In [49]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

In [50]:
```
data = pd.read_csv('E:/New folder/titanic_data.csv')
```

Out[50]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarke
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	

Set index

In [51]:
```
data.set_index(data['PassengerId'], inplace=True)
data.drop('PassengerId', axis=1, inplace=True)
```

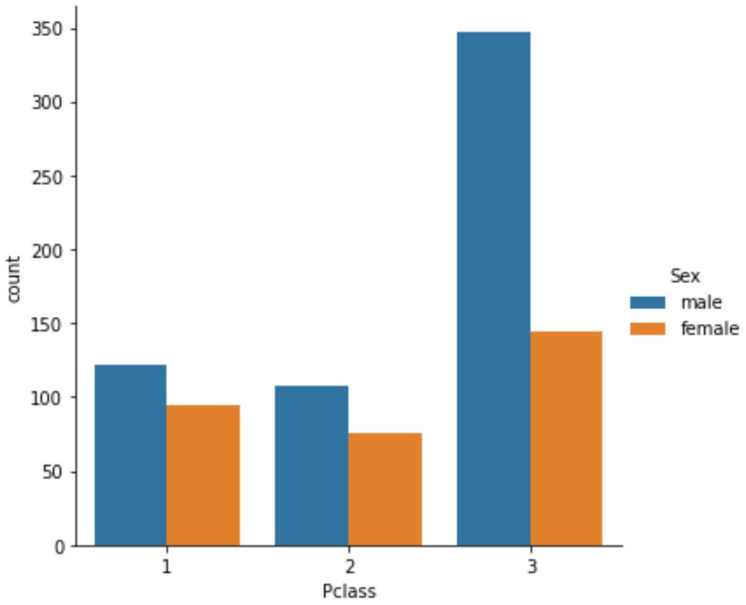
Out[51]:

PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S
6	0	3	Moran, Mr. James	male	NaN	0	0	330877	8.4583	NaN	Q
7	0	1	McCarthy, Mr. Timothy J	male	54.0	0	0	17463	51.8625	E46	S
8	0	3	Palsson, Master. Gosta Leonard	male	2.0	3	1	349909	21.0750	NaN	S
9	1	3	Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)	female	27.0	0	2	347742	11.1333	NaN	S
10	1	2	Nasser, Mrs. Nicholas (Adele Achem)	female	14.0	1	0	237736	30.0708	NaN	C

Visualizing data

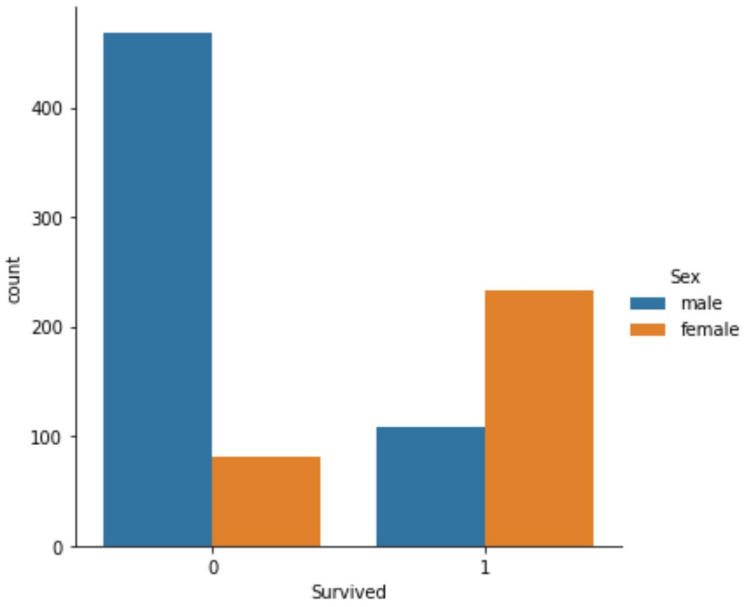
In [55]:
```
sns.factorplot('Pclass', data=data, hue='Sex', kind='count')
```

```
C:\Users\SR1407SM1106\AppData\Local\Continuum\anaconda3\lib\site-packages\seabor
n\categorical.py:3666: UserWarning: The `factorplot` function has been renamed t
o `catplot`. The original name will be removed in a future release. Please updat
e your code. Note that the default `kind` in `factorplot` (`'point'`) has change
d `'strip'` in `catplot`.
  warnings.warn(msg)
```



In [56]:

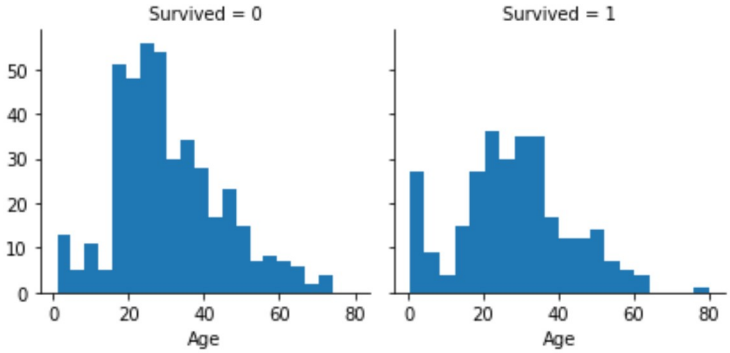
Out[56]: <seaborn.axisgrid.FacetGrid at 0x243ae60ce88>



Females are survived in majority

In [57]:
```
g = sns.FacetGrid(data, col='Survived')
```

Out[57]:
```
<seaborn.axisgrid.FacetGrid at 0x243ae76cf48>
```



More death and survival is between age 18 and 38

Remove NaN

In [58]:

Out[58]:
```
Survived      0
Pclass        0
Name          0
Sex           0
Age         177
SibSp         0
Parch         0
Ticket        0
Fare          0
Cabin       687
Embarked      2
dtype: int64
```

In [59]:

In [60]:

In [61]:

In [62]:

Out[62]:
```
Survived    0
Pclass      0
Name        0
Sex         0
Age         0
SibSp       0
Parch       0
Ticket      0
Fare        0
Cabin       0
Embarked    0
dtype: int64
```

In [63]:

Out[63]:

PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	B96 B98	S
2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	B96 B98	S
4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	B96 B98	S
6	0	3	Moran, Mr. James	male	24.0	0	0	330877	8.4583	B96 B98	Q
7	0	1	McCarthy, Mr. Timothy J	male	54.0	0	0	17463	51.8625	E46	S
8	0	3	Palsson, Master. Gosta Leonard	male	2.0	3	1	349909	21.0750	B96 B98	S
9	1	3	Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)	female	27.0	0	2	347742	11.1333	B96 B98	S
10	1	2	Nasser, Mrs. Nicholas (Adele Achem)	female	14.0	1	0	237736	30.0708	B96 B98	C

Categorical data to numerical

In [80]:
```
from sklearn import preprocessing
le = preprocessing.LabelEncoder()
cat_data = ['Sex', 'Embarked', 'Cabin']
for col in cat_data:
    data[col] = le.fit_transform(data[col])
```

Out[80]:

PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
1	0	3	Braund, Mr. Owen Harris	1	22.0	1	0	A/5 21171	7.2500	47	2
2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	0	38.0	1	0	PC 17599	71.2833	81	0
3	1	3	Heikkinen, Miss. Laina	0	26.0	0	0	STON/O2. 3101282	7.9250	47	2
4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	0	35.0	1	0	113803	53.1000	55	2
5	0	3	Allen, Mr. William Henry	1	35.0	0	0	373450	8.0500	47	2
6	0	3	Moran, Mr. James	1	24.0	0	0	330877	8.4583	47	1
7	0	1	McCarthy, Mr. Timothy J	1	54.0	0	0	17463	51.8625	129	2
8	0	3	Palsson, Master. Gosta Leonard	1	2.0	3	1	349909	21.0750	47	2
9	1	3	Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)	0	27.0	0	2	347742	11.1333	47	2
10	1	2	Nasser, Mrs. Nicholas (Adele Achem)	0	14.0	1	0	237736	30.0708	47	0

Split into training and testing data

In [82]:
```
data_X = data.iloc[:,1:]
```

In [83]:

Out[83]:

PassengerId	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
1	3	Braund, Mr. Owen Harris	1	22.0	1	0	A/5 21171	7.2500	47	2
2	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	0	38.0	1	0	PC 17599	71.2833	81	0
3	3	Heikkinen, Miss. Laina	0	26.0	0	0	STON/O2. 3101282	7.9250	47	2
4	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	0	35.0	1	0	113803	53.1000	55	2
5	3	Allen, Mr. William Henry	1	35.0	0	0	373450	8.0500	47	2

In [84]:

Out[84]:
```
PassengerId
1    0
2    1
3    1
4    1
5    0
Name: Survived, dtype: int64
```

In [85]:
```
from sklearn.model_selection import train_test_split
```

In [86]:
```
print(X_train.shape)
```
```
(712, 10)
(712,)
```

In [87]:
```
print(X_test.shape)
```
```
(179, 10)
(179,)
```

Remove unnecessary columns in training data

In [97]:
```
X_train = X_train.drop(['Name'], axis=1)
X_train = X_train.drop(['Ticket'], axis=1)
X_train = X_train.drop(['Fare'], axis=1)
```

