## INSTITUT D’ENSEIGNEMENT SUPÉRIEUR
## DE RUHENGERI

FACULTY OF APPLIED FUNDAMENTAL SCIENCES

DEPARTMENT OF COMPUTER SCIENCE

OPTION OF SOFTWARE ENGINEERING

Artificial Inteligence

*Scientia et Lux*

# GROUP 4 ASSIGNMENT

Year III SWE Group B

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**Musanze, November 2024**

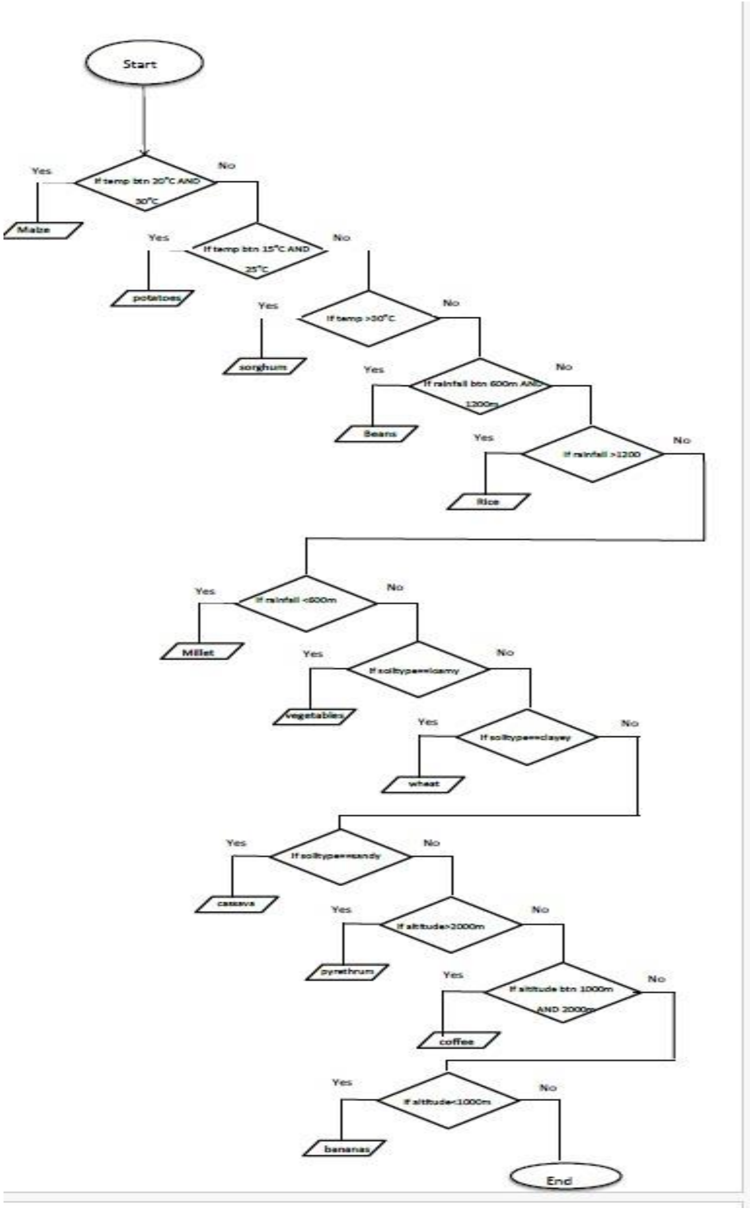
**Day 2 Report**

**Group #4**

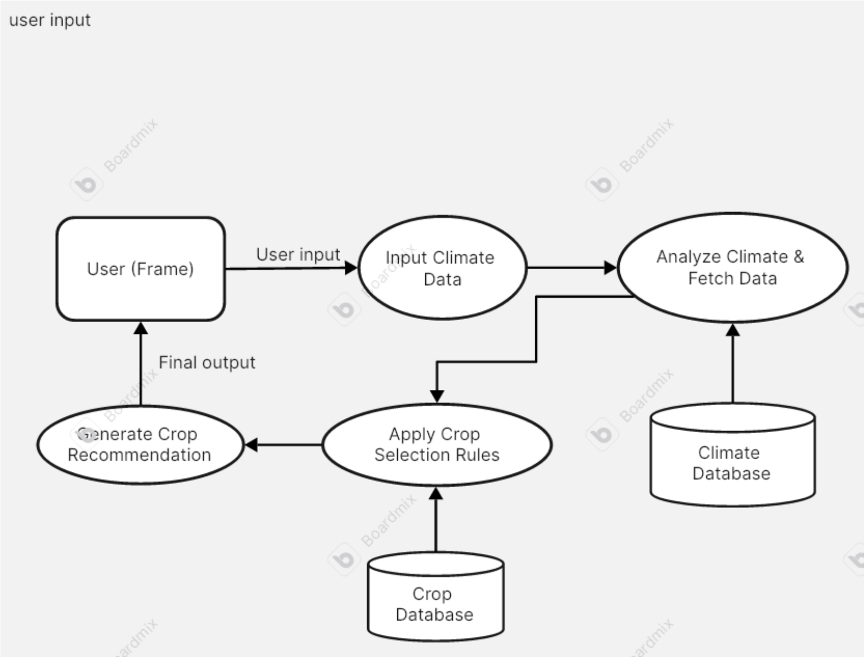
**System Design & Initial Python Development**

## 1. System Design

- **Flowchart:** A detailed flowchart was created to represent the logical flow of the crop recommendation system the figure below.



- **Data Flow Diagram (DFD):** A structured DFD was designed to illustrate the data movement between different system components as showed in the figure below



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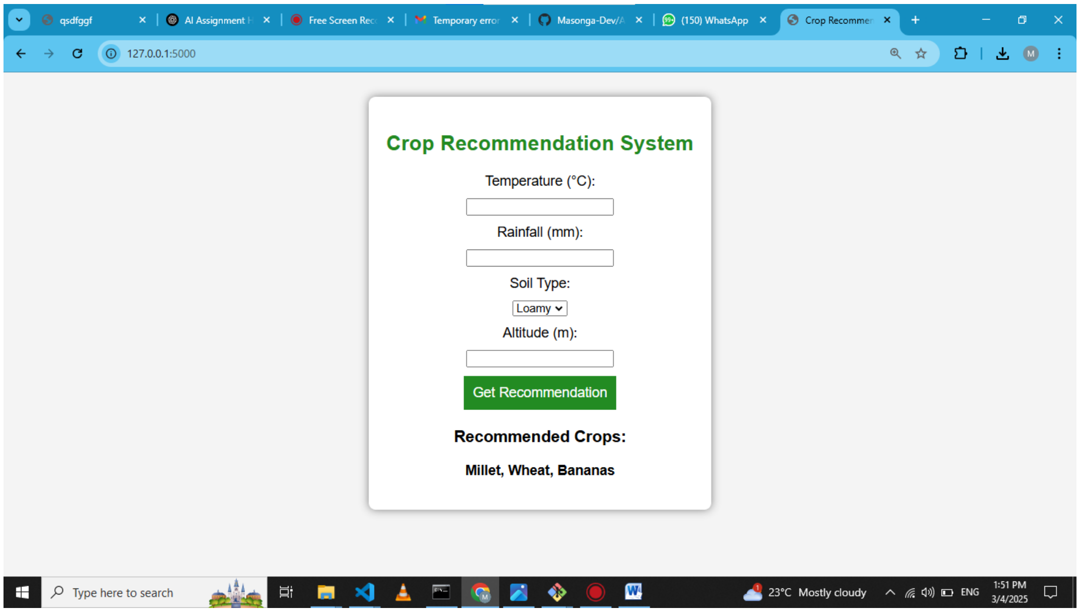
- **Architecture:** The system follows a web-based architecture, with a Flask backend handling requests and rendering recommendations based on user inputs.

## 2. Initial Python Development

- **Technology Stack:**
  - Backend: Flask (Python)
  - Frontend: HTML, CSS
  - Data Processing: Rule-based logic for crop recommendations
- **Rule-Based Logic Implemented:**
  - **Temperature:** Determines suitable crops based on temperature range.
  - **Rainfall:** Matches crops with required rainfall levels.
  - **Soil Type:** Suggests crops based on soil properties.
  - **Altitude:** Identifies crops that grow well at given altitudes.
- **Flask Web App Development:**
  - Implemented a Flask-based web interface for users to input climate data.
  - Developed a recommendation engine that suggests crops based on user inputs.
  - Integrated a user-friendly HTML form for data submission.

## 3. Testing & Documentation

- **Testing:**
  - The Python logic was tested with various inputs to verify crop recommendations.



Crop Recommendation System

Temperature (°C):

Rainfall (mm):

Soil Type:

Loamy

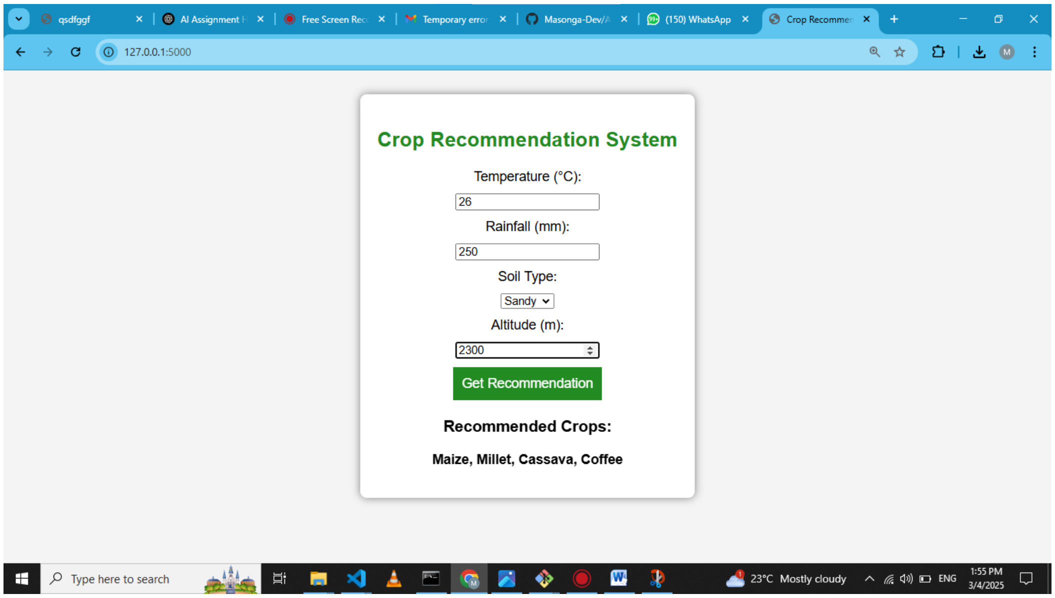
Altitude (m):

Get Recommendation

Recommended Crops:

Millet, Wheat, Bananas

- ○ The Flask web app was deployed on Binder and tested for proper functionality.



Crop Recommendation System

Temperature (°C): 26

Rainfall (mm): 250

Soil Type: Sandy

Altitude (m): 2300

Get Recommendation

Recommended Crops:

Maize, Millet, Cassava, Coffee

- **Issues Encountered & Fixes:**
  - ○ **Binder 404 Error:** Fixed by ensuring Flask runs on `0.0.0.0` and binds to the correct port.
  - ○ **Port Conflicts:** Resolved by changing Flask to run on port `5000` and updating the Binder proxy link.
  - ○ **Missing `index.html`:** Ensured `index.html` was present in the `templates/` folder to avoid rendering errors.

## 4. Next Steps

- Enhance the user interface for better usability.
- Integrate additional rule-based logic for more precise recommendations.
- Prepare for the next phase of development, including advanced AI integration.

## GitHub & Deployment Links:

- **GitHub Repository:** Masonga-Dev/AI_Group4_ExpertSystem_Assignment2
- **Binder Web App:** [![Binder](https://mybinder.org/badge_logo.svg)](https://mybinder.org/v2/gh/Masonga-Dev/AI_Group4_ExpertSystem_Assignment2.git/main)