In [159…
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [161…
```
bank_df=pd.read_csv("bank.csv",sep=";")
bank_df
```

Out[161…

	age	job	marital	education	default	balance	housing	loan	contact	da
0	30	unemployed	married	primary	no	1787	no	no	cellular	
1	33	services	married	secondary	no	4789	yes	yes	cellular	
2	35	management	single	tertiary	no	1350	yes	no	cellular	
3	30	management	married	tertiary	no	1476	yes	yes	unknown	
4	59	blue-collar	married	secondary	no	0	yes	no	unknown	
...	...	...	...	...	...	...	...	...	...	
4516	33	services	married	secondary	no	-333	yes	no	cellular	
4517	57	self-employed	married	tertiary	yes	-3313	yes	yes	unknown	
4518	57	technician	married	secondary	no	295	no	no	cellular	
4519	28	blue-collar	married	secondary	no	1137	no	no	cellular	
4520	44	entrepreneur	single	tertiary	no	1136	yes	yes	cellular	

4521 rows × 17 columns

In [163…
```
bank_df.columns
```

Out[163…
```
Index(['age', 'job', 'marital', 'education', 'default', 'balance', 'housing',
       'loan', 'contact', 'day', 'month', 'duration', 'campaign', 'pdays',
       'previous', 'poutcome', 'y'],
      dtype='object')
```

In [165…
```
bank_df.dtypes
```

Out[165…
```
age           int64
job          object
marital      object
education    object
default      object
balance       int64
housing      object
loan         object
contact      object
day           int64
month        object
duration      int64
campaign      int64
pdays         int64
previous      int64
poutcome     object
y            object
dtype: object
```

In [167…
```
cat_col=[keys for keys,values in dict(bank_df.dtypes).items() if values=="object"]
num_col=[keys for keys,values in dict(bank_df.dtypes).items() if values!="object"]
num_col
```

Out[167…
```
['age', 'balance', 'day', 'duration', 'campaign', 'pdays', 'previous']
```

In [169…
```
cat_col
```

Out[169…
```
['job',
 'marital',
 'education',
 'default',
 'housing',
 'loan',
 'contact',
 'month',
 'poutcome',
 'y']
```

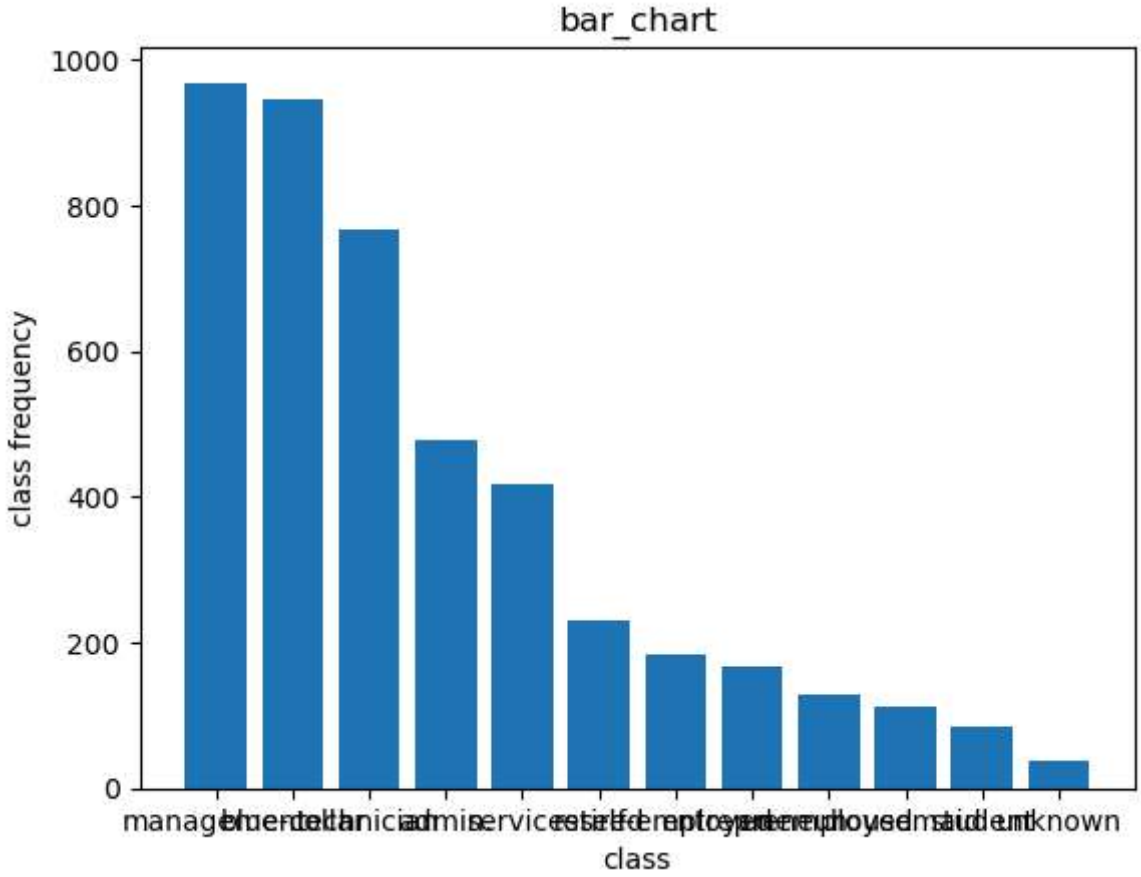
In [13]:
```
#unique value in columns and their numbers
#unique()  #nunique()
for i in cat_col:
    arr=bank_df[i].unique()
    n_arr=bank_df[i].nunique()
    print(arr,n_arr)
```

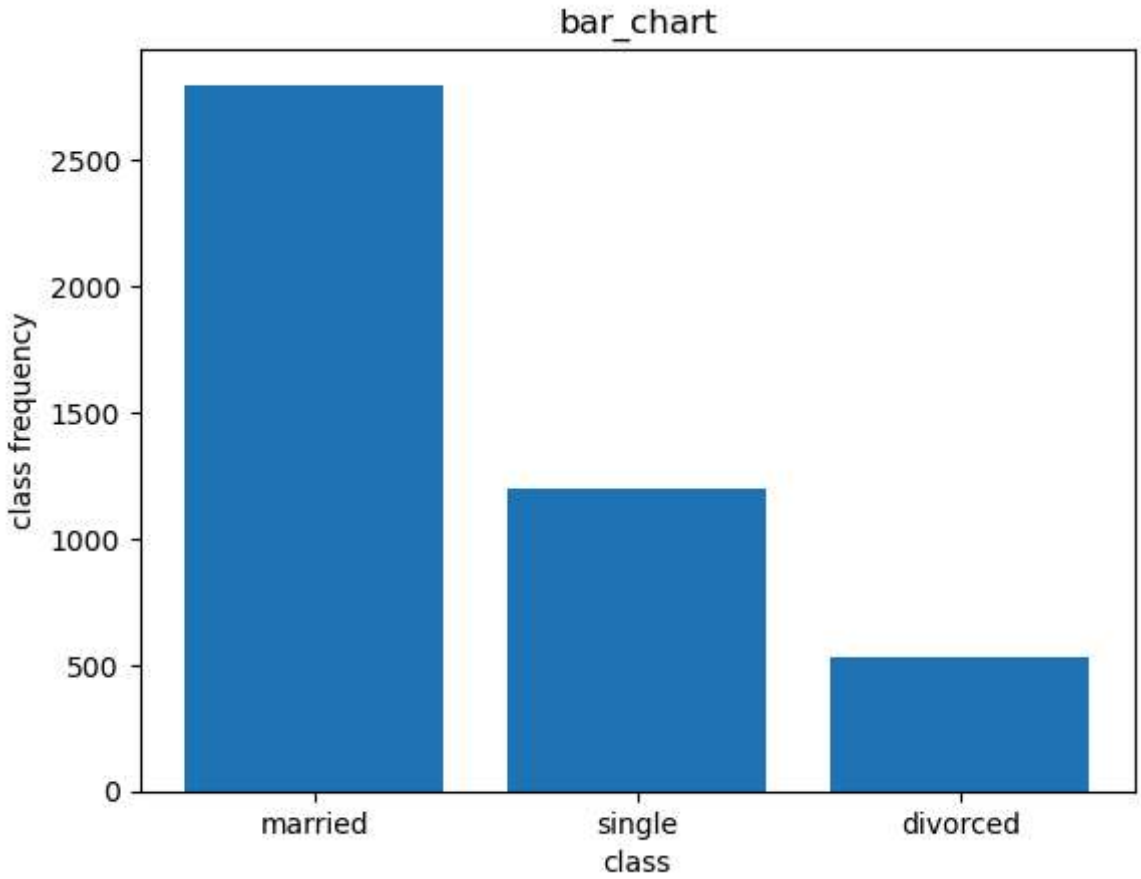
```
['unemployed' 'services' 'management' 'blue-collar' 'self-employed'
 'technician' 'entrepreneur' 'admin.' 'student' 'housemaid' 'retired'
 'unknown'] 12
['married' 'single' 'divorced'] 3
['primary' 'secondary' 'tertiary' 'unknown'] 4
['no' 'yes'] 2
['no' 'yes'] 2
['no' 'yes'] 2
['cellular' 'unknown' 'telephone'] 3
['oct' 'may' 'apr' 'jun' 'feb' 'aug' 'jan' 'jul' 'nov' 'sep' 'mar' 'dec'] 12
['unknown' 'failure' 'other' 'success'] 4
['no' 'yes'] 2
```

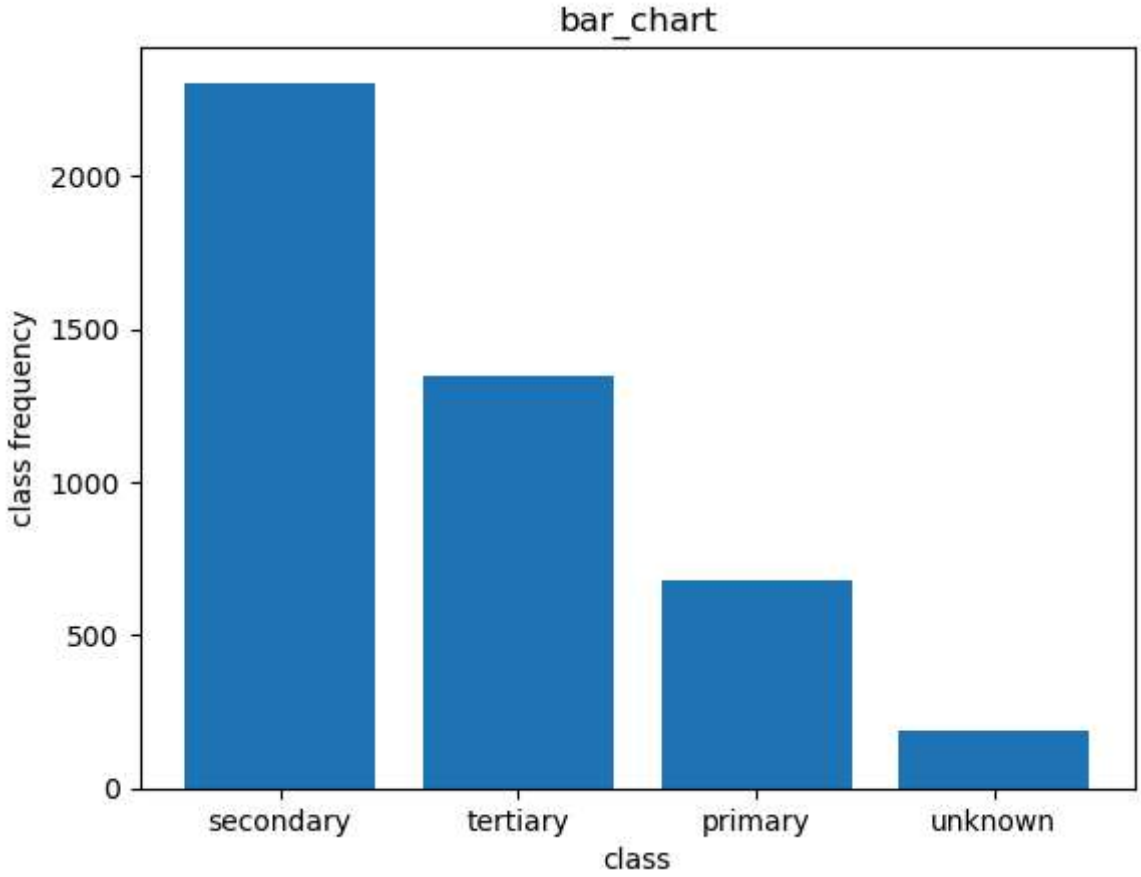
In [173…
```
bank_df["job"].value_counts()
```

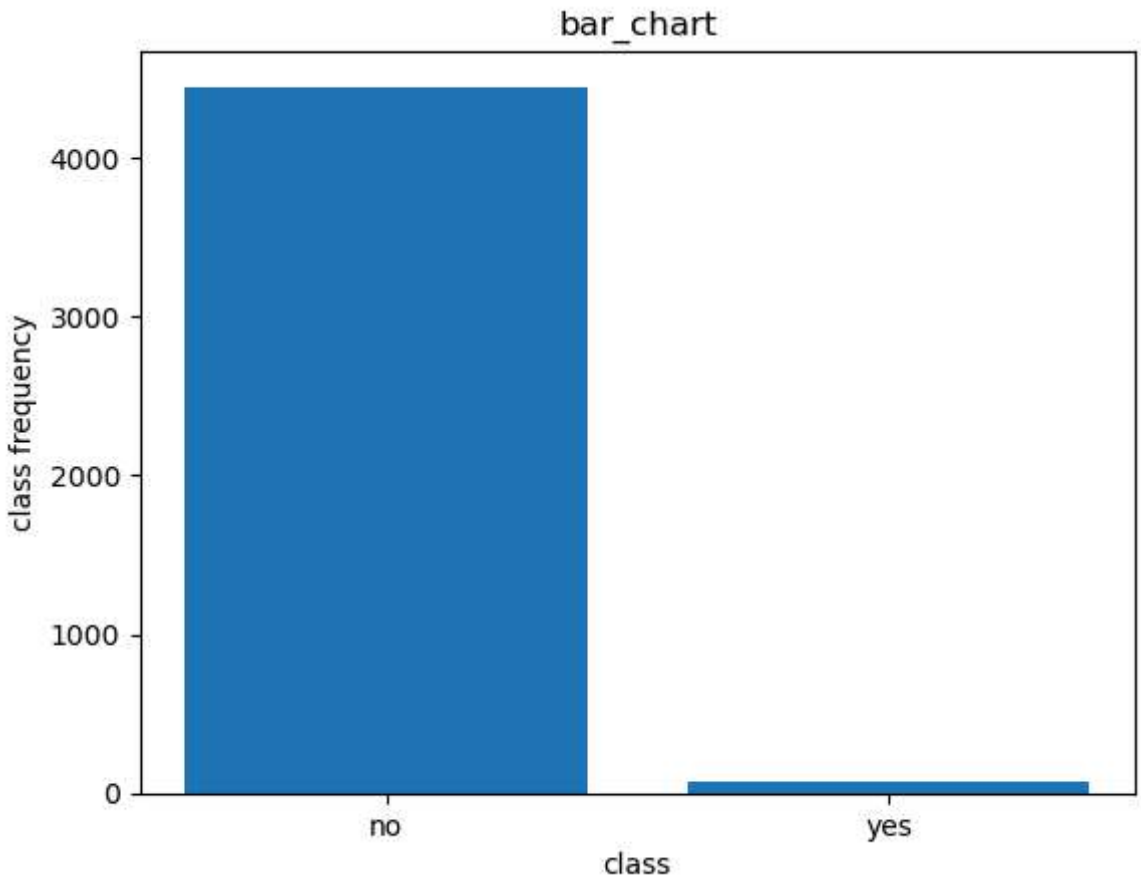
Out[173…
```
job
management       969
blue-collar      946
technician       768
admin.           478
services         417
retired          230
self-employed    183
entrepreneur     168
unemployed       128
housemaid        112
student           84
unknown           38
Name: count, dtype: int64
```

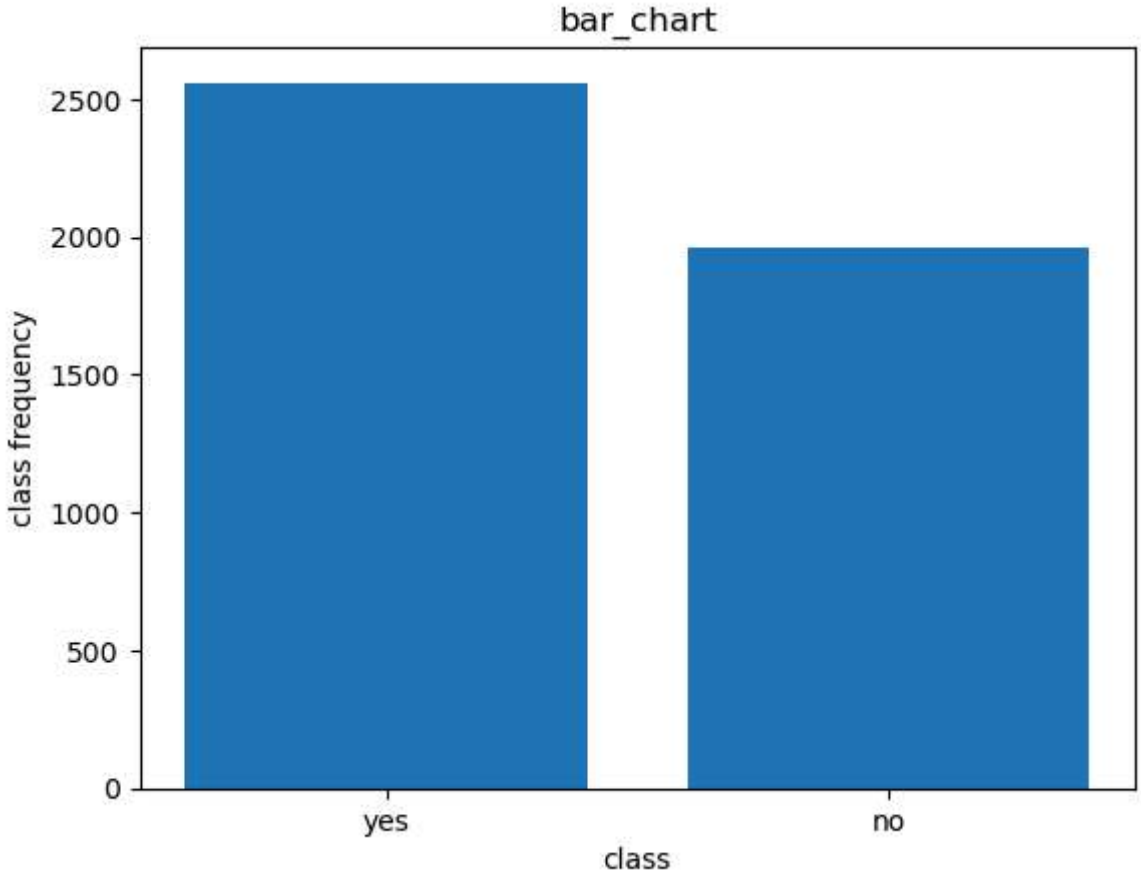
In [175…
```
for i in cat_col:
    dnf=bank_df[i].value_counts()   #using value_count() method
    keys=dnf.keys()
    values=dnf.values
    col=[i,"count"]
    df=pd.DataFrame(zip(keys,values),columns=col)

    plt.bar(i,"count",data=df)
    plt.title("bar_chart")
    plt.xlabel("class")
    plt.ylabel("class frequency")
    plt.show()
```

