Functional Languages
6th Lecture

Defining data structures

$$\text{data } \underline{Day} = \underline{Mon} \mid \underline{Tue} \ldots$$

- ▶ Building blocks:
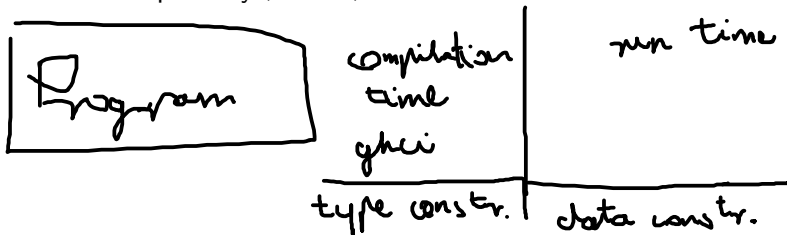 - ▶ Type constructor – used at type level, during compilation
  - ▶ Data constructor – used at expression level, during run-time
- ▶ Using `data`
- ▶ Parts: type constructor, one (or more) data constructor(s)
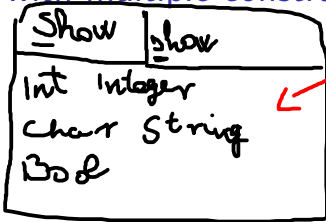- ▶ Called algebraic data types
- ▶ Example: days, mood, `Bool`

Program	compilation time ghci	run time
	type constr.	data constr.

Data constructors with arguments

- Data constructors can have zero or more arguments
- When they have at least one argument, they behave like functions
- Example: temperature, time

Types with multiple constructors

- Data constructors can have different number and type of arguments
- Example: fruits, registered users

Pattern matching

- Allows functions to
  - behave differently on each data constructor
  - unpack data and expose the inside of a value
- Example: `showTime`, `isAppleBasket`, `showUser`

Lists

- Recursive: type refers to itself
- Parametric: type of contained values can be changed