

Managing object-oriented software engineering

To introduce a new development process into an organization must be done with great care. It is essential to introduce the new process smoothly, and often a pilot project is selected to try a new process in the organization.

It involves applying principles and practices specific to object oriented methodologies to ensure effectiveness development, deployment, and maintenance of software systems.

Key factors involved in managing dose have:

- I) Project selection and preparation
- II) Product development organization.
- III) Project organization and management
- IV) Project staffing
- V) Software quality assurance.
- VI) Software metrics

Project selection and preparation.

There are five levels of process maturity of software development in organization that are defined by people which are (This is for new project development) (not so important)

- 1 Initial level: No documented method is being used.
- 2 Repeatable level : A method exists, but has not been formalized or written down.
- 3 Defined level: A formal , documented process of developing systems exists.
- 4 Managed level: formal measurements of different characteristics of processes and product are continuously performed.
- 5 Optimizing level The measurements from level (4) are systematically used as feedback to optimize the process.

for new development, a suitable way is to select a smaller project for new development or a limited re-engineering of an existing system.

Selecting the First project.

- 1) Select a real project that is important, but not with a tight time schedule or any other hard constraints
- 2) Select a problem domain that is well defined and well known.
- 3) Select people with experience from system development who have a positive view of changes
- 4) Select a project manager with high degree of interest in the task
- 5) The staff should work fulltime within the project and not be disturbed by other projects.
- 6) Base your work on a detailed plan developed in advance.

Preparation

- All person involved in the new order of work need education and training
- Give strict method process definition, more emphasis can be put on formal education and training.

A new development process involves a lots of changes which brings potential risks.

We can follow following steps in managing the risk in OOSE:

- i) Risk identification
- ii) Risk valuation
- iii) Managing the risks

Since introducing the new methods involves large risk, we should do the benefit analysis of new methods involved.

Product development organization:

When developing a product, the basic organization of a project should be built-around the product and the activities associated with the development of the product.

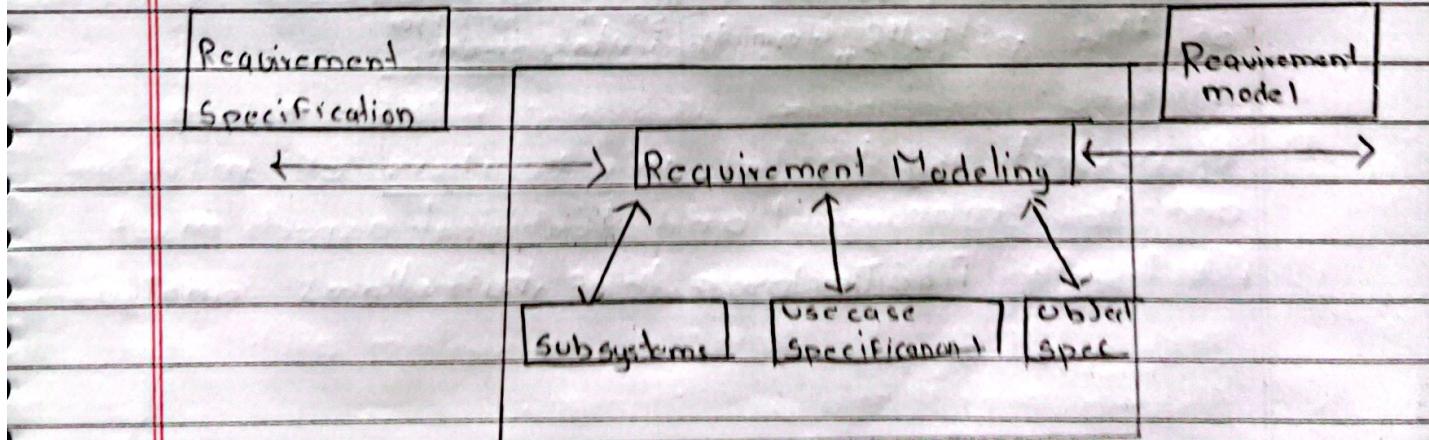


Fig: The process of requirement analysis

o Product development is to develop different models in sequence.

o The first model to be developed is requirement model.

o The requirements analysis process delivers a well-defined result. the requirement model with the use case specification.

o The next is analysis process which forms the well defined result process model.

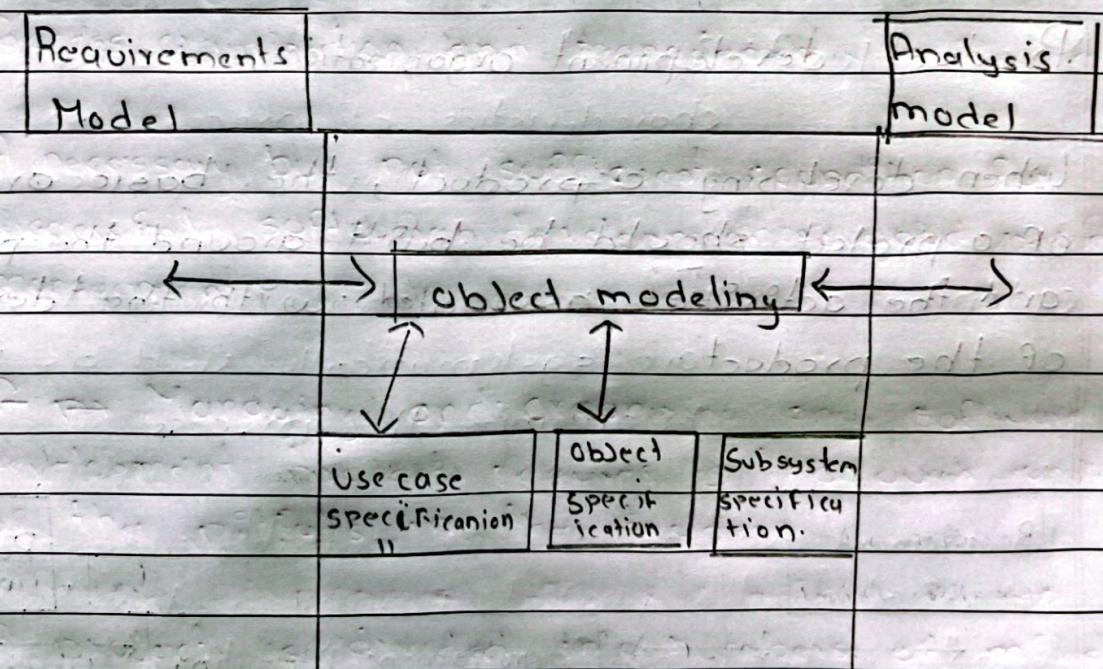
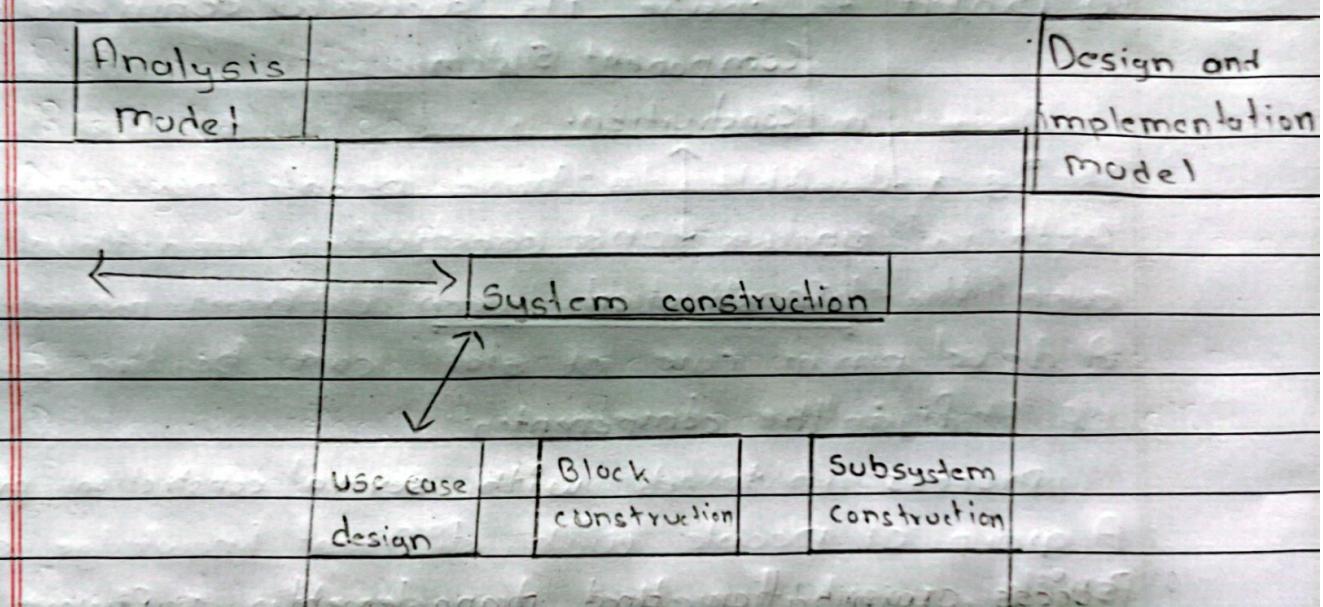


Fig: The process of robustness analysis

Analysis model is the input for the construction process. The construction process has three sub processes. They are use case design, block construction and subsystem construction.



The process of construction

The well defined result delivered by construction process is design model and source code for the unit-test blocks

The next is testing process

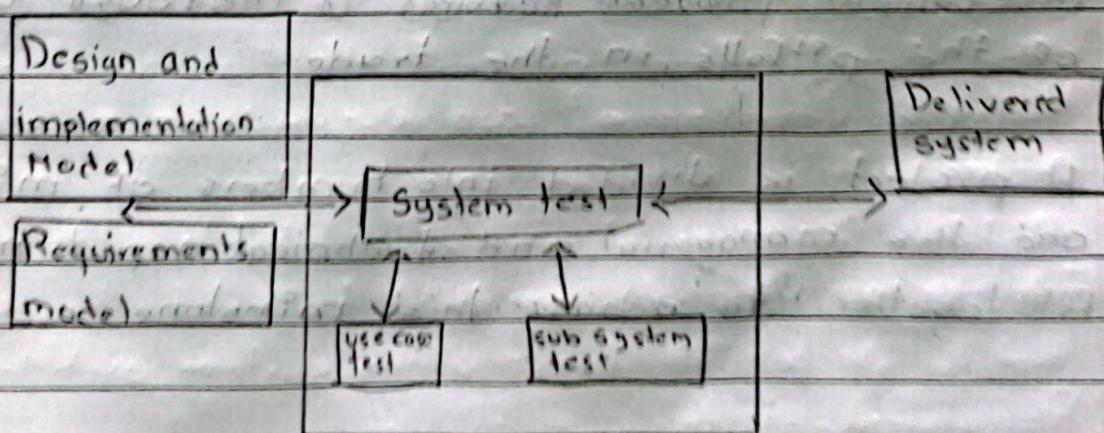


Fig: Testing process

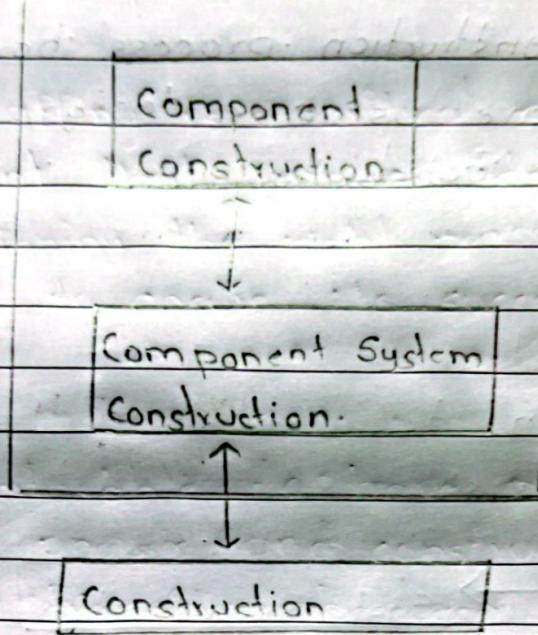


fig: the component

process interacts with several construction process

Process organization and management

- A necessary but not sufficient condition for successful software development is good project management
- ↳ Managing and organizing any software development project requires a thorough understanding of the pitfalls in the trade.
- ↳ A project is divided into numbers of milestone and the managerial and technical aspects must fit together to achieve this milestone

Milestone are concrete, objectively defined deliverables.

Project management phases are:

- I) Prestudy
- II) Feasibility study
- III) Establishment

Execution.

Conclusion.

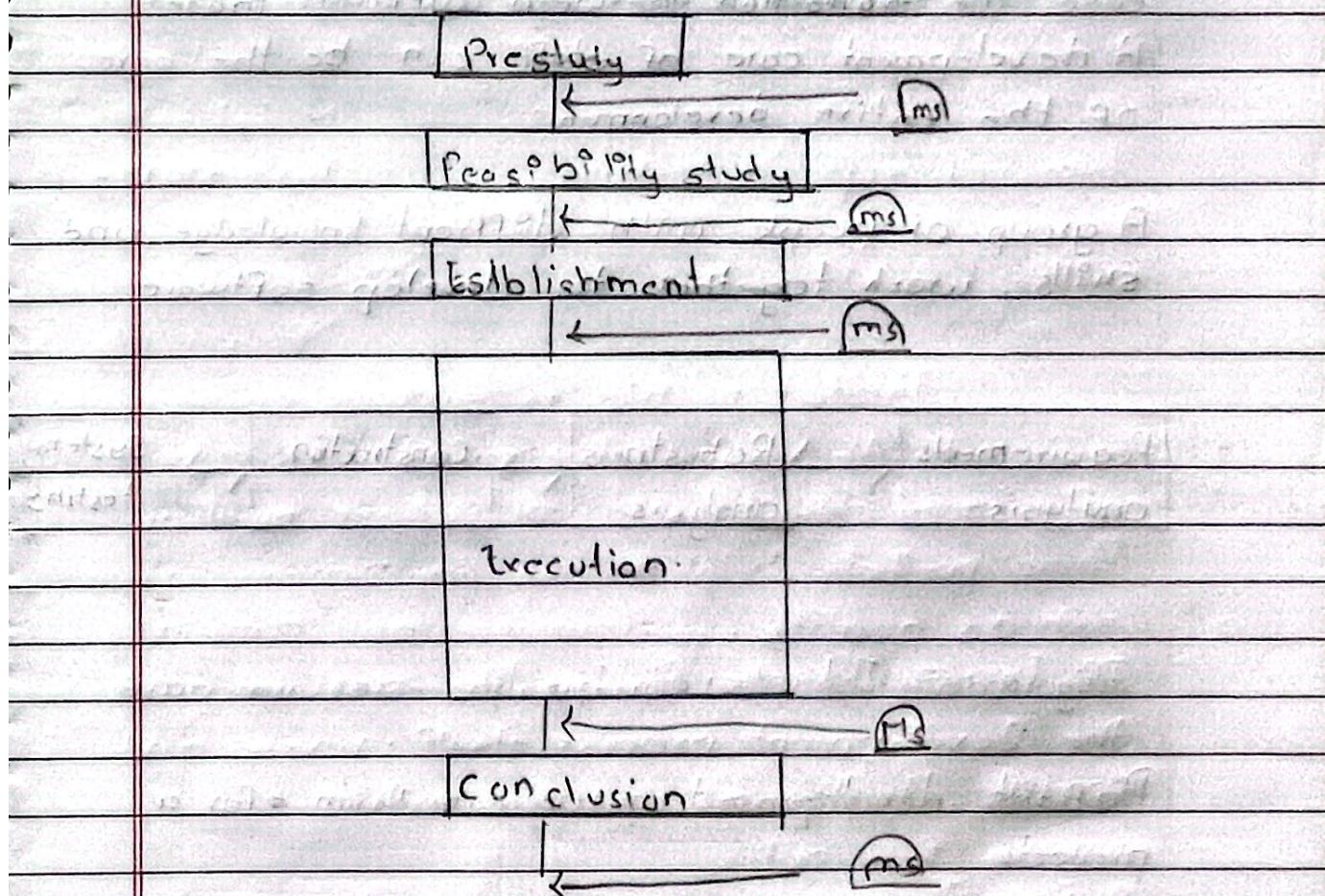


Fig: Management part of the project

Project staffing

Project staffing is a critical aspect of project management that involves identifying, acquiring and assigning the right personnel to tasks within a project to ensure its successful completion.

It is valuable to have people participate both in analysis and construction and thus ease the transition between different models. A development core of staff can be the core of the entire development.

A group of people with different knowledge and skills, work together to develop software

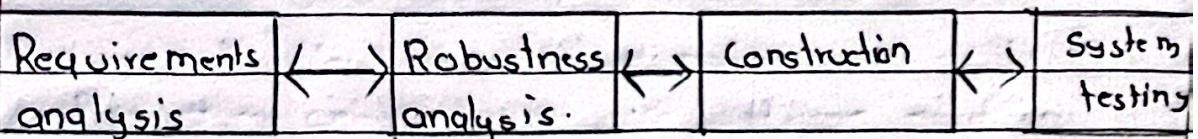


Figure 18 The coordination processes in oose

Different development group can form for a projects

- (I) System architecture group.
responsible for making system architecture
- (II) Requirement analysis group.

Development personnel group

Testing group

Besides the actual development groups, there are other roles and groups in the projects

- Methodologist
- Quality Assurance
- Documentation, manuals and training
- Reuse coordinator
- Staff
- Help system coordinator.

Software quality assurance

Software quality assurance (SQA) aims at ensuring that the final product will have an acceptable quality. It is mainly a management activity to identify quality problems early in the development.

Quality assurance focuses on both the product and the process. The product-oriented part of SQA should ensure that the software delivered has a minimum number of faults and satisfies the user need.

The material to work with when doing SQA is mainly the documentation produced during development

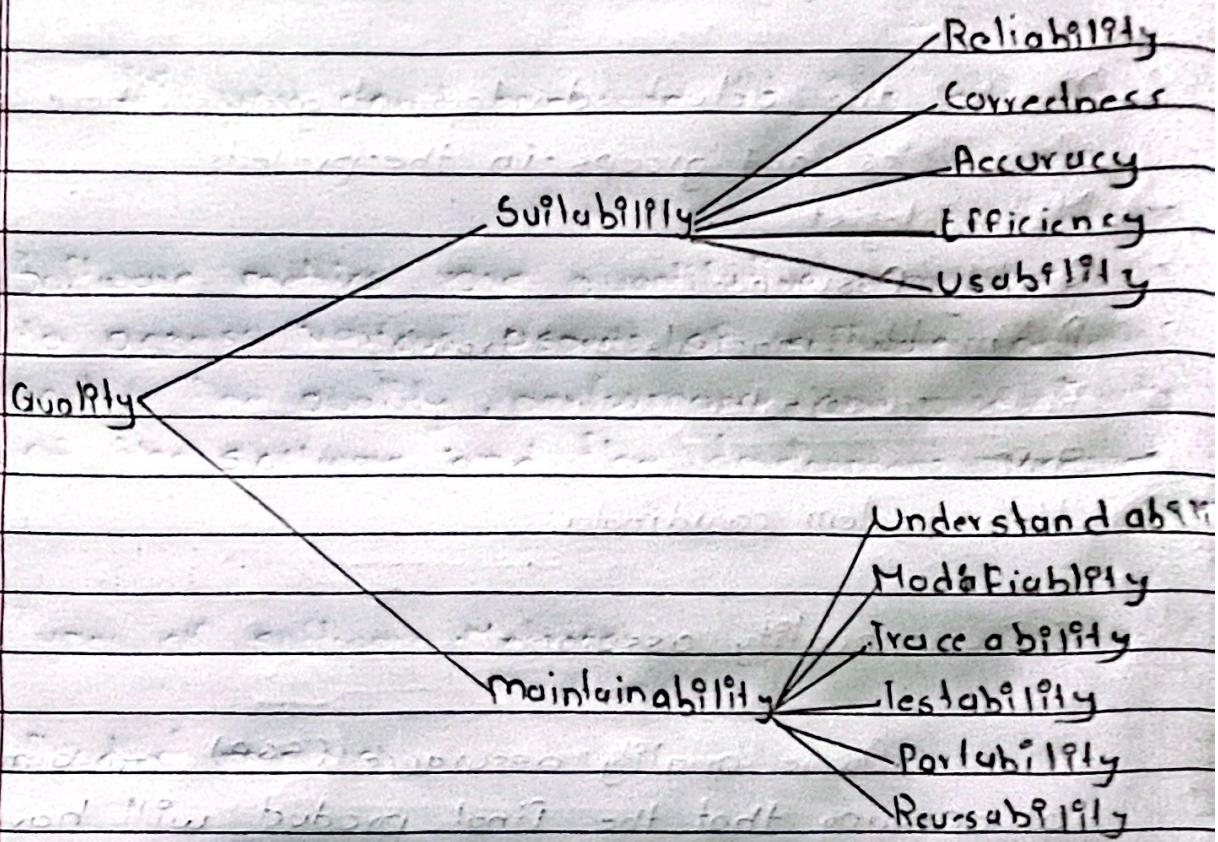


Fig Some characteristics of software quality product

The main tools for quality assurance are the development process itself; reviews and audits, testing me and also metrics.

A form formal review's objective is to decide whether to proceed to next steps or not

The aim of review's is to ~~decide~~ discover errors that have been made.

Different kinds of reviews have been defined by IEEE. Three different kind of reviews are

o Review

A formal meeting at which a model is presented to user customer or other interested parties for comment and approval.

o Inspection

A formal evaluation technique in which models are examined in detail by a person or group other than the author to detect errors, violations of development standards and other problems.

o Walk through

A review process in which developer leads one or more other members of the development team through a segment of a model that he or she has written while the other members ask questions and make comments about the code.

The QA group should not function as a policemen but rather, together with the development team, increase the quality of what is being done.

Software metrics

"If you can't measure it, it's not engineering"

Software metrics are quantitative measures used to assess various aspects of software development, including the quality, performance, and productivity of the software and the development processes.

Types of software Metrics

1) Product metrics

Product metrics in software engineering refers to the quantitative measures used to assess the characteristics of software product. These metrics help in evaluating various aspects such as quality, performance and complexity of the software.

Some common product metrics are:

- Fan in - fan out
- length of code
- cyclomatic complexity
- length of conditional nesting
- fog index

Process metrics

Process metrics is quantitative and qualitative measure related to a process, its performance and its evolutions.

Example of process related metrics

- Total development time
- Cost for quality assurance

Process related metrics may form a basis for future planning

Types of process metrics:

- I) static process metrics
- II) Dynamic process metrics
- III) Process evolution metrics

The actual code metrics that are more appropriate for OOSE are

- I) Total no. of classes
- II) Number of classes reused and the number newly developed.
- III) Total number of operation
- IV) Number of operation reused and the number newly developed.