Title: Comparative Study and Implementation of AlexNet and VGG Architectures on CIFAR-10 Dataset

Describe the design and components of:
AlexNet, VGG-16 and/or VGG-19. **Discuss** for each:
a) Convolutional layers (size, number, stride)
b) Activation functions
c) Pooling strategy
d) Fully connected layers

Compare AlexNet and VGG based on Model depth and parameter count, feature extraction strategies, filter design philosophy, regularization and generalization techniques.

Analyze the receptive field growth in both networks.

Implement AlexNet and VGG (simplified if needed) using PyTorch or TensorFlow. Train both models on the CIFAR-10 dataset. Submit non-working versions or failed attempts with short notes on what went wrong.

Visualize feature maps or filters learned by early layers.

Compare:
Training and validation accuracy/loss curves
Overfitting behavior
Time per epoch
Final test accuracy
Which model performs better on CIFAR-10 and why?
Modify VGG to include Batch Normalization and compare its performance to the original version.

Try reducing VGG's depth (e.g., VGG-8) and compare performance.

Submission Guidelines:

The report and code must be zipped and submitted via Google Classroom no later than **April 24, 2025 at 11:59 PM**.
Individual discussions will take place during lab sessions after submission, and **grades will be primarily based on your understanding during the discussion**, rather than the submitted documentation.
You are required to **include all your implementation attempts**, including any failed or incomplete versions, along with your final working code.
You are encouraged to discuss your ideas with the lab instructors before submission and may seek their guidance if needed.