Assignment 2: ASR & Noise Reduction

Objective: Investigate how noise reduction improves Automatic Speech Recognition (ASR) accuracy by recording your own voice, cleaning the audio, and measuring the Word Error Rate (WER).

Part 1: Setup & Recording

1. **Install Libraries:**

   !pip install scipy noisereduce speechrecognition jiwer sounddevice

2. **Record Audio:** Record yourself saying the sentence below in two separate .wav files.
   - **Reference Sentence:** "The quick brown fox jumps over the lazy dog."
   - **Quiet Recording:** Save as my_clean_audio.wav.
   - **Noisy Recording:** Save as my_noisy_audio.wav.
3. **Upload Files:** Upload both audio files to your notebook environment.

Part 2: Implementation & Evaluation

Task 1: Noise Reduction

Write a Python script to load my_noisy_audio.wav, apply noise reduction using the noisereduce library, and save the output as my_cleaned_audio.wav.

Task 2: Transcription

Convert all three of your audio files (clean, noisy, and cleaned) to text. Print each transcription.

Task 3: Performance (WER)

Using the jiwer library, calculate the Word Error Rate (WER) for your **noisy** and **cleaned** transcriptions. Use the original reference sentence as the ground truth. Print the final WER percentages to compare them.