**Generative AI Assignment**

**Objective**

This assignment covers core areas in modern AI workflows including computer vision, natural language processing, and conversational AI with user interfaces.

**Step 0: GitHub Setup (Mandatory)**

1. **Create a GitHub Repository**
   * Name your repository: As you like
   * Initialize with a README and .gitignore (Python)

**Clone the Repository to Your Local Machine** git clone https://github.com/your-username/genai-assignment-[your-name].git

cd genai-assignment-[your-name]

1. **Work on Your Assignment in This Repository**

**Push Your Final Work to GitHub** After completing all parts of the assignment:  
  
 git add .

git commit -m "Completed Generative AI Assignment"

git push origin main

**Part 1: Image Classification using CIFAR-10 with VGG16**

**Task:**

* Load the CIFAR-10 dataset.
* Select **1000 samples for training** and **200 samples for testing**.
* Preprocess the data to make it compatible with **VGG16** (e.g., resizing to 224x224, normalization).
* Use **VGG16** from Keras applications (with or without fine-tuning).
* Train a model and evaluate its performance (e.g., accuracy).

**Deliverables:**

* Preprocessing script or notebook.
* Model training code.
* Evaluation output.

**Part 2: Sentiment Analysis using Transformers Pipeline**

**Task:**

* Use Hugging Face’s transformers library.
* Implement a **sentiment analysis pipeline** using pre-trained models (e.g., pipeline("sentiment-analysis")).
* Test on at least 20 custom text samples (positive, negative, neutral).
* Print and explain predictions.

**Deliverables:**

* Python script/notebook.

**Part 3: Streamlit Chatbot with Custom Chain**

**Task:**

* Build a **Streamlit chatbot app** using LangChain .
* Requirements:  
    
  + **Custom Memory**: Maintain conversation history.
  + **System Prompt**: Define a role or personality for the assistant.
  + Use an **LLM model** (OpenAI, Chat Together API, Hugging Face, etc.).
  + Functional **UI** with user input and chatbot response.

**Deliverables:**

* Streamlit app code.
* Setup instructions (requirements.txt).

**Submission Instructions:**

* Ensure all work is in your GitHub repository.
* Final structure should include:
  + Source code (in organized folders)
  + Notebooks or scripts for each part
  + README with setup instructions
  + requirements.txt
* Share the **link to your GitHub repo** for grading.