Exercise: Revisit the Fashion Item Classification

Let's redo the fashion item classification. Last week, you used the MLP network. As mentioned in Topic 1, MLP is not able to preserve its spatial structure, therefore, it is not a good choice for image classification. Now, in this exercise, you will build a CNN network to re-solve the problem.

Your task:

Based on the code from last week, make a few changes to apply a CNN to the fashion-MNIST.

1. Create a simple architecture as follows:
   a. Conv-1 layer: 32 filters with size 3 x 3, a stride of 1, and ReLU activation function. Each output feature map must be the same size as the input image size (28 x 28).
   b. Maxpooling-1 layer: filter size 2 x 2, a stride of 2.
   c. Conv-2 layer: 64 filters with size 3 x 3, a stride of 1, no padding and ReLU activation function.
   d. Dense layer: 64 neurons with ReLU activation function.
   e. The output layer.
2. Use the model.summary() to check each layer's shape and number of parameters. Which layer has the largest number of parameters?
3. Draw the learning curve. And compare the test accuracy with that using MLP.
4. Since both the dataset and the model is small, you can run the Jupyter Notebook file directly on your own computer (like what you did last week). But if you want to use Google Colab's GPU, it is easy to do so by simply adding the setting-up process.