LENDING CLUB CASE STUDY

SUBMISSION

Project Group: - **Soumya Subhra Bhowmik**
- **Sahadeo Sawant**

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Abstract:

Lending Club is a **consumer finance company** which 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.

The objective here is to understand the driving factors behind loan default, and using this understanding determine the risky loan applicants.

Business Understanding:

- Lending club receives a loan application from a customer
- Based on the customers profile Lending Club then decides weather to accept or reject the loan application
- The types of risk associated with taking this decision are:
    - 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

Problem Statement:

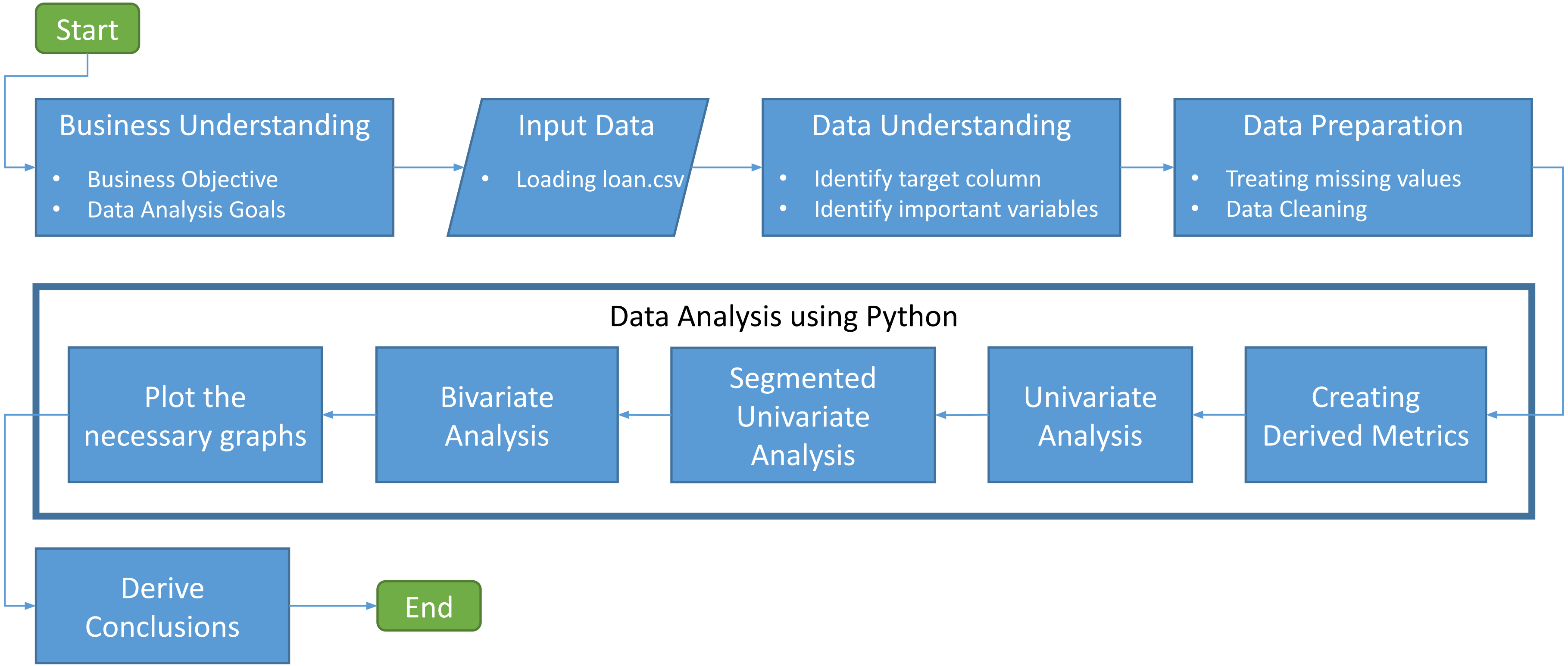
- Identifying and understanding the driving factors behind loan default.

Data Understanding:

- The dataset provided contains **39,717 records** with **111 columns**.
- A Data Dictionary file has been provided which contains the descriptions of all the available columns.
- On the basis of the provided information, we can identify some of the variables which hold a sway over tendency of default
- These variables further fall into two categories 'loan attributes' and 'customer attributes'
- The table below displays some of variables that fall under these two categories.

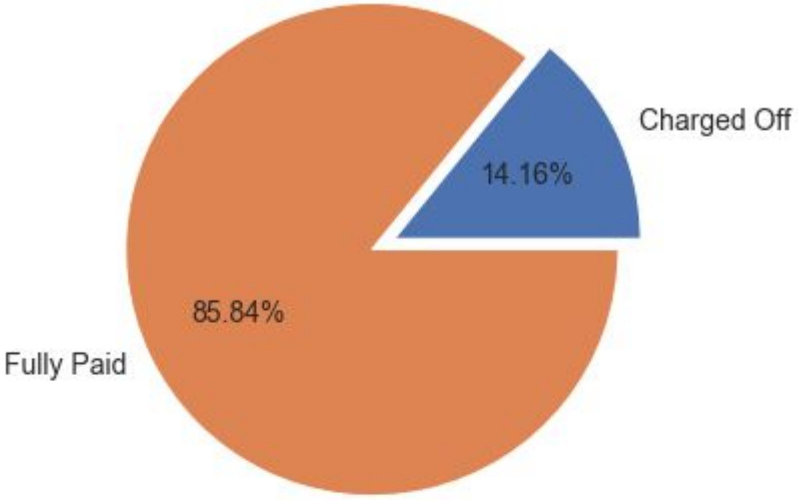
Loan attributes	Customer attributes
Loan Amount (loan_amnt)	Annual Income (annual_inc)
Grade (grade)	DTI (dti)
Interest rate (int_rate)	Employment length (emp_length)
Instalment (instalment)	State (addr_state)
Term (term)	Home ownership (home_ownership)
Purpose (purpose)	Number of Public record bankruptcies (pub_rec_bankruptcies)

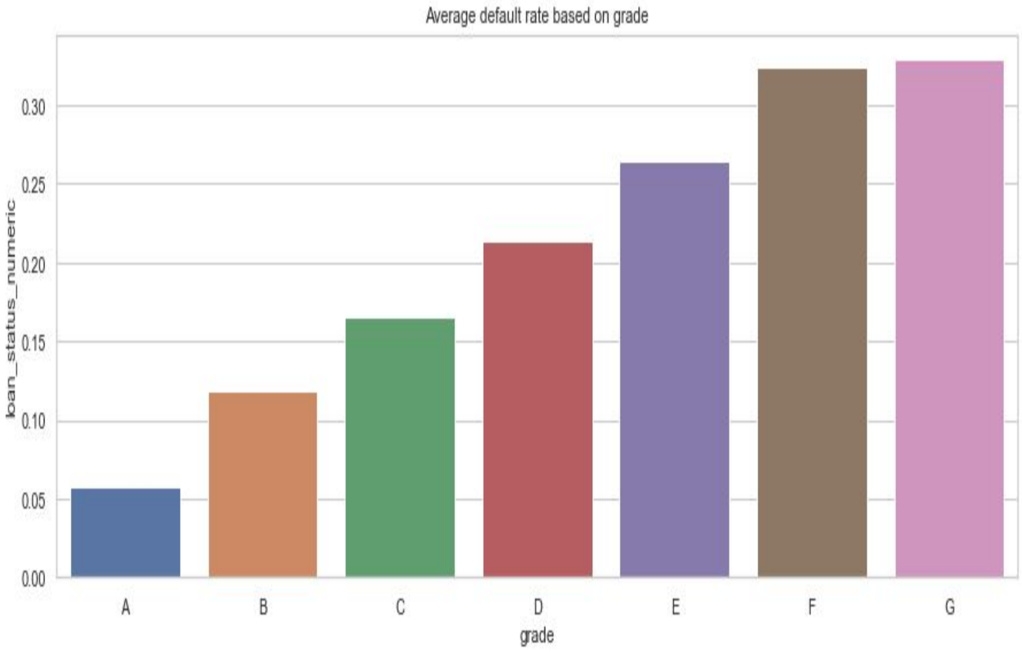
Problem solving methodology



Analysis:

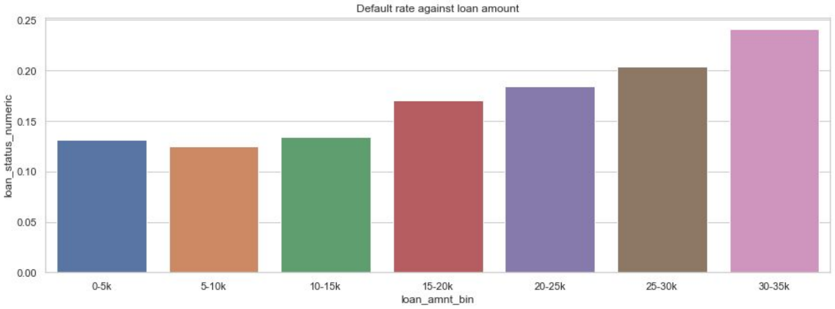
- **Loan Status**
  - Of the total loans present in the dataset, 14.16% of loans have defaulted
  - The loan default rate increases gradually with the deterioration of the grade of the loan.

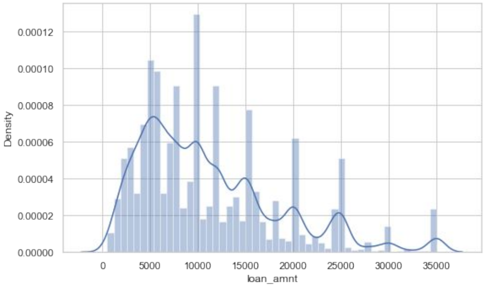


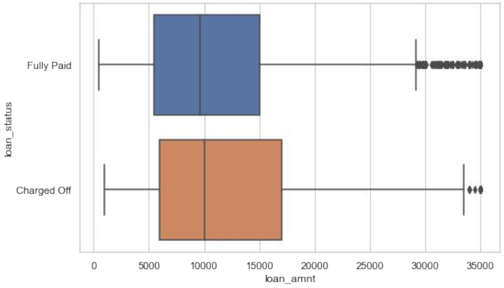


Analysis:

- **Loan Amount**:
  - Lending Club provides loan between $500 and $35,000
  - As the loan amount increases the default rate also increases.

