DESARROLLO DEL LABORATORIO N°15

In [47]:
```
#Importando librerías necesarias
import os
import pandas as pd
import numpy as np
import seaborn as sns    #Librería Gráfica
import matplotlib.pyplot as plt #Librería Gráfica

from sklearn.model_selection import train_test_split
from imblearn.under_sampling import NearMiss         #Para llevar a cabo UnderSampling

from sklearn.linear_model import LogisticRegression
from sklearn.feature_selection import RFE
import statsmodels.api as sm  #Para Análisis de Regresión Logística con librería stats

import warnings
warnings.filterwarnings('ignore')
```

In [2]:
```
os.chdir("D:\Social Data Consulting\Python for Data Science\data")
```

In [8]:
```
miArchivo='creditcard.csv'
df=pd.read_csv(miArchivo, sep=',')
del df['Time']
```

In [9]:
```
df.head()
```

Out[9]:

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	...	V
0	-1.359807	-0.072781	2.536347	1.378155	-0.338321	0.462388	0.239599	0.098698	0.363787	0.090794	...	-0.0183
1	1.191857	0.266151	0.166480	0.448154	0.060018	-0.082361	-0.078803	0.085102	-0.255425	-0.166974	...	-0.2257
2	-1.358354	-1.340163	1.773209	0.379780	-0.503198	1.800499	0.791461	0.247676	-1.514654	0.207643	...	0.2479
3	-0.966272	-0.185226	1.792993	-0.863291	-0.010309	1.247203	0.237609	0.377436	-1.387024	-0.054952	...	-0.1083
4	-1.158233	0.877737	1.548718	0.403034	-0.407193	0.095921	0.592941	-0.270533	0.817739	0.753074	...	-0.0094

5 rows × 30 columns

1. Asignar el 60% y 40% a la data de entrenamiento y testeo respectivamente.

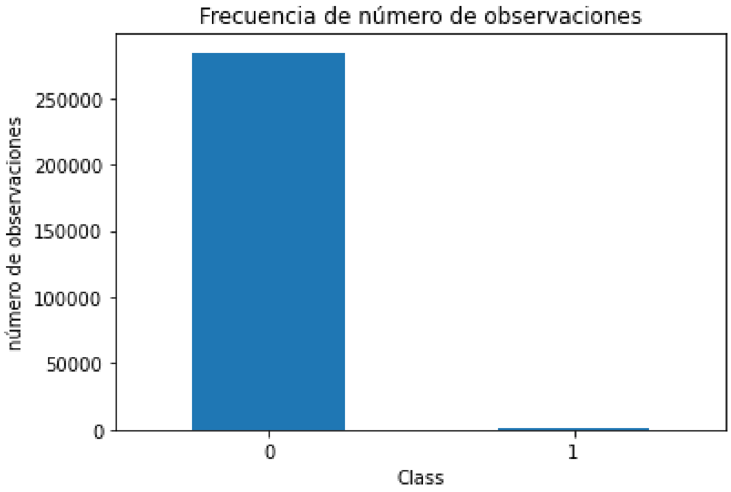
In [ ]:
```
#Dividimos la data (entrenamiento y testeo)
```

In [16]:
```
X=df.iloc[:,:29]
y=df.iloc[:,29]
```

In [17]:
```
X_train,X_test,y_train,y_test=train_test_split(X,
                                               y,
                                               test_size=0.4,
                                               random_state=2021,
                                               stratify=y)
```

2. Crear un dataframe a partir de la data de entrenamiento con la tecnica de balanceo de datos "UnderSampling" y parámetro de balanceo 0.7.

In [31]:
```
#Visualizamos el desbalanceo
count_classes = pd.value_counts(df['Class'], sort = True)
count_classes.plot(kind = 'bar', rot=0)
#plt.xticks(range(2))
plt.title("Frecuencia de número de observaciones")
plt.xlabel("Class")
plt.ylabel("número de observaciones")
plt.show()
```



In [18]:
```
#Primero creamos una instancia de NearMiss
under=NearMiss(sampling_strategy=0.7,
               n_neighbors=11)
```

In [19]:
```
#fit_resample me arroja 2 objetos ya balanceados
xtrain_under,ytrain_under= under.fit_resample(X_train,y_train)
```

In [22]:
```
#X_train.columns
columns=['V1', 'V2', 'V3', 'V4', 'V5', 'V6', 'V7', 'V8', 'V9', 'V10', 'V11',
       'V12', 'V13', 'V14', 'V15', 'V16', 'V17', 'V18', 'V19', 'V20', 'V21',
       'V22', 'V23', 'V24', 'V25', 'V26', 'V27', 'V28', 'Amount']
```

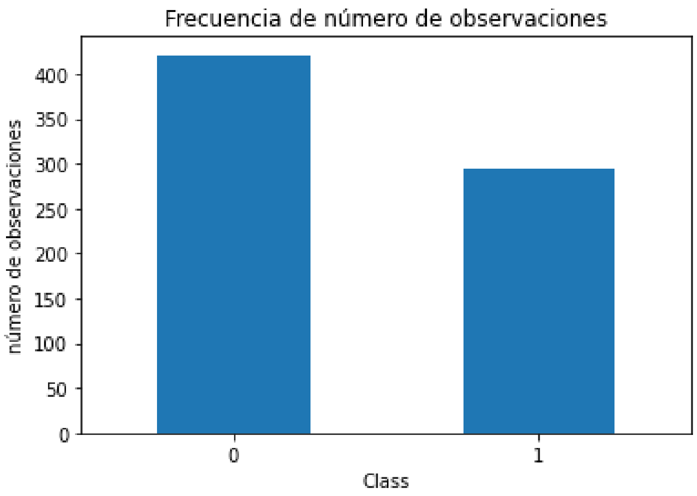
In [23]:
```
#Datos de Entrenamiento DF
xtrain_under=pd.DataFrame(xtrain_under,columns=columns)
ytrain_under=pd.DataFrame(ytrain_under,columns=["Class"])

df_entrenamiento_under=pd.concat([xtrain_under,ytrain_under],axis=1)
df_entrenamiento_under.head()
```

Out[23]:

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	...	V21
0	1.161523	1.173309	-1.602805	1.485067	1.046127	-1.044961	0.568273	-0.078050	-0.649025	-1.413683	...	-0.135894
1	1.161685	1.168669	-1.604114	1.485647	1.040086	-1.046640	0.563452	-0.074108	-0.638580	-1.411608	...	-0.136753
2	1.146649	1.141946	-1.527127	1.538383	0.900342	-1.174930	0.538144	-0.062330	-0.586083	-1.399037	...	-0.128206
3	1.161938	1.193626	-1.596951	1.482299	1.070830	-1.038444	0.586824	-0.093678	-0.690740	-1.421726	...	-0.132792
4	1.146760	1.132315	-1.529868	1.539633	0.888153	-1.178248	0.528649	-0.054473	-0.565206	-1.394939	...	-0.129857

5 rows × 30 columns

In [30]:
```
#Visualizamos el balanceo
count_classes = pd.value_counts(df_entrenamiento_under['Class'], sort = True)
count_classes.plot(kind = 'bar', rot=0)
#plt.xticks(range(2))
plt.title("Frecuencia de número de observaciones")
plt.xlabel("Class")
plt.ylabel("número de observaciones")
plt.show()
```



3. Utilizar esa data balanceada para aplicar un modelo de regresión logística utilizando sólo 6 variables predictoras (utilice recursive feature elimination (RFE)) y tener en cuenta que el TARGET es Class

In [33]:
```
#Instanciamos un objeto de clase LogisticRegression()
logit=LogisticRegression()
```

Aplicando RFE(Recursive Feature Elimination)

In [34]:
```
#Numero de variables a quedarse
n=6
```

In [35]:
```
#Instanciando un objeto RFE
RFE=RFE(estimator=logit,n_features_to_select=n)
```

In [38]:
```
#Identificando las variales dentro del modelo
df_vars=df_entrenamiento_under.columns.to_list()
```

In [39]:
```
#Detectando las predictoras y target
#target
Y=['Class']
#predictoras
X=[v for v in df_vars if v not in Y]
```

In [40]:
```
#Aprendiendo de los datos de entrenamiento
selector=RFE.fit(df_entrenamiento_under[X],df_entrenamiento_under[Y])
```

In [41]:
```
#Mostrar las variables más significativas
print(selector.support_)
```

```
[ True False False False False  True False False False False False  True
 False  True  True False False  True False False False False False False
 False False False False False]
```

In [44]:
```
final=zip(df_vars,selector.support_,selector.ranking_)
list(final)
```

Out[44]:
```
[('V1', True, 1),
 ('V2', False, 10),
 ('V3', False, 3),
 ('V4', False, 7),
 ('V5', False, 6),
 ('V6', True, 1),
 ('V7', False, 5),
 ('V8', False, 23),
 ('V9', False, 15),
 ('V10', False, 20),
 ('V11', False, 9),
 ('V12', True, 1),
 ('V13', False, 18),
 ('V14', True, 1),
 ('V15', True, 1),
 ('V16', False, 17),
 ('V17', False, 4),
 ('V18', True, 1),
 ('V19', False, 12),
 ('V20', False, 22),
 ('V21', False, 16),
 ('V22', False, 13),
 ('V23', False, 19),
 ('V24', False, 21),
 ('V25', False, 11),
 ('V26', False, 2),
 ('V27', False, 14),
 ('V28', False, 24),
 ('Amount', False, 8)]
```

Estimación REGRESIÓN LOGÍSTICA con statsmodel

In [45]:
```
x=df_entrenamiento_under[['V1','V6','V12','V14','V15','V18']]
y=df_entrenamiento_under['Class']
```

In [48]:
```
#Aprendiendo
logit= sm.Logit(y,x)
resultado=logit.fit()
```

```
Optimization terminated successfully.
         Current function value: 0.070163
         Iterations 12
```

In [49]:
```
#Resumiendo
resultado.summary2()
```

Out[49]:

Model:	Logit	Pseudo R-squared:	0.896
Dependent Variable:	Class	AIC:	112.4734
Date:	2021-05-10 22:40	BIC:	139.9155
No. Observations:	716	Log-Likelihood:	-50.237
Df Model:	5	LL-Null:	-485.15
Df Residuals:	710	LLR p-value:	9.0266e-186
Converged:	1.0000	Scale:	1.0000
No. Iterations:	12.0000		

	Coef.	Std.Err.	z	P>|z|	[0.025	0.975]
V1	-2.0041	0.3647	-5.4958	0.0000	-2.7188	-1.2894
V6	1.8428	0.3999	4.6076	0.0000	1.0589	2.6267
V12	-1.5649	0.4899	-3.1942	0.0014	-2.5251	-0.6047
V14	-1.2194	0.2861	-4.2618	0.0000	-1.7801	-0.6586
V15	-2.3595	0.4327	-5.4533	0.0000	-3.2075	-1.5115
V18	-1.1092	0.4923	-2.2531	0.0243	-2.0741	-0.1443

In [ ]: