Summary of Data

```
## [1] 113937
```

```
## [1] 81
```

Prosper which was founded in 2005 is a peer-to-peer lending platform that people can invest in each other. Prosper connects people who need money with those who have money to invest. Prosper loan data contain 113,937 rows with 81 columns.

```
##  [1] "ListingKey"
##  [2] "ListingNumber"
##  [3] "ListingCreationDate"
##  [4] "CreditGrade"
##  [5] "Term"
##  [6] "LoanStatus"
##  [7] "ClosedDate"
##  [8] "BorrowerAPR"
##  [9] "BorrowerRate"
## [10] "LenderYield"
## [11] "EstimatedEffectiveYield"
## [12] "EstimatedLoss"
## [13] "EstimatedReturn"
## [14] "ProsperRating..numeric."
## [15] "ProsperRating..Alpha."
## [16] "ProsperScore"
## [17] "ListingCategory..numeric."
## [18] "BorrowerState"
## [19] "Occupation"
## [20] "EmploymentStatus"
## [21] "EmploymentStatusDuration"
## [22] "IsBorrowerHomeowner"
## [23] "CurrentlyInGroup"
## [24] "GroupKey"
## [25] "DateCreditPulled"
## [26] "CreditScoreRangeLower"
## [27] "CreditScoreRangeUpper"
## [28] "FirstRecordedCreditLine"
## [29] "CurrentCreditLines"
## [30] "OpenCreditLines"
## [31] "TotalCreditLinespast7years"
## [32] "OpenRevolvingAccounts"
## [33] "OpenRevolvingMonthlyPayment"
## [34] "InquiriesLast6Months"
## [35] "TotalInquiries"
## [36] "CurrentDelinquencies"
## [37] "AmountDelinquent"
## [38] "DelinquenciesLast7Years"
## [39] "PublicRecordsLast10Years"
## [40] "PublicRecordsLast12Months"
## [41] "RevolvingCreditBalance"
## [42] "BankcardUtilization"
```

```
## [43] "AvailableBankcardCredit"
## [44] "TotalTrades"
## [45] "TradesNeverDelinquent..percentage."
## [46] "TradesOpenedLast6Months"
## [47] "DebtToIncomeRatio"
## [48] "IncomeRange"
## [49] "IncomeVerifiable"
## [50] "StatedMonthlyIncome"
## [51] "LoanKey"
## [52] "TotalProsperLoans"
## [53] "TotalProsperPaymentsBilled"
## [54] "OnTimeProsperPayments"
## [55] "ProsperPaymentsLessThanOneMonthLate"
## [56] "ProsperPaymentsOneMonthPlusLate"
## [57] "ProsperPrincipalBorrowed"
## [58] "ProsperPrincipalOutstanding"
## [59] "ScorexChangeAtTimeOfListing"
## [60] "LoanCurrentDaysDelinquent"
## [61] "LoanFirstDefaultedCycleNumber"
## [62] "LoanMonthsSinceOrigination"
## [63] "LoanNumber"
## [64] "LoanOriginalAmount"
## [65] "LoanOriginationDate"
## [66] "LoanOriginationQuarter"
## [67] "MemberKey"
## [68] "MonthlyLoanPayment"
## [69] "LP_CustomerPayments"
## [70] "LP_CustomerPrincipalPayments"
## [71] "LP_InterestandFees"
## [72] "LP_ServiceFees"
## [73] "LP_CollectionFees"
## [74] "LP_GrossPrincipalLoss"
## [75] "LP_NetPrincipalLoss"
## [76] "LP_NonPrincipalRecoverypayments"
## [77] "PercentFunded"
## [78] "Recommendations"
## [79] "InvestmentFromFriendsCount"
## [80] "InvestmentFromFriendsAmount"
## [81] "Investors"
```

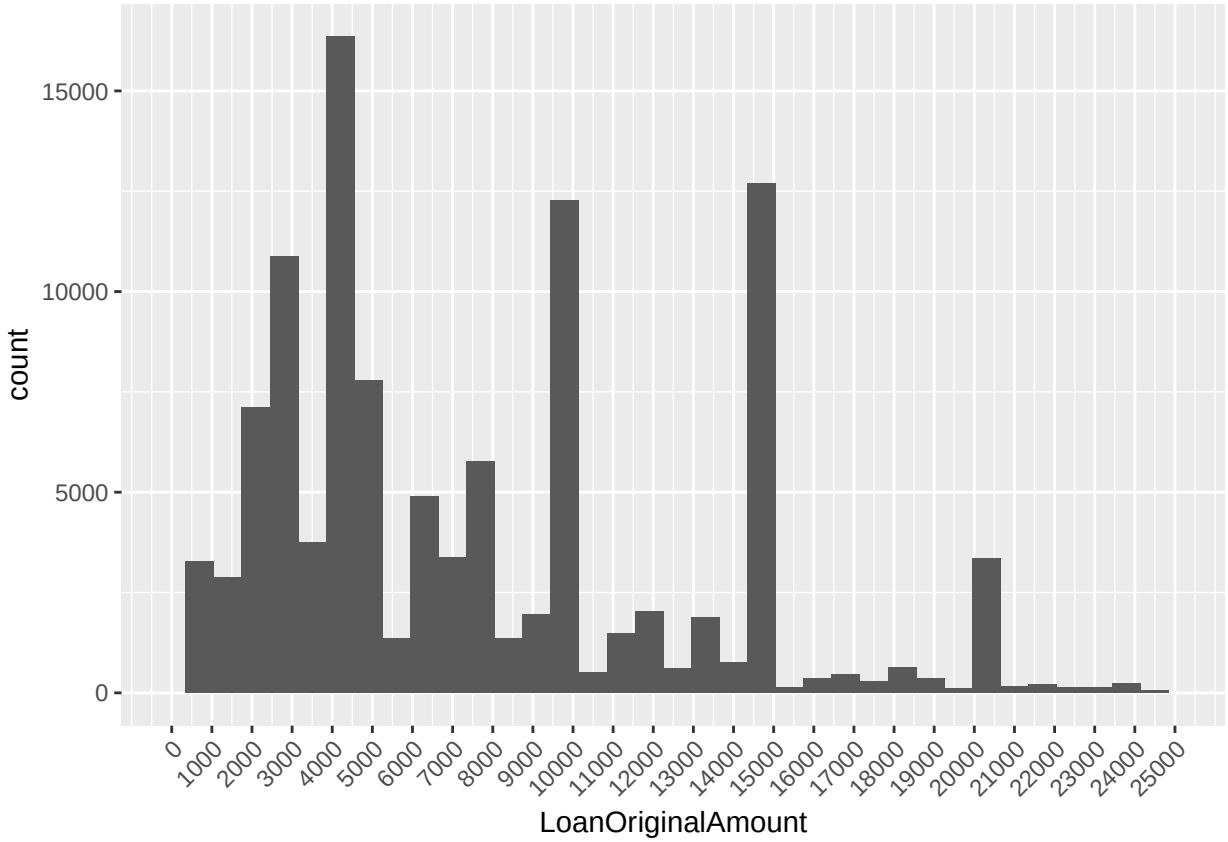
Creating new dataframe based on prosper data

```
## 'data.frame':    113937 obs. of  13 variables:
##  $ DelinquenciesLast7Years : int  4 0 0 14 0 0 0 0 0 0 ...
##  $ PublicRecordsLast10Years: int  0 1 0 0 0 0 0 1 0 0 ...
##  $ DaysWithCreditLine      : num  6240 8273 5951 13040 5378 ...
##  $ InquiriesLast6Months    : int  3 3 0 0 1 0 0 3 1 1 ...
##  $ BorrowerRate            : num  0.158 0.092 0.275 0.0974 0.2085 ...
##  $ Term                    : Factor w/ 3 levels "12","36","60": 2 2 2 2 2 3 2 2 2 2 ...
##  $ ProsperRating           : Factor w/ 7 levels "AA","A","B","C",..: NA 2 NA 2 5 3 6 4 1 1 ...
##  $ ListingCreationDate     : Factor w/ 113064 levels "2005-11-09 20:44:28.847000000",..: 14184 11189
##  $ LoanOriginalAmount      : int  9425 10000 3001 10000 15000 15000 3000 10000 10000 10000 ...
```

```
##  $ ListingCategory         : Factor w/ 21 levels "Not available",..: 1 3 1 17 3 2 2 3 8 8 ...
##  $ EmploymentStatus        : Factor w/ 9 levels "","Employed",..: 9 2 4 2 2 2 2 2 2 2 ...
##  $ AnnualIncome            : num  37000 73500 25000 34500 115000 ...
##  $ RevolvingCreditBalance  : num  0 3989 NA 1444 6193 ...
```

```
##  DelinquenciesLast7Years PublicRecordsLast10Years DaysWithCreditLine
##  Min.   : 0.000          Min.   : 0.0000          Min.   : 2150
##  1st Qu.: 0.000          1st Qu.: 0.0000          1st Qu.: 6816
##  Median : 0.000          Median : 0.0000          Median : 8411
##  Mean   : 4.155          Mean   : 0.3126          Mean   : 8760
##  3rd Qu.: 3.000          3rd Qu.: 0.0000          3rd Qu.:10390
##  Max.   :99.000          Max.   :38.0000          Max.   :26012
##  NA's   :990             NA's   :697              NA's   :697
##  InquiriesLast6Months  BorrowerRate    Term       ProsperRating
##  Min.   :  0.000      Min.   :0.0000   12: 1614   C      :18345
##  1st Qu.:  0.000      1st Qu.:0.1340   36:87778   B      :15581
##  Median :  1.000      Median :0.1840   60:24545   A      :14551
##  Mean   :  1.435      Mean   :0.1928              D      :14274
##  3rd Qu.:  2.000      3rd Qu.:0.2500              E      : 9795
##  Max.   :105.000      Max.   :0.4975              (Other):12307
##  NA's   :697                                      NA's   :29084
##                    ListingCreationDate LoanOriginalAmount
##  2013-10-02 17:20:16.550000000:     6   Min.   : 1000
##  2013-08-28 20:31:41.107000000:     4   1st Qu.: 4000
##  2013-09-08 09:27:44.853000000:     4   Median : 6500
##  2013-12-06 05:43:13.830000000:     4   Mean   : 8337
##  2013-12-06 11:44:58.283000000:     4   3rd Qu.:12000
##  2013-08-21 07:25:22.360000000:     3   Max.   :35000
##  (Other)                       :113912
##            ListingCategory       EmploymentStatus  AnnualIncome
##  Debt consolidation:58308   Employed     :67322   Min.   :       0
##  Not available     :16965   Full-time    :26355   1st Qu.:   38404
##  Other             :10494   Self-employed: 6134   Median :   56000
##  Home improvement  : 7433   Not available: 5347   Mean   :   67296
##  Business          : 7189   Other        : 3806   3rd Qu.:   81900
##  Auto              : 2572                :  2255   Max.   :21000035
##  (Other)           :10976   (Other)      : 2718
##  RevolvingCreditBalance
##  Min.   :      0
##  1st Qu.:   3121
##  Median :   8549
##  Mean   :  17599
##  3rd Qu.:  19521
##  Max.   :1435667
##  NA's   :7604
```

Univariate Plots Section

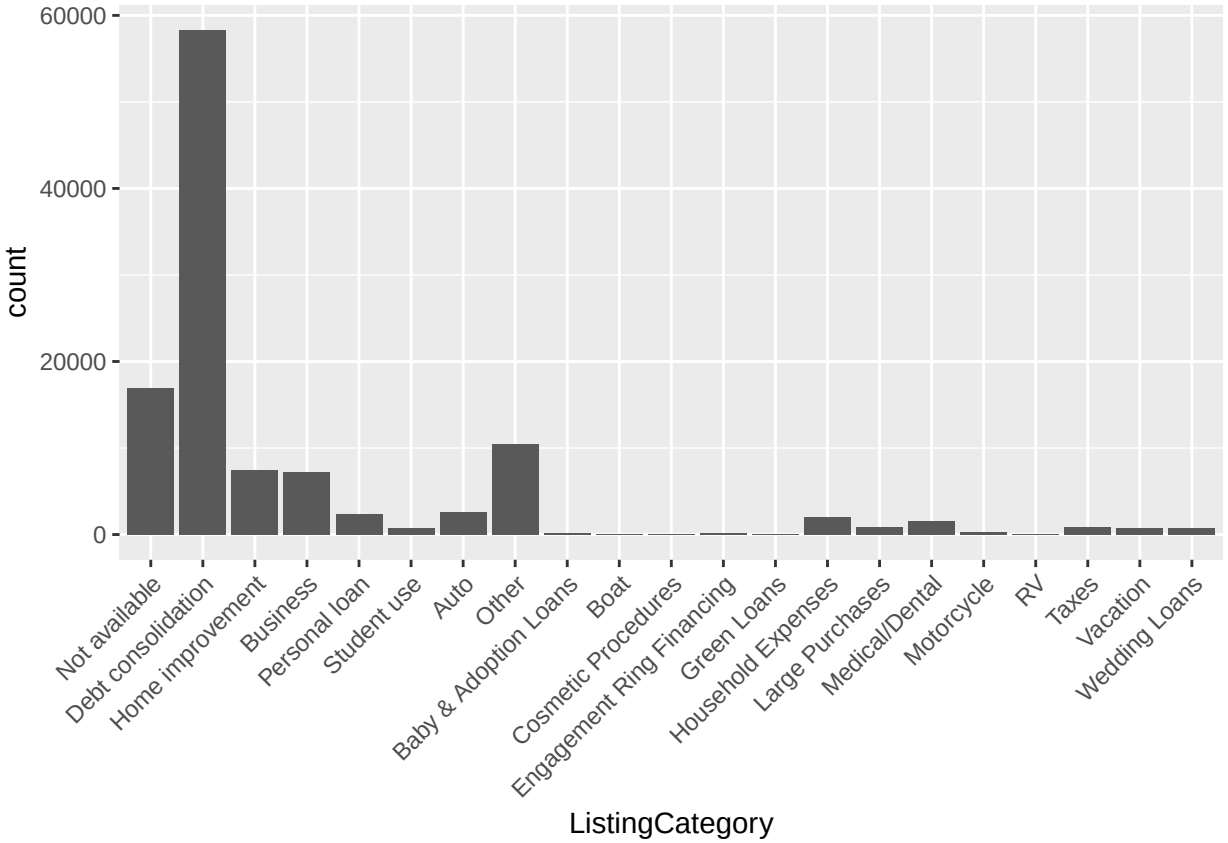


From the figure above we can see the amont of money that people borrow and as we can see people tend to borrow in whole numbers.

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    1000    4000    6500    8337   12000   35000
```

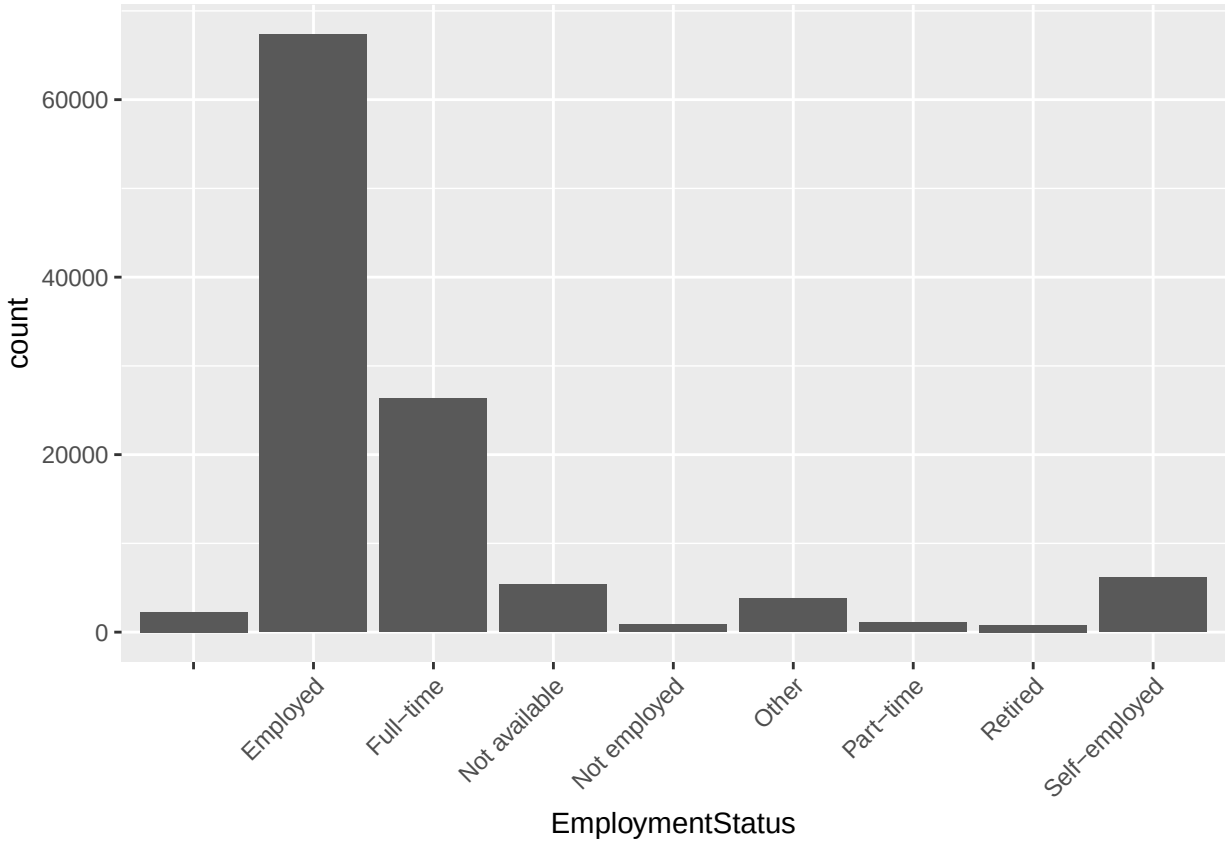
The minimum money that people borrowed is 1000 as opposed to maximum, which is 35000. the median and mean are 6500 and 8337 respectively.

Loan category



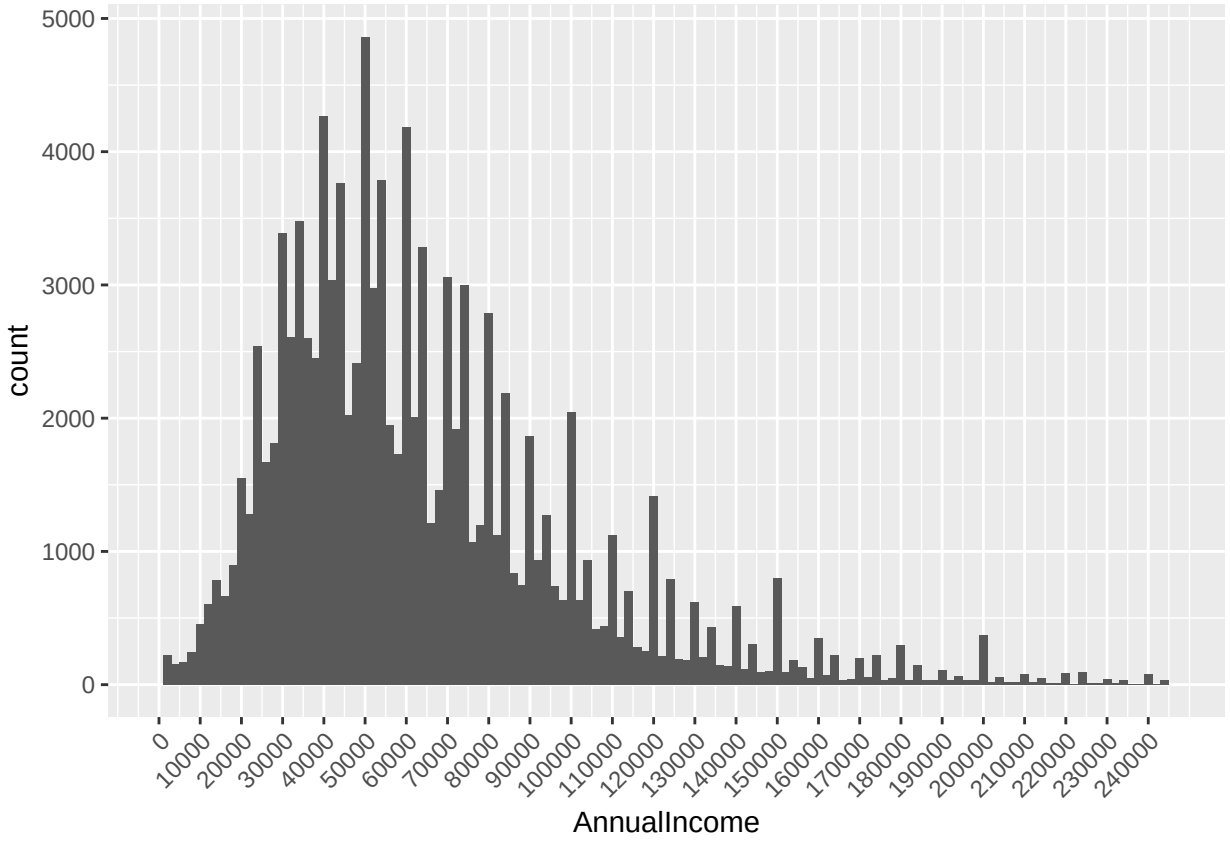
Sounds like most people borrow to cover their debts.

Employment status



As we can see most of the borrowers are employed.

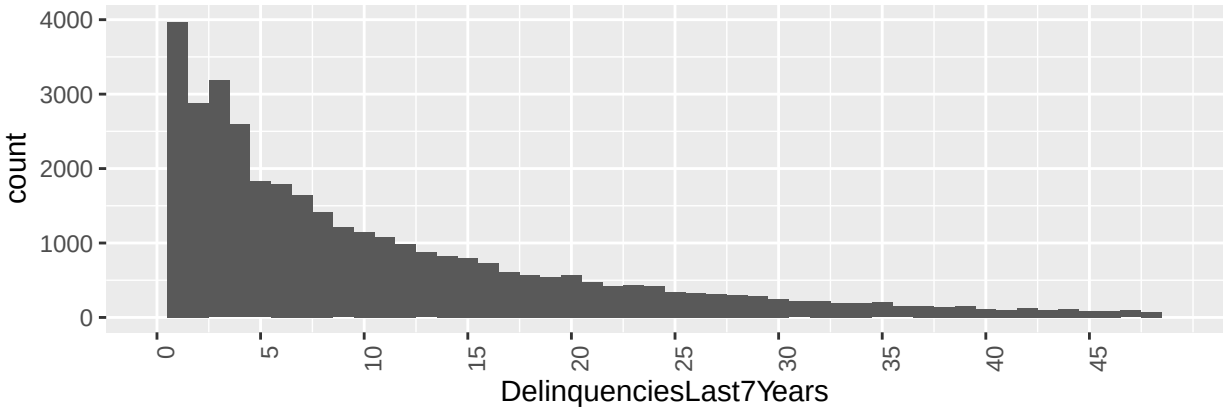
Income status

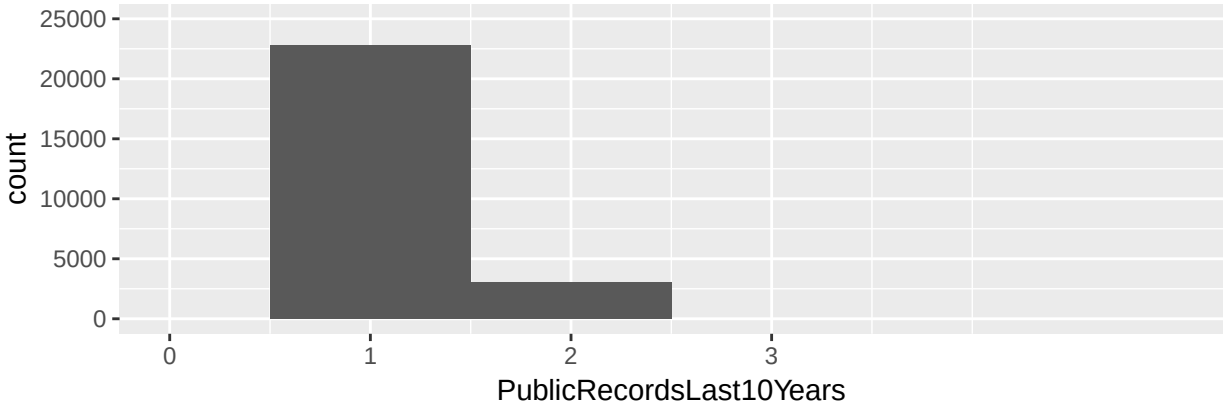



