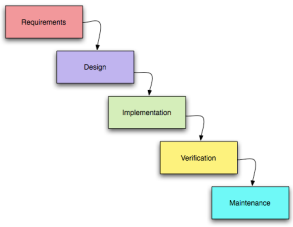
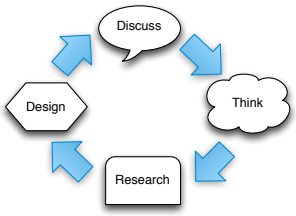
Unified Modeling Language: Class and Sequence Diagrams

by Willem van Straten and Andrew Cain

Object-oriented solutions start with analysis and design



Complex solutions require multiple iterations of refinement



COGNITIVE SCIENCE **11,** 65-99 (1987)

Why a Diagram is (Sometimes) Worth Ten Thousand Words

JILL H. LARKIN
HERBERT A. SIMON
Carnegie-Mellon University

We distinguish diagrammatic from sentential paper-and-pencil representations of information by developing alternative models of information-processing systems that are informationally equivalent and that can be characterized as sentential or diagrammatic. *Sentential* representations are sequential, like the propositions in a text. *Diagrammatic* representations are indexed by location in a plane. Diagrammatic representations also typically display information that is only implicit in sentential representations and that therefore has to be computed, sometimes at great cost, to make it explicit for use. We then contrast the computational efficiency of these representations for solving several illustrative problems in mathematics and physics.

Use the Unified Modeling Language to communicate your design through diagrams

Good object-oriented solutions require thinking and planning

UML diagrams increase the efficiency of design communication

Roles and responsibilities must be factored into classes with appropriate granularity

Appropriate abstractions must be defined

Appropriate delegation, collaboration and other relationships must be established

Pages of text are inefficient design tools

Visual modeling languages
provide a powerful communication tool

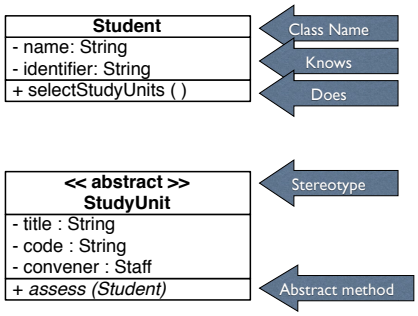
Communicate patterns and ideas
through meaningful symbols

Accessible to all stakeholders
(domain experts, developers & end users)

Free of syntax

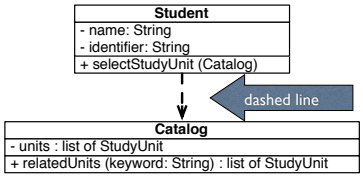
UML Class Diagrams describe
responsibilities and relationships

Responsibilities identify
what an object knows and does

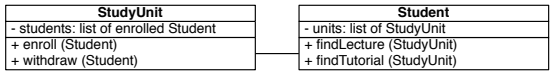


Relationships identify dependencies between objects

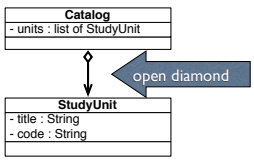
Dependence



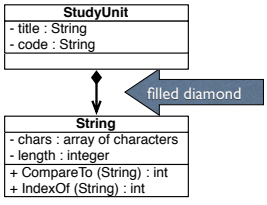
Association



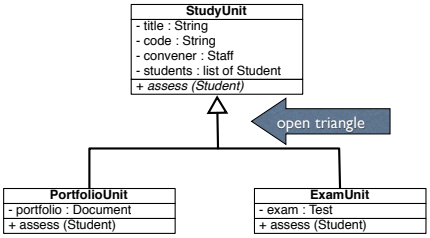
Aggregation



Composition



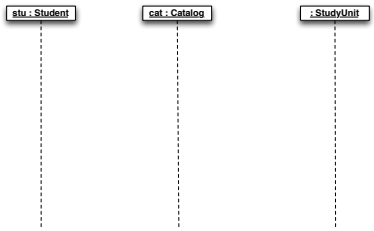
Inheritance



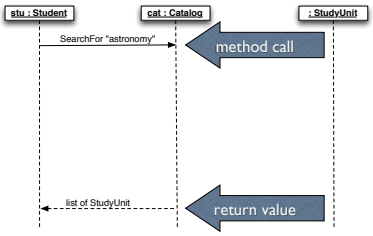
UML Sequence Diagrams describe how objects collaborate to achieve objectives

A sequence diagram is analogous to a script for a play

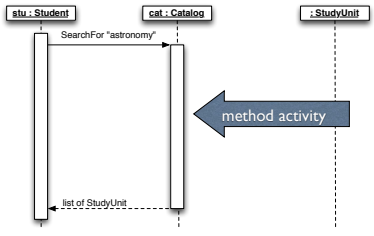
Life lines define the existence of objects



Messages are passed between objects

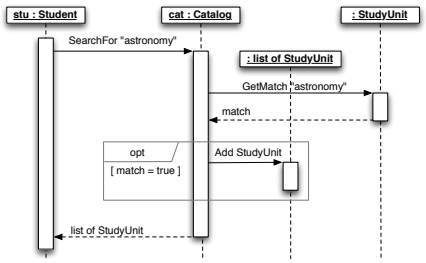


Activity is represented by open boxes

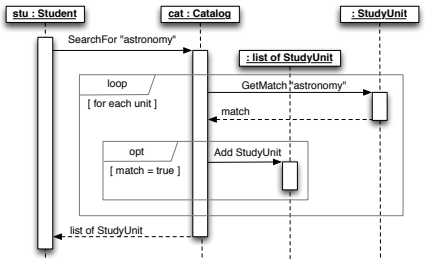


Control logic is described using
combination fragments

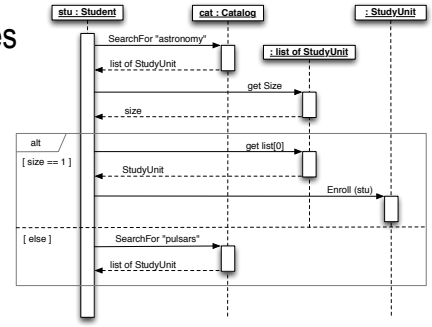
Options



Loops



Alternatives



Will you be able to communicate
using the Unified Modeling Language?

Solutions to complex problems
require multiple iterations
of design and discussion

The Unified Modeling Language
provides a visual language
for communicating design

The Unified Modeling Language
can be understood by stakeholders

Communication
through UML Diagrams
can save time and effort

This Week's Tasks

Pass Task 13: Principles of Object Oriented Programming

Credit Task 1: Concept Map

Distinction Task 1: Custom Program UML Class Diagram