Com S 362
Object-Oriented Analysis & Design

Responsibility-Driven Design
Noun Phrase Analysis
CRC Cards

Responsibility-Driven Design

Working to create designs that conform to the fundamental design principles, Software Engineers came to realize that easily maintained objects tend to:

- Have a narrow scope,

- Have well-defined, closely related responsibilities, and

- Often model entities and concepts in the problem space.

In 1989, Rebecca Wirfs-Brock and Brian Wilkerson described a design process,

Responsibility-Driven Design,

that identifies objects by looking for coherent sets of responsibilities.

Responsibility-Driven Design

Note: "Coherent" just means "strongly related" or "naturally belonging together." You can think of it as an anonym of "dissonant."

- Each set of responsibilities is discovered by looking at interactions among "candidate classes".

- Later these responsibilities will typically become properties or member functions of the containing class.

- We will later study two sets of heuristics for identifying and grouping responsibilities:

  - GRASP (from Larman), and

 - SOLID (from Martin).

Noun-Phrase Analysis

- Nouns identify "people, places, or things" (including concepts.)

- Objects model things and concepts.

- Noun-Phrase analysis exploits this similarity by using nouns in some textual description of the system or a part of the system to create an initial list of "**candidte classes**."

- Noun-Phrase analysis is a central part of Wirfs-Brock's method.

- Scenarios (any level of formality) are good input data for noun-phrase analysis

Verbs are helpful too …

- Verbs describe actions and imply capability or functionality.

- Verbs often correlate to responsibilities.

- For this reason noun-phrase analysis is sometimes called "noun-verb analysis"

CRC Cards

- Introduced in 1989 by Beck and Cunningham (at the same conference as Wirfs-Brock's paper.)

- Candidate (Class), Responsibility, Collaborator
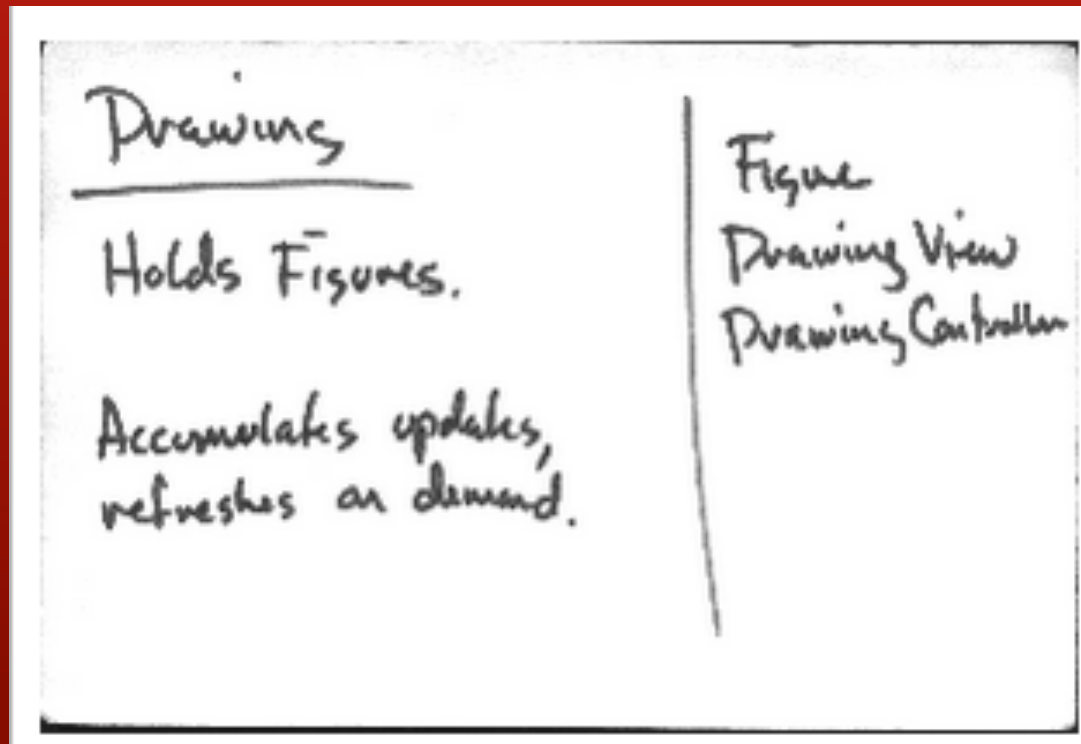
Drawing View

Holds Drawings and
Set of Handles for
Selected Figures.

Finds touched items
(Handle or Figure)

Drawings

Drawing Controller

Holds current Tool.
Sends it mouse events.

Refreshes Drawing in
Idle Loop.

Drawing
DrawingView
Tools

Cards are by Ward Cunningham (http://c2.com/doc/crc/draw.html) and are allegedly the first CRC cards ever made. They describe an early SmallTalk drawing program call HotDraw.

Best Practice

- Both in CRC Cards and Scenarios, *avoid* mentioning User Interface specifics.

- Don't fuss over the cards. To be helpful, they must evolve quickly.

- Quickly identify something you "know." Use the cards to work from the known to the unknown.

- You initial cards might represent wildly different levels of detail. That's perfectly okay. The process will help you sort it out.