SkillUp EDTECH

# EcoPoints Recycling Tracker - Overview

**Estimated duration:** 3 minutes

## Learning objectives

After completing this practice project, also known as a guided project, you will be able to demonstrate the following skills:

- Apply object-oriented programming to design Household and RecyclingEvent classes using encapsulation.
- Construct and manage `ArrayList` and `HashMap` collections to store multiple households and their recycling events.
- Use Java's Date and Time API to track household join dates and recycling dates.
- Implement console-based input handling to register households and log recycling activity.
- Apply conditional logic and loops to process user choices and navigate program options.
- Handle invalid inputs and file-related errors using Java's exception handling.
- Use Java File I/O and serialization to persist and reload program data.
- Generate reports that summarize total recycled weight and eco points across households.

You'll complete this project with the ability to comfortably work with:

- Basics of Java programming
- Strings and string operations
- Operators and Data types
- Exceptions
- `for` loops and the `while` Loop
- Conditional statements
- Arrays, Sets, and Maps
- Basic methods and functions
- Object-oriented programming (OOP) tasks
  - Encapsulation
  - Overriding
  - Polymorphism

## About this project

For this project, you are a junior Java developer hired by your local city council to help launch a new EcoPoints Recycling Program.

Your city wants to motivate households to recycle more by giving them eco points every time they recycle items such as plastic, paper, glass, or metal. These points will later be redeemable for rewards. As an initial step for this project, which will be developed in multiple iterations, your job is to build the first version of the tracking system.

Your goal is to build a simple, console-based Java app that tracks each household's recycling activities and calculates the eco points each household earns. You'll make it easy for your community members to see how much they've contributed to a cleaner, greener neighborhood!

This is a guided project, so you'll have full starter code, clear instructions, and lots of practice applying the core Java skills you've learned so far.

This project, which will take about 60 minutes to complete, includes the following tasks:

**Task 1: Create classes**

- Create well-structured classes:
  - Household with the following attributes.
    - unique ID
    - name
    - address
    - joining date
  - RecyclingEvent with the following attributes:
    - Material type (such as plastic, glass, metal, and paper)
    - Weight in kilograms
    - Date of recycling
    - Eco points earned
  - Use encapsulation to protect data and keep code organized.

**Task 2: Create collections**

- Use ArrayList and HashMap:
    - Use HashMap to store multiple households mapped to the unique household id
    - Use Arraylist to store multiple recycling events per household

**Task 3: Register households**

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    - Create new household profiles with a unique ID, name, address, and join date. Use Date & Time API to record household join dates.
    - Add the household to the collection.
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**Task 4: Log recycling events**

- Allow users to log each recycling event, including:
    - Material type (such as plastic, glass, metal, and paper)
    - Weight in kilograms
    - Date of recycling
    - Apply a simple points rule to award 10 Eco points per kilogram (kg) recycled:
        - Update each household's total points balance.
        - Add the recycling event to the collection.

**Task 5: Store data**

- Save household profiles and recycling logs to files using Java File I/O so data persists when the program closes.

**Task 6: Display records**

- Show the following outputs based on the selected option
    - All the registered households
        - All recycling events for a household
        - Total weight recycled by a household
        - Total eco points earned by a household

**Task 7: Generate reports**

- Produce simple reports such as:
    - Household with the highest total points
    - Total community recycling weight

**Task 8: Implement Error Handling**

- Use exception handling to:
    - Catch invalid inputs (such as negative weights)
    - Handle duplicate household IDs
    - Manage file read/write errors

### Next steps:

- Read and follow the instructions carefully to complete the project.

Let's get started!

## Author(s)

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