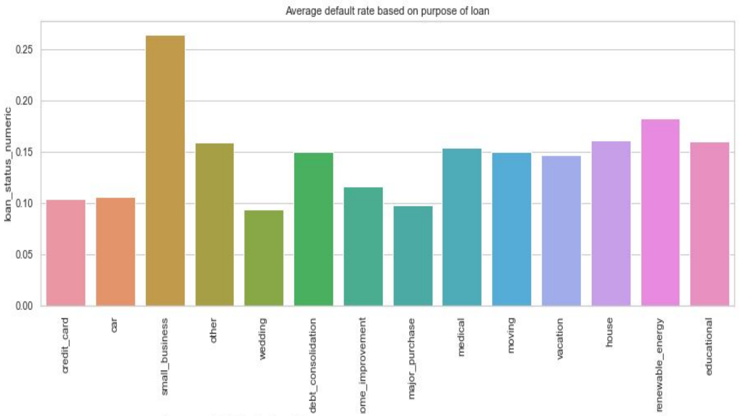


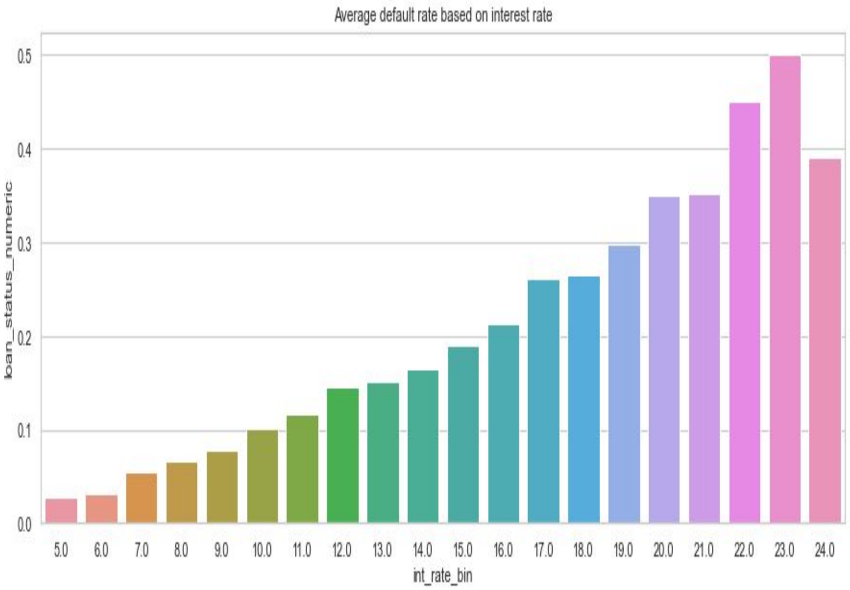


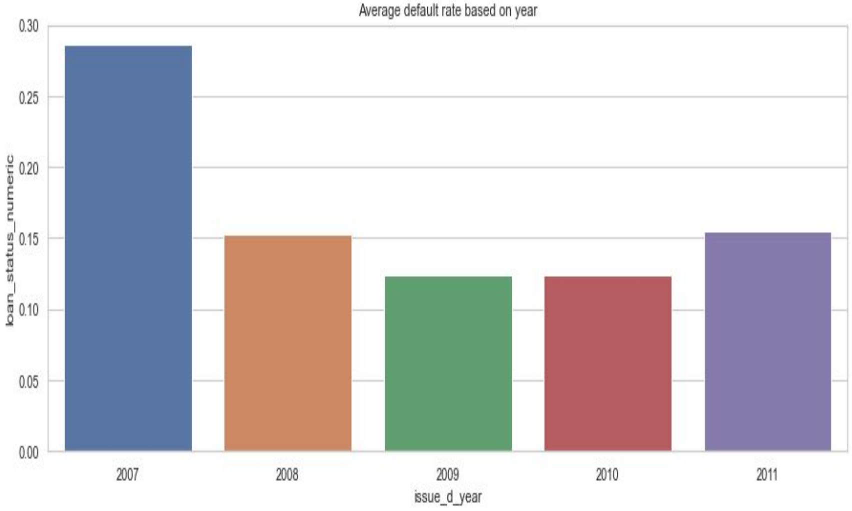


Analysis:-

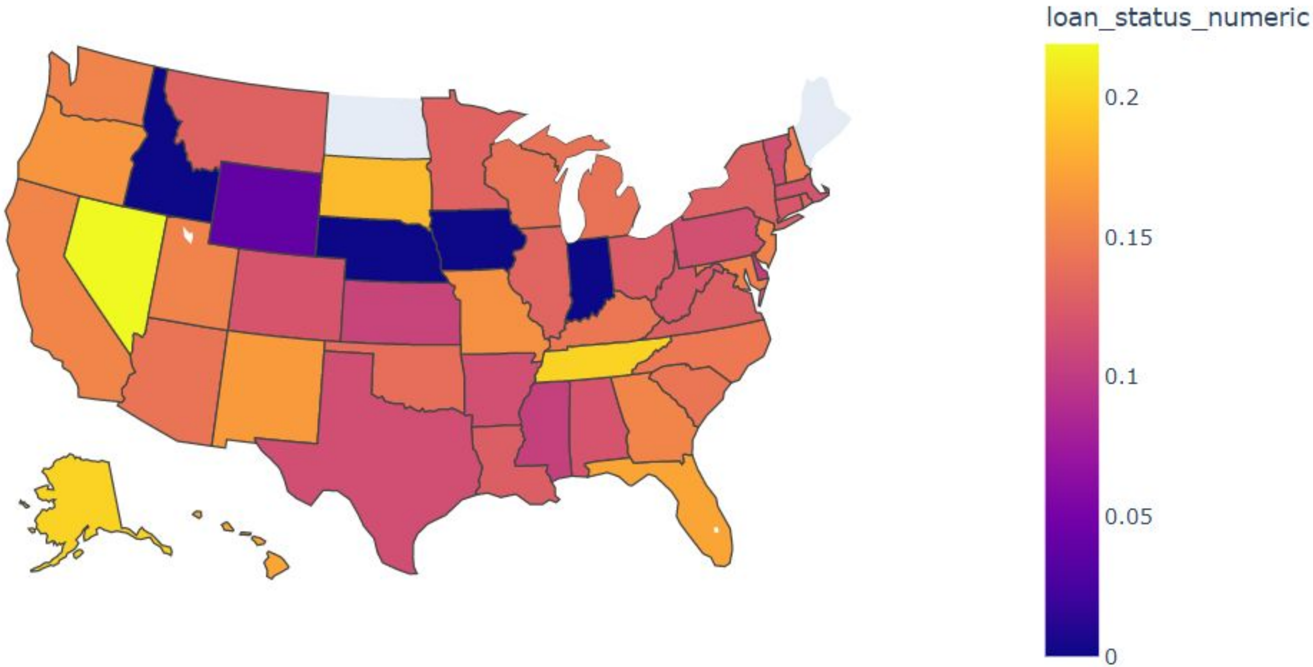
- Loans taken for the purpose of 'small_buisness' and ‘renewable_energy’ are most likely to default
- Loan default rate are seen to be increasing again from 2011
- As the interest rate increases, the default rate increases







Analysis:

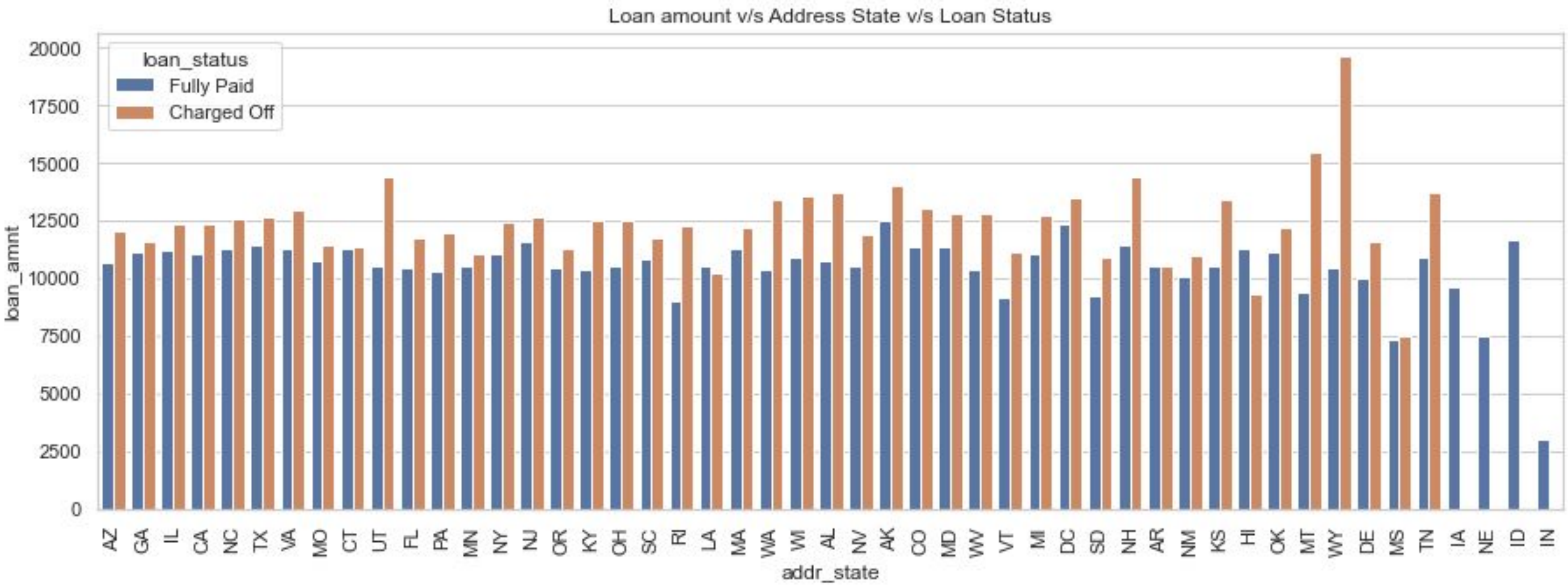


Based on this Choropleth plot, we can see that:-

- The state of Nevada has the highest default rate, followed by Alaska and Tennessee
- The states of Maine and North Dakota do not have any default loans as per the data.

