Phenomena and Concepts

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distinction

- phenomena: observable, concrete instance, specific value, can be sensed or measured
- concept: abstraction, class, type, kind
  - concrete and abstract concepts: differ in level of abstraction
- examples
  - my car (the one that sits in the parking lot out there right now): phenomenon
  - my car and that of my wife: set of phenomena
  - cars (as a generic kind of thing): concept
  - cars, boats, motorcycles, and trucks: set of concepts
  - vehicles: abstract concept

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categories of phenomena and concepts

- help us find relevant phenomena and concepts
- entities
- functions
- events and behaviors

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entities

- does it mostly carry information (data inside the machine)?
- things, represented as data
- atomic vs composed: relative to the domain in question
- mereology: whether and how an entity is composed
  - example: is atomic
  - example: is composed, record/tuple of width, depth, height
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- applied to ”something”, will produce ”something” (possible different)
- undefinedness: different schools
- signature: name with the type names for the parameters and the result
  - example
    transfer: Account -> Account -> Amount -> (Account, Account)
    An Account from which we want to transfer to another Account. The Amount we want to transfer. The two Account are both modified and so they are both part of the result.

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- definition, specification: relate output to some given inputs
  - example: sqrt yields positive value r for input x such that r*r = x
  - an algorithm or implementation also shows how to obtain the result
  - first capture "what?" then consider "how?"

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events and behaviors

- events
  - trigger an action or are triggered by an action
  - considered instantaneous
  - example: the call has just ended (triggered by action ”end call”, triggers action ”drink some water”)
- behaviors
  - sequence of actions interleaved with events
- synchronization and communication
  - shared events
  - distinguish synchronous and asynchronous communication

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