GAME SALE AND RENTAL SYSTEM

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ABSTRACT

Projek ini bertujuan untuk mewujudkan platform yang komprehensif dan selamat untuk membeli, menjual dan menyewa permainan video, menangani kos dan risiko tinggi yang berkaitan dengan perdagangan permainan tradisional. Isu utama yang ditangani ialah halangan kewangan untuk permainan, kerana ramai pemain, terutamanya yang lebih muda, mendapati harga permainan baharu yang tinggi melarang. Untuk mengatasi cabaran ini, penyelesaian yang kami cadangkan ialah tapak web yang menyediakan pasaran selamat di mana pengguna boleh menyewa, membeli dan menjual permainan dengan mudah. Pengguna boleh mencari permainan dan meneroka penyenaraian yang dikategorikan. Penjual boleh memberikan penerangan terperinci dan syarat permainan mereka. Projek ini menggunakan model air terjun untuk pembangunan sistematik, termasuk fasa seperti analisis keperluan, reka bentuk, pelaksanaan, ujian dan penggunaan. Teknologi yang digunakan termasuk HTML, CSS, JavaScript, PHP dan MySQL, memastikan sistem yang teguh dan berskala. Hasil yang dijangkakan termasuk platform mesra pengguna dan boleh dipercayai yang mendemokrasikan akses kepada permainan, menjadikannya lebih berpatutan dan boleh diakses.

ABSTRACT

This project aims to create a comprehensive and secure platform for buying, selling, and renting video games, tackling the high costs and risks associated with traditional game trading. The primary issue addressed is the financial barrier to gaming, as many players, especially younger ones, find the high prices of new games prohibitive. To overcome these challenges, our proposed solution is a website that provides a secure marketplace where users can rent, buy, and sell games with ease. Users can search for games and explore categorized listings. Sellers can provide detailed descriptions and conditions of their games.The project employs a waterfall model for systematic development, including phases such as requirements analysis, design, implementation, testing, and deployment. Technologies used include HTML, CSS, JavaScript, PHP, and MySQL, ensuring a robust and scalable system.Expected results include a user-friendly and trustworthy platform that democratizes access to games, making them more affordable and accessible.

1.0 INTRODUCTION

The game industry is a rapidly evolving and innovative field that has transformed dramatically since its emergence in the 1970s. From simple arcade titles to sophisticated mobile and online gaming platforms, technological progress and changing consumer behavior have driven the industry into a globally influential sector for entertainment, education, and social interaction. According to the Digital Entertainment and Retail Association (ERA), digital game distribution has seen a dominant rise, with 89.5% of games sold in the UK in 2022 being digital downloads, leaving only 10.5% as physical discs or cartridges.

Despite this digital dominance, physical games continue to maintain their relevance and appeal. Physical copies provide tangible ownership, the ability to collect, and the opportunity to resell or lend, offering value that digital formats cannot replicate. Furthermore, with the closure of online stores for legacy consoles such as the PlayStation 3 and PSP, digital purchases risk becoming inaccessible, whereas physical media remain usable indefinitely. Many gamers also prefer the reliability of discs or cartridges, especially when digital access is limited by storage constraints, network availability, or digital rights management (DRM) restrictions.

Beyond sentimental and technical advantages, economic factors also play a role. Gamers often sell or trade completed games to recover part of their initial cost, supporting a circular economy that encourages reuse and minimizes waste. The second-hand game market, therefore, forms a vital part of the gaming ecosystem, offering more affordable options to players while giving sellers a way to monetize unused items.

In light of these ongoing trends and user behaviors, this project proposes the development of a hybrid web-based platform dedicated to the buying, selling, and renting of video games—focusing specifically on the physical game disc market. The platform aims to address the needs of collectors, budget-conscious gamers, and casual players alike, offering features such as game condition ratings, seller reviews, secure transactions, and rental services. By combining usability, affordability, and sustainability, the platform will contribute

to a more accessible and inclusive gaming experience while promoting the continued value of physical game media in a predominantly digital era.

