

Software Maintenance

1 Types of maintenance

Definition: Corrective Maintenance

Fixed/repaired

Definition: Adaptive maintenance

Adapted to changing needs

Definition: Perfective maintenance

Improved in performance or maintainability

Definition: Preventive maintenance

Improved by fixing bugs before they activate

2 Maintenance problems

Staff problems:

- Limited understanding
- Management priorities
- Morale

Technical problems:

- Artifacts and paradigms
- Testing difficulties

3 Process metrics

May be used to assess maintainability:

- Number of requests for corrective maintenance
- Average time required for impact analysis
- Average time taken to implement a change request
- Number of outstanding change requests

4 Techniques for maintenance

Definition: Program comprehension

Reading and understanding programs in order to implement change

Definition: Reverse engineering

Analyse software to identify the components and their inter-relationships to produce call graphs and control flow graphs

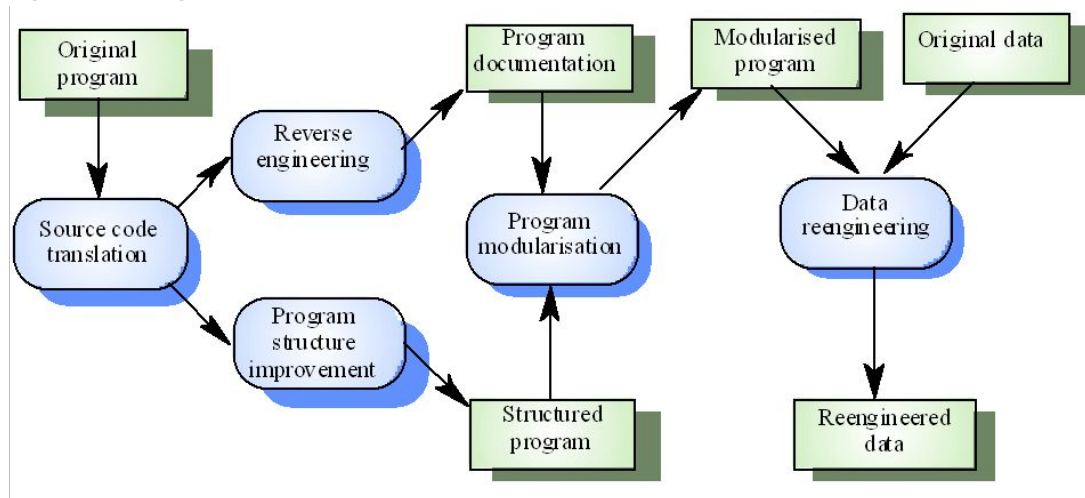
Definition: Migration

Modify to run in a different environment

Definition: Re-engineering

Restructuring or rewriting part or all of a legacy system without changing its functionality to make it easier to maintain

5 Re-engineering



5.1 Refactoring vs re-engineering

Refactoring is a continuous process of improvement throughout the development and evolution process. It is intended to avoid the structure and code degradation that increases the costs and difficulties of maintaining a system.

Re-engineering takes place after a system has been maintained for some time and maintenance costs are increasing. You use automated tools to process and re-engineer a legacy system to create a new system that is more maintainable.

6 Legacy systems

Multiple strategies for legacy systems:

- Scrap the system completely
- Continue maintaining the system
- Transform the system by re-engineering to improve its maintainability
- Replace the system with a new system

6.1 Legacy system categories

	Low quality	High quality
Low business value	Scrap the system	Replace with COTS, scrap or maintain
High business value	Re-engineer or replace	Continue in operation with maintenance