```
##      Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
##         0    38404    56000    67296    81900 21000035
```

The majority of income are between 20000 and 90000 annually. The median is 56000 and the mean is 67296.

Payment history



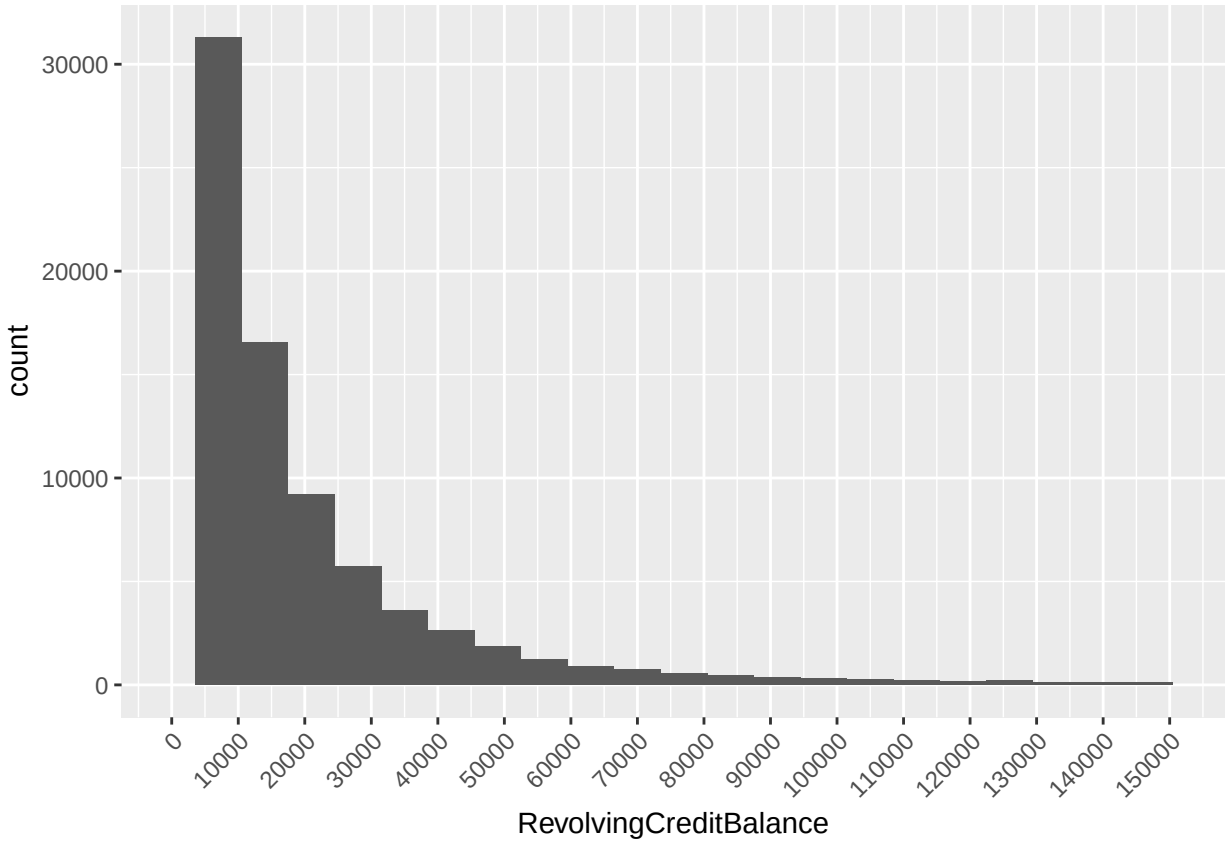



