Assignment 4: ADS for a Square

Turn in the assignment at the beginning of class.
Time allocation (max): thinking, 1 hour; design, 3 hours; implementation, 5 hours

Implement an abstract data structure for the object "square".

CONCEPTUALIZATION

Define the object and the invariant relations between its parts.
Select a mathematical formalism which suits your conceptualization.
Separate internal and external transformations.
> An external transformation refers to an external coordinate system or origin.

MODELING

Identify:
> Domain
>> the component parts of the object
>> the appropriate recognizers, accessors, and constructors
> Properties
>> the uniqueness relation which defines equality tests
>> the containment relationships between the components
>> the relevant relations between components at the same level
> Functions
>> all relevant functions between components
>> some interesting functions between the object
>>> and an external coordinate system

IMPLEMENTATION

Select:
> a data structure for the object and its components
> data structure transformations between components
> implementation language or algorithm strategy for functions

Write:
> a make function which builds accessors automatically
> a get function for locating each part of the object
> methods/functions and predicates defined above
> use the Induction Principle to write the recognizer `isa-square`

EFFICIENCY

Translate your implementation into bit manipulations.

CHALLENGE ASSIGNMENT

Implement the object "cube",
> or more generally still, the object "N-dimensional cube".