HOW TO RUN THE PROJECT:

1. Organize the Project Folder

- Create a single folder for your project.
- Place all required components in it, including:
  - Python scripts
  - Sensor interface files
  - AI/ML model files (if applicable)
  - Configuration files
  - Dataset (if training is involved)

2. Install Required Dependencies

- Use Python and install dependencies via pip.
- Required libraries may include:
  - opencv-python
  - numpy
  - tensorflow or keras (if AI model is used)
  - serial (for Arduino/PIC interfacing)

Command example:
bash
CopyEdit
pip install opencv-python numpy tensorflow pyserial

3. Connect Sensors and Microcontroller

- Interface your waste classification sensors (e.g., IR, Ultrasonic, Load cell) with a **Microcontroller** (like Arduino or PIC).
- Connect the microcontroller to the PC via USB (for serial communication).
- Make sure firmware is uploaded to the microcontroller board.

4. Load AI Classification Model (If Used)

- If the project uses AI-based image or sensor data classification:
  - Load your trained model in the Python script using TensorFlow or Keras.
  - Use model.predict() or equivalent to classify waste type.

5. Run the Main Program

- Open the main Python file (e.g., main.py).
- Use any IDE or command line to run:

bash
CopyEdit
python main.py

- The program will begin reading sensor input and classify waste in real time.

6. System Workflow

1. Waste is dropped into bin
→ Sensor activates

2. Sensor or Camera reads input
→ AI classifies item as plastic, metal, organic, etc.

3. Signal sent to Microcontroller
→ Operates servo motor to guide waste into the correct section

Hardware + Software Integration

Component	**Role**
Sensor Unit	Detect waste presence/type
Microcontroller (PIC/Arduino)	Actuates mechanism based on AI output
Python Script	Handles AI classification + serial communication
Output Mechanism	Diverts waste into appropriate bin