

What is Quality?

Quality is extremely hard to define and it is simply stated "Fit for use or purpose". It is all about meeting the needs and expectations of customers with respect to functionality, design, reliability, durability, & price of the product.



What is assurance?

Assurance is nothing but a positive declaration on a product or service ,which gives confidence. It is certainty of a product or a service, which it will work well. It gives a guarantee that the product will work without any problems as per the expectations or requirements.

What is Quality Assurance?

Quality Assurance popularly known as **QA**, is an activity to ensure that an organization is providing the best possible product or service to customers. **QA focuses on improving the processes** to deliver Quality Products to the customer. An organization has to ensure ,that processes are efficient, and effective as per the quality standards defined for software products.

Quality assurance has a defined cycle called PDCA cycle or Deming cycle.The phases of this cycle are:

- Plan
- Do
- Check
- Act



These above steps are repeated to ensure that processes followed in the organization are evaluated and improved on a periodic basis. Let's look into the above steps in detail -

- Plan - Organization should plan and establish the process related objectives and determine the processes that are required to deliver a high Quality end product.
- Do - Development and testing of Processes and also "do" changes in the processes
- Check - Monitoring of processes, modify the processes, and check whether it meets the predetermined objectives
- Act - Implement actions that are necessary to achieve improvements in the processes

An organization must use quality assurance to ensure that the product is designed and implemented with correct procedures. This helps reduce problems and errors, in the final product.

What is Quality Control?



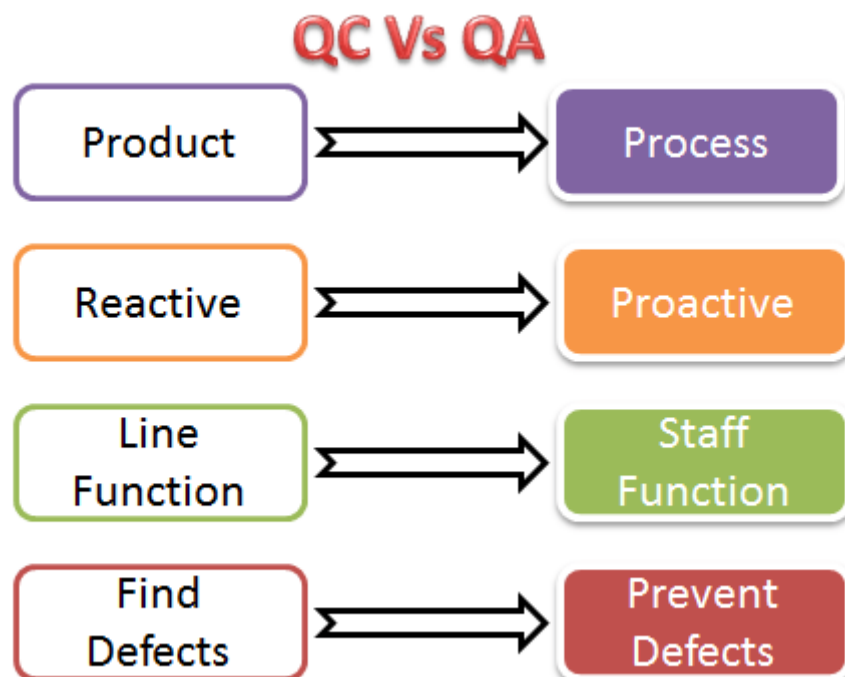
Quality control popularly abbreviated as QC, is a process used to ensure quality in a product or a service. It does not deal with the processes used to create a product, rather it examines the quality of the "end products" and the final outcome.

Main aim of Quality control is to check whether the products meet the specifications and requirements of the customer. If an issue or problem is identified, it needs to be fixed before delivery to the customer.

QC also evaluates people on their quality level skill sets and imparts training and certifications. This evaluation is required for the service based organization, and helps provide "perfect" service to the customers.

Difference between Quality Control and Quality Assurance?

Sometimes, QC is confused with the QA. Quality control is to examine the product or service and check for the result. Quality assurance is to examine the processes and make changes to the processes which led to the end-product.



Examples of QC and QA activities are as follows:

Quality Control Activities	Quality Assurance Activities
Walkthrough	Quality Audit
Testing	Defining Process
Inspection	Tool Identification and selection
Checkpoint review	Training of Quality Standards and Processes

The above activities are concerned with QA and QC of any product and not essentially software. With respect to software

- QA becomes SQA (Software Quality Assurance)
- QC becomes Software Testing.

Following table explains on differences between SQA and Software Testing:

SQA	Software Testing
Software Quality Assurance is about engineering process that ensure quality	Software Testing is to test a product for problems before the product goes live
Involves activities related to implementation of processes, procedures and standards. Example - Audits Training	Involves actives with respect to verification of product Example - Review Testing
Process focused	Product focused
Preventive technique	Corrective technique
Proactive measure	Reactive measure
The scope of SQA applied to all products that will be created by the organization	The scope of Software Testing applies to a particular product being tested.

Quality Assurance Certifications:

There are several certifications available in the industry to ensure that Organizations follow Standards Quality Processes. Customers makes this as qualifying criteria while selecting a software vendor.

ISO 9000

This standard was first established in 1987, and it is related to Quality Management Systems. This helps the organization ensure quality to their customers and other stakeholders. An organization who wishes to be certified as ISO 9000 is audited based on their functions, products, services and their processes. The main objective is to review and verify whether the organization is following the process as expected and check whether existing processes needs improvement.

This certification helps -

- Increase the profit of the organization
- Improves Domestic and International trade
- Reduces waste and increase productivity of the employees
- Provide Excellent customer satisfaction

CMMI level

The **Capability Maturity Model Integrated (CMMI)** is a process improvement approach developed specially for the software process improvement. It is based on the process maturity framework and used as general aid in business processes in Software Industry. This model is highly regarded and widely used in Software Development Organizations.

CMMI has 5 levels. An organizations is certified at CMMI level 1 to 5 based on the maturity of their Quality Assurance Mechanisms.

- Level 1 - **Initial**: In this stage quality environment is unstable. Simply, no processes has been followed or documented
- Level 2 - **Repeatable** : Some processes are followed which are repeatable. This level ensures processes are followed at the project level.
- Level 3 - **Defined** : Set of processes are defined and documented at the organizational level. Those defined processes are subject to some degree of improvement.
- Level 4 - **Managed** : This level uses process metrics and effectively controls the processes that are followed.
- Level 5 - **Optimizing** : This level focuses on the continuous improvements of the processes through learning & innovation.

Test Maturity Model (TMM):

This model assesses the maturity of processes in a Testing Environment. Even this model has 5 levels , defined below -

- Level 1 - **Initial**: There is no quality standard followed for testing processes and only ad-hoc methods are used at this level
- Level 2 - **Definition**: Defined process .Preparation of test strategy, plans, test cases are done.
- Level 3 - **Integration**: Testing is carried out throughout the software development life cycle (SDLC) - which is nothing but integration with the development activities E.g. V- Model.
- Level 4 - **Management and Measurement**: Review of requirements and designs takes place during this level and criteria has been set for each level of testing

- Level 5 - **Optimization:** Many preventive techniques are used for testing processes and tool support(Automation) is used to improve the testing standards and processes.

Conclusion:



Quality Assurance is to check whether the product developed is fit for use. For that, Organization should have processes and standards to be followed which need to be improved on a periodic basis. It concentrates mainly on the quality of product / service that we are providing to the customers during or after implementation of software.