✓ 1s

```
[35] learning_rates = [0.01, 0.05, 0.1]
     accuracy = []

     for i, lr in enumerate(learning_rates):
         print(f'Model {i+1}: Learning Rate = {lr}')
         print('-'*100)
         model = LogisticRegressionModel(X_train.shape[1])
         optimizer = torch.optim.SGD(model.parameters(), lr=lr)
         train_model(model, criterion, optimizer, X_train, y_train, epochs=1000)
         _, _, _, acc_test = evaluate_model(model, X_train, y_train, X_test, y_test)
         accuracy.append(acc_test)
         print('-'*100)
         print('-'*100)

     print(f'The best learning rate is {learning_rates[np.argmax(accuracy)]} with \
     an accuracy of {max(accuracy):.4f}')
```

```
Model 1: Learning Rate = 0.01
--------------------------------------------------------------------------------
Epoch [100/1000]: Loss = 0.7201
Epoch [200/1000]: Loss = 0.7088
Epoch [300/1000]: Loss = 0.7016
Epoch [400/1000]: Loss = 0.6972
Epoch [500/1000]: Loss = 0.6945
Epoch [600/1000]: Loss = 0.6928
Epoch [700/1000]: Loss = 0.6918
Epoch [800/1000]: Loss = 0.6912
Epoch [900/1000]: Loss = 0.6909
Epoch [1000/1000]: Loss = 0.6907
Training Accuracy: 0.5225
Test Accuracy: 0.5550
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
Model 2: Learning Rate = 0.05
--------------------------------------------------------------------------------
Epoch [100/1000]: Loss = 0.6966
Epoch [200/1000]: Loss = 0.6909
Epoch [300/1000]: Loss = 0.6904
Epoch [400/1000]: Loss = 0.6903
Epoch [500/1000]: Loss = 0.6903
Epoch [600/1000]: Loss = 0.6903
Epoch [700/1000]: Loss = 0.6903
Epoch [800/1000]: Loss = 0.6903
Epoch [900/1000]: Loss = 0.6903
Epoch [1000/1000]: Loss = 0.6903
Training Accuracy: 0.5225
Test Accuracy: 0.5350
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
Model 3: Learning Rate = 0.1
--------------------------------------------------------------------------------
Epoch [100/1000]: Loss = 0.6908
Epoch [200/1000]: Loss = 0.6903
Epoch [300/1000]: Loss = 0.6903
Epoch [400/1000]: Loss = 0.6903
Epoch [500/1000]: Loss = 0.6903
Epoch [600/1000]: Loss = 0.6903
Epoch [700/1000]: Loss = 0.6903
Epoch [800/1000]: Loss = 0.6903
Epoch [900/1000]: Loss = 0.6903
Epoch [1000/1000]: Loss = 0.6903
Training Accuracy: 0.5225
Test Accuracy: 0.5350
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
The best learning rate is 0.01 with an accuracy of 0.5550
```