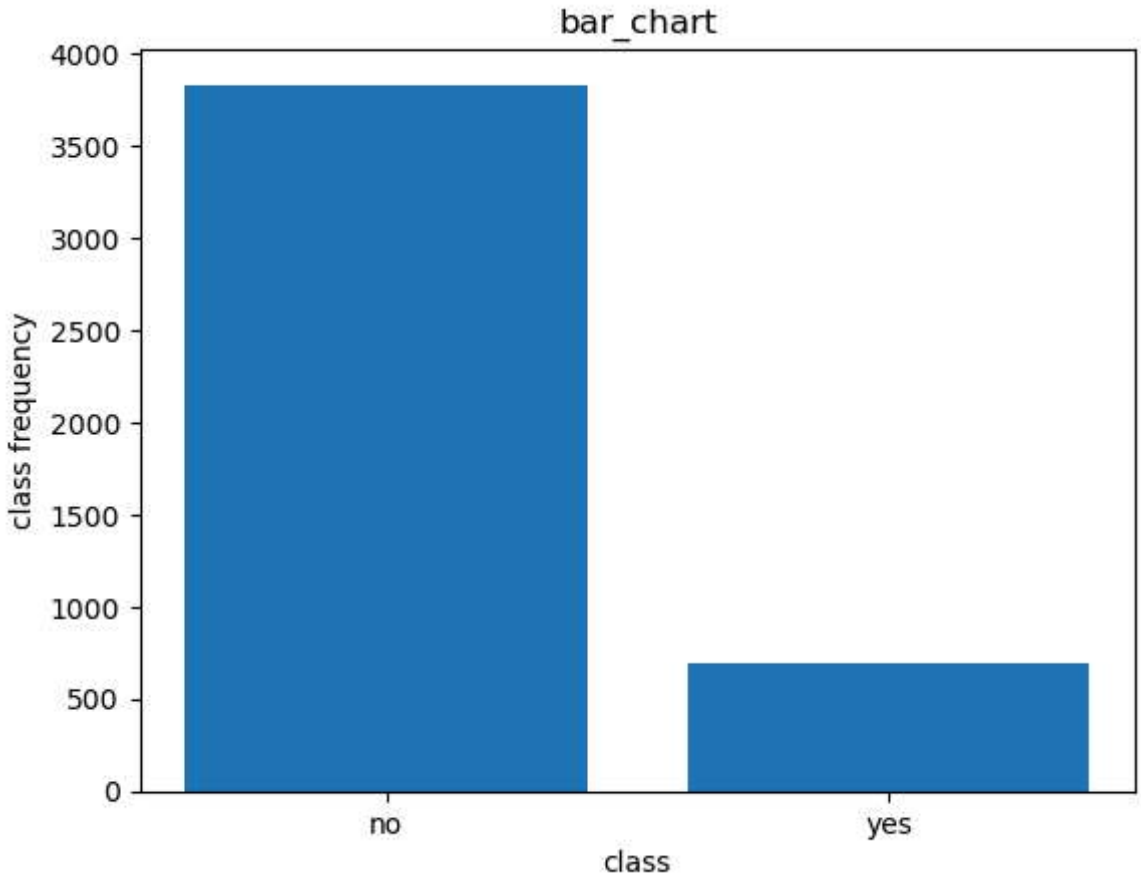

bar_chart
1000
800
600
400
200
0
class frequency
class

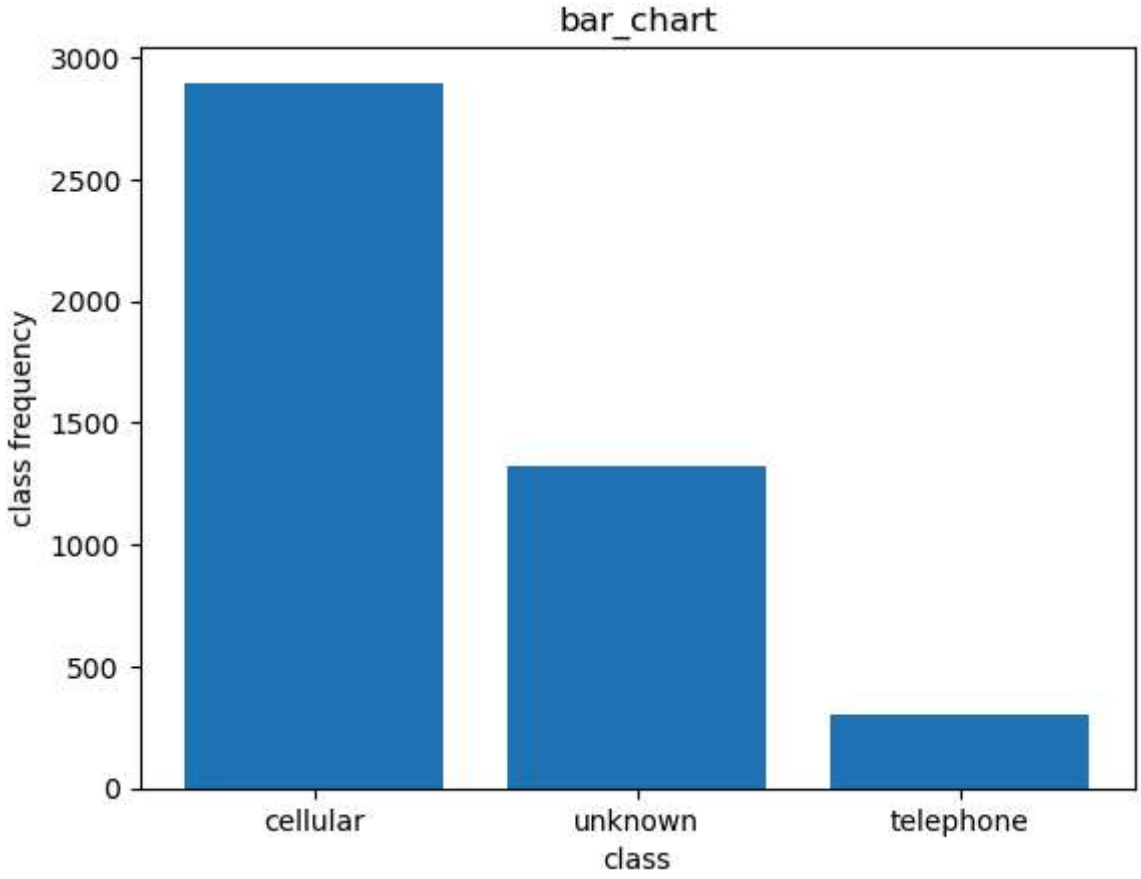

bar_chart
2500
2000
1500
1000
500
0
class frequency
married
single
divorced
class

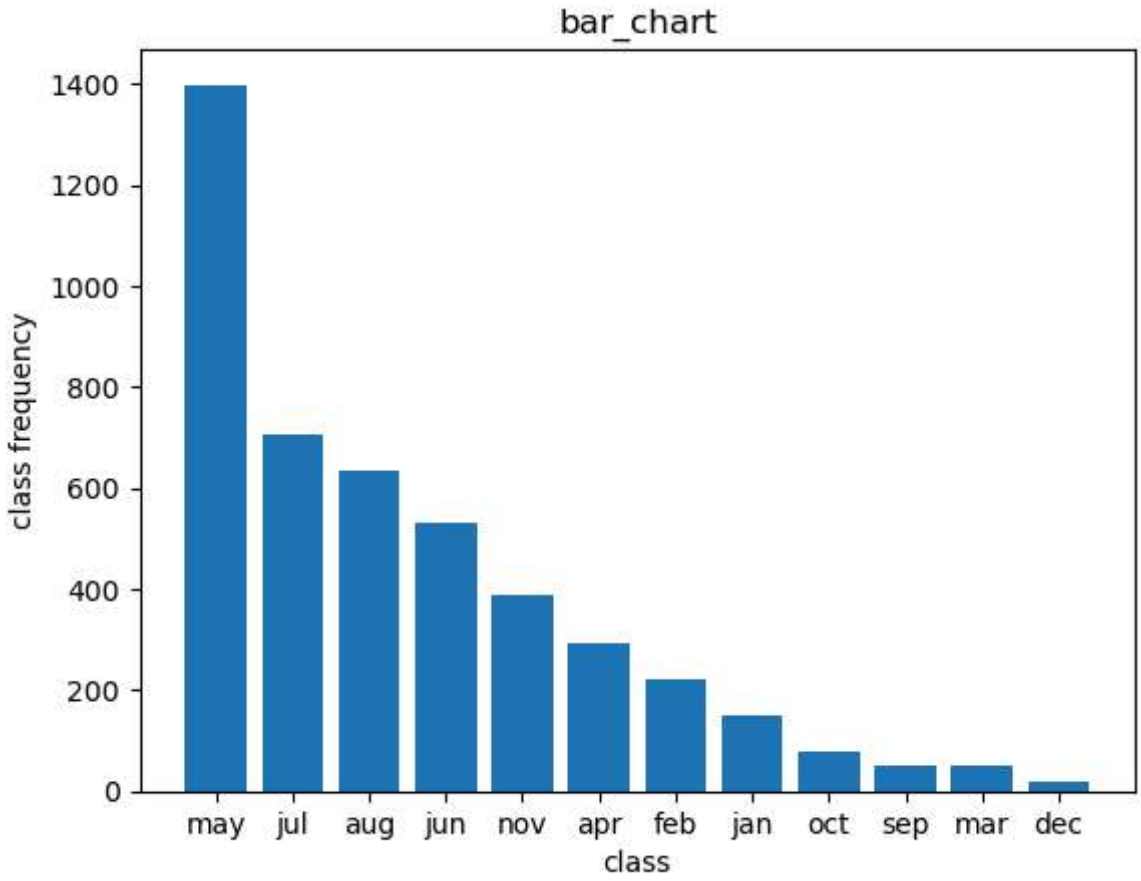

bar_chart
class frequency
2000
1500
1000
500
0
secondary
tertiary
primary
unknown
class

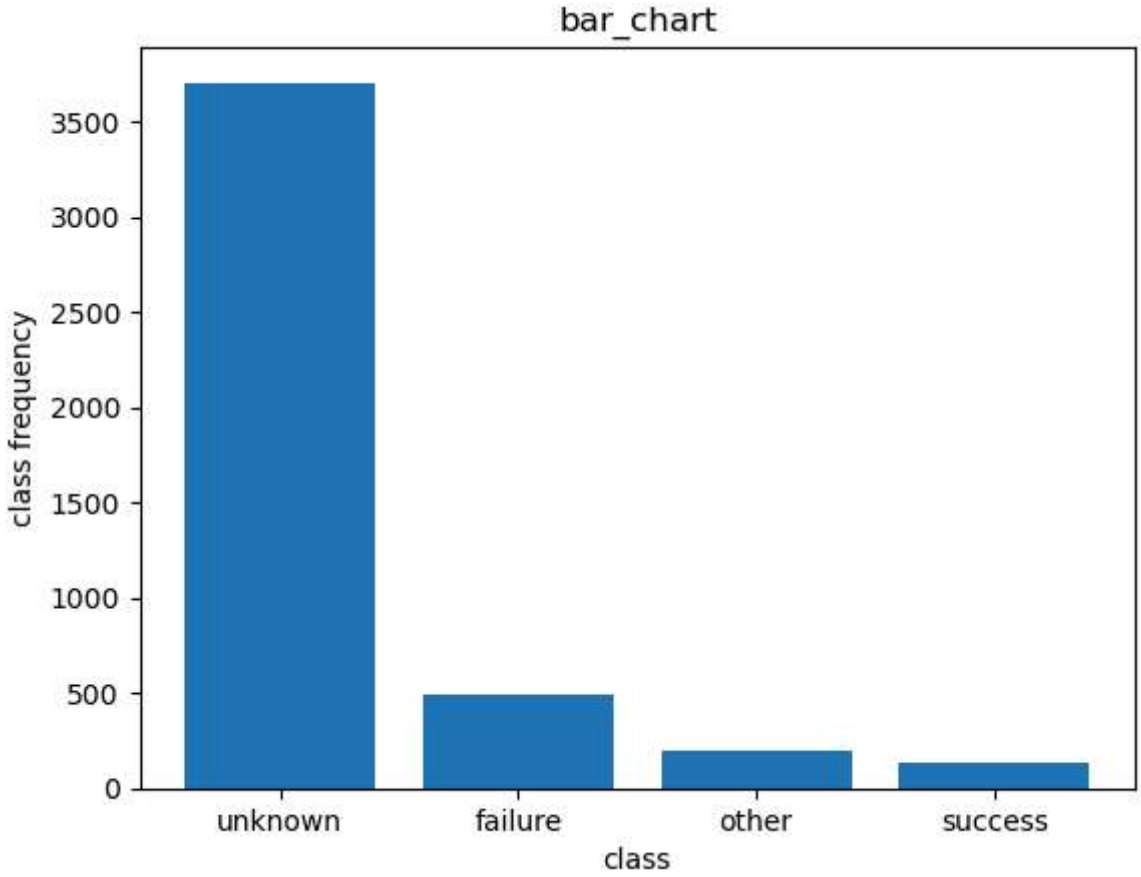

bar_chart
class frequency
4000
3000
2000
1000
0
no
yes
class

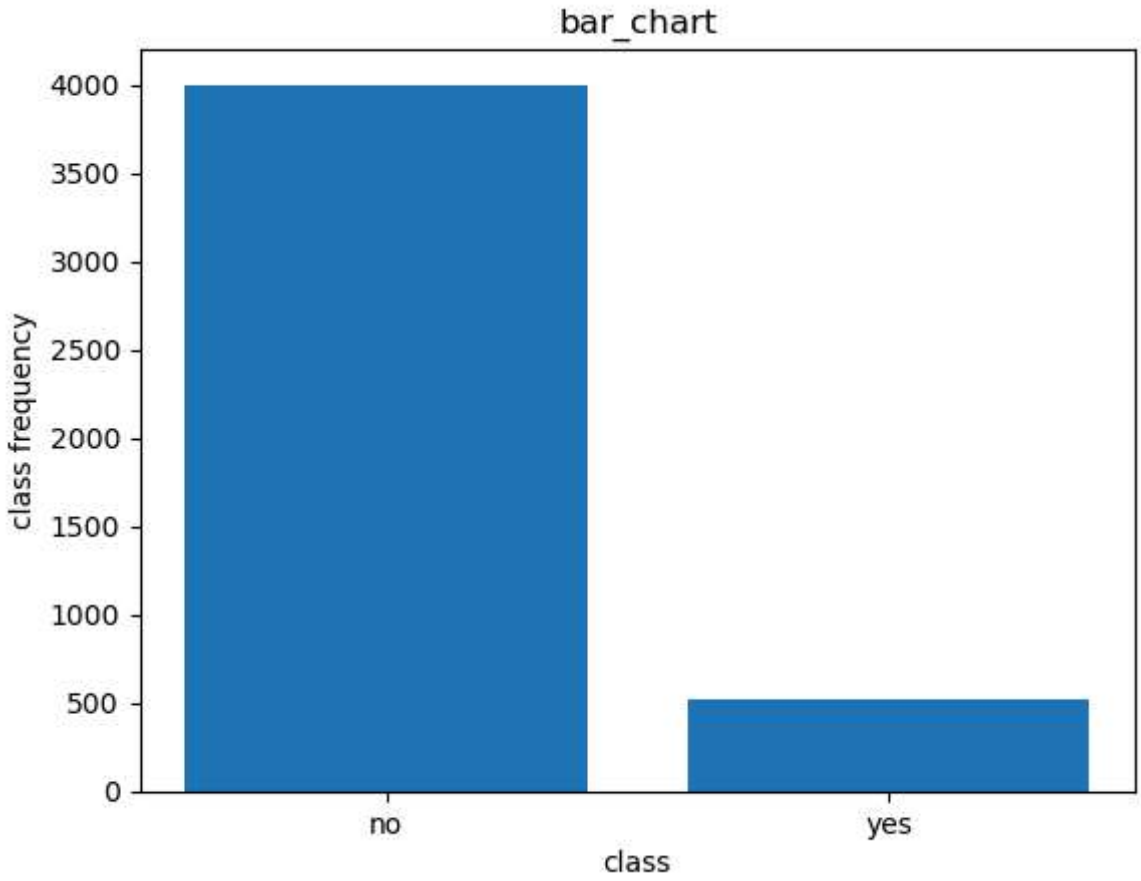

bar_chart
2500
2000
1500
1000
500
0
class frequency
yes
no
class


bar_chart
4000
3500
3000
2500
2000
1500
1000
500
0
class frequency
no
yes
class


bar_chart
class frequency
3000
2500
2000
1500
1000
500
0
cellular
unknown
telephone
class

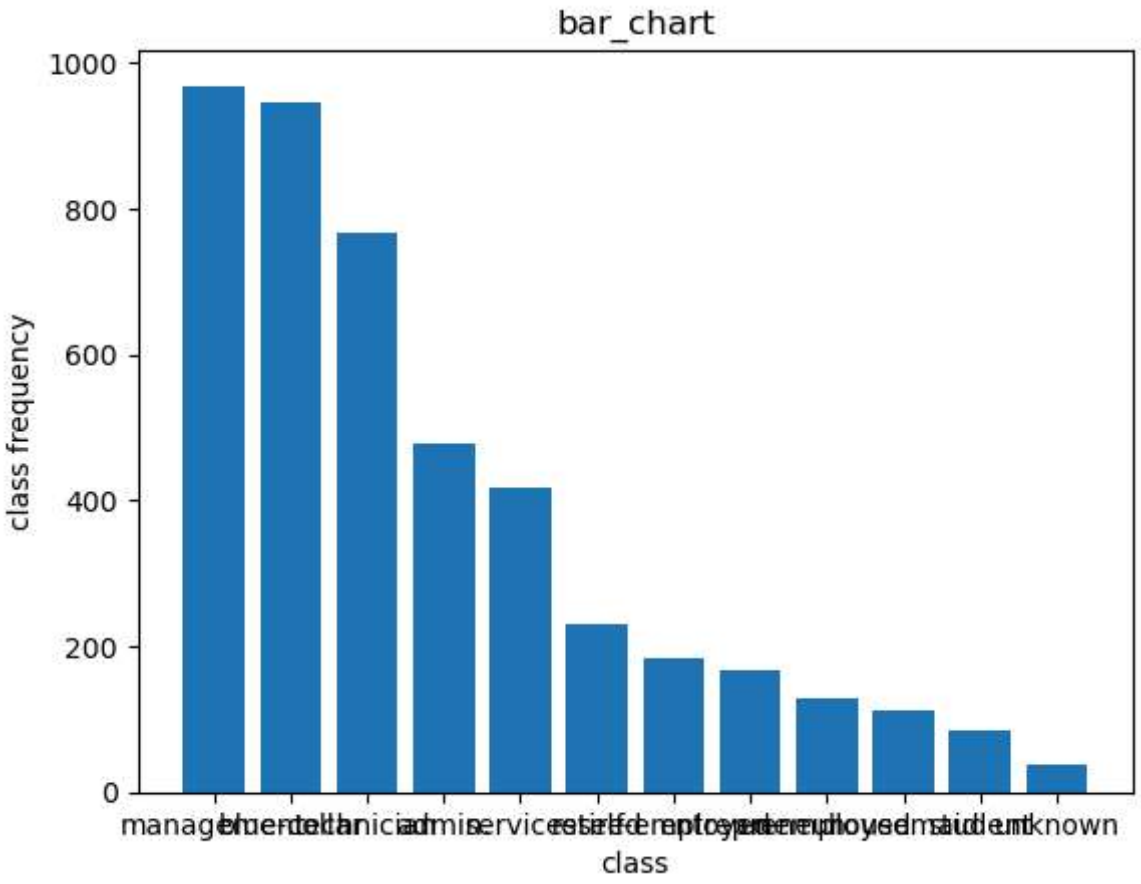

bar_chart
class frequency
1400
1200
1000
800
600
400
200
0
may
jul
aug
jun
nov
apr
feb
jan
oct
sep
mar
dec
class


bar_chart
class frequency
0
500
1000
1500
2000
2500
3000
3500
unknown
failure
other
success
class


bar_chart
class frequency
0
500
1000
1500
2000
2500
3000
3500
4000
no
yes
class

In [177…

```
# how to save dataframe and plot in directory folder


dnf=bank_df["job"].value_counts()   #using value_count() method
keys=dnf.keys()
values=dnf.values
col=["job","count"]
df=pd.DataFrame(zip(keys,values),columns=col)
df.to_csv("job.csv",index=False)    #use dataframe name>.<to_csv("name.csv")>

plt.bar("job","count",data=df)
plt.title("bar_chart")
plt.xlabel("class")
plt.ylabel("class frequency")
plt.savefig("job.jpg")
plt.show()
```



In [179…

```
#read the job dataframe
pd.read_csv("job.csv")
```

Out[179…

	job	count
0	management	969
1	blue-collar	946
2	technician	768
3	admin.	478
4	services	417
5	retired	230
6	self-employed	183
7	entrepreneur	168
8	unemployed	128
9	housemaid	112
10	student	84
11	unknown	38

In [181…
```
#make folder in directory
import os
os.getcwd()
```

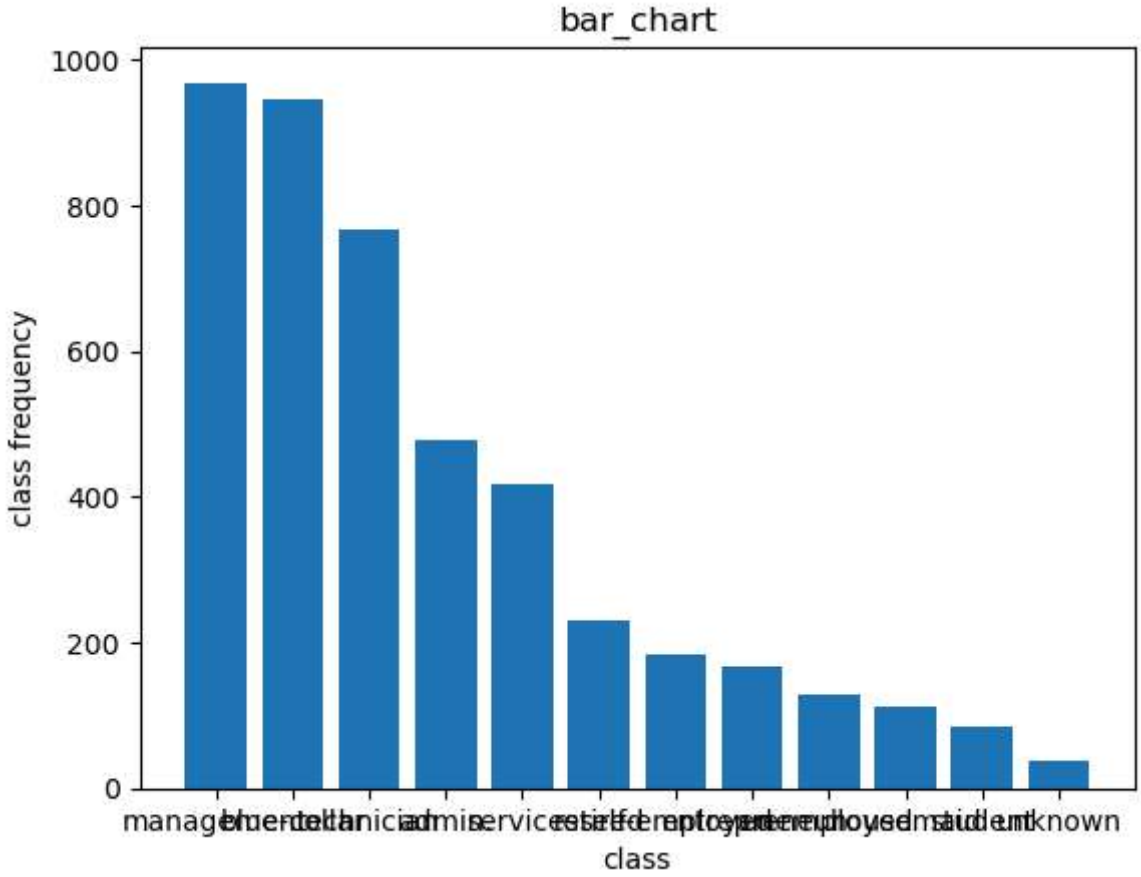
Out[181… 'C:\\Users\\Mrityunjay\\Desktop\\Data science naresh it\\Self practice'

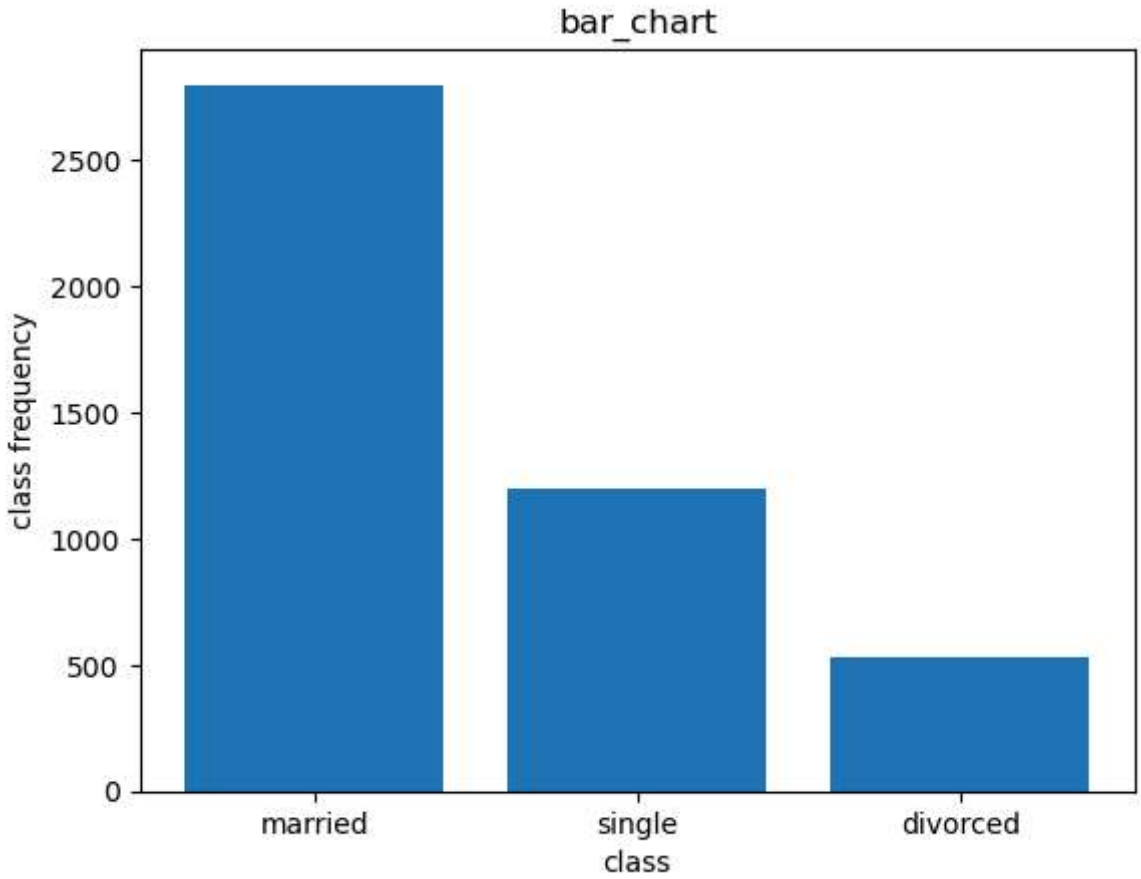
In [183…
```
root_dir=os.getcwd()
new_folder="folder"
new_dir=os.path.join(root_dir,new_folder)
os.makedirs(new_dir)
```

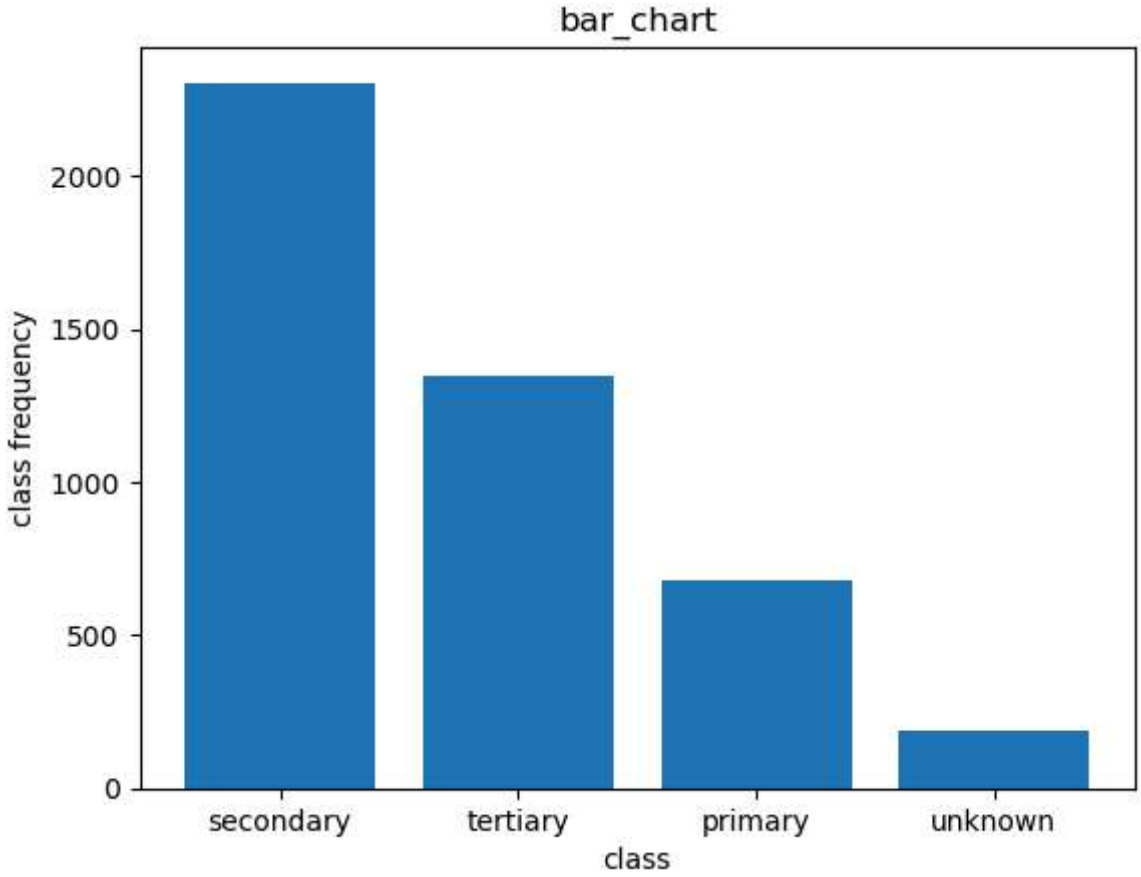
In [187…
```
new_dir
```

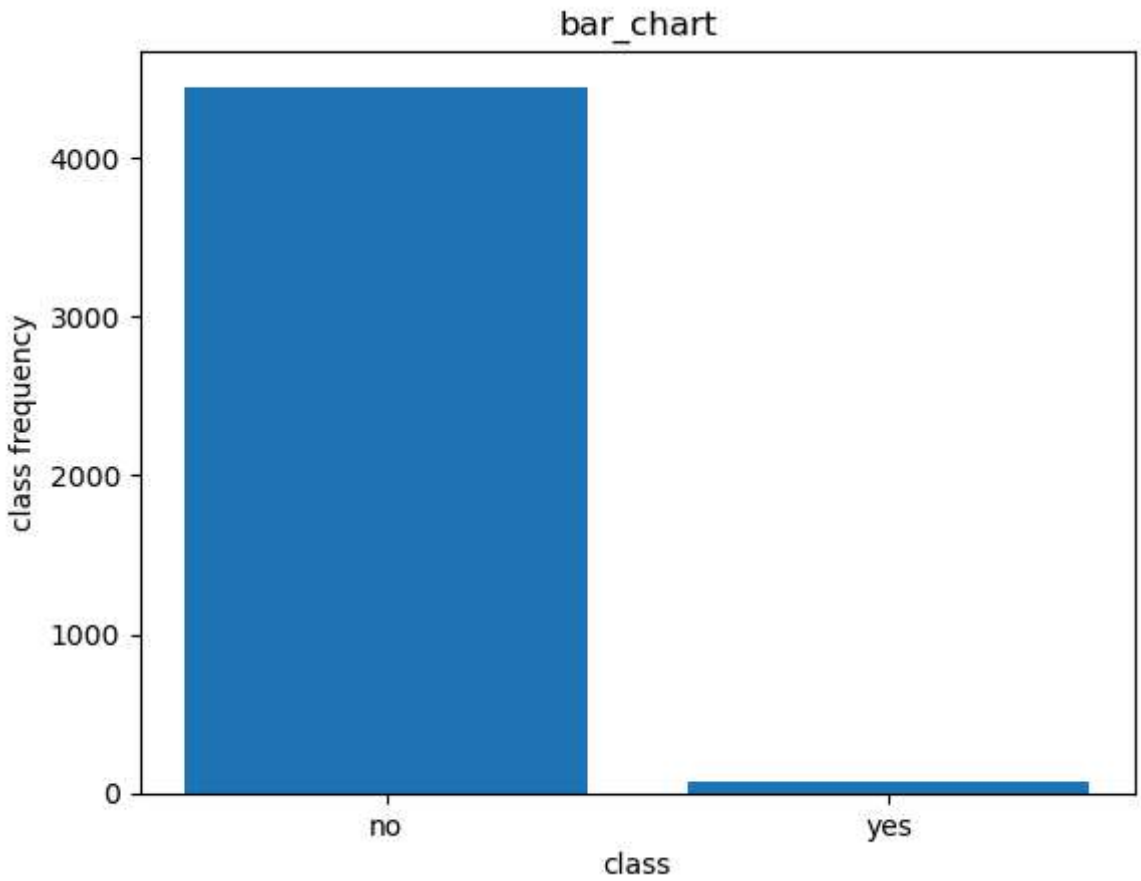
Out[187… 'C:\\Users\\Mrityunjay\\Desktop\\Data science naresh it\\Self practice\\folder'

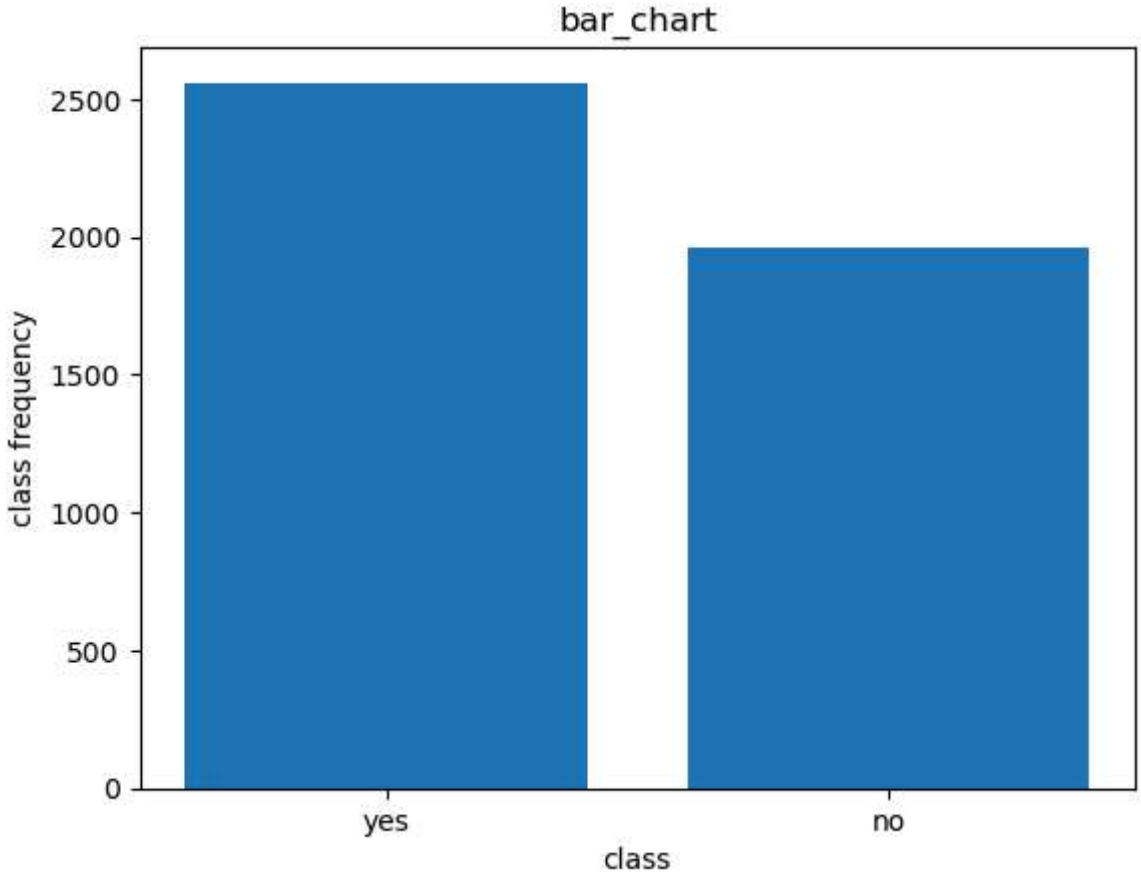
In [189…
```
#how to add and read all the categirical columns dataframe and plots in new_folder
for i in cat_col:
    dnf=bank_df[i].value_counts()   #using value_count() method
    keys=dnf.keys()
    values=dnf.values
    col=[i,"count"]
    df=pd.DataFrame(zip(keys,values),columns=col)
    df.to_csv(f"{new_dir}\\{i}.csv",index=False)    #use dataframe name>.<to_csv("n

    plt.bar(i,"count",data=df)
    plt.title("bar_chart")
    plt.xlabel("class")
    plt.ylabel("class frequency")
    plt.savefig(f"{new_dir}\\{i}.jpg")
    plt.show()
```

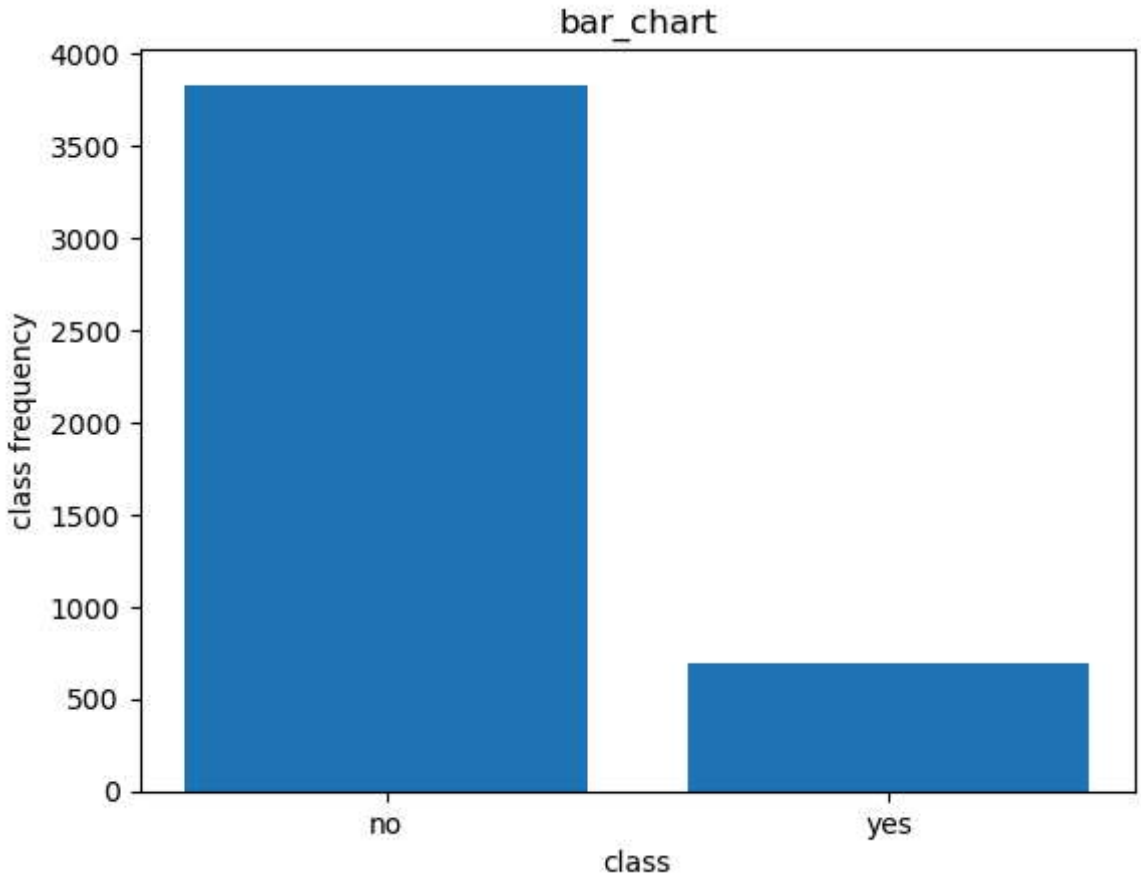

bar_chart
1000
800
600
400
200
0
class frequency
class

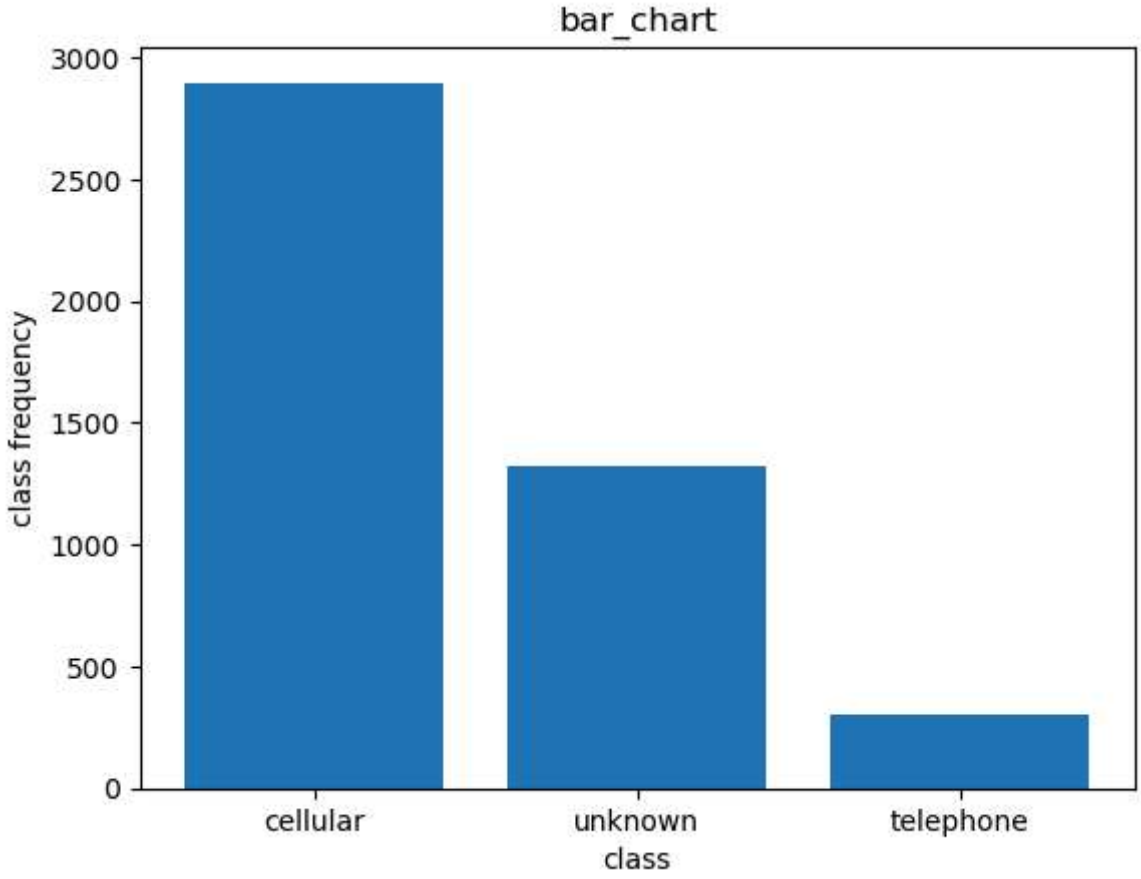

bar_chart
2500
2000
1500
1000
500
0
class frequency
married
single
divorced
class

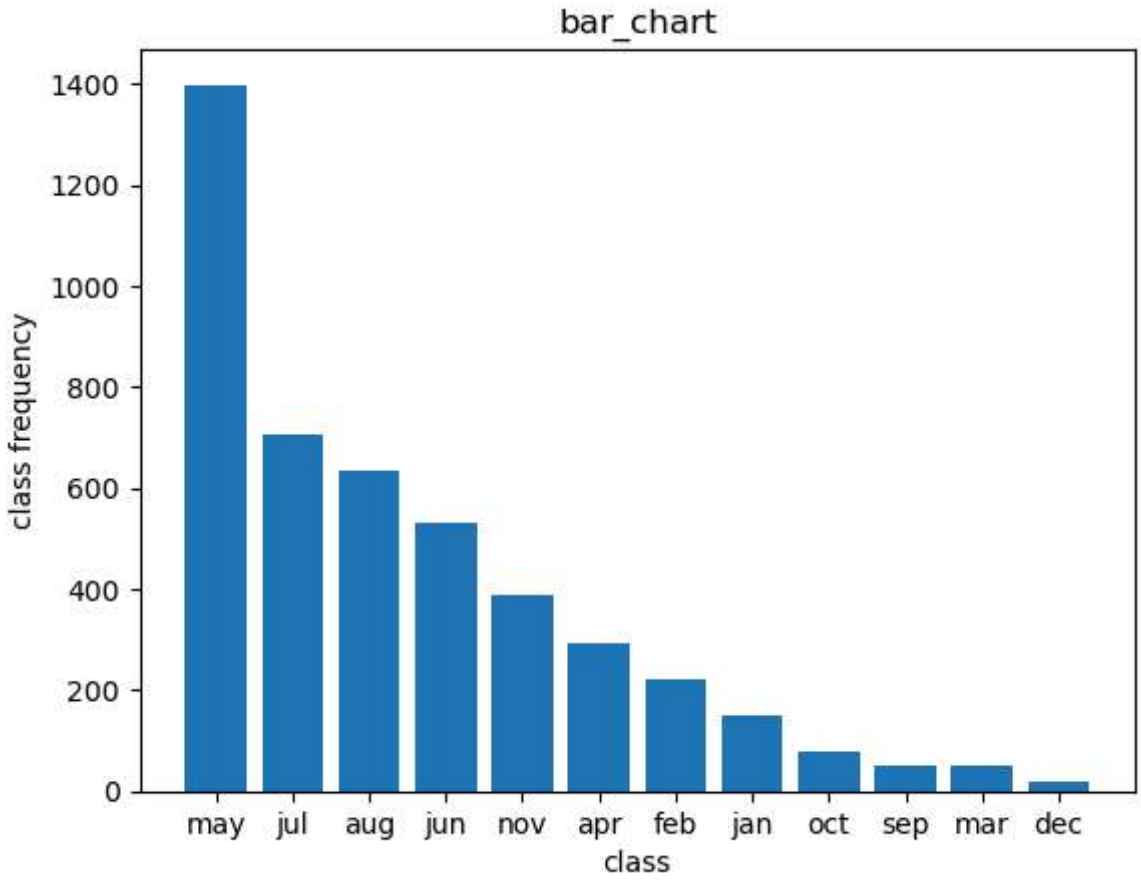

bar_chart
class frequency
2000
1500
1000
500
0
secondary
tertiary
primary
unknown
class

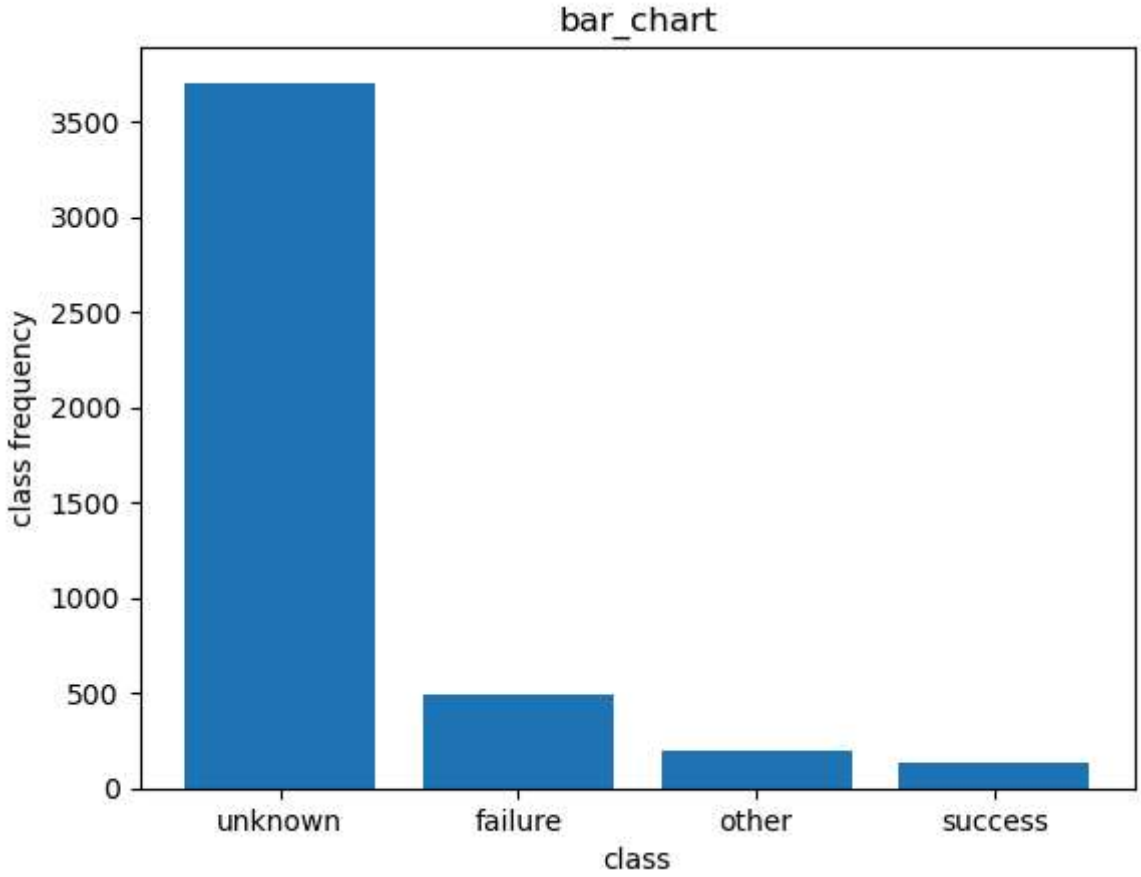

bar_chart
class frequency
4000
3000
2000
1000
0
no
yes
class

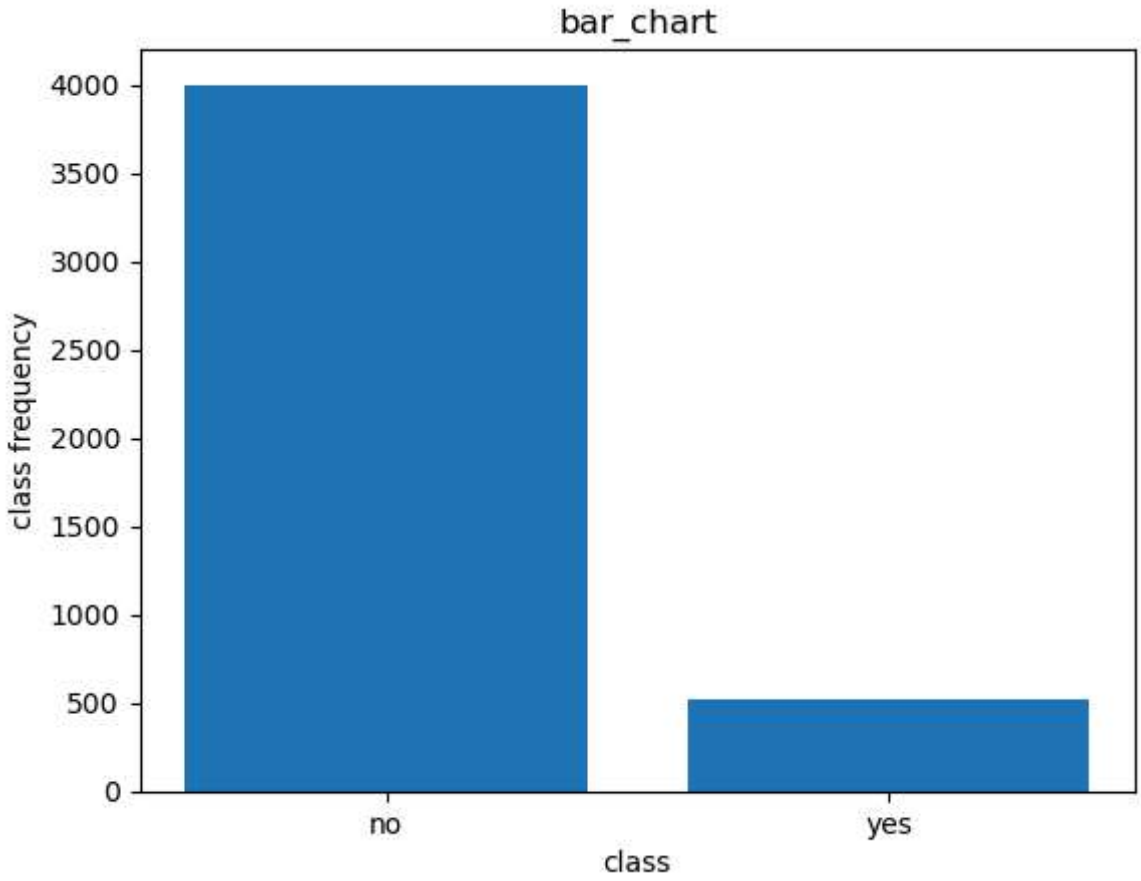

bar_chart
2500
2000
1500
1000
500
0
class frequency
yes
no
class


bar_chart
4000
3500
3000
2500
2000
1500
1000
500
0
class frequency
no
yes
class


bar_chart
3000
2500
2000
1500
1000
500
0
class frequency
cellular
unknown
telephone
class


bar_chart
1400
1200
1000
800
600
400
200
0
class frequency
may
jul
aug
jun
nov
apr
feb
jan
oct
sep
mar
dec
class


bar_chart
class frequency
3500
3000
2500
2000
1500
1000
500
0
unknown
failure
other
success
class


bar_chart
class frequency
4000
3500
3000
2500
2000
1500
1000
500
0
no
yes
class

In [191…

```
#read the folder dataframes
l=[]
for i in cat_col:
    df=pd.read_csv(f"{new_dir}\\{i}.csv")
    l.append(df)
l
```

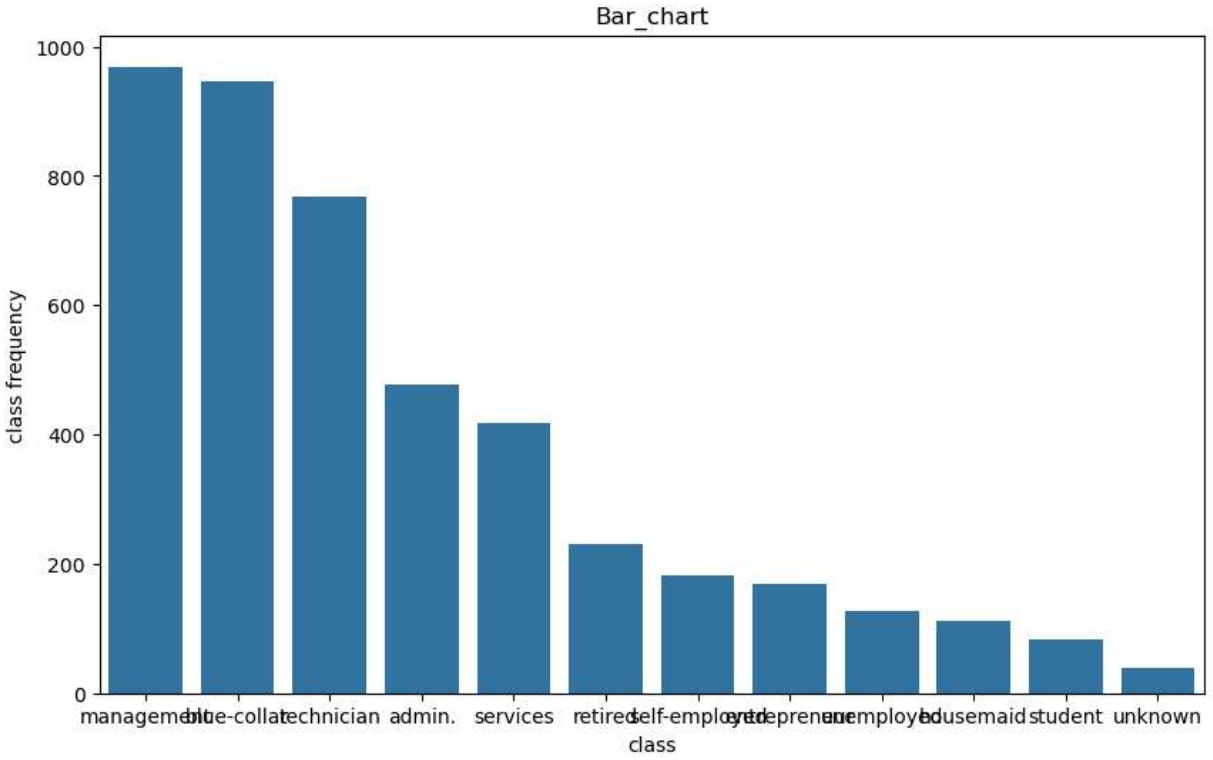
Out[191…

```
[             job  count
0     management    969
1    blue-collar    946
2     technician    768
3         admin.    478
4       services    417
5        retired    230
6   self-employed    183
7    entrepreneur    168
8      unemployed    128
9       housemaid    112
10        student     84
11        unknown     38,
    marital  count
0   married   2797
1    single   1196
2  divorced    528,
   education  count
0  secondary   2306
1   tertiary   1350
2    primary    678
3    unknown    187,
  default  count
0      no   4445
1     yes     76,
  housing  count
0     yes   2559
1      no   1962,
  loan  count
0   no   3830
1  yes    691,
     contact  count
0   cellular   2896
1    unknown   1324
2  telephone    301,
   month  count
0    may   1398
1    jul    706
2    aug    633
3    jun    531
4    nov    389
5    apr    293
6    feb    222
7    jan    148
8    oct     80
9    sep     52
10   mar     49
11   dec     20,
  poutcome  count
0  unknown   3705
1  failure    490
2    other    197
3  success    129,
     y  count
0   no   4000
1  yes    521]
```

In [193…
```
orders=bank_df["job"].value_counts().keys()
orders
```

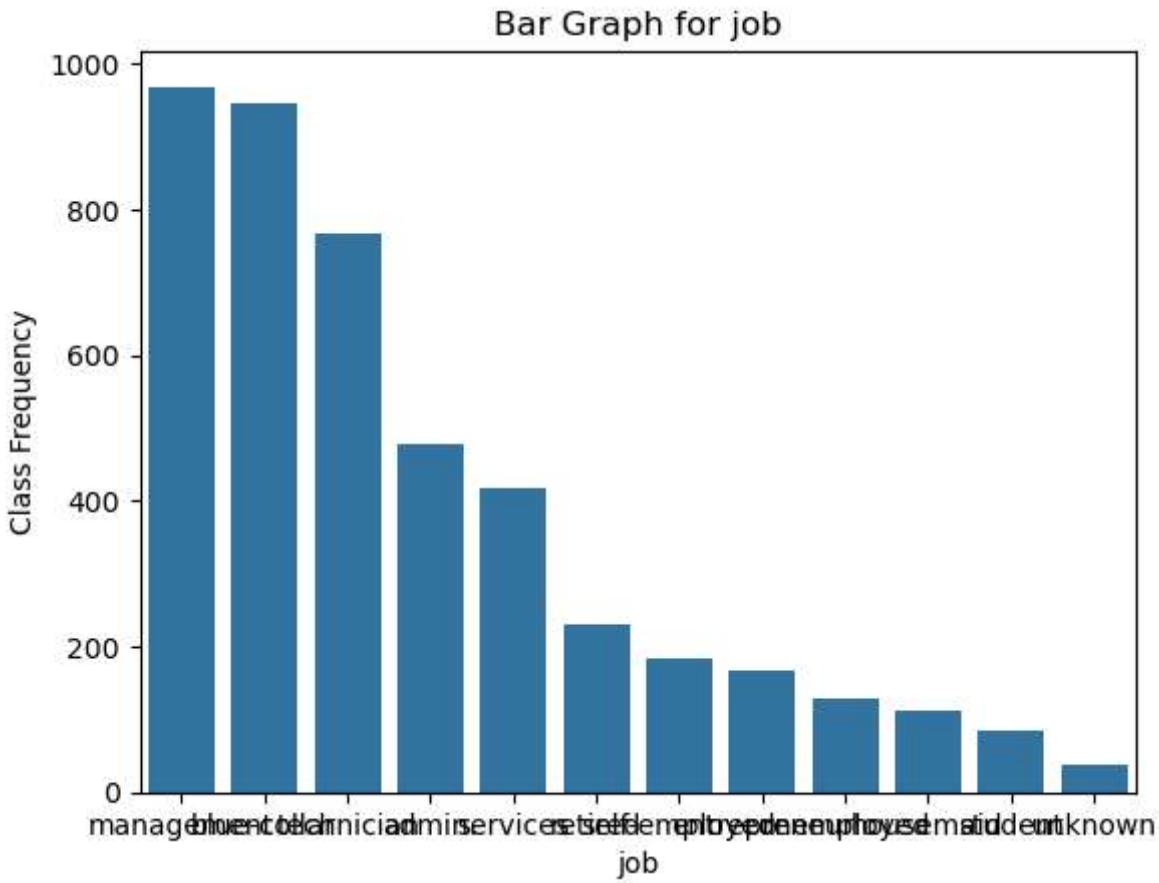
Out[193…
```
Index(['management', 'blue-collar', 'technician', 'admin.', 'services',
       'retired', 'self-employed', 'entrepreneur', 'unemployed', 'housemaid',
       'student', 'unknown'],
      dtype='object', name='job')
```

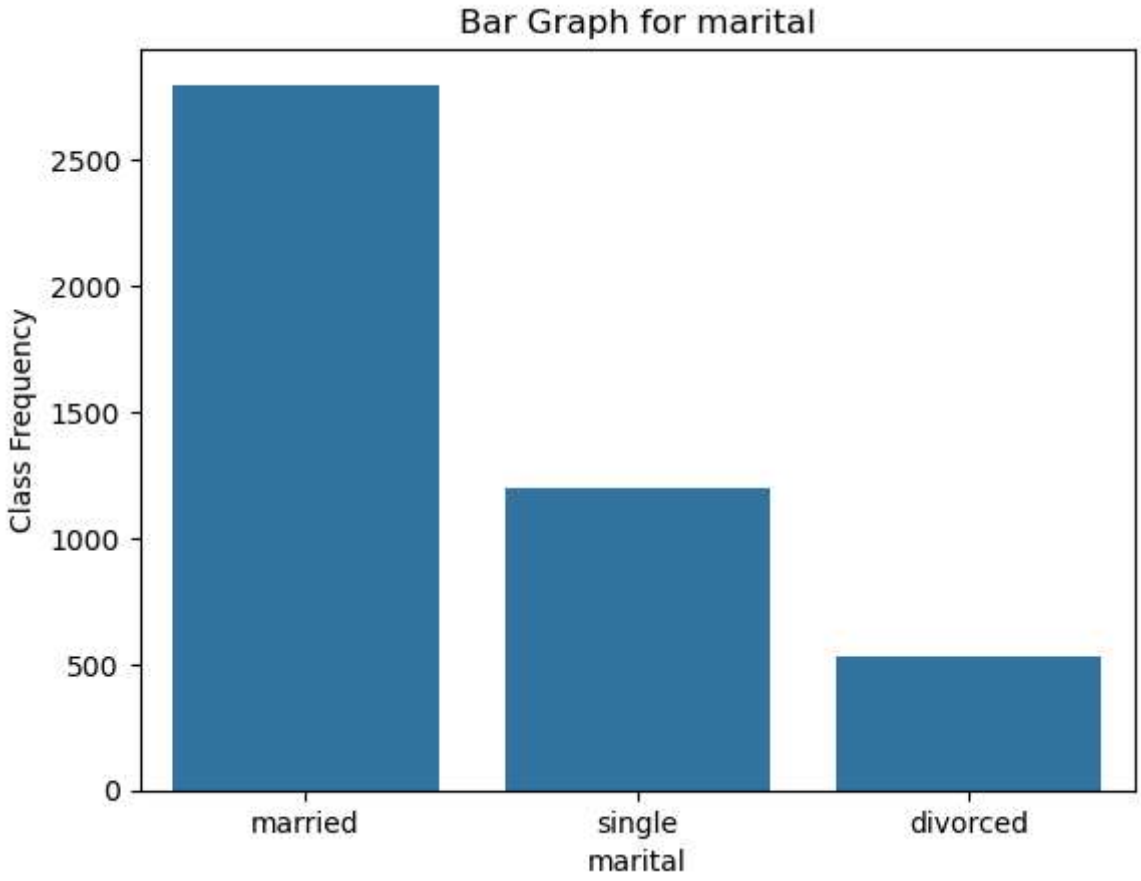
In [195…
```
#seaborn plots
orders=bank_df["job"].value_counts().keys()

plt.figure(figsize=(10,6))  #here figuresize wirte above the plot data
sns.countplot(data=bank_df,
              x="job",
              order=orders)

plt.title("Bar_chart")
plt.xlabel("class")
plt.ylabel("class frequency")
plt.savefig("job.jpg")
plt.show()
```

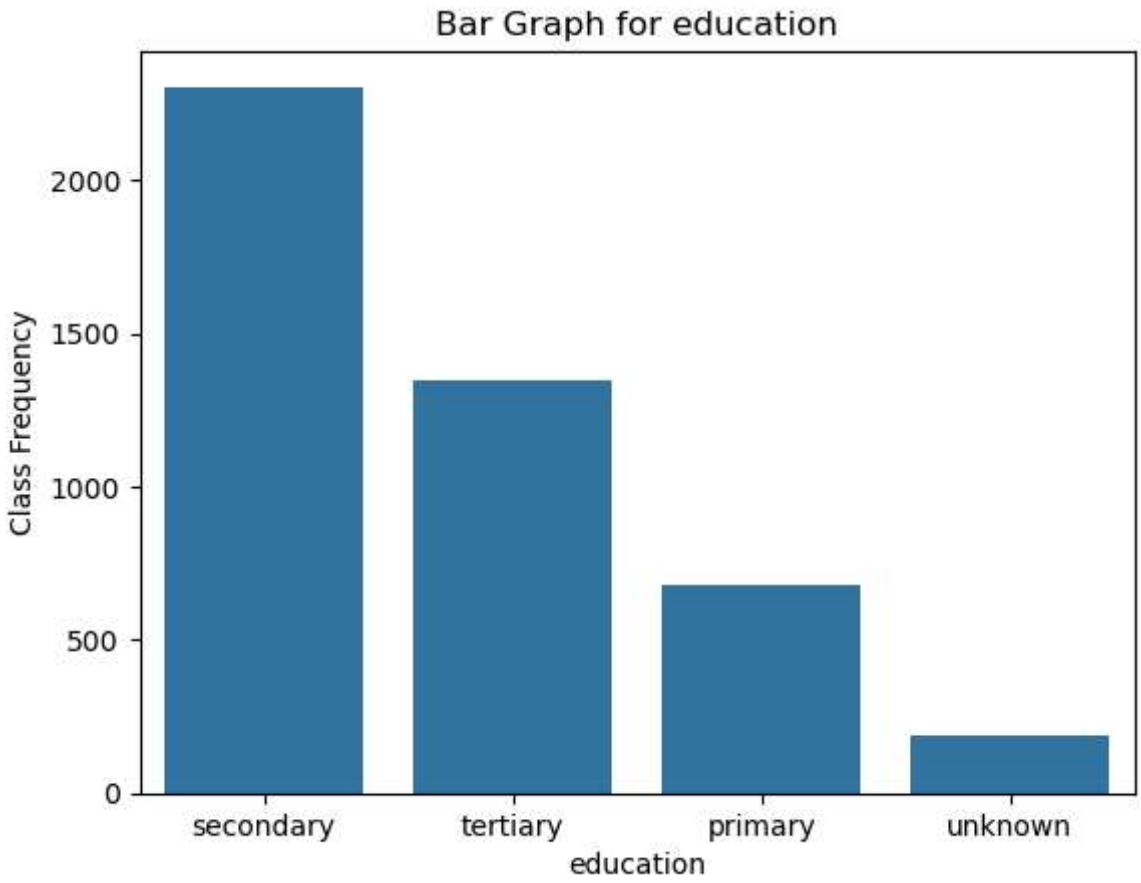


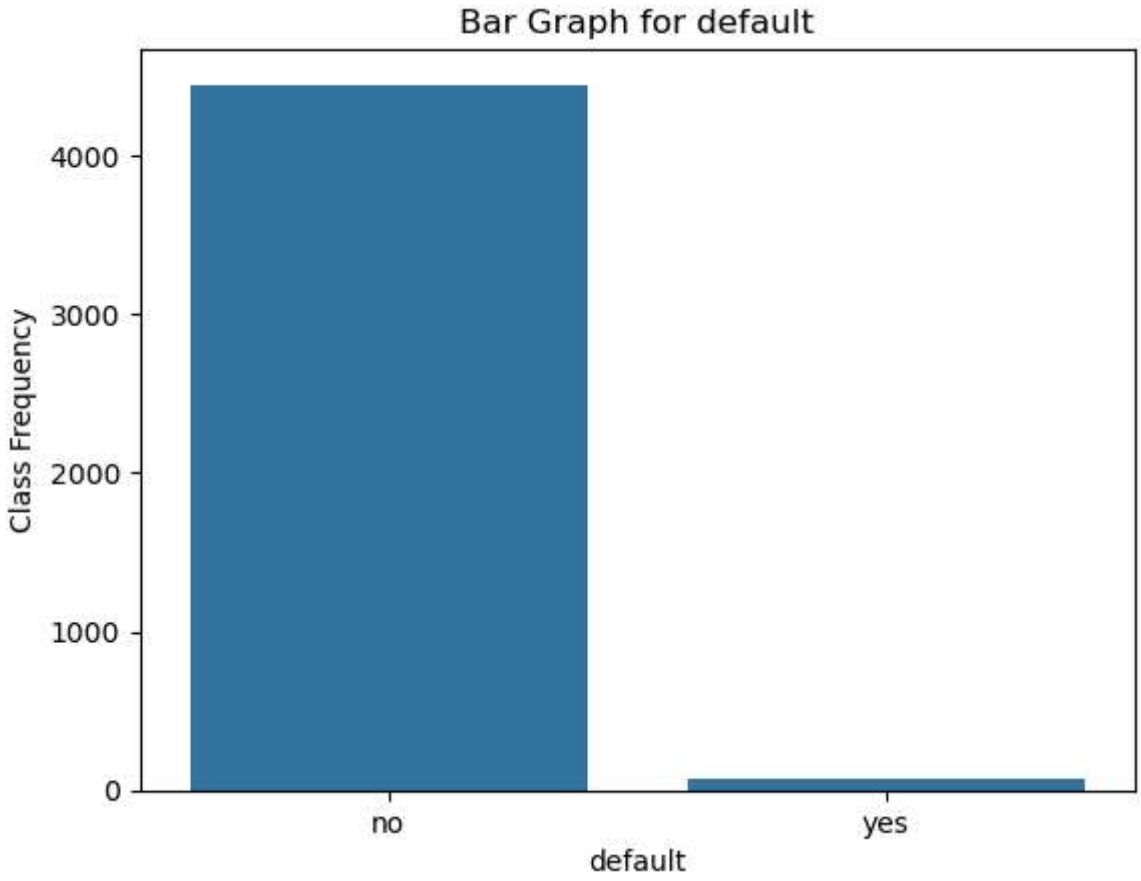
In [197…
```
#all columms ploting through loop and seborn package
orders = {}

for i in cat_col:             #loop and add columns names and keys as dict items
    cnf = bank_df[i].value_counts()
    orders[i] = cnf.keys()


for j in cat_col:              # iiterate again categorical columns order==dict val
```

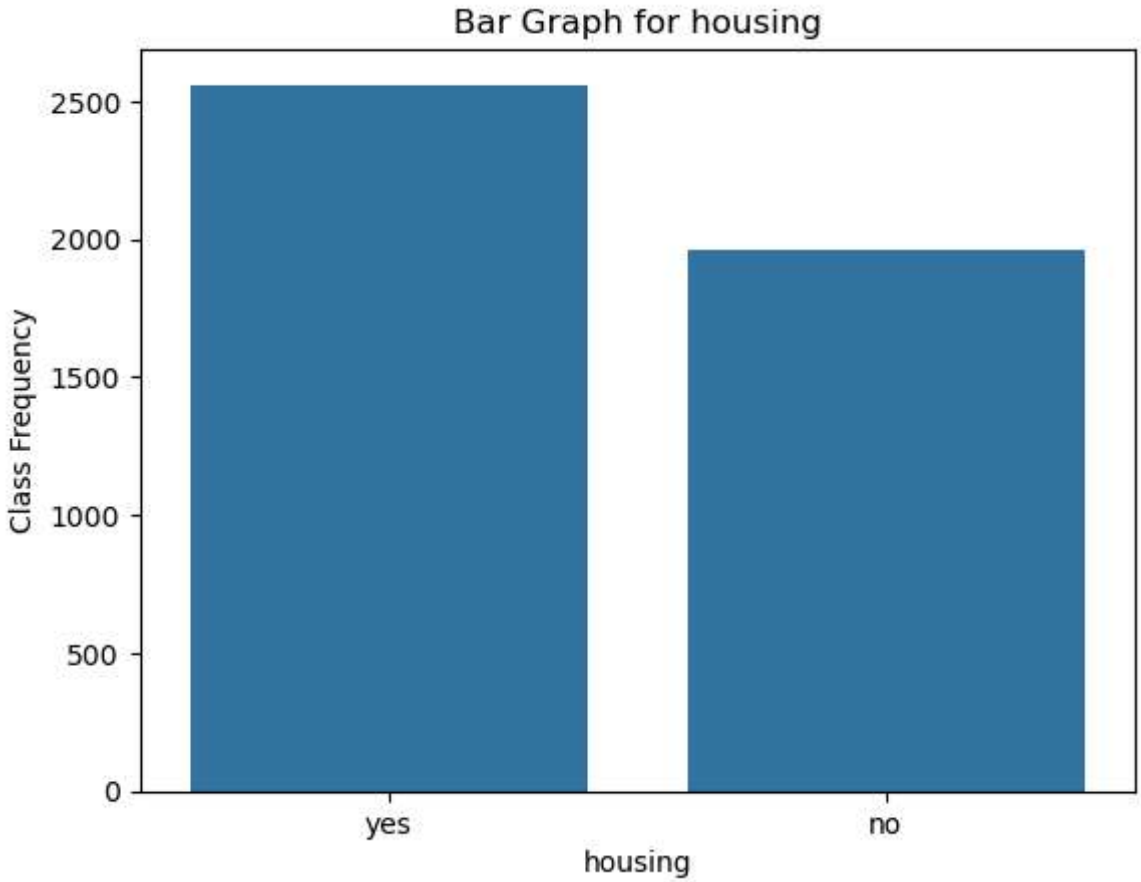
```
    sns.countplot(data=bank_df,
                  x=j,
                  order=orders[j])
    plt.title(f"Bar Graph for {j}")
    plt.xlabel(f"{j}")
    plt.ylabel("Class Frequency")
    plt.savefig(f"{new_dir}\\{i}.jpg")
    plt.show()
```

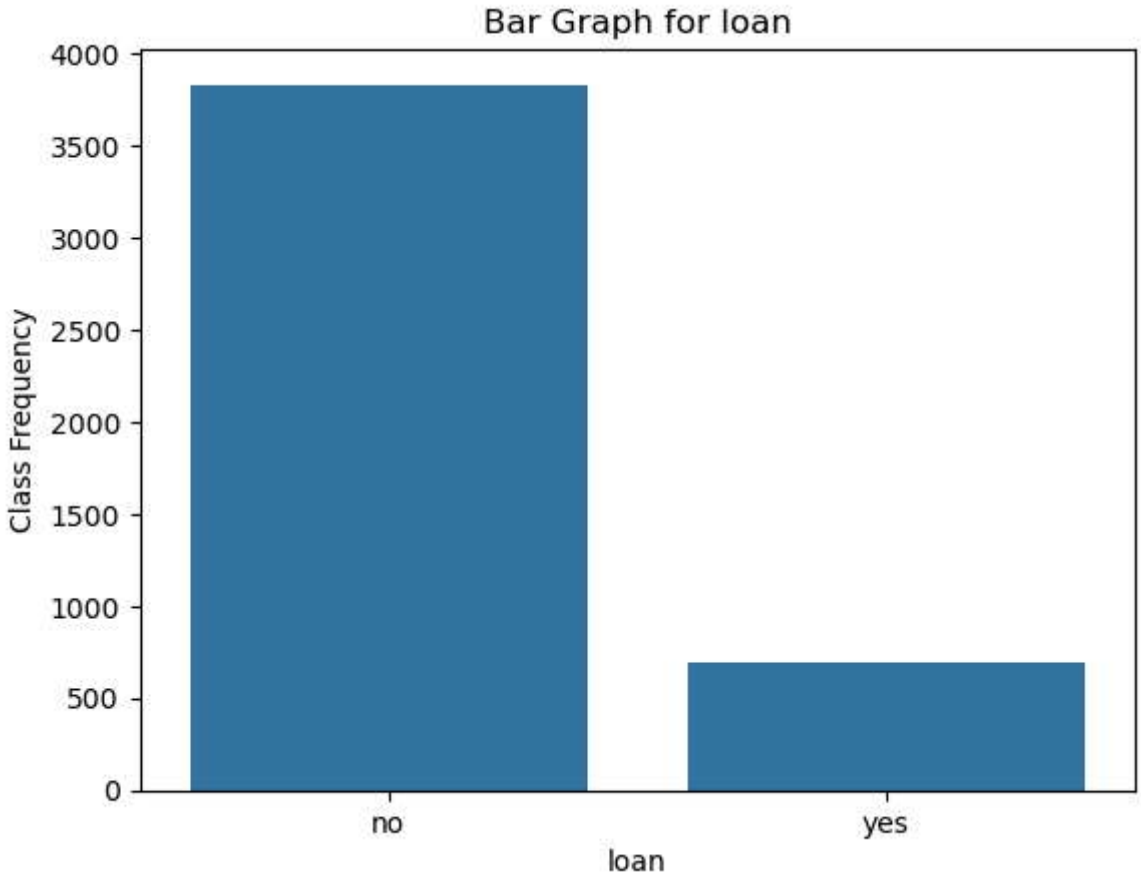


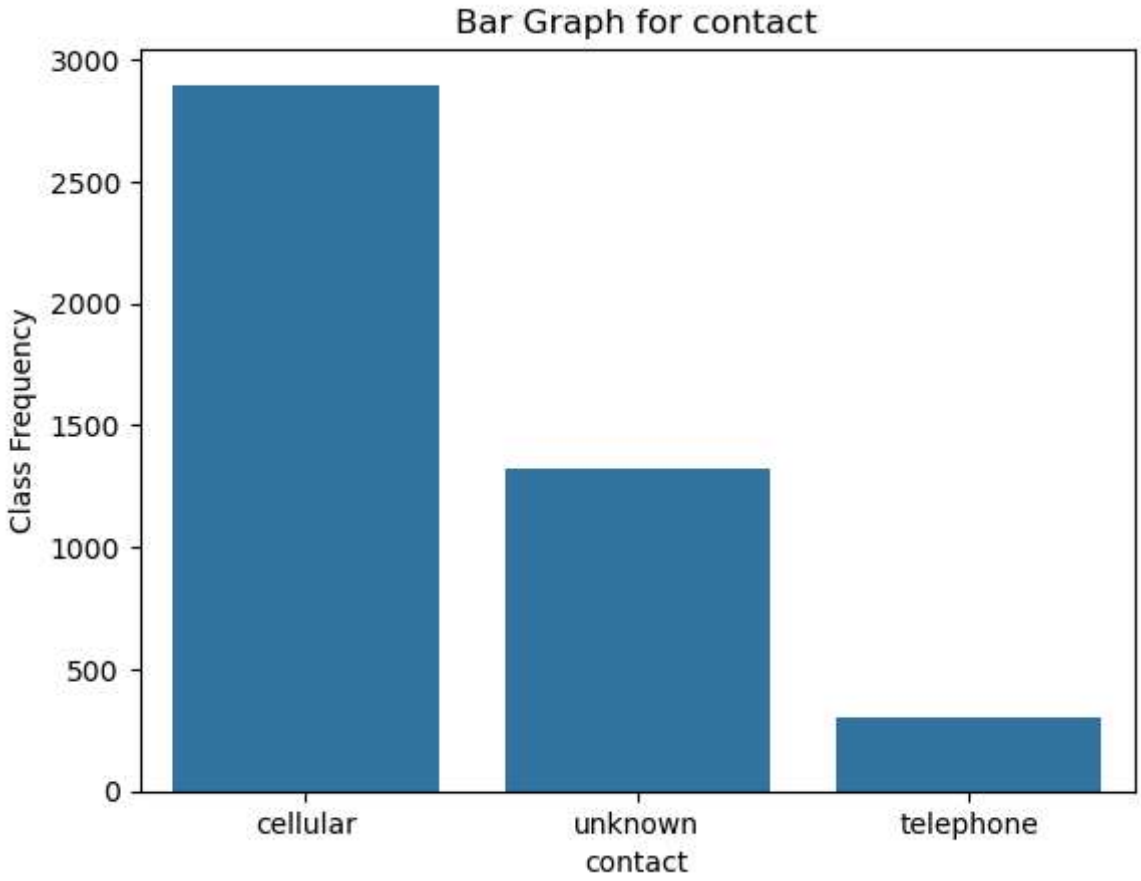

Bar Graph for marital
Class Frequency
2500
2000
1500
1000
500
0
married
single
divorced
marital

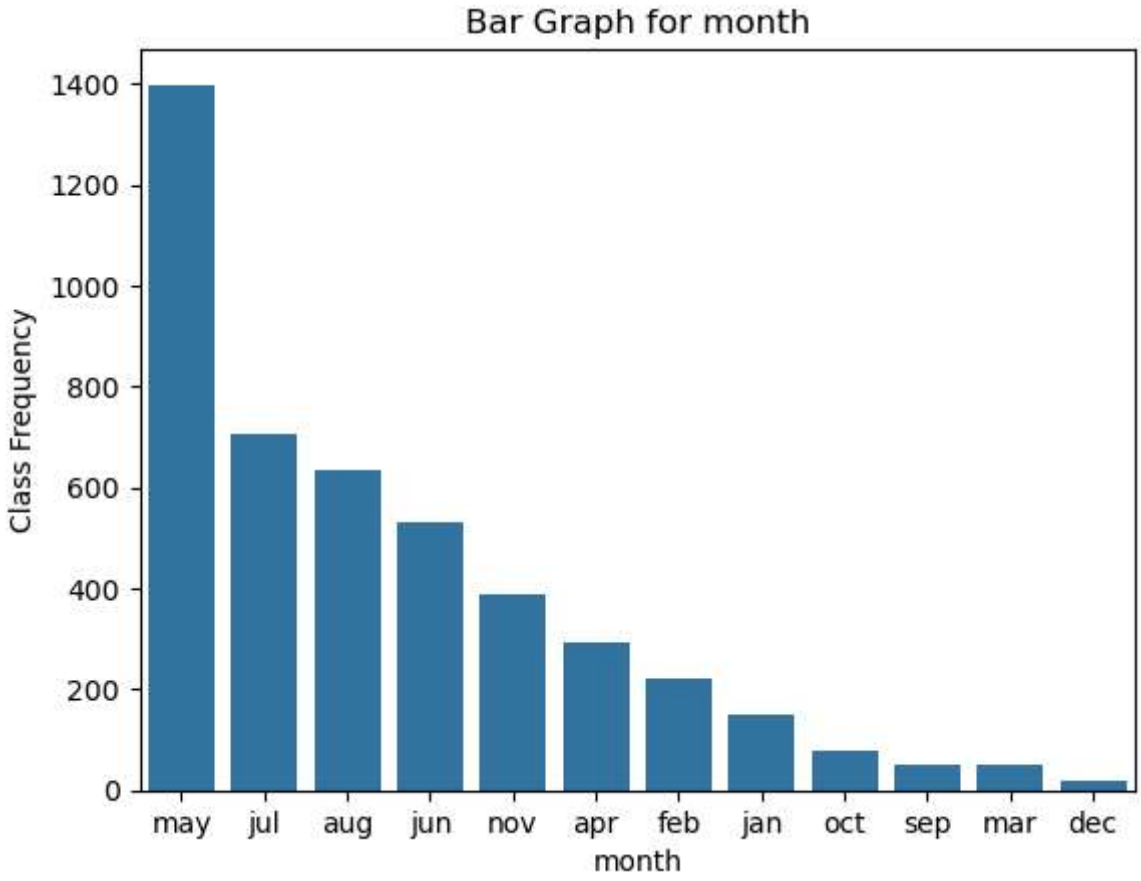

Bar Graph for education
Class Frequency
2000
1500
1000
500
0
secondary
tertiary
primary
unknown
education

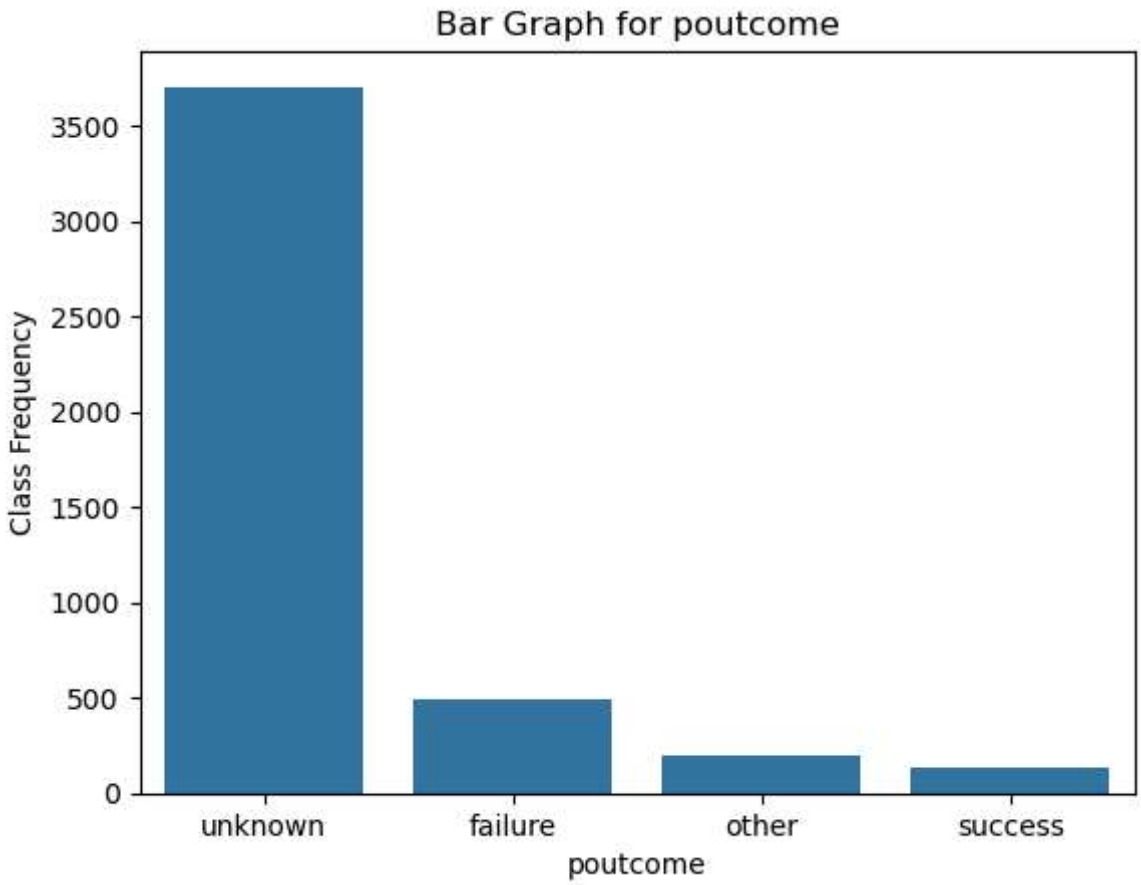

Bar Graph for default
Class Frequency
4000
3000
2000
1000
0
no
yes
default

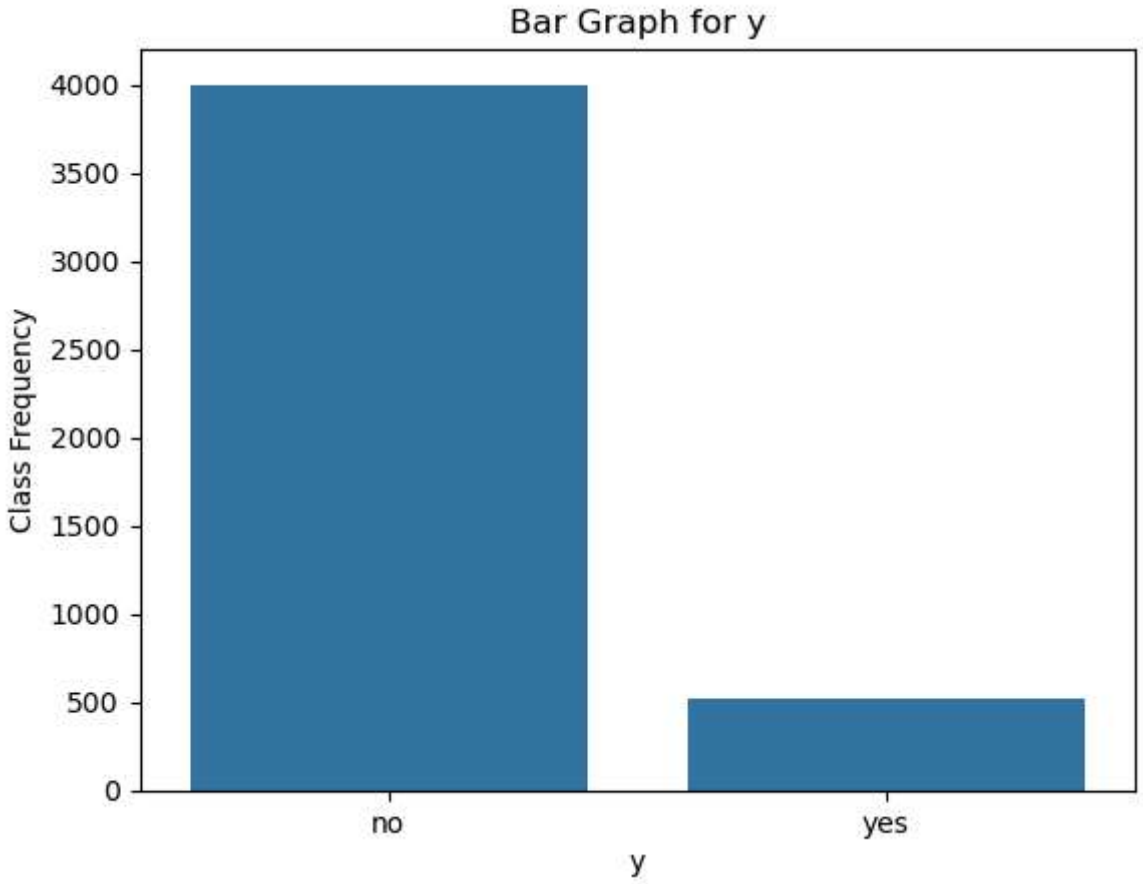

Bar Graph for housing
Class Frequency
2500
2000
1500
1000
500
0
yes
no
housing


Bar Graph for loan
Class Frequency
4000
3500
3000
2500
2000
1500
1000
500
0
no
yes
loan


