```
In [16]:
          import numpy as np
          import pandas as pd
          import matplotlib.pyplot as plt
          import seaborn as sns
In [17]:
          bank_df=pd.read_csv(r"F:\FSDS\Data Files\bank.csv",sep=';')
In [18]:
          bank_df
Out[18]:
                 age
                              job
                                   marital
                                           education default balance housing loan
                                                                                       contact day month
              0
                  30
                      unemployed
                                   married
                                                                 1787
                                                                                        cellular
                                                                                                 19
                                              primary
                                                          no
                                                                            no
                                                                                  no
                                                                                                        oct
                                                                                 yes
                  33
                                   married
                                                                 4789
                                                                                        cellular
                                                                                                 11
                          services
                                           secondary
                                                          no
                                                                                                       may
                                                                           yes
              2
                  35
                      management
                                    single
                                              tertiary
                                                          no
                                                                 1350
                                                                           yes
                                                                                  no
                                                                                        cellular
                                                                                                 16
                                                                                                        apr
                                                                                                  3
              3
                  30
                      management
                                   married
                                              tertiary
                                                                 1476
                                                                                      unknown
                                                          no
                                                                           yes
                                                                                 yes
                                                                                                        jun
              4
                  59
                        blue-collar married
                                           secondary
                                                                    0
                                                                                      unknown
                                                                                                  5
                                                          no
                                                                           yes
                                                                                  no
                                                                                                       may
             •••
           4516
                  33
                          services married
                                                                 -333
                                                                                        cellular
                                                                                                 30
                                           secondary
                                                          no
                                                                           yes
                                                                                                        jul
                                                                                  no
                             self-
                                                          yes
                                                                                 yes
          4517
                  57
                                   married
                                                                -3313
                                                                           yes
                                                                                                  9
                                              tertiary
                                                                                      unknown
                                                                                                       may
                        employed
          4518
                  57
                        technician
                                  married
                                           secondary
                                                                  295
                                                                                        cellular
                                                                                                 19
                                                          no
                                                                            no
                                                                                  no
                                                                                                       aug
          4519
                  28
                        blue-collar married
                                           secondary
                                                                 1137
                                                                                        cellular
                                                                                                  6
                                                                                                        feb
                                                          no
                                                                            no
                                                                                  no
          4520
                      entrepreneur
                                                                                                  3
                  44
                                    single
                                              tertiary
                                                          nο
                                                                 1136
                                                                           yes
                                                                                 yes
                                                                                        cellular
                                                                                                        apr
         4521 rows × 17 columns
In [19]:
          cat=bank_df.select_dtypes(include='object').columns
          num=bank_df.select_dtypes(exclude='object').columns
In [20]:
          cat
Out[20]: Index(['job', 'marital', 'education', 'default', 'housing', 'loan', 'contact',
                   'month', 'poutcome', 'y'],
                 dtype='object')
In [21]:
          num
Out[21]:
          Index(['age', 'balance', 'day', 'duration', 'campaign', 'pdays', 'previous'], dtype
          ='object')
          LabelEncoder
In [22]:
          from sklearn.preprocessing import LabelEncoder
          le=LabelEncoder()
In [23]:
```

```
In [24]:
          bank_df['y']=le.fit_transform(bank_df['y'])
In [25]:
          bank_df
                                   marital education default balance housing loan
                                                                                        contact day month
Out[25]:
                 age
                              job
              0
                  30
                       unemployed
                                   married
                                              primary
                                                                  1787
                                                                                         cellular
                                                                                                  19
                                                           no
                                                                             no
                                                                                   no
                                                                                                          oct
              1
                  33
                           services married
                                            secondary
                                                                  4789
                                                                                         cellular
                                                                                                  11
                                                           no
                                                                             yes
                                                                                   yes
                                                                                                         may
              2
                  35
                      management
                                     single
                                               tertiary
                                                                  1350
                                                                                         cellular
                                                                                                  16
                                                                             yes
                                                           no
                                                                                   no
                                                                                                          apr
              3
                  30
                      management married
                                               tertiary
                                                                  1476
                                                                                       unknown
                                                                                                   3
                                                                                                          jun
                                                           no
                                                                             yes
                                                                                   yes
              4
                  59
                        blue-collar married
                                                                     0
                                                                                                   5
                                            secondary
                                                                                       unknown
                                                           no
                                                                             yes
                                                                                                         may
                                                                                   no
           4516
                  33
                           services
                                   married
                                            secondary
                                                                   -333
                                                                             yes
                                                                                         cellular
                                                                                                  30
                                                                                                          jul
                                                           no
                                                                                   no
                              self-
          4517
                  57
                                   married
                                               tertiary
                                                                  -3313
                                                                             yes
                                                                                   yes
                                                                                       unknown
                                                                                                   9
                                                                                                         may
                                                           yes
                         employed
          4518
                  57
                         technician married
                                            secondary
                                                                   295
                                                                                         cellular
                                                                                                  19
                                                           no
                                                                             no
                                                                                   no
                                                                                                         aug
           4519
                  28
                        blue-collar married
                                            secondary
                                                                  1137
                                                                                         cellular
                                                                                                   6
                                                                                                          feb
                                                           no
                                                                             no
                                                                                   no
          4520
                  44
                                                                  1136
                                                                                         cellular
                                                                                                   3
                      entrepreneur
                                     single
                                               tertiary
                                                                             yes
                                                                                   yes
                                                                                                          apr
                                                           no
          4521 rows × 17 columns
In [26]:
          bank_df=pd.read_csv(r"F:\FSDS\Data Files\bank.csv",sep=';')
          from sklearn.preprocessing import LabelEncoder
          le=LabelEncoder()
          bank_df['y']=le.fit_transform(bank_df['y'])
          bank_df=pd.read_csv(r"F:\FSDS\Data Files\bank.csv",sep=';')
In [28]:
          from sklearn.preprocessing import LabelEncoder
          le=LabelEncoder()
```

le.fit_transform(bank_df)

```
ValueError
                                         Traceback (most recent call last)
Cell In [28], line 4
      2 from sklearn.preprocessing import LabelEncoder
      3 le=LabelEncoder()
---> 4 le.fit_transform(bank_df)
File ~\AppData\Local\Programs\Python\Python310\lib\site-packages\sklearn\preprocessin
g\_label.py:114, in LabelEncoder.fit_transform(self, y)
    101 def fit_transform(self, y):
            """Fit label encoder and return encoded labels.
   102
   103
   104
           Parameters
  (…)
   112
               Encoded labels.
   113
           y = column_or_1d(y, warn=True)
--> 114
           self.classes_, y = _unique(y, return_inverse=True)
   115
   116
           return y
File ~\AppData\Local\Programs\Python\Python310\lib\site-packages\sklearn\utils\valida
tion.py:1406, in column_or_1d(y, dtype, warn)
  1395
               warnings.warn(
  1396
                    (
  1397
                        "A column-vector y was passed when a 1d array was"
  (…)
  1402
                   stacklevel=2,
  1403
               )
           return _asarray_with_order(xp.reshape(y, (-1,)), order="C", xp=xp)
  1404
-> 1406 raise ValueError(
            "y should be a 1d array, got an array of shape {} instead.".format(shape)
  1407
  1408 )
ValueError: y should be a 1d array, got an array of shape (4521, 17) instead.
```

In [27]: bank_df

Out[27]:		age	job	marital	education	default	balance	housing	loan	contact	day	month
	0	30	unemployed	married	primary	no	1787	no	no	cellular	19	oct
	1	33	services	married	secondary	no	4789	yes	yes	cellular	11	may
	2	35	management	single	tertiary	no	1350	yes	no	cellular	16	apr
	3	30	management	married	tertiary	no	1476	yes	yes	unknown	3	jun
	4	59	blue-collar	married	secondary	no	0	yes	no	unknown	5	may
	•••											
	4516	33	services	married	secondary	no	-333	yes	no	cellular	30	jul
	4517	57	self- employed	married	tertiary	yes	-3313	yes	yes	unknown	9	may
	4518	57	technician	married	secondary	no	295	no	no	cellular	19	aug
	4519	28	blue-collar	married	secondary	no	1137	no	no	cellular	6	feb
	4520	44	entrepreneur	single	tertiary	no	1136	yes	yes	cellular	3	apr

4521 rows × 17 columns

```
In [29]: bank_df['y'].values
Out[29]: array(['no', 'no', 'no', 'no', 'no', 'no'], dtype=object)
In [30]: bank_df=pd.read_csv(r"F:\FSDS\Data Files\bank.csv",sep=';')
from sklearn.preprocessing import LabelEncoder
le=LabelEncoder()
for i in cat[1:]:
    bank_df[i]=le.fit_transform(bank_df[i])
In [31]: bank_df
```

Out[31]:		age	job	marital	education	default	balance	housing	loan	contact	day	month	(
	0	30	unemployed	1	0	0	1787	0	0	0	19	10	
	1	33	services	1	1	0	4789	1	1	0	11	8	
	2	35	management	2	2	0	1350	1	0	0	16	0	
	3	30	management	1	2	0	1476	1	1	2	3	6	
	4	59	blue-collar	1	1	0	0	1	0	2	5	8	
	•••												
	4516	33	services	1	1	0	-333	1	0	0	30	5	
	4517	57	self- employed	1	2	1	-3313	1	1	2	9	8	
	4518	57	technician	1	1	0	295	0	0	0	19	1	
	4519	28	blue-collar	1	1	0	1137	0	0	0	6	3	
	4520	44	entrepreneur	2	2	0	1136	1	1	0	3	0	

4521 rows × 17 columns

bank_df=pd.read_csv(r"F:\FSDS\Data Files\bank.csv",sep=';') In [33]: pd.get_dummies(bank_df, dtype='int')

job_blue-Out[33]: job_entreprene age balance day duration campaign pdays previous job_admin.

									Collai	
0	30	1787	19	79	1	-1	0	0	0	
1	33	4789	11	220	1	339	4	0	0	
2	35	1350	16	185	1	330	1	0	0	
3	30	1476	3	199	4	-1	0	0	0	
4	59	0	5	226	1	-1	0	0	1	
•••								•••		
4516	33	-333	30	329	5	-1	0	0	0	
4517	57	-3313	9	153	1	-1	0	0	0	
4518	57	295	19	151	11	-1	0	0	0	
4519	28	1137	6	129	4	211	3	0	1	
4520	44	1136	3	345	2	249	7	0	0	

4521 rows × 53 columns

In []: