In [49]:
```
import joblib
from xgboost import XGBClassifier
import pandas as pd
import seaborn as sns
from matplotlib import pyplot as plt
from sklearn.ensemble import RandomForestClassifier, GradientBoostingClassifier, VotingC
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import cross_validate, GridSearchCV
from sklearn.neighbors import KNeighborsClassifier
from sklearn.svm import SVC
from lightgbm import LGBMClassifier
from sklearn.tree import DecisionTreeClassifier
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score,f1_score
df=sns.load_dataset('titanic')
pd.set_option('display.max_columns',None)
pd.set_option('display.width',500)
```

In [2]:
```
pip install xgboost
```

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: xgboost in c:\users\user\appdata\roaming\python\python31
1\site-packages (2.0.3)
Requirement already satisfied: numpy in c:\programdata\anaconda3\lib\site-packages (fro
m xgboost) (1.24.3)
Requirement already satisfied: scipy in c:\programdata\anaconda3\lib\site-packages (fro
m xgboost) (1.11.1)
Note: you may need to restart the kernel to use updated packages.
```

In [3]:
```
pip install lightgbm
```

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: lightgbm in c:\users\user\appdata\roaming\python\python3
11\site-packages (4.3.0)
Requirement already satisfied: numpy in c:\programdata\anaconda3\lib\site-packages (fro
m lightgbm) (1.24.3)
Requirement already satisfied: scipy in c:\programdata\anaconda3\lib\site-packages (fro
m lightgbm) (1.11.1)
Note: you may need to restart the kernel to use updated packages.
```

In [4]:
```
df.head()
```

Out[4]:

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	who	adult_male	deck	embark
0	0	3	male	22.0	1	0	7.2500	S	Third	man	True	NaN	Southa
1	1	1	female	38.0	1	0	71.2833	C	First	woman	False	C	Che
2	1	3	female	26.0	0	0	7.9250	S	Third	woman	False	NaN	Southa
3	1	1	female	35.0	1	0	53.1000	S	First	woman	False	C	Southa
4	0	3	male	35.0	0	0	8.0500	S	Third	man	True	NaN	Southa

In [5]:
```
p=['pclass','age','sibsp','fare']
X = df[p]
y = df['survived']
```

In [6]:
```
X
```

Out[6]:

	pclass	age	sibsp	fare
0	3	22.0	1	7.2500
1	1	38.0	1	71.2833
2	3	26.0	0	7.9250
3	1	35.0	1	53.1000
4	3	35.0	0	8.0500
...	...	...	...	...
886	2	27.0	0	13.0000
887	1	19.0	0	30.0000
888	3	NaN	1	23.4500
889	1	26.0	0	30.0000
890	3	32.0	0	7.7500

891 rows × 4 columns

In [7]:
```
y
```

Out[7]:
```
0      0
1      1
2      1
3      1
4      0
      ..
886    0
887    1
888    0
889    1
890    0
Name: survived, Length: 891, dtype: int64
```

In [8]:
```
y.isnull().values.any()
```

Out[8]:
```
False
```

In [9]:
```
updated_df = X
updated_df['age']=updated_df['age'].fillna(updated_df['age'].mean())
updated_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 4 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   pclass  891 non-null    int64  
 1   age     891 non-null    float64
 2   sibsp   891 non-null    int64  
 3   fare    891 non-null    float64
dtypes: float64(2), int64(2)
memory usage: 28.0 KB

C:\Users\User\AppData\Local\Temp\ipykernel_9872\925103184.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  updated_df['age']=updated_df['age'].fillna(updated_df['age'].mean())
```

In [ ]:
```
#5.Stacking & Ensemble Learning
```

In [34]:
```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42
```

In [36]:
```
base_models = {
    'KNN': KNeighborsClassifier(),
    'DecisionTree': DecisionTreeClassifier(),
    'RandomForest': RandomForestClassifier()
}
```

In [39]:
```
def voting_classifier(base_models, X, y):
    # Tahmincilerin adlarını ve modellerini içeren bir liste oluşturma
    estimators = [(name, model) for name, model in base_models.items()]

    # VotingClassifier nesnesini oluşturma
    voting_clf = VotingClassifier(estimators=estimators)

    # Modeli eğitme
    voting_clf.fit(X, y)

    return voting_clf
```

In [ ]:
```
voting_clf = voting_classifier(base_models, X_train, y_train)
```

In [42]:
```
y_pred = voting_clf.predict(X_test)
```

In [45]:
```
accuracy = accuracy_score(y_test, y_pred)
```

In [46]:
```
print("Voting Classifier Accuracy Score:", accuracy)
```

```
Voting Classifier Accuracy Score: 0.7206703910614525
```

In [50]:
```
f1 = f1_score(y_test, y_pred)
```

In [51]:
```
f1
```

Out[51]:
```
0.6153846153846154
```

In [ ]: