

## **Assignment: Designing a CRF Model from Scratch**

Design and implement a Conditional Random Field (CRF) model for Named Entity Recognition (NER) from scratch. Your task includes:

1. Derive the mathematical formulation of a linear-chain CRF.
2. Implement the CRF model using Python (e.g., NumPy and SciPy).
3. Train the model on a provided dataset.
4. Evaluate the model's performance using metrics such as precision, recall, and F1-score.