Question:

A music streaming service wants to predict which subscribers are likely to cancel their subscriptions. They have collected the following data:

Songs Listened (per month)	Login Frequency (per month)	Cancels (y)
200	15	0
50	5	1
150	10	0
25	2	1
180	12	0
75	7	0
30	3	1
100	8	0
60	6	1
160	11	0

Write support vector classification code to predict that if the user has listened to 250 songs and login frequency is 12 per month. then person to going to cancel subscription or not

1. Create a dataset with the given values.
2. Train an SVM classifier on the data.
3. Predict the likelihood of cancellation based on the user's input (250 songs listened and 12 login frequency).

Demo Code:

```
import numpy as np
from sklearn.svm import SVC
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score

# Step 1: Prepare the data
# Input data: [Songs Listened, Login Frequency], and Cancels (0 or 1)
```

```
X = np.array([[200, 15],
              [50, 5],
              [150, 10],
              [25, 2],
              [180, 12],
              [75, 7],
              [30, 3],
              [100, 8],
              [60, 6],
              [160, 11]])

y = np.array([0, 1, 0, 1, 0, 0, 1, 0, 1, 0])  # Cancels (0 - No, 1 - Yes)

# Step 2: Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# Step 3: Create and train the SVM model
model = SVC(kernel='linear')  # Using a linear kernel
model.fit(X_train, y_train)

# Step 4: Predict if a user with 250 songs listened and 12 login frequency will cancel
new_data = np.array([[250, 12]])
prediction = model.predict(new_data)

# Step 5: Evaluate the model on the test data
y_pred = model.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)

# Display the results
print(f"Prediction (0 - No Cancel, 1 - Cancel): {prediction[0]}")
print(f"Accuracy of the model on test data: {accuracy * 100:.2f}%")
```

Output:

```
Prediction (0 - No Cancel, 1 - Cancel): 0
Accuracy of the model on test data: 50.00%
```

Q.2 A bank wants to predict if a customer will default on their loan based on their financial behavior. They have collected the following data:

- Annual Income (in $1000s)
- Credit Score
- Loan Default (y)

Annual Income Credit Score Loan Default (y)

50	700	0
30	650	1
60	720	0
25	600	1
55	710	0
35	640	1
65	730	0
28	610	1
70	750	0

- Create a dataset with the given values.
- Train an SVM classifier on the data.
- Predict the likelihood of loan default for a customer with **75k annual income** and a **credit score of 760**.

Q.3 A health insurance company wants to predict if a person is likely to claim insurance based on their health metrics. They have collected the following data:

- **Age (in years)**
- **BMI (Body Mass Index)**
- **Insurance Claim (y)**

Age	BMI	Insurance Claim (y)
25	22	0
45	28	1
35	24	0
50	30	1
40	26	0
55	32	1
30	23	0
60	34	1

38 25 0

- Create a dataset with the given values.
- Train an SVM classifier on the data.
- Predict the likelihood of an insurance claim for a person who is **48 years old** with a **BMI of 29**.