Assignment 5

This assignment may be completed individually or in groups of 2 or 3.
You are recommended to use your project groups. If you are in a group, **one student** will submit all necessary files and the **other student(s) will submit a text file** specifying members of the group and who is submitting. The report must have **all students' names and IDs**.

In this assignment, you will develop a TensorFlow program for a convolutional neural network. **Check cuLearn for the associated TensorFlow tutorial and accompanying Python Notebook.**

Description

You may use any and all functionalities found in `scikit-learn` and `tensorflow`.
You are NOT required to perform K-fold analysis in this assignment. A single training set and associated testing set may be used.

Question 1

[40 marks]

Using the provided implementation of a convolutional neural network, modify it to classify the CIFAR-10, 10 class image data. This includes:

1. Modification of the dataset loaded.
2. Changing the number of convolutional layers and sizes of max pooling layers. You must investigate 5 different model scenarios. Plot the network structures for each model using `plot_model` from `tensorflow.keras.utils`, and describe each network briefly.
3. Provide a chart of the accuracy of your network for 1-15 epochs for the scenarios investigated.
4. Provide the capability to show the top 9 patches (regions that best activate neurons), see slides 57-59 in CNN lecture (Lecture 16).