2. Fine-Grained Classification [30%]:

The fine-Grained Image Classification tasks distinguish subtle differences between classes. In both academia and industry, it is highly important to get the best possible performance out of any model. The objective here is to train a network that can accurately classify models of airplanes.

The dataset you will be using for this task is from:
https://www.kaggle.com/datasets/seryouxblaster764/fgvc-aircraft/code
You must download the dataset from Canvas:
https://ncl.instructure.com/courses/49739/files/7871440?module_item_id=3133487

The dataset comes with a training set, a validation set and a test set. You are only allowed to train your model using the training set. Having a validation set is helpful to optimise your model hyper-parameters. The test set is only used to generate the final accuracy values.
You should not use the test set for training under any circumstances.

You can use any model architecture you want. You may use any of the seminal classification architectures or you can design your own network. It is recommended that you use transfer learning (by using weights pre-trained on ImageNet). You can try to freeze some layers of your network during fine-tuning or you can finetune the entire model.

You should find the best hyper-parameters you can, so you get the best results possible (this is what the validation set is for).

At the end, after model training is complete, you should assess the performance of your classifier using the test set and report **Accuracy**, **Precision** and **Recall**. You should also create a **Confusion Matrix**.

Getting a decent level of accuracy should be relatively easy as the data distributions to which the training set and the test set belong are aligned. However, you are encouraged to try to get the best performance out of the model as all submissions are ranked based on model performance and 5 marks are given based on the rank of the submission.

Additionally, another 10 marks is dedicated to reaching certain levels of accuracy. Any submission which achieves an accuracy value above 90% on the test set will receive the full 10 marks. Submissions that produce accuracy levels between 85 to 90%, will get a mark of 8 out of 10. Any submission with accuracy results between 80 to 85% will receive 6 marks. Any submission with results from 75 to 80% accuracy will get 4 marks. All submissions with accuracy values from 70% to 75% will receive 2 mark and all submission below 70% accuracy will receive zero out of the 10 marks dedicated to this.