Various Neural Network Architect Assignment

1. Describe the basic structure of a Feedforward Neural Network (FNN). What is the purpose of the activation function?
A Feedforward Neural Network consists of an input layer, hidden layers, and an output layer. The activation function introduces non-linearity, enabling the network to learn complex patterns.

2. Explain the role of convolutional layers in a CNN. Why are pooling layers commonly used, and what do they achieve?
Convolutional layers detect spatial features in data. Pooling layers reduce the dimensionality, making the model more efficient by retaining essential features and reducing computation.

3. What is the key characteristic that differentiates Recurrent Neural Networks (RNNs) from other neural networks? How does an RNN handle sequential data?
RNNs have loops that allow information to persist, enabling them to process sequential data by maintaining hidden states that capture dependencies over time.

4. Discuss the components of a Long Short-Term Memory (LSTM) network. How does it address the vanishing gradient problem?
LSTMs have gates (input, forget, output) that control the flow of information. They mitigate the vanishing gradient problem by allowing gradients to be preserved across time steps.

5. Describe the roles of the generator and discriminator in a Generative Adversarial Network (GAN). What is the training objective for each?
The generator creates fake data, and the discriminator differentiates between real and fake data. The generator aims to fool the discriminator, while the discriminator seeks to accurately classify data.