




# **BANK LOAN CASE STUDY**

Here is where the presentation begins  
By Vishalini Devarajan



# Table of Contents

**01**

**Description**

**02**

**Approch**

**03**

**Tech Used**

**04**

**Content Plan**

**05**

**Result**

# Description

This project aims to uncover patterns that predict whether a customer might struggle with loan repayments. The insights gained can inform decisions like loan denial, reducing loan amounts, or charging higher interest rates for high-risk applicants. Our analysis focuses on the following aspects:

- Identifying and appropriately handling missing data
- Detecting outliers within the dataset
- Examining data imbalance
- Conducting univariate, segmented univariate, and bivariate analyses
- Determining the top correlations for various scenarios

# Approach

- Clean the data by identifying and addressing missing values using suitable imputation techniques.
- Conduct Exploratory Data Analysis (EDA) with univariate, bivariate, and segmented analyses.
- Utilize Excel's charting tools to create visual representations of key findings.
- Summarize insights and patterns in a clear and concise report to guide decisions on loan approvals.

# Tech used



Microsoft Excel

# Missing Data

Task A: Identify and address missing data in the dataset using Excel's built-in functions and features.

- Use the COUNT, IF, and ISBLANK functions to determine the number of null values in each column.
- Calculate the percentage of null values for each column.
- Apply the TRANSPOSE function to convert rows to columns.
- Remove columns that have 50% or more null values.
- Eliminate irrelevant columns from the analysis.

# Missing Data

Column name	no_of_null_values	Percentage_of_null_values
COMMONAREA_AVG	34960	70%
COMMONAREA_MODE	34960	70%
COMMONAREA_MEDI	34960	70%
NONLIVINGAPARTMENTS_AVG	34714	69%
NONLIVINGAPARTMENTS_MODE	34714	69%
NONLIVINGAPARTMENTS_MEDI	34714	69%
LIVINGAPARTMENTS_AVG	34226	68%
LIVINGAPARTMENTS_MODE	34226	68%
LIVINGAPARTMENTS_MEDI	34226	68%
FONDKAPREMONT_MODE	34191	68%
FLOORSMIN_AVG	33894	68%
FLOORSMIN_MODE	33894	68%
FLOORSMIN_MEDI	33894	68%
YEARS_BUILD_AVG	33239	66%
YEARS_BUILD_MODE	33239	66%
YEARS_BUILD_MEDI	33239	66%
OWN_CAR_AGE	32949	66%
LANDAREA_AVG	29721	59%
LANDAREA_MODE	29721	59%
LANDAREA_MEDI	29721	59%
BASEMENTAREA_AVG	29199	58%
BASEMENTAREA_MODE	29199	58%
BASEMENTAREA_MEDI	29199	58%
EXT_SOURCE_1	28172	56%
NONLIVINGAREA_AVG	27572	55%
NONLIVINGAREA_MODE	27572	55%
NONLIVINGAREA_MEDI	27572	55%
ELEVATORS_AVG	26651	53%
ELEVATORS_MODE	26651	53%
ELEVATORS_MEDI	26651	53%
WALLSMATERIAL_MODE	25459	51%
APARTMENTS_AVG	25385	51%
APARTMENTS_MODE	25385	51%
APARTMENTS_MEDI	25385	51%
ENTRANCES_AVG	25195	50%
ENTRANCES_MODE	25195	50%
ENTRANCES_MEDI	25195	50%
LIVINGAREA_AVG	25137	50%
LIVINGAREA_MODE	25137	50%
LIVINGAREA_MEDI	25137	50%
HOUSETYPE_MODE	25075	50%
FLOORSMAX_AVG	24875	50%
FLOORSMAX_MODE	24875	50%
FLOORSMAX_MEDI	24875	50%

These are the columns which has null values more than or equal to 50%. These columns need to be dropped.

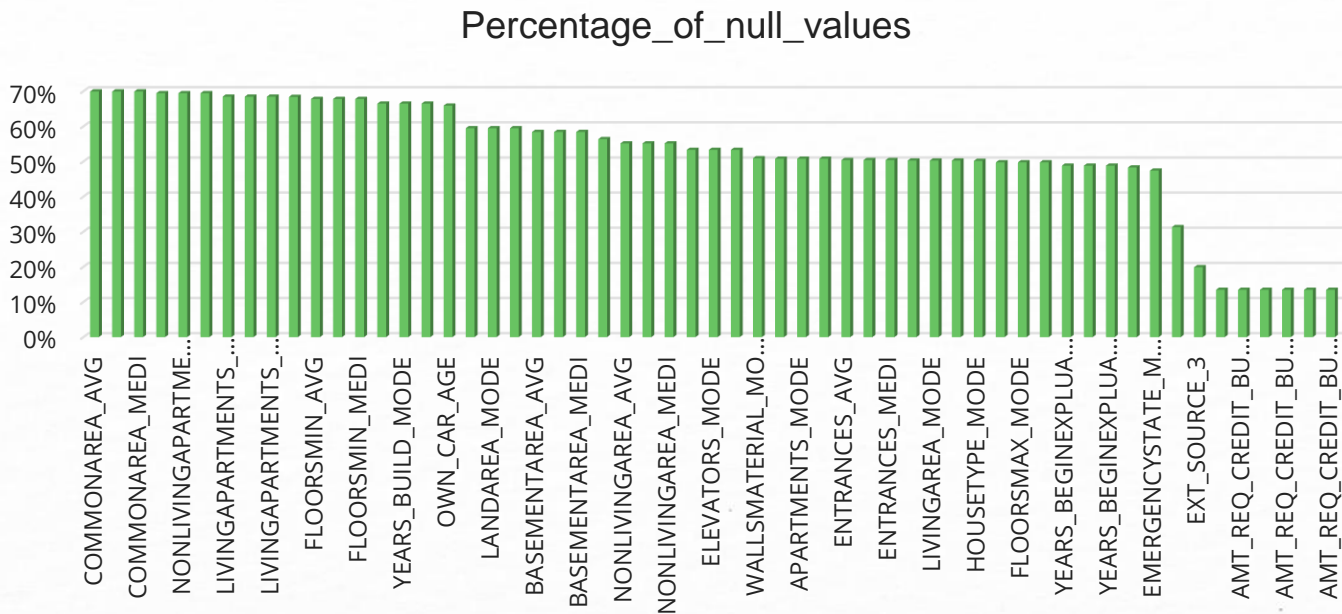
# Missing Data

Column name	no_of_null_values	Percentage_of_null_values
FLAG_MOBIL	0	0%
FLAG_EMP_PHONE	0	0%
FLAG_WORK_PHONE	0	0%
FLAG_CONT_MOBILE	0	0%
FLAG_PHONE	0	0%
FLAG_EMAIL	0	0%
CNT_FAM_MEMBERS	1	0%
REGION_RATING_CLIENT	0	0%
REGION_RATING_CLIENT_W_CITY	0	0%
EXT_SOURCE_2	126	0%
EXT_SOURCE_3	9944	20%
YEARS_BEGINEXPLUATATION_AVG	24394	49%
YEARS_BEGINEXPLUATATION_MODE	24394	49%
YEARS_BEGINEXPLUATATION_MEDI	24394	49%
TOTALAREA_MODE	24148	48%
EMERGENCYSTATE_MODE	23698	47%
DAYS_LAST_PHONE_CHANGE	1	0%
FLAG_DOCUMENT_2	0	0%
FLAG_DOCUMENT_3	0	0%
FLAG_DOCUMENT_4	0	0%
FLAG_DOCUMENT_5	0	0%
FLAG_DOCUMENT_6	0	0%
FLAG_DOCUMENT_7	0	0%
FLAG_DOCUMENT_8	0	0%
FLAG_DOCUMENT_9	0	0%
FLAG_DOCUMENT_10	0	0%
FLAG_DOCUMENT_11	0	0%
FLAG_DOCUMENT_12	0	0%
FLAG_DOCUMENT_13	0	0%
FLAG_DOCUMENT_14	0	0%
FLAG_DOCUMENT_15	0	0%
FLAG_DOCUMENT_16	0	0%
FLAG_DOCUMENT_17	0	0%
FLAG_DOCUMENT_18	0	0%
FLAG_DOCUMENT_19	0	0%
FLAG_DOCUMENT_20	0	0%
FLAG_DOCUMENT_21	0	0%

These are the columns which have irrelevant data for analysis. These columns need to be dropped.



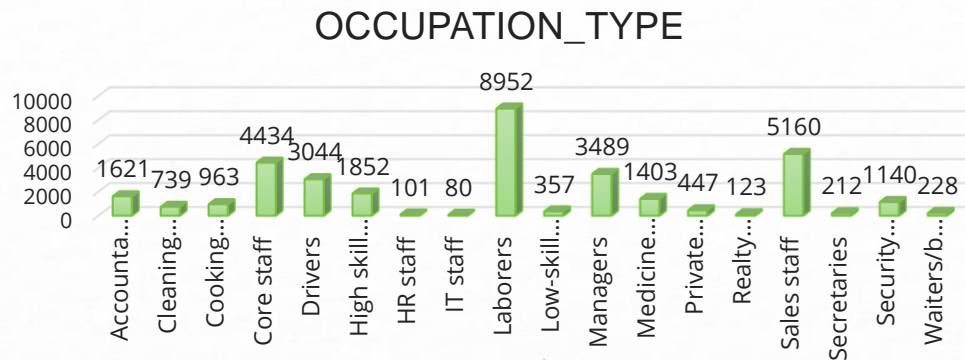
# Missing Data



# Missing Data

Mode Imputations:

## 1. OCCUPATION\_TYPE

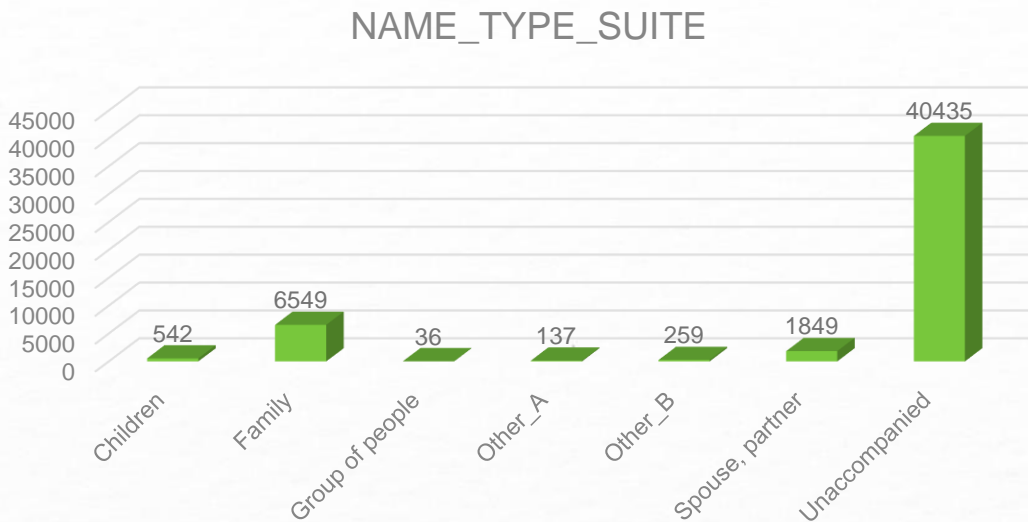


Most Occurring Variable is Laborers. We will replace blanks with 8952.

