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# **Solution S49<sup>x</sup>**

# **Technical**

# **Assesement 2**

Dr. Jennifer Piscionere

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# What are the questions?

What's the best predictor for loan defaults?

Identify at risk loans and give incentives for customers to repay loan.

Late payment forgiveness

Reduction of interest rates

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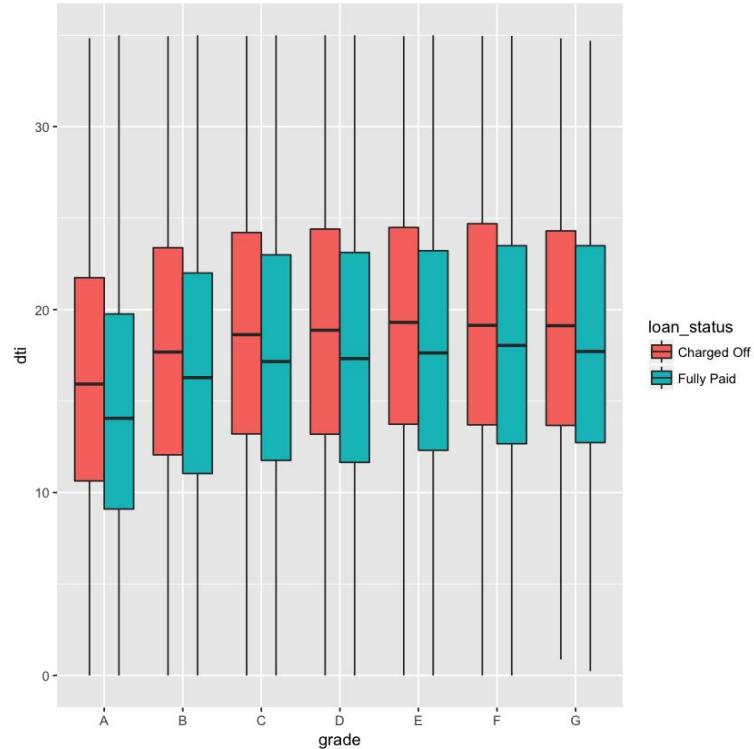
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# Outline of approach

- We have historical data on which loans were paid off and which ones were charged-off.
  - Create a model that quantifies likelihood of charge-off based on financial factors
    - Basic machine learning algorithm
  - Apply that model to current ('17) data to see which customers are at risk of not repaying loan
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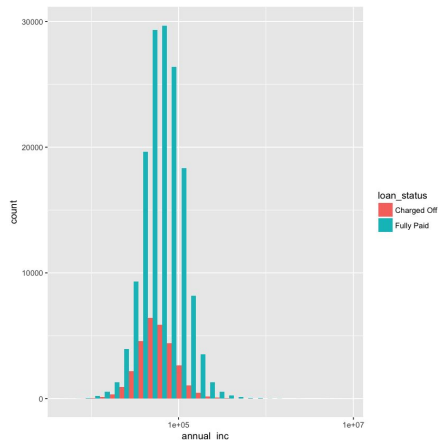
# The Data



We are using the 2012-2013 data set as a training set because it has more customers.

Interesting columns:

- DTI
  - Credit Inquiries past 6 months
  - Delinquencies
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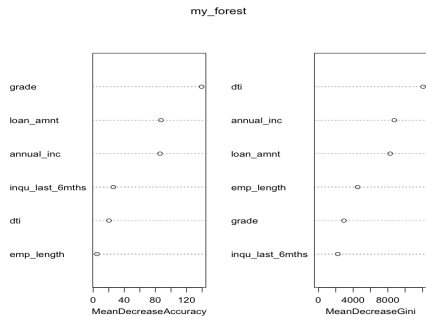
# Interesting tidbits

- Most people are using their loan as debt consolidation
- All loan classes are charged off at a roughly equal rate
- The mean DTI in the rejected group is higher, but the median is about the same
- We have credit score in the rejected group but not the approved.

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# Taking a crack at a ML approach

- In an ideal world, this approach would help to narrow down the variables that most strongly correlate with loan status.
- Since this is not an ideal world, I cherry picked some variables to work with



Loan status = F(loan\_amnt + grade + annual\_inc + dti + inqu\_last\_6mths + emp\_length)

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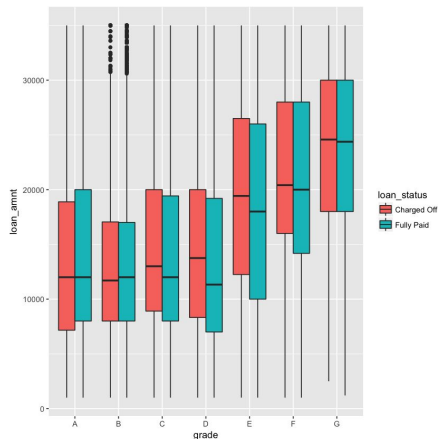
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# Building a better future model

- Computational power limited the scope of the ML
    - The next step is to apply it to the current data
    - Clean out all the na's
  - Why didn't the decision tree work?
    - Investigate how random loan repayment failure is
  - Taking a closer look at the rejected loan applications
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# To the client...?



It looks like you're doing a good job limiting your exposure to risk across all loan grades. However, you might want to take a closer look at a client's DTI in higher loan classes and offer incentives for loan repayment.

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