

Analysis [Iteration 1, Phase 2]

Slide Series 3

Analysis

During analysis we try to create a model of the problem domain as a collection of interacting objects (classes)

- This is the **analysis model** (aka domain model)

Have to find...

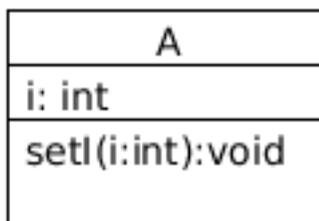
- Classes and how they are related
- To a lesser degree; possible attributes, possible behavior (methods) of the classes

Model represented as UML class diagram

- A static view

Class Diagram for Analysis Model

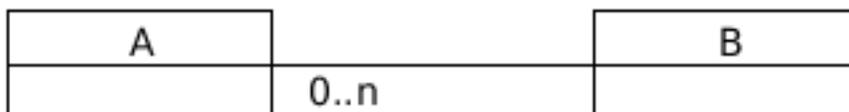
Make it simple (no arrows, except possible specialization (extends))!



Class named A with attribute i and method setI()



One instance of A is associated with one instance of B



Zero or many instances of A is associated with B



Zero or many instances of A is associated with zero or one B

Finding the Analysis Model

Have the UC's from RAD, simple method

- Underline nouns in use cases, will become be classes
- Underline verbs in use cases will become methods
- Find attributes/relationships from text (has, uses, is a, owns, knows, sends, receives, moves, rolls ...)
- **Include as much as possible**. Easy to skip later, ...

This is a critical activity

- If model wrong, not complete, inconsistent, ...
- ... **BIG** trouble later!!



This is a creative activity, few (no) rules ...

Automate a mess and you get an automated mess! // The 21 laws of programming

Remainder: Iterative Development

Getting a stable analysis model is a key issue

- Possible not stable after first iteration ...
- ... but if not stable after 2-3 ... problems!!!
- Don't assume you can fix it by coding, must solve the problem!

**Work really hard to get model stable
(i.e. solve the problem)**

Efficient Modelling

Optimal is to first draw on whiteboard!

- Very fast drawing and communication
- Use phone/camera to document
- Very fast communication, everyone can participate