# Missing Data

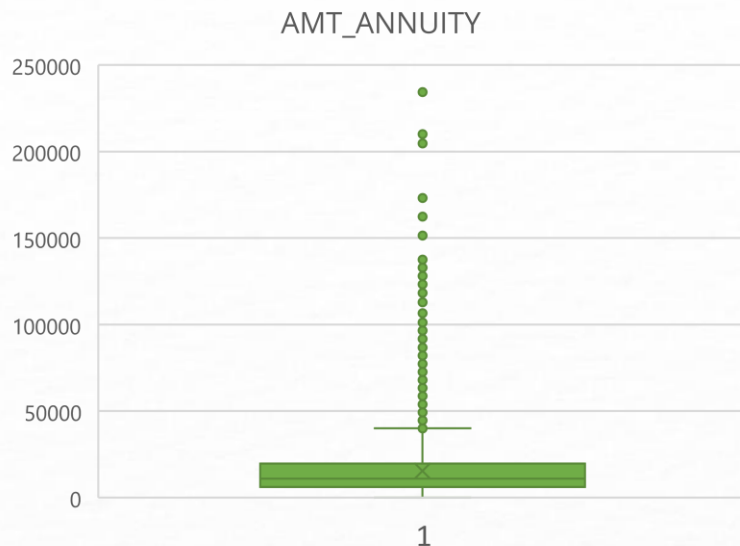
Mode:

2. NAME\_TYPE\_SUITE



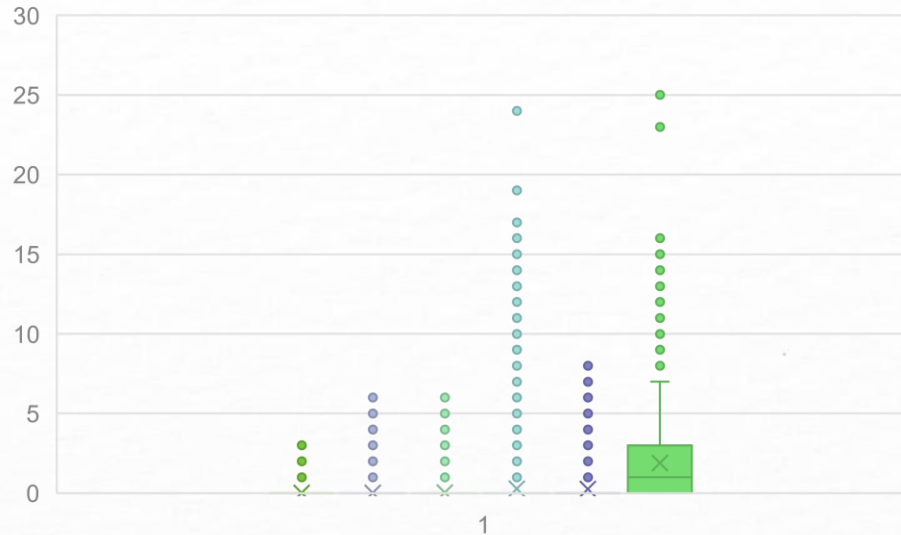
# Missing Data

## Median Imputations



# Missing Data

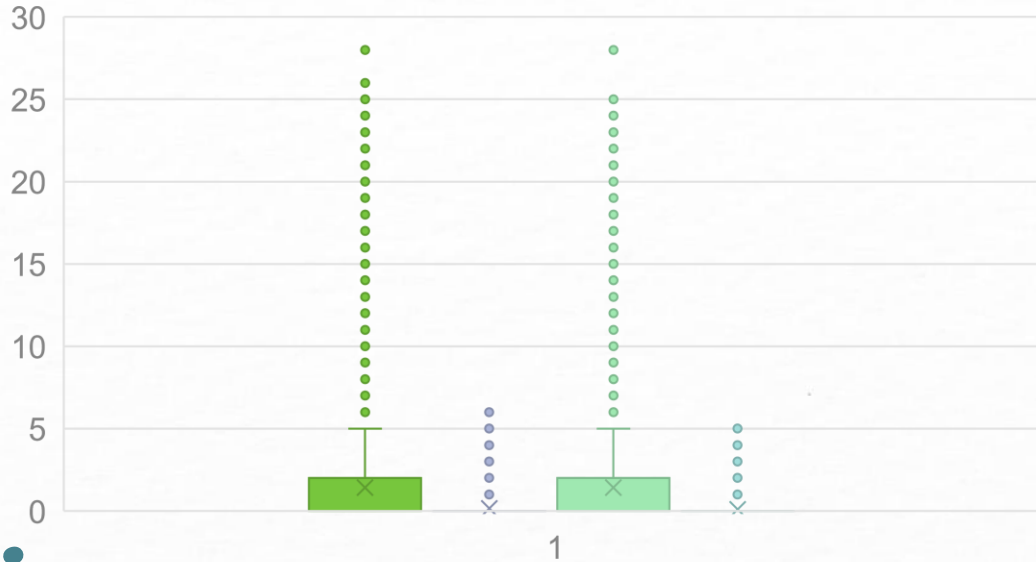
Median Imputation:



- 3. AMT\_REQ\_CREDIT\_BUREAU\_HOUR
- 4. AMT\_REQ\_CREDIT\_BUREAU\_DAY
- 5. AMT\_REQ\_CREDIT\_BUREAU\_WEEK
- 6. AMT\_REQ\_CREDIT\_BUREAU\_MON
- 7. AMT\_REQ\_CREDIT\_BUREAU\_QRT
- 8. AMT\_REQ\_CREDIT\_BUREAU\_YEAR

# Missing Data

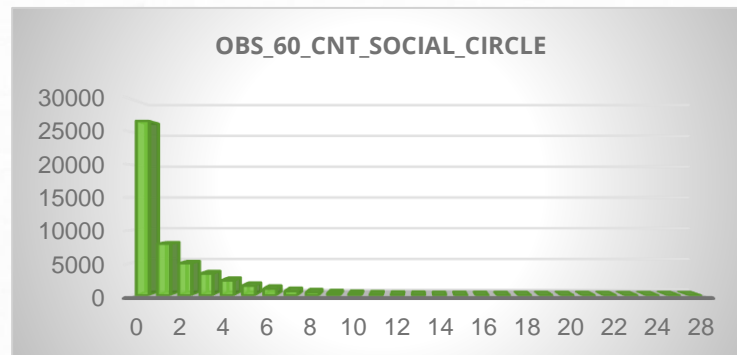
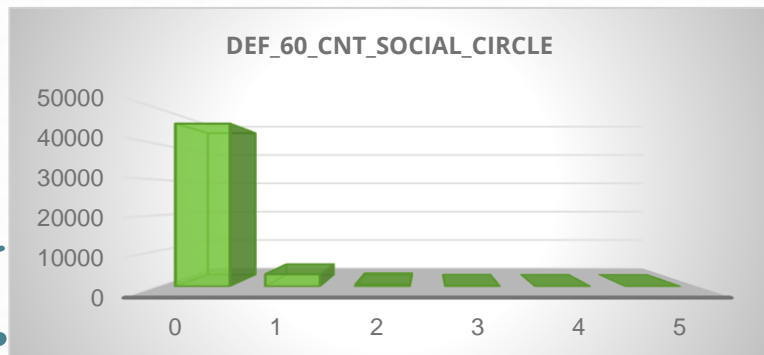
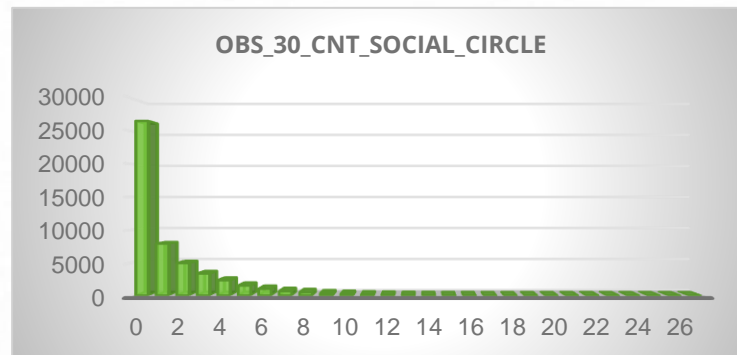
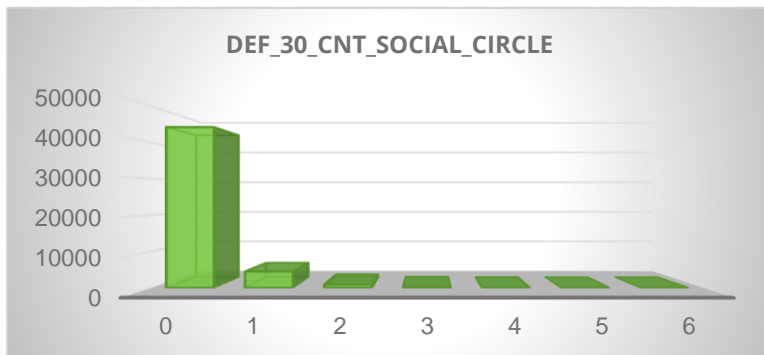
Median/Mode Imputations:



1. DEF\_30\_CNT\_SOCIAL\_CIRCLE
2. OBS\_30\_CNT\_SOCIAL\_CIRCLE
3. DEF\_60\_CNT\_SOCIAL\_CIRCLE
4. OBS\_60\_CNT\_SOCIAL\_CIRCLE

# Missing Data

Median/Mode Imputations:



# Missing Data

## Previous\_application Datasets:

Column name	no_of_null_values	Percentage_of_null_values
RATE_INTEREST_PRIMARY	49833	99.67%
RATE_INTEREST_PRIVILEGED	49833	99.67%
AMT_DOWN_PAYMENT	25197	50.40%
RATE_DOWN_PAYMENT	25197	50.40%

These are the columns which has null values more than or equal to 50%. These columns need to be dropped.

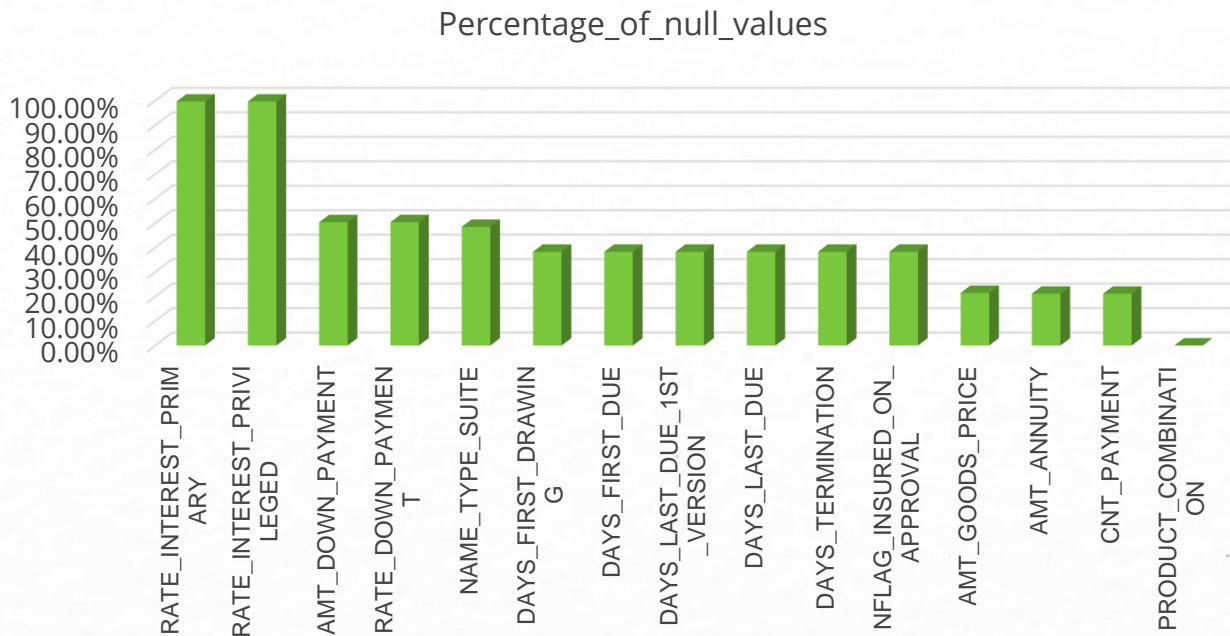
Column name	no_of_null_values	Percentage_of_null_values
NAME_TYPE_SUITE	24243	48.49%
PRODUCT_COMBINATION	8	0.02%
WEEKDAY_APPR_PROCESS_START	0	0.00%
HOURLY_APPR_PROCESS_START	0	0.00%
FLAG_LAST_APPL_PER_CONTRACT	0	0.00%
NFLAG_LAST_APPL_IN_DAY	0	0.00%

These are the columns which have irrelevant data for analysis. These columns need to be dropped.



