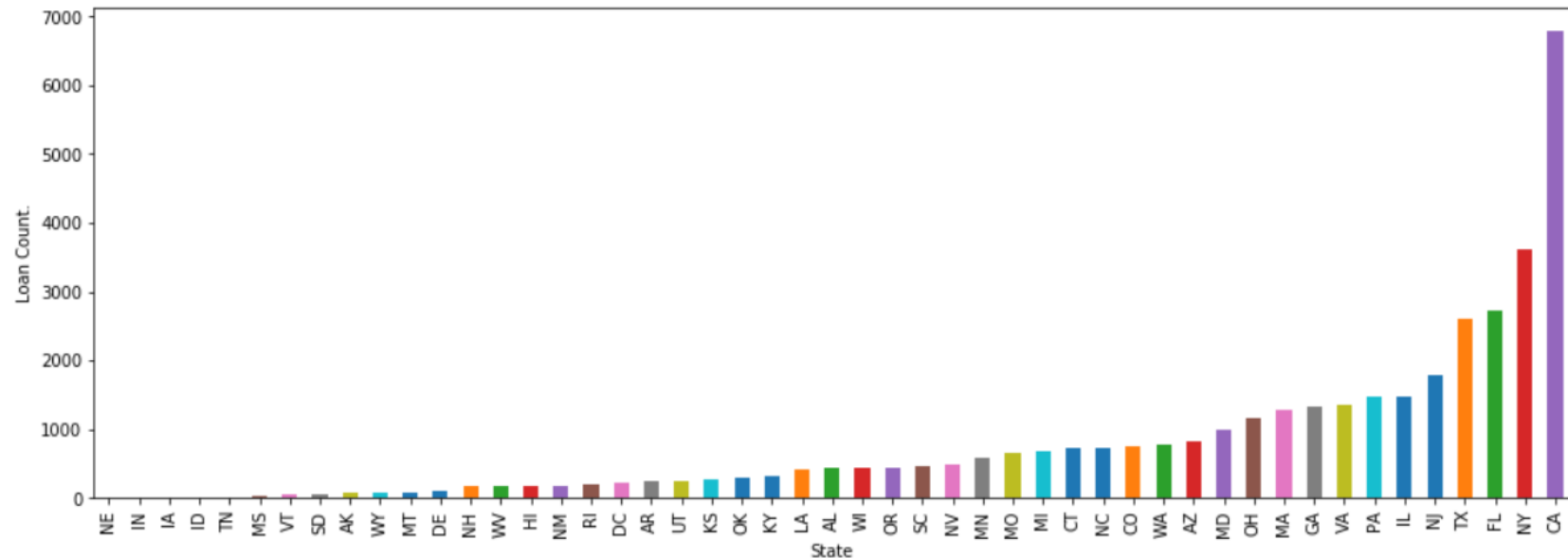
Top 10 State [Lowest - Charge Off Loans].



Top 10 State [Lowest - Paid Off Loans].



Statewise Loan Distribution

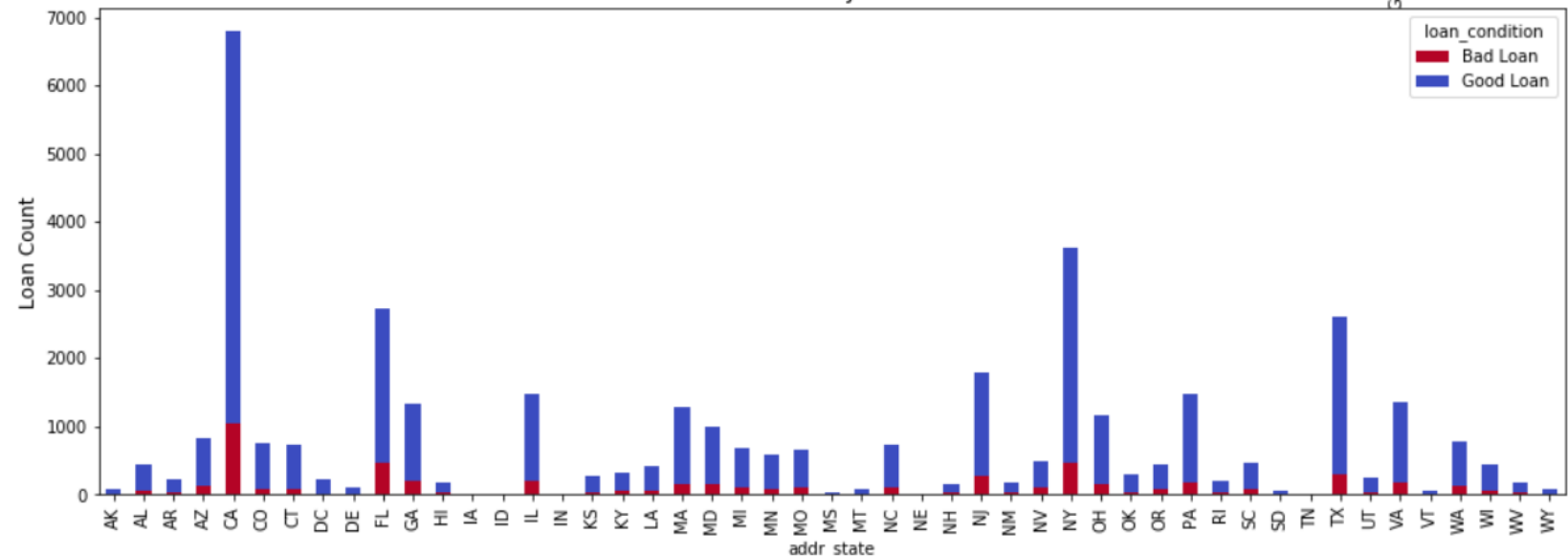
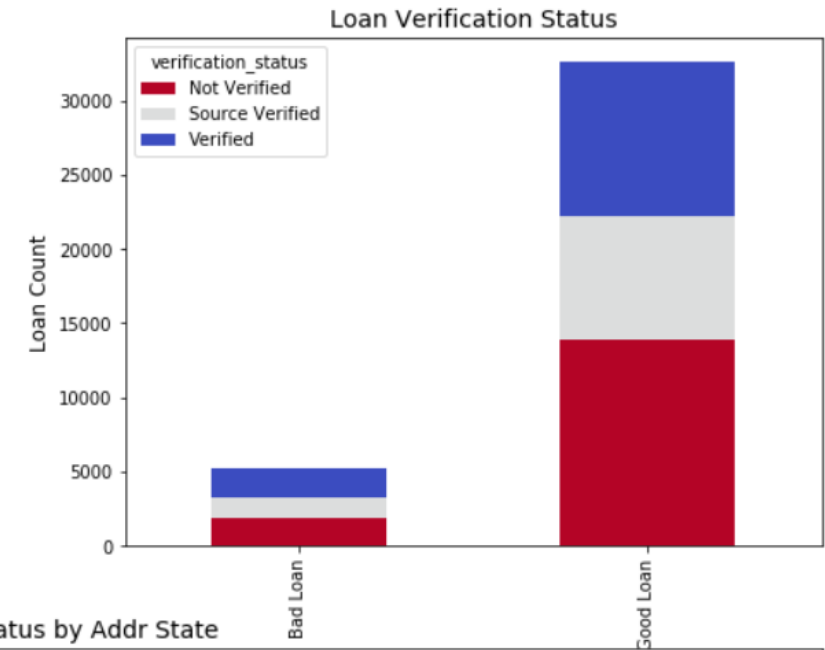
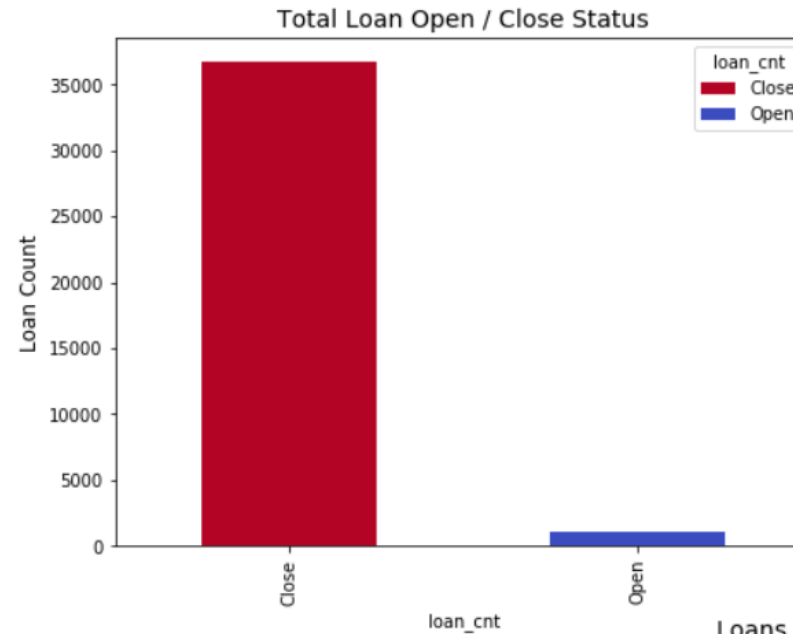


Bi-Variant Analysis.

Loan Distribution.

- CA and NY has the highest number of Bad loans.
- Highest number of Bad loans are from “Verified” Category.
- Highest number of Good Loans are from “Not Verified” category.

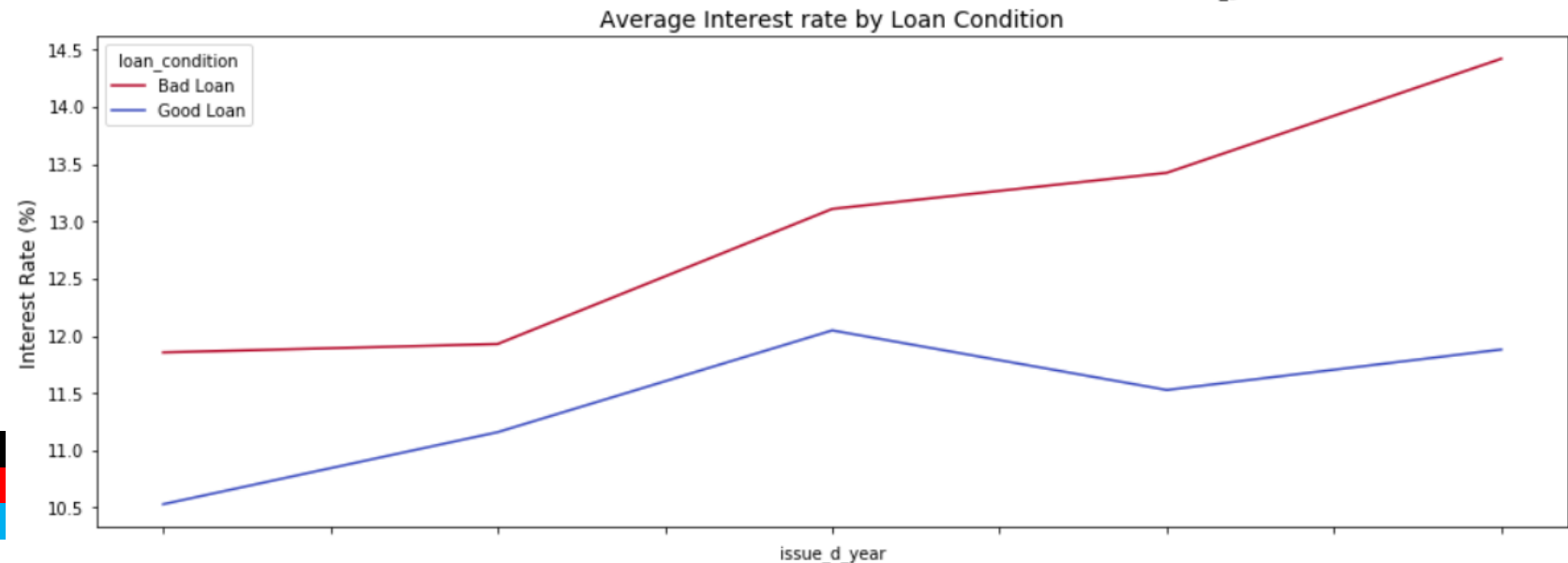
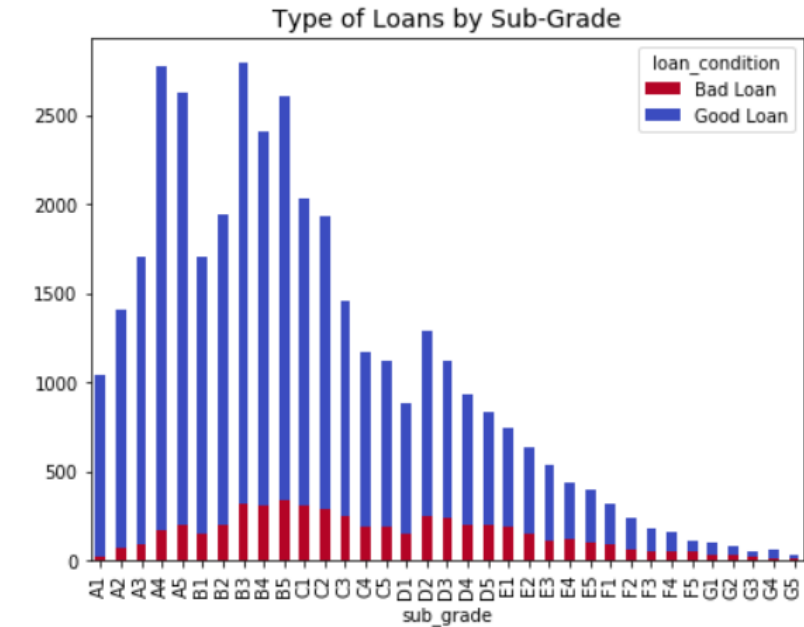
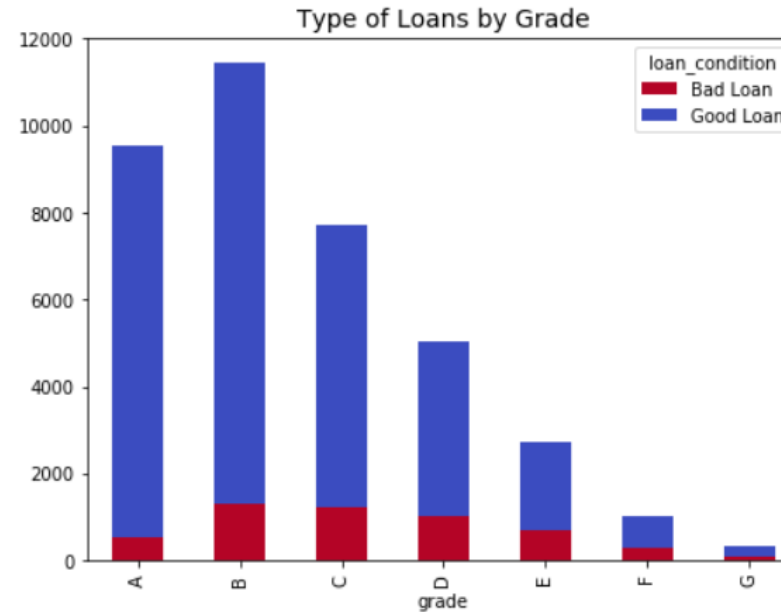
Loan Category	State	Verification Status
Bad Loan	CA, NY	Verified
Good loan	CA, NY	Not Verified



Accessing Risk

- Most of the default loan are due to high interest rate.
- B and C Grade has highest number of bad loans.

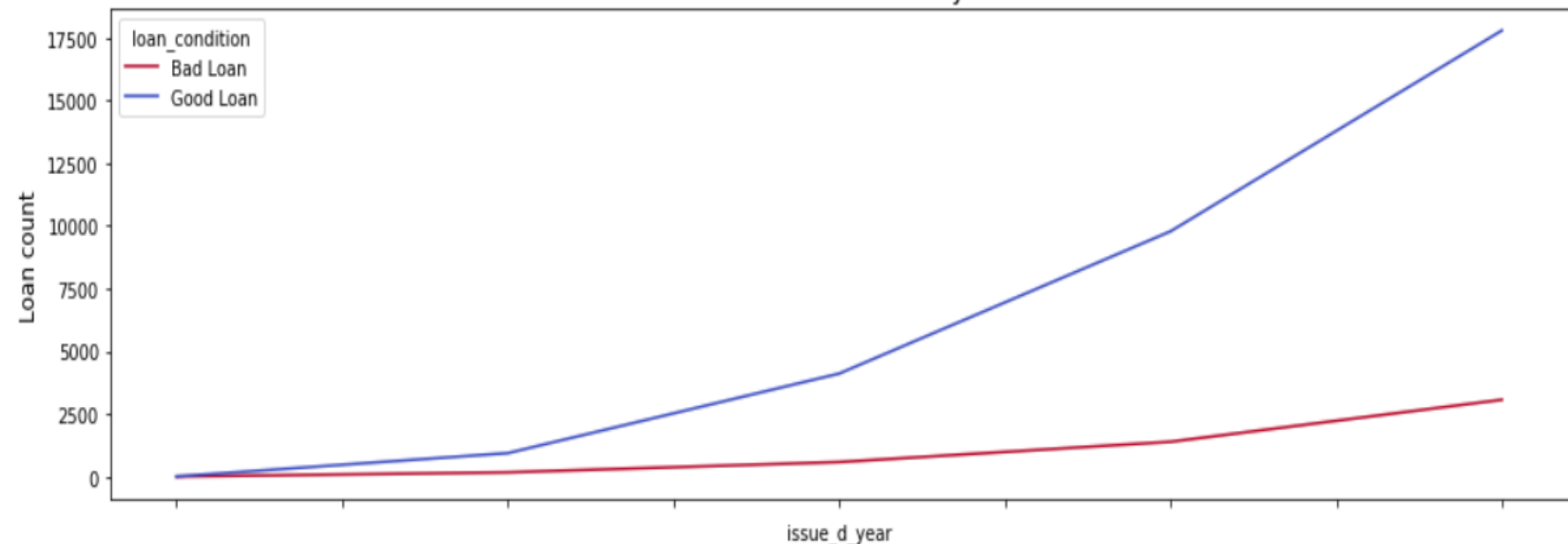
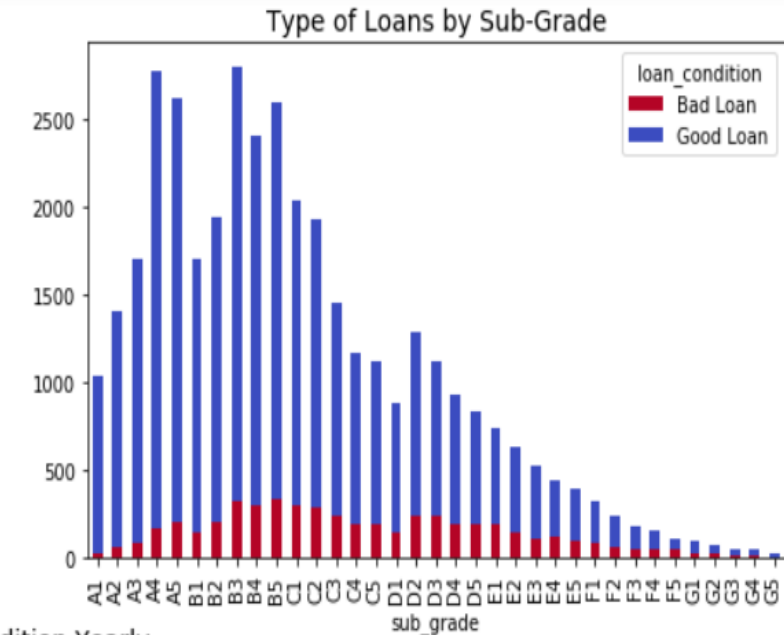
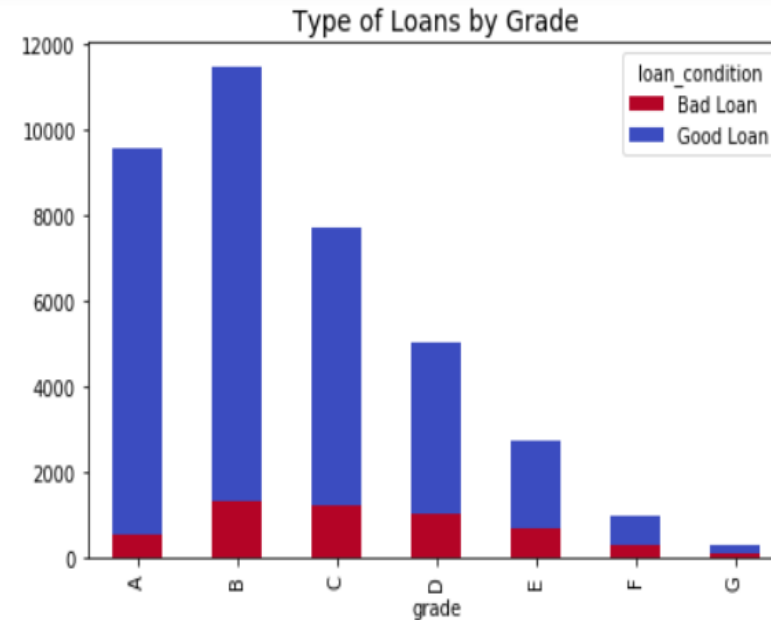
Loan Category	State	Verification Status	Grade	Int Rte
Bad Loan	CA, NY	Verified	B, C, D	High
Good loan	CA, NY	Not Verified	A, B, G	Low



