Resources

- [Deep Learning for Sequence Tasks - Google Drive](#)

Part 1:

1. **Understanding RNN**
   - **Question:** What are Recurrent Neural Networks, and how do they differ from traditional feedforward neural networks?
   - **Task:** Explain the working of RNN, and how information is passed through the network over time.
2. **Stacking RNN Layers and Bi-directional Architecture**
   - **Question:** Discuss the advantages and potential drawbacks of stacking RNN layers. What are Bi-directional RNNs, and how do they enhance the performance of sequence models?
   - **Task:** Explains when and why you would use stacked RNN layers and bi-directional RNNs in a sequence modeling task.
3. **Hybrid Architecture**
   - **Question:** What is a hybrid architecture in the context of sequence modeling? Provide examples of how combining RNNs with other deep learning models can enhance performance.
4. **Types of RNN:**
   - **Question:** List down types of RNN model and explain their structures and differences with RNN.

Part 2:

1. **Implementing a Basic RNN Model**
   - **Task:** Using a dataset of your choice (e.g., text, time-series data), implement a basic RNN model. Train the model to perform a sequence task such as text generation, sentiment analysis, or time-series prediction.
   - **Deliverable:** Perform this experimentation in a notebook and provide a detailed explanation or comments.
2. **Stacking RNN Layers and Bi-directional RNNs**
   - **Task:** Modify your basic RNN model by stacking multiple RNN layers and also converting it into a bi-directional RNN. Analyze the performance improvement (if any) compared to the basic RNN model. (Note: Separate Implementation of Stacked RNN & Bi-Directional RNN)
   - **Deliverable:** Perform this experimentation in a notebook and provide a detailed explanation or comments.
3. **Exploring Hybrid Architectures**
   - **Task:** Implement a hybrid architecture by combining your RNN model with another model (e.g., CNN, Attention mechanism). Train this hybrid model on the same dataset and compare its performance with the previous models.

- **Deliverable:** Submit the Python code in a notebook for the hybrid model along with a report discussing the results, challenges faced, and the benefits (or drawbacks) of using a hybrid approach.