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+-----+-----+-----+-----+
+-----+-----+-----+-----+
|      id|member_id|loan_amnt|funded_amnt|funded_amnt_inv|      term|
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|delinq_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_delinq|
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|
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_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
68407277	NULL	3600.0	3600.0	3600.0
13.99	123.03	C	C4	leadman
MORTGAGE	55000.0	Not Verified	Dec-2015	Fully Paid
n	https://lendingcl...	NULL	debt_consolidation	Debt consolidation
190xx	PA	5.91	0.0	Aug-2003
679.0	1.0		30.0	NULL

7.0	0.0	2765.0	29.7	13.0		w
0.0		0.0	4421.723916800001		4421.72	3600.0
821.72		0.0	0.0		0.0	Jan-
2019		122.67	NULL		Mar-2019	
564.0		560.0			0.0	
30.0	1.0	Individual		NULL	NULL	
NULL		0.0	722.0	144904.0	2.0	2.0
0.0	1.0		21.0	4981.0	36.0	3.0
3.0	722.0	34.0		9300.0	3.0	1.0
4.0		4.0	20701.0		1506.0	37.2
0.0	0.0		148.0		128.0	
3.0	3.0	1.0			4.0	
69.0		4.0				69.0
2.0	2.0		4.0	2.0	5.0	3.0
4.0	9.0		4.0	7.0		0.0
0.0		0.0		3.0		76.9
0.0		0.0	0.0		178050.0	7746.0
2400.0			13734.0		NULL	
NULL		NULL			NULL	
NULL	NULL		NULL		NULL	
NULL		NULL			NULL	
NULL			NULL		N	NULL
NULL	NULL		NULL		NULL	
NULL	NULL			NULL		NULL
NULL	NULL			NULL		NULL
NULL		NULL				NULL
NULL			NULL		Cash	
N		NULL		NULL		NULL
NULL		NULL		NULL		
68355089	NULL	24700.0	24700.0		24700.0	36 months
11.99	820.28	C	C1		Engineer	10+ years
MORTGAGE	65000.0		Not Verified	Dec-2015	Fully Paid	
n https://lendingcl...	NULL		small_business		Business	
577xx	SD 16.06		1.0	Dec-1999		715.0
719.0	4.0			6.0		NULL
22.0	0.0	21470.0	19.2	38.0		w
0.0	0.0		25679.66		25679.66	24700.0
979.66		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	1.0
0.0	1.0		19.0	18005.0	73.0	2.0
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	2.0	4.0			2.0	
NULL		0.0				6.0
0.0	5.0		5.0	13.0	17.0	6.0
20.0	27.0		5.0	22.0		0.0

0.0		0.0		2.0		97.4	
7.7		0.0	0.0	314017.0		39475.0	
79300.0		24667.0		NULL			
NULL		NULL		NULL			
NULL	NULL		NULL	NULL			
NULL		NULL		NULL			
NULL			NULL	N		NULL	
NULL	NULL		NULL	NULL			
NULL	NULL			NULL		NULL	
NULL		NULL				NULL	
NULL		NULL					NULL
NULL			NULL		Cash		
N		NULL		NULL		NULL	
NULL		NULL		NULL			
68341763	NULL	20000.0	20000.0	20000.0	60 months		
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		695.0		
699.0	0.0		NULL		NULL		
6.0	0.0	7869.0	56.2	18.0	w		
0.0	0.0	22705.924293878397		22705.92	20000.0		
2705.92		0.0	0.0		0.0	Jun-	
2017	15813.3	NULL		Mar-2019			
704.0	700.0			0.0			
NULL	1.0	Joint App		71000.0	13.85		
Not Verified		0.0	0.0	189699.0	0.0		
1.0	0.0	4.0		19.0	10827.0	73.0	
0.0	2.0	2081.0	65.0	14000.0	2.0		
5.0	1.0		6.0	31617.0	2737.0		
55.9		0.0	0.0		125.0		
184.0		14.0	14.0	5.0			
101.0		NULL		10.0			
NULL		0.0	2.0		3.0	2.0	
4.0	6.0	4.0	7.0		3.0		
6.0	0.0	0.0		0.0			
0.0	100.0	50.0		0.0	0.0		
218418.0		18696.0	6200.0		14877.0		
NULL		NULL		NULL			
NULL		NULL		NULL			
NULL		NULL		NULL			
NULL			NULL				
NULL	N	NULL	NULL	NULL	NULL		
NULL	NULL		NULL		NULL		
NULL	NULL		NULL		NULL		
NULL		NULL			NULL		
Cash		N		NULL		NULL	
NULL		NULL		NULL		NULL	
66310712	NULL	35000.0	35000.0	35000.0	60 months		
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		
076xx	NJ 17.06	0.0	Sep-2008	785.0	
789.0	0.0		NULL	NULL	
13.0	0.0	7802.0	11.6	17.0	w
15897.65	15897.65		31464.01	31464.01	
19102.35	12361.66		0.0	0.0	
0.0	Feb-2019	829.9	Apr-2019	Mar-2019	
679.0		675.0		0.0	
NULL	1.0	Individual	NULL	NULL	
NULL	0.0	0.0	301500.0	1.0	1.0
0.0	1.0	23.0	12609.0	70.0	1.0
1.0	6987.0	45.0	67300.0	0.0	1.0
0.0		2.0	23192.0	54962.0	12.1
0.0	0.0		36.0	87.0	
2.0	2.0	1.0		2.0	
NULL		NULL		NULL	
0.0	4.0		5.0	8.0	10.0
10.0	13.0		5.0	13.0	0.0
0.0		0.0	1.0	100.0	
0.0		0.0	0.0	381215.0	52226.0
62500.0		18000.0	NULL		
NULL		NULL	NULL	NULL	
NULL	NULL		NULL	NULL	
NULL		NULL		NULL	
NULL			NULL	N	NULL
NULL	NULL	NULL	NULL		
NULL	NULL		NULL	NULL	
NULL	NULL				NULL
NULL		NULL		Cash	
N		NULL	NULL	NULL	
NULL		NULL	NULL		
68476807	NULL	10400.0	10400.0	10400.0	60 months
22.45	289.91	F	F	Contract Specialist	3 years
MORTGAGE	104433.0	Source Verified	Dec-2015	Fully Paid	
n https://lendingcl...	NULL	major_purchase	Major purchase		
174xx	PA 25.37	1.0	Jun-1998	695.0	
699.0	3.0		12.0	NULL	
12.0	0.0	21929.0	64.5	35.0	w
0.0	0.0		11740.5	11740.5	10400.0
1340.5		0.0	0.0		0.0
2016	10128.96	NULL		Mar-2018	
704.0		700.0		0.0	
NULL	1.0	Individual	NULL	NULL	
NULL	0.0	0.0	331730.0	1.0	3.0
0.0	3.0	14.0	73839.0	84.0	4.0
7.0	9702.0	78.0	34000.0	2.0	1.0
3.0		10.0	27644.0	4567.0	77.5
0.0	0.0		128.0	210.0	

[illegible]


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|      id|member_id|loan_amnt|funded_amnt|funded_amnt_inv|      term|
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|delinq_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_delinq|
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|
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_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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+-----+-----+-----+-----+-----+-----+-----+

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68407277	NULL	3600.0	3600.0	3600.0	36 months
13.99	123.03	C	C4	leadman	10+ years
MORTGAGE	55000.0	Not Verified	Dec-2015	Fully Paid	
n https://lendingcl...	NULL	debt_consolidation	Debt consolidation		
190xx	PA	5.91	0.0	Aug-2003	675.0
679.0	1.0		30.0		NULL
7.0	0.0	2765.0	29.7	13.0	w
0.0	0.0	4421.723916800001		4421.72	3600.0
821.72		0.0	0.0		0.0
2019	122.67	NULL		Mar-2019	

564.0		560.0		0.0					
30.0	1.0	Individual		NULL		NULL			
NULL	0.0	722.0	144904.0	2.0		2.0			
0.0	1.0	21.0	4981.0	36.0		3.0			
3.0	722.0	34.0	9300.0	3.0	1.0				
4.0		4.0	20701.0	1506.0	37.2				
0.0	0.0		148.0		128.0				
3.0	3.0	1.0		4.0					
69.0		4.0			69.0				
2.0	2.0		4.0	2.0	5.0	3.0			
4.0	9.0		4.0	7.0		0.0			
0.0		0.0		3.0		76.9			
0.0		0.0	0.0		178050.0		7746.0		
2400.0		13734.0		NULL					
NULL		NULL		NULL					
NULL	NULL		NULL		NULL				
NULL		NULL			NULL				
NULL			NULL		N		NULL		
NULL	NULL		NULL		NULL				
NULL	NULL			NULL		NULL			
NULL		NULL					NULL		
NULL			NULL		Cash				
N		NULL		NULL		NULL			
NULL		NULL		NULL					
68355089	NULL	24700.0	24700.0		24700.0	36 months			
11.99	820.28	C	C1		Engineer	10+ years			
MORTGAGE	65000.0		Not Verified	Dec-2015	Fully Paid				
n https://lendingcl...	NULL		small_business		Business				
577xx	SD 16.06		1.0	Dec-1999		715.0			
719.0		4.0		6.0		NULL			
22.0	0.0	21470.0	19.2	38.0		w			
0.0	0.0		25679.66		25679.66		24700.0		
979.66		0.0	0.0			0.0	Jun-		
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	1.0			
0.0	1.0		19.0	18005.0	73.0		2.0		
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	2.0	4.0		2.0					
NULL		0.0			6.0				
0.0	5.0		5.0	13.0	17.0	6.0			
20.0	27.0		5.0	22.0		0.0			
0.0		0.0		2.0		97.4			
7.7		0.0	0.0		314017.0		39475.0		
79300.0		24667.0		NULL					
NULL		NULL		NULL					

NULL		NULL		NULL		NULL	
NULL		NULL				NULL	
NULL				NULL		N	NULL
NULL		NULL		NULL		NULL	
NULL		NULL		NULL		NULL	
NULL		NULL				NULL	
NULL				NULL		Cash	NULL
N		NULL		NULL		NULL	
NULL		NULL		NULL			
68341763	NULL	20000.0	20000.0		20000.0	60 months	
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	695.0	
699.0		0.0		NULL		NULL	
6.0	0.0	7869.0	56.2	18.0		w	
0.0		0.0 22705.924293878397			22705.92	20000.0	
2705.92		0.0	0.0			0.0	Jun-
2017	15813.3		NULL		Mar-2019		
704.0		700.0			0.0		
NULL	1.0	Joint App			71000.0	13.85	
Not Verified		0.0		0.0	189699.0	0.0	
1.0	0.0	4.0			19.0	10827.0	73.0
0.0	2.0	2081.0	65.0		14000.0	2.0	
5.0	1.0		6.0		31617.0	2737.0	
55.9		0.0		0.0		125.0	
184.0		14.0		14.0	5.0		
101.0		NULL			10.0		
NULL		0.0		2.0		3.0	2.0
4.0	6.0	4.0		7.0		3.0	
6.0		0.0		0.0		0.0	
0.0	100.0		50.0			0.0	0.0
218418.0		18696.0	6200.0				14877.0
NULL		NULL			NULL		
NULL		NULL		NULL		NULL	
NULL		NULL		NULL			
NULL			NULL				
NULL	N	NULL		NULL		NULL	
NULL	NULL		NULL		NULL		
NULL	NULL		NULL		NULL		
NULL		NULL				NULL	
Cash		N			NULL		NULL
NULL		NULL		NULL		NULL	
66310712	NULL	35000.0	35000.0		35000.0	60 months	
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		
076xx	NJ 17.06		0.0		Sep-2008	785.0	
789.0		0.0		NULL		NULL	

13.0	0.0	7802.0	11.6	17.0		w
15897.65		15897.65		31464.01		31464.01
19102.35		12361.66		0.0		0.0
0.0	Feb-2019		829.9	Apr-2019		Mar-2019
679.0		675.0		0.0		
NULL	1.0	Individual		NULL		NULL
NULL		0.0	0.0	301500.0	1.0	1.0
0.0	1.0		23.0	12609.0	70.0	1.0
1.0	6987.0	45.0		67300.0	0.0	1.0
0.0		2.0	23192.0	54962.0	12.1	
0.0	0.0		36.0		87.0	
2.0	2.0	1.0		2.0		
NULL		NULL			NULL	
0.0	4.0		5.0	8.0	10.0	2.0
10.0	13.0		5.0	13.0		0.0
0.0		0.0		1.0	100.0	
0.0		0.0	0.0	381215.0		52226.0
62500.0			18000.0	NULL		
NULL		NULL		NULL		
NULL	NULL		NULL		NULL	
NULL		NULL			NULL	
NULL			NULL		N	NULL
NULL	NULL		NULL	NULL		
NULL	NULL			NULL		NULL
NULL	NULL					NULL
NULL		NULL			Cash	
N		NULL		NULL		NULL
NULL		NULL		NULL		
68476807	NULL	10400.0	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...	NULL		major_purchase		Major purchase	
174xx	PA 25.37		1.0	Jun-1998		695.0
699.0	3.0			12.0		NULL
12.0	0.0	21929.0	64.5	35.0		w
0.0	0.0		11740.5		11740.5	10400.0
1340.5		0.0	0.0			0.0
2016	10128.96		NULL		Mar-2018	
704.0		700.0			0.0	
NULL	1.0	Individual		NULL		NULL
NULL		0.0	0.0	331730.0	1.0	3.0
0.0	3.0		14.0	73839.0	84.0	4.0
7.0	9702.0	78.0		34000.0	2.0	1.0
3.0		10.0	27644.0	4567.0	77.5	
0.0	0.0		128.0		210.0	
4.0	4.0	6.0		4.0		
12.0		1.0			12.0	
0.0	4.0		6.0	5.0	9.0	10.0
7.0	19.0		6.0	12.0		0.0

[illegible]

A set of five horizontal dashed lines for handwriting practice. Each line has a small plus sign (+) at a specific position: the first line has a plus sign at the beginning; the second line has a plus sign in the middle; the third line has a plus sign towards the end; the fourth line has a plus sign in the middle; and the fifth line has a plus sign towards the end.

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 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)
```

A handwriting practice sheet featuring 15 rows of dashed lines. Each row contains a series of plus signs (+) at regular intervals, with the number of plus signs decreasing from 15 in the first row to 1 in the last row. The plus signs are positioned on the dashed lines to guide letter height and placement.

```

+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
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+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
|      id|member_id|loan_amnt|funded_amnt|funded_amnt_inv|      term|
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|delinq_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_delinq|
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|
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_delinq|num_accts_ever_120_pd|num_actv_bc_tl|

```



```

+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+
|6300587|    NULL| 12000.0| 12000.0|    12000.0| 36 months|
15.22|    417.28|    C|    C3|    NULL|    NULL|
MORTGAGE| 42000.0| Source Verified|Jul-2013| Fully Paid|
n|https://lendingcl...|    NULL|    credit_card|Credit
Card Payoff| 713xx|    LA| 3.8|    0.0|    Oct-1996|
670.0|    674.0|    0.0|    33.0|
NULL|    7.0|    0.0| 3108.0| 91.4| 29.0|
f|    0.0|    0.0|13885.726104168401| 13885.73|
12000.0| 1864.87|20.8600000009100002| 0.0|
0.0| Nov-2014| 108.83|    NULL|    Nov-2014|
619.0|    615.0|    0.0|
NULL|    1.0| Individual|    NULL|    NULL|
NULL|    0.0|    0.0| 3108.0|    NULL|    NULL|
NULL|    NULL|    NULL|    NULL|    NULL|    NULL|
NULL|    NULL|    NULL| 3400.0|    NULL|    NULL|
NULL|    2.0| 1036.0|    NULL|    NULL|
0.0|    0.0| 141.0|    204.0|
18.0|    18.0| 1.0|    NULL|
NULL|    18.0|
0.0|    0.0| 3.0|    0.0| 4.0| 8.0|
7.0| 20.0|    3.0| 7.0|    0.0|
0.0|    0.0|    0.0|    96.0|
NULL|    0.0| 0.0| 3400.0|    3108.0|
0.0|    0.0|    NULL|    NULL|    NULL|
NULL|    NULL|    NULL|    NULL|
NULL|    NULL|    NULL|    NULL|
NULL|    N|    NULL|    NULL|    NULL|
NULL|    NULL|    NULL|    NULL|
NULL|    NULL|    NULL|    NULL|
NULL|    NULL|    NULL|    NULL|
Cash|    N|    NULL|    NULL|    NULL|
NULL|    NULL|    NULL|    NULL|
|6311418|    NULL| 7125.0| 7125.0|    7125.0| 36 months|
15.88| 250.08|    C|    C4| century concrete| 10|
RENT| 30000.0| Not Verified|Jul-2013| Fully Paid| n|
https://lendingcl...| Borrower added ...| other|
Other| 236xx| VA|13.28| 0.0| Jun-2000|

```

695.0		699.0		0.0		NULL	
93.0	8.0	1.0	3385.0	25.5	15.0		
f	0.0		0.0	7220.924234675899		7220.92	
7125.0		95.92		0.0	0.0		
0.0	Sep-2013		7220.52	NULL		Aug-2018	
614.0		610.0			0.0		
NULL	1.0	Individual		NULL		NULL	
NULL	0.0	150.0	9090.0	NULL	NULL	NULL	
NULL	NULL	NULL	13300.0	NULL	NULL	NULL	
NULL	NULL	NULL	1136.0	1842.0	29.2		
0.0	0.0	81.0		159.0			
15.0	5.0	0.0		15.0			
NULL		15.0			NULL		
0.0	1.0	3.0	3.0	5.0	4.0		
6.0	11.0	4.0	8.0		0.0		
0.0	0.0		2.0	100.0			
0.0	1.0	0.0	20200.0		9090.0		
2600.0		6900.0	NULL				
NULL		NULL	NULL				
NULL	NULL		NULL		NULL		
NULL	NULL				NULL		
NULL		NULL		N	NULL		
NULL	NULL	NULL	NULL				
NULL	NULL		NULL		NULL		
NULL	NULL			NULL		NULL	
NULL	NULL					NULL	
NULL		NULL		Cash			
N		NULL	NULL	NULL	NULL		
NULL		NULL	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	Apr-2016	13979.48	NULL		Apr-2016		
734.0		730.0		0.0			
NULL	1.0	Individual		NULL	NULL		
NULL	0.0	0.0	43016.0	NULL	NULL	NULL	
NULL	NULL	NULL	43900.0	NULL	NULL	NULL	
NULL	NULL	2.0	5377.0	9236.0	76.3		
0.0	0.0	123.0		184.0			
12.0	12.0	2.0		66.0			
NULL		12.0			NULL		
0.0	5.0	6.0	5.0	9.0	2.0		

7.0	11.0		6.0	8.0	0.0
0.0	0.0		1.0	100.0	
80.0	0.0	0.0		58199.0	30048.0
38900.0		0.0		NULL	
NULL		NULL		NULL	
NULL	NULL		NULL	NULL	
NULL	NULL			NULL	
NULL		NULL		N	NULL
NULL	NULL	NULL		NULL	
NULL	NULL		NULL		NULL
NULL	NULL			NULL	NULL
NULL	NULL				NULL
NULL		NULL		Cash	
N		NULL		NULL	NULL
NULL		NULL		NULL	
6300526	NULL	24000.0	24000.0	24000.0	36 months
6.03	730.46	A	A1	Lexington family ...	10
MORTGAGE	114107.0		Verified	Jul-2013	Fully Paid
n	https://lendingcl...	Borrower added ...		credit_card	
Refinance loan	272xx	NC	7.08	0.0	Oct-1996
755.0	759.0	0.0		NULL	
NULL	11.0	0.0	29366.0	38.2	43.0
f	0.0	0.0	26296.2757411036		26296.28
24000.0	2296.28		0.0	0.0	
0.0	Aug-2016	730.17	NULL		Nov-2018
769.0		765.0		0.0	
NULL	1.0	Individual		NULL	NULL
NULL	0.0	0.0	286131.0	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL
NULL	NULL	NULL	76900.0	NULL	NULL
NULL	3.0	26012.0	34634.0	45.9	
0.0	0.0	132.0		204.0	
7.0	7.0	7.0	7.0		
NULL		7.0		NULL	
0.0	2.0		2.0	6.0	13.0
10.0	31.0		2.0	11.0	0.0
0.0	0.0		2.0		100.0
0.0	0.0	0.0		336489.0	29366.0
64000.0		0.0		NULL	
NULL		NULL		NULL	
NULL	NULL		NULL	NULL	
NULL	NULL			NULL	
NULL		NULL		N	NULL
NULL	NULL	NULL		NULL	
NULL	NULL		NULL		NULL
NULL	NULL			Cash	
N		NULL		NULL	NULL
NULL		NULL		NULL	
6301469	NULL	18000.0	18000.0	18000.0	60 months

[illegible]

```

# 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
Does not meet the...	761
Late (16-30 days)	4349
Oct-2015	1

Average DTI by Home Ownership:

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