FC Q&A:

**\*\*QUESTION 1\*\***: What are the problems with sigmoid?

**\*\*ANSWER\*\***:

\* In a large area, the function has zero derivatives, which means that there are many cases where we don't have gradients that we can improve

\* The output range isn't centered around zero.

**\*\*QUESTION 2.1\*\***: What are the accuracy and loss values?

Explain the loss and accuracy graphs.

**\*\*ANSWER\*\***:

Test Accuracy : 0.1829

Test Loss : 6.892094945907592

On the graph we can see that as we make more epochs the model is getting better and the accuracy is increasing while the loss is decreasing.

Despite the improvements, accuracy is still low, and the loss is still high, which suggests that the hidden layer dim is too small, which weakens the model.

**\*\*QUESTION 2.2\*\***: What are the accuracy and loss values?

Explain the loss and accuracy graphs.

**\*\*ANSWER\*\***:

Test Accuracy : 0.2785

Test Loss : 6.8530741214752195

The graphs are similar to the previous graphs, but one can see that after increasing the hidden layer dimension, the accuracy has improved, and the loss has decreased, although it's still not good enough, we can also see that the improvement between epochs is very small, which implies that the learning rate is too low, and the hidden layer dimension is still too small.

**\*\*QUESTION 2.3\*\***: What are the accuracy and loss values?

Explain the loss and accuracy graphs.

**\*\*ANSWER\*\***:

Test Accuracy : 0.2509

Test Loss : 6.870093584060669

As we saw in the previous train, the model is improving between every epoch, but the improvement is too slow, probably because the learning rate is too low.

**\*\*QUESTION 2.4\*\***: What are the accuracy and loss values?

Explain the loss and accuracy graphs.

**\*\*ANSWER\*\***:

Test Accuracy : 0.3556

Test Loss : 6.849764823913574

We can see from those graphs that train and test sets get almost the same results. That means that the model isn't learning only the test samples (overfitting), but that it exceeds to get the same accuracy for both graphs as well.

As for the LR, its low value affects the model as we described above.

**\*\*QUESTION 3.1\*\***: What are the accuracy and loss values?

Explain the loss and accuracy graphs.

**\*\*ANSWER\*\***:

Test Accuracy : 0.0982

Test Loss : 6.910411262512207

We can se that between the epochs the accuaracy and loss rate is barely change, the LR is too low.

**\*\*QUESTION 3.2\*\***: What are the accuracy and loss values?

Explain the loss and accuracy graphs.

**\*\*ANSWER\*\***:

Test Accuracy : 0.9355999999999998

Test Loss : 4.850043487548828

Based on the learning rate and hidden layer dimension, we can see that both the accuracy and the loss are improving significantly between epochs, for both train and validation sets.

As we said before because of the low learning rate, we didn't improve between epochs. Now we can see the effect of higher learning rate.

**\*\*QUESTION 3.3\*\***: What are the accuracy and loss values?

Explain the loss and accuracy graphs.

**\*\*ANSWER\*\***:

Test Accuracy : 0.7202999999999999

Test Loss : 6.5369964122772215

the accuracy and loss got worst from last attempt, the only thing we changed is to decrease the LR.

Again, the improvements between epochs are too slow - the LR is too small.

**\*\*QUESTION 4:\*\*** : Suggest a way to improve the results by changing the networks's architecture

**\*\*ANSWER\*\***:

It is possible to create more hidden layers.

The more hidden layers we add to the model, the deeper the model can learn, meaning it will learn more distinctive and unique features through each hidden layer.

**\*\*QUESTION 5:\*\*** Where are the bright regions? why?

**\*\*ANSWER:\*\***

the brightest region can be found in the middle.

The reason is that the most of the features can be found in the center area of any photo of digit.