Allocation policy for testing effort of modular software system under budgetary constraint

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Abstract

During the last two decades we have seen a very rapid development in information technology and software development. In fact, the software developer's aims to develop reliable software at minimum cost and they try to release at appropriate time. Software testing is an important phase in software Development Life Cycle (SDLC). Usually, software contains a number of different modules to perform specific functions that are tested independently by unit test. In real life, it is not possible to perfectly debug all faults from a module during testing phase. Our aim is to remove maximum number of faults from each module within the specified resource budget at the minimum cost. The purpose of this paper is to discuss two types of optimization problems. The first optimization problem is corresponding to bi-criteria problem in which we have considered the maximum fault removal from each module with minimum cost, subject to total allocated resource budget. Since the software developers desire to remove at least some number of faults from each module, so an aspiration level of fault removal from each module is introduced in the second optimization problem. Finally numerical examples are given to illustrate the correctness of the problem.

Keywords: *Optimization Problem, Non Homogenous Poisson Process, Resource allocation, Faults, Imperfect debugging, Dynamic Programming, Software Development Life Cycle.*

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Journal of Information & Optimization Sciences
Vol. 32 (2011), No. 2, pp. 315–337