Software Maintenance :-

It is a process of modifying a software system after it has been delivered to the customer.

Goals :

i) improve system's functionality
ii) " " performance
iii) " " reliability
iv) To adapt changing environments and requirements.

Need for maintenance :-

i) Correct faults
ii) Improve the design
iii) Implement enhancements
iv) Interface with other systems.
v) Migrate legacy software
vi) Retire software
vii) Requirement of user change.
viii) Run the code fast

Categories of Software Maintenance :-

i) Corrective Maintenance :-

It is essential either to rectify some bugs observed while the system is in use, or, to enhance the performance of the system.

ii) Adaptive Maintenance :-

This includes modifications and updations when the customers need the product to run on new platforms, on new OS, or when they need the product to interface with new hardware and software.

iii) Perfective Maintenance :-

To support the new features that users want to or change different type of functionalities of the system according to user's demands

(iv) Preventive :-
To prevent future problems of the software. It goals to attend problems which are not significant at this moment but may cause serious issue in future.

Reverse Engineering :-
Reverse ~~code~~ ~~of~~ engineering is the process of extracting knowledge or design information from anything man-made and reproducing it based on extracted info.

→ Also called - Back- engineering
→ Main objective : To check how the system works.

Software Reverse Engineering :- Process of recovering the design and the requirements specs. of a product from an analysis of it's code.

| |

Software Re-engineering :-

Cost of software Maintenance :-

It includes :-

       i). **Labor cost :-** developers, engineers, technicians etc.

       ii). **Hardware & Software cost :-** costs of hardware, & software such as servers, software licenses, and development tools.

       iii). **Training cost :-** It includes the cost of training personnel to perform maintenance tasks, such as developers, engineers and technicians.

Effort of Software Maintenance :- It includes:-

i) **Time & resources:-** time and resources required to perform the maintenance, such as time required to identify and fix the problem, test the solution, and implement the solution.

ii) **Communication & Coordination:-** Effort required to communicate and coordinate with the stakeholders, such as customers and other teams.

iii) **Testing & validation:-** This includes the effort required to test and validate the solution to ensure that its working properly.

System Configuration Management :- (SCM):-

→ It is an arrangement of exercises which controls change by recognizing the items for change, setting up connection b/w those things, making/characterizing instruments for overseeing diverse variants, controlling the changes being executed in current framework, inspecting and revealing on the changes made.
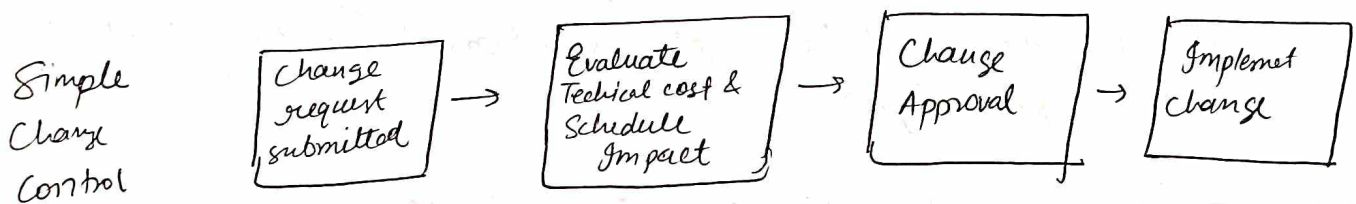
Processes Involved:-
   i)- Identification & Management
   ii) version Control
   iii)- Change control
   iv) Configuration auditing
   v) Reporting

SCM Tools:- CFEngine, Bcfg2 server etc.

Objectives of SCM :-

- To identify the configuration of the ~~product~~ software at various point in time.
- Systematically control change to the configuration.
- Maintain the integrity and tractability of the configuration throughout the ~~product~~ software life cycle.

Change - Control Process :-

Simple
Change
Control

| Change request submitted | → | Evaluate Technical cost & Schedule Impact | → | Change Approval | → | Implement change |

Change Control Board (CCB) ★

Version Control :-

Creating version/specifications of the existing product to build new products from the help of SCM system.
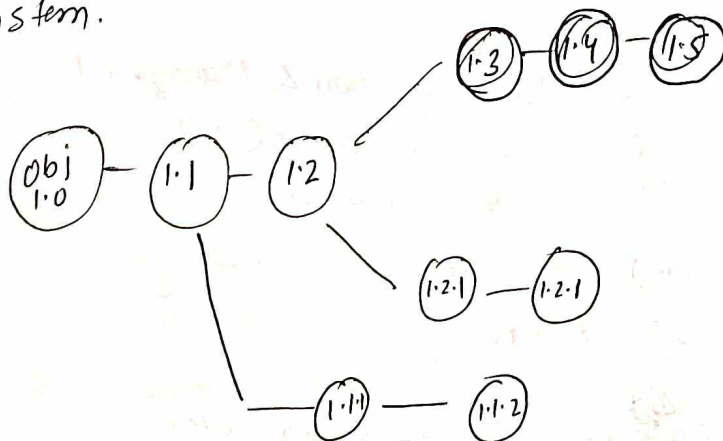
<u>Risk Management :-</u> A risk is a probable problem - it might happen or might not.

<u>Characteristics :-</u> i) Uncertainity
                          ii) Loss

<u>Risk mangement consists of :-</u>

i) Risk Identification
ii) Risk Analysis
iii) Risk Planning
iv) Risk Monitoring

<u>3 - classes of Risk :-</u>

i) <u>Project Risk :-</u>

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3-classes of Risk :-

1) **Project Risk :-** Projects risks concern various sorts of monetary funds, schedules, personnel, resource, and customer-related issues.
    example:- schedule slippage.

2) **Technical Risks :-** Technical risks concern potential sty implementation, interfacing, testing, and maintenance issue

~~Technical~~
  → It embodies :-
    i) ambiguous specification
    ii) incomplete specification
    iii) dynamic   "
    iv) technical uncertainity
    v) Technical degenration.

3) **Business Risks :-** It embodies the risks of building a superb product that nobody needs, losing monetary funds or personal commitments etc.

Resource Allocation:

To assign the available resource in an economic way is known as resource allocation.

2-parts:

① Strategic planning:

In strategic planning resource allocation is plan for using available resources; for example, human resources, specially in the near term, to achieve goals for the future.

② Resource Leveling:-

It's main objective is to smooth resource requirement by shifting slack jobs beyond periods of peak requirement.

Approach for resource allocation:-

1) Manual Approach
2) Algorithmic Approach :- using computer program
3) Combination of both