Out[97]:

PassengerId	Pclass	Sex	Age	SibSp	Parch	Cabin	Embarked
366	3	1	30.0	0	0	47	2
287	3	1	30.0	0	0	47	2
26	3	0	38.0	1	5	47	2
86	3	0	33.0	3	0	47	2
259	1	0	35.0	0	0	47	0

In [103]:
```
X_test = X_test.drop(['Name'], axis=1)
X_test = X_test.drop(['Ticket'], axis=1)
X_test = X_test.drop(['Fare'], axis=1)
```

Out[103]:

PassengerId	Pclass	Sex	Age	SibSp	Parch	Cabin	Embarked
509	3	1	28.0	0	0	47	2
553	3	1	24.0	0	0	47	1
616	2	0	24.0	1	2	47	2
513	1	1	36.0	0	0	121	2
812	3	1	39.0	0	0	47	2

KNN

In [101]:
```
from sklearn.neighbors import KNeighborsClassifier
knn = KNeighborsClassifier()
```

Out[101]:
```
KNeighborsClassifier(algorithm='auto', leaf_size=30, metric='minkowski',
                     metric_params=None, n_jobs=None, n_neighbors=5, p=2,
                     weights='uniform')
```

In [104]:
```

```

Out[104]:
```
0.7039106145251397
```

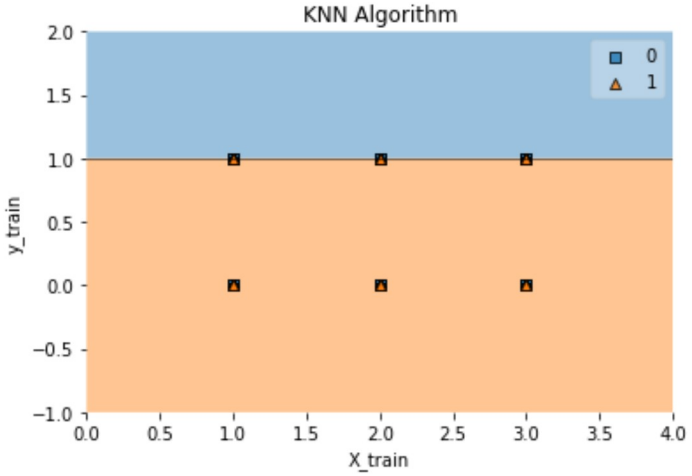
In [107]:
```
y_pred = knn.predict(X_test)
from sklearn.metrics import confusion_matrix
```

Out[107]:
```
array([[87, 26],
       [27, 39]], dtype=int64)
```

Accuracy: 70.4%

In [109]:
```
from mlxtend.plotting import plot_decision_regions
X_train_plot=X_train[['Pclass','Sex']]
knn=KNeighborsClassifier()
knn.fit(X_train_plot, y_train)
plot_decision_regions(X_train_plot.to_numpy(), y_train.to_numpy(), clf=knn)
plt.xlabel('X_train')
plt.ylabel('y_train')
plt.title('KNN Algorithm')
```

```
C:\Users\SR1407SM1106\AppData\Local\Continuum\anaconda3\lib\site-packages\mlxten
d\plotting\decision_regions.py:249: MatplotlibDeprecationWarning: Passing unsupp
orted keyword arguments to axis() will raise a TypeError in 3.3.
  ax.axis(xmin=xx.min(), xmax=xx.max(), y_min=yy.min(), y_max=yy.max())
```



Bagging Classifier

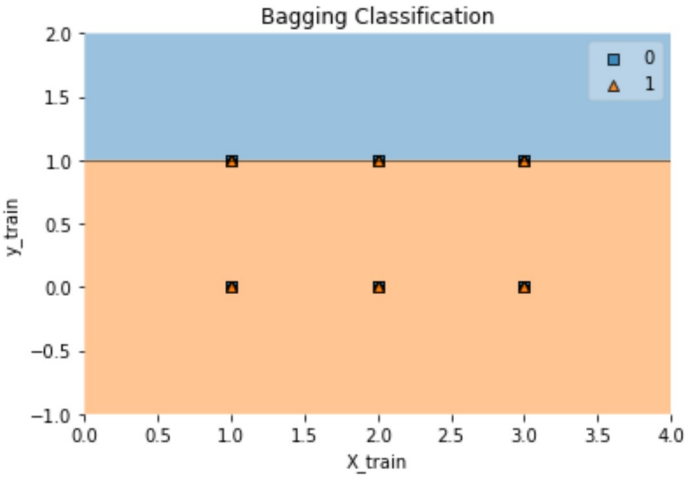
In [110]:
```
from sklearn.ensemble import BaggingClassifier
bag = BaggingClassifier()
bag.fit(X_train, y_train)
print('Accuracy Score: ', bag.score(X_test, y_test))
y_pred2 = bag.predict(X_test)
from sklearn.metrics import confusion_matrix
```

```
Accuracy Score:  0.7374301675977654
Confusion Matrix:  [[86 27]
 [20 46]]
```