# Missing Data

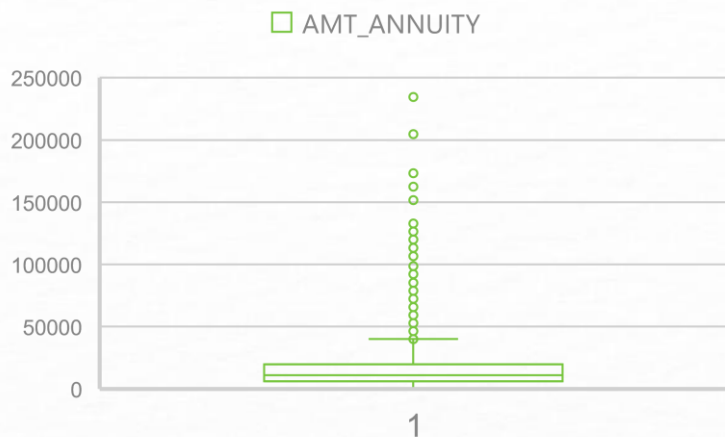
Previous\_application datasets



# Missing Data

Previous\_application datasets:

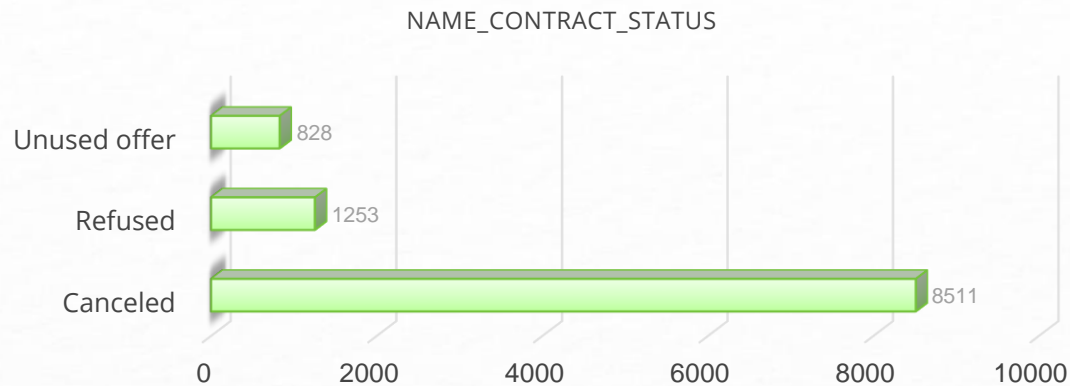
Median Imputations:



# Missing Data

Previous\_application datasets

## 1. Custom Imputations:

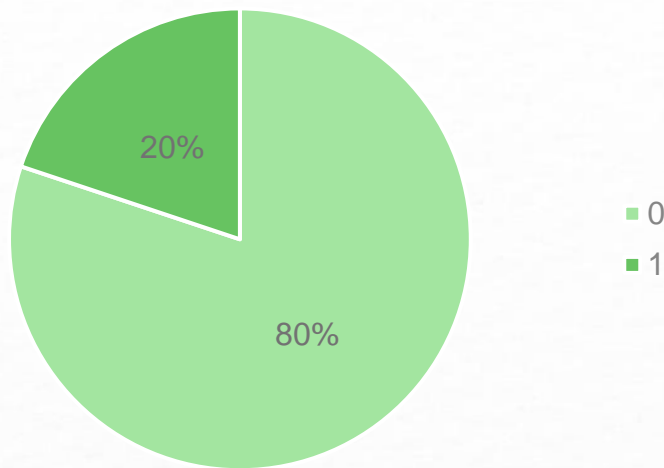


# Missing Data

Previous\_application datasets

Mode Imputations:

NFLAG\_INSURED\_ON\_APPROVAL



# Outliers

Task B: Detect and identify outliers in the dataset using Excel statistical functions and features, focusing on numerical variables.

- First we will select numerical columns like AMT\_INCOME\_TOTAL and AMT\_CREDIT.
- Calculate Quartile 1, Quartile 3, IQR, Upper Limit and Lower Limit.
- We will use Box Plot to highlight the outliers

AMT_INCOME_TOTAL	
Quartile 1	112500
Quartile 3	202500
IQR	90000
Upper Limit	337500
Lower Limit	-22500

## Formulas:

Quartile 1 : =QUARTILE(A:A,1 )

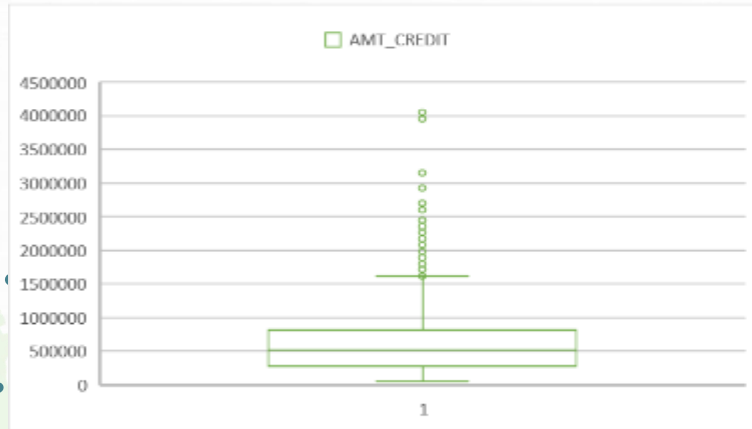
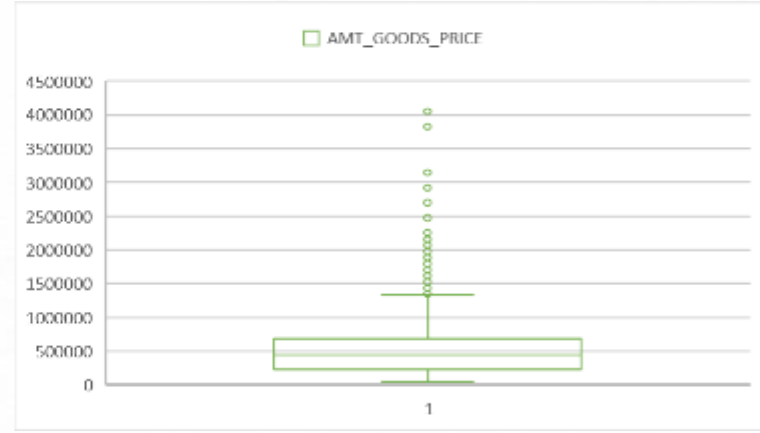
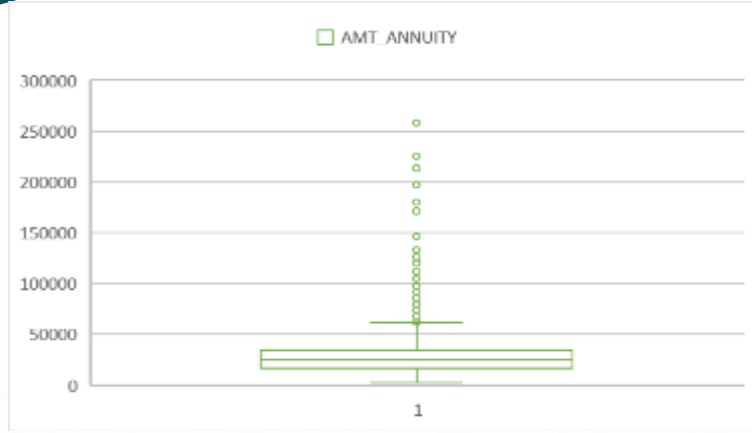
Quartile 3 : =QUARTILE(A:A,3)

IQR = Quartile 3 - Quartile 1

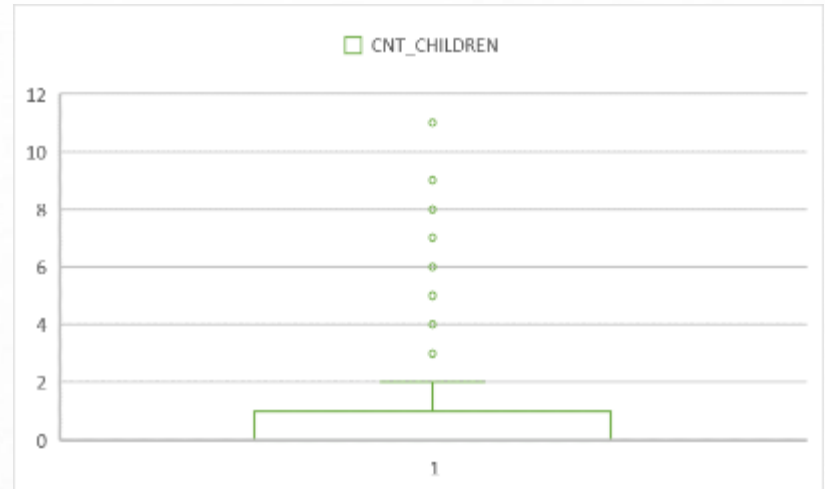
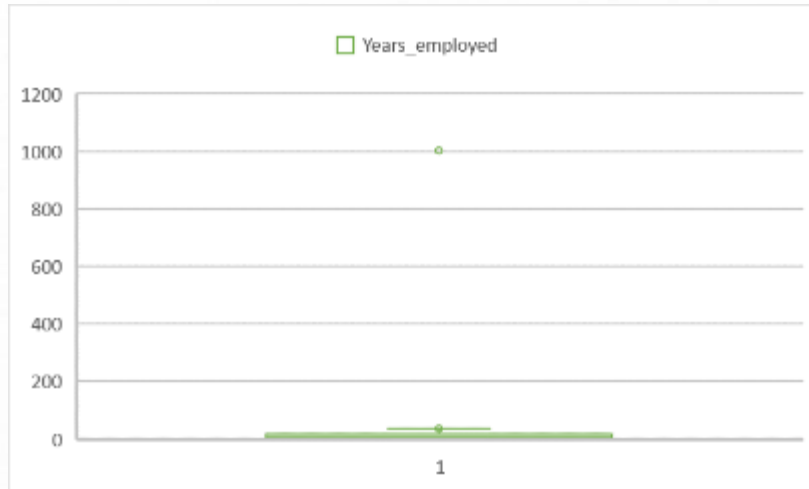
Upper Limit = Quartile 3 + 1.5\*IQR

Lower Limit = Quartile 1 - 1.5IQR

# Outliers

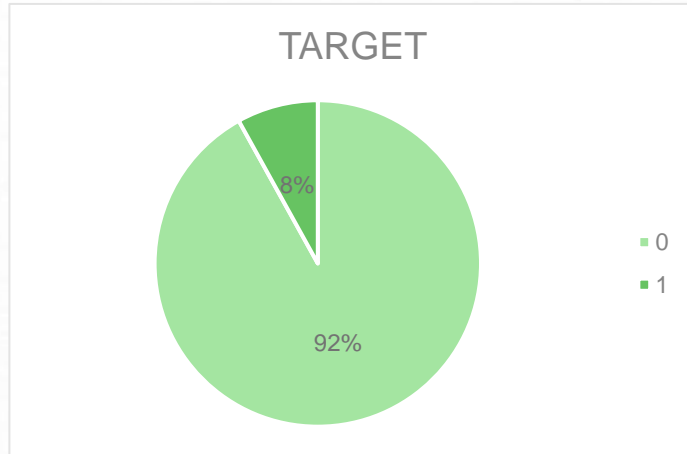


# Outliers



# Data Imbalance

Task C: Determine if there is data imbalance in the loan application dataset and calculate the ratio of data imbalance using Excel functions.

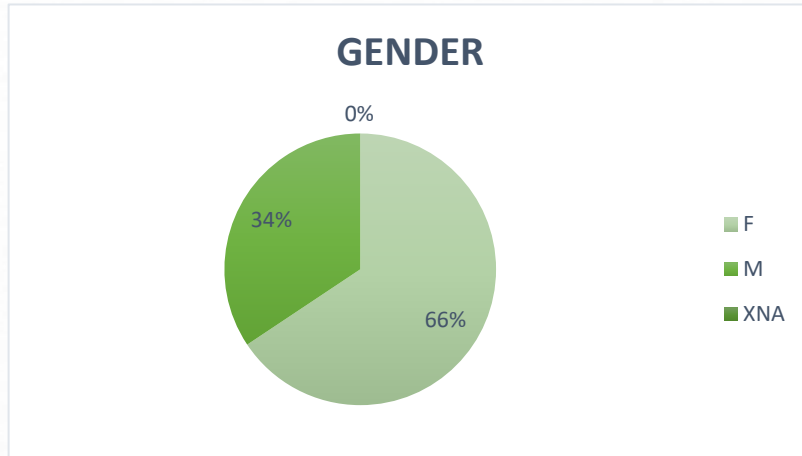


Row Labels	Count of TARGET
0	45973
1	4026
Grand Total	49999



# Data Imbalance

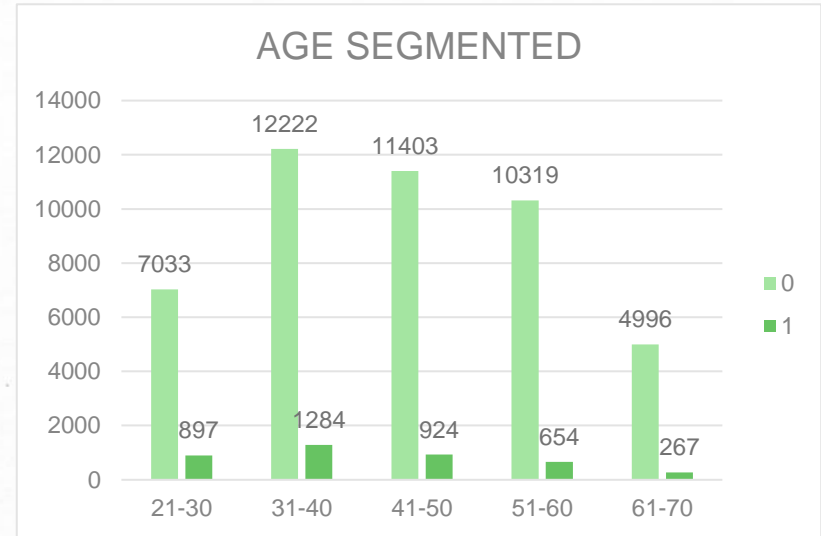
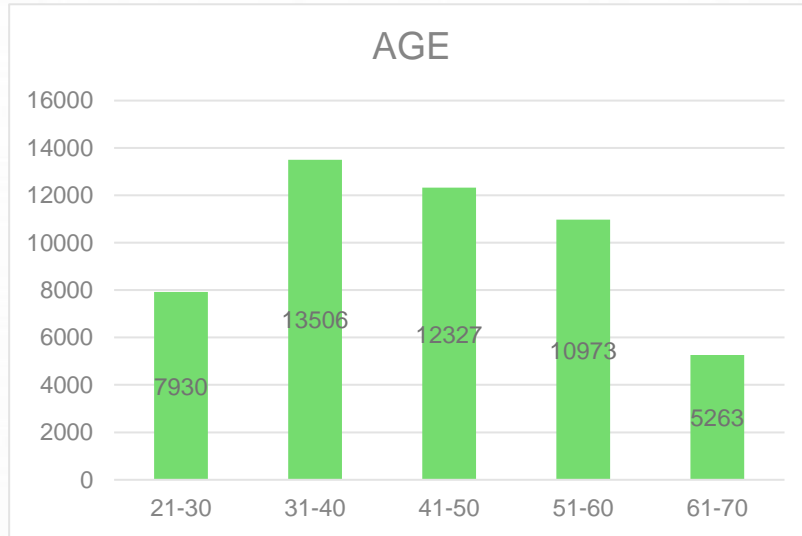
CODE\_GENDER COLUMN