Accessing Risk

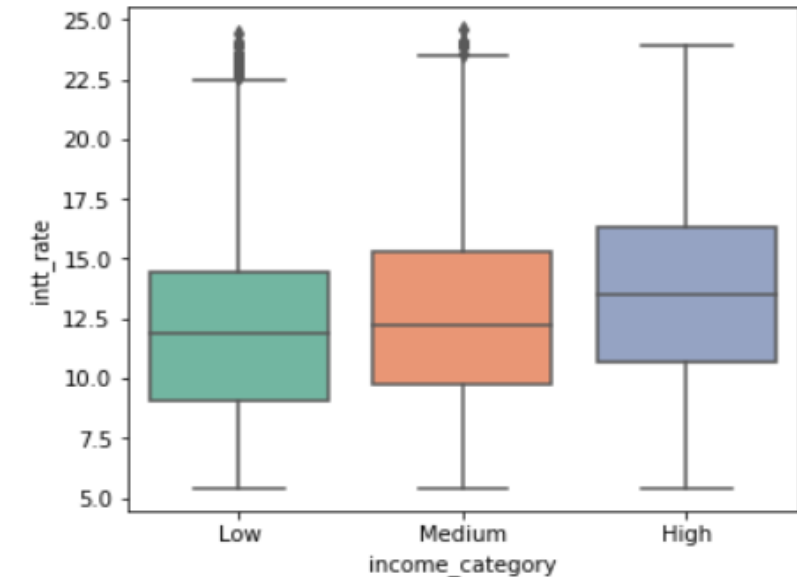
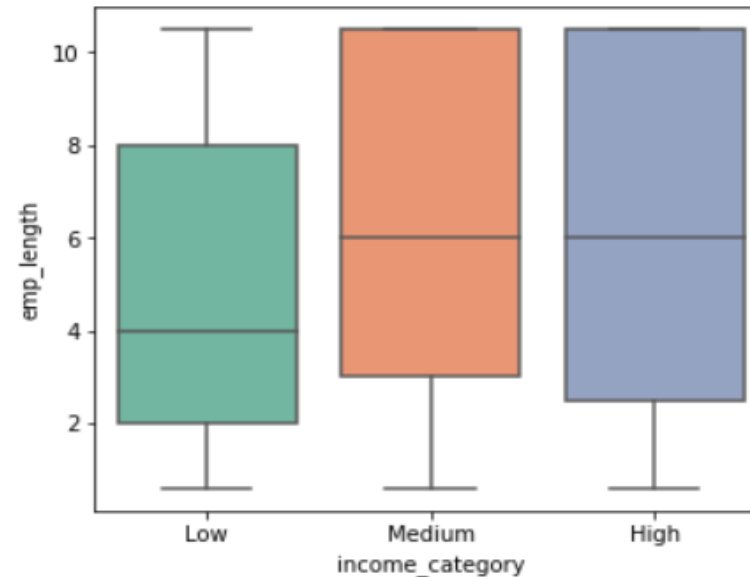
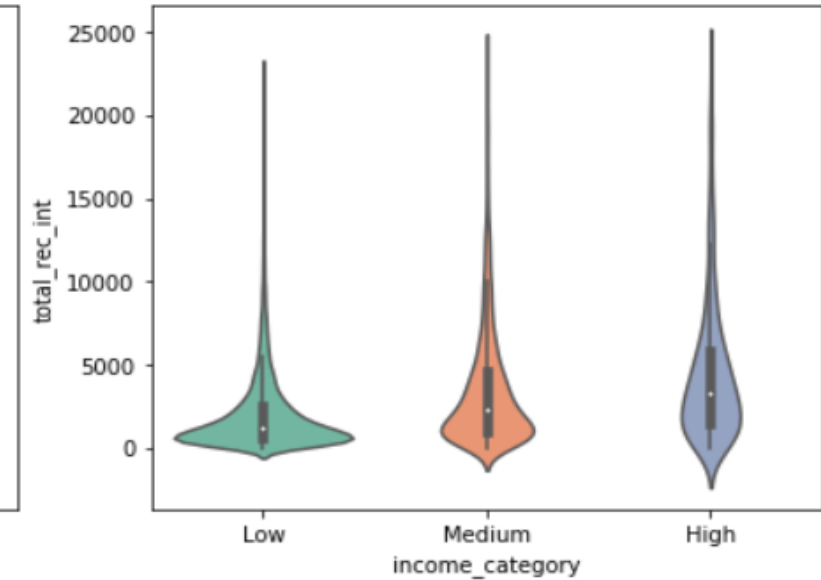
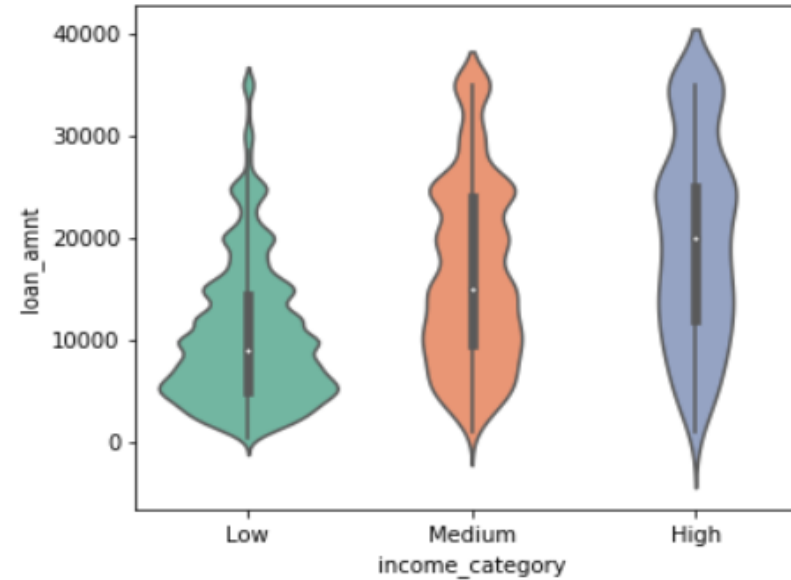
- Good loans ratio peaked/stagnated in 2009,2010
- B and C Grade has highest number of bad loans.