Bar Graph for contact
Class Frequency
3000
2500
2000
1500
1000
500
0
cellular
unknown
telephone
contact


Bar Graph for month
Class Frequency
1400
1200
1000
800
600
400
200
0
may
jul
aug
jun
nov
apr
feb
jan
oct
sep
mar
dec
month


Bar Graph for poutcome
Class Frequency
3500
3000
2500
2000
1500
1000
500
0
unknown
failure
other
success
poutcome



In [199…
```
new_dir1=os.listdir(new_dir)
new_dir1
```

Out[199…
```
['contact.csv',
 'contact.jpg',
 'default.csv',
 'default.jpg',
 'education.csv',
 'education.jpg',
 'housing.csv',
 'housing.jpg',
 'job.csv',
 'job.jpg',
 'loan.csv',
 'loan.jpg',
 'marital.csv',
 'marital.jpg',
 'month.csv',
 'month.jpg',
 'poutcome.csv',
 'poutcome.jpg',
 'y.csv',
 'y.jpg']
```

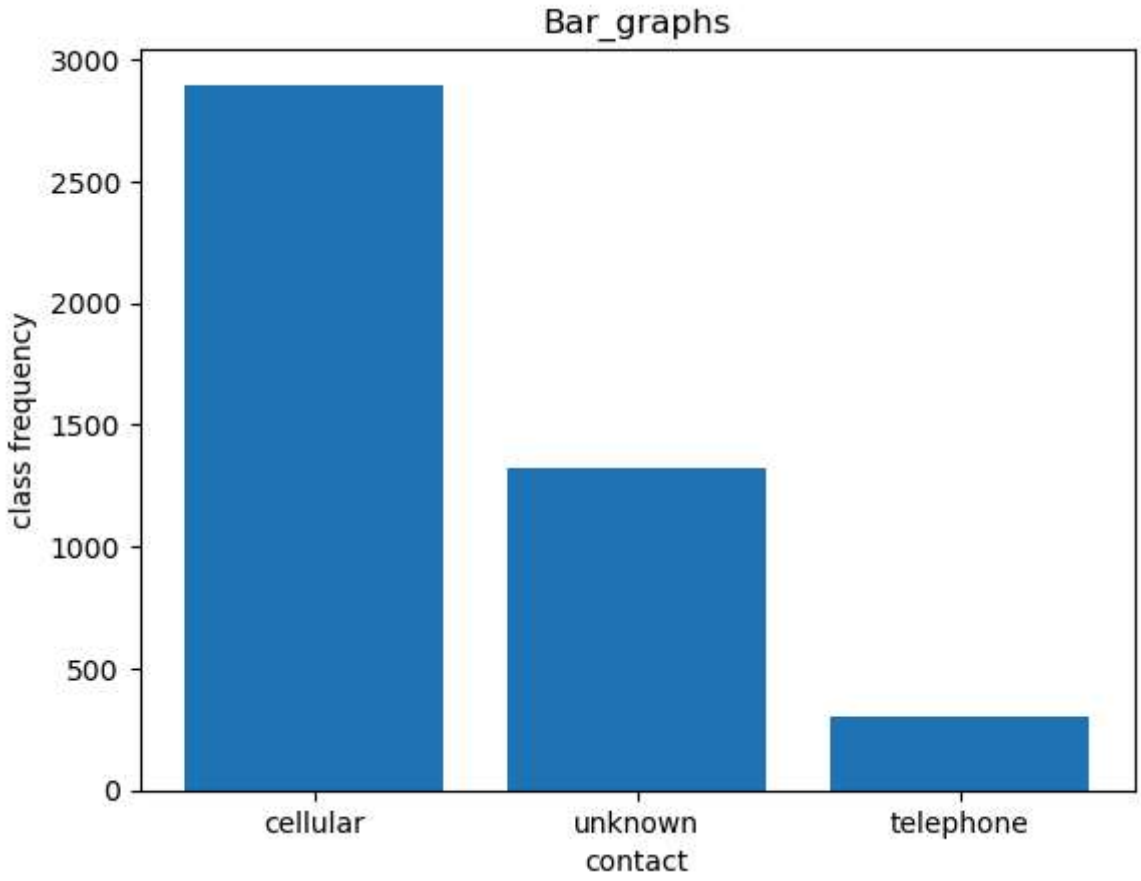
In [201…
```
root_d=os.getcwd()
n_dir="new_folder"
new_d=os.path.join(root_d,n_dir)
os.makedirs(new_d)
```

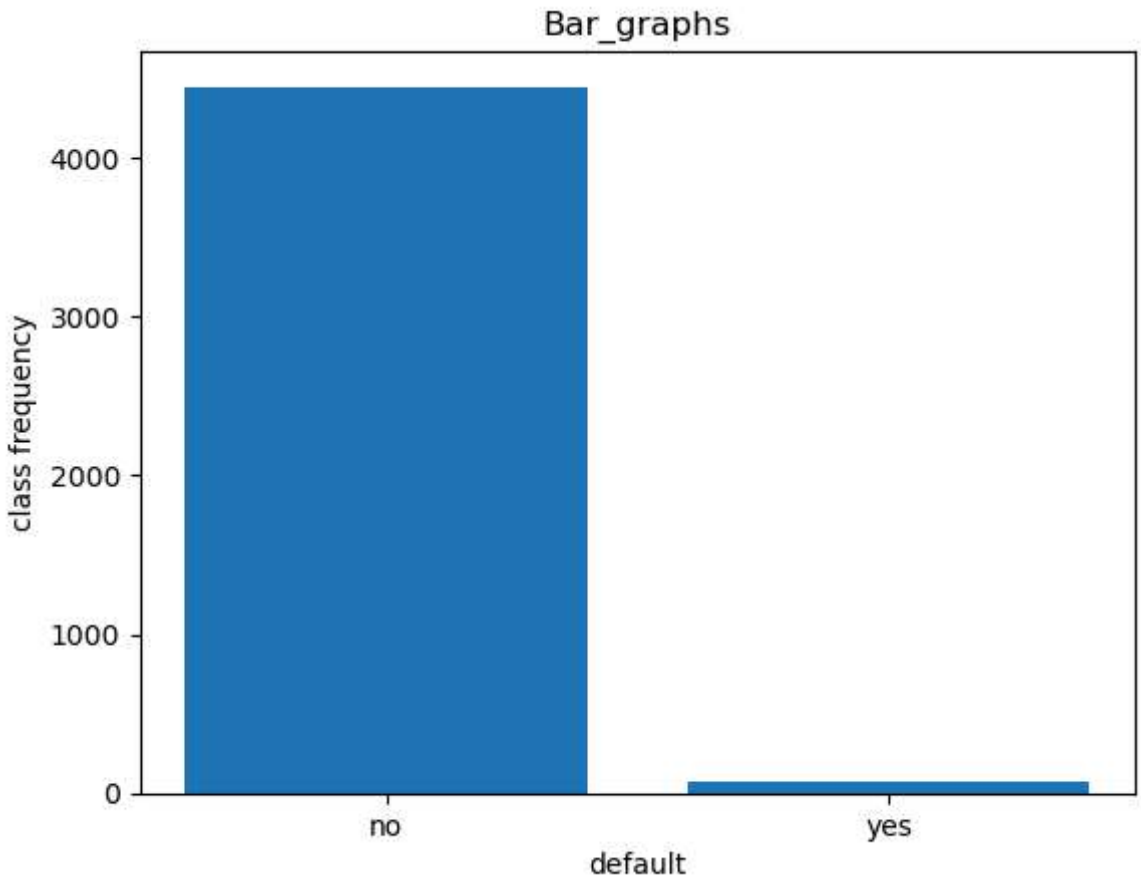
In [203…
```
#save the dataframe in directory folder

for i in cat_col:
    dnf=bank_df[i].value_counts()   #using value_count() method
    keys=dnf.keys()
    values=dnf.values
    col=[i,"count"]
    df=pd.DataFrame(zip(keys,values),columns=col)
    df.to_csv(f"{new_d}\\{i}.csv",index=False)    #use dataframe name>.<to_csv("nam
```

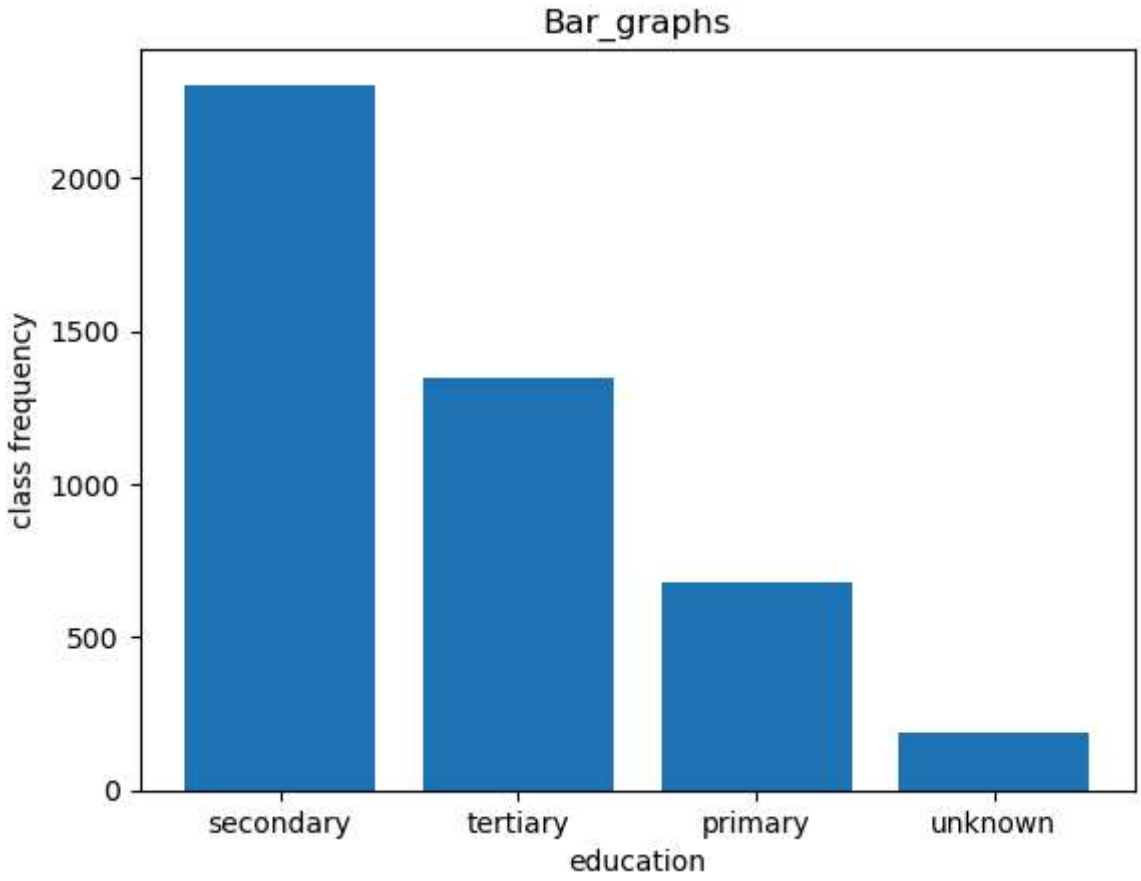
In [205…
```
dfms=os.listdir(new_d)   #check directory list
dfms
```

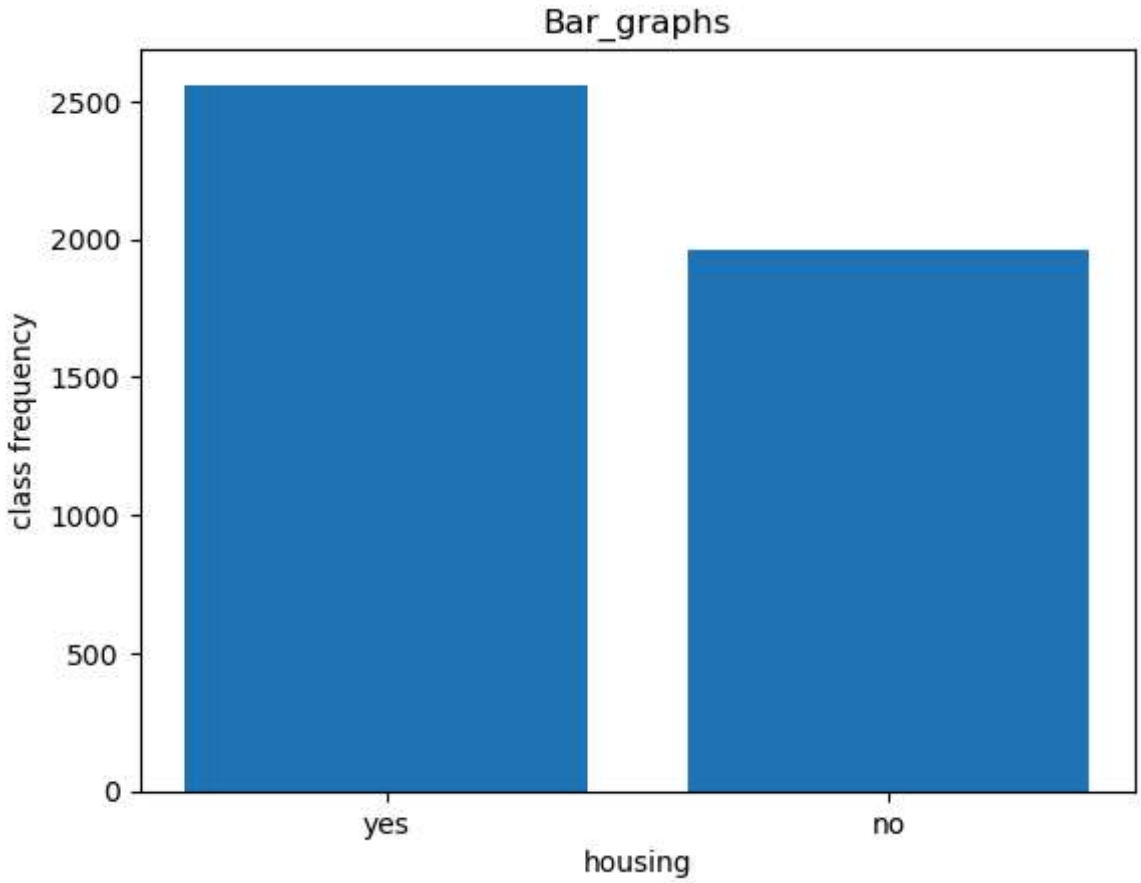
Out[205…
```
['contact.csv',
 'default.csv',
 'education.csv',
 'housing.csv',
 'job.csv',
 'loan.csv',
 'marital.csv',
 'month.csv',
 'poutcome.csv',
 'y.csv']
```

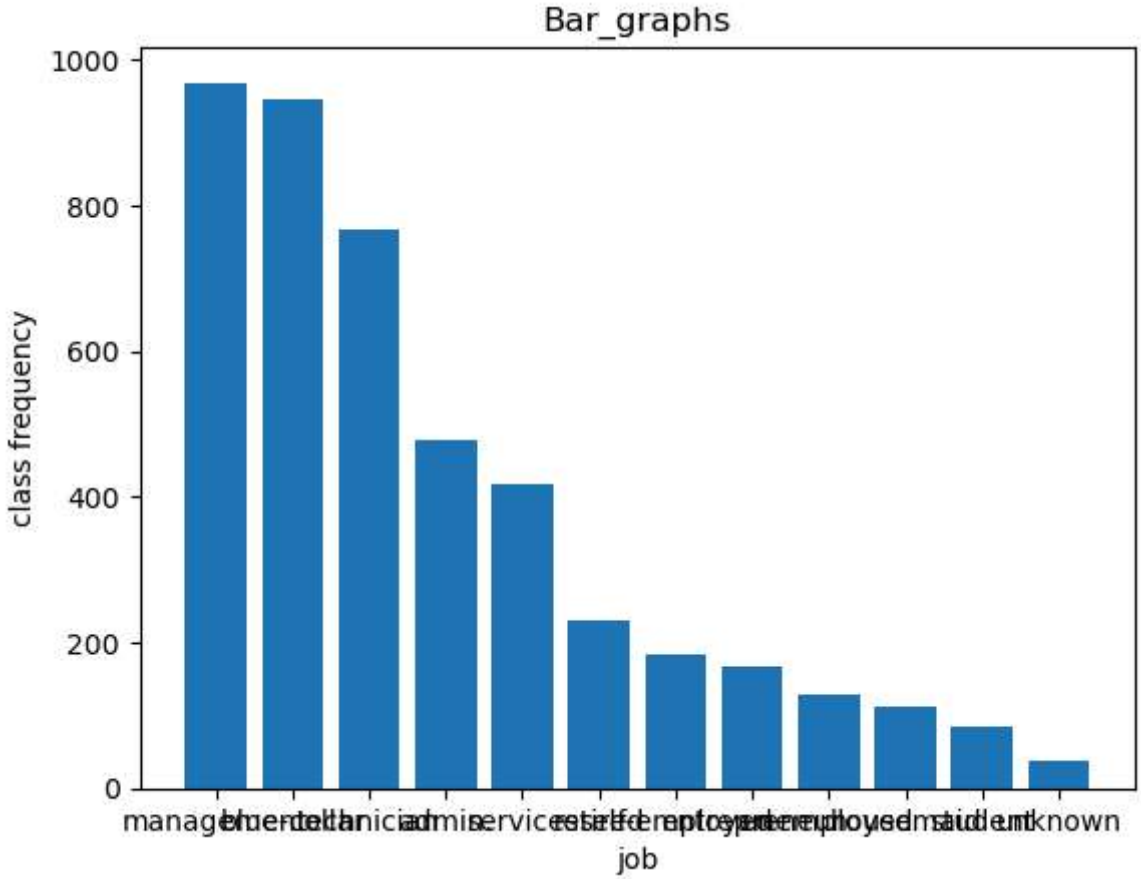
In [207…
```
#read directory dataframe and plot
for i in dfms:
    df3=pd.read_csv(f"{new_d}\\{i}")
    plt.bar(i[:-4],"count",data=df3)
    plt.xlabel(f"{i[:-4]}")
    plt.ylabel("class frequency")
    plt.title("Bar_graphs")
    plt.show()
```

