CS2 Skin Rating GUI

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Abstract—This report presents the design, implementation, and analysis of a Java-based application for rating weapon skins from the Counter-Strike 2 (CS2) game. The graphical user interface (GUI) application leverages Java Swing to create an intuitive dark-themed user interface that allows users to browse, view, and rate various in-game weapon skins. This paper explores the system architecture, object-oriented programming principles employed in the development process, and implementation details. The application demonstrates practical application of core object-oriented programming concepts including inheritance, encapsulation, abstraction, polymorphism, and composition through a modular design that facilitates maintenance and future expansion.

Keywords—object-oriented programming, Java Swing, GUI development, component-based design, inheritance.

# Pendahuluan

Aplikasi CS2 Skin Rating dikembangkan menggunakan bahasa pemrograman **Java** dengan library GUI **Java Swing**. Tujuan utama dari proyek ini adalah membangun antarmuka pengguna interaktif yang menampilkan item grafis berbentuk skin senjata, serta memungkinkan pengguna memberikan penilaian terhadap item yang ditampilkan.

Pengembangan aplikasi ini menekankan pada penerapan **konsep Object-Oriented Programming (OOP)**, serta pemisahan komponen berdasarkan tanggung jawabnya masing-masing. Dengan pendekatan ini, aplikasi menjadi lebih terstruktur, mudah dipelihara, dan dapat dikembangkan lebih lanjut.

Proyek ini juga memanfaatkan **Apache NetBeans** untuk menyusun layout awal dengan drag-and-drop, yang kemudian disempurnakan di **Visual Studio Code** dengan penambahan fitur, styling, dan optimisasi struktur kode. Kombinasi dua alat ini mempercepat workflow pengembangan dan memungkinkan fokus pada kualitas logika program.

Aplikasi ini dikembangkan dengan menggunakan Java Swing, sebuah toolkit GUI untuk Java. Tujuan utama dari aplikasi ini adalah:

1. Membuat Interface pengguna yang intuitif dengan tema gelap yang konsisten.
2. Menerapkan basis kode modular yang dapat dipelihara dengan mengikuti prinsip-prinsip berorientasi objek.
3. Memungkinkan pengguna untuk menelusuri koleksi skin berdasarkan kategori senjata.

Laporan ini membahas implementasi teknis dari tujuan-tujuan ini melalui arsitektur aplikasi, pola desain, dan prinsip-prinsip inti OOP.

## Arsitektur Sistem

Aplikasi CS2 Skin Rating mengikuti arsitektur berbasis komponen yang khas untuk aplikasi Java Swing. Sistem ini terdiri dari beberapa kelas, masing-masing bertanggung jawab atas komponen dan fungsionalitas UI tertentu

## Komponen Inti

1. **CS2SkinRating**: Kelas jendela aplikasi utama yang mewarisi dari JFrame dan berfungsi sebagai wadah untuk semua komponen lainnya.
2. **TopBarPanel**: Mengelola judul dan tombol utilitas (Discord, Ko-Fi)
3. **SidebarPanel**: Menangani navigasi di antara berbagai kategori senjata.
4. **CardDisplayPanel**: Menampilkan gambar Skin dalam tata letak grid..
5. **SkinCard**: Mewakili item skin individu dengan gambar dan informasi.
6. **BottomBarPanel**: Berisi tombol tindakan untuk menilai dan menyimpan.
7. **Button**: Kelas utilitas untuk membuat tombol yang konsisten di seluruh aplikasi.

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## Hubungan Komponen

Komponen-komponen tersebut disusun secara hirarkis, dengan kelas utama **CS2SkinRating** yang berisi semua komponen lainnya. Aplikasi ini menggunakan BorderLayout sebagai pengelola tata letak utama, dengan komponen yang diposisikan sebagai berikut:

* TopBarPanel (NORTH)
* SidebarPanel (WEST)
* CardDisplayPanel di dalam JScrollPane (CENTER)
* BottomBarPanel (SOUTH)

SideBarPanel berkomunikasi dengan CardDisplayPanel untuk memperbarui konten yang ditampilkan ketika kategori dipilih.