```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##   0.000   0.000   0.000   4.155   3.000  99.000     990
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##  0.0000  0.0000  0.0000  0.3126  0.0000 38.0000     697
```

It is obvious that most of the borrower have zero or one deliquencies in the last 7 years. Similarly they have zero or one public records in the last 10 years.

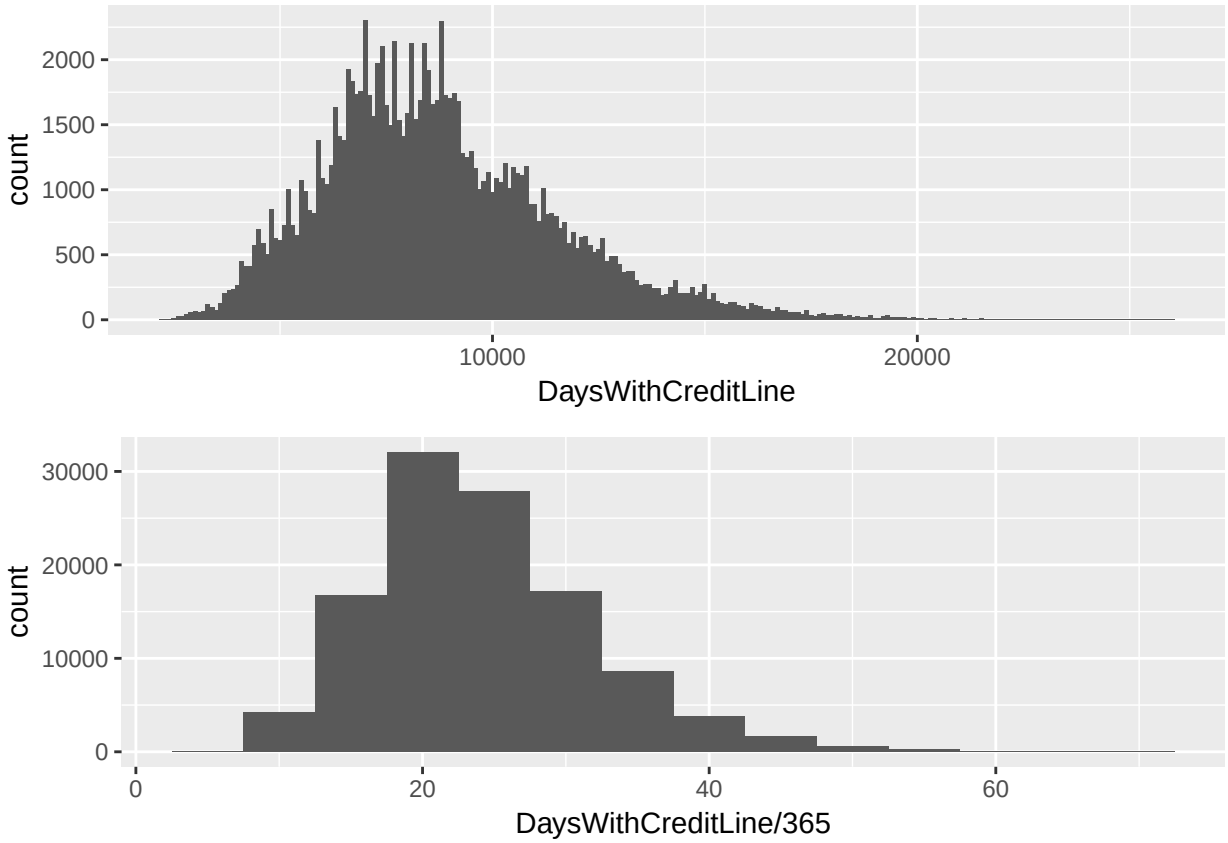
Revolving Credit Balance




```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##       0    3121    8549   17599   19521 1435667    7604
```

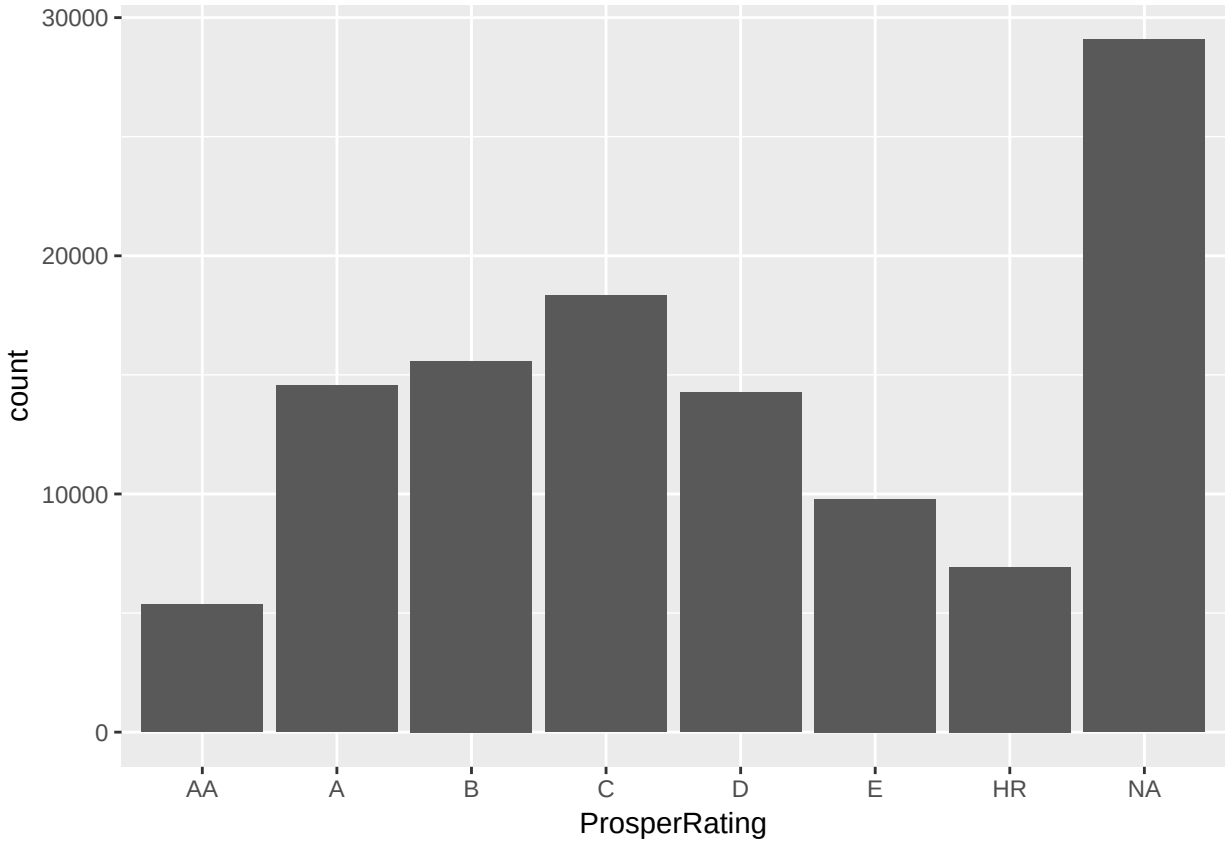
Revolving Credit Balance is the total outstanding balance that the borrower owes on his/her credit accounts. The median and mean are 8549 and 17600 respectively and the most common amount is 0.

Length of credit history



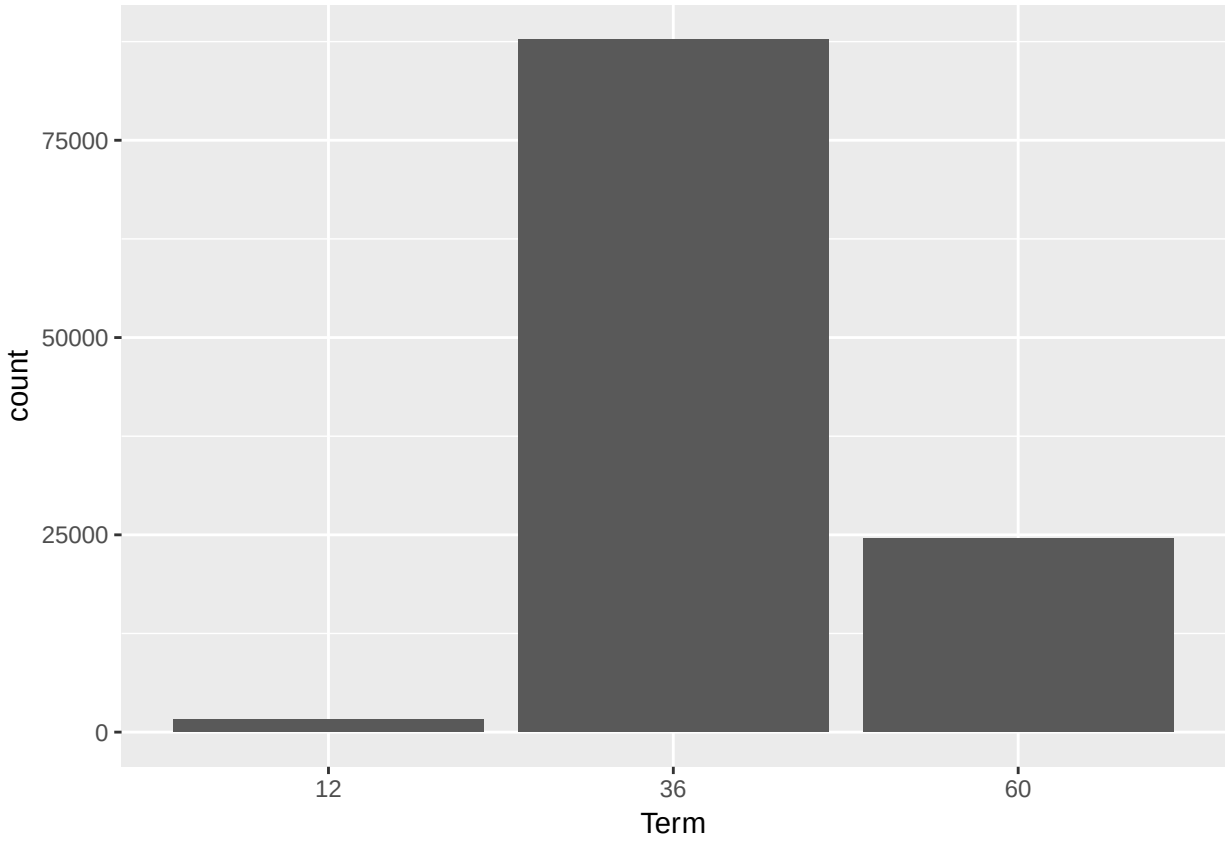
here is a credit line stors the credit story of 60 years.

