Practice 13: Lists of Lists

Two-Dimensional Data Structures (2D)
Module 4: Composite Data

What is a two-dimensional list?
Until now, our lists were like a single row of people. Now, we are going to create a **table**. Imagine a grid: each row is a contact, and each column is a piece of data (Name or Age). In programming, this is achieved by putting a **list inside another list**.

Key Concepts

1. The Sublist (The Entry)

Every time we register someone, we create a ”mini-list” with their information:

- **Index 1:** Name (e.g., ”Ana”)
- **Index 2:** Age (e.g., 14)

2. The List of Lists (The Directory)

The variable `Directory` will contain these entries. If we have 3 contacts:

- **Directory[1]** → [”Ana”, 14]
- **Directory[2]** → [”John”, 15]
- **Directory[3]** → [”Martha”, 13]

THE CHALLENGE: Accessing Data

To get a specific piece of data, we need **two coordinates**:

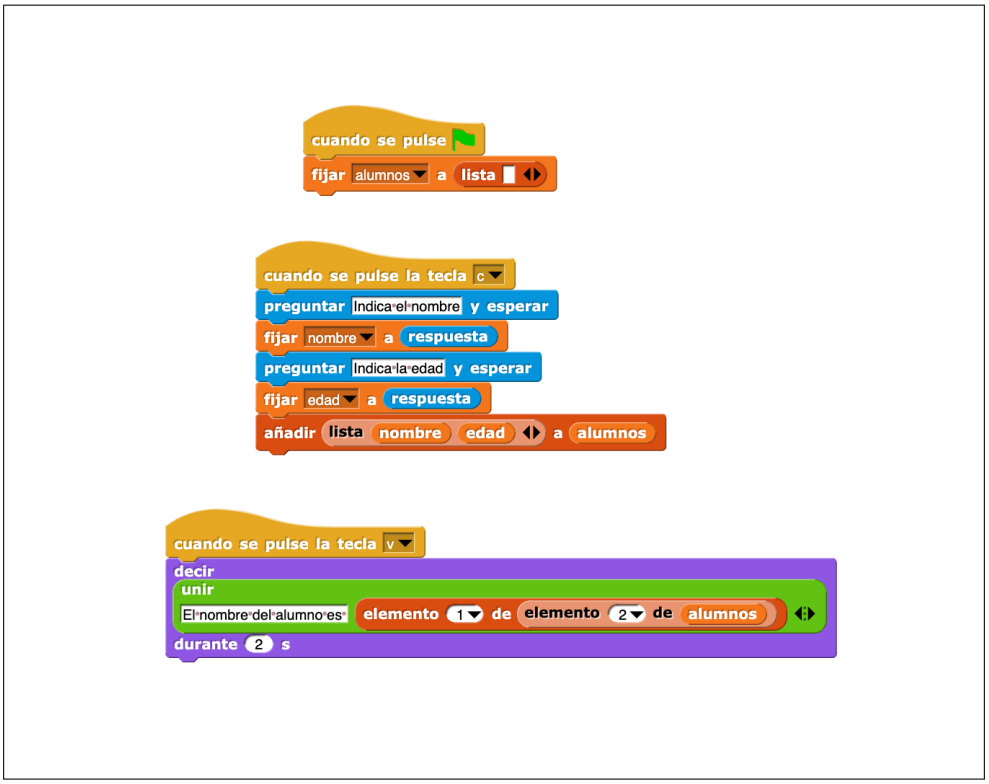
1. Which row do I want? (Which person?)
2. Which column do I want? (The name or the age?)

Instructions in Snap! (see the image below)

1. Create the variable `Directory` and empty it at the start.
2. **Adding data:** Use the `add (list (name) (age)) to (Directory)` block. Note that we are adding a *full list* as a single element.
3. **Reading data:** To say the name of the second person, use:

`item (1) of (item (2) of (Directory))`.

Helpful Code



Visualization in Snap!

When you run the program, double-click the `Directory` variable monitor on the stage. Snap! will detect it is a 2D list and show it as a **data table**.

Technical note: This structure is the basis for spreadsheets (like Excel) and relational databases.