Q1)

```
import numpy as np
from sklearn.datasets import fetch_california_housing
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.neural_network import MLPClassifier
from sklearn.metrics import accuracy_score

housing = fetch_california_housing()
X = housing.data
y = housing.target

print(X)
print(y)

average_price = np.mean(y)
y_binary = (y > average_price).astype(int)

X_train, X_test, y_train, y_test = train_test_split(X, y_binary, test_size=0.3)

scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

mlp = MLPClassifier(hidden_layer_sizes=(35,5),activation='tanh', max_iter=500)
```

```
mlp.fit(X_train, y_train)

y_pred = mlp.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)
print(f"Test Accuracy:",accuracy)
```

Q2)

```
import pandas as pd
from sklearn.preprocessing import StandardScaler
from sklearn.cluster import AgglomerativeClustering
import matplotlib.pyplot as plt
import seaborn as sns

data=pd.read_csv("Wholesalecustomersdata.csv")

data = data.drop(columns=['Channel', 'Region'], errors='ignore')
scaler= StandardScaler()
data_scaled = scaler.fit_transform(data)
print(data_scaled)

agg_clustering = AgglomerativeClustering(n_clusters=5)
data['Cluster'] = agg_clustering.fit_predict(data_scaled)
```

```
plt.figure(figsize=(14, 10), dpi=100)
sns.pairplot(data, hue='Cluster', palette='Set2', markers=["o", "s", "D", "^"])
plt.suptitle('Pairwise Clustering of Wholesale Customers')
plt.tight_layout()
plt.show()

cluster_sum = data.groupby('Cluster').mean()
print("Cluster Summary (mean spending per category):")
print(cluster_sum)
```