

# A Model for Code Restructuring, A Tool for Improving Systems Quality in Compliance with Object Oriented Coding Practice

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## Abstract

A major goal of software restructuring is to preserve or increase the value of a piece of software. Restructuring a system may make it possible to add more features to the existing system or make the software more reusable in other systems. This research presents a code restructuring model and its associated architecture for improving the quality of object-oriented legacy system and existing ones to a new target system structure. This research reviewed existing literature on code restructuring models and their limitations, this helped in the identification of research gap. Data was collected and observable behaviour of the sample model recorded. Data collected was validated, edited and coded then analysed using observable behaviours. The literature on existing restructuring models, techniques and algorithm, frameworks and tools were reviewed and used to determine the nature of the model. Findings revealed that the existing models did not effectively take care of proper restructuring. Finally, the proposed model was developed and validated, it revealed that the model would assist greatly in achieving effective restructuring and therefore the research recommended a restructuring model described in this report.

**Keywords:** *Restructuring, software maintenance, code restructuring, object-oriented legacy, observable behavior.*

## 1. Introduction

Many existing software systems can benefit from code restructuring models to reduce maintenance cost and improve reusability. Yet, intuition-based, ad hoc restructuring can be difficult and expensive, and can even make software structure worse. Code restructuring is one of the software reengineering activities. It is where the source code is analyzed and violations of structured programming practices are noted and repaired, the revised code also needs to be reviewed and tested. A wide variety of models have been proposed and used to deal with restructuring and restructuring. These include the various techniques and methods for code restructuring processes that have been applied in the development of code restructuring models that can be applied to specific code or to group legacy software. Although various code restructuring models and frameworks that have been proposed before can be used to perform restructuring of various software paradigm, most of these models are limited to a

specific restructuring methods and techniques, language paradigm or specific part of the software code and did not meet the intended restructuring objectives. Most authors of these developments also leave an open window for future research of their work

## 2. Research Objectives

The main objective of this study was to develop a code restructuring model to improve the quality of systems in compliance with object-oriented systems. Other specific objectives are;

- 1 To review related work with regard to existing code restructuring models in Object Oriented Programming
- 2 To identify weaknesses and challenges of existing code restructuring models in Object Oriented Programming
- 3 To propose a model for code restructuring based on Object Oriented Programming.
- 4 To automate the model for code restructuring in compliance with Object Oriented Programming best practice
- 5 To validate the proposed code restructuring model

## 3. Research Questions

The study was guided by the following research questions;

- RQ1** What are the existing code restructuring Models in Object Oriented Programming?  
**RQ2** What are the weaknesses and challenges of existing code restructuring models in Object Oriented Programming?  
**RQ3** How can we automate the model for code restructuring in Object Oriented Programming  
**RQ4** How does the proposed code restructuring model perform in comparison to existing code restructuring models?

## 4. Research Methodology