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Fault Seeding Models and Input Domain Based Models for Software Reliability Measurement and Improvement.

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Abstract— Reliability is the important aspect of software . Software Quality is important factor when we design a software..The software quality depends on different factors such as software reliability, efficiency, cost etc. Software Reliability determine the probability of failure-free software operation for a specified period of time in a particular environment. Software Reliability can be categorized into 3 parts: modelling, measurement & improvement. In this paper, we have describe the software reliability as the measure of software quality. Reliable software is able to accomplish the better achievement and allows software to work properly in a specified environment. [1,2]

Keywords: Software reliability, Software reliability growth model, MTTR, MTTF, MTBF.

INTRODUCTION

Reliability of Software is the possibility that software will work properly in a described environment and for a described time. Using the following formula, the probability of failure is computed by testing a sample of all input which are available.

Probability = Number of failing cases / Total number of cases under consideration [3,4]

Software:

Software is a set of instructions and code written by programmers in any of separate special computer languages. Software is divided into two main groups:

(1) System software: controls the basic operation of a computer which is already Exist in the machine. Like BIOS and Operating System.

(2) Application software: It perform the particular tasks by the user need, such as accounting, communicating, data processing, word processing.

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Software reliability:

Software Reliability is the probability of failure-free software operation for a specified period of time in a specified environment. Software Reliability is also an important factor affecting system reliability.A simple measure of reliability is mean time between failure (MTBF). It is calculated as MTBF=MTTF+MTTR here, MTTF=meantime to failure MTTR=mean time to repair. In addition to reliability measure, we must develop a measure of availability.
Software reliability is divided into three activities:

1. Error prevention
2. Fault detection and removal.
3. Measurements to maximize reliability, [7,8]

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Introduction to Software Reliability Growth Models:

In critical business applications, the vital component is software reliability .In software reliability ,growing is very difficult because there is interrelationship among all the software modules as of existing software. This is also very difficult to find out whether the software is being expressed reliable or not. The users or customer feedback i.e. problem reports, complaints or compliments prove the reliability of any software product.

Software reliability models are classification into two types, which help to predict software reliability by executing test cases. The first group of models is called defect density models. These type of models use loop, lines of code, input or output and external references to find out the number of faults in the software . The second groups of models are called “software reliability growth models”.

The two categories of Software reliability growth models are: concave and S-shaped. In both models the rate of change is decreases as the number of error detection increases.

The fault is detected or repaired, the fault detection increases and the rate of change decreases.

(1) Concave

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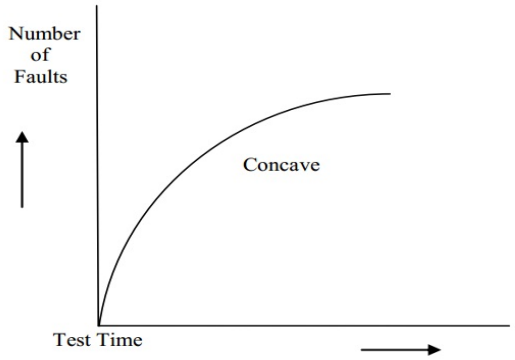

2)S-Shaped

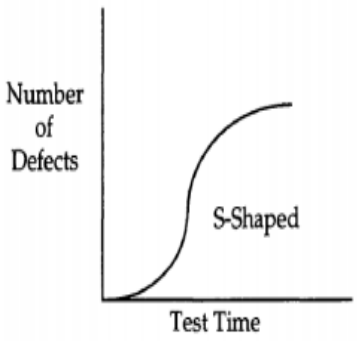

Figure 2. S-shaped model[4]

According to type of failure process software reliability growth models are categorized as follows:

I. Times between failure models:

II. Failure count model:

III. Fault seeding model:

IV. Input domain based model

I selected two model.

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Fault Seeding Models

The basic approach in this class of models is to "seed" a known number of faults in a program which is assumed to have an unknown number of indigenous faults. The program is tested and the observed numbers of seeded and indigenous faults are counted. From these, an estimate of the fault content of the program prior to seeding is obtained and used to assess software reliability and other relevant measures

Input Domain Based Model

The basic approach taken here is to generate a set of test cases from an input distribution which is assumed to be representative of the operational usage of the program. Because of the difficulty in obtaining this distribution, the input domain is partitioned into a set of equivalence classes, each of which is usually associated with a program path. An estimate of program reliability is obtained from the failures observed during physical or symbolic execution of the test cases sampled from the input domain.

CONCLUSION

Software reliability is a vital research space and software reliability is fundamental part of software quality .There are many models use in software reliability but I choose two models so I want to compare between in these two models, Fault seeding models and Input domain based model for check the reliability .[13,14]

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