Data Preprocessing-

- Checked every column of dataset for null values and duplicate values.
- In columns like first time home buyer, PPM ,Number of Borrowers X values are present which are not available values. Replaced that values with the respective mode value of column.
- First payment date and maturity date columns shows date in number format. Converted number to date using formula [DATE(INT(C2/100),MOD(C2,100),1)].
- Calculated credit range column using formula [IFS(A2<=650, "Poor", A2<=700, "Fair", A2<=750, "Good", A2<=900, "Excellent")].
- Created measure Prepayment_Rate using formula

```
Prepayment_Rate =

VAR TotalRows = COUNTROWS('finalpr dataset')
VAR PrepaidCount =
   SUMX('finalpr dataset',
      IF(
        AND(
      'finalpr dataset'[OrigUPB] / 'finalpr dataset'[OrigLoanTerm]
       * 'finalpr    dataset'[MonthsInRepayment < 'finalpr dataset'
       [OrigUPB] * 0.2,'finalpr dataset'[OrigUPB] * 0.1 <
      'finalpr dataset'[OrigUPB] / 'finalpr dataset'[OrigLoanTerm] *
      'finalpr dataset'[MonthsInRepayment]
      ),1, 0 ) )
 VAR PrepaymentRate = DIVIDE(PrepaidCount, TotalRows)
 RETURN
 SWITCH(
  TRUE(),
  ISBLANK(PrepaymentRate), BLANK(),PrepaymentRate
  )
```

- Created Measure DTI range using below formula.

```
DTI_Range =
IF(
   AND('finalpr dataset'[DTI] <= 20, 'finalpr dataset'[DTI] >= 0), "0-20", IF(
   AND('finalpr dataset'[DTI] <= 40, 'finalpr dataset'[DTI] >= 21), "21-40", IF(
   AND('finalpr dataset'[DTI] <= 60, 'finalpr dataset'[DTI] >= 41), "41-60", IF(
   AND('finalpr dataset'[DTI] <= 75, 'finalpr dataset'[DTI] >= 61),
      "61-75","Above 75"))))
```

Dashboard -

1 .Imported data from Excel in power BI using get data option.Then check the data before loading and click on load option.

2 .First changed canvas background with color which is available in canvas background option.

KPI's-

3 .Then Created KPIs like Average Original Interest Rate and Average Loan Term.

1. Average Original Interest Rate =Average("OrigInterestRate ")
2. Average Loan Term .=Average("OrigLoanTerm")

Filters-

4 .Then Created Filters like Loan Characteristics Filters, Credit Score Filter,Geographic Filters, Time Filters,Loan Status Filters,Delinquency Status Filters.

- Loan Characteristics Filters-I have taken OrigLoanTerm as a filter and placed it in slicer. we can apply this filter and check impact on other visualization charts by moving slider in the range of 301 to 361.
- Credit Score Filter -For this filter I have used field credit range and make it as a slicer with dropdown list. We can visualize the effect on all values by selecting any option from dropdown list .
- Geographic Filters-For this filter I have taken PropertyState field and created a slicer with dropdown list.We can check state wise effect on all loan characteristics by selecting any state.
- Time Filters-I have taken MaturityDate field as a time filter.We can visualize effect on all parameters by moving slider between the dates.
- Loan Status Filters-For this filter ,Firstly I have created LoanStatus measure using below formula.

```
LoanStatus =
IF(
'finalpr dataset'[MonthsInRepayment] > 0 && 'finalpr dataset'[Prepayment_Rate] > 0,          "Active",
IF(
        'finalpr dataset'[MonthsInRepayment] = 0 && 'finalpr dataset'[Prepayment_Rate] > 0, "Paid Off",
        IF(
```

```
                'finalpr dataset'[MonthsInRepayment] > 0 && 'finalpr dataset'[Prepayment_Rate] = 0,
                "Charged Off",
                "Unknown"
        )
)
)
```

After that we can check visualization as per loan status i.e active,paid off or charged off.

- Delinquency Status Filters-For this filter I have created Delinquency Status measure first and then created slicer with a vertical list to show the options.we can apply one or multiple option to visualize effect on other fields.

```
DelinquencyStatus =
IF('finalpr dataset'[MonthsDelinquent] = 0, "Current",
IF('finalpr dataset'[MonthsDelinquent] > 0 && 'finalpr dataset'[MonthsDelinquent] < 3, "Past Due",
        IF('finalpr dataset'[MonthsDelinquent] > 6, "Defaulted","Unknown")
)
)
```

Visualization Chart-

- Scatter Plot- Created scatterplot by taking Prepayment_rate on X axis ,LTV on Y axis and OrigUPB as a values.
  It shows values of LTV and OrigUPB at different Prepayment_Rate whenever we click on any dots in scatter plot.
- Bar Chart-Created a bar chart with Prepayment_rate and DTI Range .
  It shows Preapayment rate for Each DTI range .Whenever we click on any bar in bar chart it shows values of DTI range and prepayment rate.
- Box Plot-Created Box plot of prepayment rate and credit range.
  It shows Preapyment rates values for each credit range like poor,fair,good and excellent.
  It shows the minimum, maximum and median values for each category.

Observations-

- Average OrigInterestRate is 6.93.
- Average OrigLoanTerm is 359.84
- When we apply geographical filter i.e PropertyState filter ,For Each state all values like kpi values and all charts visuals changes and shows different patterns.
- Prepayment Rate is higher for credit range good and lower for credit range poor.
- For DTI range 0-20 prepayment rate is lower and for DTI range 21-40 prepayment rate is high .
- OrigInterstRate is high when we apply delinquency status filter (defaulted) and lower for status Current.
- When we apply Loan status filter and select active option then scatter plot shows constant prepayment rate i.e 1.0 for all LTV values.,DTI Ranges and credit ranges .