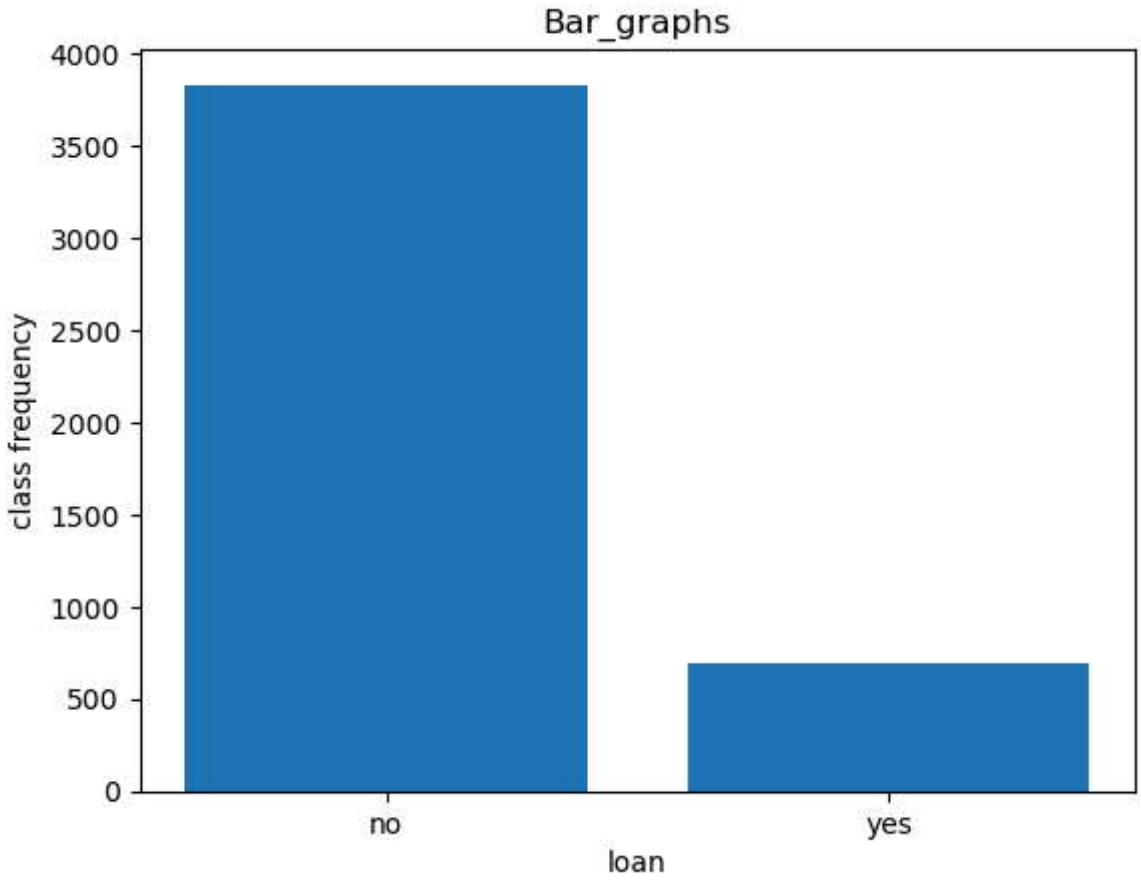

Bar_graphs
3000
2500
2000
1500
1000
500
0
class frequency
cellular
unknown
telephone
contact

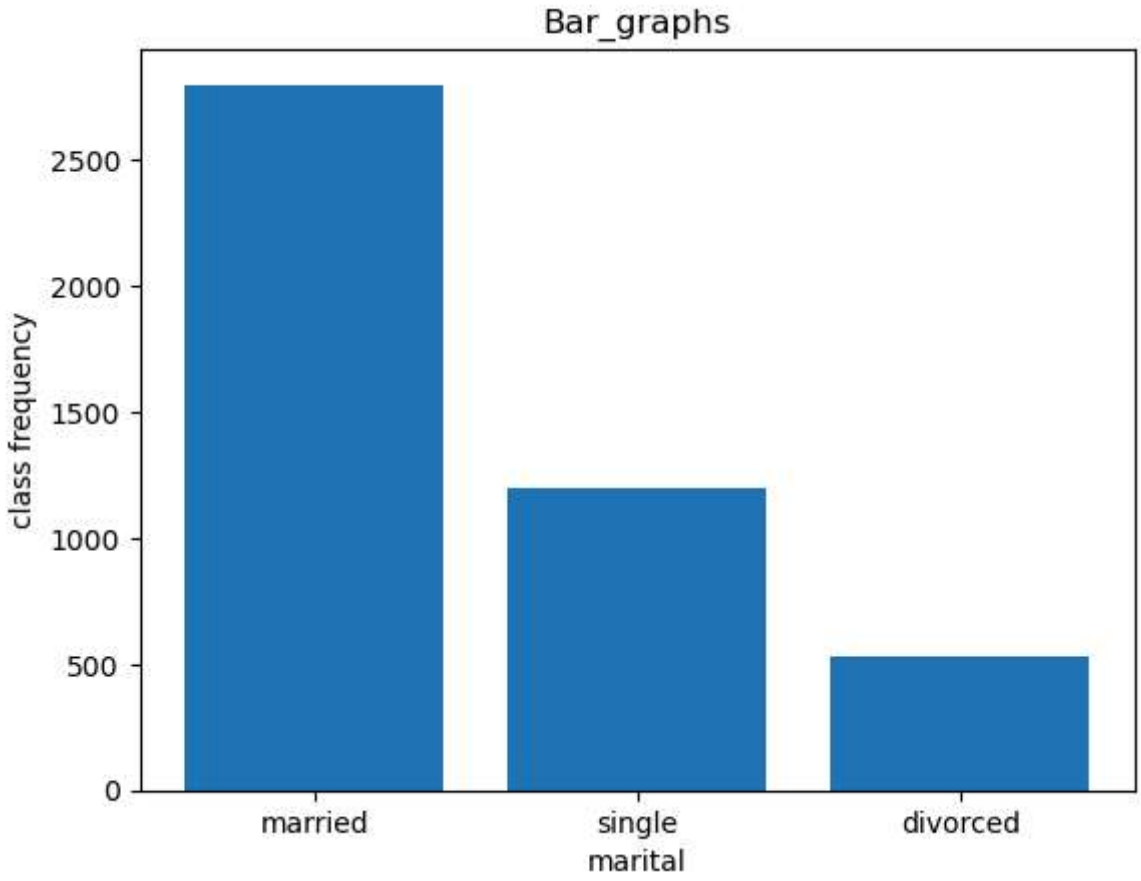

Bar_graphs
4000
3000
2000
1000
0
class frequency
no
yes
default

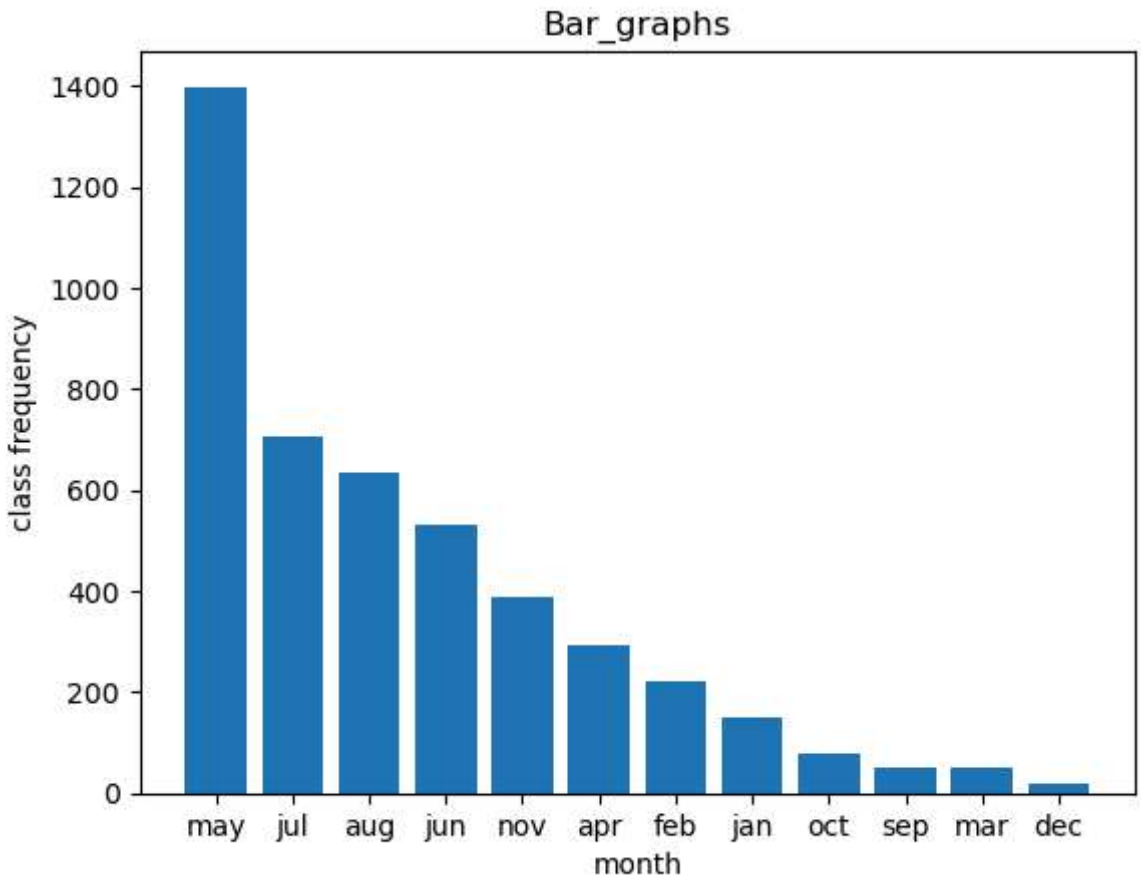

Bar_graphs
class frequency
2000
1500
1000
500
0
secondary
tertiary
primary
unknown
education

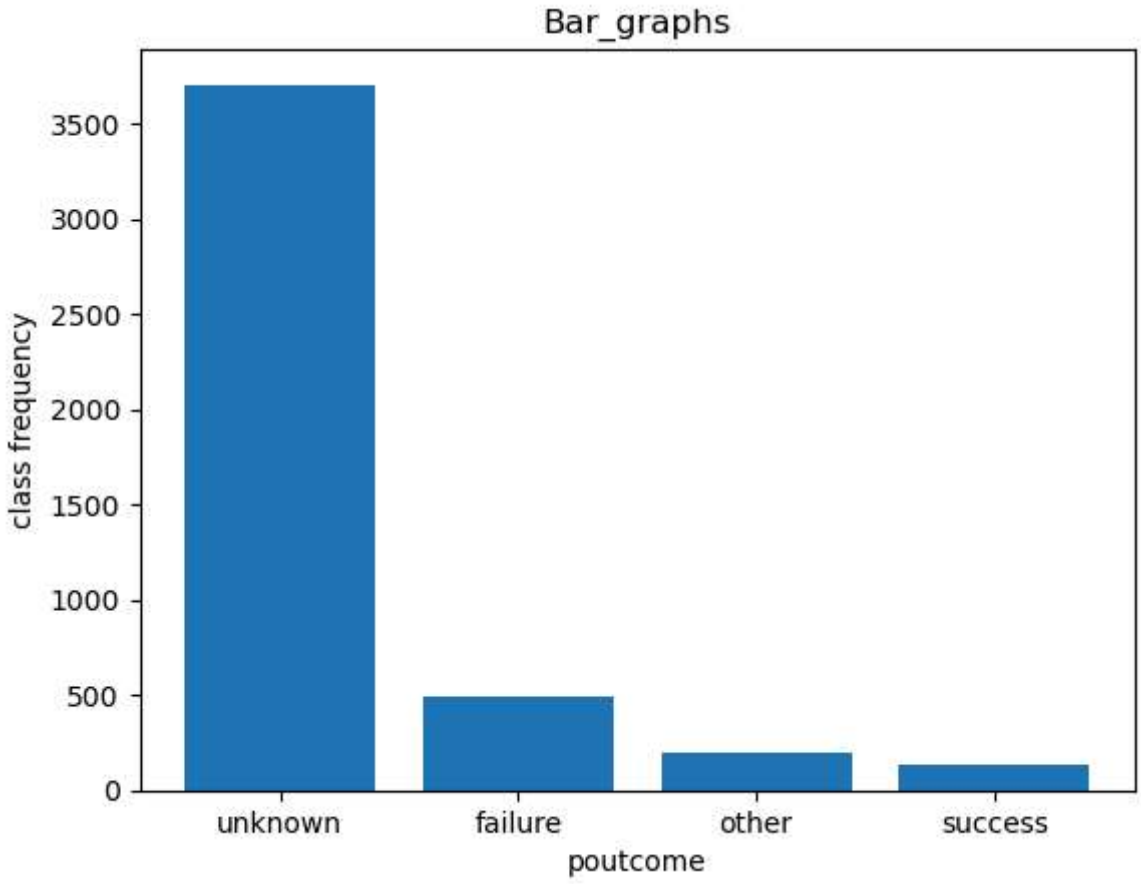

Bar_graphs
class frequency
2500
2000
1500
1000
500
0
yes
no
housing

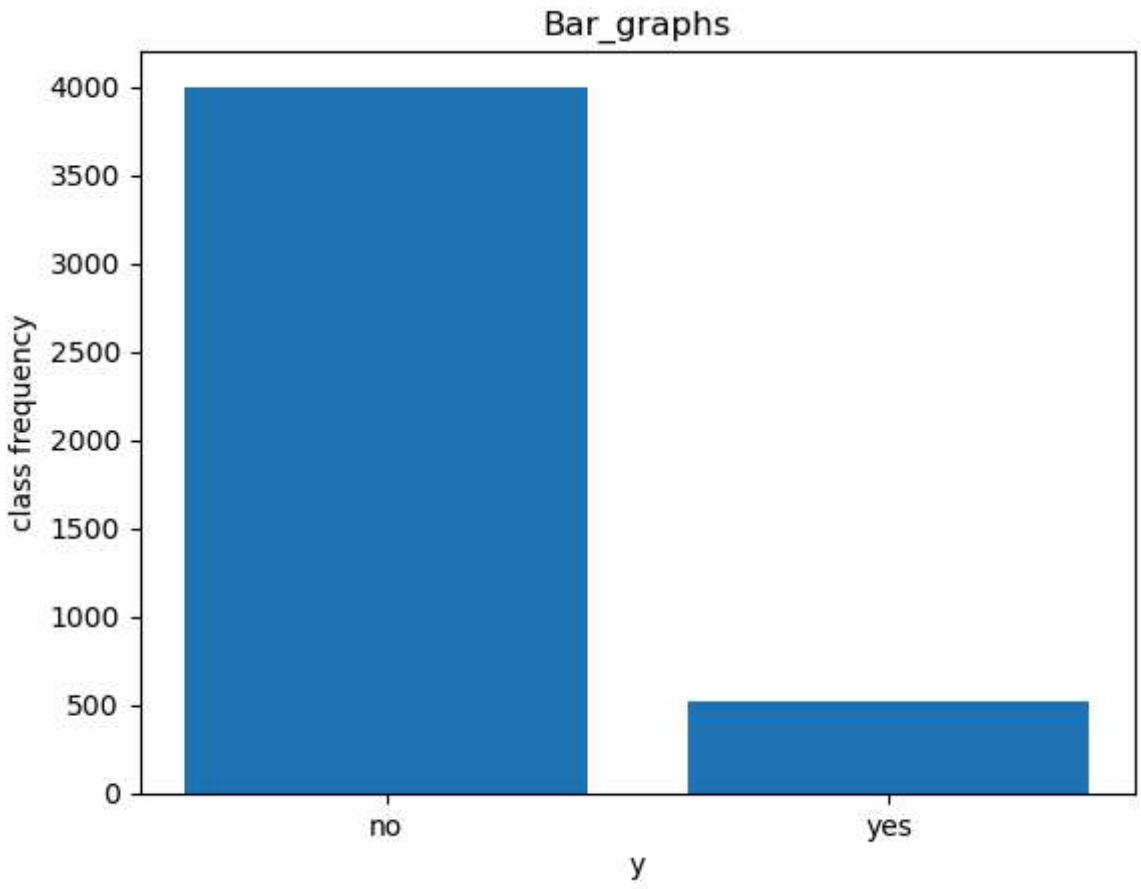

Bar_graphs
class frequency
1000
800
600
400
200
0
job


Bar_graphs
class frequency
4000
3500
3000
2500
2000
1500
1000
500
0
no
yes
loan


Bar_graphs
class frequency
2500
2000
1500
1000
500
0
married
single
divorced
marital


Bar_graphs
class frequency
1400
1200
1000
800
600
400
200
0
may
jul
aug
jun
nov
apr
feb
jan
oct
sep
mar
dec
month


Bar_graphs
class frequency
3500
3000
2500
2000
1500
1000
500
0
unknown
failure
other
success
poutcome


Bar_graphs
class frequency
4000
3500
3000
2500
2000
1500
1000
500
0
no
yes
y

In [ ]:
```
#subplot
```

In [ ]: