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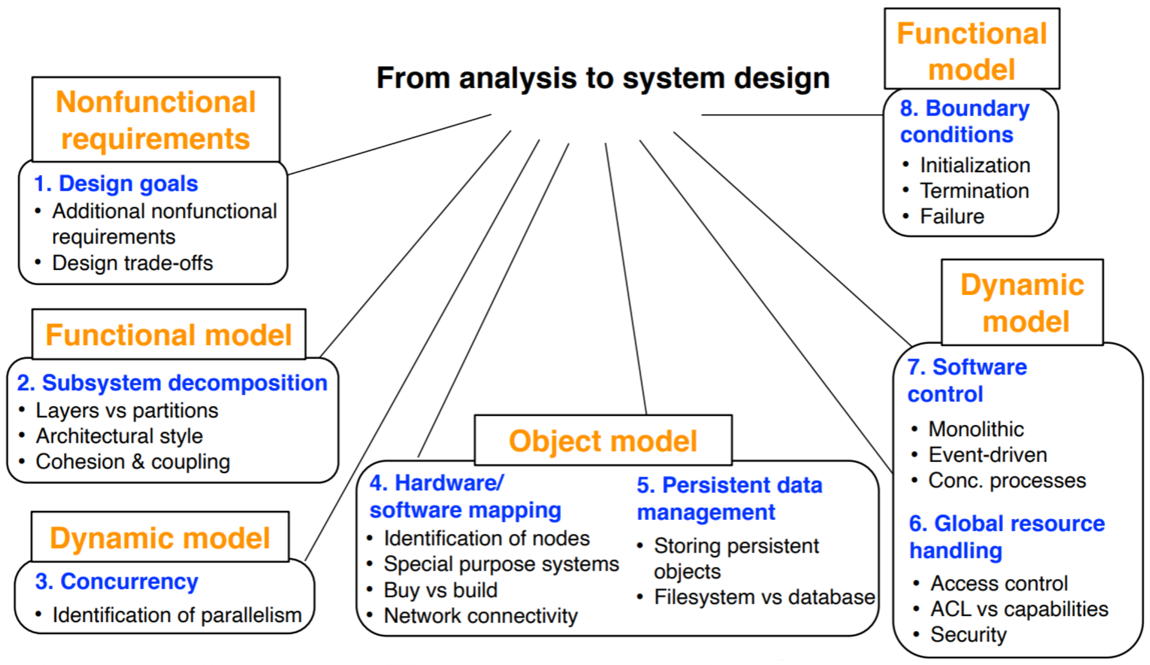
EIST Important Stuff

UML/Models

System Design



Main influence of requirements analysis artifacts to system design

Requirements analysis	System Design
Nonfunctional Requirements	1. Design Goals
Functional model	2. Subsystem decomposition 8. Boundary Conditions
Object model	4. Hardware/software mapping 5. Persistent data management
Dynamic model	3. Concurrency 6. Global resource handling 7. Software control

Clues for design Patterns

Pattern	Text

Pattern	Text
Composite Pattern	*complex structure* *must have variable depth and width*
Strategy Pattern	*must provide a policy independent from the mechanism* *must allow to change algorithms at runtime*
Proxy Pattern	*must be location transparent*
Observer Pattern (MVC)	*states must synchronized* *many systems must be notified*
Adapter Pattern	*must interface with an existing object*
Bridge Pattern	*must interface to several systems, some of them to be developed in the future* *an early prototype must be demonstrated* *must provide backward compatibility*
Façade Pattern	*must interface to existing set if objects* *must interface to existing API* *must interface to existing service*

Examples for design patterns

Adapter pattern

> *A game (-engine) could be – in theory – be designed in a way that it would be possible*
>
> *to swap out the rendering pipeline between Input Assembler and Output Merger.*
>
> *Although, this is a really unlikely and abysmally performing system, it shows that*
>
> *in practice the adapter might be more than just passing through method calls.*
>
> *In reality it will probably perform tasks like swapping data structures.*
>
> ***Advantages***
>
> - *easier to use for customers that will use the code for their own system*
> - *reusability for newer systems*
> - *TODO*
>
> ***Disadvantages***
>
> - *Slowing down performance by processing data*
> - *encourages working around an old system than renewing it*

Bridge Pattern

> *a*
>
> ***Advantages***
>
> - *a*
>
> ***Disadvantages***
>
> - *a*

Composite Pattern

> *a*
>
> ***Advantages***
>
> - *a*
>
> ***Disadvantages***
>
> - *a*

Bridge Pattern

> *a*
>
> ***Advantages***
>
> - *a*
>
> ***Disadvantages***
>
> - *a*

Bridge Pattern

> *a*
>
> ***Advantages***
>
> - *a*
>
> ***Disadvantages***
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> - *a*

Bridge Pattern

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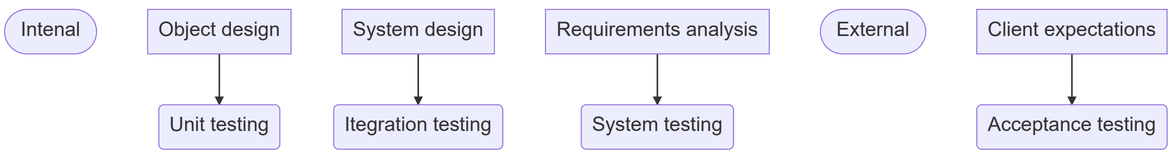
3 ways to use UML models

- **Communication** common vocabulary for informal communication → Target: human (developer, end user)
- **Analysis and design** enable developers to specify a future system → Target: CASE tool, compiler
- **Archival** provide a way for storing the design and rationale of an existing system → Target: human (analyst, project manager)

Typical software development activities

Requirements elicitation	What is the problem?	Application domain
Analysis		
System design	What is the solution?	Solution domain
Object design	What are the best data structures and algorithms for the solution?	
Implementation	How is the solution constructed?	
Testing	Is the problem solved?	
Delivery	Can the customer use the solution?	Application domain
Maintenance	Are enhancements needed?	

Testing



JUnit

Annotations

- `@Test`
- `@Test(expected=IllegalArgumentException.class)`
- `@Test(timeout=100)` (in ms)
- `@Before`
- `@After`
- `@BeforeClass` (static method)

- `@AfterClass` (static method)
- `@Ignore(String)` ignore Test, print out string instead

Integration Testing approaches in layered architecture

- Big bang approach (not good, for example for waterfall model)

  > *Test all Classes in Unit Tests separately before running one test for their entire integration*

- Stubs and drivers
  - stub

    > *a component that is below the current implementation [top down integration]*

  - driver

    > *a component that is above the current implementation [bottom up integration]*

- Bottom-Up Integration
  - no stubs
  - useful for
    - oo-systems
    - performance oriented systems (real-time)
  - drivers NEEDED
  - User Interface implemented last
- Top Down integration
  - test cases can be defined related to the functional requirements
  - no drivers
  - stubs NEEDED, writing difficult, large number might be needed
  - Interfaces may not be tested separately
- Modified Top Down integration
  - Test each layer separately
  - NEEDS both stubs and drivers
- Horizontal Integration (bath above are such integrations)
  - difficult with larger systems
- Vertical Integration
  - Scenario driven design
  - Used in scrum

Blackbox and Whitebox testing

Blackbox testing

> *In and output behavior of the system*
>
> *testing partitions : test -1, 0, 1 instead of all numbers*

Whitebox testing

> *Coverage*
>
> *Is all code run during a test to validate its quality*