Datos

In [1]:

```
import pandas as pd
df = pd.read_csv("Pregunta4.csv")
df.head()
```

Out[1]:

	id	casado	tiene_hijos	nro_dpntes	edad	trabaja	tipo_vivienda	hace_deporte	ofrece_
0	701	no	si	1	25	si	propia	1	conc
1	305	no	no	0	29	no	familiar	0	
2	203	no	si	1	34	si	propia	0	
3	304	si	si	3	43	si	propia	1	
4	102	si	no	1	51	si	propia	2	conc

In [2]:

```
df = pd.get_dummies(df, columns = ["tiene_hijos","casado","trabaja"], drop_first = True
)

#Tipo_vivienda = 0 -> propia
#Tipo_vivienda = 1 -> familiar
#Tipo_vivienda = 2 -> arrienda
viviendas = {"propia":0,"familiar":1,"arrienda":2}
df['tipo_vivienda'] = df['tipo_vivienda'].replace(viviendas)

#ofrece_seguro = 0 -> no
#ofrece_seguro = 1 -> si con condiciones
#ofrece_seguro = 2 -> si
seguros = {"si con condiciones": 1, "no":0, "si":2}
df['ofrece_seguro'] = df['ofrece_seguro'].replace(seguros)
df
```

Out[2]:

	id	nro_dpntes	edad	tipo_vivienda	hace_deporte	ofrece_seguro	tiene_hijos_si	casad
0	701	1	25	0	1	1	1	
1	305	0	29	1	0	0	0	
2	203	1	34	0	0	2	1	
3	304	3	43	0	1	2	1	
4	102	1	51	0	2	1	0	
5	406	2	52	2	0	0	1	
6	507	4	43	2	3	2	1	
7	108	0	33	1	0	0	0	
8	409	1	27	0	2	2	1	
9	180	1	28	0	3	1	1	
10	191	2	50	1	0	0	0	
11	212	1	34	1	2	2	1	
12	213	1	42	1	0	0	1	
13	314	1	40	2	0	0	0	
14	415	1	25	0	0	2	1	
15	116	0	39	1	0	0	0	
16	117	1	31	0	2	1	0	
17	218	0	37	0	3	1	0	
18	519	1	29	1	3	2	1	
19	120	1	30	0	0	2	1	
20	221	0	28	1	1	1	0	
21	322	1	27	0	3	1	1	
22	323	4	40	0	1	2	1	
23	624	1	36	0	3	2	1	
24	125	0	39	1	1	0	0	

In [3]:

```
df.keys()
```

Out[3]:

```
Index(['id', 'nro_dpntes', 'edad', 'tipo_vivienda', 'hace_deporte',
       'ofrece_seguro', 'tiene_hijos_si', 'casado_si', 'trabaja_si'],
      dtype='object')
```

In [4]:

```
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(df.drop(['id','ofrece_seguro'],axis
=1),df['ofrece_seguro'],test_size=0.2)
X_train.shape
```

Out[4]:

```
(20, 7)
```

In [5]:

```
y_test.shape
```

Out[5]:

```
(5,)
```

KNN

In [14]:

```
from sklearn.neighbors import KNeighborsClassifier

knn = KNeighborsClassifier(n_neighbors=4) #n_neighbors=1
knn.fit(X_train, y_train)
```

Out[14]:

```
KNeighborsClassifier(algorithm='auto', leaf_size=30, metric='minkowski',
                     metric_params=None, n_jobs=None, n_neighbors=4, p=2,
                     weights='uniform')
```

In [15]:

```
knn.score(X_test,y_test)
```

Out[15]:

```
0.8
```

In [16]:

```
y_test
```

Out[16]:

```
21    1
12    0
19    2
11    2
15    0
Name: ofrece_seguro, dtype: int64
```

In [17]:

```
y_pred = knn.predict(X_test)
y_pred
```

Out[17]:

```
array([1, 0, 1, 2, 0], dtype=int64)
```

In [18]:

```
from sklearn.metrics import confusion_matrix
confusion_matrix(y_test, y_pred)
```

Out[18]:

```
array([[2, 0, 0],
       [0, 1, 0],
       [0, 1, 1]], dtype=int64)
```

In [66]:

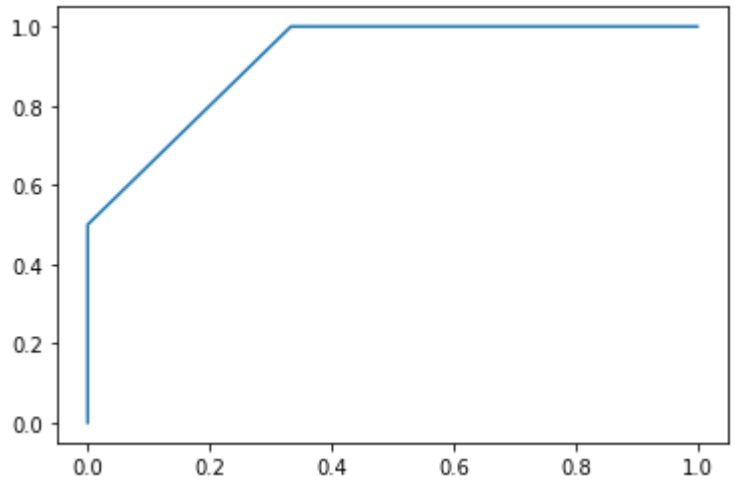
```
"""
import scikitplot as skplt
import matplotlib.pyplot as plt

skplt.metrics.plot_roc_curve(y_test, y_pred)
plt.show()
"""
"""
import matplotlib.pyplot as plt
import numpy as np
%matplotlib inline
# This is the ROC curve
plt.plot(X_test,y_test)
plt.show()
"""
"""
import matplotlib.pyplot as plt  # doctest: +SKIP
from sklearn import datasets, metrics, model_selection, svm
#X, y = datasets.make_classification(random_state=0)
#X_train, X_test, y_train, y_test = model_selection.train_test_split(            X, y,
 random_state=0)
#clf = svm.SVC(random_state=0)
#clf.fit(X_train, y_train)
#SVC(random_state=0)
metrics.plot_roc_curve(knn, X_test, y_test)  # doctest: +SKIP
plt.show()                                   # doctest: +SKIP
"""

y_1 = np.array(y_test)
scores_1 = np.array(y_pred)
fpr, tpr, thresholds = metrics.roc_curve(y_1, scores_1, pos_label=2)
plt.plot(fpr, tpr)
#y = label_binarize(y, classes=[0, 1, 2, 3])
#y_pred
```

Out[66]:

```
[<matplotlib.lines.Line2D at 0x1e85d04ac08>]
```



KMeans

In [49]:

```
from sklearn.cluster import KMeans
from sklearn import metrics
X=df.drop(['id','ofrece_seguro'],axis=1)
y=df['ofrece_seguro']
```

In [50]:

```
X.head()
```

Out[50]:

	nro_dpntes	edad	tipo_vivienda	hace_deporte	tiene_hijos_si	casado_si	trabaja_si
0	1	25	0	1	1	0	1
1	0	29	1	0	0	0	0
2	1	34	0	0	1	0	1
3	3	43	0	1	1	1	1
4	1	51	0	2	0	1	1

In [51]:

```
y.head()
```

Out[51]:

```
0    1
1    0
2    2
3    2
4    1
Name: ofrece_seguro, dtype: int64
```

In [52]:

```
km = KMeans(n_clusters=3,max_iter=500)
km.fit(X)
```

Out[52]:

```
KMeans(algorithm='auto', copy_x=True, init='k-means++', max_iter=500,
       n_clusters=3, n_init=10, n_jobs=None, precompute_distances='auto',
       random_state=None, tol=0.0001, verbose=0)
```

In [53]:

```
predicciones = km.predict(X)
predicciones
```

Out[53]:

```
array([0, 0, 0, 1, 2, 2, 1, 0, 0, 0, 2, 0, 1, 1, 0, 1, 0, 1, 0, 0, 0, 0,
       1, 1, 1])
```

In [54]:

```
from sklearn.metrics import confusion_matrix
cm = confusion_matrix(y,predicciones)
cm
```

Out[54]:

```
array([[2, 4, 2],
       [5, 1, 1],
       [6, 4, 0]], dtype=int64)
```

In [55]:

```
"""
import seaborn as sb
%matplotlib inline
sn.heatmap(cm,cmap='Pastel1', annot=True)
"""
from sklearn.metrics import accuracy_score
print(accuracy_score(y, predicciones))
```

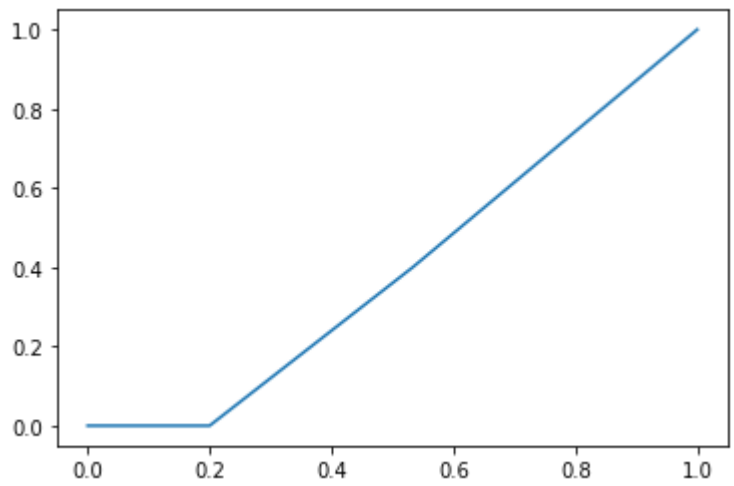
```
0.12
```

In [65]:

```
y_1 = np.array(y)
scores_1 = np.array(predicciones)
fpr, tpr, thresholds = metrics.roc_curve(y_1, scores_1, pos_label=2)
plt.plot(fpr, tpr)
#y = label_binarize(y, classes=[0, 1, 2, 3])
#y_pred
```

Out[65]:

```
[<matplotlib.lines.Line2D at 0x1e85cfeff88>]
```



Arboles de clasificación

In [57]:

```
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
from sklearn.tree import export_graphviz
import graphviz
import matplotlib.pyplot as plt
import numpy as np

arbol = DecisionTreeClassifier(max_depth=3)
```

In [58]:

```
arbol.fit(X_train, y_train)
```

Out[58]:

```
DecisionTreeClassifier(class_weight=None, criterion='gini', max_depth=3,
                       max_features=None, max_leaf_nodes=None,
                       min_impurity_decrease=0.0, min_impurity_split=None,
                       min_samples_leaf=1, min_samples_split=2,
                       min_weight_fraction_leaf=0.0, presort=False,
                       random_state=None, splitter='best')
```

In [59]:

```
arbol.score(X_train, y_train)
```

Out[59]:

```
0.9
```

In [60]:

```
arbol.score(X_test, y_test)
```

Out[60]:

```
0.8
```

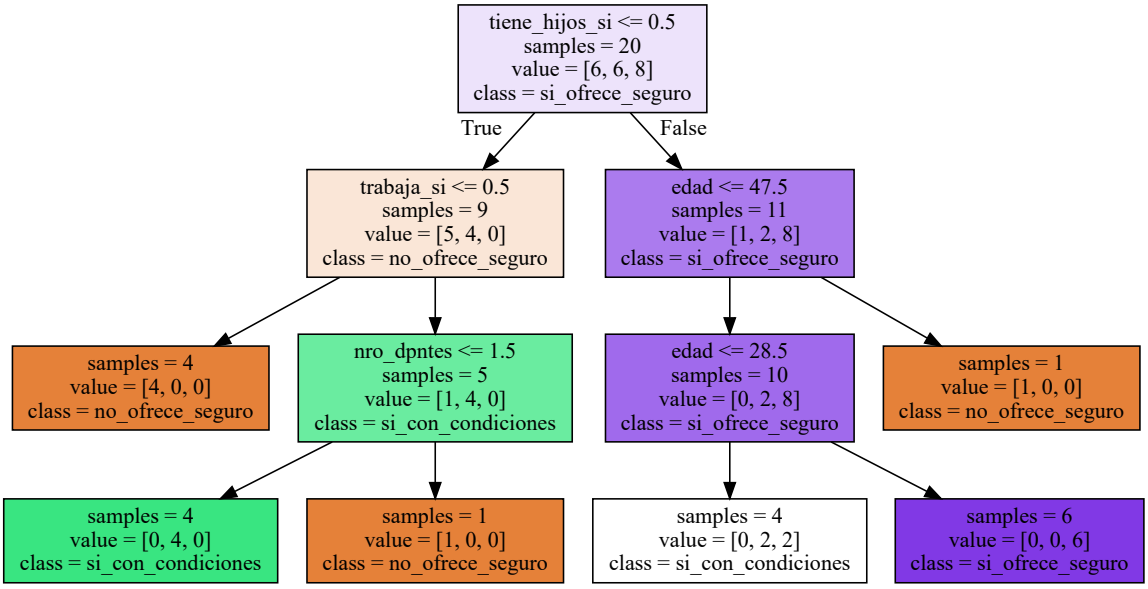
In [61]:

```
export_graphviz(arbol,out_file='arbol.dot',class_names=['no_ofrece_seguro','si_con_cond
iciones','si_ofrece_seguro'],
                feature_names=['nro_dpntes','edad','tipo_vivienda','hace_deporte','tien
e_hijos_si','casado_si','trabaja_si'],
                impurity=False, filled=True)
```

In [62]:

```
with open('arbol.dot') as f:
    dot_graph=f.read()
graphviz.Source(dot_graph)
```

Out[62]:



In [67]:

```
y_pred = arbol.predict(X_test)
y_pred
```

Out[67]:

```
array([1, 2, 2, 2, 0], dtype=int64)
```

In [68]:

```
from sklearn.metrics import confusion_matrix
confusion_matrix(y_test, y_pred)
```

Out[68]:

```
array([[1, 0, 1],
       [0, 1, 0],
       [0, 0, 2]], dtype=int64)
```

In [69]:

```
y_1 = np.array(y_test)
scores_1 = np.array(y_pred)
fpr, tpr, thresholds = metrics.roc_curve(y_1, scores_1, pos_label=2)
plt.plot(fpr, tpr)
#y = label_binarize(y, classes=[0, 1, 2, 3])
#y_pred
```

Out[69]:

```
[<matplotlib.lines.Line2D at 0x1e85e085808>]
```