Coding for Environmental Protection: Projects and Ideas

Aman and Priya were ninth-grade students at Greenfield High School in Jaipur. Both were passionate about technology and deeply concerned about the growing pollution and waste in their city. During a science exhibition at their school, they came across an interesting idea: combining their coding skills with environmental awareness to create projects that could solve real-world problems.

"What if we could use our coding skills to protect the environment?" Aman asked Priya as they brainstormed ideas under the shade of a neem tree near their classroom.
"That would be amazing!" Priya replied. "Let's think of a project that helps solve a problem in our city."

The duo decided to create a project that would encourage proper waste management in their community. They called their initiative **"EcoSense: Smart Waste Segregator App"**.

Part 1: Why Coding for Environmental Protection?

In today's digital world, technology plays a key role in solving environmental challenges. Whether it's monitoring pollution levels, managing waste, or spreading awareness, coding offers endless possibilities. By learning to code, students can create tools and apps to address local environmental issues.

Here are some ideas for coding projects focused on environmental protection:

- An app that tracks air quality in your city.
- A website to educate people about reducing plastic usage.
- A game that teaches recycling in a fun way.
- A program to calculate and reduce your carbon footprint.

Aman and Priya decided to build an app that would help households segregate their waste effectively by educating them about biodegradable, non-biodegradable, and recyclable waste.

Part 2: EcoSense: A Waste Segregator App

The idea behind **EcoSense** was simple:

- The app would allow users to type the name of an item (like "banana peel" or "plastic bottle").
- It would tell users whether the item is biodegradable, non-biodegradable, or recyclable.
- It would also provide tips on how to dispose of the waste properly.

1. Tools and Resources Needed

To build this app, Aman and Priya needed the following tools:

- **MIT App Inventor**: A beginner-friendly platform for building apps.
- **Google Sheets**: To store information about different types of waste.
- **A Smartphone or Emulator**: To test the app.
- **Internet Connection**: For accessing resources and APIs.

2. Step-by-Step Guide to Create EcoSense

Step 1: Set Up the App Layout

Using MIT App Inventor, Aman and Priya designed the app's user interface.

- **Search Box**: To allow users to type the name of the waste item.
- **Search Button**: To trigger the search functionality.
- **Result Box**: To display whether the item is biodegradable, non-biodegradable, or recyclable.
- **Tips Section**: To show disposal tips for the item.

Here's what the layout looked like:
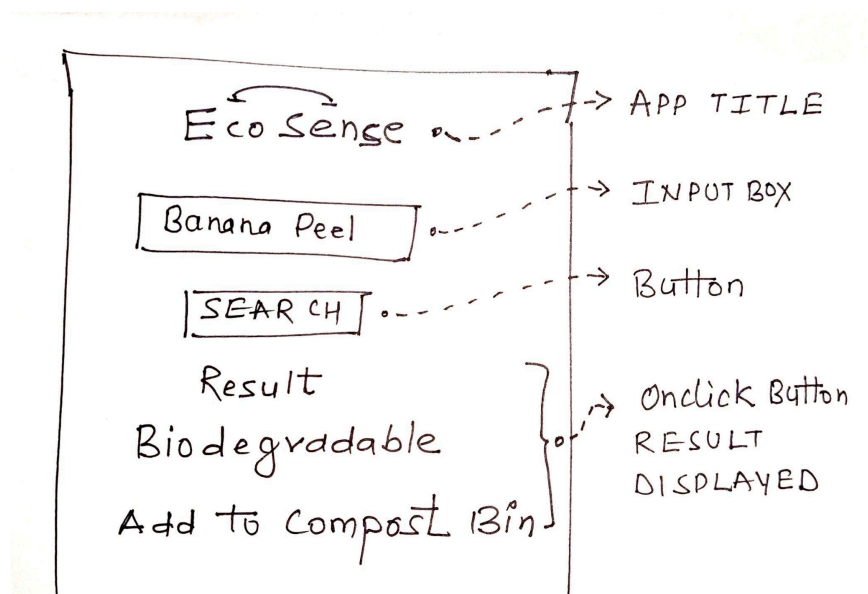
Step 2: Connect to the Database

To provide information about waste items, they created a **Google Sheet** with the following columns:

- **Item Name**: The name of the waste item (e.g., "Banana Peel").

- **Category**: Whether it is biodegradable, non-biodegradable, or recyclable.
- **Tips**: Tips for disposing of the item (e.g., "Add to compost bin").

The Google Sheet was shared publicly, and its link was integrated into the app.

Step 3: Write the Code in MIT App Inventor

Using the **Blocks Editor** in MIT App Inventor, they created the following logic:

1. When the user clicks the **Search Button**:
   - Fetch the item name entered in the textbox.
   - Search for the item in the Google Sheet using the API.
   - Display the result in the result box (biodegradable, non-biodegradable, or recyclable).
   - Show tips in the tips section.

Here's a simplified version of the blocks:
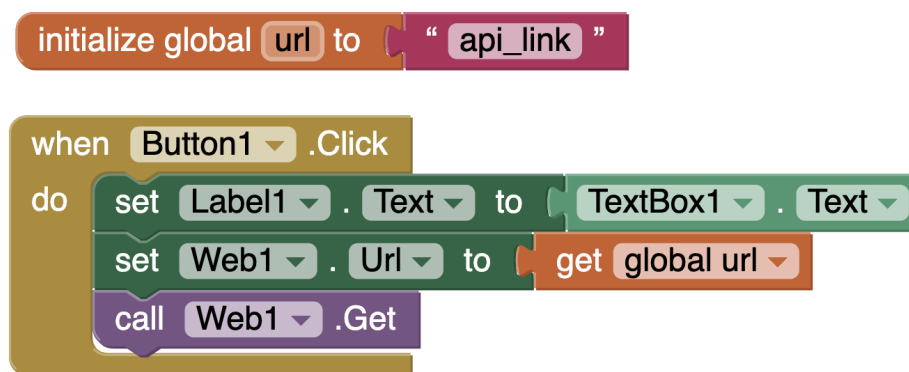
[When Button1.Click]

  - Set itemName to TextBox1.Text

  - Call Web1.Get (URL: Google Sheet API + itemName)

  - When Web1.GotText:

    - Parse response

    - Set ResultBox.Text to response.category

    - Set TipsBox.Text to response.tips

Step 4: Test and Refine the App

Aman and Priya tested the app by entering various waste items. They fixed bugs, like spelling mismatches and missing data, by adding synonyms for items in the Google Sheet.

Part 3: Benefits of EcoSense

After launching the app, Aman and Priya shared it with their school and community. It received great feedback!

- **Students learned about waste segregation.**
- **Households started composting biodegradable waste.**
- **Plastic recycling increased in their neighborhood.**

Sample Code Snippet for the Google Sheet API Integration

Google Sheets API Setup (Pseudocode):

python

Copy code

```python
import requests


def fetch_waste_info(item_name):
    # URL of the public Google Sheet API
    url = "https://sheets.googleapis.com/v4/spreadsheets/{spreadsheetId}/values/{range}?key={API_KEY}"
    response = requests.get(url)


    # Parse the data
    for row in response.json()['values']:
        if row[0].lower() == item_name.lower():
            return {
```

```
        "category": row[1],

        "tips": row[2]

    }

return {"error": "Item not found"}
```

Conclusion: Empowering Change Through Coding

By the end of their project, Aman and Priya realized that coding isn't just about creating apps—it's about solving problems and making an impact.

Their teacher, Mrs. Iyer, proudly said, "You've shown how students can use their skills to protect the environment. Keep innovating!"

Now, it's your turn! Think about the problems in your area and start coding for change. Whether it's an app to reduce waste, monitor air quality, or spread awareness, your ideas can make a big difference!