Loan Category	Grade	Sub Grade	Year (Max)	Year (Min)
Bad Loan	B, C	B3, B4	2011	2007
Good loan	B, A	A3	2011	2007



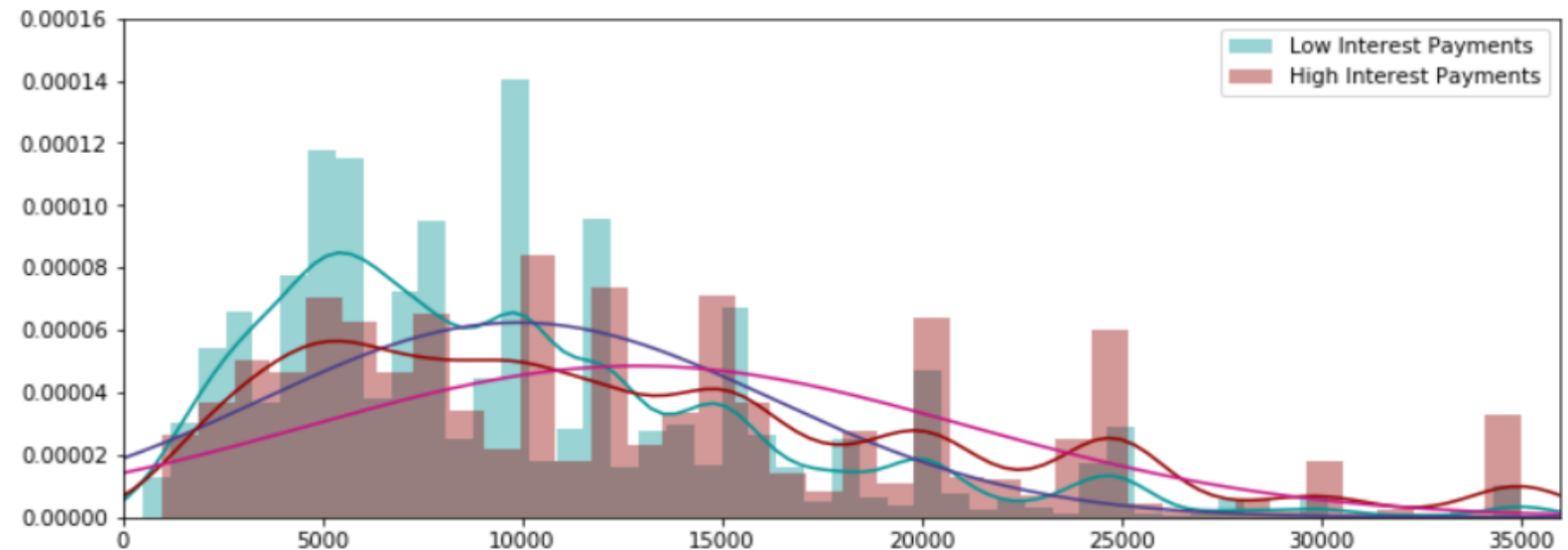
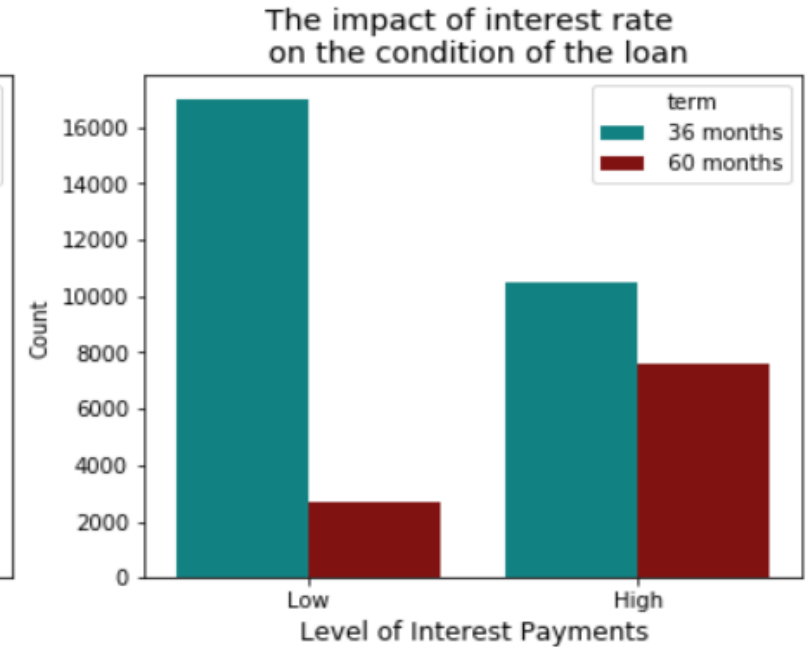
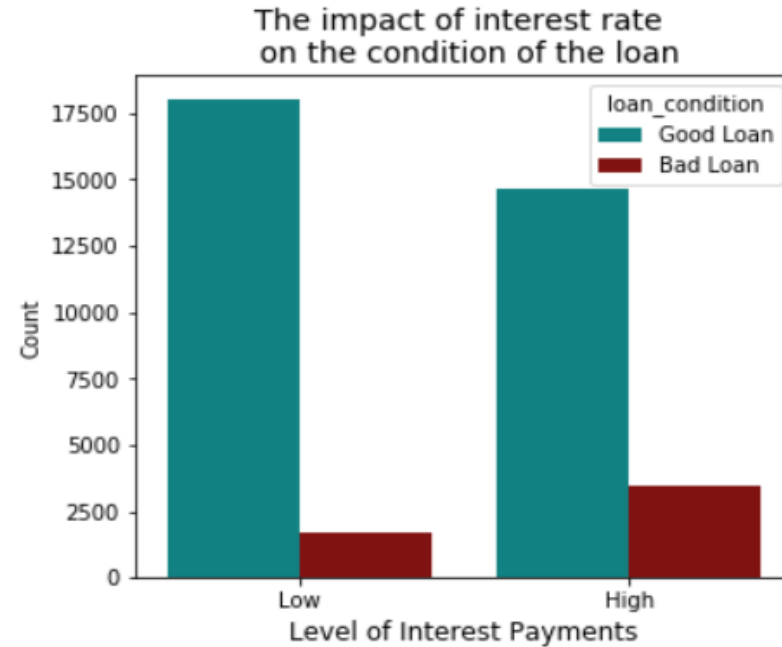
Accessing Risk

