## DL Lab 4 Answer

**Question 7**

Why 1783 boxes?

The model divides the image into a grid of 19x19 cells.

In each cell, the model predicts 5 boxes, so initially, you have a total of

19×19×5=1805 boxes.

The model filters out boxes that have low confidence scores or don't meet certain criteria. After filtering, 1783 boxes remain.

Maximum and Minimum values

Max – 1805 with no boxes filtered out

Min – 0 with all boxes filtered out (since they don’t meet the required criteria)

**Question 8**

Anchor boxes are like a starting template with a predefined size used by the model to help find objects in images.

Advantages of anchor boxes

* Works for Different Shapes and Sizes as objects in images can be different shapes and sizes. Anchor boxes make it easy for the model to predict boxes that fit these different objects well.
* Makes the model can make more accurate with predictions with less guesswork.
* Detects Objects of Various Sizes because objects are small, and some are big. Using anchor boxes of different sizes helps the model spot both small and large objects in the same image.

**Question 10**

Selected image 1 – 0104.jpg

A street with a green light

Description automatically generated

A street sign on a street

Description automatically generated

Correctly detected – The truck, 1 traffic light

Incorrectly detected – None

Undetected – 2 more traffic lights, the car further away, road sign

Bounding boxes – seem to fit the images properly in the output image

Selected image 2 – 0116.jpg

A crosswalk with red lights

Description automatically generated

A crosswalk on a street

Description automatically generated

Correctly detected – A car, 1 traffic light

Incorrectly detected – None

Undetected – 6 more traffic lights, the car further away, the bus further away, road sign

Bounding boxes – the detected traffic light bounding box is a little out of place, the car bounding box fits properly (for the visible part of the car)

**Question 11**

1. Changing max\_boxes parameter

When max\_bozes value was increased from 10 to 50 it led to a higher number of objects being captured with boxes.

On the other hand, the reduction of the value, led to lesser objects being captured.

1. Changing score\_threshold parameter

When this parameter is reduced it lets the model detect more objects, but some new objects were not actually what was predicted by the model. So, it also led to an increase in false positives.

On the other hand, when increased, lesser objects are detected but accuracy is better.

1. Changing IoU threshold parameter

Lowering the IoU Threshold we can observe fewer redundant boxes in the output images, but some closely located objects are missing.

Increasing the IoU Threshold we can see more detected objects, but sometimes too much overlapping.