Later, Tools to draw UML

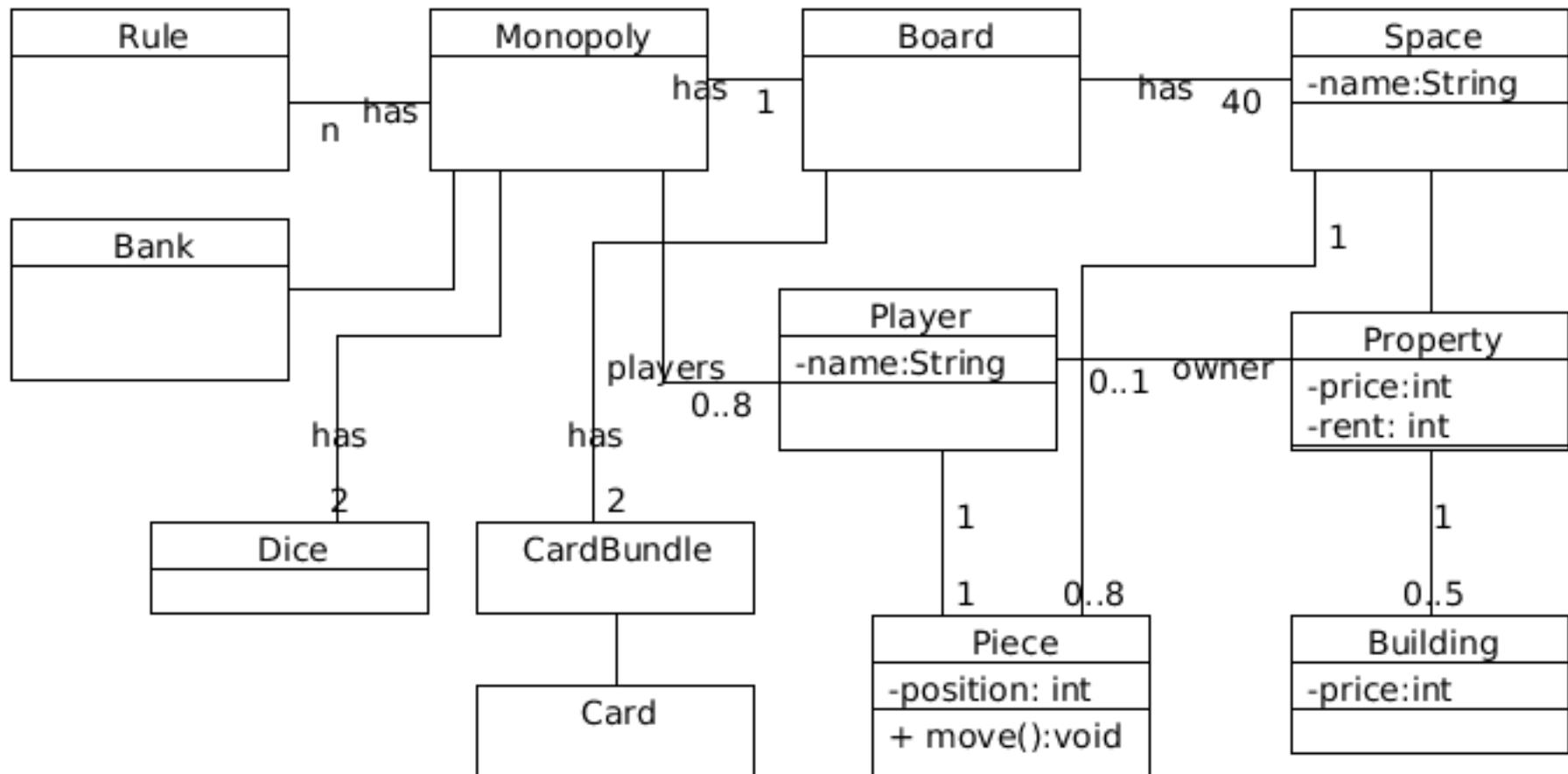
- When model getting more stable
- UMLet plugin to Eclipse, fastest possible (I use)
- Linux : Dia
- Mac/Win? ...

Picking Nouns for **MP**

From UC Move

- Dice
- Piece
- Board
- Space
- Jail
- Card
- Rent
- Player
- Balance

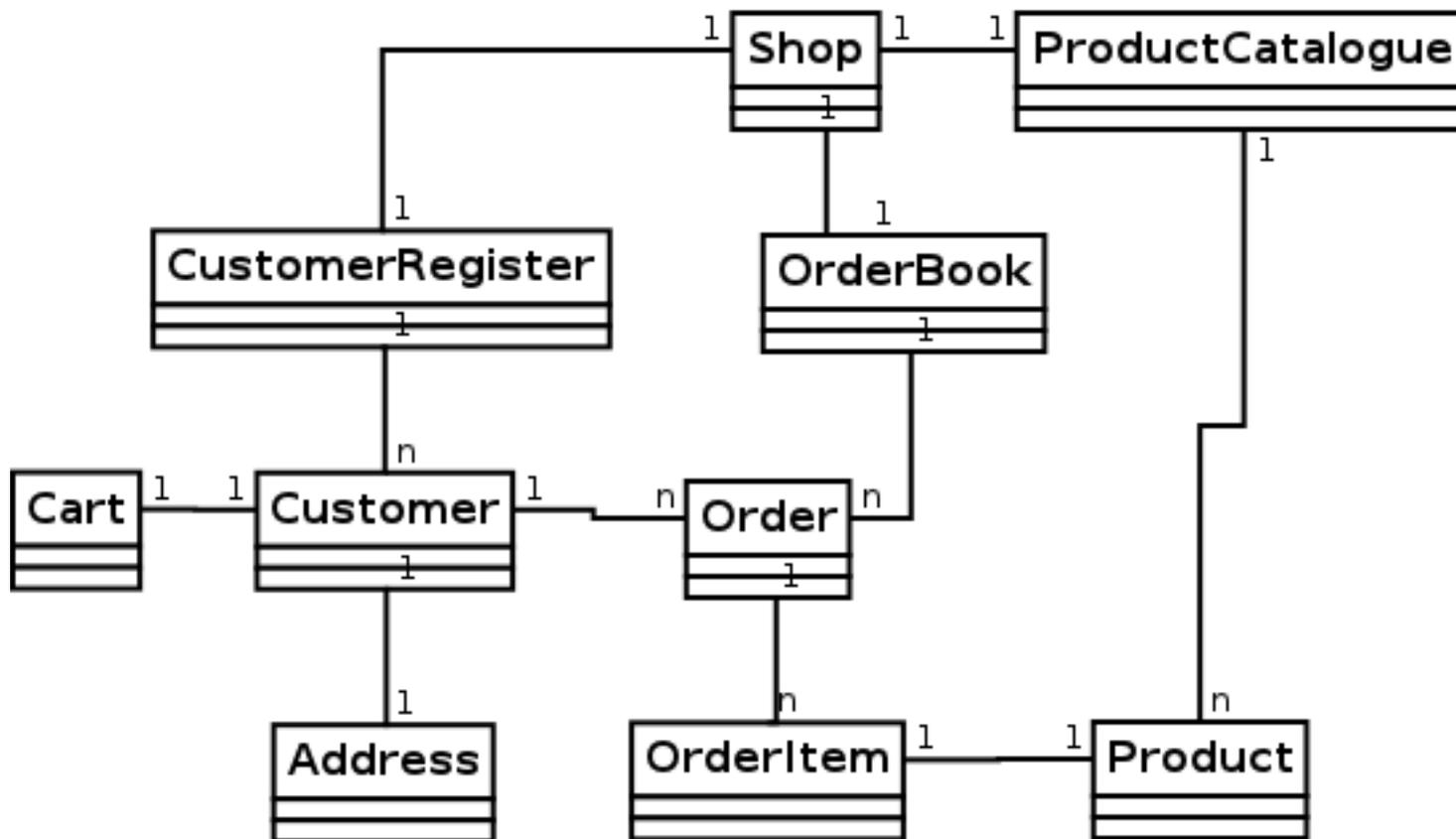
Preliminary Analysis Model for MP



This is not the ultimate truth, it's a starts of a solution...