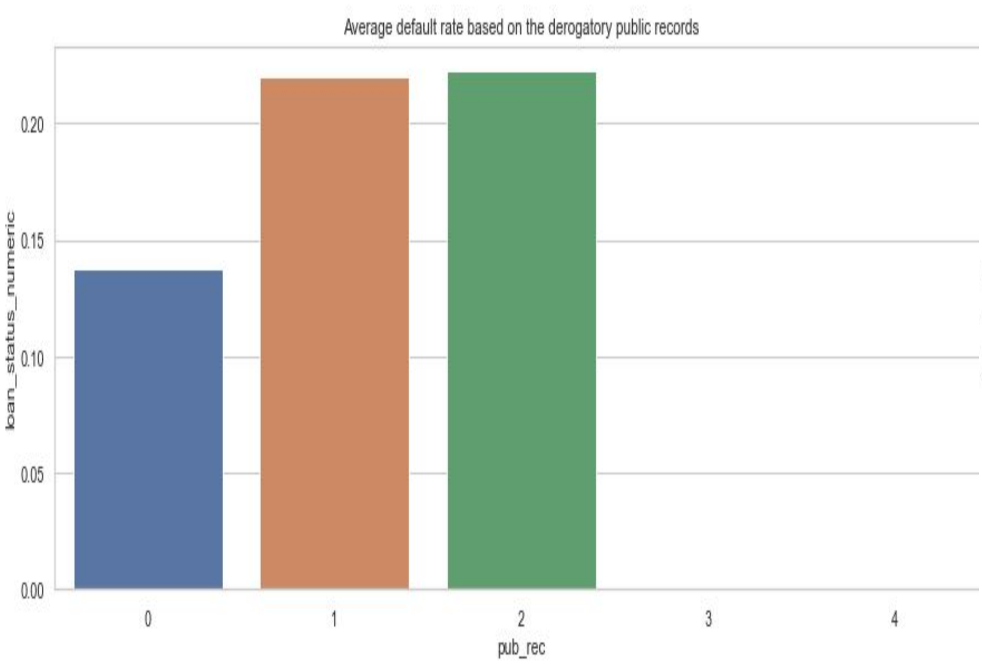
Analysis:

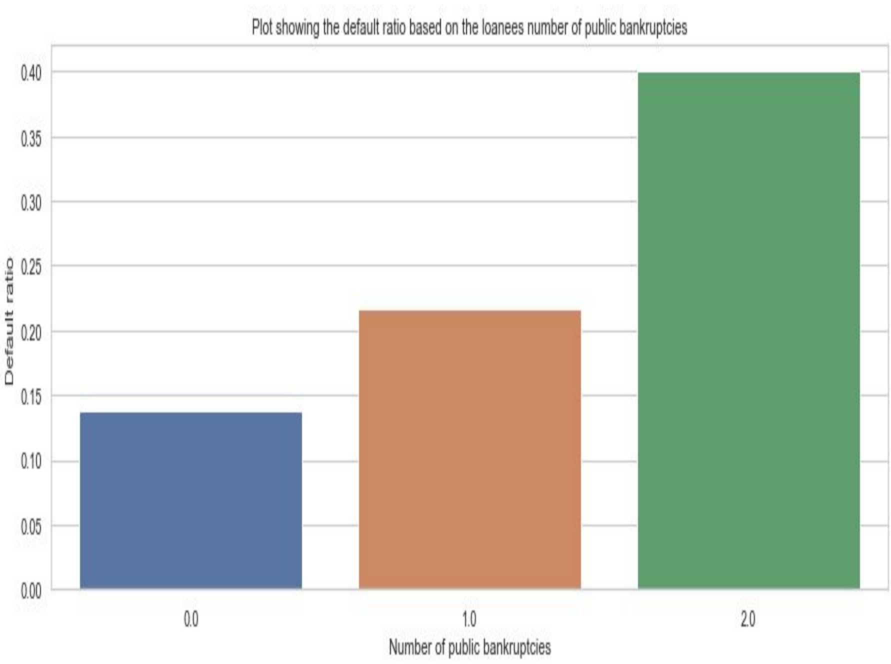
- From the graph below we can see that the state of **Wyoming** has high default rate for loans belonging to a relatively higher loan amount.



Analysis:

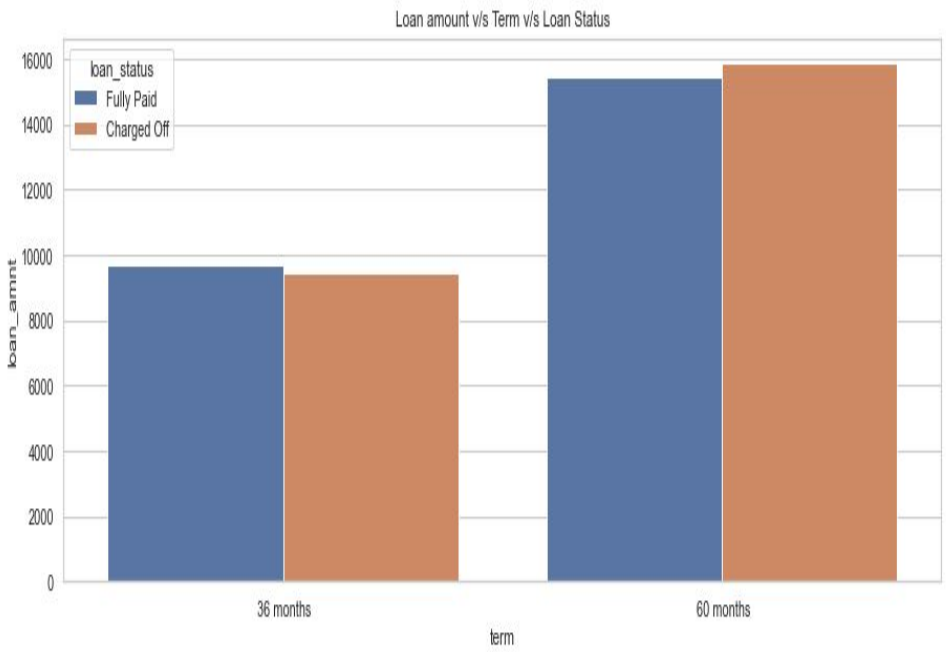
Number of defaulted loans increase with an increase in both the number of derogatory public records and the number of publicly recorded bankruptcies.

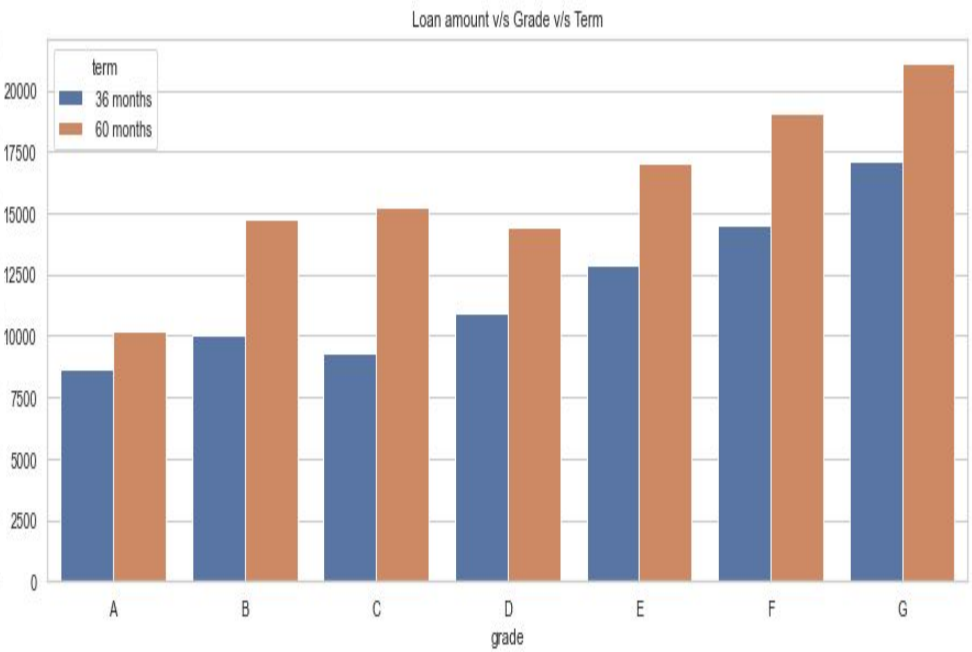




Analysis:

- The Lending Club offers two terms of loans: 36 months and 60 months. We see here that the loan amount is much higher for loans with duration of 60 months, than loans with duration of 36 months.
- Of the 7 grades of loans provided, the loan amount increases from A to G gradually, as do the duration of the loan





Conclusions:

Recommendations based on the analysis:-

- Loans with Grade A and B irrespective of loan terms and grade C and D with term of 36 months are likely to repay. Other lower grades loans (Grade E,F, G) with any loan terms are relatively risky.
- Customers applying loan for ' small business ’ purpose are more likely to default so should be avoided while loan purpose of car, wedding, major purchase and credit should be favoured.
- Customers with Public bankruptcy record or Public derogatory records are more likely to default.
- Customers from Nevada, Alaska and Tennessee have a high default rate and should be avoided, while Customers from Maine and North Dakota with 0% default rates should be favoured.
- Similarly loan application from Wyoming for a large sum have mostly defaulted