In [1]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, classification_report
from sklearn.metrics import confusion_matrix
import warnings
warnings.filterwarnings('ignore')
```

In [2]:
```
df = pd.read_csv(r'D:\CSE ENGG NOTES\6th SEMESTER\ML LAB\Datasets\heart.csv')
```

In [3]:
```
df.head()
```

Out[3]:

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal
0	52	1	0	125	212	0	1	168	0	1.0	2	2	3
1	53	1	0	140	203	1	0	155	1	3.1	0	0	3
2	70	1	0	145	174	0	1	125	1	2.6	0	0	3
3	61	1	0	148	203	0	1	161	0	0.0	2	1	3
4	62	0	0	138	294	1	1	106	0	1.9	1	3	2

In [4]:
```
df.shape
```

Out[4]:
```
(1025, 14)
```

In [5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1025 entries, 0 to 1024
Data columns (total 14 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   age       1025 non-null   int64
 1   sex       1025 non-null   int64
 2   cp        1025 non-null   int64
 3   trestbps  1025 non-null   int64
 4   chol      1025 non-null   int64
 5   fbs       1025 non-null   int64
 6   restecg   1025 non-null   int64
 7   thalach   1025 non-null   int64
 8   exang     1025 non-null   int64
 9   oldpeak   1025 non-null   float64
 10  slope     1025 non-null   int64
 11  ca        1025 non-null   int64
 12  thal      1025 non-null   int64
 13  target    1025 non-null   int64
dtypes: float64(1), int64(13)
memory usage: 112.2 KB
```

In [6]:
```
df.isnull().sum()
```

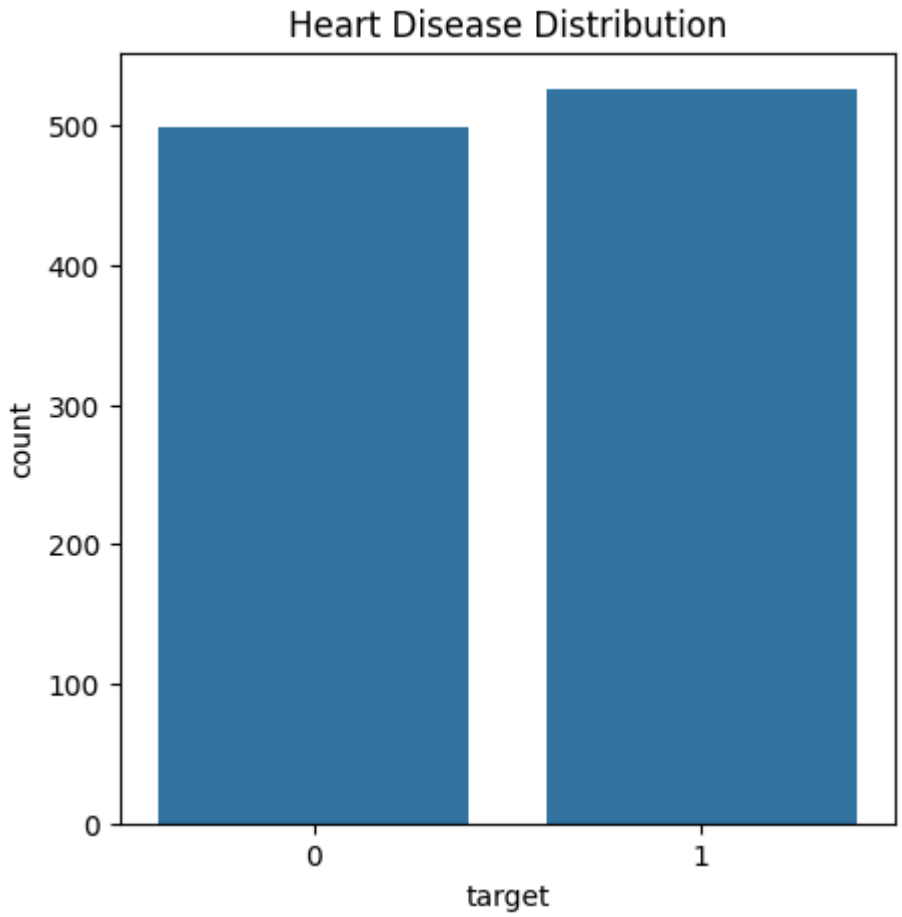
Out[6]:
```
age         0
sex         0
cp          0
trestbps    0
chol        0
fbs         0
restecg     0
thalach     0
exang       0
oldpeak     0
slope       0
ca          0
thal        0
target      0
dtype: int64
```

In [7]:
```
df.describe()
```

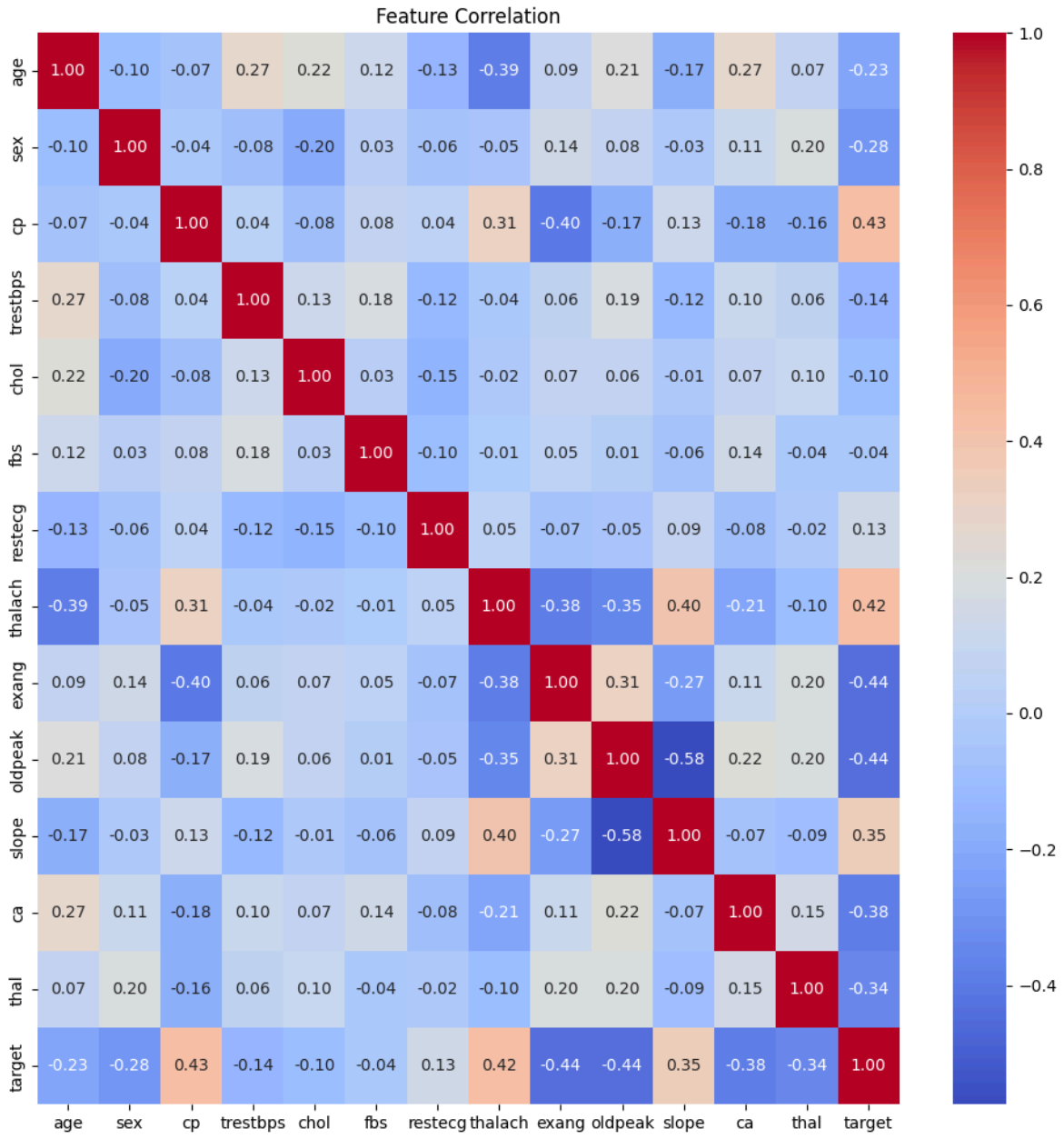
Out[7]:

	age	sex	cp	trestbps	chol	fbs	
count	1025.000000	1025.000000	1025.000000	1025.000000	1025.00000	1025.000000	10
mean	54.434146	0.695610	0.942439	131.611707	246.00000	0.149268	
std	9.072290	0.460373	1.029641	17.516718	51.59251	0.356527	
min	29.000000	0.000000	0.000000	94.000000	126.00000	0.000000	
25%	48.000000	0.000000	0.000000	120.000000	211.00000	0.000000	
50%	56.000000	1.000000	1.000000	130.000000	240.00000	0.000000	
75%	61.000000	1.000000	2.000000	140.000000	275.00000	0.000000	
max	77.000000	1.000000	3.000000	200.000000	564.00000	1.000000	

In [8]:
```
plt.figure(figsize=(5,5))
sns.countplot(x='target', data=df)
plt.title("Heart Disease Distribution")
plt.show()
```



In [9]:
```
plt.figure(figsize=(12,12))
sns.heatmap(df.corr(), annot=True, cmap='coolwarm', fmt='.2f')
plt.title("Feature Correlation")
plt.show()
```



In [10]:
```
df = pd.get_dummies(df, columns=['cp'], drop_first=True)
```

In [11]:
```
scaler = StandardScaler()
scaled_features = scaler.fit_transform(df.drop('target', axis=1))

df_scaled = pd.DataFrame(scaled_features, columns=df.drop('target', axis=1).colu
df_scaled['target'] = df['target']
```

In [12]:
```
X = df_scaled.drop('target', axis=1)
y = df_scaled['target']

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

print(f"Training data shape: {X_train.shape}")
print(f"Test data shape: {X_test.shape}")
```

```
Training data shape: (820, 15)
Test data shape: (205, 15)
```

In [13]:
```
model = LogisticRegression()
model.fit(X_train, y_train)
```

Out[13]:

```
LogisticRegression
LogisticRegression()
```

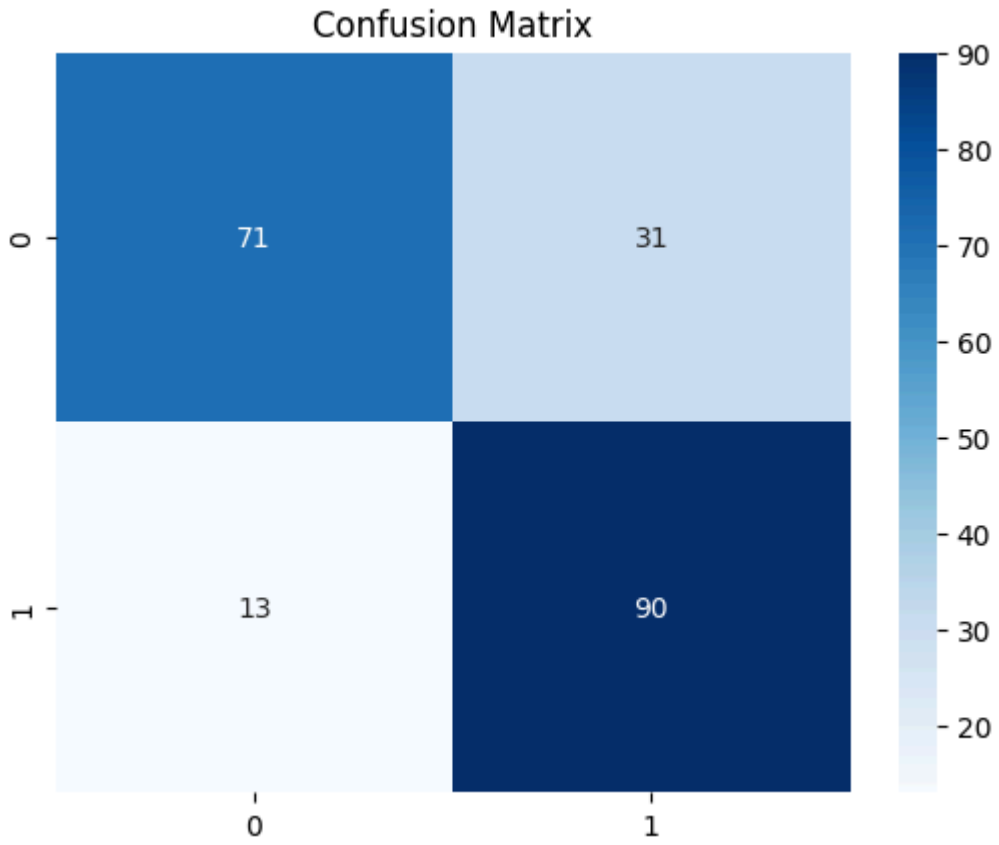
In [14]:

```
y_pred = model.predict(X_test)
print(f"Accuracy: {accuracy_score(y_test, y_pred)*100:.2f}%")
```

```
Accuracy: 78.54%
```

In [15]:

```
conf_matrix = confusion_matrix(y_test, y_pred)
sns.heatmap(conf_matrix, annot=True, fmt='d', cmap='Blues')
plt.title("Confusion Matrix")
plt.show()
```



In [ ]: