```
# Read CSV from FileStore
file path =
"/FileStore/shared uploads/azuser3611 mml.local@techademy.com/accepted
2007 to 2018Q4.csv"
df bronze = spark.read \
 .option("header", True) \
 .option("inferSchema", True) \
 .csv(file path)
# Save to Bronze Delta
df bronze.write \
 .format("delta") \
 .mode("overwrite") \
 .save("/FileStore/lending/bronze/delta")
# Preview data
df bronze.show(5)
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+------
+----+------
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+-----+------
+-----
  id|member id|loan amnt|funded amnt|funded amnt inv|
int rate|installment|grade|sub grade|
                                        emp title|emp length|
home ownership|annual inc|verification status| issue d|loan status|
pymnt plan|
                       url|desc|
                                        purposel
title|zip_code|addr_state| dti|delinq_2yrs|earliest_cr_line|
fico range low|fico range high|ing last 6mths|mths since last deling|
mths since last record|open acc|pub rec|revol bal|revol util|
total_acc|initial_list_status|out_prncp|out_prncp_inv|
total pymnt|total pymnt inv|total rec prncp|total rec int|
total rec late fee|recoveries|collection recovery fee|last pymnt d|
last pymnt amnt|next pymnt d|last credit pull d|last fico range high|
last fico range low|collections 12 mths ex med|
mths since last major derog|policy code|application type|
annual inc joint|dti joint|verification status joint|acc now deling|
tot coll amt|tot cur bal|open acc 6m|open act il|open il 12m|
open_il_24m|mths_since_rcnt il|total bal il|il util|open rv 12m|
open_rv_24m|max_bal_bc|all_util|total_rev_hi_lim|inq_fi|total_cu_tl|
ing last 12m/acc open past 24mths/avg cur bal/bc open to buy/bc util/
chargeoff within 12 mths|deling amnt|mo sin old il acct|
mo_sin_old_rev_tl_op|mo_sin_rcnt_rev_tl_op|mo_sin_rcnt_tl|mort_acc|
mths since recent bc|mths since recent bc dlq|mths since recent inq|
mths since_recent_revol_delinq|num_accts_ever_120_pd|num_actv_bc_tl|
num actv rev tl|num bc sats|num bc tl|num il tl|num op rev tl|
num rev accts|num rev tl bal gt 0|num sats|num tl 120dpd 2m|
num tl 30dpd|num tl 90g dpd_24m|num_tl_op_past_12m|pct_tl_nvr_dlq|
percent bc gt 75|pub rec bankruptcies|tax liens|tot hi cred lim|
total bal ex mort|total bc limit|total il high credit limit|
revol bal joint|sec app fico range low|sec app fico range high|
sec_app_earliest_cr_line|sec_app_inq_last_6mths|sec_app_mort_acc|
sec app open acc|sec app revol util|sec app open act il|
sec app num rev accts|sec app chargeoff within 12 mths|
sec app collections 12 mths ex med|
sec app mths since last major derog|hardship flag|hardship type|
hardship reason|hardship status|deferral term|hardship amount|
hardship start date|hardship end date|payment plan start date|
hardship_length|hardship_dpd|hardship_loan_status|
orig projected additional accrued interest
hardship payoff balance amount|hardship last payment amount|
disbursement method|debt settlement flag|debt settlement flag date|
```

```
settlement status|settlement date|settlement amount|
settlement percentage|settlement term|
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+-----
+----+
+----+
-----+-----
+-----
+----+
  -----+
         3600.0| 36 months|
1684072771
  NULL
    3600.01
      3600.01
    C
  123.03|
13.99
     C4|
        leadman| 10+ years|
     Not Verified|Dec-2015| Fully Paid|
MORTGAGE |
  55000.0
n|https://lendingcl...|NULL|debt consolidation|Debt consolidation|
  PA| 5.91|
190xx|
     0.0
        Aug-2003|
           675.01
679.0|
   1.0|
           NULL
       30.0
```

```
0.0| 2765.0| 29.7| 13.0|
           7.01
                                                                                                                                                                                                                                                                                                                                                                                                 w|
                                                                                                                                                                                                                                                                                                                                                               3600.0
                                                                                                 0.0| 4421.723916800001|
                                                                                                                                                                                                                                                                                              4421.72|
           0.0|
                                                                                               0.0| 0.0|
122.67| NULL|
                                                                                                                                                                                                                                                                                                                                                                         0.0| Jan-
           821.72
                                                                                                                                                                                                                                                                                         Mar-2019|
           20191
                                                               560.0| 0.0|

1.0| Individual| NULL| NULL|

0.0| 722.0| 144904.0| 2.0|

1.0| 21.0| 4981.0| 36.0|

722.0| 34.0| 9300.0| 3.0| 1.0|

4.0| 20701.0| 1506.0| 37.2|

0.0| 148.0| 128.0|
           564.0|
           30.0|
                                                                                                                                                                                                                                                                                                                                                                                                            2.0|
           NULL
                                                                                                                                                                                                                                                                                                                                                                                                                   3.01
           0.0
           3.0|
           4.0|
                                                                                                                                                                                            148.0|
                                                                                                                                                                                                                                                                                   128.0|
4.0|
                                                                                    0.0|
3.0| 1.0|
4.0|
           0.01
           3.0|
                                                                                                                                                                                                                                                                                                                                                69.01
           69.01
                                                                                                                                                        4.0|
                                                                                                                                                                                                      4.0|
                                                                                                                                                                                                                                                                                                                                               5.0| 3.0|
                                                                                                2.0|
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           2.01
                                                                                                                                                                                                         4.0|
                                                                                                9.0|
           4.0|
                                                                                                                                                                                                                                                                                   7.0|
                                                                                                                                                                                                                                                                                                                                                                                           0.01
                                                                                                                  | 0.0| 0.0| 1/8050.0| | 0.0| 0.0| NULL| | NULL
                                                                                                                               0.0|
                                                                                                                                                                                                                                                                                                                                         76.9|
           0.0
                                                                                                                                                                                                                                                                            178050.0| 7746.0|
           0.0
           2400.0|
           NULL
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           NULLI
                                                                                                  NULL| NULL| N|
NULL| NULL| NULL|
NULL| NULL|
                                                                                                                                                                                                                                                                                                                                                NULL
           NULL
NULL|
Sequence of the sequence of 
                                                                                                                                                                                                                                                                                                                                                N| NULL|
           NULL
      979.66| 0.0| 0.0| 0.0| 0.0|
2016| 926.35| NULL| Mar-2019|
699.0| 695.0| 0.0|
NULL| 1.0| Individual| NULL| NULL
NULL| 0.0| 0.0| 204396.0| 1.0|
0.0| 1.0| 19.0| 18005.0| 73.0|
3.0| 6472.0| 29.0| 111800.0| 0.0| 0.0|
6.0| 4.0| 9733.0| 57830.0| 27.1|
0.0| 0.0| 113.0| 192.0|
2.0| 4.0| 2.0|
NULL| 0.0| 6.0|
                                                                                                                                                                                                                                                                                                                                                         NULL
                                                                                                                                                                                                                                                                                                                                                1.0|
                                                                                                                                                                                                                                                                                                                                                                                                              1.0|
                                                                                                                                                                                                                                                                                                                                                                                                                    2.0|
                                                                                                                                                       0.0| 5.0| 13.0| 17.0| 6.0| 5.0| 22.0| 0.0|
                                                            5.0|
27.0|
           20.0|
```

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2.0| 314017.0|
                   0.0|
0.01
                                                    97.41
                   0.0| 0.0|
                                                             39475.01
7.7
                           24667.0|
79300.0
                                              NULL
NULLI
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                             NULL|
                                             Cashl
                                         NULL|
                       NULL
N I
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              NULL| NULL|
NULL| 20000.0| 20000.0|
NULL
                                               20000.0| 60 months|
|68341763|
10.78 | 432.66 | B | B4 | truck driver | 10+ years | MORTGAGE | 63000.0 | Not Verified | Dec-2015 | Fully Paid | n | https://lendingcl... | NULL | home_improvement | NULL |
605xx|
             IL | 10.78 | 0.0 | Aug-2000 | 0.0 | NULL |
                                                             695.0|
       0.0| NULL|
0.0| 7869.0| 56.2| 18.0|
699.0|
                                                            NULL
6.0|
                                                             W
             0.0|22705.924293878397| 22705.92|
                                                             20000.0|
0.0
2705.92|
                    0.0| 0.0|
                                                          0.0| Jun-
                            NULL|
2017|
             15813.3|
                                          Mar-2019|
                       Joint App| 0.0|

0.0| 71000.0| 13.85|

0.0| 0.0| 189699.0| 0.0|

4.0| 10.0| 10007.0:
             700.0|
704.0|
NULL|
             1.0|
Not Verified|
                   4.0| 19.0| 10
2081.0| 65.0| 14000.0|
6.0| 31617.0|
                                         19.0 | 10827.0 | 73.0 |
1.0|
            0.0|
0.0|
            2.0|
                                            14000.0| 2.0|
                                                          2737.0|
5.0|
            1.0|
                                   0.0
55.9|
                        0.0
                                                       125.0|
184.0|
                       14.0|
                                      14.0|
                                                5.0|
                                                10.0|
101.0
                         NULL
                                                     3.0| 2.0|
                       0.0|
                                      2.01
NULL|
                                                      3.0|
          6.0|
                      4.0|
                                      7.0|
4.0|
                 0.0|
                              0.0|
                                                0.0|
6.0|
                             50.0|
             100.0|
                                                     0.0
                                                            0.0
                   18696.0|
                              6200.0|
218418.0|
                                                             14877.0|
                                               NULL
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                             NULL|
NULL
               NULL|
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Cashl
                        N I
              NULL| NULL| NULL| NULL| NULL| 35000.0| 35000.0| 60 months|
                                        NULLI
                                                        NULLI
NULLI
|66310712|
14.85| 829.9| C| C5|Information Syste...| 10+ years|
```

```
MORTGAGE| 110000.0| Source Verified|Dec-2015| Current| n|https://lendingcl...|NULL|debt_consolidation|Debt_consolidation|
                       0.0
076xx
             NJ|17.06|
                                         Sep-2008|
                                                           785.0|
                0.0
                                     NULL
789.01
                                                            NULLI
                            11.6|
13.0|
        0.0|
              7802.0|
                                     17.0|
                                                            wl
             15897.65|
                            31464.01|
15897.65|
                                               31464.01
19102.35
             12361.66
                                    0.0
                                               0.0
       Feb-2019|
                          829.91
                                  Apr-2019|
                                                      Mar-2019|
0.0|
                   675.0|
                                               0.0
679.0
            1.0| Individual|
                                                    NULL
NULL
                                            NULL
            0.0
                                  301500.0|
                                                  1.0|
NULL
                            0.0|
                                                             1.0|
                            23.0|
                                                 70.0|
0.0
           1.0|
                                     12609.0|
                                                              1.0|
                                          0.0| 1.0|
54962.0| 12.1|
1.0|
       6987.0|
                  45.0|
                               67300.0|
                            23192.0|
0.0
                    2.01
0.0
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                             36.0|
                                                 87.0|
              2.0
                     1.0|
                                           2.0|
2.0|
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NULL
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                              5.0|
                                                  10.0|
                                                            2.01
              4.0|
                                         8.0|
             13.0|
                                  5.0|
                                         13.0|
10.0
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0.01
                  0.0|
                                    1.0|
                                                 100.01
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                    0.0
                                        381215.0|
0.01
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62500.0|
                         18000.0
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                                               Cash|
                      NULL
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                                                       NULL
N |
              NULL| NULL| NULL| NULL|
NULLI
                                              10400.0| 60 months|
1684768071
                     F| F1| Contract Specialist| 3 years|
          289.91|
22.45|
MORTGAGE | 104433.0 | Source Verified | Dec-2015 | Fully Paid
n|https://lendingcl...|NULL| major_purchase| Major purchase|
                                         Jun-1998|
174xx|
             PA | 25.37 |
                              1.0|
                                                           695.0|
                3.0
                                     12.01
                                                           NULLI
699.0
        0.0| 21929.0|
                                     35.0|
12.0|
                            64.5|
                                                           w
                                           11740.5
                            11740.5
                                                           10400.0|
0.0
             0.0
1340.51
                     0.01
                            0.01
                                                       0.0| Jul-
2016
                            NULL|
                                          Mar-2018|
           10128.96
                  700.0|
                                               0.0
704.0|
                    Individual|
                                            NULL|
NULLI
            1.0|
                                                      NULLI
                            0.0| 331730.0|
                                                   1.0|
NULL
           0.0
                                                               3.01
                           14.0| 73839.0| 84.0|
34000.0| 2.0| 1.0|
           3.0|
                                                              4.0|
0.0|
       9702.01
                  78.0|
7.0|
                            27644.0|
3.0|
                  10.0|
                                         4567.0| 77.5|
0.0|
           0.0
                            128.0|
                                           210.0
```

```
4.01
    4.01
      6.01
            4.01
      1.0|
              12.0|
12.0|
0.0
    4.0|
        6.0|
           5.01
              9.0|
                10.0|
7.0
           12.01
   19.0
         6.0|
                0.0|
0.01
     0.01
          4.01
              96.6
        0.0
           439570.0|
                95768.0|
60.0
     0.01
20300.0
       88097.0|
            NULL
      NULL|
NULL
             NULL
         NULL
NULL
    NULL
              NULL
     NULL
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         NULL
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              NΙ
            NULL|
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```

+
<pre># Preview data df_bronze.show(5)</pre>
++
+
+
+
+
+
+
+
+

```
+----+
+-----
+-----
+-----+----
+----+
      id|member id|loan amnt|funded amnt|funded amnt inv|
int rate|installment|grade|sub grade|
                                          emp title|emp length|
home ownership|annual inc|verification status| issue d|loan status|
pymnt plan|
                         url|desc|
                                          purpose|
title|zip code|addr state| dti|deling 2yrs|earliest cr line|
fico_range_low|fico_range_high|inq_last_6mths|mths_since_last_delinq|
mths since last record|open acc|pub rec|revol bal|revol util|
total acc|initial list status|out prncp|out prncp inv|
total pymnt|total pymnt inv|total rec prncp|total rec int|
total rec late fee|recoveries|collection recovery fee|last pymnt d|
last pymnt amnt|next pymnt d|last credit pull d|last fico range high|
last fico range low|collections 12 mths ex med|
mths since last major derog|policy code|application type|
annual_inc_joint|dti_joint|verification_status_joint|acc_now_deling|
tot coll amt|tot cur bal|open acc 6m|open act il|open il 12m|
open il 24m/mths since rcnt il/total bal il/il util/open rv 12m/
open rv 24m|max bal bc|all util|total rev hi lim|ing fi|total cu tl|
ing last 12m/acc open past 24mths/avg cur bal/bc open to buy/bc util/
chargeoff within 12 mths|deling amnt|mo sin old il acct|
mo sin old rev tl op|mo sin rcnt rev tl op|mo sin rcnt tl|mort acc|
mths since recent bc|mths since recent bc dlq|mths since recent inq|
mths since recent revol deling num accts ever 120 pd num actv bc tl
num actv rev tl|num bc sats|num bc tl|num il tl|num op rev tl|
num_rev_accts|num_rev_tl_bal_gt_0|num_sats|num_tl_120dpd_2m|
num tl 30dpd|num tl 90g dpd 24m|num tl op past 12m|pct tl nvr dlq|
percent_bc_gt_75|pub_rec_bankruptcies|tax_liens|tot_hi_cred_lim|
total_bal_ex_mort|total_bc_limit|total_il_high_credit_limit|
revol bal joint|sec app fico range low|sec app fico range high|
sec app earliest cr line|sec app ing last 6mths|sec app mort acc|
sec app open acc|sec app revol util|sec app open act il|
sec app num rev accts|sec app chargeoff within 12 mths|
sec app collections 12 mths ex med
sec_app_mths_since_last_major_derog|hardship_flag|hardship_type|
hardship reason|hardship status|deferral term|hardship amount|
hardship start date|hardship end date|payment plan start date|
hardship length|hardship dpd|hardship loan status|
orig_projected_additional_accrued_interest|
hardship payoff balance amount|hardship last payment amount|
disbursement method|debt settlement flag|debt settlement flag date|
settlement status|settlement date|settlement amount|
settlement percentage|settlement term|
```

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+----+----+-----
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+-----
------+-----
|68407277|
      3600.0|
          3600.0
              3600.0| 36 months|
    NULL
13.99
   123.03|
      C \mid
        C41
             leadman| 10+ years|
       Not Verified|Dec-2015| Fully Paid|
MORTGAGE |
   55000.0
n|https://lendingcl...|NULL|debt_consolidation|Debt_consolidation|
    PA| 5.91|
190xx|
        0.01
            Aug - 2003 |
                 675.01
679.0|
           30.0|
                 NULL
    1.0|
          13.0|
7.0|
  0.0|
    2765.0
       29.7
                 w|
    0.0 | 4421.723916800001 |
            4421.72
                 3600.01
0.01
821.72
      0.01
         0.01
                0.0
                  Jan-
        NULL
2019|
    122.67
            Mar-2019|
```

```
564.01
       30.01
                                                                                                                                                                                                                                                      2.0|
       NULL
       0.0
                                                                                                                                                                                                                                                         3.0|
       3.0|
       4.0|
                                                     0.0| 1.0|
3.0| 1.0|
4.0|
       0.0
       3.0|
                                                                                            4.0| 2.0| 4.0| 7.0|
       69.0
                                                                                                                                                                                                               69.0|
                                                                                                                                                                        2.0| 5.0| 3.0|
7.0| 0.0|
                                                          2.0|
       2.0|
       4.01
                                                           9.0|
                                                                                                                                                 3.0|
                                                                                                                                                                                                           76.9|
                                                                               0.0|
       0.0
                                                                      0.0| 0.0|
13734.0|
NULL|
NULL|
                                                                                                                            0.0| 178050.0|
                                                                                                                                                                                                                                                 7746.0|
       0.0
                                                                                                                                                                     NULL|
       2400.0|
                                                                                                                                                                      NULL |
NULL |
       NULLI
                                                                                                                                                                                                               NULL
       NULL
                                                                  NULL| NULL| NULL| NULL|
       NULLI
                                                                                                                                                                                                               NULL
                                                                                                                                                                                                               N| NULL|
       NULL
       NULL
| NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | NULL | STATE | SENTIN | 
                                                                           NULL|
NULL|
                                                                                                                                                                                                                                 NULL
       NULLI
                                                  5.0
                                                                            0.0| 6.0|

| 5.0| 13.0| 17.0|

| 5.0| 22.0|

0.0| 2.0| 97.4|

0.0| 0.0| 314017.0|
                                                           27.0|
       20.0
                                                                                                            2.0| 97.4|
0.0| 314017.0|
24667.0| NULL|
       0.0|
                                                                                                                                                                                                                                      39475.0|
       7.7
       79300.01
                                                                                           NULL|
       NULL
```

```
NULLI
               NULL|
                               NULLI
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                    NULL
                                                  NULL
NULLI
NULL
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               NULL
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                            NULL
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                                                      NULL
NULLI
                NULLI
NULLI
                   NULL
                                                            NULL
NULL
                           NULL
                                              Cash|
                     NULL
                                      NULL|
                                                     NULL
NΙ
                                   NULL
NULL
                    NULL|
                    20000.0| 20000.0|
                                         20000.0| 60 months|
|68341763|
              NULL
                             B4| truck driver| 10+ years|
10.78
          432.66
                    B|
                        Not Verified|Dec-2015| Fully Paid|
MORTGAGE |
           63000.0|
n|https://lendingcl...|NULL| home_improvement|
                                                         NULL
             IL|10.78| 0.0|
                                        Aug - 2000 |
                                                         695.01
605xx1
               0.0
                                    NULL
699.0|
                                                          NULLI
       0.0|
                                   18.0|
              7869.0|
                          56.2
6.0|
                                                         w|
             0.0|22705.924293878397|
                                                         20000.01
0.0
                                         22705.92
2705.92
                     0.0| 0.0|
                                                      0.0| Jun-
            15813.3|
                           NULL
2017|
                                         Mar-2019|
704.01
                  700.0|
                                              0.0
                                                   13.85
                      Joint App
                                        71000.0|
NULL
            1.0|
                      0.0|
                                       189699.0
                                                         0.0|
Not Verified
                                  0.0|
           0.0
                                       19.0| 10827.0| 73.0|
1.0|
                      4.0|
                                          14000.0| 2.0|
                             65.0|
                  2081.0|
0.0
           2.0|
5.0|
            1.0|
                                6.0|
                                       31617.0
                                                      2737.0|
                        0.0|
                                                   125.0|
                                   0.01
55.91
                                             5.0|
184.0|
                     14.0|
                                   14.0|
                                             10.0|
101.0|
                        NULL
                                                  3.0|
                     0.0|
                                   2.01
                                                            2.01
NULLI
                                                      3.0|
                      4.0|
4.0|
         6.0
                                   7.01
                            0.0
                0.0|
                                              0.0
6.0
                                                  0.0|
            100.0|
                                                           0.0
0.01
                             50.0|
                  18696.0|
                                 6200.0|
                                                         14877.0
218418.0
NULL
                     NULL
                                            NULL
                     NULL
                                     NULL
NULL
                                                     NULLI
                  NULL
                                       NULLI
NULL
NULL
                                 NULL|
                                                        NULL
               NΙ
                          NULL
                                         NULL
NULLI
                                                  NULL
               NULLI
                                 NULL
NULLI
NULL
               NULL
                           NULL
                                               NULL
                                                        NULL
                             NULLI
NULLI
                                            NULL
Cash|
                      N I
                                                             NULL
                                     NULL
               NULL
                                                    NULLI
NULL
                                              35000.0| 60 months|
              NULL| 35000.0| 35000.0|
|66310712|
                            C5|Information Syste...| 10+ years|
           829.9|
                    C|
14.85|
                   Source Verified|Dec-2015| Current|
MORTGAGE| 110000.0|
n|https://lendingcl...|NULL|debt_consolidation|Debt_consolidation|
             NJ|17.06| 0.0|
076xx1
                                    Sep-2008|
                                                         785.01
789.0|
                0.0
                                    NULL
                                                          NULL
```

```
13.0| 0.0| 7802.0|
                                    31464.01
                                       11.6| 17.0|
                                                                                  w
                                                                31464.01|
15897.65 | 15897.65 | 19102.35 | 12361.66 |
                   15897.65
                                                  0.0
                                                                  0.01
                                  829.9| Apr-2019|
           Feb-2019|
0.0|
                                                                            Mar-2019|
                         675.0|
679.0|
                                                                 0.01
                 1.0| Individual|
                                                                         NULL|
                                                              NULL|
NULL
                0.0
                                      0.0| 301500.0| 1.0|
23.0| 12609.0| 70.0|
67300.0| 0.0| 1.0|
                                                                  1.0|
NULL
                                                                                      1.0|
           1.0|
6987.0| 45.0|
                                                                                       1.0|
0.0|
1.0|
                                       23192.0|
                                                           54962.0 | 12.1|
0.0
                            2.0|
                0.0|
                                         36.0|
0.01
                                                                 87.0|
                             1.0|
                2.0|
2.0|
                              NULL
                                                                        NULLI
NULLI
                                                          8.0| 10.0|
                                          5.0|
                   4.0|
                                                                                   2.01
0.0
                   13.0|
                                               5.0|
10.0|
                                                          13.0|
                                                                                   0.0
                          0.0|
                                                                     100.0|
0.0|
                                                   1.0|
                            0.0| 0.0| 18000.0|
                                                         381215.0|
                                                                                   52226.01
0.0
                                                              NULL
62500.0|
                              NULL|
                                                              NULL
NULL
                                           NULL|
                       NULL|
                                                                        NULLI
NULLI
                         NULL
NULL
                                                                        NULL
                                        NULL|
NULL| NULL|
NULL|
NULL
                                                                        NI
                                                                                      NULL
                     NULL|
NULL|
NULL
NULL
                                                                              NULL
                          NULL
                                                                                       NULL
NULL

        NULL|
        NULL|
        Cash|

        N|
        NULL|
        NULL|
        NULL|

        NULL|
        NULL|
        NULL|
        NULL|

        | 68476807|
        NULL|
        10400.0|
        10400.0|
        60 months|

        | 22.45|
        289.91|
        F|
        F1| Contract Specialist|
        3 years|

        | MORTGAGE|
        104433.0|
        Source Verified|Dec-2015|
        Fully Paid|

        | n|https://lendingcl
        | NIIII | | major purchased
        Major purchased

n|https://lendingcl...|NULL| major_purchase| Major purchase| 174xx| PA|25.37| 1.0| Jun-1998| 695.0| 699.0| 3.0|
                                                     12.0|
                  3.0|
            0.0| 21929.0|
                                                    35.0
                                       64.5|
12.0|
                                                                                  w
                                                    11740.5|
                                                                              10400.0|
                   0.0|
                                       11740.5
0.0|
                          0.0|
                                       0.0
1340.5
                                                                             0.0| Jul-
                                       NULL| Mar-2018|
                10128.96
2016|
               700.0| 0.0|
1.0| Individual| NULL| NULL
0.0| 0.0| 331730.0| 1.0|
3.0| 14.0| 73839.0| 84.0|
2.0| 78.0| 34000.0| 2.0| 1.0|
10.0| 27644.0| 4567.0| 77.5|
704.0|
NULL
                                                                          NULL
          3.0|
9702.0| 78.0|
10.0|
                                                                        1.0|
                                                                                        3.01
NULLI
                                                                                       4.0|
0.01
7.0|
3.0|
                                       128.0|
                                                         210.0|
4.0|
0.0
                4.0| 6.0|
4.0|
                               1.0|
                                                                        12.0|
12.0|
                                        6.0| 5.0|
6.0| 12.0|
              4.0|
19.0|
                                                                        9.0| 10.0|
0.0|
7.0|
                                                                                 0.0|
```

0.0 60.0 20300.0	0.0 0.0 0.6 88097.0		5 95768.0
NULL NULL NULL NULL NULL NULL NULL NULL NULL	NULL NULL NULL NULL NULL NULL NULL NULL	NÜLL NULL NU NULL N NULL NULL	LL NULL NULL NULL NULL
NULL N NULL +	NULL NULL NULL	Cash NULL NULL	NULL
	+	· +	
+		· +	+
++-		· +	
++-			
+			+
++			
+	+	+	
+	+		
+	-+		

```
<del>+</del>-----
+----+
+----+
+-----
+----+
only showing top 5 rows
# SILVER LAYER FULL CODE
from pyspark.sql.functions import col, regexp replace
#Read from Bronze Delta Table
df bronze =
spark.read.format("delta").load("/FileStore/lending/bronze/delta")
#Clean & Transform
df silver = df bronze.dropna(subset=["loan amnt", "term", "int rate"])
  .withColumn("int rate", regexp replace("int rate", "%",
"").cast("double")) \
  .withColumn("loan_amnt", col("loan_amnt").cast("double")) \
  .withColumn("annual_inc", col("annual inc").cast("double")) \
  .withColumn("dti", col("dti").cast("double")) \
  .withColumn("emp length", regexp_replace("emp_length", "\\+ years|
years |< 1 \text{ year}^{"}, "")
  .withColumn("emp length", regexp replace("emp length", "n/a",
"0")) \
  .withColumn("emp length", col("emp length").cast("int"))
#Save as Delta Table in Silver Layer
df silver.write.format("delta").mode("overwrite").save("/FileStore/
lending/silver/delta")
#Preview Transformed Data
df silver.show(5)
+-----
+-----
+-----
+-----
+-----
+----+
+-----+-----
+-----
+-----
+-----
```

```
+-----
+-----
+-----
+-----
+-----
+-----
+-----
+-----
+----+
+-----
+-----
+-----
+------
+----+
+----+
+----+
+-----
+----+
   id|member id|loan amnt|funded amnt|funded amnt inv|
int rate|installment|grade|sub grade|
                        emp title|emp length|
home ownership|annual inc|verification status| issue d|loan status|
pymnt plan|
              urll
                        descl
          title|zip_code|addr_state| dti|delinq_2yrs|
purposel
earliest cr line|fico range low|fico range high|ing last 6mths|
mths since last deling|mths since last record|open acc|pub rec|
revol bal|revol util|total acc|initial list status|out prncp|
out prncp inv|
          total pymnt|total pymnt inv|total rec prncp|
total rec int|total rec late fee|recoveries|collection recovery fee|
last pymnt d|last pymnt amnt|next pymnt d|last credit pull d|
last_fico_range_high|last_fico_range_low|collections_12_mths_ex_med|
mths since last major derog|policy code|application type|
annual inc joint|dti joint|verification status joint|acc now deling|
tot coll amt|tot cur bal|open acc 6m|open act il|open il 12m|
open il 24m/mths since rcnt il/total bal il/il util/open rv 12m/
open rv 24m/max bal bc/all util/total rev hi lim/ing fi/total cu tl/
inq_last_12m|acc_open_past_24mths|avg_cur_bal|bc_open_to_buy|bc_util|
chargeoff_within_12_mths|delinq_amnt|mo_sin_old_il_acct|
mo sin old rev tl op|mo sin rcnt rev tl op|mo sin rcnt tl|mort acc|
mths since recent bc|mths since recent bc dlq|mths since recent inq|
mths since recent revol deling num accts ever 120 pd num actv bc tl
```

```
num actv rev tl|num bc sats|num bc tl|num il tl|num op rev tl|
num rev accts|num rev tl bal gt 0|num sats|num tl 120dpd 2m|
num_tl_30dpd|num_tl_90g_dpd_24m|num_tl_op_past_12m|pct_tl_nvr_dlq|
percent bc gt 75|pub rec bankruptcies|tax liens|tot hi cred lim|
total bal ex mort|total bc limit|total il high credit limit|
revol_bal_joint|sec_app_fico_range_low|sec_app_fico_range_high|
sec app earliest cr line|sec app ing last 6mths|sec app mort acc|
sec app open acc|sec app revol util|sec app open act il|
sec_app_num_rev_accts|sec_app_chargeoff within 12 mths|
sec app collections 12 mths ex med!
sec app mths since last major derog|hardship flag|hardship type|
hardship_reason|hardship_status|deferral_term|hardship_amount|
hardship start date|hardship_end_date|payment_plan_start_date|
hardship length|hardship dpd|hardship loan status|
orig projected additional accrued interest
hardship payoff balance amount|hardship last payment amount|
disbursement method|debt settlement flag|debt settlement flag date|
settlement status|settlement date|settlement amount|
settlement percentage|settlement term|
+-----
+-----
+-----
+-----
+-----
+-----
+-----
+-----
+-----
+-----
+-----
+-----
+-----
+------
+-----
+-----
+----+
+-----
+-----
```

```
+-----
+-----
+----+---+----
+----
+-----
+-----
4----
+-----
+------
+-----
+-----+
163005871
          NULL|
               12000.0|
                       12000.0
                                    12000.0| 36 months|
                       C3|
15.22
        417.28|
                C \mid
                                     NULLI
                                             NULLI
                 Source Verified|Jul-2013| Fully Paid|
        42000.01
MORTGAGE |
n|https://lendingcl...|
                                     credit card|Credit
                             NULL
                         3.8|
Card Payoff|
           713xx|
                     LA|
                                  0.0
                                           0ct-1996|
670.0
           674.01
                        0.0
                                         33.0
       7.0|
                                   29.0
NULL
             0.0
                  3108.0
                            91.4
     0.0
                0.0|13885.726104168401|
                                      13885.73|
12000.0|
          1864.87 | 20.860000009100002 |
                                   0.0
                              NULL
     Nov-2014|
0.0
                   108.83
                                         Nov-2014|
                                    0.0|
619.0
              615.0|
                 Individual|
                                         NULL
NULLI
         1.0
                                  NULL|
NULLI
           0.0
                     0.0
                            3108.0
                                      NULLI
                                               NULLI
        NULL
                       NULL
                                NULL
                                      NULL
NULLI
                                               NULL
                          3400.0|
                                NULL
              NULL
                                         NULLI
NULLI
        NULL
                       1036.01
NULLI
                2.01
                                   NULL
                                         NULLI
        0.01
                                     204.0|
0.0
                     141.0|
18.0|
           18.0|
                  1.0|
                                 NULLI
                                       33.01
NULL
                18.0|
0.0
           0.0|
                       3.0|
                                0.01
                                       4.0|
                                              8.0|
7.01
         20.0
                         3.0|
                                7.01
                                            0.01
              0.0
0.01
                            0.01
                                      96.01
NULL
                0.0|
                                 3400.01
                                               3108.0
                       0.0
                               NULL
                    0.0
                                                NULLI
0.01
NULL
                  NULL|
                                   NULLI
                                                NULL
              NULL
                             NULLI
NULLI
                                             NULL
NULLI
                          NULL
            N|
                                NULLI
                                            NULLI
NULL
                    NULLI
           NULL
                          NULL
                                        NULL
NULL
NULLI
           NULLI
                     NULLI
                                     NULLI
                                            NULL
NULLI
                       NULL
                                   NULL
Cash|
                 N|
                                                NULL
             NULL
                             NULLI
                                         NULL
NULLI
                7125.0
          NULL
                         7125.0
                                     7125.0| 36 months|
|6311418|
        250.08|
                C
                       C4|
                            century concrete
15.88
                 Not Verified|Jul-2013| Fully Paid|
     30000.01
RENT
                                                 n|
https://lendingcl...|
                 Borrower added ...|
                                         otherl
Other|
      236xx|
                 VA|13.28|
                             0.0|
                                      Jun-2000|
```

```
699.0| 0.0| NULL|
8.0| 1.0| 3385.0| 25.5| 15.0|
0.0| 0.0| 7220.924234675899| 7220.92|
 695.0
 93.0|
 f|
                          7125.01
 0.0|
 614.0|
 NULL
                                                                                                                                                                                                                   NULLI
 NULL
                                                                                                                                                                                                                   NULL
 NULL
 NULL
 NULLI
                                                                                                                                         15.0
 0.0|
                                       5.0| 0.0|
 15.0|
                                                                       3.0| 4.0|
                                                                                                                                             NULL|
3.0| 5.0| 4.0|
 NULL
                                     1.0|
11.0|
 0.0|
                                                                                                                                              8.0
                                                                                                                                                                                           0.0|
 6.0|
                                                              0.0|
                                                                                                                         2.0|
 0.01
                                                  1.0| 0.0|
6900.0|
NULL|
                                                                                                                                              20200.0|
                                                                                                                                                                                                            9090.0|
 0.0
                                                                                                         NULL|
NULL|
NULL|
 2600.0|
 NULLI
                                                        NULL|
                                                                                                                                                                               NULL
 NULL
                                                                    NULL
 NULL
                                                                                                                                                                               NULL
                                                                                                 NULL| N|
NULL| NULL|
                                                                                                                                                                              N| NULL|
 NULL
                                                    NULL|
NULL|
 NULL
                                                           NULL|
NULL|
                                                                                                                                                                                               NULL
 NULL
                                                                                                                                                                                                                   NULL
 NULLI

      NULL|
      NULL|
      Cash|

      N|
      NULL|
      NULL|

      NULL|
      NULL|
      NULL|

      |6321535|
      NULL|
      24000.0|
      24000.0|

      14.331
      563.561
      00.00
      00.00

                                                                                                                                                                                            NULL
| 6321535 | NULL | 24000.0 | 24000.0 | 24000.0 | 60 months | 14.33 | 562.56 | C | C2 | Caddell Construct... | 10 | RENT | 85000.0 | Verified | Aug-2013 | Fully Paid | n | https://lendingcl... | NULL | credit_card | Loan for life | 351xx | AL | 12.52 | 0.0 | Jun-1998 | 695.0 | 699.0 | 0.0 | NULL | NULL | 8.0 | 0.0 | 30048.0 | 68.4 | 15.0 | f | 0.0 | 0.0 | 31418.84 | 31418.84 | 24000.0 | 7418.84 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | Apr-2016 | 13979.48 | NULL | Apr-2016 | 734.0 | 730.0 | 0.0 | NULL | NUL
                                                                                                                                                  24000.0| 60 months|
                                                                                        NULL| NULL| NULL|

43900.0| NULL| NULL|

5377.0| 9236.0| 76.3|

123.0| 184.0|
                                   NULL|
NULL| NULL|
 NULL
                                                                                                                                                                                                                   NULL
 NULLI
                                    2.0| 5377.

0.0| 123.0|

12.0| 2.0|

12.0|
 NULL
 0.0
 12.0|
                                                                         12.0| NULL| 6.0| 5.0| 9.0|
 NULL
                         5.0|
 0.0|
                                                                                                                                                                                                       2.0|
```

```
7.01
            11.0|
                                6.0|
                                        8.01
                                                         0.01
                                1.0|
                  0.0|
                                                100.0|
0.0
                                         58199.0|
80.01
                     0.0
                              0.0
                                                           30048.01
38900.0|
                             0.0|
                                           NULL
NULL
                      NULL
                                              NULL
                NULL|
                                NULL|
NULL
                                                  NULL
                    NULL
                                                    NULL
NULL
                                  NULL
                                                  N I
                                                            NULLI
NULLI
                                           NULL
NULL
               NULL|
                            NULL|
                                       NULL
NULL
                 NULL
                                                       NULL
                                                             NULL
NULLI
                   NULLI
NULL
                           NULL
                                              Cash|
                     NULL
                                       NULL
                                                      NULL|
ΝI
NULLI
                    NULL
                                    NULLI
                   NULL| NULL| 24000.0|
|6300526|
             NULL
                                             24000.0| 36 months|
                   A| A1|Lexington ramity ...,

