

# Comparing Maintainability and Code Quality in Software Paradigms

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## **Abstract**

This study's goal is to compare approaches to functional programs and object-oriented programs to find how it affects maintainability and code quality. By looking at 3 cases, we analyze, how does a functional approach to software architecture compare to an OOP (Object-oriented programming) approach when it comes to maintainability and code quality?

## **1 Introduction**

This is time for all good men to come to the aid of their party!

## **2 Theory**

### **2.1 Characteristics of Functional Programming**

Expressions and functions

#### **2.1.1 Iterator pattern**

### **2.2 Object Oriented Programming**

Uses variables, commands and procedures

### **2.2.1 SOLID principles**

## **3 Methods**

### **3.1 Cyclomatic Complexity**

### **3.2 Cognitive Dimensions**

### **3.3 Case studies**

#### **3.3.1 Simplified chess game**

Chess is a famous game and assumed that the reader know how it works. Aim is to implement a simplified variant of it. This is not ordinary chess but a simplified version:

- Only pawns and horses exist.
- You win by removing all the other players pieces.

The player should be able to do the following:

- List all available moves for a certain chess piece.
- Move the chess piece to a given space
- Switch player after move
- Get an overview of the board
- Get an error when making invalid moves

#### **3.3.2 to-do List**

A common task in programming is to create some kind of data store with information. A to-do list is a minimal example of that. It consists of a list of items that can be used to remember what to do later. The user should be able to:

- Create a new item in the to-do list.
- Remove an item from the to-do list.

- See all items in the to-do list.
- Update an item from the to-do list.

### **3.3.3 Chatbot engine**

Oftentimes when developing applications we have to deal with complex information input. One of those cases is when we have chat bots. Chat bots are interactive programs that respond with a text answer to the users input. For this application we will implement the following:

- Interpreter that can handle semi-complex inputs and deal with errors.
- Give answers to those inputs in form of text messages.

## **4 Results**

## **5 Conclusions**

## **6 Limitations**

### **6.1 Improvements to implementation**

## **References**