Here are the procedures to implement the code in main.py:

1. After you define the dataset by covid\_dataset, you need to give sub-folders of train, validation and test, you also need to give title of each disease catalog of each folder, the number of images in each catalog is flexible.
2. Using the ImageDataGenerator and flow\_from\_directory functions to define the train dataset, validation dataset and test dataset, you can change the parameters in these functions to adjust the dataset imbalance issue.
3. In the code, you could choose Inception v3, Inception v3 + ResNet, VGG-19 model or transfer learning + fine tuning on Inception v3.
4. For transfer learning, usually, you can get rid of the default fully connected layer of each model at the beginning, adding your own fully connected layer, like Dense function.
5. You do not need to train every weight in the neural network, you can choose which layers you want to train.
6. In the code, we used Adam optimizer with a default learning rate of 0.0001, the loss function is categoricalcrossentropy, which is matching with the Softmax activation function.
7. The code can automatically print out the train and validation accuracy, loss, for the test dataset, it can also output the confusion matrix, and classification report, the code running log will also be created eventually.