DESARROLLO LABORATORIO 07

In [1]:

```
import pandas as pd
import numpy as np
import os
import matplotlib.pyplot as plt

from sklearn.model_selection import train_test_split
from imblearn.under_sampling import NearMiss         #Para llevar a cabo UnderSampling
from imblearn.over_sampling import RandomOverSampler #Para llevar a cabo OverSampling
from imblearn.combine import SMOTETomek              #Para combinar U/O Sampling
```

In [2]:

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

In [3]:

```
fileCsv="creditcard.csv"
df_fraude=pd.read_csv(fileCsv,sep=',')
```

In [4]:

```
# Conociendo la data
```

In [5]:

```
df_fraude.head()
```

Out[5]:

	Time	V1	V2	V3	V4	V5	V6	V7	V8	V9	...	V21
0	0.0	-1.359807	-0.072781	2.536347	1.378155	-0.338321	0.462388	0.239599	0.098698	0.363787	...	-0.018307
1	0.0	1.191857	0.266151	0.166480	0.448154	0.060018	-0.082361	-0.078803	0.085102	-0.255425	...	-0.225775
2	1.0	-1.358354	-1.340163	1.773209	0.379780	-0.503198	1.800499	0.791461	0.247676	-1.514654	...	0.247998
3	1.0	-0.966272	-0.185226	1.792993	-0.863291	-0.010309	1.247203	0.237609	0.377436	-1.387024	...	-0.108300
4	2.0	-1.158233	0.877737	1.548718	0.403034	-0.407193	0.095921	0.592941	-0.270533	0.817739	...	-0.009431

5 rows × 31 columns

In [6]:

```
fraude_freq=pd.value_counts(df_fraude.Class)
fraude_freq
```

Out[6]:

```
'0'    284315
'1'       492
Name: Class, dtype: int64
```

In [7]:

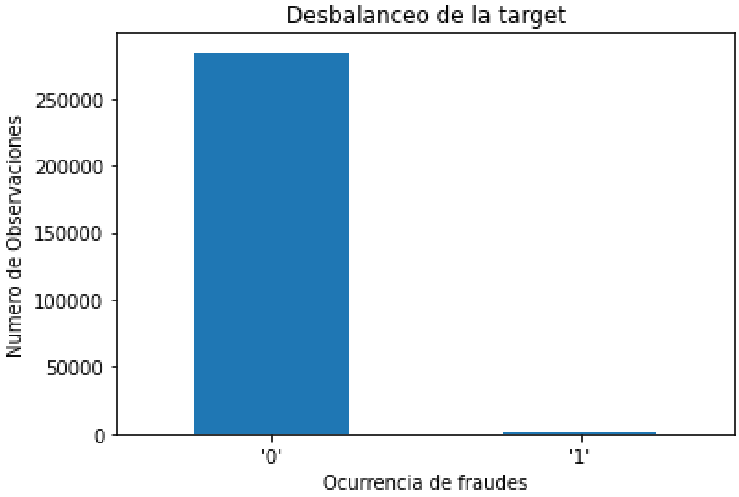
```
fraude_freq*100/sum(fraude_freq)
```

Out[7]:

```
'0'    99.827251
'1'     0.172749
Name: Class, dtype: float64
```

In [8]:

```
fraude_freq.plot(kind='bar',rot=0)
plt.title('Desbalanceo de la target')
plt.xlabel('Ocurrencia de fraudes')
plt.ylabel('Numero de Observaciones')
plt.show()
```



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

In [9]:

```
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 [10]:

```
df_fraude.drop(df_fraude[["Time"]], axis=1, inplace=True)
```

In [11]:

```
x, y = df_fraude.iloc[:, 0:29].values, df_fraude.iloc[:, 29].values
```

In [12]:

```
xtrain, xtest, ytrain, ytest =train_test_split(
                     x, #valores de los predictores
                     y, #los valores del target
                     test_size=0.4, #proporción para datos de testeo
                     random_state=0, #semilla
                     stratify=y) #la variable de estratificación
```

In [13]:

```
#Datos de entrenamiento
xtrain= pd.DataFrame(xtrain,columns=columns)
ytrain= pd.DataFrame(ytrain,columns=["Class"])

fraude_entrenamiento = pd.concat([xtrain, ytrain], axis=1)
fraude_entrenamiento.head()
```

Out[13]:

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	...	
0	1.871921	-1.443713	-0.751781	-1.164242	-0.445334	1.308200	-1.312689	0.436614	-0.133761	0.762721	...	0.54
1	2.182974	-1.008460	-2.834986	-3.264015	0.830545	0.294460	-0.090330	-0.001023	0.272701	-0.272232	...	-0.14
2	1.937508	-0.641264	-0.282543	0.151947	-0.569875	0.520526	-1.052534	0.356209	1.490638	0.014241	...	0.08
3	-2.425694	0.021840	1.568449	-0.400754	-1.376772	-0.465135	-0.170305	0.470701	-1.259302	0.014449	...	-0.30
4	1.286755	-1.194764	1.503195	-0.353358	-1.869471	0.605151	-1.749865	0.461911	0.668069	0.467496	...	0.15

5 rows × 30 columns

In [14]:

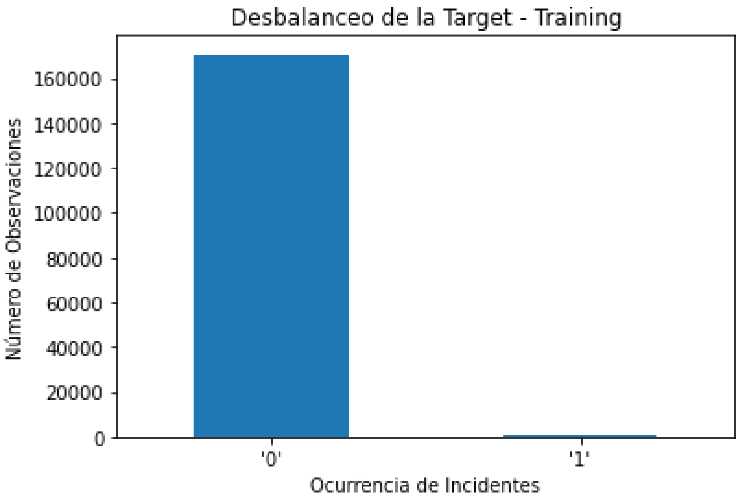
```
count_classes=pd.value_counts(fraude_entrenamiento['Class'])
count_classes
```

Out[14]:

```
'0'    170589
'1'       295
Name: Class, dtype: int64
```

In [15]:

```
#Graficando el Desbalanceo de la Target en el Training Set
count_classes.plot(kind='bar',rot=0)
plt.title('Desbalanceo de la Target - Training')
plt.xlabel('Ocurrencia de Incidentes')
plt.ylabel('Número de Observaciones')
plt.show()
```



UnderSampling

2. Crear un dataframe a partir de la data de entrenamiento con la tecnica de balanceo de datos "OverSampling"

In [16]:

```
fraude_entrenamiento.head()
```

Out[16]:

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	...	
0	1.871921	-1.443713	-0.751781	-1.164242	-0.445334	1.308200	-1.312689	0.436614	-0.133761	0.762721	...	0.54
1	2.182974	-1.008460	-2.834986	-3.264015	0.830545	0.294460	-0.090330	-0.001023	0.272701	-0.272232	...	-0.14
2	1.937508	-0.641264	-0.282543	0.151947	-0.569875	0.520526	-1.052534	0.356209	1.490638	0.014241	...	0.08
3	-2.425694	0.021840	1.568449	-0.400754	-1.376772	-0.465135	-0.170305	0.470701	-1.259302	0.014449	...	-0.30
4	1.286755	-1.194764	1.503195	-0.353358	-1.869471	0.605151	-1.749865	0.461911	0.668069	0.467496	...	0.15

5 rows × 30 columns

In [17]:

```
#Primero creamos una instancia de NearMiss
under=NearMiss(sampling_strategy=0.7, #proporcion de balanceo final
               n_neighbors=11) #numero de vecinos a considerar en la aleatoriedad
```

In [18]:

```
#fit_resample me arroja 2 objetos ya balanceados
xtrain_under,ytrain_under= under.fit_resample(xtrain,ytrain)
```

In [19]:

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

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

Out[19]:

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	...	V2
0	1.181213	1.224356	-1.488377	1.679347	0.817619	-1.560638	0.670368	-0.239600	-0.394236	-1.579606	...	-0.16733
1	1.204859	1.239465	-1.617894	1.599566	1.004932	-1.366792	0.684636	-0.236725	-0.419992	-1.588344	...	-0.18524
2	1.202009	1.190585	-1.632177	1.606599	0.948371	-1.381099	0.644213	-0.201820	-0.326250	-1.570709	...	-0.19161
3	1.181516	1.254303	-1.479782	1.675330	0.854511	-1.550802	0.698414	-0.263085	-0.456828	-1.591747	...	-0.16258
4	1.247352	1.271853	-1.594286	1.651759	0.798938	-1.842113	0.748526	-0.363491	-0.384503	-1.538167	...	-0.2151

5 rows × 30 columns

In [20]:

```
count_classes_under=pd.value_counts(fraude_entrenamiento_under.Class)
count_classes_under
```

Out[20]:

```
'0'    421
'1'    295
Name: Class, dtype: int64
```

In [21]:

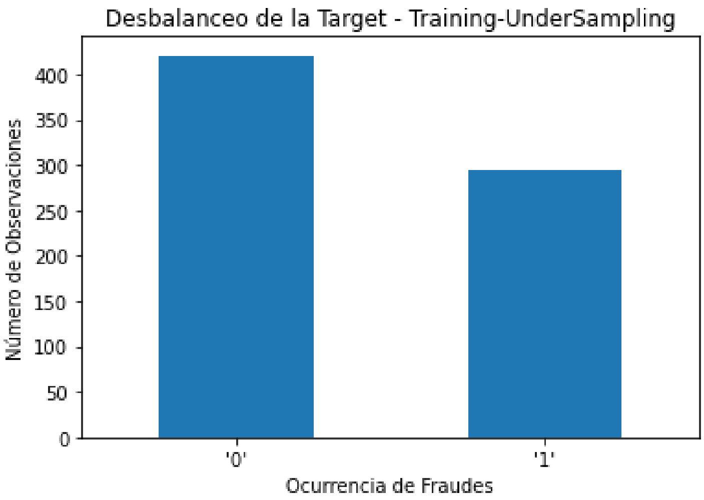
```
#Verificando la proporcion entre categorias
prop=round(count_classes_under[1]*100/count_classes_under[0],1)
prop
```

Out[21]:

```
70.1
```

In [22]:

```
#Graficando el Desbalanceo de la Target en el Training Set
count_classes_under.plot(kind='bar',rot=0)
plt.title('Desbalanceo de la Target - Training-UnderSampling')
plt.xlabel('Ocurrencia de Fraudes')
plt.ylabel('Número de Observaciones')
plt.show()
```



OverSampling

3. Crear un dataframe a partir de la data de entrenamiento con la tecnica de balanceo de datos "OverSampling"

In [23]:

```
#Creamos una instancia de RandomOverSampler
over=RandomOverSampler(sampling_strategy=0.7,
                       random_state=2020)#semilla, se puede colocar cualquier numero pero las pers
```

In [24]:

```
xtrain_over,ytrain_over=over.fit_resample(xtrain,ytrain)
```

In [25]:
```
#Datos de Entrenamiento DF
xtrain_over=pd.DataFrame(xtrain_over,columns=columns)
ytrain_over=pd.DataFrame(ytrain_over,columns=["Class"])

fraude_entrenamiento_over=pd.concat([xtrain_over,ytrain_over],axis=1)
fraude_entrenamiento_over.head()
```

Out[25]:

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	...	
0	1.871921	-1.443713	-0.751781	-1.164242	-0.445334	1.308200	-1.312689	0.436614	-0.133761	0.762721	...	0.54
1	2.182974	-1.008460	-2.834986	-3.264015	0.830545	0.294460	-0.090330	-0.001023	0.272701	-0.272232	...	-0.14
2	1.937508	-0.641264	-0.282543	0.151947	-0.569875	0.520526	-1.052534	0.356209	1.490638	0.014241	...	0.08
3	-2.425694	0.021840	1.568449	-0.400754	-1.376772	-0.465135	-0.170305	0.470701	-1.259302	0.014449	...	-0.30
4	1.286755	-1.194764	1.503195	-0.353358	-1.869471	0.605151	-1.749865	0.461911	0.668069	0.467496	...	0.15

5 rows × 30 columns

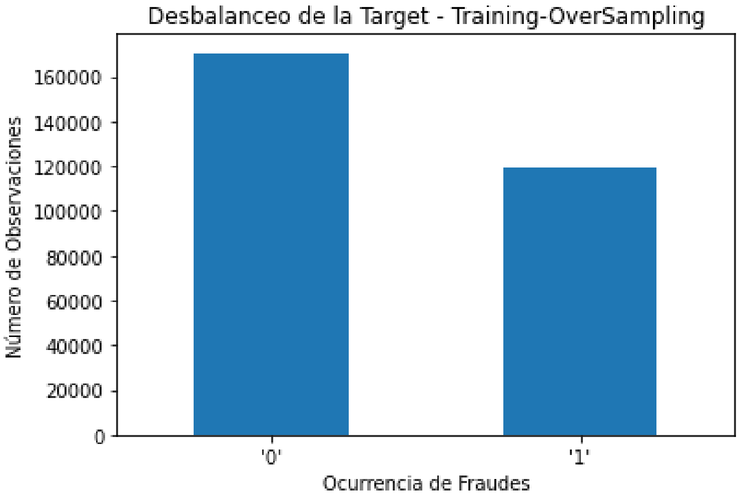
In [26]:
```
#Calculando las frecuencias por categoria
count_classes_over=pd.value_counts(fraude_entrenamiento_over.Class)
count_classes_over
```

Out[26]:
```
'0'    170589
'1'    119412
Name: Class, dtype: int64
```

In [27]:
```
#Verificando la proporcion
prop=round(count_classes_over[1]*100/count_classes_over[0],1)
prop
```

Out[27]:
```
70.0
```

In [28]:
```
#Graficando el Desbalanceo de la Target en el Training Set
count_classes_over.plot(kind='bar',rot=0)
plt.title('Desbalanceo de la Target - Training-OverSampling')
plt.xlabel('Ocurrencia de Fraudes')
plt.ylabel('Número de Observaciones')
plt.show()
```



SMOTE_Tomek

4. Crear un dataframe a partir de la data de entrenamiento con la tecnica de balanceo de datos "SmoteTomek"

In [35]:

```
st=SMOTETomek(sampling_strategy=0.7)
```

In [30]:

```
xtrain_st,ytrain_st=st.fit_sample(xtrain,ytrain)
```

In [31]:

```
#Datos de Entrenamiento DF
xtrain_st=pd.DataFrame(xtrain_st,columns=columns)
ytrain_st=pd.DataFrame(ytrain_st,columns=["Class"])

fraude_entrenamiento_st=pd.concat([xtrain_st,ytrain_st],axis=1)
fraude_entrenamiento_st.head()
```

Out[31]:

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	...	
0	1.871921	-1.443713	-0.751781	-1.164242	-0.445334	1.308200	-1.312689	0.436614	-0.133761	0.762721	...	0.54
1	2.182974	-1.008460	-2.834986	-3.264015	0.830545	0.294460	-0.090330	-0.001023	0.272701	-0.272232	...	-0.1
2	1.937508	-0.641264	-0.282543	0.151947	-0.569875	0.520526	-1.052534	0.356209	1.490638	0.014241	...	0.08
3	-2.425694	0.021840	1.568449	-0.400754	-1.376772	-0.465135	-0.170305	0.470701	-1.259302	0.014449	...	-0.30
4	1.286755	-1.194764	1.503195	-0.353358	-1.869471	0.605151	-1.749865	0.461911	0.668069	0.467496	...	0.15

5 rows × 30 columns

In [32]:

```
#Calculando las frecuencias por categoria
count_classes_st=pd.value_counts(fraude_entrenamiento_st.Class)
count_classes_st
```

Out[32]:

```
'0'    170586
'1'    119409
Name: Class, dtype: int64
```

In [33]:

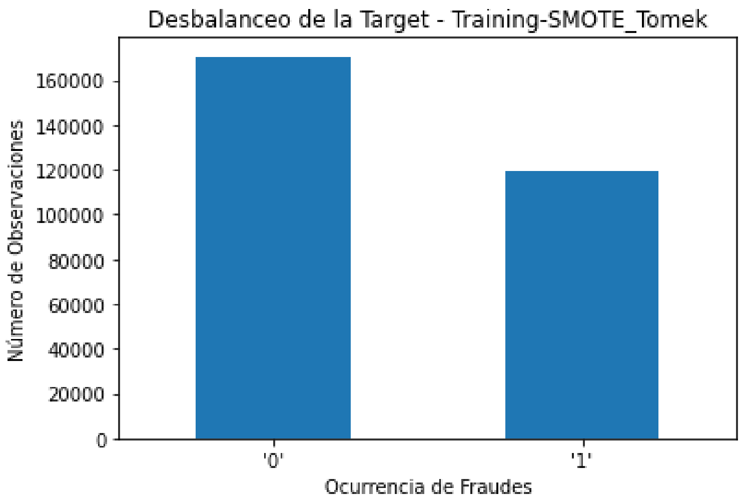
```
#Verificando la proporcion
prop=round(count_classes_st[1]*100/count_classes_st[0],1)
prop
```

Out[33]:

```
70.0
```

In [34]:

```
#Graficando el Desbalanceo de la Target en el Training Set
count_classes_st.plot(kind='bar',rot=0)
plt.title('Desbalanceo de la Target - Training-SMOTE_Tomek')
plt.xlabel('Ocurrencia de Fraudes')
plt.ylabel('Número de Observaciones')
plt.show()
```


Desbalanceo de la Target - Training-SMOTE_Tomek
Número de Observaciones
'0'
'1'
Ocurrencia de Fraudes