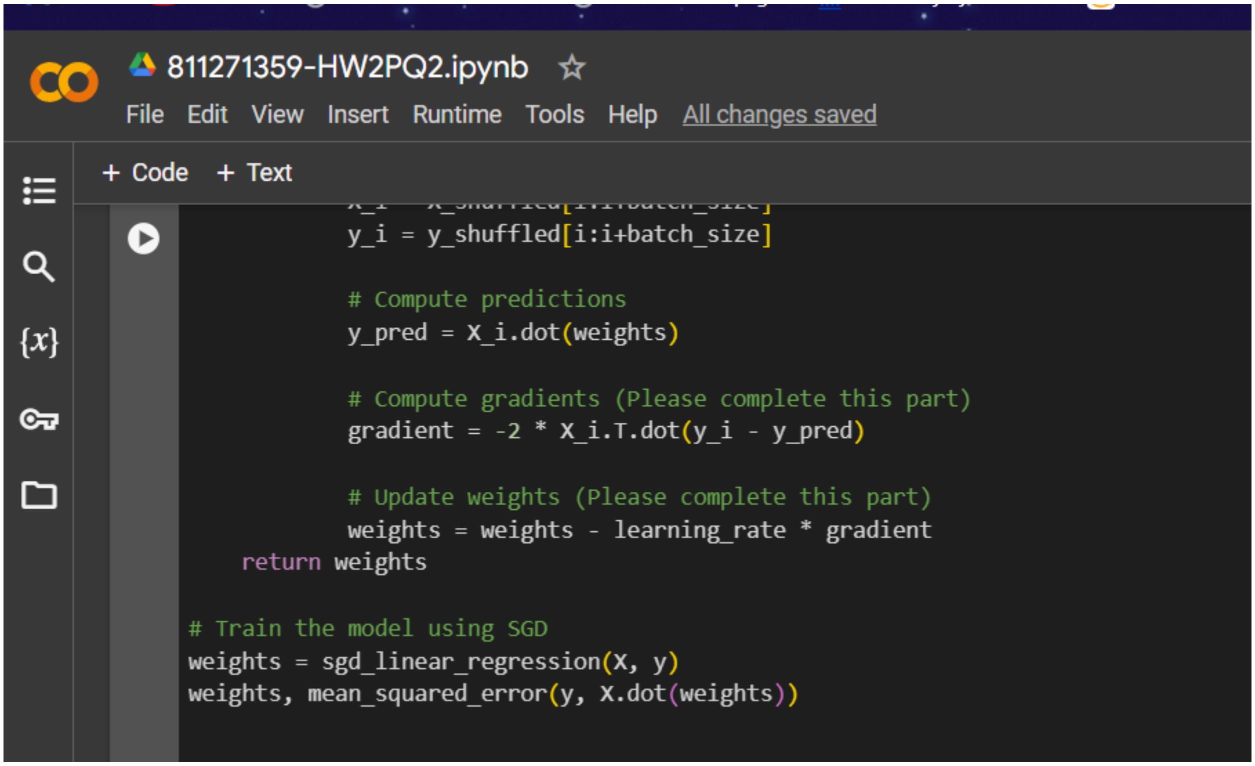
Name : Abhishek Milind Patwardhan

ID : 811271359

Data Science - II

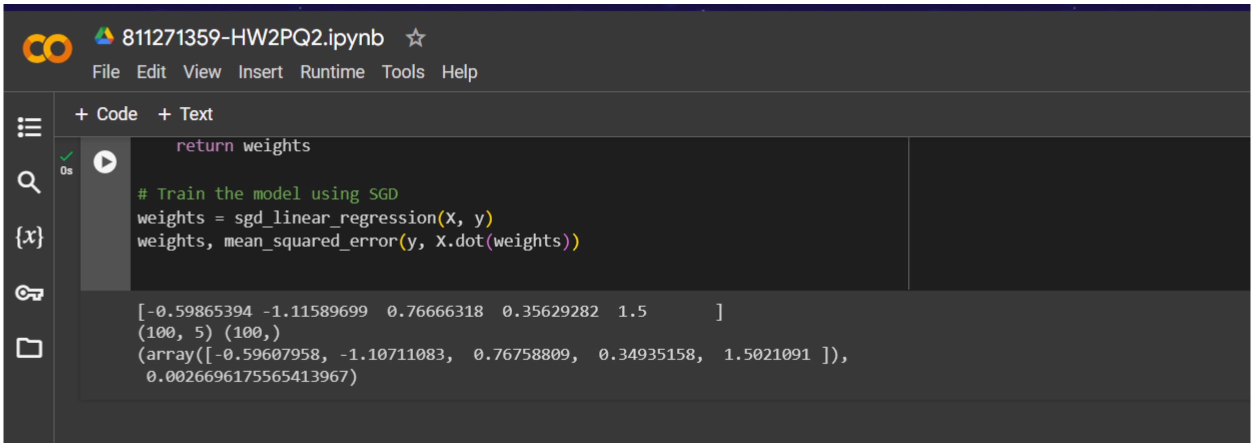
Homework - 2

Changes in Lines of Code of Q1-2) Linear regression.py File



```
            X_i = X_shuffled[i:i+batch_size]
            y_i = y_shuffled[i:i+batch_size]

            # Compute predictions
            y_pred = X_i.dot(weights)

            # Compute gradients (Please complete this part)
            gradient = -2 * X_i.T.dot(y_i - y_pred)

            # Update weights (Please complete this part)
            weights = weights - learning_rate * gradient
    return weights

# Train the model using SGD
weights = sgd_linear_regression(X, y)
weights, mean_squared_error(y, X.dot(weights))
```

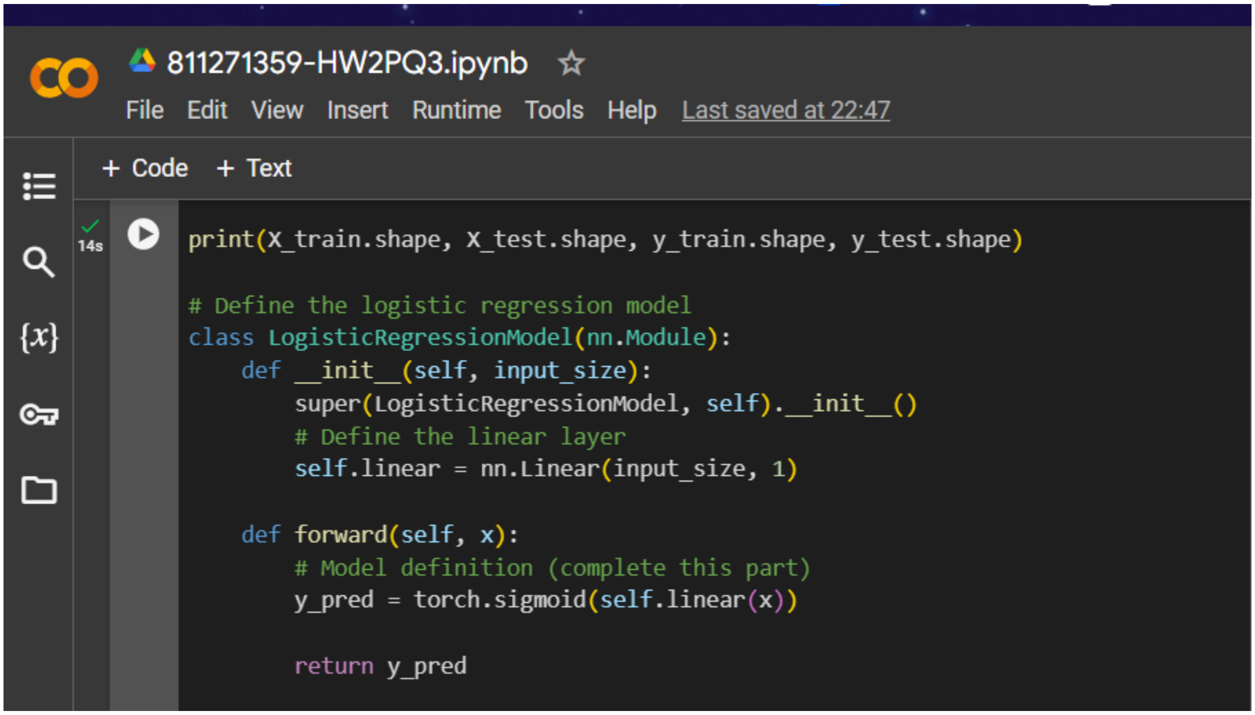
Output :



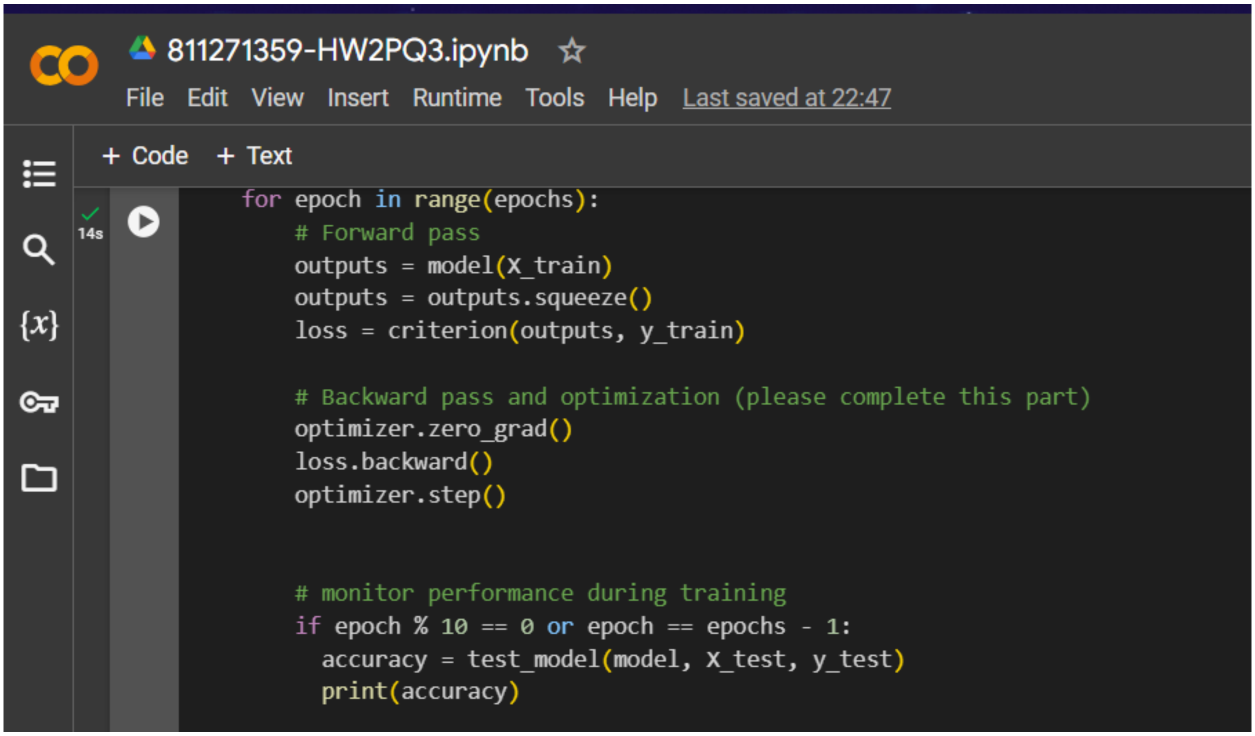
```
    return weights

# Train the model using SGD
weights = sgd_linear_regression(X, y)
weights, mean_squared_error(y, X.dot(weights))
```

```
[-0.59865394 -1.11589699  0.76666318  0.35629282  1.5       ]
(100, 5) (100,)
(array([-0.59607958, -1.10711083,  0.76758809,  0.34935158,  1.5021091 ]),
 0.0026696175565413967)
```

Changes in Lines of Code of Q1-3) Logistic Regression.py File

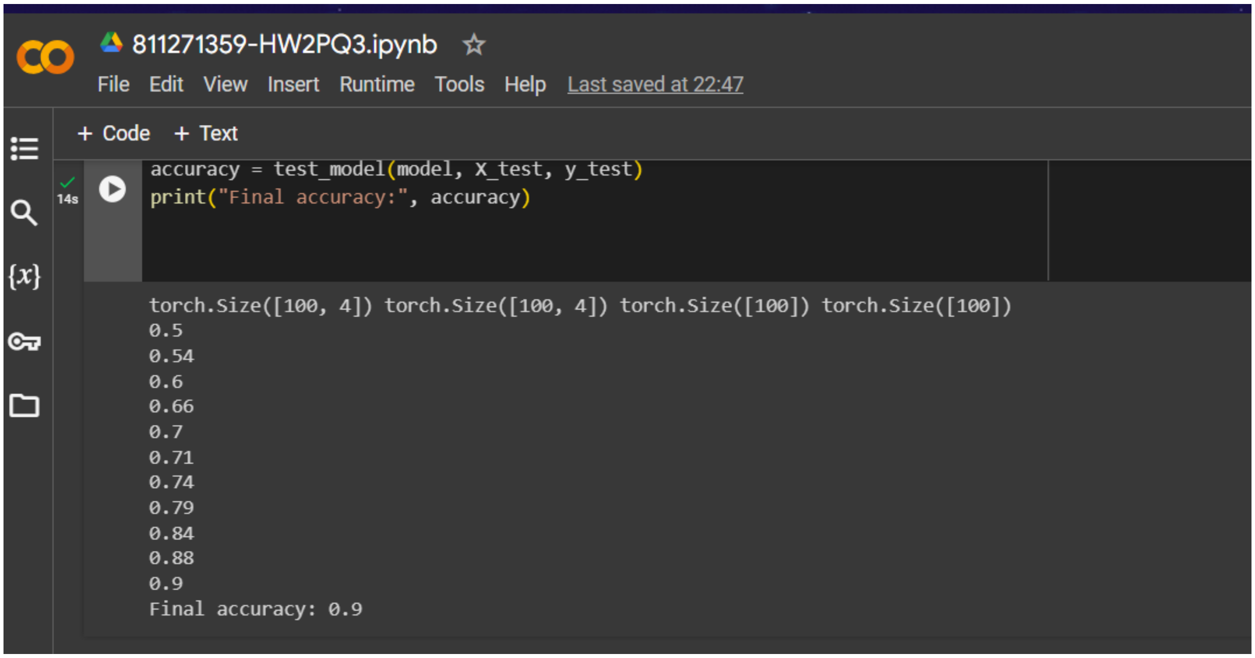


```
print(X_train.shape, X_test.shape, y_train.shape, y_test.shape)

# Define the logistic regression model
class LogisticRegressionModel(nn.Module):
    def __init__(self, input_size):
        super(LogisticRegressionModel, self).__init__()
        # Define the linear layer
        self.linear = nn.Linear(input_size, 1)

    def forward(self, x):
        # Model definition (complete this part)
        y_pred = torch.sigmoid(self.linear(x))

        return y_pred
```



```
    for epoch in range(epochs):
        # Forward pass
        outputs = model(X_train)
        outputs = outputs.squeeze()
        loss = criterion(outputs, y_train)

        # Backward pass and optimization (please complete this part)
        optimizer.zero_grad()
        loss.backward()
        optimizer.step()


        # monitor performance during training
        if epoch % 10 == 0 or epoch == epochs - 1:
          accuracy = test_model(model, X_test, y_test)
          print(accuracy)
```

Output :


811271359-HW2PQ3.ipynb
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+ Code + Text
14s

```
accuracy = test_model(model, x_test, y_test)
print("Final accuracy:", accuracy)
```

```
torch.Size([100, 4]) torch.Size([100, 4]) torch.Size([100]) torch.Size([100])
0.5
0.54
0.6
0.66
0.7
0.71
0.74
0.79
0.84
0.88
0.9
Final accuracy: 0.9
```