Rating



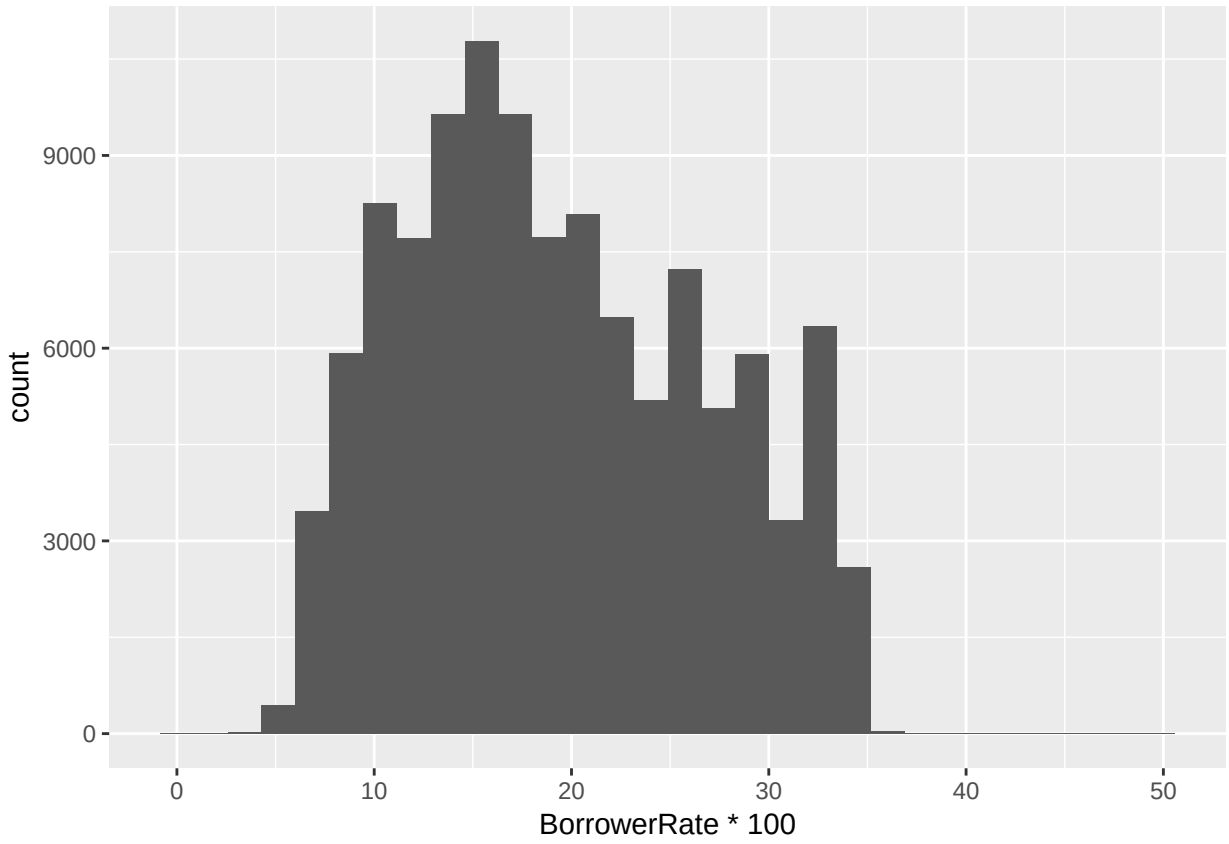
The most common rating is C follows by B. A and D are at the next steps (excluding the NA).

Loan length



Most loans have 36 months terms

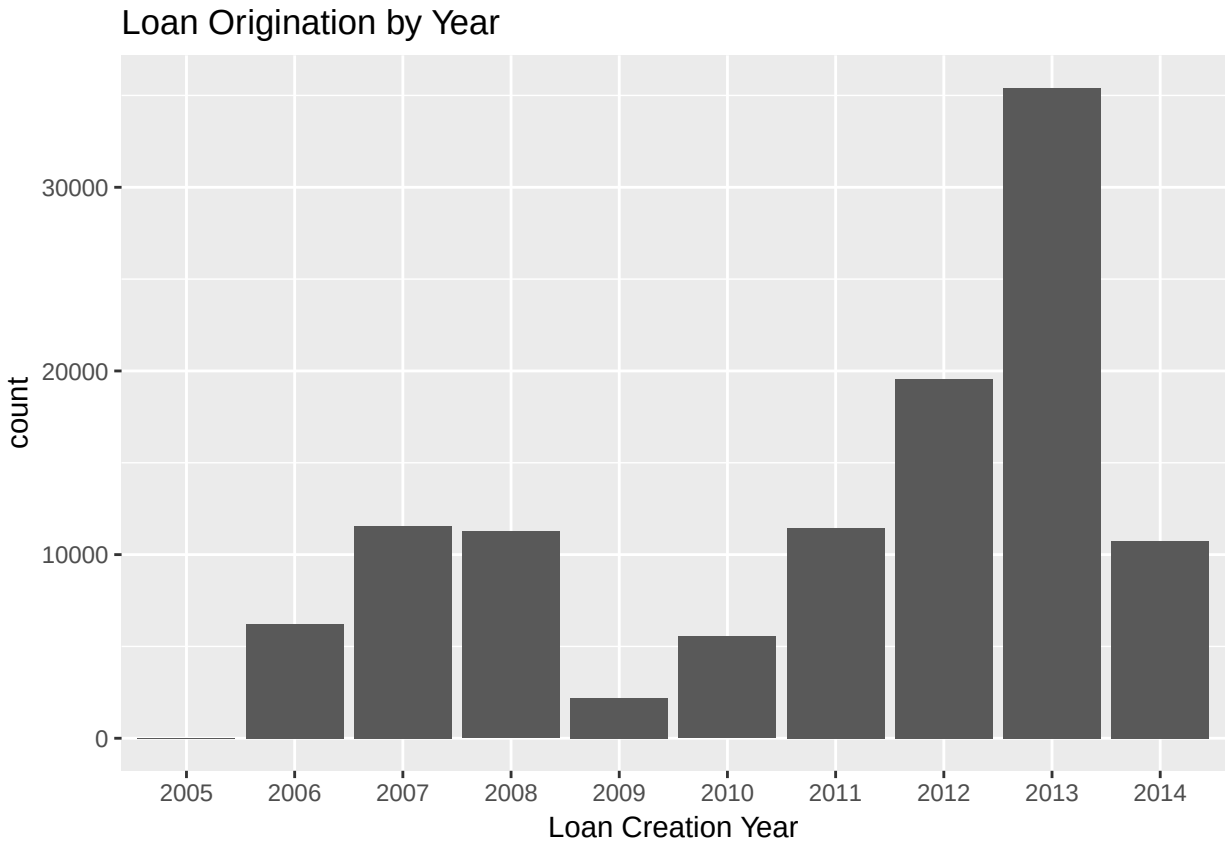
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



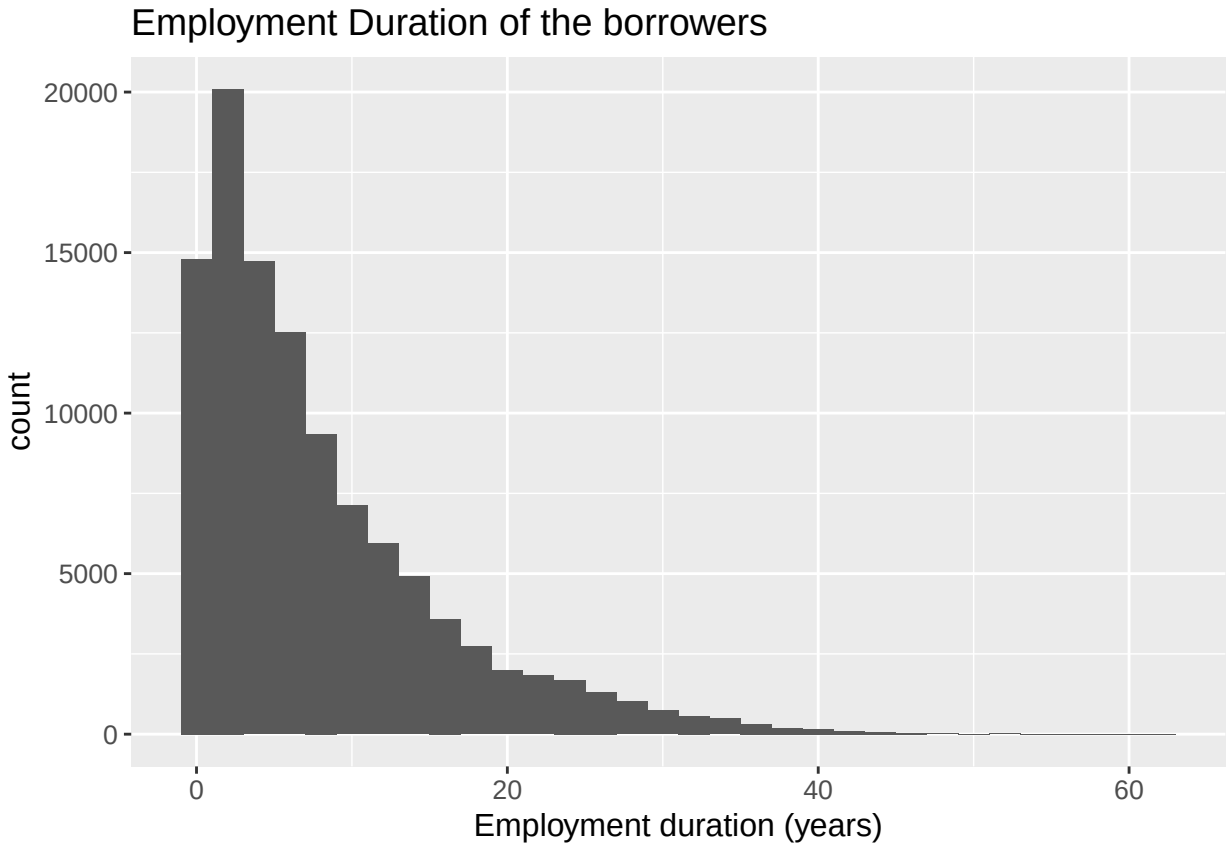

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.0000  0.1340  0.1840  0.1928  0.2500  0.4975
```

The median and mean for the borrower rate are 18.4% and 19.28% respectively, and The maximum borrower rate is 0.4975 or 49.75%.

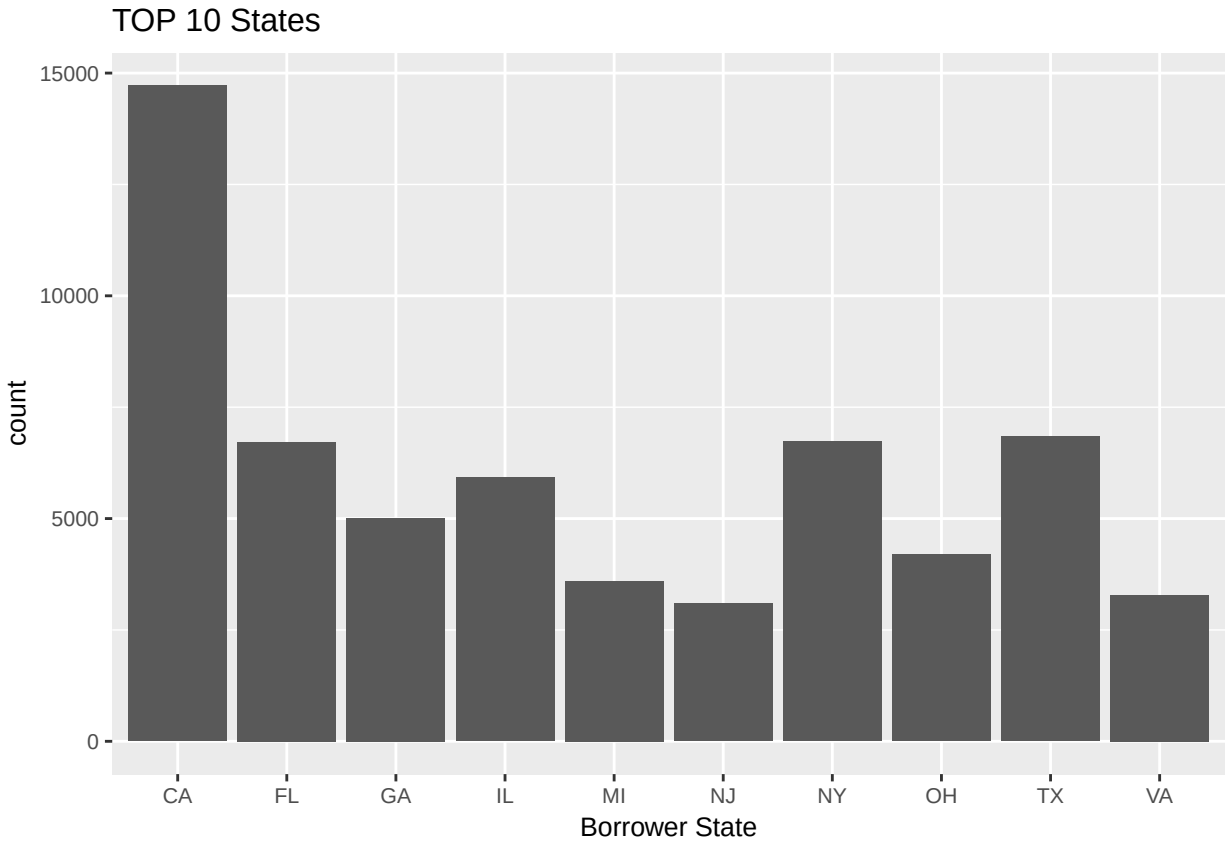
Years borrowing



2013 is the year that people borrowed money more than any other years and 2009 is the minimum borrowing year. There can be many resons behind that like economic crises or elections.



With the increase of the length of employment there is a decreas in the number of people who borrow loans.



As we can see California is the state that people were more likely to loan and Florida, Illinois, New York and Texas are at the next steps.

Univariate Analysis

What is the structure of your dataset?

For the purpose of this project I am using the Prosper data set, which contains all Prosper loans created until March 11th, 2014. There are discrete and continuous variables in this dataset.Each variable is a column and each row is an observation.

What is/are the main feature(s) of interest in your dataset?

- DelinquenciesLast7Years
- PublicRecordsLast10Years
- DebtToIncomeRatio
- RevolvingCreditBalance
- DaysWithCreditLine
- LoanOriginalAmount
- ListingCategory

- EmploymentStatus
- AnnualIncome
- BorrowerRate
- Term
- ProsperRating
- Listing Creation Date

What other features in the dataset do you think will help support your investigation into your feature(s) of interest?

Other variables that help me in my investigation are Employment Duration, Debt To Income Ratio, Prosper Rating and Occupation.

Did you create any new variables from existing variables in the dataset?

I created following new variables during the analysis: ListingCretionYear and Days with credit line.

Of the features you investigated, were there any unusual distributions? Did you perform any operations on the data to tidy, adjust, or change the form of the data? If so, why did you do this?

I set ListingCreationYear variable as a factor so when I plotted it would look discrete. I've alose taked care of ranked variables order in top 10 loan states.

Bivariate Plots Section

> **Tip**: Based on what you saw in the univariate plots, what relationships between variables might be interesting to look at in this section? Don't limit yourself to relationships between a main output feature and one of the supporting variables. Try to look at relationships between supporting variables as well.

Bivariate Analysis

> **Tip**: As before, summarize what you found in your bivariate explorations here. Use the questions below to guide your discussion.

Talk about some of the relationships you observed in this part of the investigation. How did the feature(s) of interest vary with other features in the dataset?

Did you observe any interesting relationships between the other features (not the main feature(s) of interest)?

What was the strongest relationship you found?

Multivariate Plots Section

> **Tip**: Now it's time to put everything together. Based on what you found in the bivariate plots section, create a few multivariate plots to investigate more complex interactions between variables. Make sure that the plots that you create here are justified by the plots you explored in the previous section. If you plan on creating any mathematical models, this is the section where you will do that.

Multivariate Analysis

Talk about some of the relationships you observed in this part of the investigation. Were there features that strengthened each other in terms of looking at your feature(s) of interest?

Were there any interesting or surprising interactions between features?

OPTIONAL: Did you create any models with your dataset? Discuss the strengths and limitations of your model.

Final Plots and Summary

> **Tip**: You've done a lot of exploration and have built up an understanding of the structure of and relationships between the variables in your dataset. Here, you will select three plots from all of your previous exploration to present here as a summary of some of your most interesting findings. Make sure that you have refined your selected plots for good titling, axis labels (with units), and good aesthetic choices (e.g. color, transparency). After each plot, make sure you justify why you chose each plot by describing what it shows.

Plot One

Description One

Plot Two

Description Two

Plot Three

Description Three

Reflection

Tip: Here's the final step! Reflect on the exploration you performed and the insights you found. What were some of the struggles that you went through? What went well? What was surprising? Make sure you include an insight into future work that could be done with the dataset.

Tip: Don't forget to remove this, and the other **Tip** sections before saving your final work and knitting the final report!