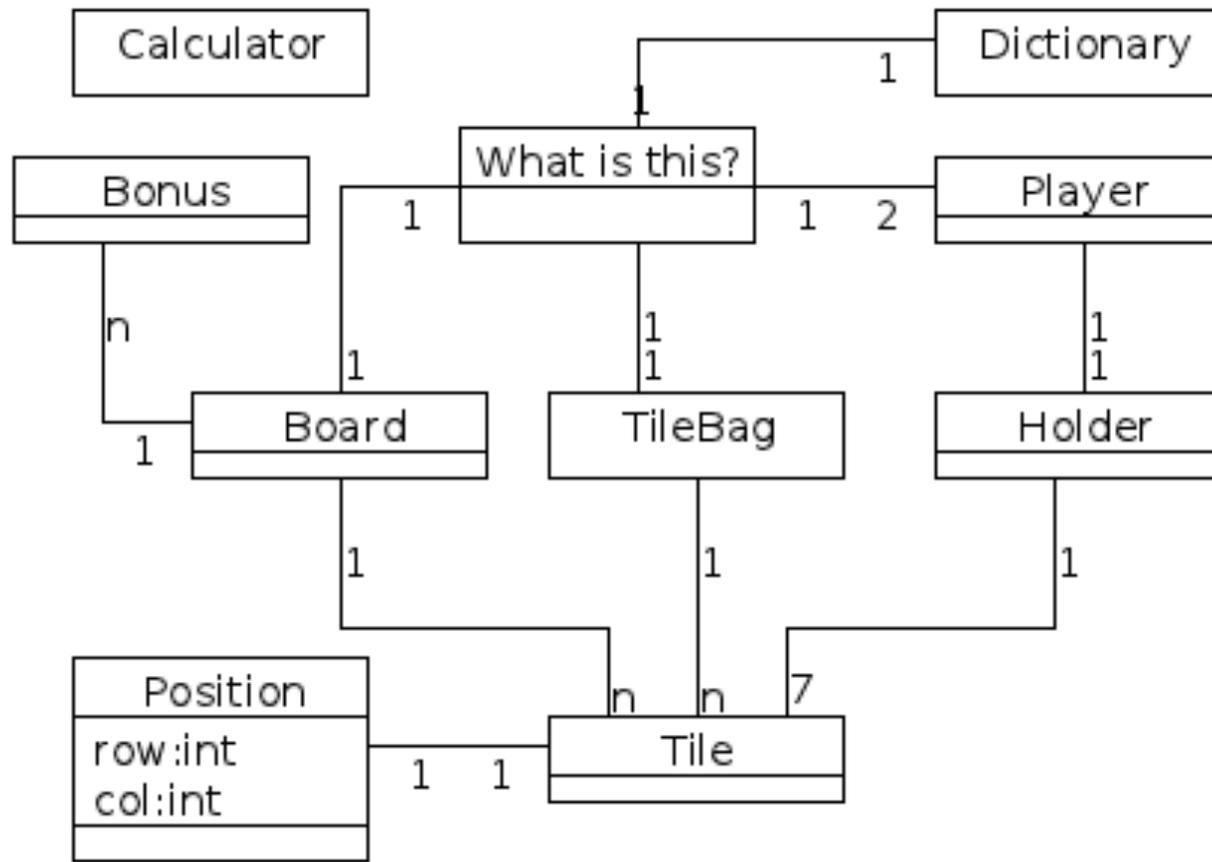
Other Example of Analysis Model

A Store



Yet Another Example of Analysis Model

A domain model of what?



Yet, Yet Another Example of Analysis

Model

Let's assume a chat application. Some possible objects

- Inbox
- UserRegistry
- Chat
- TopicList
- Topic
- Message
- ChatRoom
- ...

How are these related?

Identity and Life Cycle

How do we identify objects?

- Do classes need to define identity (later equals() method)?

Will any objects survive the execution of the program?

- If so must be able to store objects
- Objects surviving = persistent objects (persistency)

Identity and Life Cycle for **MP**

Player names must be unique!

Space names must be unique!

No objects will survive ... (for now)

More .. ?!?

Parallel Development

During this phase you can, in parallel, start implementing the GUI

- Have a mockup from RE
- Identify input/output elements from mockup
- Will change in response to the design and implementation of the model, so don't put too much effort
- Plan for techniques/tools to use

If using a different GUI-style (animated, 3d) you need to start "technical" prototyping right now!

- This is not covered in course

Technical Issues for GUI

Some Issues

- The GUI shouldn't be monolithic (i.e one huge JFrame)
- GUI is composed of many panels (custom components also good)
- Separate construction code (`JButton b = new JButton()`) and event code (listeners)
 - Use factories
- No model logic whatever in GUI
 - Don't use GUI for logical behaviour i.e. disable a button to prevent. Button disabled because of model state!
- GUI can use non-visible classes: Options, Preferences, etc. (holding "look"-data (non-model data, data not part of the domain problem))

GUI as Part of MVC

Some Issues

- EventListeners in GUI classes or...
- ..as separate classes outside (i.e. control classes in MVC)
- GUI will later be "observer" of model, technical solutions?
 - Recommended some kind of EventBus, upcoming...

GUI Tools

GUI-drawing tool often generate horrible code

- Possible many times as much code...
- Checkout before using in full scale (clean up generated code)

NetBeans and Eclipse have built in (or plugin) GUI editors

- Eclipse plugin: WindowBuilder

Using XML to define the GUI

- SwiXML
- BerylXML
- Links from course page
- Others...???