Accuracy: 73.7%

In [111]:
```
bag = BaggingClassifier()
bag.fit(X_train_plot, y_train)
plot_decision_regions(X_train_plot.to_numpy(), y_train.to_numpy(), clf=bag)
plt.xlabel('X_train')
plt.ylabel('y_train')
plt.title('Bagging Classification')
```

```
C:\Users\SR1407SM1106\AppData\Local\Continuum\anaconda3\lib\site-packages\mlxten
d\plotting\decision_regions.py:249: MatplotlibDeprecationWarning: Passing unsupp
orted keyword arguments to axis() will raise a TypeError in 3.3.
  ax.axis(xmin=xx.min(), xmax=xx.max(), y_min=yy.min(), y_max=yy.max())
```



Decision Tree Classifier

In [112]:
```
from sklearn.tree import DecisionTreeClassifier
dt = DecisionTreeClassifier()
dt.fit(X_train, y_train)
print('Score: ', dt.score(X_test,y_test))
preed_y = dt.predict(X_test)
from sklearn.metrics import confusion_matrix
```

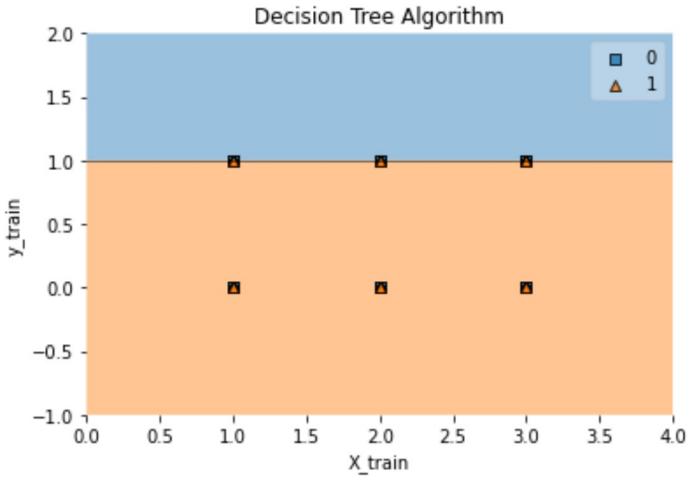
```
Score:  0.6983240223463687
```

Out[112]:
```
array([[82, 31],
       [23, 43]], dtype=int64)
```

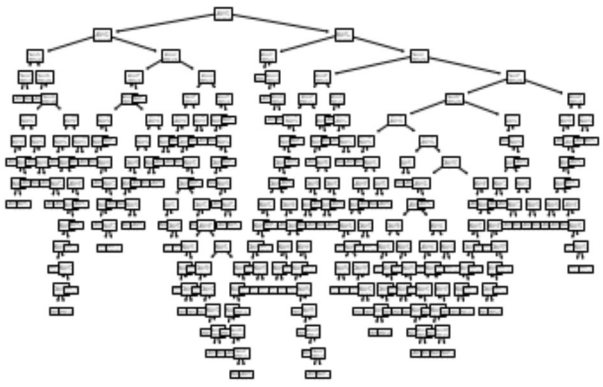
Accuracy: 69.8%

In [113]:
```
from mlxtend.plotting import plot_decision_regions
dt = DecisionTreeClassifier()
dt.fit(X_train_plot, y_train)
plot_decision_regions(X_train_plot.to_numpy(), y_train.to_numpy(), clf=dt)
plt.xlabel('X_train')
plt.ylabel('y_train')
plt.title('Decision Tree Algorithm')
```

```
C:\Users\SR1407SM1106\AppData\Local\Continuum\anaconda3\lib\site-packages\mlxten
d\plotting\decision_regions.py:249: MatplotlibDeprecationWarning: Passing unsupp
orted keyword arguments to axis() will raise a TypeError in 3.3.
  ax.axis(xmin=xx.min(), xmax=xx.max(), y_min=yy.min(), y_max=yy.max())
```



In [120]:
```
from sklearn import tree
clf = tree.DecisionTreeClassifier()
clf.fit(X_train, y_train)
tree.plot_tree(clf)
plt.figure(figsize = (20, 25))
```



```
<Figure size 1440x1800 with 0 Axes>
```

In [ ]:

In [ ]:

In [ ]:

In [ ]: