UNIT 5

MEASURING SOFTWARE QUALITY USING QUALITY METRICS

In Software Engineering, Software Measurement is done based on some Software Metrics where these software metrics are referred to as the measure of various characteristics of a Software.
In Software engineering Software Quality Assurance (SAQ) assures the quality of the software. Set of activities in SAQ are continuously applied throughout the software process. Software Quality is measured based on some software quality metrics.
There is a number of metrics available based on which software quality is measured. But among them, there are few most useful metrics which are most essential in software quality measurement. They are –

1. Code Quality
2. Reliability
3. Performance
4. Usability
5. Correctness
6. Maintainability
7. Integrity
8. Security

Now let's understand each quality metric **in detail –**

1. Code Quality – Code quality metrics measure the quality of code used for the software project development. Maintaining the software code quality by writing Bug-free and semantically correct code is very important for good software project development. In code quality both Quantitative metrics like the number of lines, complexity, functions, rate of bugs generation, etc, and Qualitative metrics like readability, code clarity, efficiency, maintainability, etc are measured.

2. Reliability – Reliability metrics express the reliability of software in different conditions. The software is able to provide exact service at the right time or not is checked. Reliability can be checked using Mean Time Between Failure (MTBF) and Mean Time To Repair (MTTR).

3.Performance – Performance metrics are used to measure the performance of the software. Each software has been developed for some specific purposes. Performance metrics measure the performance of the software by determining whether the software is fulfilling the user requirements or not, by analyzing how much time and resource it is utilizing for providing the service.

4.Usability – Usability metrics check whether the program is user-friendly or not. Each software is used by the end-user. So it is important to measure that the end-user is happy or not by using this software.

5. Correctness – Correctness is one of the important software quality metrics as this checks whether the system or software is working correctly without any error by satisfying the user. Correctness gives the degree of service each function provides as per developed.

6. Maintainability – Each software product requires maintenance and up-gradation. Maintenance is an expensive and time-consuming process. So if the software product provides easy maintainability then we can say software quality is up to mark. Maintainability metrics

include time requires to adapt to new features/functionality, Mean Time to Change (MTTC), performance in changing environments, etc.

7. Integrity – Software integrity is important in terms of how much it is easy to integrate with other required software's which increases software functionality and what is the control on integration from unauthorized software's which increases the chances of cyberattacks.

8. Security – Security metrics measure how much secure the software is? In the age of cyber terrorism, security is the most essential part of every software. Security assures that there are no unauthorized changes, no fear of cyber attacks, etc when the software product is in use by the end-user.