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## **EXPERIMENT NO:- 1**

**Aim:-** Study the concepts of Failure, Error, Fault and Defect with example.

### **What is Failure?**

It is a condition that causes the software to fail to perform its required function.

In other words Failure means “External behaviour is incorrect”

If under certain environment and situation defects in the application or product get executed then the system will produce the wrong results causing a failure.

Failures can also be caused because of the other reasons also like:

- Because of the environmental conditions as well like a radiation burst, a strong magnetic field, electronic field or pollution could cause faults in hardware or firmware. Those faults might prevent or change the execution of software.
- Failures may also arise because of human error in interacting with the software, perhaps a wrong input value being entered or an output being misinterpreted.
- Finally failures may also be caused by someone deliberately trying to cause a failure in the system.

### **Example**

Failure are caused by environment or sometime due to mishandling of product. Suppose we are using a compass just beside a current running wire then this will not show the correct direction and this is not helping in getting the right information from the product. In other way when a defect is found by end-user then this is called failure.

## **What is Error?**

The mistakes made by programmer is known as an “Error”.

Error is deviation from actual and expected value.

Error could happen because of the following reasons:

- Because of some confusion in understanding the functionality of the software
- Because of some miscalculation of the values
- Because of misinterpretation of any value, etc.

Error is terminology of Developer.

One common definition of a software error is a mismatch between the program and its specification. In other words, we can say, a software error is present in a program when the program does not do what its end user expects.

## **Categories of Software Errors**

- User interface errors such as output errors or incorrect user messages.
- Function errors
- Hardware defects
- Incorrect program version
- Requirements errors
- Design errors
- Documentation errors
- Architecture errors
- Module interface errors
- Performance errors
- Boundary-related errors

## **Example**

This is caused due to human actions like code is not following the standard, there is some mistake in syntax, or there is mistake in invocation of variable or might be there is some mistakes in which database connectivity code is faulty. These all are

counted as Error.

### **What is Fault?**

Fault is a State of software caused by an error.

Fault is incorrect step, process or data definition in computer program which causes the program to behave in an unintended or unanticipated manner.

Fault is a condition that causes the software to fail to perform its required function.

A false, wrong step, process or data definition in a software product.

### **What is Defect?**

A defect is an error or a bug, in the application which is created. A programmer while designing and building the software can make mistakes or error. These mistakes or errors mean that there are flaws in the software. These are called defects.

Commonly refers to several troubles with the software products, with its external behaviour or with its internal features.

### **Example**

- Introducing unreliable network traffic.
- Testing with a full hard drive.
- Testing with some hardware component malfunction.
- Testing in out-of-spec electrical conditions.

A defect is an error is an coding or logic that causes a program to malfunction or to produce incorrect/unexpected results.

### **Difference between Defect, Error, Failure and Fault**

**DEFECT:** Variation in actual & expected result shows a defect in the product/software. It is generally found after the software goes to production. A defect occurs only after a mistake done from the developer's end. Programmatic error gives rise to software defect.

**FAULT:** It is a condition that causes a system to fail in performing its required function.

**FAILURE:** When a software/product is found unable to perform a required function according to its specification, this kind of scenarios are coined as Failure. It generally occurs when expected behaviour doesn't meets the required behaviour.

**ERROR:** Is an undesirable deviation from the requirement. Difference between expected & actual result is Error.

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