# LENDING CLUB - CASE STUDY

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# Problem Statement

This company is the largest online loan marketplace, facilitating personal loans, business loans, and financing of medical procedures. Borrowers can easily access lower interest rate loans through a fast online interface.

Like most other lending companies, lending loans to ‘risky’ applicants is the largest source of financial loss (called credit loss). Credit loss is the amount of money lost by the lender when the borrower refuses to pay or runs away with the money owed. In other words, borrowers who **default** cause the largest amount of loss to the lenders. In this case, the customers labelled as 'charged-off' are the 'defaulters'.

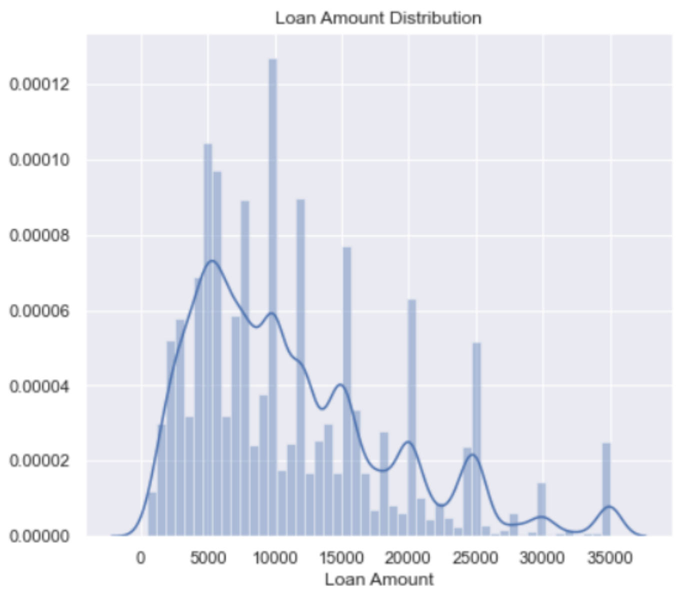
Goal is to identify these risky loan applicants, then such loans can be reduced thereby cutting down the amount of credit loss. Identification of such applicants using EDA is the aim of this case study.

In other words, the company wants to understand the **driving factors (or driver variables)** behind loan default, i.e. the variables which are strong indicators of default. The company can utilize this knowledge for its portfolio and risk assessment.

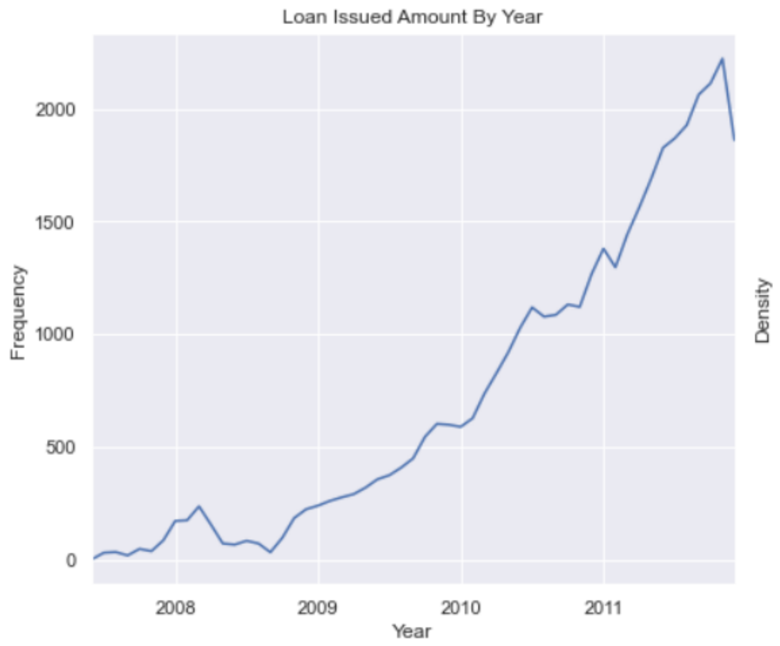
# Observations made in EDA

The time series plot on the right shows a rising popularity of loan lending, there is drop after 2008 this could be due the U.S Recession (housing market crash in 2008), after 2009 there is a sharp increase in Loan issue.
The distribution of loan amount is to the right. Most borrowers applied loan of around 10,000.

## Laon distribution by Amount



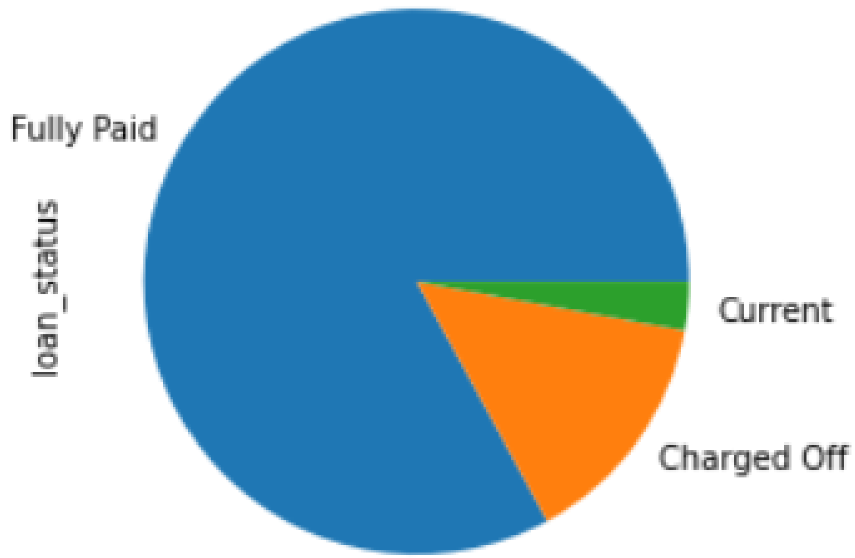

## Laon distribution by Year



# Observations made in EDA

Observations
# 83 percent loans were fully paid.
# Close to 14% loans were charged off
# Currently on going loans are close to 3%

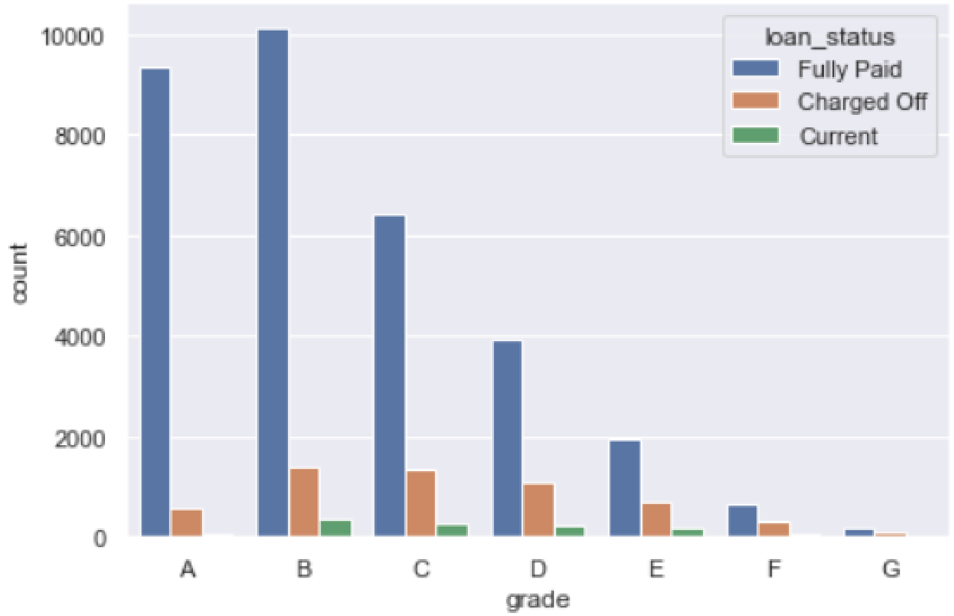
## Distribution of Loan status in the Data Set



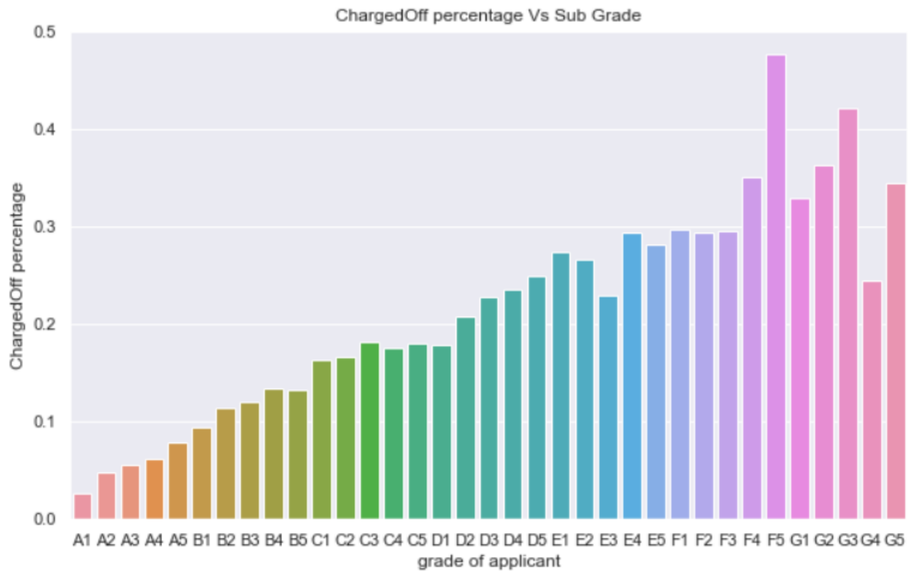
# Observations made in EDA

From the following charts on grade and subgrade we can infer that among F and G, F5,G2,G3 are likely to charge off

## Laon distribution by grade




## Laon distribution by Subgrade



# Observations made in EDA

Loans which fall under the small business purpose have the most risk involved, 27% default, the logical reason for this could be that small business and start ups tend to end up being unsuccessful.
Also the maximum good loans seem to fall under wedding and car loans.

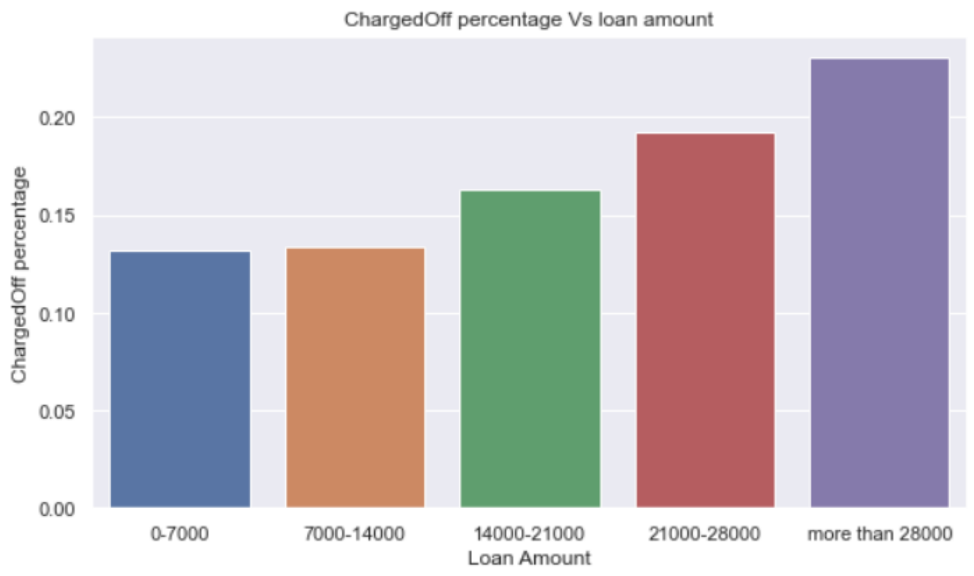
## Loan Status against Charge off %

| loan_status<br>purpose | Charged Off | Current | Fully Paid | Total | FullyPaid% | Default% |
|---|---|---|---|---|---|---|
| car | 157 | 50 | 1332 | 1489 | 89.460000 | 10.540000 |
| credit_card | 530 | 98 | 4406 | 4936 | 89.260000 | 10.740000 |
| debt_consolidation | 2723 | 575 | 15127 | 17850 | 84.750000 | 15.250000 |
| educational | 56 | 0 | 269 | 325 | 82.770000 | 17.230000 |
| home_improvement | 344 | 100 | 2517 | 2861 | 87.980000 | 12.020000 |
| house | 59 | 14 | 306 | 365 | 83.840000 | 16.160000 |
| major_purchase | 221 | 36 | 1922 | 2143 | 89.690000 | 10.310000 |
| medical | 106 | 12 | 570 | 676 | 84.320000 | 15.680000 |
| moving | 91 | 7 | 482 | 573 | 84.120000 | 15.880000 |
| other | 628 | 125 | 3217 | 3845 | 83.670000 | 16.330000 |
| renewable_energy | 19 | 1 | 83 | 102 | 81.370000 | 18.630000 |
| small_business | 470 | 74 | 1270 | 1740 | 72.990000 | 27.010000 |
| vacation | 52 | 6 | 318 | 370 | 85.950000 | 14.050000 |
| wedding | 96 | 21 | 829 | 925 | 89.620000 | 10.380000 |

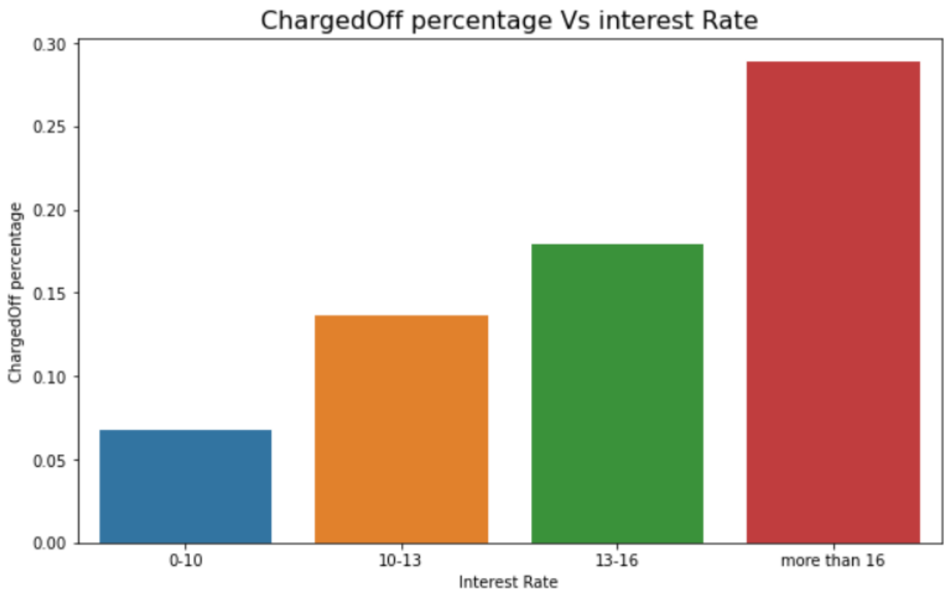
# Observations made in EDA

From the following charts one could come to a conclusion that a higher loan amount coupled with higher interest rate tend to become risky loans

## Charge off % against Loan Amount



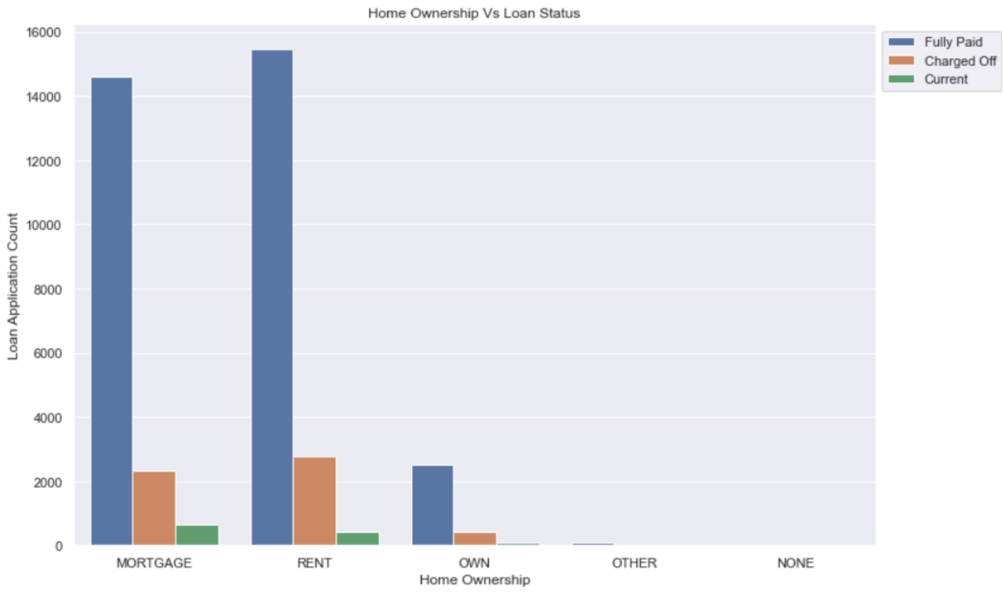

## Charge off % against interest rate



# Observations made in EDA

Loan applicants who are living in a rented house or those paying mortgage are more likely to charge off.
Home owners seem to have the least charge off ratio. Short term loans (36 months term) seem to have a higher charge off rate as short term loans could have a higher monthly EMI requirement thus a driving factor for a default and potentially leading to charge off

## Home owner ship against charge off %




## Loan tenure vs charge off %

# CONCLUSION AND RECOMMENDATION

WE HAVE SEEN THE DRIVING FACTORS IN THE PREVIOUS SLIDES, THE FINAL RECOMMENDATION ARE AS FOLLOWS

- ✓ LOAN APPLICANTS WHOSE ANNUAL INCOME FALLS BETWEEN 0 TO 20,000 AND IF THE SUBGRADE IS F5,G2 OR G3 THEN THERE IS HIGH CHANCE THAT THESE APPLICANTS COULD BECOME POTENTIAL CHARGE OFF'S

- ✓ WE SEE A RISK OF CHARGE OFF WHEN THE PURPOSE OF LOAN IS SMALL BUSINESS AND IF THE TIME HORIZON TO PAY THIS LOAN AMOUNT IS LESS THAN 36 MONTHS. ON THE CONTRARY IF THE LOAN TENURE IS LONGER AND/OR THE PURPOSE IS WEDDING OR VEHICLE LOAN (CAR) THEN THESE TEND TO BE GOOD LOANS.

- ✓ LOAN APPLICANTS WHO ARE LIVING IN A RENTED HOUSE OR THOSE PAYING MORTGAGE ARE MORE LIKELY TO CHARGE OFF. HOME OWNERS SEEM TO HAVE THE LEAST CHARGE OFF RATIO

- ✓ THE MOST RISKY LOANS TEND TO BE THOSE APPLICANTS WHO ARE PAYING MORTGAGE OR RENT OR THEIR LOAN PURPOSE IS LISTED AS SMALL BUSINESS OR THEIR SUB GRADES FALL UNDER F5, G2 OR G3, ALONG WITH THESE FACTORS IF THE INTEREST RATE IS ALSO HIGHER THEN THERE IS HIGH CHANCE OF CHARGE OFF.