Abstract

Software Engineering is associated with development of software products using well defined principles, techniques and processes. The result of Software Engineering is an effective and reliable product. The software products have chances to fail during implementation and design phases. The design time testing and reliability measurement can enhance the process of development and their component management to work more effectively for long time. Software Testing is evaluation of the software product against system requirements gathered from users and system specification. That mainly comprises of validation and verification. The reliability analysis concerned with analyzing the system and their functions to get the amount of time when the system and their components works reliably. In this paper, Reliability Engineering based case study on software product development is performed. The concept of Software Engineering and the component based product development, use the Unified Modeling Language (UML) diagrams and create Reliability Block Diagram (RBD). RBDs are used to evaluate entire software components and their sub components to find their reliability according to the number of usages and increasing time factor. Therefore, to analyze the software system
using RBD, UML to RBD conversion is required. The UML diagram for online shopping is first explored and then its sub use-case checkout is designed. The sub-case is then re-organized according to the functionality that can be similar to component diagram. The component diagram is used further to convert the software system into the RBD diagram. The result of RBD analysis defined in terms of Block failure rate, Block unreliability Vs. Time, Block Reliability vs. Time, System Reliability vs. Time and the System Reliability statistics. The finding of the experiments shows that the system can be improved through the RBD analysis. Additionally the improvements during the design phases can refine the productivity and reliability of the system.

References

12. Bernardi, Simona, José Merseguer, and Dorina C. Petriu. "Dependability modeling and
analysis of software systems specified with UML." ACM Computing Surveys (CSUR) 45, no. 1,
13. Distefano, Salvatore, Antonio Puliafito, and Kishor S. Trivedi. "Dynamic aspects and
behaviors of complex systems in performance and reliability assessment." ACM Sigmetrics
14. Ubal, Rafael, Dana Schaa, Perhaad Mistry, Xiang Gong, Yash Ukidave, Zhongliang
Chen, Gunar Schirner, and David Kaeli. "Exploring the heterogeneous design space for both
performance and reliability." In Design Automation Conference, 2014 51st ACM/EDAC/IEEE,
approach based inflection S-shaped software reliability growth model." Ain Shams Engineering
Journal 2015.
survey." ACM Sigsoft Software Engineering Notes 36, no. 6, pp. 1-6, 2011.
17. Singh, Lalit Kumar, Gopika Vinod, and A. K. Tripathi. "Impact of change in component
reliabilities on system reliability estimation." ACM Sigsoft Software Engineering Notes 39, no. 3,
pp. 1-6, 2014.
"Enhancing software reliability estimates using modified adaptive testing." Information and
Reliability, Availability, and Serviceability”, ACM Computing Surveys, Vol. 20, no. 4, December

Index Terms

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Keywords

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Study.