Verified|Jul-2013| Fully Paid|

credit card
         730.46|
6.03|
MORTGAGE| 114107.0|
n|https://lendingcl...| Borrower added ...| credit_card|
Refinance loan | 272xx | NC | 7.08 |
                                              0.0|
                                                    0ct-1996|
755.0
               759.0|
                               0.0
                                                    NULLI
        11.0 | 0.0 | 29366.0 | 38.2
                                             43.0|
NULL|
               0.0| 26296.2757411036|
                                              26296.28
f|
       0.0
             2296.28| 730.17|
24000.01
                                             0.0
                                   0.0
                                       NULL
                                                     Nov-2018|
0.0|
       Aug-2016|
                                              0.0|
769.0|
                   765.0|
                                           NULL
                     Individual|
NULLI
            1.0|
                                                     NULLI
                           0.0| 286131.0|
                                                 NULL|
           0.0|
                                                            NULL
NULLI
                           NÚLL|
           NULL
                                         NULL|
                                                 NULL
NULL
                                                            NULL
                                          NULL| NULL|
| 34634.0| 45.9|
                                         NULL
                   NULL
                                76900.01
NULLI
          NULL|
                            26012.0|
                     3.0|
NULL
           0.0
                           132.0|
                                               204.0|
0.0|
             7.0|
                      7.0|
7.0|
                                          7.01
NULL
                                                  NULLI
                     7.0|
                             2.0|
              2.0|
                                                 13.0|
                                                            5.0|
0.0|
                                        6.0|
                                 2.0|
             31.0|
                                        11.0|
                                                          0.01
10.0
                  0.0|
0.0
                                    2.0|
                                                100.0|
                                       336489.0|
0.0
                    0.0|
                             0.0
                                                          29366.0
                             0.0
                                           NULLI
64000.0|
NULLI
                      NULLI
                                              NULL
                NULL|
                                NULL
                                                  NULL
NULL
                    NULLI
NULL
                                                    NULLI
                                                  ΝI
                                                            NULL
                                  NULL
NULLI
                            NULL|
               NULL
                                           NULL
NULL
                                       NULL
                                                       NULL
NULLI
                 NULL
                                                             NULL
                   NULL
NULLI
                           NULL
NULLI
                                              Cash|
                     NULLI
                                       NULLI
                                                      NULLI
NΙ
NULLI
                    NULL|
                                    NULL
             NULL| NULL| NULL| NULL|
                                            18000.0| 60 months|
|6301469|
```

```
D1|McKenna Brothers ...|
17.561
      452.79
            DΙ
                                  10|
      50000.0|
             Source Verified | Aug-2013 | Fully Paid |
MORTGAGE |
n|https://lendingcl...|
                     NULL|debt consolidation|Debt
consolidation|
                 FL|13.92|
         338xx1
                          0.01
                                Jan-19991
                              NULL
695.0
        699.01
                  0.01
     9.0|
NULLI
         0.0
             10758.0|
                          20.0|
    0.0
               27239.794818997
                            27239.79|
f|
            0.0
18000.0|
       9239.79|
                    0.0
                          0.0|
0.0
    Aug-2018
              452.24
                      NULL
                              Feb-2019|
579.0|
           575.0|
                          0.0
                         NULL
NULLI
            Individual|
                              NULLI
       1.0
NULLI
        0.0
               0.0
                   114474.0
                            NULLI
                                   NULLI
      NULL
                            NULL
                        NULLI
                                   NULLI
NULLI
                 NULLI
          NULLI
                  11300.0|
                              NULLI
NULLI
      NULL
                        NULLI
NULLI
            4.0|
                14309.0|
                          85.01
                              97.9
0.0
      0.0
                142.0|
                           176.0|
                        148.0|
19.0|
        13.0|
             4.0|
NULLI
            19.0|
                             NULL
        3.0|
                                  5.01
0.01
                 6.0
                       4.0|
                             6.0|
7.01
       11.0|
                  6.0
                                0.0
                       9.01
          0.0
0.01
                    0.01
                            100.0
                        122916.0|
100.0|
            0.0
                  0.0
                       8596.01
                                 NULLI
18193.0
        4100.0
             NULL
NULLI
                          NULLI
         NULL
                  NULLI
NULL
                             NULL
            NULL |
NULLI
                              NULLI
                                   NULL
NULL
                   NULLI
                             NΙ
                         NULL
        NULL
                NULL
NULL
                       NULL
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only showing top 5 rows
from pyspark.sql.functions import avg, count, col
# Read Silver Delta Table
df silver =
spark.read.format("delta").load("/FileStore/lending/silver/delta")
# Aggregation Example 1 - Loan amount & interest rate by grade
loan summary by grade = df silver.groupBy("grade").agg(
 avg("loan_amnt").alias("avg_loan_amount"),
 avg("int_rate").alias("avg interest rate")
)
# Save to Gold Layer
loan summary by grade.write.format("delta").mode("overwrite").save("/
FileStore/lending/gold/loan summary by grade")
# Aggregation Example 2 - Default count by loan status
loan status counts = df silver.groupBy("loan status").count()
# Save to Gold Layer
loan status counts.write.format("delta").mode("overwrite").save("/
FileStore/lending/gold/loan status counts")
```

```
# Aggregation Example 3 — Average DTI by home ownership
dti by home = df silver.groupBy("home ownership").agg(
   avg("dti").alias("avg dti")
)
# Save to Gold Layer
dti by home.write.format("delta").mode("overwrite").save("/FileStore/
lending/gold/dti by home ownership")
# Step 5: Show the first results
print("Loan Summary by Grade:")
loan summary by grade.show()
print("Loan Status Counts:")
loan status counts.show()
print("Average DTI by Home Ownership:")
dti by home.show()
Loan Summary by Grade:
+----+
|grade| avg_loan_amount| avg_interest_rate|
+----+
    F| 19124.64653110048| 25.45409066985592|
    E|17453.078391907933| 21.82965253356323|
    B | 14173.33819852703 | 10.67580623818657 |
    D| 15711.98300680591|18.143067189846647|
    C|15038.083317821778|14.143688622323502|
    A|14603.343209545825| 7.084545374764227|
    G|20383.988740959896|28.074255424062848|
 Loan Status Counts:
+----+
 loan_status| count|
 -----+
        Fully Paid|1076751|
            Default| 40|
In Grace Period | 8436 | Does not meet the... | 1988 |
        Charged Off| 268558|
  Late (31-120 days) | 21467|
            Current| 878317|
                    761
Does not meet the...
   Late (16-30 days) | 4349 |
      0ct-2015| 1|
Average DTI by Home Ownership:
```

+	++
home_ownership	avg_dti
+	++
OWN	19.096916330565303
	18.321027439692315
MORTGAGE	19.17011531831442
j ANY	18.07481927710843
OTHER	14.342044198895026
j NONE	20.157407407407405
2 years	NULL
+	++