From Domain Classes and Use Cases to Design Classes

Exercise

- I have a sealed room in which some triangles are magically suspended in the air. Their position and orientation is random. There is also a ball in the room. It has some position and velocity at time \( t \).

- Describe how the ball moves between time \( t \) and \( t + \Delta t \) (use case)

CRC Cards Technique (Responsibility-Driven Design)

- Informal, non-detailed
- Used for group brain-storming
- End result is a first cut at classes for an object-oriented model
- Not intended to provide a complete design

CRC

- **C**: Classes
- **R**: Responsibilities
- **C**: Collaborations

The Basic Idea

- Develop set of index cards.
- Each card represents one class.
- A card contains:
  - The name of the class.
  - The responsibilities of the class.
  - Collaborations: other classes with which this class inter-operates, in conjunction with the attendant responsibility.
Limiting the size of a card is an attempt at preventing the class from becoming too complex.

Sample Application:
A graph-drawing program

Possible screen image

Typical Application
Use-Cases:
- Draw shape
- Move shape
- Resize shape
- Connect shapes
- Erase shape
- Erase connector

Example of CRC card
for a graph-drawing program (1)

Example of CRC card
for a graph-drawing program (2)

Example of CRC card
for a graph-drawing program (3)

Example of CRC card
for a graph-drawing program (4)
Note:

- Responsibilities are usually for *members* (objects) of the class rather than the class itself, although
- Class-wide responsibility is possible (corresponding to static method)

Attribute Value vs. Object

- An object of a class typically has one or more *attributes*.
- Attributes have *values* that specify or describe the object.
- A value might or might not deserve the distinction of being an object itself.
- A would-be attribute that is object-valued is actually a *collaboration*.

Once the CRC cards are constructed...

- Team can engage in role-playing to verify that use-case scenarios make sense for chosen CRC.
- Each person can role-play one or more class cards.
- If something doesn't work, change the class accordingly.
- Revision of use-cases might also be indicated.

Exercise

- I have a sealed room in which some triangles are magically suspended in the air. Their position and orientation is random. There is also a ball in the room. It has some position and velocity at time t.
- Construct CRC cards for this system.