We think about abstraction.

1. Questions?

2. From before: Booleans—basic operations—combining values—interaction with non-booleans—identity vs. equivalence testing and None.

3. From before: Full details on if—forms—nesting—pass.

4. From before: The while loop—break—continue.

5. Abstraction: the result of “seeing only the big picture,” by hiding the details. Important related ideas:

   (a) The interface is the “front-facing,” public side of the system.

   (b) The implementation is the hidden, private details of how the interface is actually accomplished.

   (c) Encapsulation is typically used to confine the implementation details and ensure their privacy.

   (d) The preconditions are assumed to be true if we make use of the interface.

       These are tested by assertions.

   (e) Provided the preconditions hold, the postcondition is what will be true once we use the system.

6. Unfortunately, we sometimes fail to appreciate the correct level for abstraction.

   Like any craft, the road to improvement sometimes involves repeated attempts at design.

   (a) The process of reducing the preconditions is called generalization.

   (b) Because a system is often made up of several components that must work together, the process of reworking the design in a consistent manner is called refactoring.

7. General truths.

   (a) Design is hard and takes patience.

   (b) Poor interface design leads to burdensome, legacy client code.

   (c) Significant refactoring is an indication of flaws in the original design.

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