SOFTWARE MAINTENANCE

Major Thoughts !!!!!

- What is maintenance?
- When is it required?
- Why it is required?

Answers

- Activities required or undertaken to conserve as nearly, and as long, as possible the original condition of an asset or resource while compensating for normal wear and tear

OR

Consists of the activities required to keep a software system operational and responsive after it is accepted and made operational at user site.

- The life of your software does not end when it finally launches. In reality, its life has just begun when software is deployed to be used by end user.

- To avoid any major breakdown

Introduction

- **Software maintenance in software engineering** is the modification of a **software** product after delivery
  - To correct faults.
  - To improve performance or other attributes.
- A common perception of **maintenance** is that it merely involves fixing defects/bugs/faults.
- Software maintenance is widely accepted part of SDLC now a days.
- It stands for all the modifications and updations done after the delivery of software.

Software Maintenance - Terminology

- **Software Maintenance**
  - Consists of the activities required to keep a software system operational and responsive after it is accepted and deployed on user site.

- **Software Maintainer**
  - Person whose mission is to support existing software systems

CAUSES FOR MAINTENANCE

- **Market Conditions**
  - Policies, which changes over the time, such as taxation and newly introduced constraints like, how to maintain bookkeeping, may trigger need for modification.
- **Client Requirements**
  - Over the time, customer may ask for new features or functions in the software.

- **Host Modifications**
  - If any of the hardware and/or platform (such as operating system) of the target host changes, software changes are needed to keep adaptability.

- **Organization Changes**
  - If there is any business level change at client end, such as reduction of organization strength, acquiring another company, organization venturing into new business, need to modify in the original software may arise

Maintenance Categories

- Corrective maintenance
- Adaptive maintenance
- Perfective maintenance
- Preventive maintenance

CORRECTIVE MAINTENANCE

- Deals with the repairing faults or defects being faced in regular system functions.
- A defect can result due to errors in software design, logic and coding.
- Design errors occur when changes made to the software are incorrect, incomplete, wrongly communicated, or. the change request is misunderstood
- Logical errors result from invalid tests, incorrect implementation of design specifications, faulty logic flow, or incomplete test of data.

- All these errors, referred to as residual errors, prevent the software from conforming to its agreed specifications.
- The need for corrective maintenance is usually initiated by bug reports drawn by the users.
- The approach in corrective maintenance is to locate the original specifications in order to determine what the system was originally designed to do.
- In the event of a system failure due to an error, actions are taken to restore the operation of the software system.
- Corrective maintenance accounts for 20% of all the maintenance activities.

PERFECTIVE MAINTENANCE

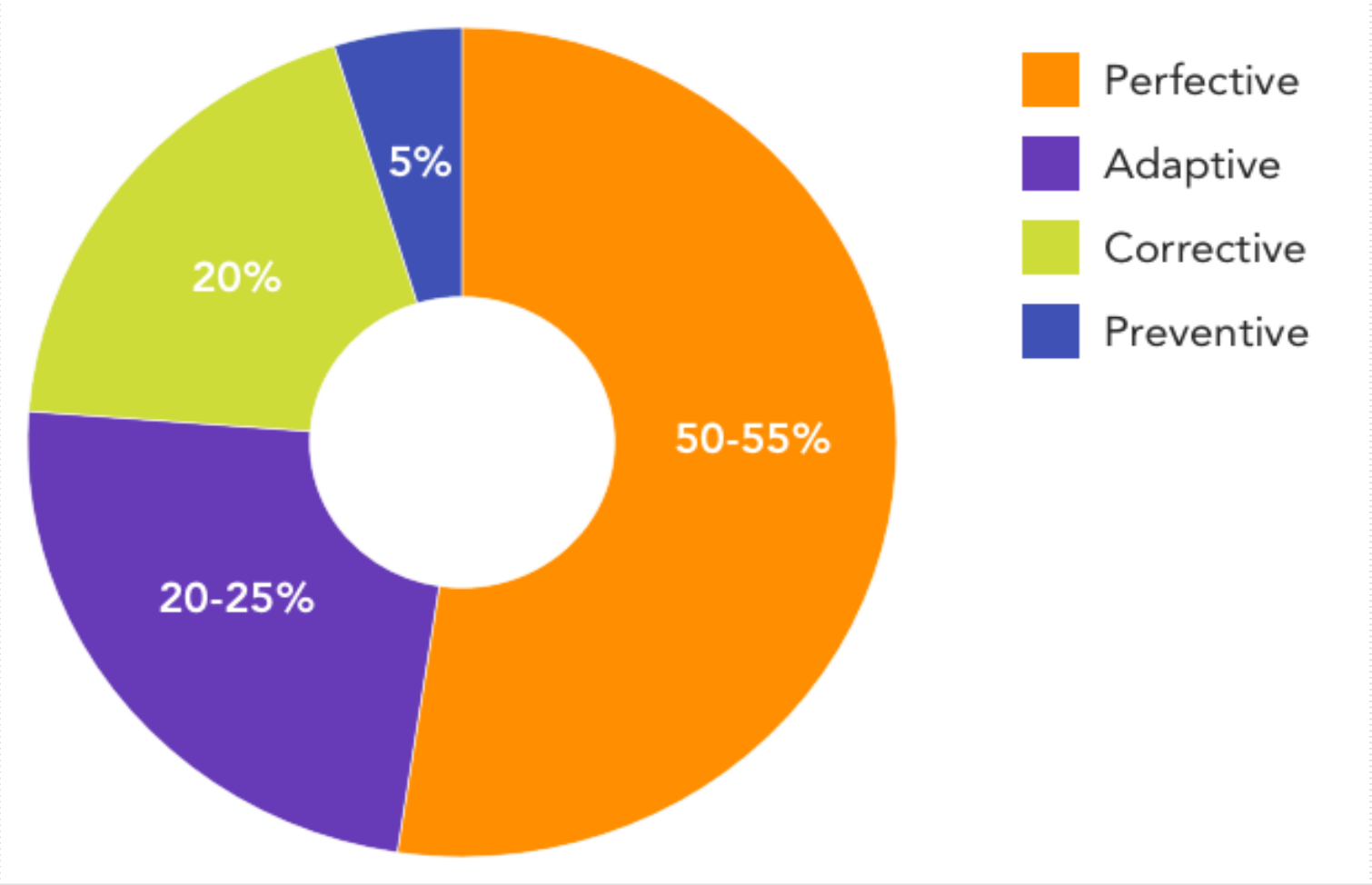
- Deals with implementing new or changed user requirements.
- Involves making functional enhancements to the system in addition to the activities to increase the system's performance even when the changes have not been suggested by faults.
- Includes all efforts to improve the quality of the software.
- Includes restructuring code, creating and updating documentation, improving reliability or efficiency.
- Perfective maintenance accounts for 50%, that is, the largest of all the maintenance activities.

ADAPTIVE MAINTENANCE

- Adaptive maintenance is the implementation of changes in a part of the system, which has been affected by a change that occurred in some other part of the system.
- Adaptive maintenance consists of adapting software to changes in the environment such as the hardware or the operating system.
- The term environment in this context refers to the conditions and the influences which act (from outside) on the system i.e. business rules, work patterns, and government policies etc.
- Adaptive maintenance accounts for 25% of all the maintenance activities.

PREVENTIVE MAINTENANCE

- Preventive maintenance involves performing activities to prevent the occurrence of errors.
- It tends to reduce the software complexity thereby improving program understandability and increasing software maintainability.
- It comprises documentation updating, code optimization, and code restructuring.
- Documentation updating involves modifying the documents affected by the changes in order to correspond to the present state of the system.
- Code optimization involves modifying the programs for faster execution or efficient use of storage space.
- Preventive maintenance is limited to the maintenance organization only and no external requests are acquired for this type of maintenance.
- Preventive maintenance accounts for only 5% of all the maintenance activities.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Perfective
Adaptive
Corrective
Preventive

MAINTAINABILITY

- Maintainable software exhibits:

1. Effective modularity.
2. It makes use of design patterns that allow ease of understanding.
3. It has been constructed using well-defined coding standards and conventions.
4. It has undergone a variety of quality assurance techniques.
5. It has been created by software engineers who recognize that they may not be around when changes must be made.
6. Therefore, the design and implementation of the software must “assist” the person who is making the change.