

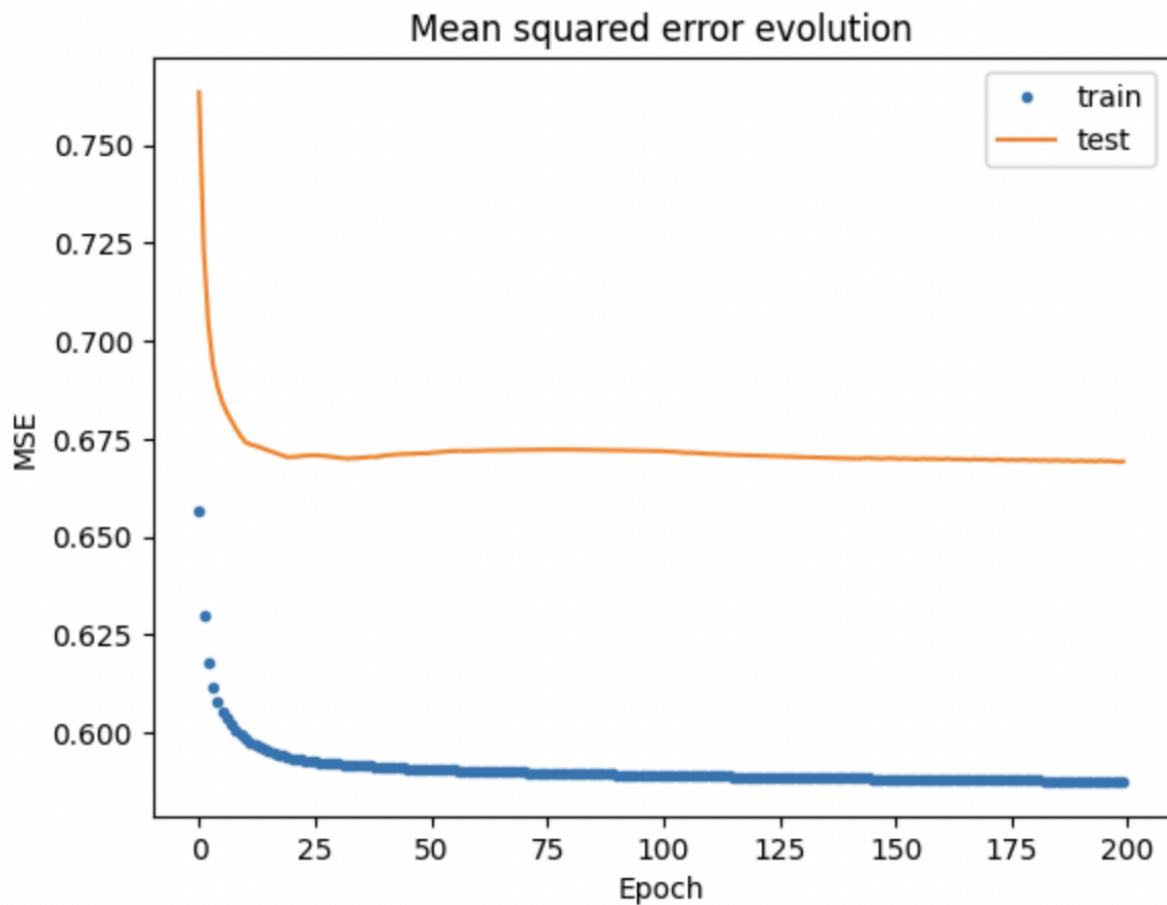
Group 12 Lab 1c:

Task 1:

Code for forward method:

```
def forward(self, x0):  
    # Compute output of first layer  
    x1 = relu(torch.matmul(x0, self.A1))  
    # Compute output of second layer  
    x2 = relu(torch.matmul(x1, self.A2))  
    return x2
```

Task 2:

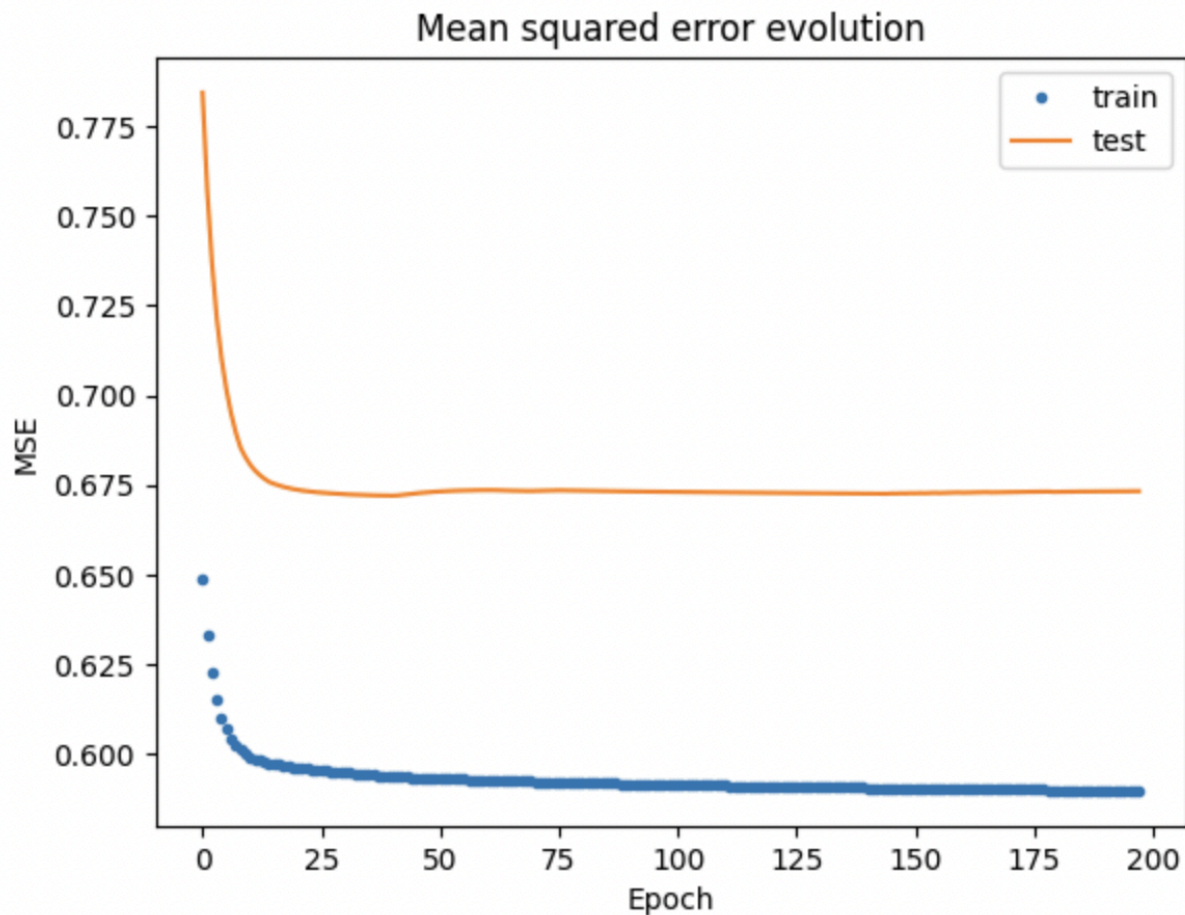


Train loss: 0.5876004933545627

Test loss: 0.669245626655795

Discussion of differences: The significant values of the testing and training errors indicates that the model does not perfectly predict the outcome. However, the similarity in the risks we calculated means that the model does not purely memorize the training data but develops a process to generate predictions based on the data. The difference between the two signifies that the model does not perfectly predict the Penn GPAs based on input data. The test loss is also greater than the training loss, as there are differences between the two batches, and the algorithm is developed with the training data.

Task 4:



Train loss: 0.7765933338260693

Test loss: 0.8100185665419221

Male Test loss: 0.4651316008964805

Female Test loss: 1.1038111669065576

Average Male GPA: 3.772876790337897

Average Female GPA: 3.7192166666666666

Discussion: When the data is separated by the gender parameter, the model now is biased on predicting Penn GPA for male and female students. The testing error for female students is much higher than the testing error for male students. We also found that the average female GPA in the predicted data is lower than that of male students. The significant difference between the testing errors shows that it can be perilous to introduce gender information into the model.