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Software Quality Assurance & Testing

- **Software:** program + associated documentation, support and resources.

  User → Application S/W → OS → H/W
  (Indirectly communicating with hardware).

- **Types of Software:**

  (1) Application Software : word processors, browsers, etc.
  - General-purpose
  - Customized.

  (2) System Software : essential for system operation (OS & drivers)
  (3) Utility Software : Editors, IDE, compilers, interpreters.

- **Quality:-**
  - Associated with satisfaction of requirements (Customer/ Consumer's point of view)
  - Associated with function compliance of software with proposed requirements (product's point of view).

- **Requirement Types:-**

  Implied :- not stated explicitly, to be inferred.
  Explicit :- Specified by a user.

→ All requirements cannot be explicitly stated as :-

- requirements may arise from competition.
- all requirements cannot be identified.
- requirements may be dependant on current trends in tech.

→ General-purpose s/w must cater needs of millions, so all requirements (especially those in conflict) may not be met. Further requirements may change over time.

- Quality of conformance :- How well a product meets specified standards.
- Quality of design :- - Transforming stated requirements from implied requirements.
  - Minimizing implied requirements (due to mis-communication)
  - Minimize gap of unfulfilled requirements (defects)

design for varying markets, budget-range, etc.

* Requirements must be repeatedly assured. Fulfilling once is not enough, must be constantly measured.
(meeting these requirements in a consistent & repeatable manner)

- Importance of Quality in S/w :-

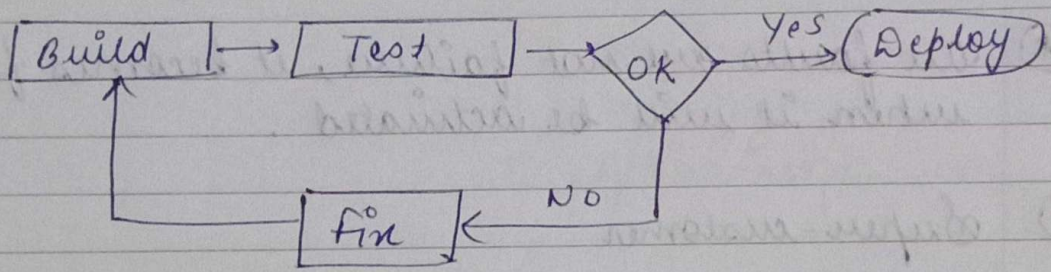
- Extreme dependency, especially over life saving &

mission critical softwares for which proper function is critical with no defects.

- Increasing requirements & expectations based on increasing competition.
- High scope of error due to tight deadlines, less resources for development.
- No second chance in mission-critical applications.

- **Minimizing & Eliminating defects :-**

Quality Control :- Testing after a given time to detect defects. (after the product is build)



- Expensive in nature (time & cost expectations).
- possible during Build phases only (not after deployment).

Quality Assurance :- testing in parallel after deployment based on reviews, examinations, etc.

Soft. Qual Ass. for

13/09/22

IEEE definition of software Quality -

- Code
  procedures
  documentation
  data
  } consists of these

- ISO definition -

  program/code, procedures, doc., data.

- Software errors → not all soft errors are soft faults.
  → grammatical / logical / conceptual mistake

fault :- → affect the functionality then fault.

(*) all faults are not failure, it becomes failure when it will be activated.

(*) Super-customer

- client developer communication failure
- incomplete req.
- unnecessary req.

(*) non-compliance with documentation & coding inst.

- Shortcomings of Testing process

- procedural errors.
- documentation errors.

1.4 Practical app. to Software Quality

- listing of non-existing software functionalities.

- IEEE def^{n} of S/W Quality -

  degree to which a system meets the specified req.

- Juran's definition

- SQA definitions

  CMM → gives level to the organization

  capability maturity model.

  → levels by CMM

  1 - initial
  2 - Repeatable
  3 - Defined
  4 - Managed
  5 - Optimizing