Assignment 6

Submit:

- Python code
- Evidence that it ran. You can either provide a screenshots of the result in Spyder.

I recommend using x2go for connecting and the Spyder editor (under Programming) for writing Python programs. You can also do this assignment on your home computer if you install all the necessary libraries and a PostgreSQL database. You will need to import the following libraries:

```
import numpy
import pandas
import matplotlib
import psycopg2
```

a) (1 points) Create a tuple thistuple = ("apple", "banana", "cherry") and retrieve the element with the index 1

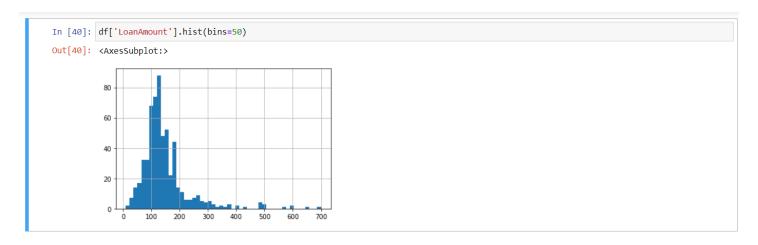
```
In [28]: import numpy
         import pandas
         import matplotlib
         import psycopg2
In [37]: thistuple = ("apple", "banana", "cherry")
         print(thistuple[1]);
         banana
In [38]: | df = pandas.read_csv(r"E:\NDSU\Database\Assignments\Parisa-assignment/train.csv");
               Loan ID Gender Married Dependents
                                                     Education Self Employed \
             LP001002
                        Male No 0
                                                     Graduate
                                Yes 1 Graduate
Yes 0 Graduate
Yes 0 Not Graduate
No 0 Graduate
              LP001003
                         Male
                                                                         No
             LP001005
                         Male
                                                                         Yes
             LP001006
                         Male
                                                                          No
                                                   Graduate
         4
             LP001008
                         Male
                                                                         No
                                         0 Graduate
3+ Graduate
1 Graduate
2 Graduate
                                 · · ·
         609 LP002978 Female
                                   No
                        Male
                                 Yes
         610 LP002979
                                  Yes
Yes
         611 LP002983
                         Male
         613 LP002990 Female
                                              0
                                                     Graduate
                                                                         Yes
                                 No
              AnnlicantTncome CoannlicantTncome LoanΔmount Loan Δmount Term \
```

b) (1 points) Load the data from train.csv making sure to provide the correct path. The print the first 10 rows using the below syntax

```
df = pandas".read_csv("/home/first.last/train.csv")
print(df.head(10))
```

```
In [41]: | df = pandas.read_csv(r"E:\NDSU\Database\Assignments\Parisa-assignment/train.csv");
         print(df.head(10))
             Loan ID Gender Married Dependents
                                                  Education Self_Employed \
         0 LP001002
                                                   Graduate
                      Male
                                No
                                            0
                                                   Graduate
         1
            LP001003
                      Male
                               Yes
                                            1
                                                                      No
            LP001005
                      Male
                               Yes
                                                   Graduate
                                                                      Yes
                                            0 Not Graduate
         3
           LP001006
                      Male
                               Yes
                                                                      No
         4 LP001008
                      Male
                               No
                                                   Graduate
                                                                      No
         5 LP001011
                      Male
                              Yes
                                           2
                                                   Graduate
                                                                      Yes
         6 LP001013
                      Male
                               Yes
                                           0 Not Graduate
                                                                       No
            LP001014
                      Male
                               Yes
                                                   Graduate
                                                                       No
                                           3+
           LP001018
                      Male
                               Yes
                                            2
                                                   Graduate
                                                                       No
         9 LP001020
                               Yes
                                                   Graduate
                      Male
                                            1
                                                                       No
            ApplicantIncome CoapplicantIncome LoanAmount Loan_Amount_Term \
         0
                       5849
                                          0.0
                                                     NaN
                                                                      360.0
                       4583
                                       1508.0
                                                    128.0
                                                                      360.0
         1
         2
                       3000
                                          0.0
                                                     66.0
                                                                      360.0
         3
                       2583
                                       2358.0
                                                    120.0
                                                                      360.0
                       6000
                                          0.0
                                                    141.0
                                                                      360.0
         5
                       5417
                                       4196.0
                                                    267.0
                                                                      360.0
                                       1516.0
                                                                      360.0
         6
                       2333
                                                    95.0
                                                    158.0
                                                                      360.0
         7
                       3036
                                       2504.0
         8
                       4006
                                       1526.0
                                                    168.0
                                                                      360.0
                                                    349.0
                                                                      360.0
                      12841
                                      10968.0
            Credit_History Property_Area Loan_Status
         0
                                  Urban
                      1.0
         1
                       1.0
                                  Rural
                                  Urban
         2
                       1.0
                                                  Υ
                                  Urban
                                                  Υ
         3
                      1.0
                                  Urban
                       1.0
         5
                                  Urban
                                                  Υ
                       1.0
                       1.0
                                  Urban
                                                  Υ
         6
                       0.0
                              Semiurban
```

c) (1 points) Show a histogram of LoanAmount using 20 bins. Example of similar type of histogram: df['ApplicantIncome'].hist(bins=50)



d) (7points) Import the database interaction library psycopg2. Create a table in the PostgreSQL database that matches the content of the dataframe df (this can be done using psql). Insert the content of df into the table you created. The second portion should be done using Python with psycopg2. You can find more documentation at:

https://www.psycopg.org/docs/usage.html and more details in the tutorial at https://www.postgresqltutorial.com/postgresql-python/

- 1-As we were asked, I created database table in PSQL and named Loan01.
- 2-By Copy instruction in Python, I copied the content of train.csv into the Loan01 table.

```
In [29]: #connect to an existing DB
    conn = psycopg2.connect(
        host="",
        database="Assignment8",
        user="postgres",
        password="Parisa4653")

In [30]: cur = conn.cursor()
    with open(r"E:\NDSU\Database\Assignments\Parisa-assignment/train.csv") as f:
        next(f)
        cur.copy_from(f, 'loan01', sep=',')
        conn.commit()
```

Then:

In PSQL: Select* from Loan01;

es: loan01		boolean RIMARY KEY	, btree (loan	_id)								
		T* from Lo										La constato
1_1d + 1002		married + No	dependents 0	education + Graduate	selt_employed No	applicantincome 5849	coapplicantincome + 0	loanamount 	loan_amount_term + 360	credit_history + 1	property_area + Urban	loan_status + t
1003	Male	Yes	1 0	Graduate	No	4583	1508	128	360	1 1	Rural	f
1005 1006	Male Male	Yes Yes	j 0	Graduate Not Graduate	Yes No	3000 2583	0 2358	66 120	360 360	1	Urban Urban	t t
1008 1011	Male Male	No Yes	0 2	Graduate Graduate	No Yes	6000 5417	0 4196	141 267	360 360	1 1	Urban Urban	t t
1013	Male	Yes	0	Not Graduate	No		1516		360	1	Urban	t
1014 1018	Male Male	Yes Yes	3+ 2	Graduate Graduate	No No	3036 4006	2504 1526	158 168	360 360	0 1	Semiurban Urban	f t
1020 1024	Male Male	Yes Yes	1 2	Graduate Graduate	No No	12841 3200	10968 700	349 70	360 360	1 1	Semiurban Urban	f t
1027	Male	Yes		Graduate	į į	2500	1840	109	360	1	Urban	t
1028 1029	Male Male	Yes No	2 0	Graduate Graduate	No No	3073 1853	8106 2840	200 114	360 360	1 1	Urban Rural	t f
1030 1032	Male Male	Yes	2 0	Graduate Graduate	No No	1299 4950	1086 0	17 125	120 360	1 1	Urban Urban	t t
1034	Male	No No		Not Graduate	No	3596	0	100	240		Urban	t
1036 1038	Female Male	No Yes	0 0	Graduate Not Graduate	No No	3510 4887		76 133	360 360	0 1	Urban Rural	f f
1041	Male	Yes	0	Graduate		2600	3500			1	Urban	t
1043 1046	Male Male	Yes Yes	0 1	Not Graduate Graduate	No No	7660 5955	0 5625	104 315	360 360	0 1	Urban Urban	† t
1047 1050	Male	Yes Yes	0 2	Not Graduate Not Graduate	No No	2600 3365	1911 1917	116 112	360 360	0 0	Semiurban Rural	f f
1052	Male	Yes		Graduate	į i	3717	2925		360		Semiurban	f
1066 1068	Male Male	Yes Yes	0 0	Graduate Graduate	Yes No	9560 2799	0 2253	191 122	360 360	1 1	Semiurban Semiurban	t t
1073	Male	Yes	2 0	Not Graduate	No No	4226 1442	1040	110	360 360	1	Urban	t
1086 1087	Male Female	No		Not Graduate Graduate	NO	3750	0 2083	35 120	360	1 1	Urban Semiurban	† t
1091 1095	Male Male	Yes No	1 0	Graduate Graduate	No No	4166 3167	3369 0	201 74	360 360	 1	Urban Urban	f f
1097	Male	No		Graduate	Yes	4692	j 0	106	360	1	Rural	f
1098 1100	Male Male	Yes No	0 3+	Graduate Graduate	No No	3500 12500	1667 3000	114 320	360 360	1 1	Semiurban Rural	t f
1106 1109	Male Male	Yes	0 0	Graduate Graduate	No No	2275 1828	2067 1330	100	360	1 0	Urban Urban	t
1112	Female	Yes Yes	į ė	Graduate	No	3667	1459	144	360	1	Semiurban Act	livate Windows
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	Male	Yes	0 0	Graduate Graduate	No No	2378 3166	0 2064	9 104	360 360	1 0	Urban Urban	f f
2842	Male	Yes Yes		Graduate Graduate Graduate	No No No	2378 3166 3417	0 2064 1750	9 104 186	360 360 360	1	Urban Urban Urban	f f t f
2842 2847 2855	Male Male Male	Yes Yes Yes Yes	0 1 2	Graduate Graduate Graduate Graduate Graduate	No No No No No	2378 3166 3417 5116 16666	0 2064 1750 1451 0	9 104 186 165 275	360 360 360 360 360	1 0 1 0 1	Urban Urban Urban Urban Urban	f t f t
2842 2847 2855 2862 2863	Male Male Male Male Male	Yes Yes Yes Yes Yes Yes	0 1 2 2 3+	Graduate Graduate Graduate Graduate Graduate Not Graduate Graduate	No No No No No No	2378 3166 3417 5116 16666 6125 6406	0 2064 1750 1451 0 1625	9 104 186 165 275 187 150	360 360 360 360 360 480 360	1 0 1 0 1 1	Urban Urban Urban Urban Urban Semiurban Semiurban	f t t f f
2842 2847 2855 2862 2863 2868	Male Male Male Male	Yes Yes Yes Yes Yes Yes Yes	0 1 2 2 3+ 2	Graduate Graduate Graduate Graduate Graduate Not Graduate Graduate Graduate	No No No No No No No	2378 3166 3417 5116 16666 6125 6406 3159	0 2964 1750 1451 0 1625 0 461	9 104 186 165 275 187 150 108	360 360 360 360 360 480 360 480	1 0 1 0 1 1 1	Urban Urban Urban Urban Urban Semiurban Semiurban Urban	f t f t f f
2842 2847 2855 2862 2863 2868 2872 2874	Male Male Male Male Male Male	Yes	0 1 2 2 3+ 2 0	Graduate Graduate Graduate Graduate Graduate Not Graduate Graduate Graduate Graduate Graduate	No No No No No No No No No	2378 3166 3417 5116 16666 6125 6406 3159 3087 3229	0 2064 1750 1451 0 1625 0 461 2210 2739	9 104 186 165 275 187 150 108 136	360 360 360 360 360 480 360 84 360 360	1 0 1 0 1 1 1 1	Urban Urban Urban Urban Urban Urban Semiurban Semiurban Urban Urban	f f t f f t t
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2842 2847 2855 2862 2865	Male Male Male Male Male Male Male Male	Yes No Yes No Yes No Yes No Yes Yes No Yes Yes	0	Graduate	No No No No No No No No	2378 3166 3417 5116 16666 6125 6406 3159 3087 3229 1782 3182 6540 1836 3166 1180 2787 4283 2297 2165 4750 3600 6600 9357 3659 16120 3833 6383 2987 3284 5780 416 2894 416 2894 416 2894 3400 3400 3400 34987 3232 2900 4106 8872	0 2664 1759 1451 0 1625 0 461 2739 2232 2917 0 33837 0 0 1917 3090 1522 0 0 0 0 3416 0 0 3390 0 0 1990 0 41667 2792 0 0 4369 0 41667 2792 0 0 43191 0 0 0 41667 2792 0 0 0 4111 1950 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	9 104 186 185 187 187 188 110 107 106 110 107 106 110 107 106 110 107 106 110 107 106 110 107 106 110 107 106 110 107 106 107 108 108 109 109 109 109 109 109 109 109 109 109	360 360	1	Urban Urban Urban Urban Urban Urban Urban Urban Semiurban Urban Semiurban Urban Rural	ftftftfttttttttttttttttttttttttttttttt
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614 records is shown in Loan01 table.

Spyder:

