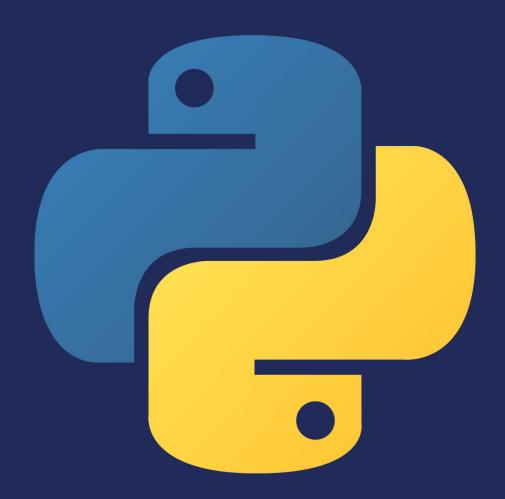# Generative AI for Machine Translation

Assignment Questions

Generative AI for Machine Translation Questions

1. What is Statistical Machine Translation (SMT)?
2. What are the main differences between SMT and Neural Machine Translation (NMT)?
3. Explain the concept of attention in Neural Machine Translation.
4. How do Generative Pre-trained Transformers (GPTs) contribute to machine translation?
5. What is poetry generation in generative AI?
6. How does music composition with generative AI work?
7. What role does reinforcement learning play in generative AI for NLP?
8. What are multimodal generative models?
9. Define Natural Language Understanding (NLU) in the context of generative AI.
10. What ethical considerations arise in generative AI for creative writing?
11. How can attention mechanisms improve NMT performance on longer sentences?
12. What are some challenges with bias in generative AI for machine translation?
13. Explain how reinforcement learning differs from supervised learning in generative AI.
14. What is the role of a decoder in NMT models?
15. How does fine-tuning a GPT model differ from pre-training it?
16. Describe one approach generative AI uses to avoid overfitting in creative content generation.
17. What makes GPT-based models effective for creative storytelling?
18. How does context preservation work in NMT models?
19. What is the main advantage of multimodal models in creative applications?
20. How does generative AI handle cultural nuances in translation?
21. Why is it difficult to fully remove bias in generative AI models?

Practical -

1. Implement a basic Statistical Machine Translation (SMT) model that uses word-by-word translation with a dictionary lookup approach.
2. Implement an Attention mechanism in a Neural Machine Translation (NMT) model using PyTorch.
3. Use a pre-trained GPT model to perform machine translation from English to French.
4. Generate a short poem using GPT-2 for a specific theme (e.g., "Nature").
5. Implement a basic reinforcement learning setup for text generation using PyTorch's reward function.
6. Create a simple multimodal generative model that generates an image caption given an image.
7. Demonstrate how to evaluate bias in generated content by analyzing GPT responses to prompts with potentially sensitive terms.
8. Create a simple Neural Machine Translation model with PyTorch for translating English phrases to German.