**Labsheet 04 Answers**

7. In the below given cell, shape of the boxes.eval() is (1783,4). Why are there 1783 boxes? Explain the reason for it. What is the maximum number and minimum number you can get for that? Write these answers in a word file.

* The boxes.eval() array has a shape of (1783, 4), which means there are 1,783 bounding boxes that passed the confidence threshold after the yolo\_filter\_boxes function was applied in the YOLO object detection model. Initially, the model predicts 1,805 bounding boxes (based on a 19x19 grid, with each grid cell predicting 5 bounding boxes). However, only 1,783 of these bounding boxes had confidence scores above the threshold, which is why these are the remaining boxes. The maximum possible number of boxes you can get is 1,805 if all predictions meet the confidence threshold, while the minimum possible number is 0 if none of the predictions do.

8.yolo\_anchors.txt contains 10 values. They can be considered as height and width of 5 anchor boxes. What is the advantage of using such anchor boxes? What was the method used to determine the sizes of these anchor boxes?

* The yolo\_anchors.txt file contains 10 values, which represent the height and width of 5 anchor boxes. Using anchor boxes in object detection algorithms like YOLO provides several advantages. Anchor boxes help in detecting objects of different sizes and aspect ratios, speed up training convergence, and improve the model’s ability to detect small or elongated objects. They simplify the computation and increase recall by providing predefined dimensions that act as initial estimates for object localization. This approach enhances the model’s performance in handling dense object placements and diverse image content. The sizes of these anchor boxes are typically determined using methods like K-means clustering, which clusters the dimensions of bounding boxes in the training dataset to find the optimal anchor sizes.