Assignment 1

Question 4

**1. What patterns do you observe in the *training and validation accuracy curves*?**  
When training a model, usually see the **training accuracy** improving consistently — which makes sense because the model is learning from the data it sees repeatedly. The **validation accuracy**, on the other hand, may improve at first but could eventually level off or even start to drop. If the training accuracy keeps getting better while the validation accuracy stalls or worsens, that’s a clear sign of **overfitting** — the model is learning too much from the training data and struggling to generalize to new, unseen data.

**2. How can you use *TensorBoard to detect overfitting*?**  
TensorBoard gives a great visual way to spot overfitting. By plotting **training vs. validation loss and accuracy**, we can clearly see how our model is performing over time. If the **training loss keeps going down** while the **validation loss starts going up**, or if the **training accuracy improves** but **validation accuracy drops**, our model is likely overfitting. These visual cues make it easier to decide when to stop training or when to tune our model further.

**3. What happens when you increase the number of epochs?**  
Training for more epochs usually helps model learn better — up to a point. At first, both training and validation accuracy might improve. But if we keep training too long, the model might **memorize the training data** instead of learning patterns, which leads to **overfitting**.  
That means training accuracy keeps going up, but validation accuracy starts to suffer.  
It’s important to find a good balance — sometimes using **early stopping** can help stop training right before overfitting kicks in.