

Software Testing Fundamentals

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Agenda:-

- Introduction
- Importance of testing in SDLC
- Testing life cycle
- Test planning
- Types of testing
- Verification & Validation
- Quality Assurance & Control
- Bug reporting

Introduction to Software Testing

Software Testing

Software testing is a process used to identify the correctness, completeness and quality of developed computer software.

It is the process of executing a program / application under positive and negative conditions by manual or automated means. It checks for the :-

- ❖ Specification
- ❖ Functionality
- ❖ Performance

Why Software Testing ?

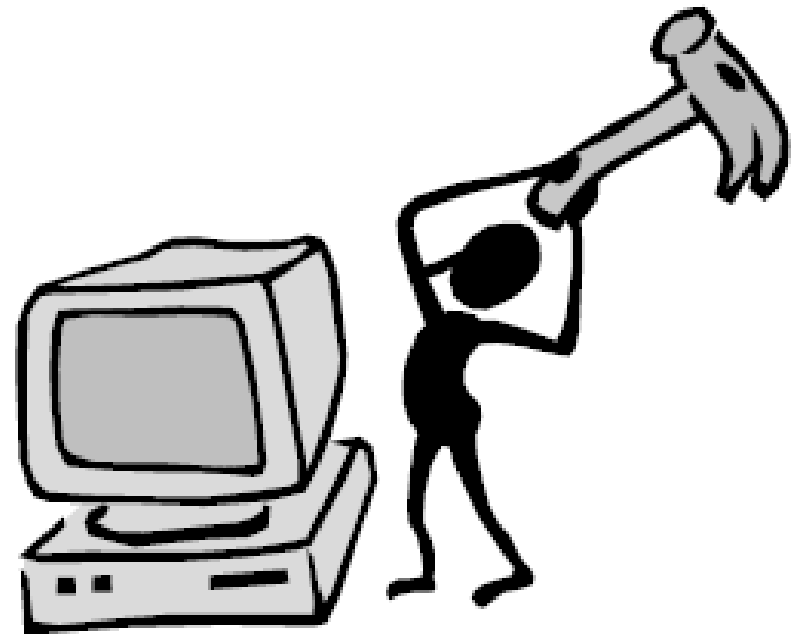
Software Testing is important as it may cause mission failure, impact on operational performance and reliability if not done properly.

Effective software testing delivers quality software products satisfying user's requirements, needs and expectations.

Who Should Test?



- Developer
 - Understands the system
 - But, will test gently
 - And, is driven by deadlines



- Independent tester
 - Must learn system
 - But, will attempt to break it
 - And, is driven by “quality”

What ...????

...is an "ERROR"??

....is a "Bug"??

....is Fault, Failure ??

Bug, Fault & Failure

A person makes an **Error**
That creates a **fault** in software
That can cause a **failure** in operation

- Error** : An error is a human action that produces the incorrect result that results in a fault.
- Bug** : The presence of error at the time of execution of the software.
- Fault** : State of software caused by an error.
- Failure** : Deviation of the software from its expected result. It is an event.

Who is a Software Tester??..

Software Tester is the one who performs testing and find bugs, if they exist in the tested application.

The Testing Team

✓ **Program Manager-**

- The planning and execution of the project to ensure the success of a project minimizing risk throughout the lifetime of the project.
- Responsible for writing the product specification, managing the schedule and making the critical decisions and trade-offs.

✓ **QA Lead-**

- Coach and mentor other team members to help improve QA effectiveness
- Work with other department representatives to collaborate on joint projects and initiatives
- Implement industry best practices related to testing automation and to streamline the QA Department.

✓ **Test Analyst\Lead-**

- Responsible for planning, developing and executing automated test systems, manual test plans and regressions test plans.
- Identifying the Target Test Items to be evaluated by the test effort
- Defining the appropriate tests required and any associated Test Data
- Gathering and managing the Test Data
- Evaluating the outcome of each test cycle

✓ **Test Engineer-**

- Writing and executing test cases and Reporting defects
- Test engineers are also responsible for determining the best way a test can be performed in order to achieve 100% test coverage of all components

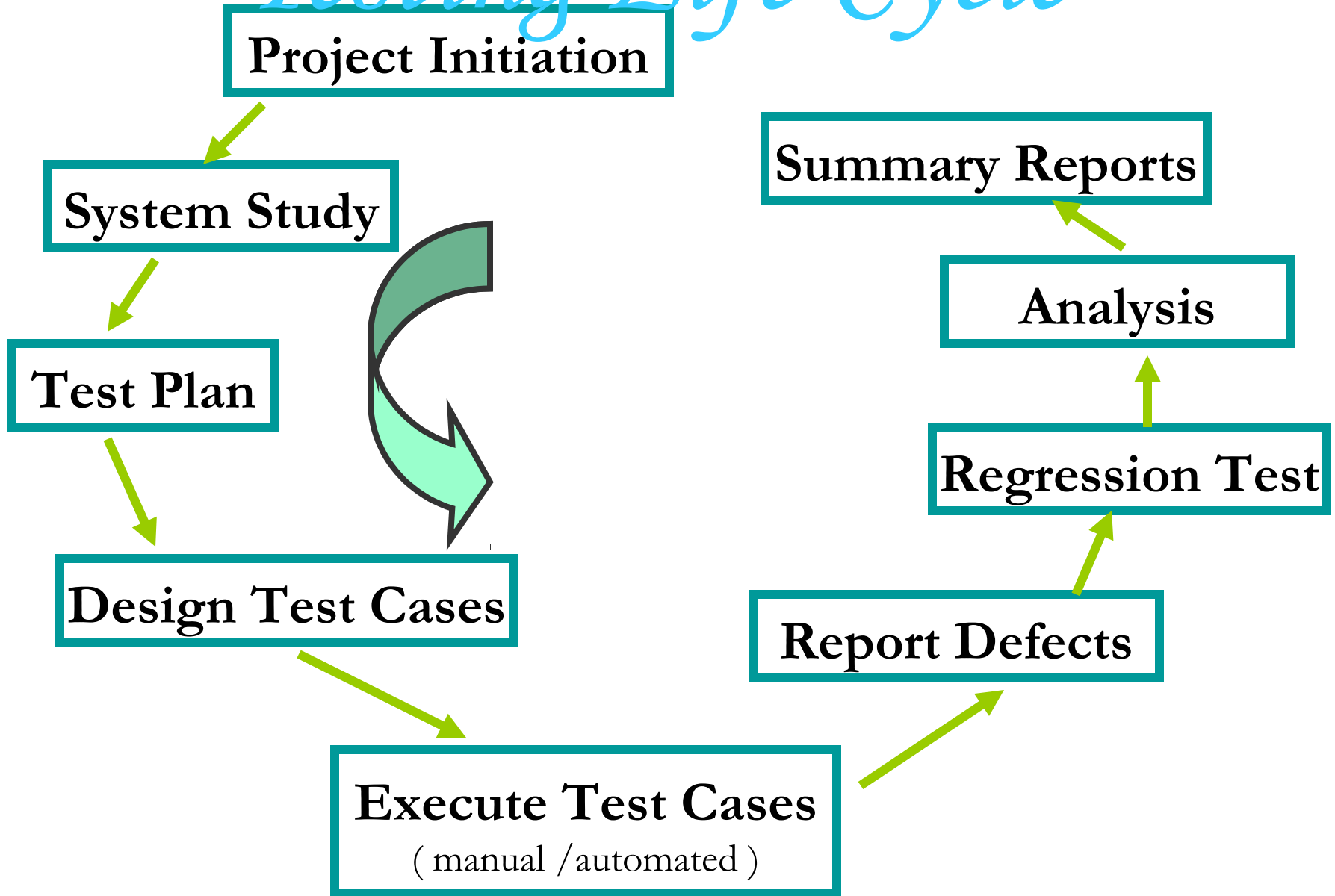
Importance Of Testing In SDLC

When to Start Testing in SDLC

- Requirement
- Analysis
- Design
- Coding
- Testing
- Implementation
- Maintenance

❖ *Testing starts from Requirement Phase*

Testing Life Cycle



Test Planning

Test Plan

A test plan is a systematic approach to testing a system i.e. software. The plan typically contains a detailed understanding of what the eventual testing workflow will be.

Test Case

A test case is a specific procedure of testing a particular requirement.

It will include:

- Identification of specific requirement tested
- Test case success/failure criteria
- Specific steps to execute test
- Test Data

Levels Of Testing

Unit Testing

1. Test each module individually.
2. Follows a white box testing (Logic of the program)
3. Done by Developers

Integration Testing

After completing the unit testing and dependent modules development, programmers connect the modules with respect to HLD for Integration Testing through below approaches.

System Testing

After completing **Unit** and **Integration** testing through white box testing techniques development team release an .exe build (all integrated module) to perform black box testing.

- Usability Testing
- Functional Testing
- Performance Testing
- Security Testing

Usability Testing

During this test, testing team concentrates on the user friendliness of build interface. It consists of following sub tests.

- **User Interface Test:** Ease of use (screens should be understandable to operate by End User)
- **Look & Feel :-** attractive
- **Speed in interface :-** Less number of task to complete task
- **Manual Support Test :-** Context sensitiveness of user manual.

Functional Testing

- The process of checking the behavior of the application.
- It is geared to functional requirements of an application.
- To check the correctness of outputs.
- Data validation and Integration
i.e. inputs are correct or not.

Performance Testing

- **LOAD TESTING** – Also Known as Scalability Testing. During this test, test engineers execute application build under customer expected configuration and load to estimate performance.
- **STRESS TESTING** – During this test, Test engineers estimates the peak load. To find out the maximum number of users for execution of out application user customer expected configuration to estimate peak load.
PEAK LOAD > CUSTOMER LOAD (EXPECTED)
- **DATA VOLUME TESING** -- Testing team conducts this test to find the maximum limit of data volume of your application.

Security Testing

Testing how well the system protects against unauthorized internal or external access, willful damage, etc, may require sophisticated testing techniques

Smoke testing

Smoke testing is non-exhaustive software testing, ascertaining that the most crucial functions of a program work, but not bothering with finer details.

Alpha Testing

1. The application is tested by the users who doesn't know about the application.
2. Done at developer's site under controlled conditions
3. Under the supervision of the developers.

Acceptance Testing

A formal test conducted to determine whether or not a system satisfies its acceptance criteria and to enable the customer to determine whether or not to accept the system.

It is the final test action before deploying the software. The goal of acceptance testing is to verify that the software is ready and can be used by the end user to perform the functions for which the software was built.

Beta Testing

1. This Testing is done before the final release of the software to end-users.
2. Before the final release of the software is released to users for testing where there will be no controlled conditions and the user here is free enough to do what ever he wants to do on the system to find errors.

Regression Testing

Testing with the intent of determining if bug fixes have been successful and have not created any new problems. Also, this type of testing is done to ensure that no degradation of baseline functionality has occurred.

Monkey Testing

Testing the application randomly like hitting keys irregularly and try to breakdown the system there is no specific test cases and scenarios for monkey testing.

Verification & Validation

Verification

- Verification is the process confirming that -software meets its specification, done through inspections and walkthroughs

Use – To identify defects in the product early in the life cycle

Validation

- Validation is the process confirming that it meets the user's requirements. It is the actual testing.

*Verification : Is the **Product Right***

*Validation : Is it the **Right Product***

Quality Assurance & Quality Control

What is Quality ?

Quality is defined as meeting the customer's requirements and according to the standards

The best measure of Quality is given by FURPS

- **Functionality**
- **Usability**
- **Reliability**
- **Performance**
- **Scalability**

Why Quality ?

- ❖ Quality is the important factor affecting an organization's long term performance.
- ❖ Quality improves productivity and competitiveness in any organization.

Quality Assurance

Quality Assurance is a planned and systematic set of activities necessary to provide adequate confidence that products and services will conform to specified requirements and meets user needs.

- It is process oriented.
- Defect prevention based.
- Throughout the Life Cycle.
- It's a management process.

Quality Control

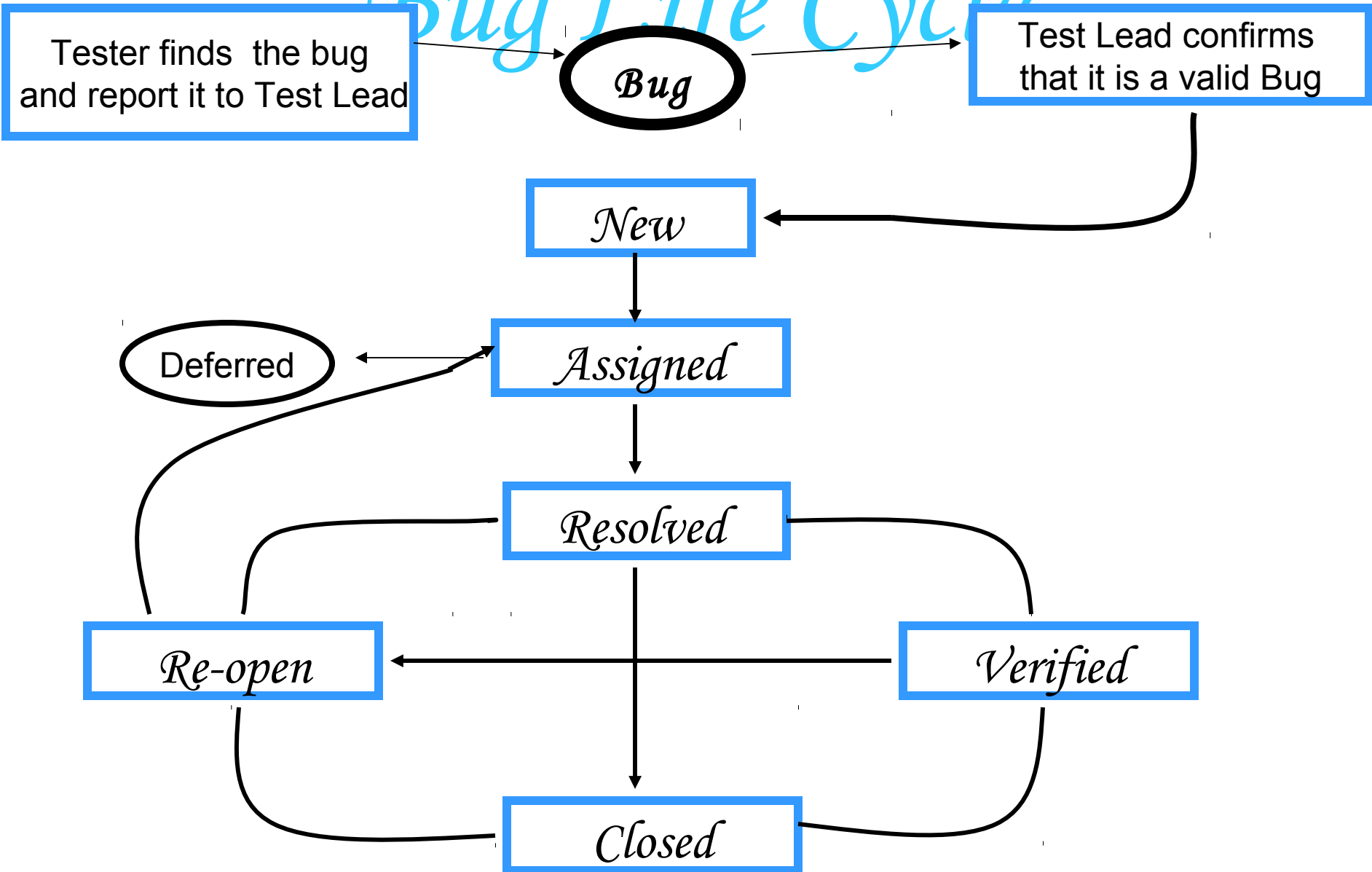
Quality control is the process by which product quality is compared with the applicable standards and the action taken when non conformance is detected.

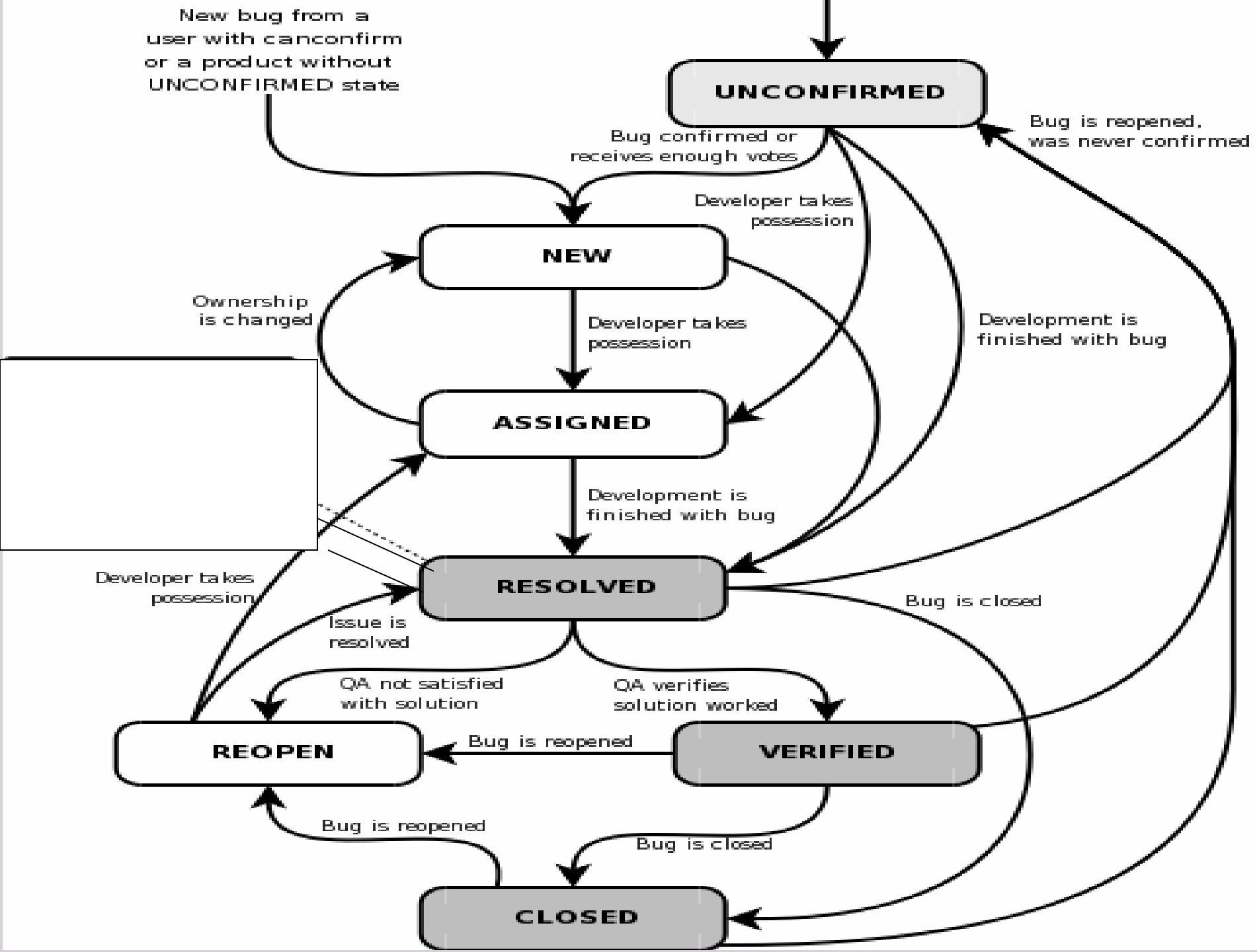
- It is product oriented
- Defect detection based

QA vs. QC

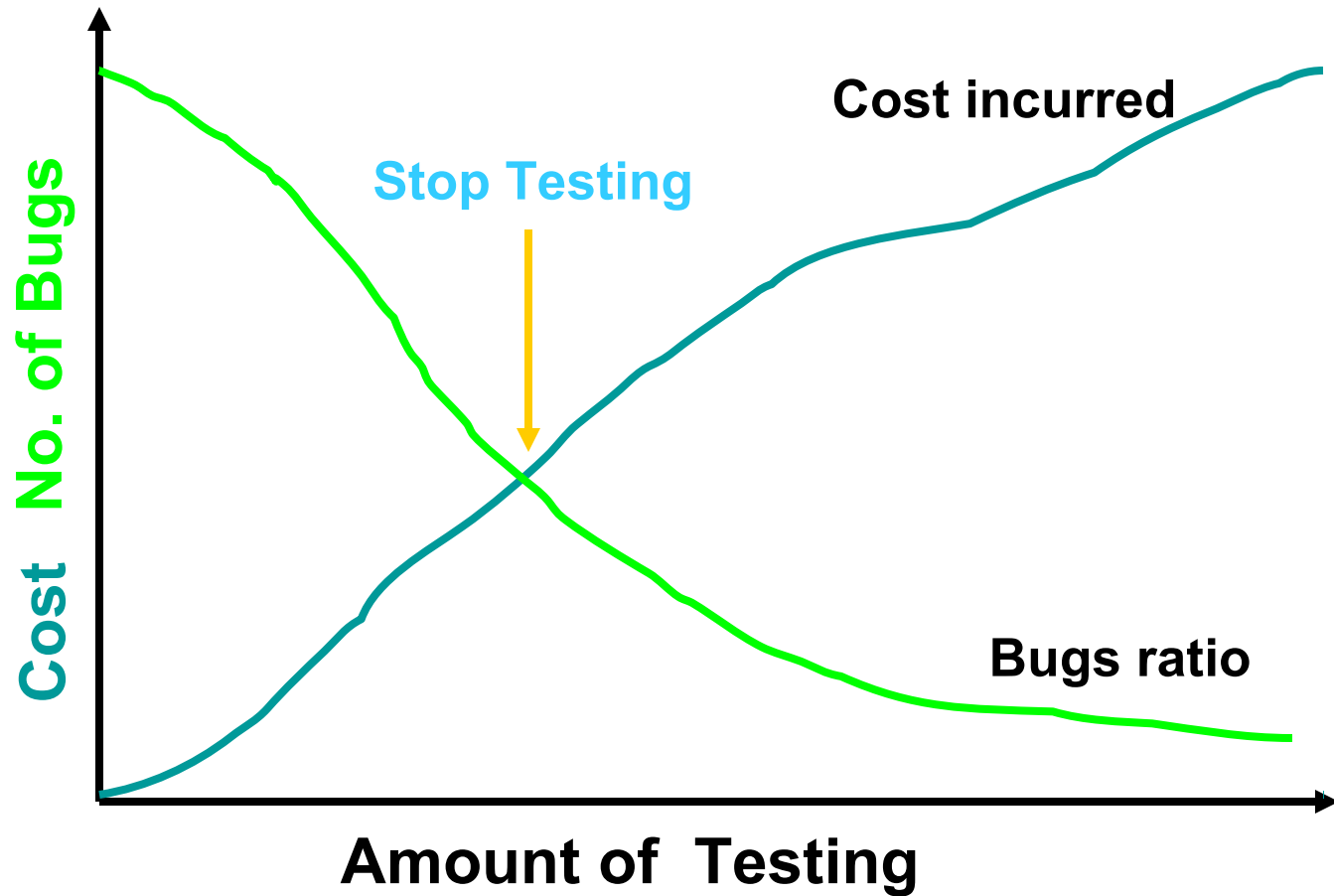
- Quality Assurance makes sure that we are doing the right things, the right Way.
 - QA focuses on building in quality and hence preventing defects.
 - QA deals with process.
 - QA is for entire life cycle.
 - QA is preventive process.
- Quality Control makes sure the results of what we've done are what we expected .
 - QC focuses on testing for quality and hence detecting defects.
 - QC deals with product.
 - QC is for testing part in SDLC.
 - QC is corrective process.

Bug Life Cycle





When to Stop Testing



Thats all FOLKS !!