- Borrower with low income tends to default more.
- Borrower with low income tends to have short employment length as compare to medium and high income category people.
- Borrower with high income has loan with high interest rate. But people with low income category are also having relatively high interest rate.



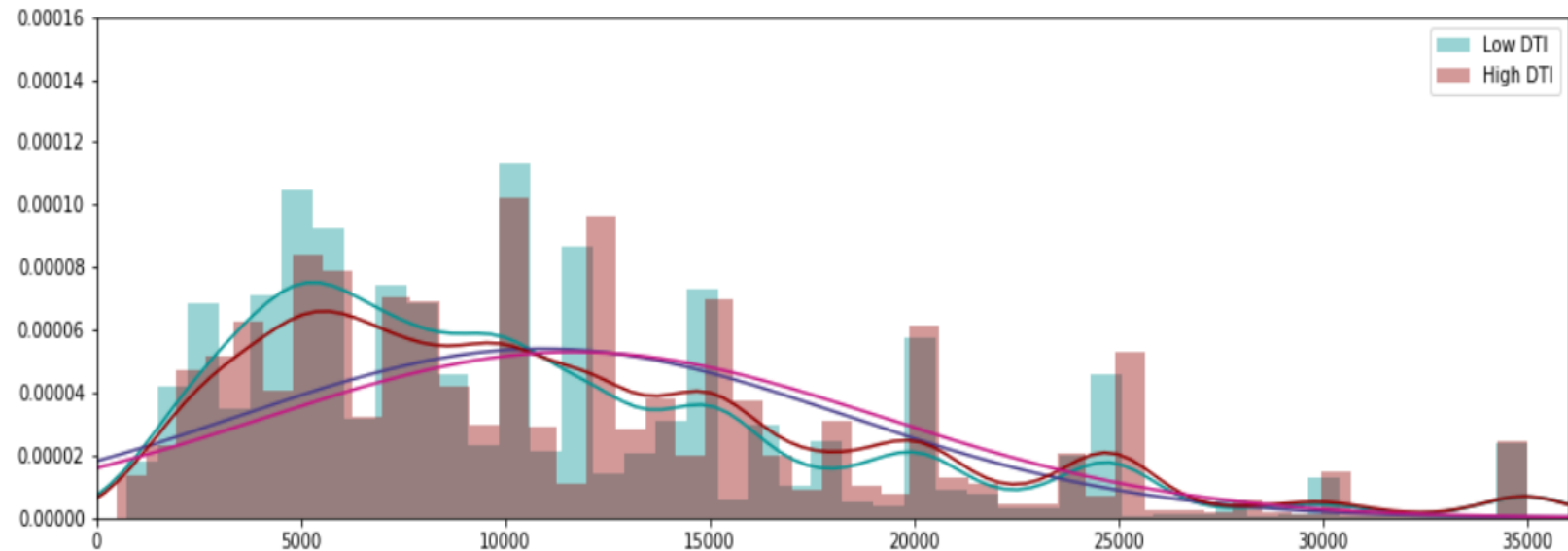
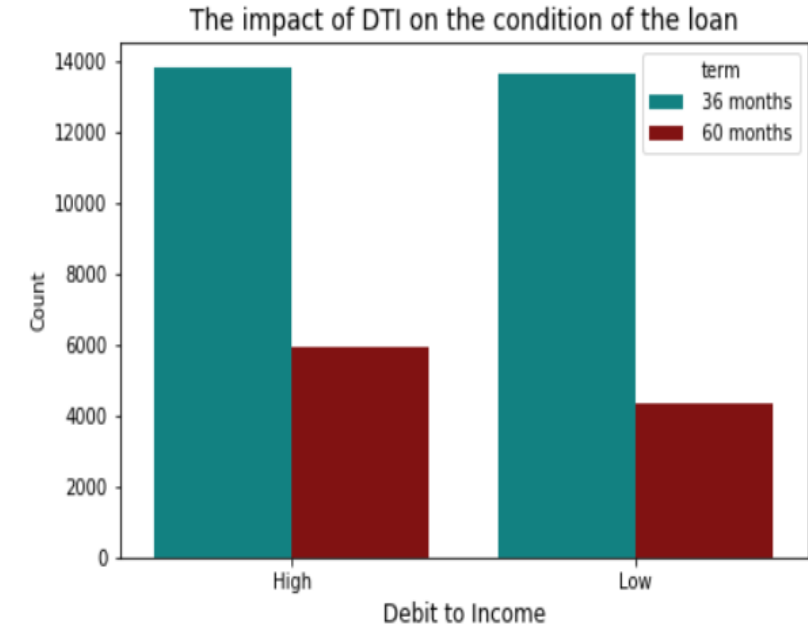
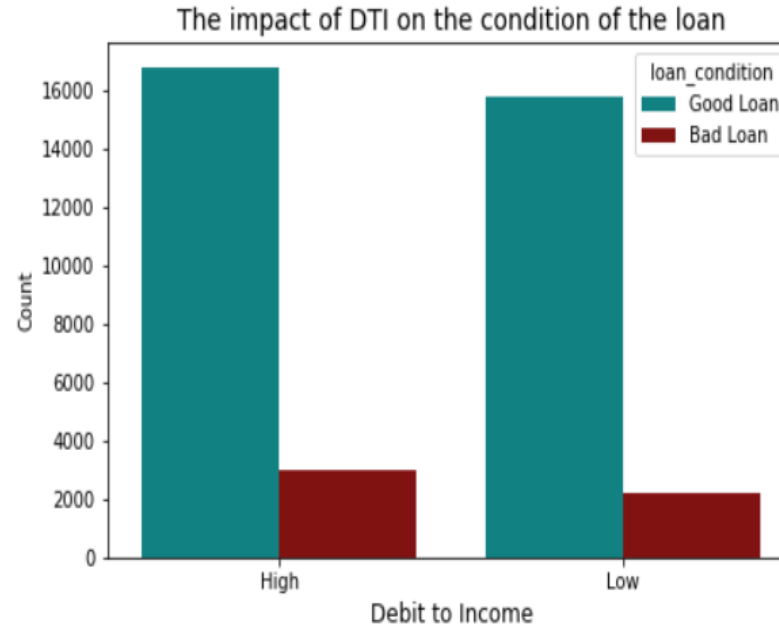
Impact of High Interest Rate.

- Borrower with high tenure will have high probability of becoming bad loan.
- Loan with high interest rate (i.e. Above 12.00%) would more likely to become Bad loan.



Impact of High Interest Rate.

- Borrower with high DTI will have high probability of becoming bad loan.
- Loan with high interest rate (i.e. above 12.00%) would more likely to become Bad loan.



Conclusion.

- Currently, total 13.75% of loan fall in category of bad loans. This % might increase due to current loan which might turn into a bad loan.
- Currently, the most likely to default are borrowers with LC grade 'G'.
- For 36 months, the most likely to be charged off on a loan are customers with Loan category grade 'G'
- For 60 months, the most likely to be charged off on a loan are customers with Loan category grade 'F'
- Borrower from CA tends to have low emp length i.e. `emp_length <= 1`.
- Borrower with high debit to income will have high probability of becoming bad loan.

Borrower with **Low income category** had a slightly higher chance of becoming a bad loan.

- Loans with **higher interest rate** are more likely to become a **bad loan**.
- Loan with category as debit consolidation tend to have a higher risk of being a bad loan.
- In case of charged off loans verification status does not make much of impact.