Documenting the Analysis

From previous phase we have recorded requirement elicitation in the RAD

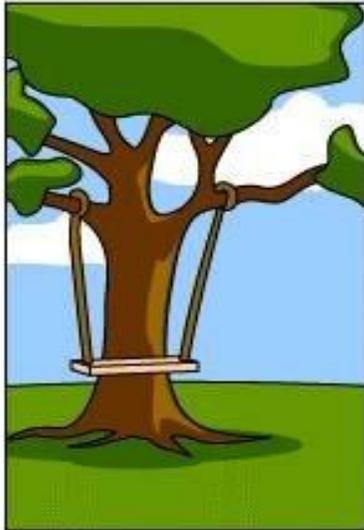
Analysis is also documented in RAD

- Include the analysis model class diagram (possible updated later)
- List: Identity & Persistency
- Possible updated GUI

Hmmm...



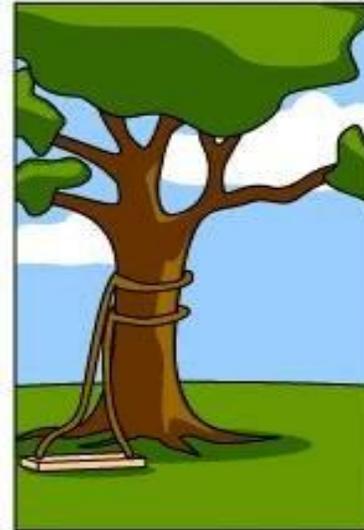
How the customer explained it



How the Project Leader understood it



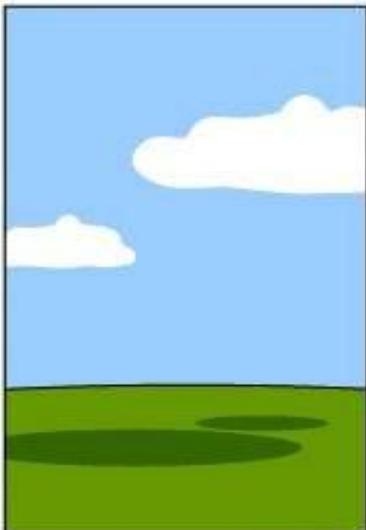
How the Analyst designed it



How the Programmer wrote it



How the Business Consultant described it



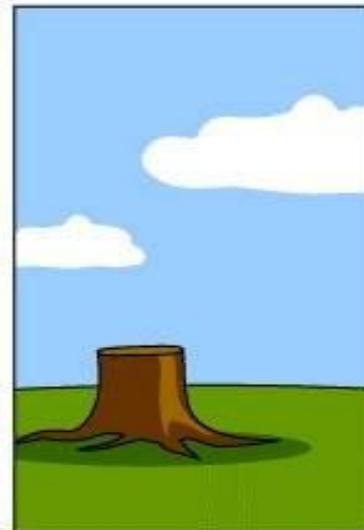
How the project was documented



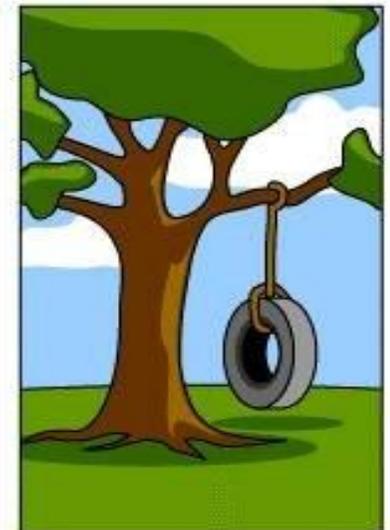
What operations installed



How the customer was billed



How it was supported



What the customer really needed

Summary

Analysis focus on building an analysis model

- We used the requirements from RAD (use cases) to find a model
 - Mostly classes, not much of attributes and methods
- We expressed the model as an UML-class diagram
- We documented model in RAD
- In parallel we develop a very basic GUI

Next: From analysis model to design model and first running increment (just a short intro to TDD before...)