GENDER	Count of CODE_GENDER
F	32823
M	17174
XNA	2
Grand Total	49999

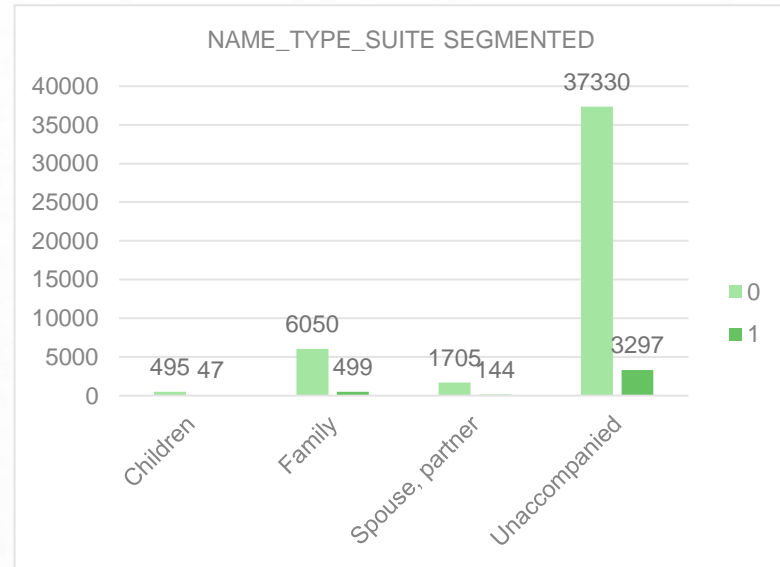
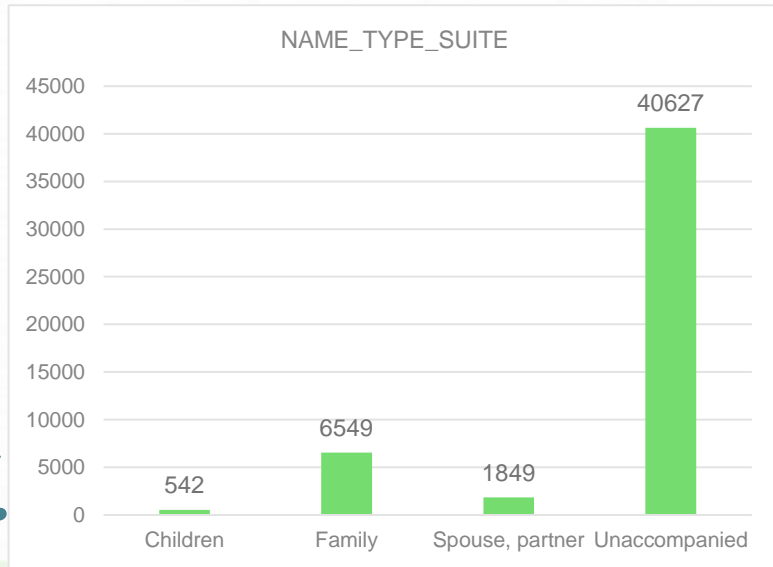
# Univariate/Segmented Univariate Analysis

Task D: Perform univariate analysis to understand the distribution of individual variables, segmented univariate and bivariate analysis.



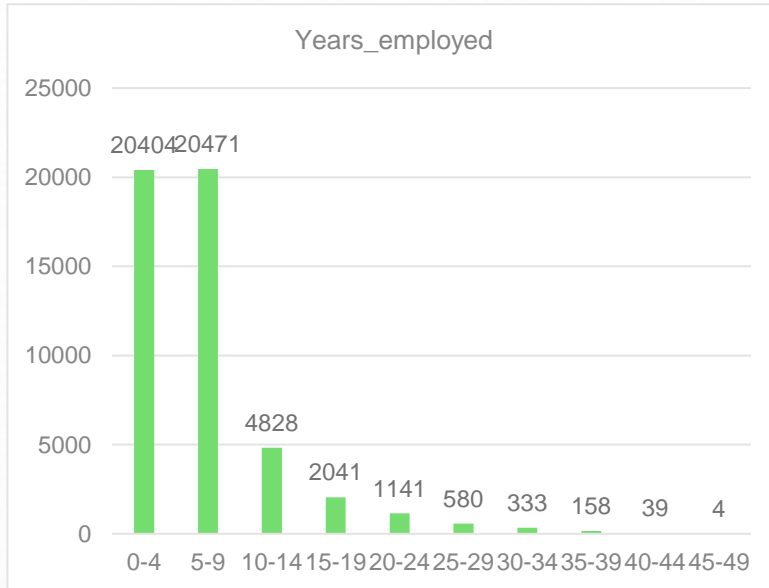
# Univariate/Segmented Univariate Analysis

Majority of the Clients are Unaccompanied followed by Family.

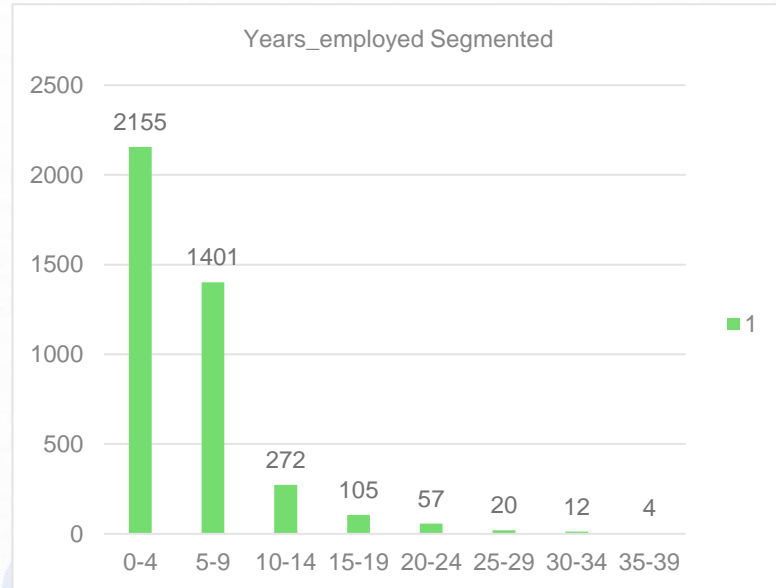


# Univariate/Segmented Univariate Analysis

Majority of the Clients are having 0-9 years of experience

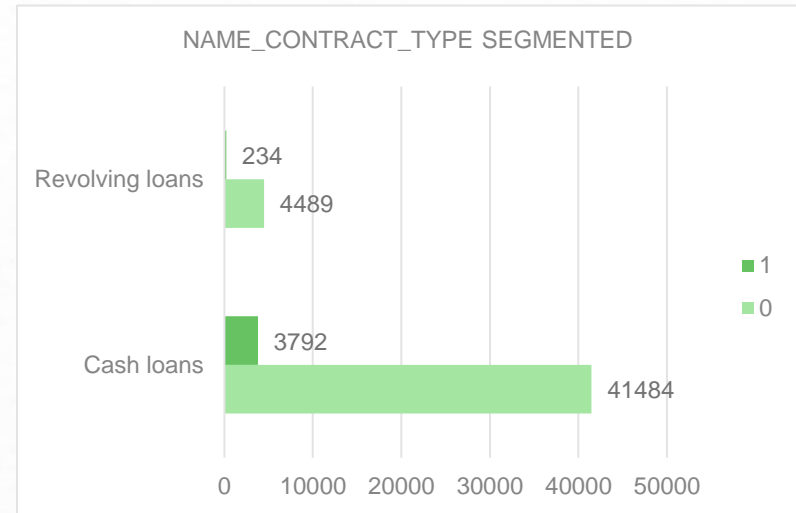
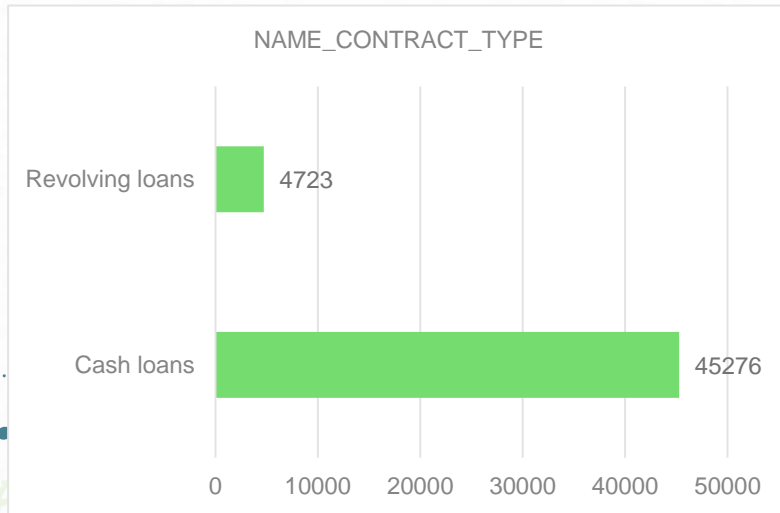


We can see as experience increases , chances of defaulting decreases.



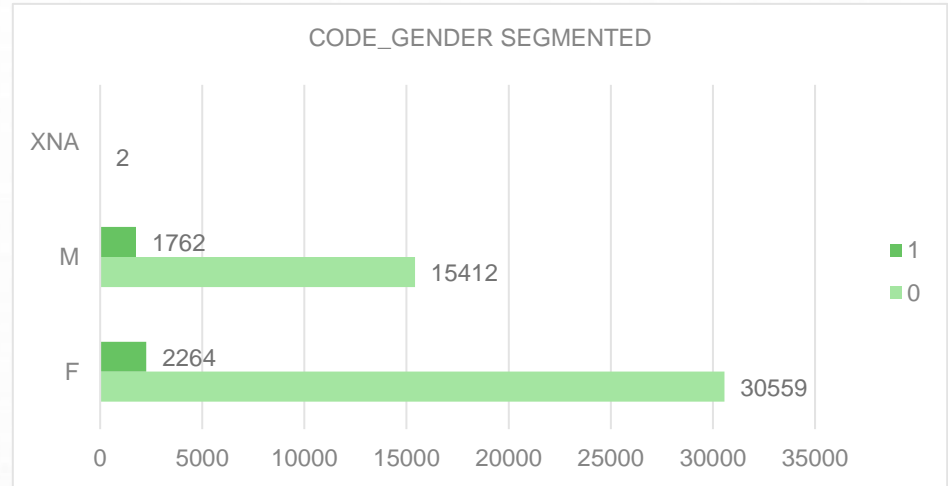
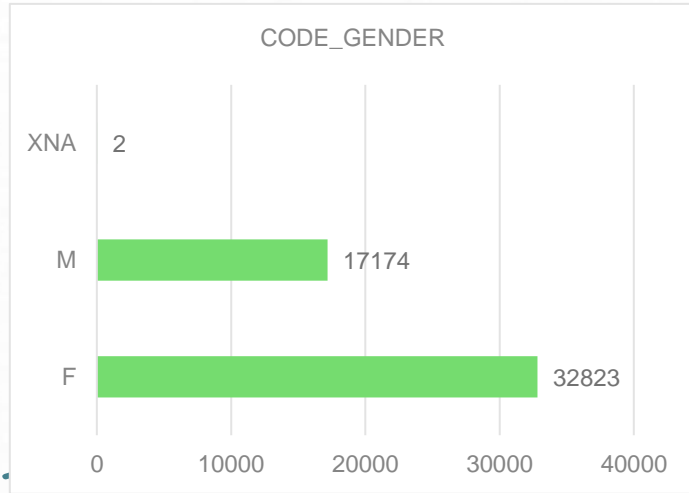
# Univariate/Segmented Univariate Analysis

Majority of the Clients are taking Cash loans.



# Univariate/Segmented Univariate Analysis

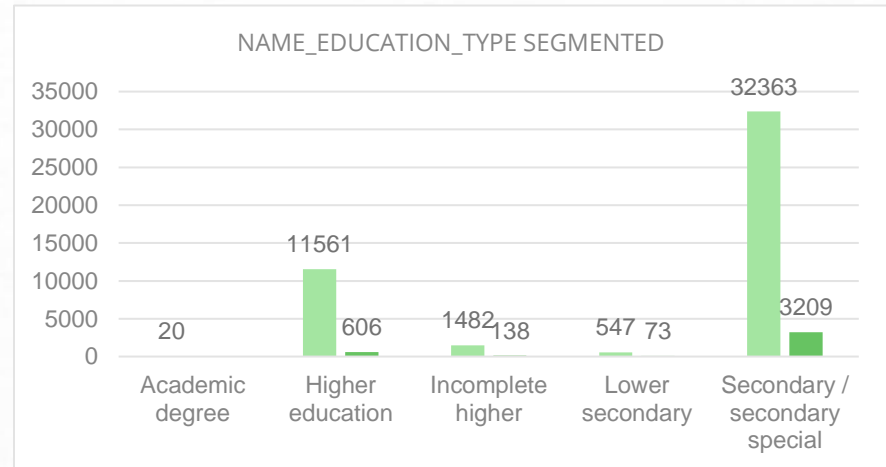
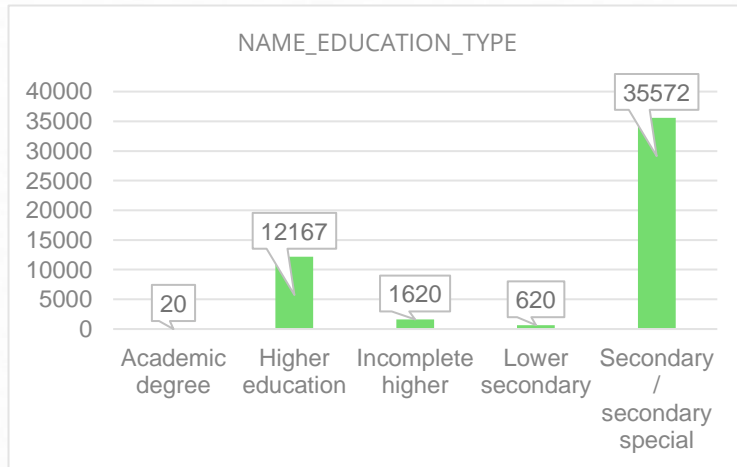
Male are less defaulters compared to Female.



# Univariate/Segmented Univariate Analysis

The numbers of loans taken by Clients with Secondary special Education is the highest and Academic degree is the lowest

Least default: Academic degree Highest default: Secondary special

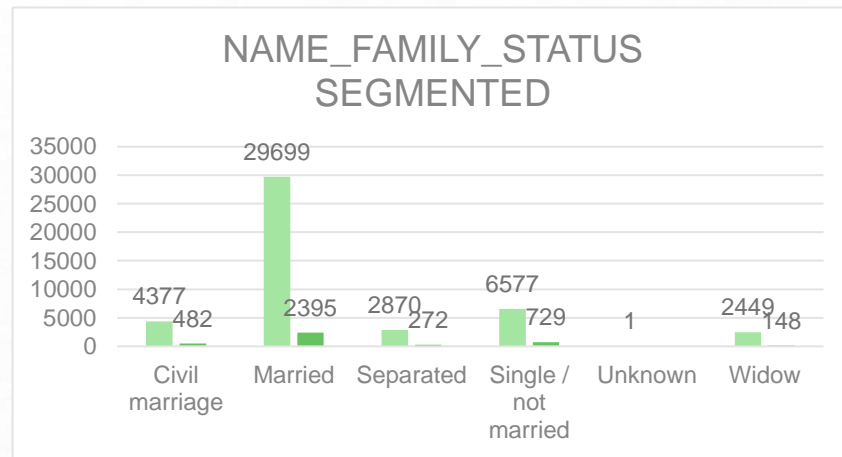
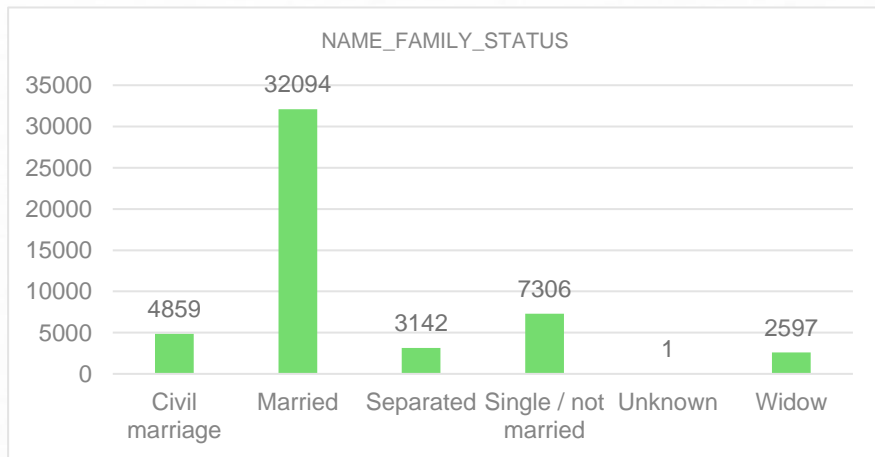


# Univariate/Segmented Univariate Analysis

The number of loans taken by Married clients are the highest and clients who are widows are the least if we ignore unknown.

Least Defaulter: Widow

Highest Defaulter : Married

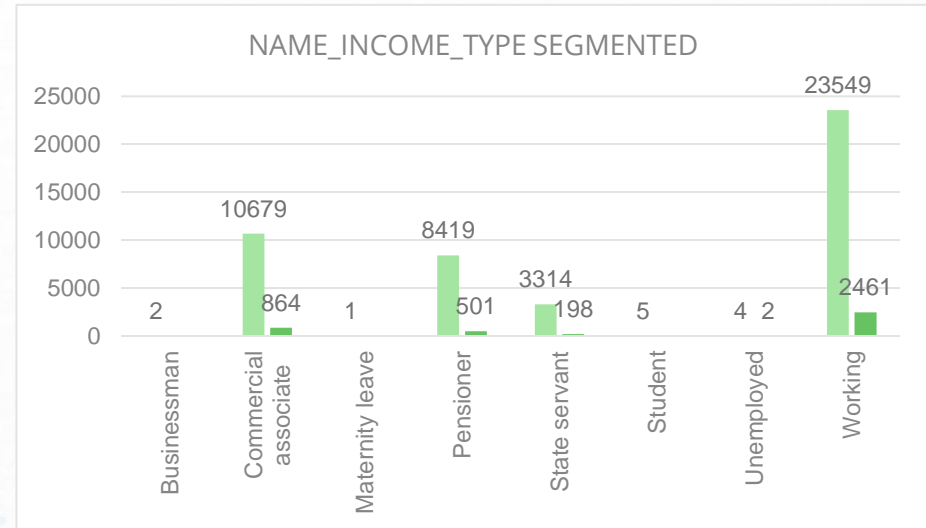
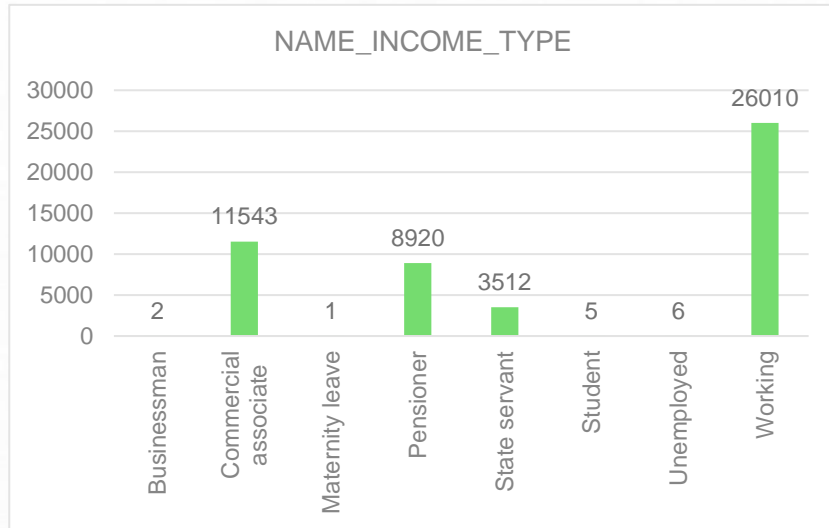




# Univariate/Segmented Univariate Analysis

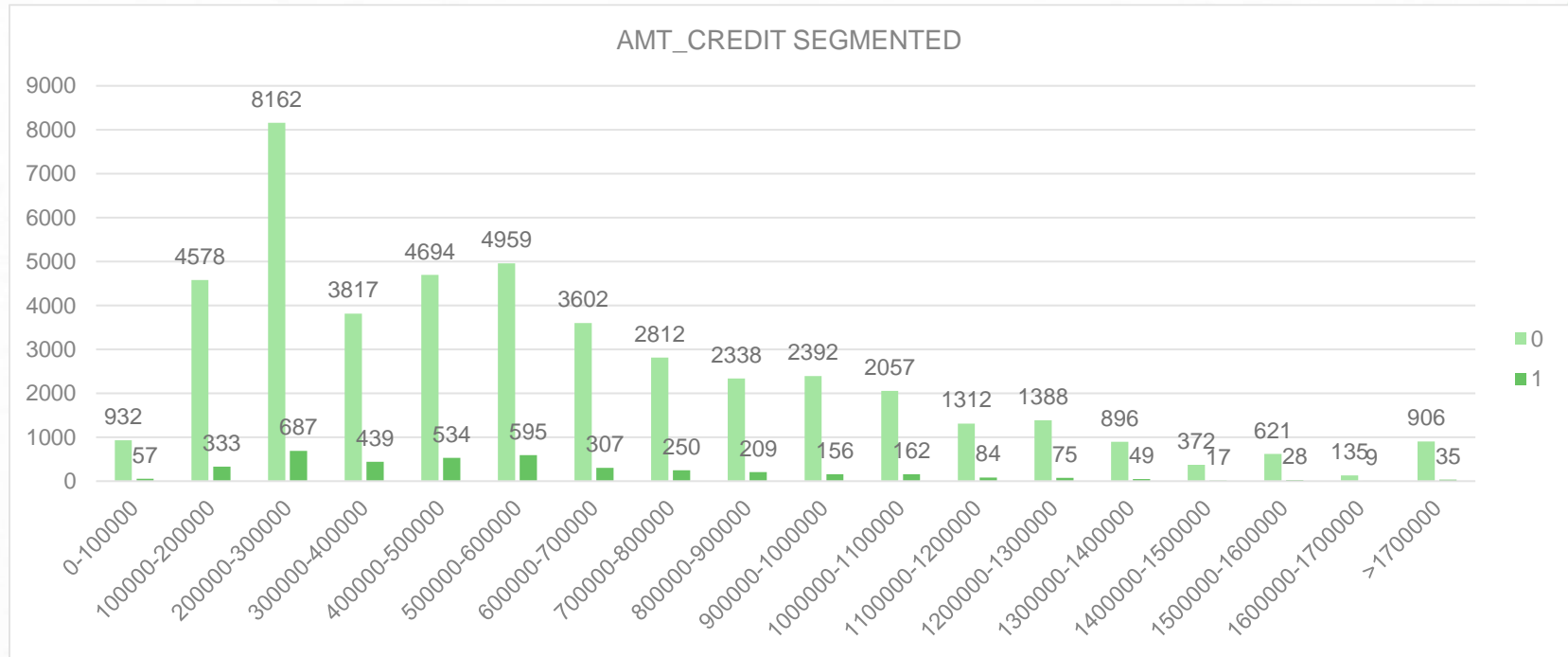
Bank target those groups whose income type is working.

Least default: Academic degree Highest default: Secondary special



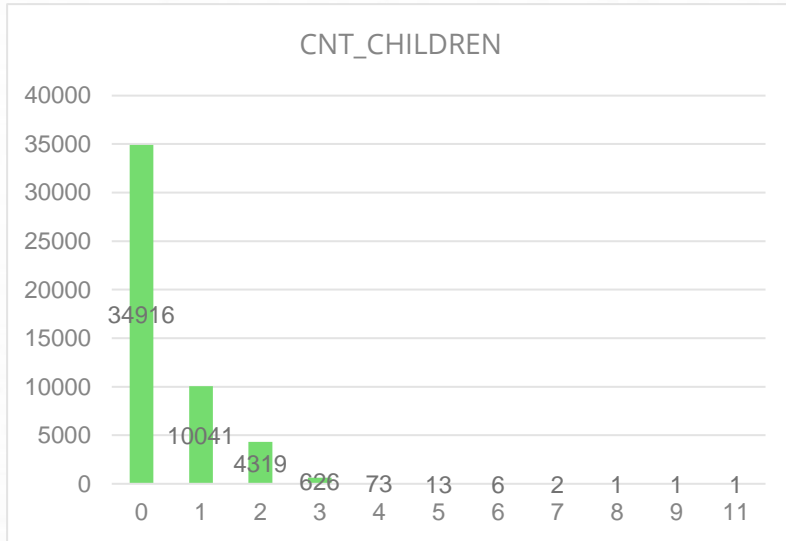
# Univariate/Segmented Univariate Analysis

Majority of the Clients took the loan between 2L – 3L.

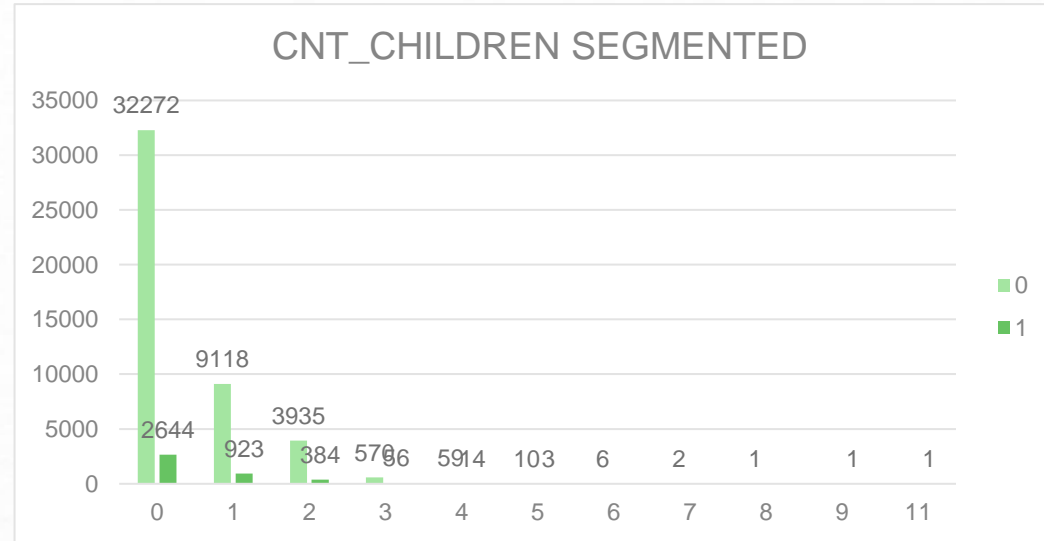


# Univariate/Segmented Univariate Analysis

The highest number of loans are taken by Clients who does not have a child

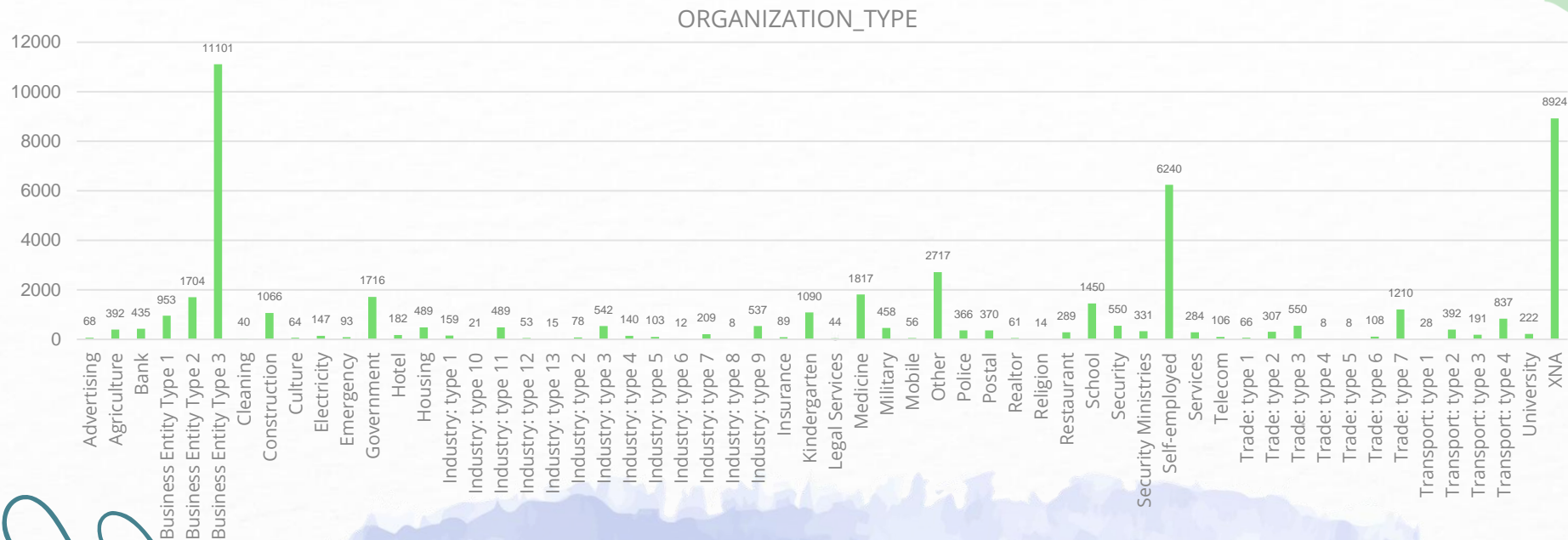


As number of children increases, number of client who took loan decreases.



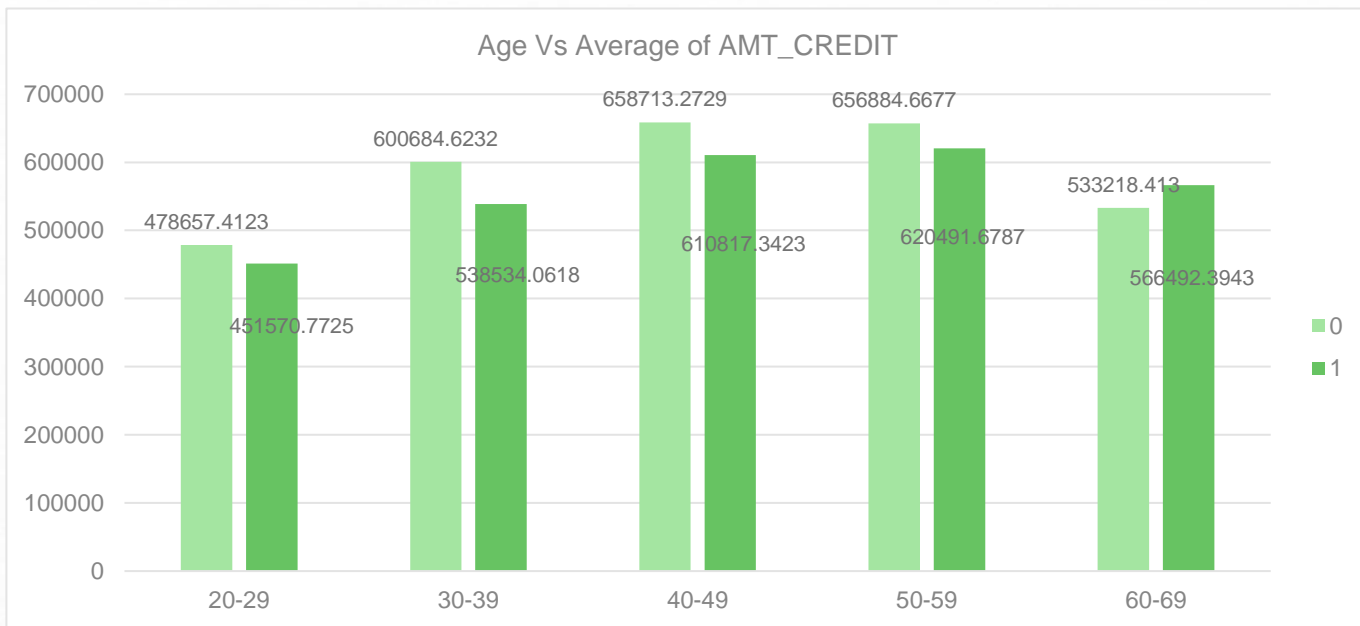
# Univariate/Segmented Univariate Analysis

Clients who are working in business Entity type of Organization took the highest number of loans.



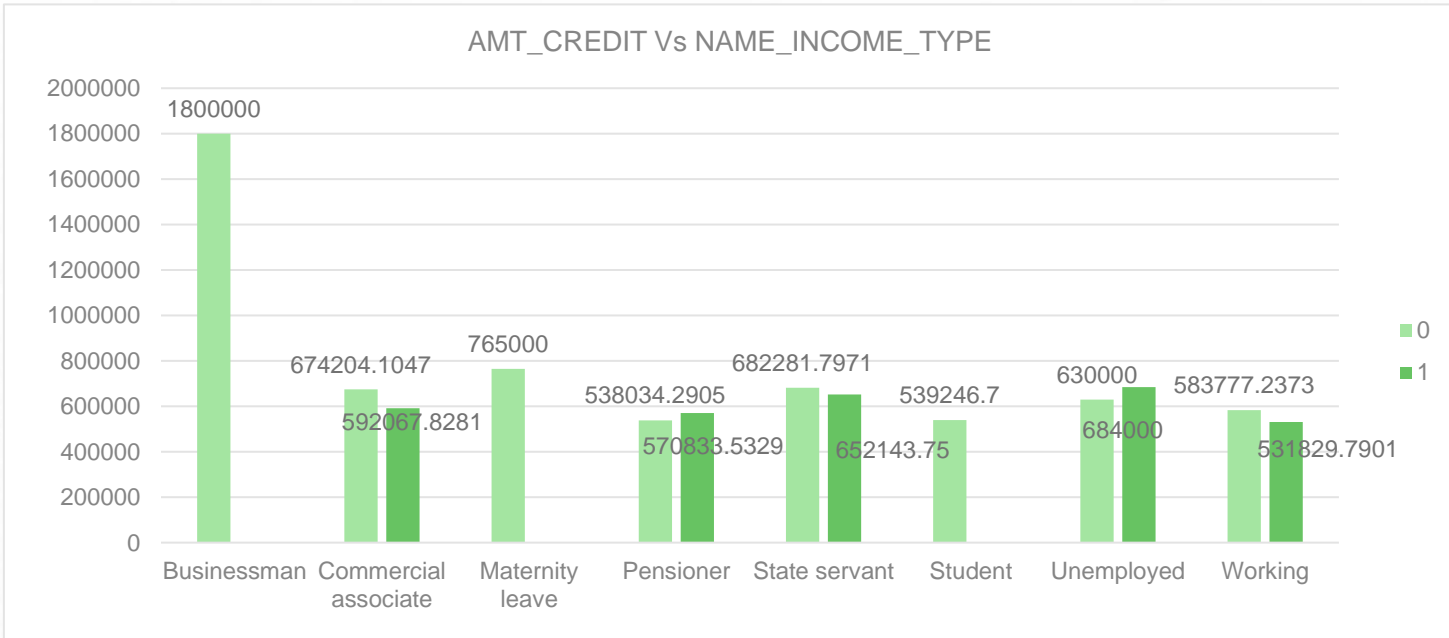
# Bivariate Analysis

Age group 40-49 took the highest amount of loan but age group 50-59 are defaulter with highest amount of loan.



# Bivariate Analysis

As we can see Businessman has the highest amount of loan and they have paid on time. Clients who are unemployed have highest amount of loan which they didn't repay on time.



# Correlations

Task E: Segment the dataset based on different scenarios (e.g., clients with payment difficulties and all other cases) and identify the top correlations for each segmented data using Excel functions.

Top Correlation Coefficients for Payment difficulties are:-

Correlation between Columns	Values
OBS_60_CNT_SOCIAL_CIRCLE - OBS_30_CNT_SOCIAL_CIRCLE	0.998357563
AMT_GOODS_PRICE - AMT_CREDIT	0.986051701
LIVE_REGION_NOT_WORK_REGION - REG_REGION_NOT_WORK_REGION	0.861374946
DEF_60_CNT_SOCIAL_CIRCLE - DEF_30_CNT_SOCIAL_CIRCLE	0.850995792
REG_CITY_NOT_WORK_CITY - LIVE_CITY_NOT_WORK_CITY	0.825358079
AMT_ANNUITY - AMT_GOODS_PRICE	0.774006842
AMT_ANNUITY - AMT_CREDIT	0.770772818

# Correlations

	CNT_CHILDREN	AMT_INCOME_TOTAL	AMT_CREDIT	AMT_ANNUITY	AMT_GOODS_PRICE	REGION_POPULATION_RELATIVE	DAYS_BIRTH	DAYS_EMPLOYED	DAYS_REGISTRATION	DAYS_ID_PUBLISH	HOUR_APPR_PROCESS_START	REG_REGION_NOT_LIVE_REGION	REG_REGION_NOT_WORK_REGION	LIVE_REGION_NOT_WORK_REGION	REG_CITY_NOT_LIVE_CITY	REG_CITY_NOT_WORK_CITY	CBS_30_CNT_SOCIAL_CIRCLE	DEF_30_CNT_SOCIAL_CIRCLE	AMT_REQ_CREDIT_BUREAU_HOUR	AMT_REQ_CREDIT_BUREAU_DAY	AMT_REQ_CREDIT_BUREAU_WEEK	AMT_REQ_CREDIT_BUREAU_MON	AMT_REQ_CREDIT_BUREAU_QRT	AMT_REQ_CREDIT_BUREAU_YEAR			
CNT_CHILDREN	1	0.03619722	0.005705458	0.02638396	0.001046405	-0.024912809	0.335076269	-0.243591518	0.183072478	-0.032537221	0.00527	-0.01038	0.013795	0.021685	0.020102	0.070971	0.067882	0.01618	-0.00282	0.016335	-0.00333	0.002617	0.001199	0.004327	-0.01161	-0.00473	-0.035734888
AMT_INCOME_TOTAL	0.03619722	1	0.377965752	0.451135167	0.383650216	0.181941261	0.37789425	-0.162702675	0.06893375	0.032286256	0.05432	0.078943	0.157051	0.14773	0.009928	0.01515	0.019664	-0.03305	-0.03201	-0.03302	-0.03254	0.008123	0.009478	0.009488	0.074855	0.015778	0.031323516
AMT_CREDIT	0.005705458	0.377965752	1	0.770772818	0.986051701	0.095539444	-0.051084182	-0.077367129	0.008053758	-0.008290189	0.056325	0.027813	0.056097	0.054431	-0.02137	-0.01401	0.00398	0.000876	-0.01351	0.001185	-0.01857	3.65E-05	0.013486	0.005375	0.063976	0.026793	-0.01568333
AMT_ANNUITY	0.02638396	0.451135167	0.770772818	1	0.774006842	0.11272925	0.009911417	-0.113052388	0.0460901	0.00942897	0.053565	0.046176	0.082502	0.07487	-0.00528	0.001629	0.011203	-0.00999	-0.01975	-0.00968	-0.02301	0.010141	0.009157	0.01891	0.037985	0.010059	-0.004173747
AMT_GOODS_PRICE	0.001046405	0.383650216	0.986051701	0.774006842	1	0.098891174	-0.04866402	-0.07506956	0.011016938	-0.009441255	0.05133	0.030368	0.057546	0.054659	-0.02044	-0.0145	0.002862	0.000634	-0.01516	0.000856	-0.01969	0.000828	0.013665	0.005849	0.065821	0.027627	-0.034532324
REGION_POPULATION_RELATIVE	-0.024912809	0.181941261	0.095539444	0.11272925	0.098891174	1	-0.030435419	-0.00610653	-0.058501361	-0.002236280	0.167612	-0.00319	0.053149	0.08742	-0.04009	-0.03825	-0.01128	-0.01907	0.008906	-0.01801	0.003254	-0.00313	-0.00034	0.002645	0.070737	-0.00969	0.004652396
DAYS_BIRTH	0.335076269	0.073769425	-0.051084182	0.009911417	-0.048664402	-0.030435419	1	-0.615289978	0.335028046	0.270073313	0.096389	0.060427	0.059515	0.069886	0.183305	0.236134	0.149168	0.012887	0.000684	0.012285	0.002207	0.001486	0.001984	-0.0024	-0.00245	-0.02152	-0.070067716
DAYS_EMPLOYED	-0.243591518	-0.162702675	-0.077367129	-0.113052388	-0.07506956	-0.00610653	-0.615289978	1	-0.204370881	-0.27222439	0.09236	-0.03641	-0.10733	-0.09557	-0.09256	-0.25406	-0.21774	0.05655	0.01703	0.005511	0.016516	-0.00429	0.001618	-0.00648	-0.03295	0.014577	0.044183816
DAYS_REGISTRATION	0.183072478	0.06893375	0.008053758	0.03460801	0.011016938	-0.058501361	0.335028046	-0.204370881	1	0.103548902	-0.0024	0.0279	0.034658	0.03238	0.067811	0.091595	0.061159	0.010978	0.003449	0.011286	0.006282	-0.00369	-0.00338	0.00066	-0.01072	0.003127	-0.02296176
DAYS_ID_PUBLISH	-0.032537221	0.032286256	-0.008290189	0.00942897	-0.002236280	0.270073313	-0.27222439	0.103548902	0.103548902	1	0.037971	0.033328	0.047812	0.033752	0.07508	0.020002	0.063319	-0.01185	0.002313	-0.01216	0.002642	0.002824	0.003515	-0.00467	-0.01323	-0.02459	-0.044692876
HOUR_APPR_PROCESS_START	-0.005272551	0.08543156	0.056234809	0.053564989	0.065133303	0.167612161	0.09638927	-0.092357978	-0.002396446	0.037971336	1	0.051187	0.073572	0.059753	0.019489	0.0264925	0.015139	-0.00795	-0.00236	-0.00798	-0.00609	-0.00744	0.010333	-0.00673	0.028843	-0.0005	-0.0305658
REG_REGION_NOT_LIVE_REGION	-0.01038335	0.078942904	0.027812773	0.046175655	0.030367022	-0.003185217	0.060427	-0.0364131	0.02789954	0.03228477	0.051187	1	0.449535	0.080452	0.335116	0.142598	0.039493	-0.0512	-0.00827	-0.01514	-0.00938	-0.00246	-0.00576	-0.00177	-0.00861	-0.00027	-0.019535847
REG_REGION_NOT_WORK_REGION	0.013794941	0.157051351	0.05609866	0.082502425	0.063145413	0.059515233	-0.107331487	0.049557036	0.047811506	0.037572	0.449535	0.080452	1	0.861375	0.151927	0.236807	0.192234	-0.0252	-0.00892	-0.02538	-0.01372	0.86E-06	0.003132	-0.00861	-0.00378	-0.00877	-0.011958758
LIVE_REGION_NOT_WORK_REGION	0.021685703	0.147730123	0.05443061	0.074870093	0.054659311	0.08749786	0.06988551	-0.095573749	0.032033964	0.03751626	0.059753	0.080452	0.861375	1	0.02161	0.183888	0.233754	-0.02018	-0.0069	-0.02041	-0.01204	0.002473	0.002902	0.005435	0.009927	0.012137	-0.02490817
REG_CITY_NOT_LIVE_CITY	0.020101544	0.009927866	-0.02137243	-0.005276721	-0.020436382	-0.046091849	0.183304735	-0.092557531	0.067811428	0.075800551	0.019493	0.335116	0.151927	0.02161	1	0.441438	0.029175	-0.00533	0.005492	-0.00554	0.005517	0.0000484	8E-05	-0.00107	0.01356	-2.2E-05	-0.00661236
REG_CITY_NOT_WORK_CITY	0.0707971057	0.015150008	-0.004007357	0.026134428	-0.01448882	-0.046091849	-0.082516217	0.102001817	0.028925	0.142598	0.236807	0.192234	0.0252	0.00852	0.02538	0.033312	0.044275	-0.00023	0.002178	-0.01214	-0.00394	-0.00158	-0.00194	-0.00158	-0.00394	-0.011958758	
LIVE_CITY_NOT_WORK_CITY	0.067882194	0.01963673	0.00397996	-0.011203722	0.002861354	-0.011278612	0.149167938	-0.217741277	0.061159259	0.06319004	0.015139	0.009493	0.192234	0.033752	0.029175	0.825358	1	-0.05522	-0.00225	-0.00511	-0.0002	0.004008	-0.01014	0.002422	-0.0046	0.005623	-0.012495259
CBS_30_CNT_SOCIAL_CIRCLE	0.016180299	-0.030435993	0.000876384	-0.009992103	0.000054386	-0.01059608	0.012287026	0.005650192	0.010977833	-0.011054044	-0.00795	0.05152	-0.0252	-0.02018	-0.00533	-0.00604	-0.00552	1	0.306155	0.998358	0.22917	0.002364	0.000973	-0.00429	0.00881	0.008845	0.034161046
DEF_30_CNT_SOCIAL_CIRCLE	-0.00282133	-0.032012977	-0.033094931	-0.019746021	-0.015155074	-0.008955591	0.000683769	-0.00733326	0.00849889	0.002312725	-0.00236	-0.00827	-0.00891	-0.0068	0.005492	0.001001	-0.00225	0.306155	1	0.308562	0.850996	-0.0004	0.000387	-0.00504	0.007688	0.00535	-0.01596751
CBS_60_CNT_SOCIAL_CIRCLE	0.016334944	-0.03301707	-0.01184762	-0.009675946	0.000056455	-0.018012695	0.01229458	0.00511276	0.011256659	-0.01255888	-0.00798	-0.01514	-0.02538	-0.02041	-0.00554	-0.00603	-0.00511	0.998358	0.308562	1	0.23128	0.002585	0.000866	-0.00488	0.008127	0.008675	0.034573624
DEF_60_CNT_SOCIAL_CIRCLE	-0.003330304	-0.032553174	-0.010856738	-0.023010616	-0.019693981	0.003253593	0.002207122	0.01651602	0.006238428	0.002642424	-0.00609	0.00938	-0.01372	-0.01204	0.005517	0.003312	-0.0002	0.22917	0.850996	0.23128	1	-0.0032	0.002778	-0.00573	0.003972	0.008307	0.015204988
AMT_REQ_CREDIT_BUREAU_HOUR	0.00621709	0.008122955	3.63E-06	0.001408	0.00027899	-0.00312124	0.001486295	-0.00428949	-0.03687968	0.002382411	-0.00744	-0.00246	4.86E-06	0.002473	0.00484	0.004275	0.004008	0.002364	-0.0004	0.002585	-0.0032	1	0.230763	0.012126	0.009547	0.003518	0.00495354
AMT_REQ_CREDIT_BUREAU_DAY	0.001198938	0.009477681	0.01348553	0.00915839	0.01366546	-0.000338841	0.00193866	0.00148187	-0.00338406	0.003514735	0.010333	-0.00576	0.000753	0.002902	8E-05	-0.00023	-0.00124	0.000973	0.003687	0.000866	0.002778	0.230763	1	0.249123	-0.00065	-0.00787	-0.00085777
AMT_REQ_CREDIT_BUREAU_WEEK	0.004327432	0.009478725	0.053734948	0.018809974	0.058404951	0.00264462	-0.001401164	-0.00648155	-0.000659813	-0.00465388	-0.00673	-0.00177	0.003321	0.005435	-0.00107	0.002178	0.002422	-0.00429	-0.00504	-0.00488	-0.00573	0.012126	0.249123	1	-0.0106	-0.0346	0.024731717
AMT_REQ_CREDIT_BUREAU_MON	-0.011607819	0.074854679	0.063975989	0.037895476	0.058210489	0.070736631	-0.002452976	-0.032954589	-0.00714839	-0.01232625	0.028843	-0.00861	0.004293	-0.01356	-0.01024	-0.0046	0.00817	0.007688	0.008127	0.003972	0.009547	-0.00065	-0.0106	0.011888	0.019311173	-0.0031773	0.0121744813
AMT_REQ_CREDIT_BUREAU_QRT	-0.00473083	0.01577735	0.06793294	0.010059213	0.027627409	-0.00964959	-0.012152968	0.0140757401	0.003127351	-0.024588881	-0.0005	-0.00027	-0.00877	-0.01237	-2.2E-05	-0.00394	-0.00523	0.008945	0.00535	0.008675	0.008307	0.003518	0.010787	-0.0146	0.011888	1	0.121744813
AMT_REQ_CREDIT_BUREAU_YEAR	-0.035734888	0.031323516	-0.01568333	-0.004173747	-0.034532324	0.004652396	-0.070067716	0.044183816	-0.02296176	-0.044692876	-0.02306	0.01953	-0.02753	-0.02249	-0.00666	-0.01196	-0.01295	0.034161	0.004507	0.034574	0.015205	0.004095	-0.00086	0.004737	0.019311	0.121745	1



# Correlations

Top Correlation Coefficients for Re-payers are:

Correlation between Columns	Values
AMT_CREDIT - AMT_GOODS_PRICE	0.982267963
OBS_60_CNT_SOCIAL_CIRCLE - OBS_30_CNT_SOCIAL_CIRCLE	0.998065853
DEF_60_CNT_SOCIAL_CIRCLE - DEF_30_CNT_SOCIAL_CIRCLE	0.89051161
REG_REGION_NOT_WORK_REGION - LIVE_REGION_NOT_WORK_REGION	0.806743886
REG_CITY_NOT_WORK_CITY - LIVE_CITY_NOT_WORK_CITY	0.783754676
AMT_CREDIT - AMT_ANNUITY	0.749665201
AMT_GOODS_PRICE - AMT_ANNUITY	0.74950403

# Correlations

	CNT_CHILDREN	AMT_INCOME_TOTAL	AMT_CREDIT	AMT_ANNUITY	AMT_GOODS_PRICE	REGION_POPULATION_RELATIVE	DAYS_BIRTH	DAYS_EMPDAYS	REG_ID	HOUR_APPR_PROCESS_START	REG_REGION_NOT_LIVE_REGION	REG_CITY_NOT_LIVE_CITY	LIVE_CITY	OBS_30_CNT_SOCIAL_CIRCLE	DEF_30_CNT_SOCIAL_CIRCLE	OBS_60_CNT_SOCIAL_CIRCLE	DEF_60_CNT_SOCIAL_CIRCLE	AMT_REQ_CREDIT_BUREAU_DAY	AMT_REQ_CREDIT_BUREAU_WEEK	AMT_REQ_CREDIT_BUREAU_MON	AMT_REQ_CREDIT_BUREAU_QRT	AMT_REQ_CREDIT_BUREAU_YEAR					
CNT_CHILDREN	1	0.010110177	0.007801905	0.029178977	-0.001079665	-0.020595154	0.2496732	-0.1899	0.15211	-0.0424	-0.0069	-0.0157	-0.0057	-0.0004	0.00175	0.04892	0.05818	0.01799	-0.0136	0.01515	-0.0185	-0.0003	-0.0306	-0.0306	0.00816	-0.011520595	-0.03080113
AMT_INCOME_TOTAL	0.010110177	1	0.015271444	0.018004594	0.013269502	-0.006180303	0.009033662	-0.0116	-0.0096	-0.0091	0.0148	0.00059	0.00167	0.00223	-0.006	-0.0104	-0.008	-0.0113	-0.008	-0.0112	-0.0067	-0.0011	-0.0014	-0.0022	-0.0009	-0.003749228	-0.05100984
AMT_CREDIT	0.007601905	0.015271444	1	0.749665201	0.982267963	0.067775624	-0.142506035	0.01604	-0.0428	0.0438	0.0454	0.00646	0.02354	0.0346	-0.0523	-0.0391	-0.0067	0.03347	-0.0249	0.03444	-0.029	0.02781	-0.0085	0.00013	0.008341	-0.019361211	-0.016459973
AMT_ANNUITY	0.029178977	0.018004594	0.749665201	1	0.74950403	0.073123998	-0.008751713	-0.0796	0.02158	-0.0213	0.04489	0.03176	0.06569	0.07424	-0.0177	0.00218	0.01356	0.01382	-0.0345	0.0141	-0.0405	0.0374	-0.0187	0.03472	0.0713	-0.001630664	0.001569273
AMT_GOODS_PRICE	-0.01079665	0.013269502	0.982267963	0.74950403	1	0.076635488	-0.141005888	0.02024	-0.0433	-0.0497	0.05746	0.00708	0.02502	0.03542	-0.0527	-0.044	-0.0131	0.03272	-0.0191	0.03388	-0.0206	0.01526	-0.0063	0.00011	0.07891	-0.020867636	-0.023475441
REGION_POPULATION_RELATIVE	-0.020595154	-0.006180303	0.067775624	0.073123998	0.076635488	1	-0.016468731	0.00774	-0.0461	-0.0051	0.15605	-0.0031	0.03197	0.05954	-0.0349	-0.0433	-0.0252	-0.0089	0.02781	-0.0071	0.02714	0.00936	-0.0038	0.01206	0.0754	0.015103168	0.024023928
DAYS_BIRTH	0.2496732	0.009033662	-0.142506035	-0.008751713	-0.141005888	-0.016468731	1	-0.5815	0.28844	0.2478	0.05789	0.03961	0.07551	0.55449	0.14911	0.22635	0.1434	-0.0112	-0.0208	-0.0126	-0.0258	0.0249	-0.0227	-0.0097	-0.0073	-0.008783235	-0.080127316
DAYS_EMPLOYED	-0.189934184	-0.011555963	0.016039571	-0.079560008	0.020235348	0.007742399	-0.581479041	1	-0.1887	-0.2301	-0.0521	-0.0353	-0.0849	-0.0723	-0.0882	-0.2463	-0.2006	0.00352	0.02996	0.00421	0.02389	-0.003	0.04949	0.00339	-0.0331	0.017875807	0.017692456
DAYS_REGISTRATION	0.152113117	-0.009561152	-0.04284404	0.021581654	-0.043020226	-0.046130288	0.288437837	-0.1887	1	0.09029	-0.0578	0.01585	0.01639	0.01358	0.05557	0.10076	0.06982	-0.0058	0.001	-0.0059	-0.0064	0.00638	-0.0015	-0.0082	-0.0015	-0.006290417	-0.025094154
DAYS_ID_PUBLISH	-0.042360717	-0.009122006	-0.043771901	-0.02132109	-0.04972332	-0.005118563	0.247896571	-0.2301	0.09029	1	0.00552	0.02415	0.04111	0.02957	0.0641	0.08301	0.03844	-0.0273	-0.0284	-0.0262	-0.0279	0.01408	-0.0064	0.01954	-0.0379	-0.036371471	-0.08159406
HOUR_APPR_PROCESS_START	-0.006884357	0.014482013	0.045386384	0.044891881	0.057462759	0.156049669	0.057891695	-0.0521	-0.0578	0.00552	1	0.04942	0.07615	0.06606	0.00552	0.0032	-0.0118	-0.0197	0.01767	-0.0195	0.01752	-0.0331	0.00141	-0.0091	0.06634	-0.011742807	-0.037911822
REG_REGION_NOT_LIVE_REGION	-0.015713279	0.000594885	0.006456715	0.031759558	0.007079035	-0.003015241	0.039614727	-0.0353	0.01585	0.02415	0.04942	1	0.5295	0.10053	0.33817	0.14759	-0.0037	-0.032	0.00849	-0.032	0.00582	-0.011	0.0042	0.00723	0.05155	-0.010452446	-0.033986108
REG_CITY_NOT_LIVE_CITY	-0.00566593	0.000665752	0.023536318	0.065686571	0.019170075	0.07512807	-0.0849	0.01639	0.0111	0.07615	0.5295	0.10053	1	0.80674	0.18375	0.22868	0.16908	-0.0321	0.00152	-0.0316	0.00493	0.0227	0.01115	-0.0188	-0.0159	-0.010984631	-0.029281003
LIVE_REGION_NOT_WORK_REGION	-0.003891253	0.002228043	0.034804167	0.074238732	0.035421594	0.059536379	0.054493345	-0.0723	0.01358	0.02957	0.06606	0.10053	0.80674	1	0.02608	0.1578	0.21787	-0.0208	-0.0061	-0.02	8.7E-05	0.03195	0.00701	-0.0322	0.04081	-0.014115297	-0.014042305
REG_CITY_NOT_LIVE_CITY	0.001745088	-0.005992314	-0.052261708	-0.01770478	-0.052373855	-0.024911305	0.148110246	-0.0882	0.05557	0.0641	0.00552	0.33817	0.18375	0.02608	1	0.4673	-0.015	-0.0499	0.00342	-0.0594	0.00258	-0.0011	-0.0191	-0.0042	-0.0356	-2.97186E-05	-0.020026505
REG_CITY_NOT_WORK_CITY	0.048916581	-0.01057192	-0.039113138	0.002176683	-0.04388108	-0.043285387	0.226350689	-0.2463	0.10076	0.08301	0.0032	0.14759	0.22868	0.1578	0.4673	1	0.78375	-0.0421	-0.0156	-0.0416	-0.0137	0.01833	-0.0053	0.00463	-0.0447	-0.049007672	-0.025982692
LIVE_CITY_NOT_WORK_CITY	0.05803771	-0.008036091	-0.006664341	0.0152623619	-0.033057846	-0.025223619	0.143399639	-0.2006	0.06982	0.03844	-0.0118	-0.0037	0.16908	0.21787	-0.015	0.78375	1	-0.0241	-0.0279	-0.023	-0.0246	0.01426	0.00077	0.00587	-0.0202	-0.037744229	-0.06136593
OBS_30_CNT_SOCIAL_CIRCLE	0.017913919	-0.011280916	0.034466173	0.013819016	0.025772367	-0.008875436	-0.011510233	0.00352	-0.0508	-0.0273	-0.0321	-0.0208	-0.0499	-0.0421	-0.0241	1	0.36507	0.99807	0.29795	-0.0441	-0.017	0.00584	0.01608	0.034839849	0.050517528	0.056157528	
DEF_30_CNT_SOCIAL_CIRCLE	-0.01361871	-0.007979437	-0.014946679	-0.034545374	-0.010956612	0.027805916	-0.020838794	0.02996	0.001	-0.0284	0.01767	0.00849	0.00152	-0.0061	0.00342	-0.0156	-0.0279	0.36507	1	0.36806	0.89051	0.00273	0.01224	-0.0116	0.00809	0.020201304	0.021016648
OBS_60_CNT_SOCIAL_CIRCLE	0.015145875	-0.011211173	0.034493908	0.01498626	0.033873194	-0.007065002	-0.01257029	0.00421	-0.0059	-0.0262	-0.0195	-0.032	-0.0316	-0.02	-0.0504	-0.0416	-0.023	0.99807	0.36806	1	0.30142	-0.0136	-0.0174	0.00556	0.01698	0.03400413	0.050708513
DEF_60_CNT_SOCIAL_CIRCLE	-0.013595702	-0.006726958	-0.029007236	-0.040471029	-0.020592919	0.027742318	-0.025756651	-0.0239	-0.0064	-0.0279	0.01752	0.00582	0.00493	8.7E-05	0.00258	-0.0137	-0.0246	0.29795	0.89051	0.30142	1	-0.0132	-0.0103	-0.0039	0.01303	0.02534772	0.02626159
AMT_REQ_CREDIT_BUREAU_HOUR	-0.000287596	-0.001041719	0.017806362	0.037397489	0.015261095	0.009595216	0.024898075	0.00368	0.01408	-0.0031	-0.011	0.0227	0.03195	-0.0011	0.01833	0.01426	-0.0141	0.00273	-0.0136	-0.0132	1	0.3512	0.01932	-0.0001	0.010998487	0.006159687	
AMT_REQ_CREDIT_BUREAU_DAY	-0.030605294	-0.00144685	-0.008518401	-0.018688343	-0.006151908	-0.008383339	-0.02267042	0.04948	-0.0015	-0.0064	0.00141	0.0042	0.01115	0.00701	-0.0191	-0.0053	0.00077	-0.017	0.01224	-0.0174	-0.0103	0.3512	1	0.06139	-0.0163	0.025535445	0.027607009
AMT_REQ_CREDIT_BUREAU_WEEK	-0.030604048	-0.002218606	0.000125371	0.034772145	0.000114491	0.012064245	-0.009606382	0.02039	-0.0182	0.01954	-0.0091	0.00723	-0.0188	-0.0322	-0.0042	0.00463	0.01057	0.00584	-0.0116	0.00556	-0.0039	0.19392	0.06199	1	-0.001	0.01697359	0.030916965
AMT_REQ_CREDIT_BUREAU_MON	0.008160996	-0.00064018	0.083408196	0.071295225	0.078908703	0.075995596	-0.007777997	-0.0331	-0.0015	-0.0378	0.06634	0.01555	-0.0159	0.04081	-0.0356	-0.0447	-0.0202	0.01608	0.00809	0.01698	0.01303	-0.0001	-0.0163	-0.001	1	0.019494601	0.038789503
AMT_REQ_CREDIT_BUREAU_QRT	-0.011520595	-0.003749228	-0.019361311	-0.001630664	-0.020867636	0.015103168	-0.008783235	0.01788	-0.0063	-0.0327	-0.0117	-0.0105	-0.011	-0.0141	-3E-05	-0.049	-0.0377	0.03844	0.00201	0.0384	0.02353	0.0311	0.02354	0.0117	0.01995	1	0.03631744
AMT_REQ_CREDIT_BUREAU_YEAR	-0.03080113	-0.005100984	-0.016459973	0.001569273	-0.023475441	0.024023928	-0.090127316	0.01769	-0.0251	-0.0816	-0.0379	-0.034	-0.0293	-0.014	-0.0202	-0.006	-0.0061	0.05052	0.02102	0.05071	0.02063	0.00616	0.02761	0.03092	0.03879	0.03631744	1