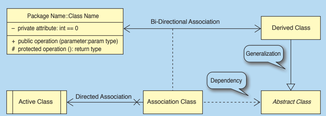
Architectural Analysis:

Purpose:
- To define the initial class structure required to support the system functionality

Artifacts:
- Classes defined by roles and responsibilities
- Class diagrams
- Initial class inheritance structure

Class Diagram:
It shows the static structure of the system in terms of the classes and their relations.



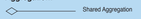
Association Adornments

Role and Label:

Multiplicity:

1	exactly one	mandatory
0..1	max. one	optional
*	many	optional
1..*	many	mandatory
n..m	min. n, max. m	

Aggregation:

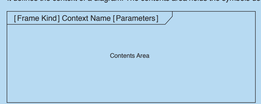


Qualifier:

Identifies instances of the target class

Ordering:

Diagram Frame:
It defines the context of a diagram. The contents area holds the symbols describing the context.



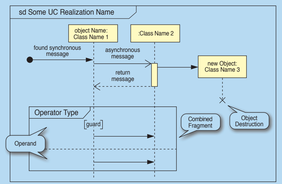
Frame Kind:
- cls (class)
- pkg (package)
- cmp (component)
- stm (state machine)
- act (activity)
- uc (use case)
- sd (interaction)

Use Case Analysis:

Purpose:
- To complete the class structure and to identify the mechanisms and dynamics required to realize the system functionality

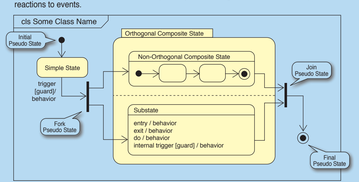
Artifacts:
- A use case realization for each use case
- Class diagrams and sequence diagrams showing how use cases are realized
- State machines for classes with state dependent behavior

Sequence Diagram:
It shows lifelines and their message exchange over time.



Operator Type:
- ref
- loop
- opt
- alt
- par
- strict
- critical
- assert
- neg

State Machine Diagram:
It shows the sequence of states that an object may have during its life and its state dependent reactions to events.

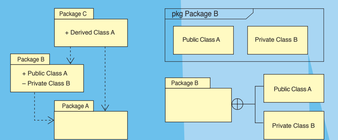


Logical Architecture:

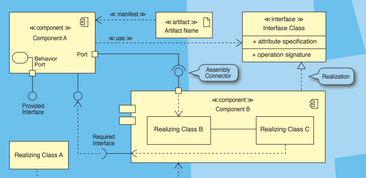
Purpose:
- To set the foundation for concurrent development
- To reduce dependencies between development units (packages and components)
- To expand the purely functional analysis model with IO related functionality

Artifacts:
- A logical architecture view showing packages, layers and subsystems in the form of package diagrams, component diagrams and component interface specifications

Package Diagram:
It shows packages, their contents as well as the overall structure and layering of the system.



Component Diagram:
It shows components, their ports, interfaces and realizing elements as well as how the components are wired. A component is a logical reusable SW unit, defined by provided and required interfaces. It is implemented by one or more manifesting artifacts.

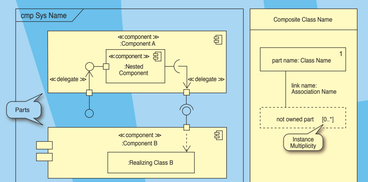


Physical Architecture:

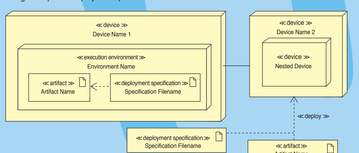
Purpose:
- To complete the design so that the system can be effectively realized
- To evolve the design and system architecture so that all requirements and constraints are satisfied

Artifacts:
- A physical architecture view showing threads, processes, artifacts and nodes in the form of composite structure, deployment, communication and timing diagrams

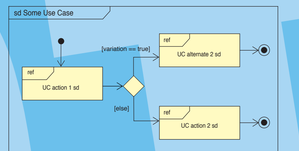
Composite Structure Diagram:
It shows the links and multiplicities of the composing parts of composite classes or components.



Deployment Diagram:
It shows the nodes, their relations and composition. It also shows the deployed artifacts along with optional deployment specifications.

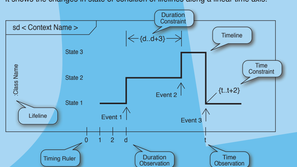


Interaction Overview Diagram:
It provides an overview of the flow of control between interaction diagrams.
It is like an activity diagram, whose nodes are interactions.

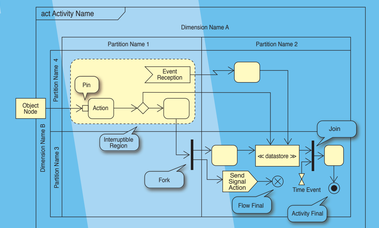


Communication Diagram:
It shows objects, their links and messages between them.

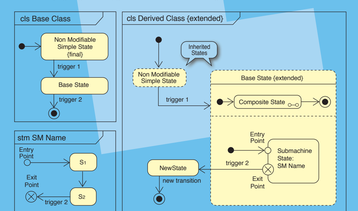
Timing Diagram:
It shows the changes in state or condition of lifelines along a linear time axis.



Activity Diagram:
It shows the sequence and conditions for coordinating actions. It also shows the related data and control flows, as well as event reception, time events and interrupts.



Advanced State Machine:
State machines and states can be extended by:
- adding new transitions, states and substates
- modifying target states, guards and actions of existing transitions



ANALYSIS DISCIPLINE

Purpose:
- To find a logical solution for the functional requirements

Artifacts:
- Complete and fully specified object oriented model, in the form of class diagrams, sequence diagrams, state machine diagrams and full class specifications

Process:

DESIGN DISCIPLINE

Purpose:
- To evolve a robust and flexible system architecture
- To satisfy all supplementary requirements (URPS and DIPI)

Artifacts:
- An architectural view highlighting the architecturally significant aspects
- A complete and fully specified object oriented model that includes package diagrams, component diagrams, composite structure diagrams, timing diagrams and deployment diagrams

Process:

Logical architecture		
Reduce class complexity and dependencies using principles of: ■ Open closed ■ Liskov substitution ■ Dependency inversion ■ Interface segregation	Define package architecture using principles of: ■ Reuse and common closure ■ Package dependency ■ Dependency direction ■ Package stability Define components and their interfaces.	Model system interfaces ■ Identify interface requirements from the use cases ■ Define a complete interface concept ■ Design and integrate interfaces with minimal changes to the functional model

Physical architecture		
Define the process view ■ Identify active classes ■ Model synchronization using timing diagrams ■ Model communication mechanisms	Define initialization of components and active classes ■ Draw composite structure diagrams	Define the physical system architecture ■ Identify physical artifacts and their contents ■ Identify nodes and assign artifacts

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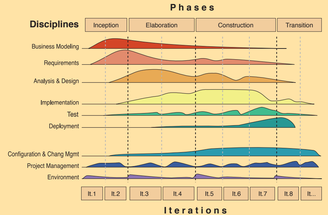
THE OO DEVELOPMENT PROCESS

The development process is:
- use case driven
- incremental & iterative
- architechture centric

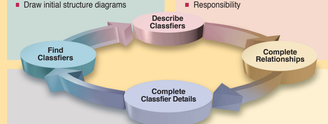


The Micro Process

It defines the core activities of object oriented analysis and design.

Find classifiers in problem domain
- Create an initial list of classifiers
- Select relevant classifiers
- Draw initial structure diagrams

Describe classifiers by
- Description
- Roles
- Responsibility



Complete classifier details
- Identify attributes
- Identify operations
- Identify state dependent behavior

Complete classifier relationships
- Describe associations
- Identify correct generalizations
- Identify dependencies and realizations

REQUIREMENTS DISCIPLINE

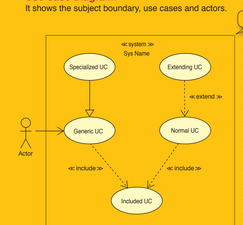
Purpose:
- To define system scope and boundaries
- To establish and maintain agreement with the customers and other stakeholders on:
  - what the system should do
  - conditions and constraints

Artifacts:
- Vision / Charter document
- Fully specified use case model (actors, use case diagrams and use case documents with optional activity and sequence diagrams)
- Supplementary requirement documents (URPS and DIPI)

Process:
- Write a vision / charter document
- Understand and model the problem domain
- Describe the system boundaries by identifying actors
- Describe system functionality by identifying and describing use cases
  - the textual specification can be enhanced with activity and sequence diagrams
- Describe the supplementary requirements

Use Case Diagram:

It shows the subject boundary, use cases and actors.

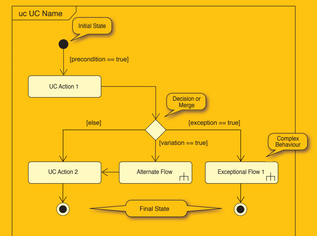


Use Case Description:

Each use case is textually described in the following manner:
- Title
- Goal
- Description
- Actors
- Pre-conditions
- Post-conditions
- Basic flow
- Exceptional flows
- Alternate flows
- Supplementary requirements

Activity Diagram:

It provides a graphical overview of the use case flow, its exceptional and alternate flows.



Sequence Diagram:

It provides a birds-eye view of the message exchange between the actors and the system.