The Different Kinds of Data

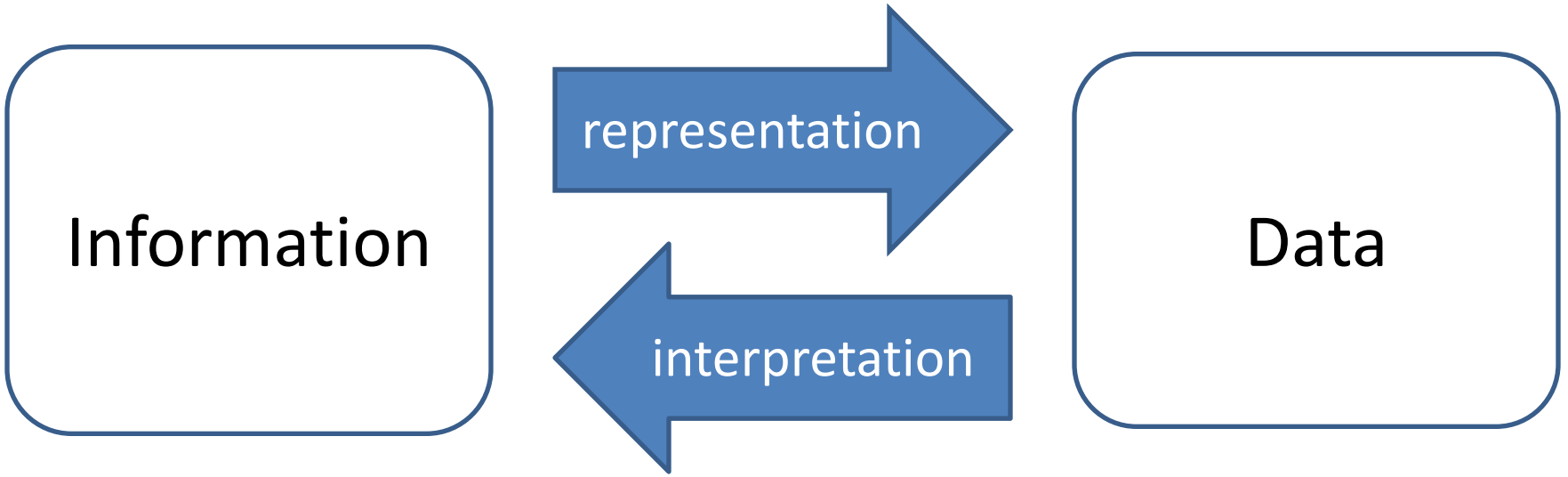
CS 5010 Program Design Paradigms

Lesson 1.2

Learning Objectives for This Lesson

- By the time you finish this lesson, you should be able to:
  - explain the relationship between information and data.
  - list the steps of the data design recipe.
  - define scalar, compound, itemization, and mixed data and give examples of each.

Information and Data



Information Analysis and Data Design

- Information is what lives in the real world
- Need to decide *what part* of that information needs to be represented as data.
- Need to decide *how* that information will be represented as data
- Need to document how to *interpret* the data as information

Choosing a data representation

- Let's assume you know what pieces of information need to be represented.
- We need to know what kind of information each piece is.

Kinds of Data

Kinds of Data
1. Scalar Data
2. Compound Data
3. Itemization Data
4. Mixed Data
5. Recursive Data
6. Mutually Recursive Data
7. Functional Data

1. Scalar Data

- Simple data, e.g. numbers, strings, etc.
- These are already values in Racket.
- Racket has lots more kinds of values, but these will be enough for now.
- If a variable or constant contains scalar data, the interpretation tells the meaning of that data.

2. Compound Data

- *Compound data* is data that consists of two or more quantities, or has two or more attributes
- Examples:
  - a book in a bookstore inventory
    - it has author, title, ISBN, cost, price
  - a circle on the screen
    - it has x and y positions, color, and radius.
- The interpretation gives the meaning of each field.

A Compound can contain a compound

- An author might have a first name, a last name, a birthdate, etc.
- A faucet might contain two washers
  - an upper washer and a lower washer
- Each washer might have several attributes
  - inner dimension, outer dimension, thickness
  - manufacturer, model number, cost, etc.

3. Itemization Data

- *Itemization data* is data that takes on one of a few values.
- Sometimes this is called “enumeration data.”
- The data definition lists the possible values and their interpretation.

4. Mixed Data

- Our last kind of data (for today) is *mixed data*.
- Often your data is in the form of alternatives, like itemization data, but one or more of the alternatives is actually compound data.
- We call this *mixed data*.
- Compound data and itemization data are just special cases of mixed data.

Example of mixed data

In a wine bar, an order may be one of three things: a cup of coffee, a glass of wine, or a cup of tea.

- For the coffee, we need to specify the size (small, medium, or large) and type (this is a fancy bar, so it carries many types of coffee). Also whether or not it should be served with milk.
- For the wine, we need to specify which vineyard and which year.
- For tea, we need the size of the cup and the type of tea (this is a fancy bar, so it carries many types of tea).

Here's a summary of the different kinds of data

Kind of Information	Example
Scalar	Temperature
Itemization	Traffic Light state (red, yellow, OR green)
Compound	Book (author, title, AND copies)
Mixed	BarOrder (coffee (compound), OR wine (compound) OR tea (compound))

Next Steps

- Do Guided Practice 1.1
- If you have questions about this lesson, ask them on the Discussion Board
- Go on to the next lesson