widely understood. Product Backlog, Nexus Sprint Backlog, Integrated Increment [4].

Sources

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UDC 004.4

System Analysis in Software Engineering: Applying the Algorithm for Enumerating All Possible Scenarios

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System analysis is the process of studying a system and its requirements in order to design an information system that meets those requirements. It is a key step in the software development performed after project planning. The goal of system analysis is to provide a detailed and complete understanding of the system functionality that needs to be developed [4].

One of the challenges in system analysis is identifying all possible scenarios and occasions that need to be considered when designing the system architecture and writing the technical specifications [1]. For complex systems with multiple variable parameters, it can be difficult for analysts to methodically think through all permutations of events, user actions, and system responses. Critical factors may be missed, resulting in gaps in requirements and unexpected system behavior. The application of a structured algorithm for enumerating all possible scenarios during system analysis is demonstrated in Figure 1. The technique involves defining all parameters affecting the system functionality, calculating the total number of scenarios using combinatorics, and iteratively stepping through the scenarios.

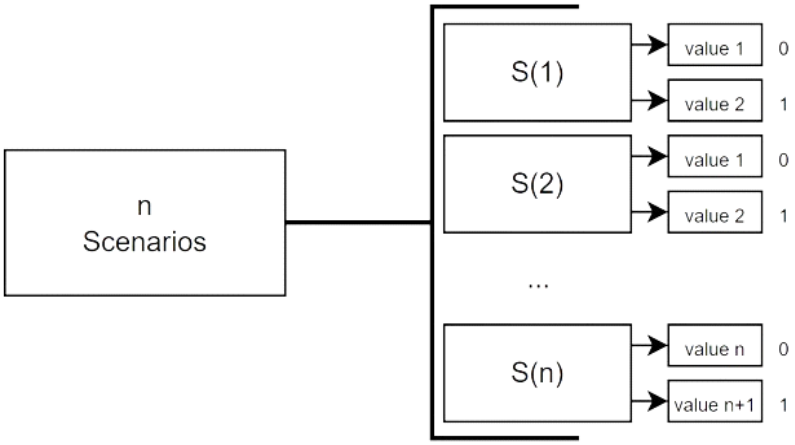

Fig. 1- Algorithm for Enumerating All Possible Scenarios

This method provides a comprehensive analysis by forcing analysts to consider every possible combination of parameter values in a systematic manner.

Scenario modelling is a common technique of system analysis. There are two main approaches to identifying cases and scenarios: unstructured, creative brainstorming and organized structuring based on formal methods [2,3].

Creative brainstorming relies on the experience and intuition of analysts to come up with relevant scenarios. This method can be prone to overlooking important scenarios. In contrast, organized structuring aims to systematically enumerate scenarios in an exhaustive manner. Some examples of formal methods include:

- classifying parameters into domains;
- applying combinatorial math to calculate permutations;
- using state machine modeling to define system states.

Conclusion. Applying the structured algorithm for enumerating all possible scenarios provides a comprehensive analysis by defining parameters, calculating permutations, and stepping through the scenarios.

This method contributes to the field of system analysis by providing analysts with a systematic technique for thoroughly analyzing complex systems with multiple variables. The formal process gives confidence that the requirements cover all relevant scenarios.

Overall, the algorithm demonstrates a rigorous approach to analysis requirements that can enhance system design and reduce unexpected behavior in software projects. Structured systematics should be applied along with creative thinking to fully understand system requirements.

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A SYSTEMATIC APPROACH TO SOLVING THE OPTIMIZATION PROBLEMS OF MANAGEMENT OF TECHNOLOGICAL LINES

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The task of creating a technological line is generally reduced [1] to three stages: 1) development of the design of individual devices of the technological line; 2) selection of the inventory of line devices from the available range (most often by performance) and 3) connecting them into a single structure; operational management of the technological line.

Unfortunately, the above are often considered as separate tasks, which does not allow optimization of the technology creation process according to a global criterion [2].

Therefore, let's consider a simplified two-stage structure (Fig. 1), typical for a number of industries [3]: chemical, mining, food, etc.

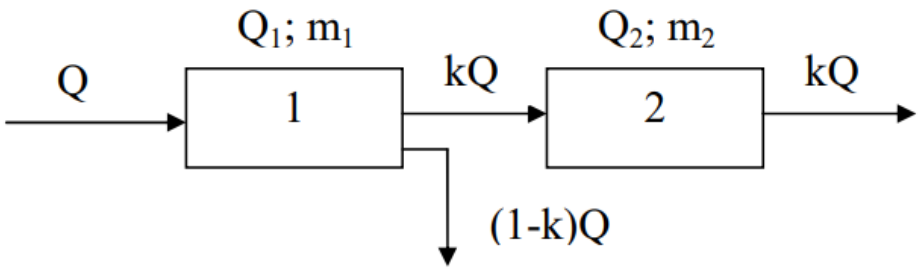

Figure 1 – Simplified two-stage structure of the technological line