Unified Modeling Language

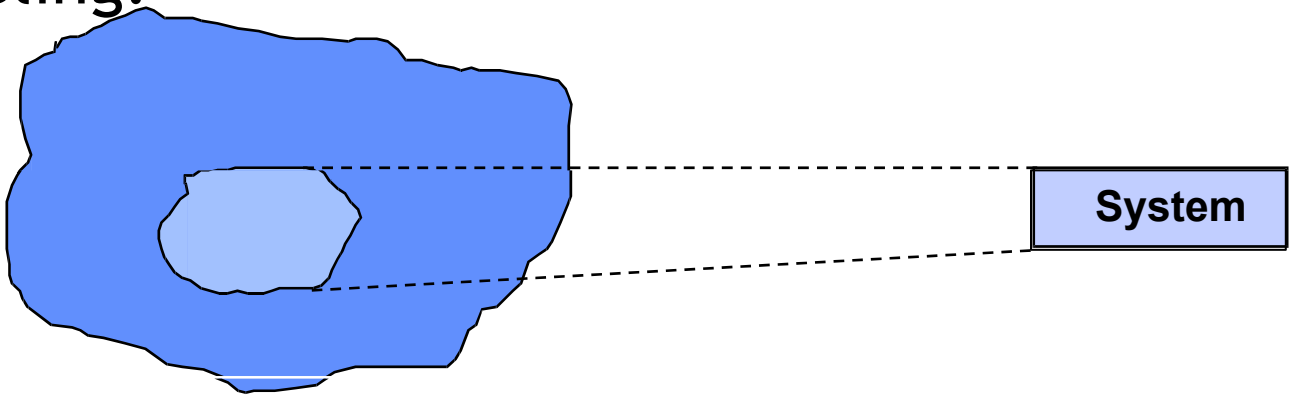
Introduction to the modeling world

Introductio

- UML or Unified Modeling Language .
- This is primarily a graphical communication mechanism for developers and customers

What is a model

- A model is a simplification of reality.
- Model provides a blueprint of a system
- When you make **a model** you are making a **mapping from the problem domain to a representation** of the system you are modeling.



Principles of

- Principle 1: “ The choice of what models to create has a profound influence on how the problem is attacked and the solution is shaped. ”
- Principle 2: “ Every model may be expressed at different level of precision. ”
- Principle 3: “ The best models are connected to reality. ”
- Principle 4: “ No single model is sufficient. ”

Why UML

- UML is a Language for
  - Visualizing
  - Specifying
  - Constructing
  - Documenting

UML is a

- A language provides a vocabulary and some rules for combining words in the vocabulary.
- The vocabulary and rules of modeling language focuses on the conceptual and physical representation of a system.
- For modeling language the notations are their vocabulary and there are some predefined rules for using them.

UML is a language for

- Most of us when given a programming problem, we just think it and we code it.
- Still we are doing some modeling
  - but mentally
- However there are several problems with this
  - Communication is harder.
  - Hard to reconstruct.
  - Some important property of the s/w can sometimes be skipped.
- Modeling can be
  - Textual
  - Graphical
- Since UML has some well defined notations and semantics so any designer can visualize the system.

UML is a language for

- Specifying means building a model that is
  - Precise
  - Unambiguous
  - Complete
- UML addresses the specification of all the important decision of
  - Analysis
  - Design
  - Implementation

UML is a language for

- UML is not a programming language.
- But it can be directly used to construct code in variety of languages.
- UML expresses the things graphically while programming language expresses the things textually.
- Forward engineering : Construction of a code from a model.
- Reverse Engineering : Reconstruction of the model from the code itself.

UML is a language for

- The following documents should also be maintained by s/w developers
  - Requirement
  - Architecture
  - Design
  - Source code
  - Project plan Tests

Where can we use UML

- Enterprise information system
- Banking and financial services
- Telecommunication
- Transportation
- Defense/ aerospace
- Retail
- Medical electronics
- Scientific
- Distributed web-based services

Conceptual

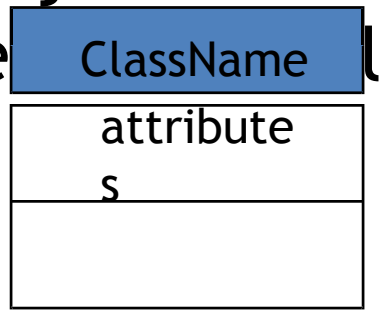
- Building blocks
  - Things
  - Relationships
  - Diagrams
- Things are the abstractions that are the first class citizens in a model.
- Relationship ties things together.
- Diagram groups interesting

Things

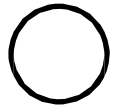
- Four kinds of things are in UML
  - Structural things
  - Behavioral things
  - Grouping Things
  - Annotational things

Structural

- These are the nouns in UML.
- Mostly there are seven kind of structural thing
  - Class -Set of objects sharing same attribute, ope lationship and semantics.



  - Interface- A collection of operations.



Interfac
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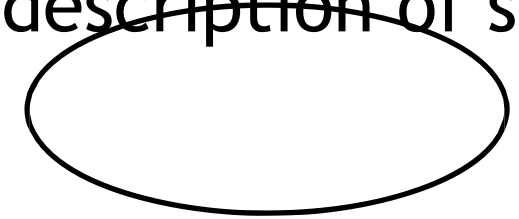
Structural

– Collaboration- defines an interaction and a society of roles and other elements that works together to provide cooperative behavior.

Collaborations

– Use case- A description of set of sequence of action.

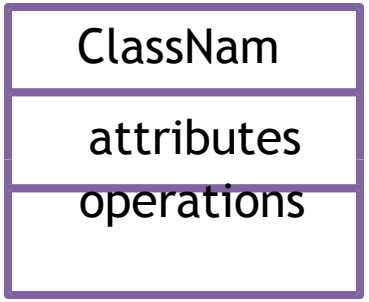


Use case name

Use case

Structural

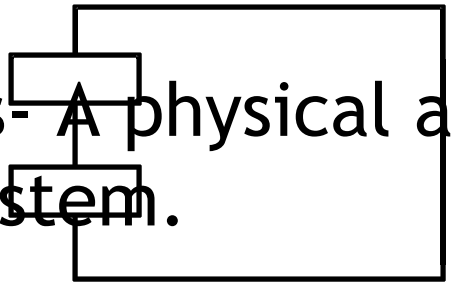
– Active Class- A class whose obiect owns a
or a
thread.



Active

Class

– Components- A physical and replaceable part of a system.

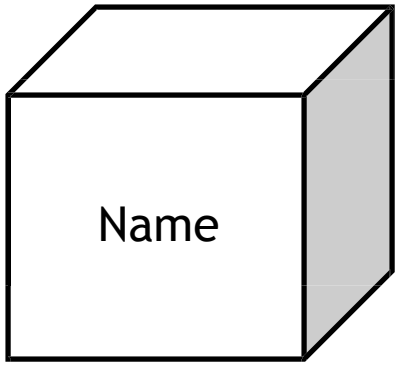


name

Component

Structural

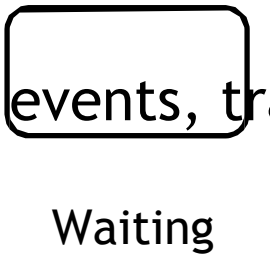
– Server- A node with some memory and processing capability.



Behavioral

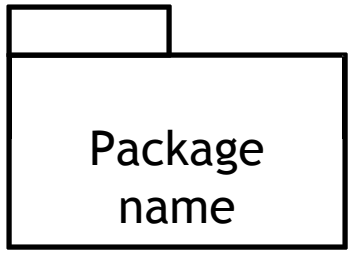
- Dynamic part of a model
- Acts as the verb of the model
- Two kinds of behavioral things are present-
  - Interaction - massage, action sequence, links etc.

  - State machine- states, events, transitions



Grouping

- Organizational part of UML.
- One kind of grouping things are available in UML
  - Packages- General purpose mechanism for organizing.



Package

Annotational

- Explanatory part of UML.
- Usually notes are used.

Relationshi

- Dependencies- Directed to the things being depended on.

Dependencies

- Association- Connections between objects.

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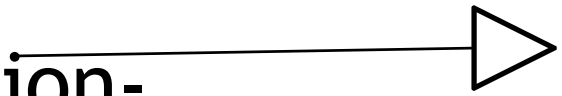
Associations

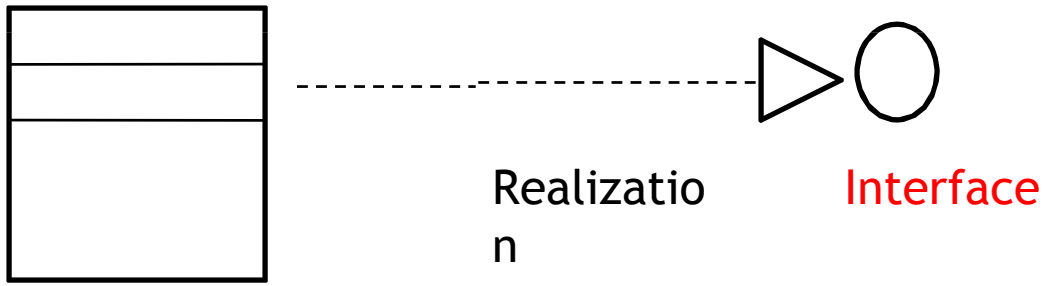
- Generalization-



Generalizati
on

Relationshi

- Realization- Used in the context of interface and collaborations.



Diagram

- Class Diagram
- Object Diagram
- Use case Diagram
- Sequence Diagram
- Collaboration Diagram
- State chart Diagram
- Activity Diagram
- Component Diagram
- Deployment Diagram