BACKEND(PYTHON)

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from flask import Flask, render_template, request
import speech_recognition as sr
import pyttsx3
import math

# Step 1: Create a Flask Web Application
app = Flask(__name__)

# Step 2: Function to make the program speak results
def speak(text):
    engine = pyttsx3.init()
    engine.say(text)
    engine.runAndWait()

# Step 3: Function to calculate mathematical expressions
def calculate_expression(expression):
    try:
        result = eval(expression, {"_builtins_": None}, vars(math))
        return result
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    except Exception:
        return "Error: Invalid mathematical expression"

# Step 4: Function to recognize speech input
def recognize_speech():
    recognizer = sr.Recognizer()
    with sr.Microphone() as source:
        recognizer.adjust_for_ambient_noise(source)
        try:
            print("Listening...")
            audio = recognizer.listen(source, timeout=5)
            expression = recognizer.recognize_google(audio)
            print(f"Recognized: {expression}")
            return expression.lower()
        except:
            return "Error: Unable to recognize voice."

# Step 5: Create the index() function to handle web requests
@app.route("/", methods=["GET", "POST"])
def index():
    result = ""
    expression = ""
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    if request.method == "POST":
        if "voice" in request.form:
            expression = recognize_speech()
        else:
            expression = request.form["expression"]

        if "Error" not in expression:
            result = calculate_expression(expression)
            speak(f"The result is {result}")
        else:
            result = expression

    return render_template("index.html", result=result,
expression=expression)

# Step 6: Run the Flask Web Application
if __name_ == "_main__":
    app.run(debug=True)
```