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ML-LAB-TASK-10

In [43]:
```
import pandas as pd
import numpy as np

data = pd.read_csv('./framingham.csv')
data.tail(9)
```

Out[43]:

	male	age	education	currentSmoker	cigsPerDay	BPMeds	prevalentStroke	preva
4229	0	51	3.0	1	20.0	0.0	0	
4230	0	56	1.0	1	3.0	0.0	0	
4231	1	58	3.0	0	0.0	0.0	0	
4232	1	68	1.0	0	0.0	0.0	0	
4233	1	50	1.0	1	1.0	0.0	0	
4234	1	51	3.0	1	43.0	0.0	0	
4235	0	48	2.0	1	20.0	NaN	0	
4236	0	44	1.0	1	15.0	0.0	0	
4237	0	52	2.0	0	0.0	0.0	0	

In [44]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4238 entries, 0 to 4237
Data columns (total 16 columns):
 #   Column           Non-Null Count  Dtype  
---  ------           --------------  -----  
 0   male             4238 non-null   int64  
 1   age              4238 non-null   int64  
 2   education        4133 non-null   float64
 3   currentSmoker    4238 non-null   int64  
 4   cigsPerDay       4209 non-null   float64
 5   BPMeds           4185 non-null   float64
 6   prevalentStroke  4238 non-null   int64  
 7   prevalentHyp     4238 non-null   int64  
 8   diabetes         4238 non-null   int64  
 9   totChol          4188 non-null   float64
 10  sysBP            4238 non-null   float64
 11  diaBP            4238 non-null   float64
 12  BMI              4219 non-null   float64
 13  heartRate        4237 non-null   float64
 14  glucose          3850 non-null   float64
 15  TenYearCHD       4238 non-null   int64  
dtypes: float64(9), int64(7)
memory usage: 529.9 KB
```

In [45]:
```
#missing values in the dataset
print("missing values in the dataset")
print(data.isnull().sum())
```

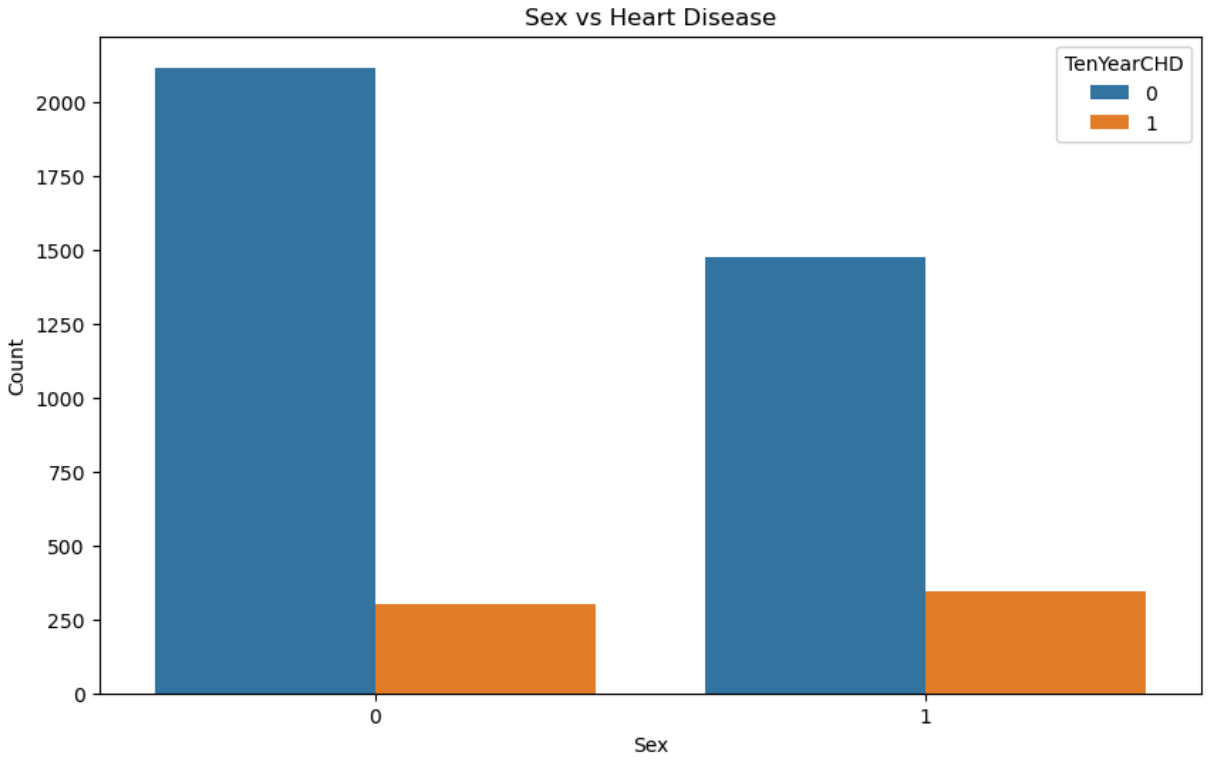
```
missing values in the dataset
male                 0
age                  0
education          105
currentSmoker        0
cigsPerDay          29
BPMeds              53
prevalentStroke      0
prevalentHyp         0
diabetes             0
totChol             50
sysBP                0
diaBP                0
BMI                 19
heartRate            1
glucose            388
TenYearCHD           0
dtype: int64
```

In [46]:
```
#handling missing values

#filling missing values with mean
data = data.fillna(data.mean())

#missing values in the dataset
print("missing values in the dataset")
print(data.isnull().sum())
```

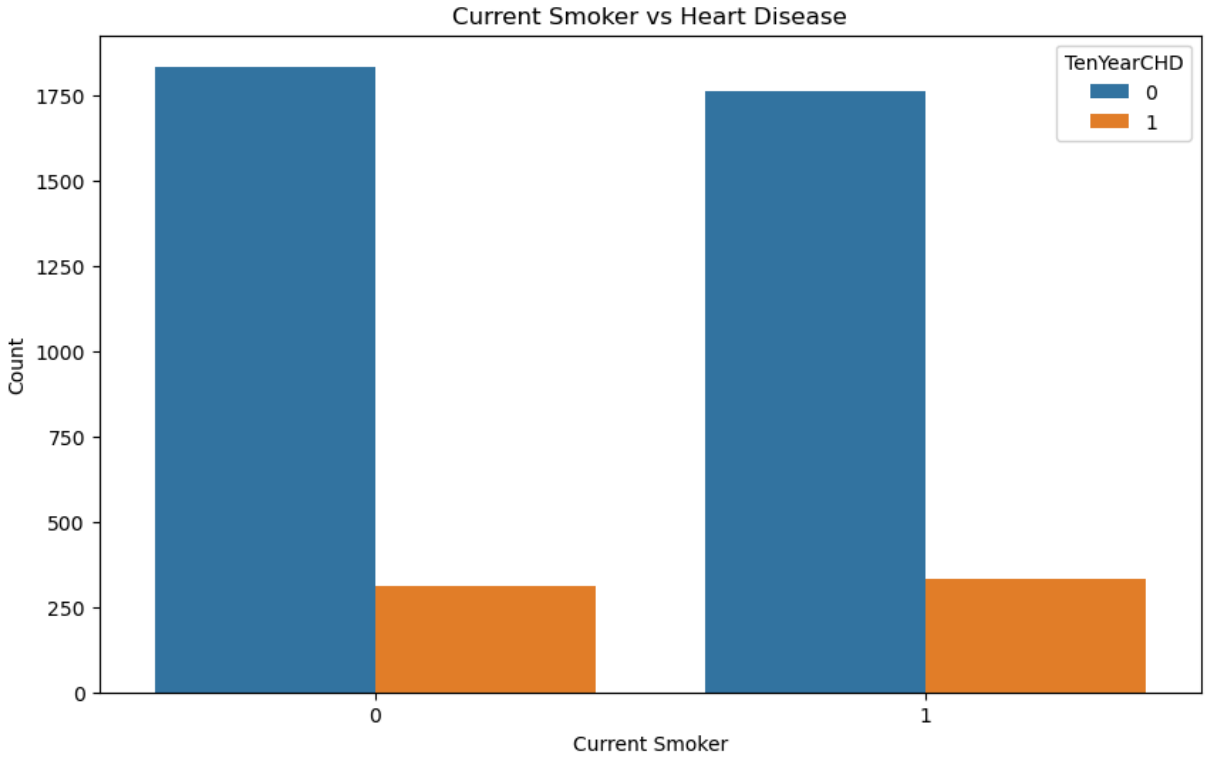
```
missing values in the dataset
male               0
age                0
education          0
currentSmoker      0
cigsPerDay         0
BPMeds             0
prevalentStroke    0
prevalentHyp       0
diabetes           0
totChol            0
sysBP              0
diaBP              0
BMI                0
heartRate          0
glucose            0
TenYearCHD         0
dtype: int64
```

In [47]:
```
# visualizing the dataset

import plotly.express as px

#correlation matrix
correlation_matrix = data.corr()
fig = px.imshow(correlation_matrix)
fig.show()
```

In [48]:
```
import seaborn as sns
import matplotlib.pyplot as plt
# Plot Crosstab
plt.figure(figsize=(10, 6))
sns.countplot(x='male', hue='TenYearCHD', data=data)
plt.title('Sex vs Heart Disease')
plt.xlabel('Sex')
plt.ylabel('Count')
plt.legend(title='TenYearCHD')
plt.show()
```



In [49]:
```
#crossplot currentSmoker vs TenYearCHD
plt.figure(figsize=(10, 6))
sns.countplot(x='currentSmoker', hue='TenYearCHD', data=data)
plt.title('Current Smoker vs Heart Disease')
plt.xlabel('Current Smoker')
plt.ylabel('Count')
plt.legend(title='TenYearCHD')
plt.show()
```



In [ ]:
```
#  SVM -SVC
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score, confusion_matrix

X = data.drop(['TenYearCHD'], axis=1)
y = data['TenYearCHD']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, rar

model = SVC()
model.fit(X_train, y_train)
y_pred1 = model.predict(X_test)

print("Accuracy Score: ", accuracy_score(y_test, y_pred1))
print("Confusion Matrix: \n", confusion_matrix(y_test, y_pred1))

#  SVM -LinearSVC
from sklearn.svm import LinearSVC

model = LinearSVC()
model.fit(X_train, y_train)
y_pred2 = model.predict(X_test)

print("Accuracy Score: ", accuracy_score(y_test, y_pred2))
print("Confusion Matrix: \n", confusion_matrix(y_test, y_pred2))




# Difference between SVC and LinearSVC
# SVC is the C-support vector classification. It is a powerful classificatic
# LinearSVC is the linear support vector classification. It is a linear clas
```

```
Accuracy Score:  0.8514150943396226
Confusion Matrix:
 [[722   2]
 [124   0]]
Accuracy Score:  0.8549528301886793
Confusion Matrix:
 [[722   2]
 [121   3]]
```