# Metodologi

# Implementation Details

## User Interface Design

The application features the dark-themed UI with consistent styling across components :

* Background colors ranging from dark to medium gray (RGB: 45,45,45 to 70,70,70)
* White or light gray text for contrast
* Consistent button styling through the Button utility class
* Grid layout for skin cards with appropriate spacing and borders
* Scrollable main content area to accommodate variable content size

## Component Implementation

The application is divided into seven distinct Java classes:

|  |  |
| --- | --- |
| CS2SkinRating.java | Main application window |
| TopBarPanel.java | Title and utility buttons |
| SidebarPanel.java | Navigation panel |
| Button.java | Button styling utility |
| CardDisplayPanel.java | Content display area |
| SkinCard.java | Individual skin component |
| BottomBarPanel.java | Action buttons |

Each class handles Specific UI elements and behaviors:

## **CS2SkinRating**: Initializes the main window, sets up layout and contains the main() method.

## **SkinCard**: Loads and displays skin images with dynamic scaling, provides interactive behavior.

## **CardDisplayPanel**: Manages the collection of SkinCard instances in a grid layout.

## **SidebarPanel**: Contains category buttons with event handling for content switching.

## Event Handling

The application implements event handling primarily through ActionListener for buttons and MouseListener for skin cards:

* SidebarPanel buttons trigger content updates in CardDisplayPanel.
* SkinCard components show detailed information in a dialog when clicked.
* Rating and Save buttons in BottomBarPanel are prepared for future implementation.

# Object Oriented Programming Principles

The application demonstrates several key OOP principles that enhance its structure and maintainability:

## Classes and Objects

The codebase is organized into classes that serve as blueprints for objects. For example:

* SkinCard card = new SkinCard(...) creates instances of skin display components.
* Each panel class (TopBarPanel, SidebarPanel, etc.) represents a distinct UI component.

## Inheritance

Inheritance is used extensively to extend Java Swing components:

* CS2SkinRating extends JFrame - The main window inherits from Swing's JFrame.
* TopBarPanel extends JPanel - Custom panels extend Swing's JPanel.
* SidebarPanel extends Button - Navigation panel extends the custom Button class.
* Button extends JPanel - Custom button implementation extends JPanel.

## Encapsulation

#### Component data and behaviors are encapsulated within their respective classes:

#### **SkinCard** encapsulates image loading, scaling, and display logic.

#### **TopBarPanel** encapsulates title and button creation/styling.

#### **SidebarPanel** encapsulates category navigation logic.

## Abstraction

#### The application employs abstraction to hide implementation complexity:

* The **Button.createButton()** factory method abstracts button creation and styling.
* **CardDisplayPanel.updateDisplay()** abstracts the process of loading and displaying skins.
* JSwing components themselves provide abstraction over low-level GUI operations.

## Polymorphism

#### Polymorphism is demonstrated in several ways:

* Method overriding: The anonymous Runnable implementation overrides the run() method.
* The add() method accepts various Component subtypes (JPanel, JLabel, JButton).
* Method overloading: Button.createButton() has two variants with different parameters.

## Composition

#### The application uses composition to build complex object from simpler ones:

* CS2SkinRating contains TopBarPanel, SidebarPanel, CardDisplayPanel, and BottomBarPanel
* CardDisplayPanel contains multiple SkinCard instances
* TopBarPanel contains JLabel and JPanel components

# Result and Discussion

The CS2 Skin Rating application successfully implements a functional GUI for browsing and viewing CS2 weapon skins. The application features:

* A responsive dark-themed user interface
* Navigation between weapon categories (AWP, Knives)
* Grid display of skin images with names
* Detailed information dialogs for individual skins

## Strengths

1. **Modularity**: The component-based architecture allows for independent development and testing of UI elements.
2. **Maintainability**: Clear separation of concerns makes the code easier to maintain and extend.
3. **Consistency**: The Button utility class ensures consistent styling across the application.
4. **Scalability**: New skin categories can be easily added through the existing framework.

## Limitations And Future Work

1. **Persistence**: The current implementation lacks data persistence for user ratings.
2. **Limited Categories**: Only AWP and Knife categories are implemented.
3. **Rating Functionality**: The rating feature is present in the UI but not fully implemented.

Future enhancements could include:

1. Database integration for persistent storage of skins and ratings
2. User authentication system
3. Expanded skin categories
4. Filtering and sorting capabilities
5. Statistical analysis of community ratings

# Conclusion

This paper presented the design and implementation of a Java Swing application for browsing and rating CS2 weapon skins. The application demonstrates practical application of object-oriented programming principles through a modular, component-based architecture.

The CS2 Skin Rating application successfully meets its design objectives by providing an intuitive user interface for skin browsing and viewing. The adherence to OOP principles has resulted in a maintainable and extensible codebase that can be further enhanced with additional features in future iterations.

The implementation showcases how Java Swing can be used to create modern, themed applications with complex UI components through proper application of object-oriented design principles.

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