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Software Testing Day 8 – Defect Tracking

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Agenda

- Defect Tracking - What is defect
- Categories of Defects
- Preparation of DPD (Defect Profile Document)
- Defect Metrics



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What is a defect

- A software defect is an error, flaw, failure, or fault in a computer program that causes it to produce an incorrect or unexpected result, or to behave in unintended ways.
- A software bug occurs when the actual results don't match with the expected results.
- Developers and programmers sometimes make mistakes which create bugs called defects.
- Most bugs come from mistakes that developers or programmer make.

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What is a defect – Types of defects

Types of defects

- **Functional Bugs**
- **Unit Level Bugs**
- **Integration Level Bugs**
- **Usability defects**
- **Performance defects**
- **Security defects**
- **Compatibility defects**

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What is a defect – Types of defects

- **Functional bugs are those which cause the software to malfunction. A good example of this would be a button which, when clicked, is supposed to open a new window – but instead, nothing happens.**

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What is a defect – Types of defects

- **Functional Defect:** Not full fill the requirement as we need.
- e.g. If the requirement is after successfully login Welcome page should be opened.
- 1- Enter Correct login detail---- Welcome page should be come.
- 2-Enter In-Correct login detail---- Welcome page should not be come.
- these are functional requirements...and if it is not working then its called Functional defect

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What is a defect – Types of defects

- **Unit level bugs are defects that are related to the functionality of a single software unit. A software unit is the smallest testable part of an application. Examples of software units include classes, methods, and procedures. Unit level bugs can have a significant impact on the overall quality of the software.**

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What is a defect – Types of defects – Unit testing defects

You have written a function to add two numbers:

```
int Add(int a, int b) { return a+b; }
```

The above function takes two numbers as input and returns their sum.

A unit test code would look something like this:

```
void TestAdd1() { Assert.AreEqual(Add(5, 10), 15) }
```

The above unit test "asserts" that $5 + 10$ is equal to 15. If the Add function returns anything else Assert.AreEqual result in error and the test case will fail.

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What is a defect – Types of defects – Unit testing defects

You will probably add a few more unit test cases like these:

```
void TestAdd2() { Assert.AreEqual(Add(500, 1000), 1500) }  
void TestAdd3() { Assert.AreEqual(Add(0, 1000), 1000) }  
void TestAdd4() { Assert.AreEqual(Add(-100, 100), 0) }  
void TestAdd5() { Assert.AreEqual(Add(-100, -1100), -1200) }
```

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What is a defect – Types of defects

- **Integration level bugs are defects that occur when two or more software units are combined. These defects can be difficult to find and fix because they often require coordination between multiple teams. However, they can have a significant impact on the overall quality of the software.**

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What is a defect – Types of defects

Inbox

Compose mail

Sent Items

Trash

Spam

Contact

Folders

Logout

Compose Mail

To

From

Subject

TEXT FIELD

☐ Save To Draft

☐ Add To Contact

SEND

CANCEL

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What is a defect – Types of defects

- **Usability bugs are defects that impact the user experience of the software that makes it difficult to use. A usability defect is a defect in the user experience of software that makes it difficult to use. Usability bugs are the bugs such as If a website is complicated to access or get around or the signup process is complicated to go through.**

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What is a defect – Types of defects

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What is a defect – Types of defects

- **Performance bugs are defects that impact the performance of the software. This can include things like the speed of the software, how much memory it uses, or how many resources it consumes. Performance level bugs can be difficult to track down and fix, because they can be caused by a number of different factors.**

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What is a defect – Types of defects

- **Security bugs are a type of software defect that can have major consequences if left unaddressed. These defects can allow malicious users to gain access to sensitive data or systems, or even allow them to take control of the affected software. As such, it is critical that security level bugs are given high priority and addressed as soon as possible.**

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What is a defect – Types of defects

- **Compatibility defects** are those bugs which occur when an application is not compatible with the hardware it is running on, or with other software it needs to interact with. Incompatibility between software and hardware can result in crashes, data loss, and other unpredictable behavior. Testers need to be aware of compatibility issues and test accordingly. A software application that has compatibility issues does not run consistently on different sorts of hardware, operating systems, web browsers, and devices when connected with certain programs or running under specific network conditions.

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Preparation of DPD (Defect Profile Document)

| | | | | | | | | | | | | | | |
|------------------|--------------|-------------|-------------------------|------------------------|--------------------|---------|------------|----------|----------|-------------|-----------------|----------------|----------------|--|
| Company Emblem | | | | | | | | | | | | | | |
| | | | Defect Profile Document | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Project ID: | | | Project Name: | | | | | | | | | | | |
| Date of Release: | | | Version No: | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Bug ID | Test Case ID | Module Name | Bug Desc | Reproducible? (Yes/No) | Steps to Reproduce | Summary | Bug Status | Severity | Priority | Tester Name | Date of Finding | Developer Name | Date of Fixing | |
| B001 | TC001 | | | | | | | | | | | | | |
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Preparation of DPD (Defect Profile Document)

| | | | |
|-----------------|---|--|--|
| Bug Status | It is used to keep track the status of the bug in this bug report | | |
| New | it is given by the tester when he find out the bug | | |
| Assigned | It is given by the developer team lead after assigning to concerned developer | | |
| Open | It is given by the developer while he fixing the bug | | |
| Fixed | It is given by the developer after he fixed the bug | | |
| Closed | It is given by the tester if the bug is fixed in new Build | | |
| Reviewed-not ok | It is given by the test if the bug is not fixed in new build | | |
| Deferred | The bug which is going to be fixed in next iteration | | |

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Defect Metrics - Defect detection efficiency

Defect Detection Efficiency : Number of valid defects logged in the total defects logged by testing team. To measure and improve application knowledge of testing team and improve productivity and quality.

v - Number of valid defects logged by testing team

d - Number of total defects logged during testing

$$=v/d \%$$

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Defect Metrics – Defect Leakage

Defect Leakage is the Metric which is used to identify the efficiency of the QA testing i.e., how many defects are missed / slipped during the QA testing.

Defect Leakage = (No. of Defects found in UAT / No. of Defects found in QA testing.) * 100

d - defects found during up to (SIT)testing

e - defects found during UAT/ end user testing

$$=e/d \%$$

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Defect Metrics – Defect Removal Efficiency / Testing Effectiveness

Percentage of issues found in testing phase against issues found in testing and defects found after testing phase. To evaluate the effectiveness of the QA and testing is meeting the set target. Improving the target above 90% requires quality improvements in testing phase and all other phases before testing phase including development.

- i - Number of valid defects found during Testing
- u - Number of valid in-scope defects found during UAT
- p - Number of valid in-scope defects found in Production

$$= i / (i + u + p) \%$$

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Defect Metrics – Defect Density

Number of defects found in testing per test case. This metric is used to measure the quality of the builds. Poor build quality requires additional testing effort for more defects logging, revalidating and regression testing. It also reduces Testing Effectiveness and also Testing Confidence.

d - Number of valid defects caught during testing, UAT and Production

t - Total number of test cases executed

$$=d/t\%$$

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Defect Metrics – Defect spill over

Defect Spill-Over – Measures the number of defects that don't get resolved in a given sprint or iteration, and how many defects spill over from one sprint, to be resolved in the next.

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Defect Metrics – Defect Cycle Time

Defect Cycle Time – Measures how much time elapses between starting work on fixing a bug and fully resolving that bug. An agile control chart can help visually represent the speed of resolving tasks within the agile cycle.

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Defect Metrics – Defect Categories

Defect Categories – The number of defects by groups; such as functionality errors, communication errors, security bugs, performance defects. This can help agile teams determine the Pareto 20% of defects that cause 80% of issues for end users.

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Defect Metrics – Defects Found in Production

Defects Found in Production / Escaped Defects – Counts the defects for a given release that were found after the release date. A “bottom line” metric showing the quality of the software delivered to end users.

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Lab session – Preparation of Defect profile document

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