Gen-ai Assignment-2

1. **What is the difference between RNN and LSTM?**

= A Recurrent Neural Network (RNN) processes sequential data by maintaining a hidden state that is updated at each time step. However, standard RNNs struggle to capture long-range dependencies due to the vanishing gradient problem. Long Short-Term Memory (LSTM) networks are a type of RNN that include special gates (input, forget, and output) and a memory cell, which allow them to retain information over longer sequences more effectively.

**2. What is the vanishing gradient problem, and how does LSTM solve it?**  
= The vanishing gradient problem occurs during backpropagation when gradients shrink as they pass through each time step, making it difficult for RNNs to learn long-term dependencies. LSTMs solve this by using a memory cell that preserves gradients and three gating mechanisms to regulate the flow of information, allowing gradients to propagate without vanishing over many time steps.