2.0 LITERATURE REVIEW

With the development of the gaming industry, second-hand trading and leasing platforms have gradually become an important way for players to obtain game content. In order to gain a comprehensive understanding of the current development status and application potential of second-hand trading platforms, relevant research has compared and analyzed the functions and characteristics of existing second-hand platforms to identify the strengths and weaknesses of the current market, thereby providing a reference for the functional design and optimization of this research platform.

In the 1980s, the widespread popularity of home entertainment made consumers realize that frequent purchases of films and games were costly. At that time, the price of a game had reached $60, which prompted retail chains like Blockbuster to launch a game rental business to fill the market gap caused by high costs. With technological progress, the quality of game production kept improving, and the development costs rose accordingly. The price of games also increased from $60 to $70. A survey in the United States showed that approximately 60% of players were under the age of 34, many of whom were students with limited funds. Due to the high prices, many players tended to wait for the games to drop in price before purchasing them, and popular new releases usually took more than a year to get discounted, resulting in a delay in obtaining them.

With the development of the Internet, online game rental platforms have emerged. However, mainstream platforms have strict regulations for game rentals, and violations may result in penalties such as account suspension. Selling accounts also carries risks, such as SONY being able to reclaim accounts through the initial email bound to them, causing losses to buyers. At the same time, the overall quality of the current game rental sector is uneven, and the promotional effects are often exaggerated, while the actual economic benefits are unclear. Microsoft's Xbox Game Pass (XGP) and SONY's subsequent subscription services allow users to access the game library through membership, although they bring convenience to users, these services all have problems with unstable updates of the games in the library. In the membership services, most new releases are not promptly available, resulting in users having to spend tens of dollars each month but still being unable to experience the desired game content.

On the other hand, traditional second-hand game trading platforms suffer from issues such as disorderly categorization and a lack of effective supervision between buyers and sellers. Although most transactions proceed smoothly, when problems arise in the transactions (such as receiving damaged goods), buyers often have to bear additional time and effort costs. Current literature analysis indicates that these platforms still have room for improvement in terms of user rights protection, transaction fairness, and functional completeness.
Therefore, given the limitations of the existing platform, this study proposes to develop a second-hand game trading and leasing platform with a complete classification system and

user supervision mechanism, focusing on serving the physical disc market, and providing grade ratings, user evaluations, and leasing functions, in order to enhance the platform's stability, user-friendliness, and cost-effectiveness. Through the comparison and summary of the existing system, this research platform strives to build a clear-structured, fully functional, and secure game second-hand market solution that meets the needs of users.

3.0 METHODOLOGY

The website offers a secure platform where individuals can rent and sell video games. Users start by setting up and accessing their accounts. On the site, they can search for games, explore recommendations on the homepage, or navigate through categories to discover titles they're interested in. When purchasing a game, buyers provide their address and payment details. Once payment is confirmed, sellers dispatch the game to the provided address. The website encourage buyers to record and share a video of them unboxing the game, ensuring the item matches their purchase.Sellers are required to list details like the game's name and condition. For rentals, sellers set a deposit and rental fee. Renters pay the deposit upfront, which is refunded upon the timely and undamaged return of the game. Late returns or damages result in appropriate deductions from the deposit. This system ensures a trustworthy and smooth transaction process for both renting and purchasing games on the platform.

3.1 DEFINITION OF USER NEEDS

3.1.1 Consumer

1.Visual Online Rental and Purchase:Access the platform to browse product information, including basic details, descriptions, condition, and pricing.
2.Quickly select favorite products through intuitive visual displays.

3.1.2 Merchant

1.Visual Online Rental and Purchase:Upload product information, images, and prices, and update the description of the product's condition.
2.Provide detailed product descriptions to ensure consumers have comprehensive information.

3.2 CONCEPTUAL MODEL DESIGN

The conceptual model design of this system describes the interaction relationships between users and the various components of the second-hand game sales and rental platform. This platform implements multiple core functions such as user registration, game browsing, purchase, rental, inventory management, and resume module, aiming to build a fully functional, user-friendly, and data-secure online trading environment.

According to the system architecture design, the interaction type between the user registration and login components is "command" (Command), meaning that the system presents a form to the user, and the user completes the registration or login process by inputting personal information. The interface type of this component is form input. All registration data will be submitted through the form to the backend and securely stored in the system database. The database uses a structured design to ensure data integrity and quick retrieval.

The interaction type between the game list and detail display component is "Instructions". The system actively presents game information, including titles, platforms, prices, condition ratings, etc. Users can choose to "purchase" or "rent" and proceed to the interaction process. The interface type of this component includes a combination of text and images as well as operation buttons, ensuring that users can quickly obtain game details and make choices.

The interaction type of the purchase and lease module is "Selection". After the user confirms their intention to purchase or lease, the system will conduct inventory verification, generate an order, and carry out the payment process. The lease function also includes processes such as lease term selection and return address filling. This part is associated with the inventory log component to achieve the tracking and update of the inventory status for each transaction.

The interaction type of the user resume management module is "edit". This module enables users to create, edit and store resume information. Users can upload content and preview, modify it within the system. All resume data is stored in the database in a structured manner, facilitating subsequent queries and displays.

In the background management section of the system, administrators can perform operations such as goods in-out-of-stock, and update through the inventory management and log tracking modules. The interaction type is "command", and it is presented in a combination of graphics and list interfaces to enhance operational efficiency. All inventory changes are recorded in the inventory change log table, which is used for system auditing and anomaly tracking.

This system adopts a well-structured database design scheme, covering user table, game product table, order table, rental table, inventory log table, etc. All table structures have clear relationships, making them easy to maintain and expand. The development tools used in this system are PHP and MySQL, and the front end uses HTML/CSS/JavaScript to ensure good performance and compatibility.

In summary, this conceptual model achieves the core functions of the platform through the orderly interaction among components. It not only ensures the smoothness of user experience but also takes into account the reliability and maintainability of the system.
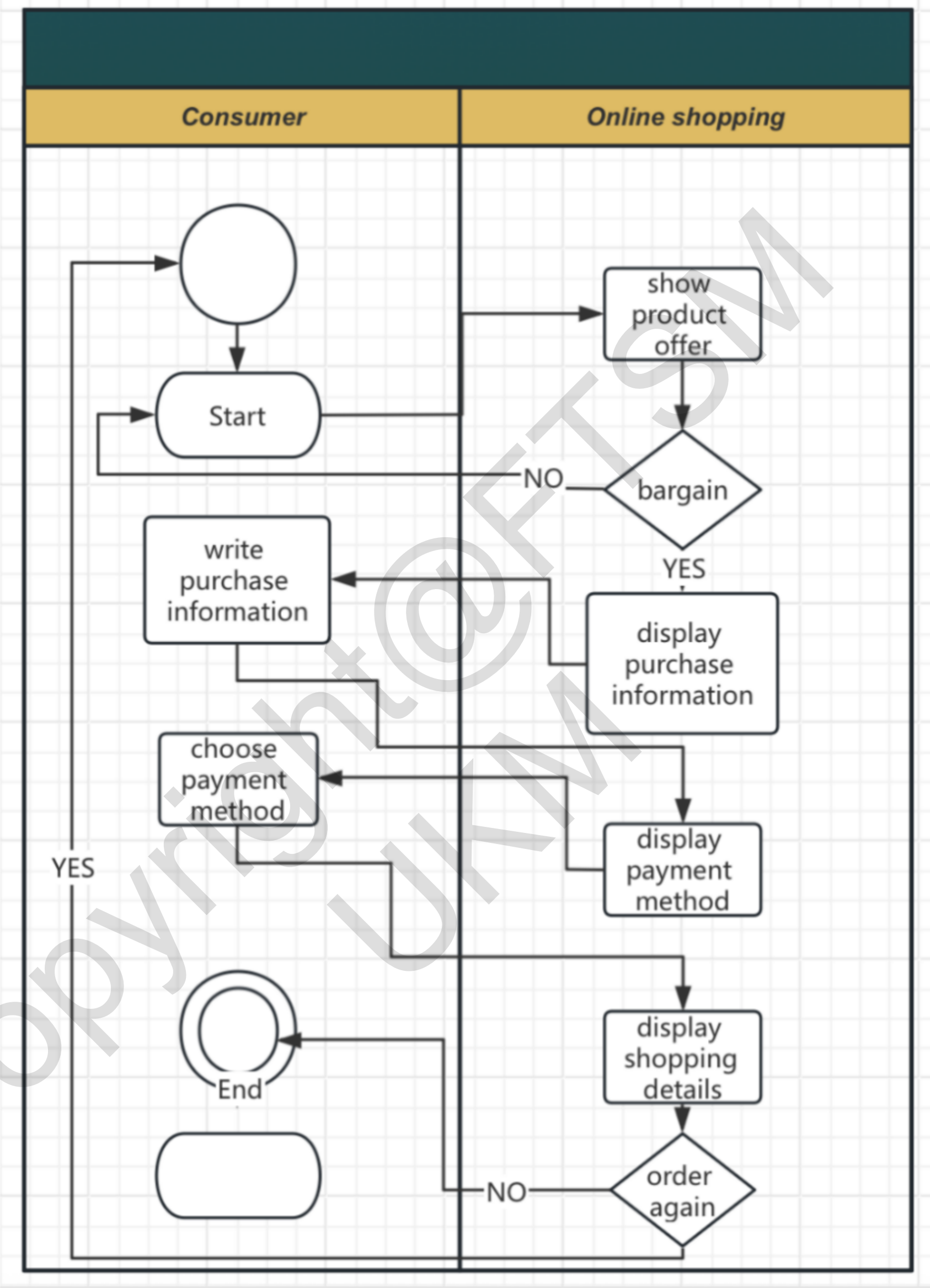
Figure 1: Activity Diagram

4.0 RESULT

4.1 SYSTEM DEVELOPMENT

This project was developed using Visual Studio Code as the primary integrated development environment (IDE). The core technologies include HTML for structuring the web pages, CSS for styling, JavaScript (JS) for interactivity, and PHP for server-side scripting. The backend database was implemented using MySQL, and phpMyAdmin was utilized for database management and testing.During the development stage, multiple key modules were implemented to fulfill the functional requirements of the e-commerce game disc trading system. These include:

Upload Page: Allows sellers to upload game disc information, including title, platform, condition rating, and game cover images.
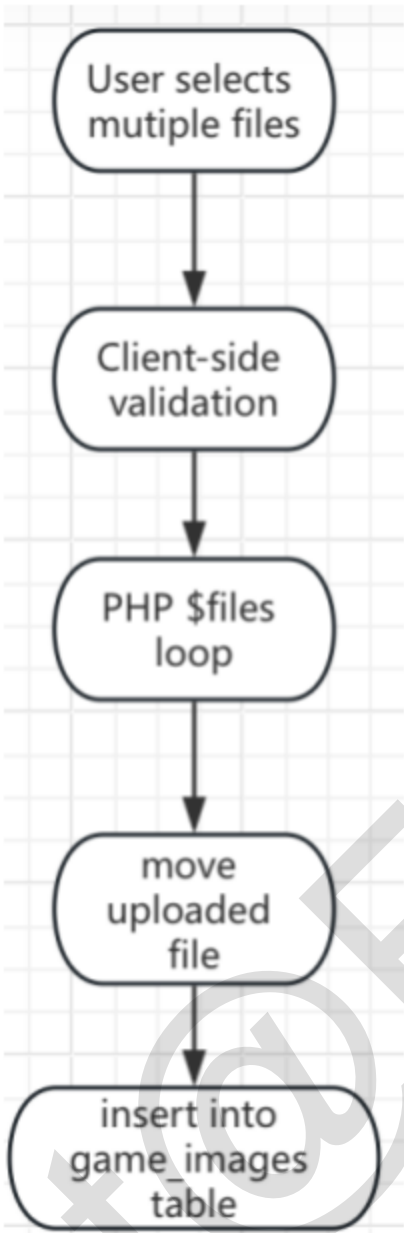

Figure 2: Upload product(Sell) Interface

Figure 3: Upload picture flowchart

Rent Page: Enables users to browse games available for rent, filter listings by platform or condition, and initiate rental requests.
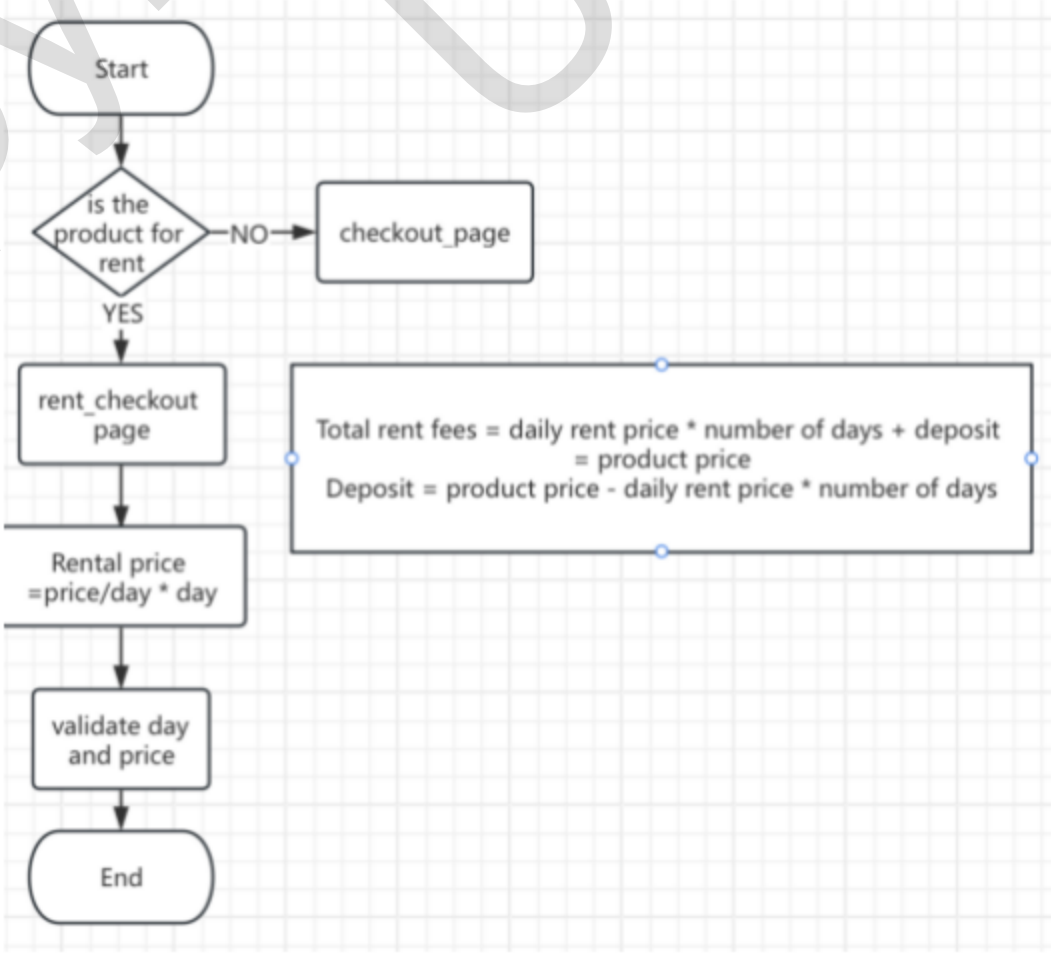

Figure 4: Rent_checkout flowchart

Figure 5: Rent product page

Search Functionality: Users can perform keyword-based searches to quickly locate specific game titles across the platform.
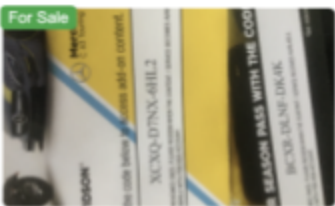
Figure 6: Search product interface
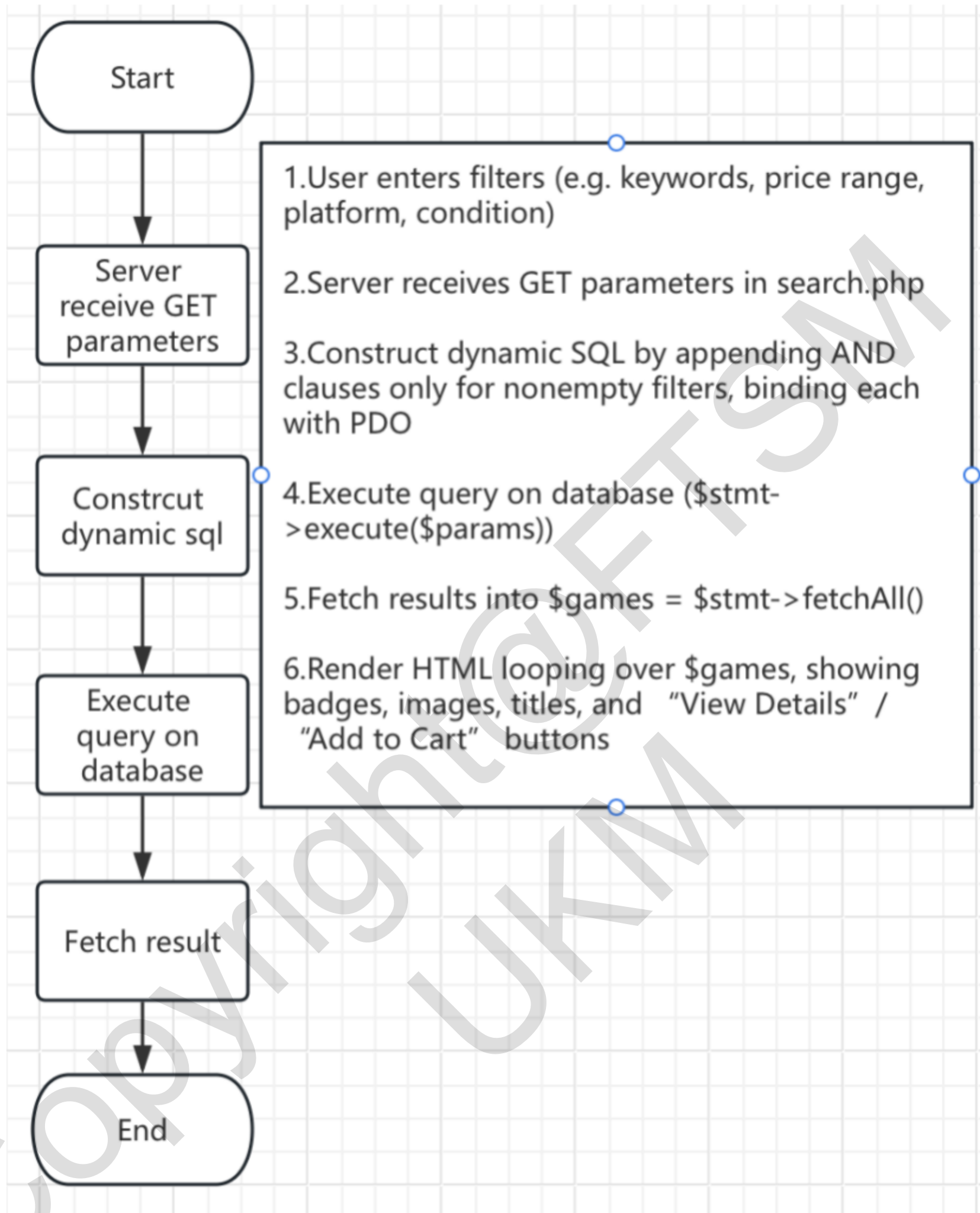
Figure 7: Search flowchart

Each page is connected to the MySQL database via PHP scripts, ensuring dynamic data handling and real-time updates. Proper validation and error handling were incorporated to enhance system robustness and provide users with informative feedback during interactions.Throughout the development process, challenges such as ensuring proper session handling, preventing duplicate cart entries, and securely managing user authentication were encountered. These issues were resolved by implementing logic checks in PHP and using hashed password storage techniques.

4.1 SYSTEM TESTING

This chapter defines the testing strategy for the second-hand game market system and summarizes the test results. The system testing aims to ensure that all implemented functions - including user authentication, product upload, search, shopping cart management, checkout (including sale and rental processes), and order management - can operate correctly and meet functional and non-functional requirements. The test scope covers the end-to-end operation processes of buyers and sellers, including user registration, login, logout, and profile updates; product-related operations such as uploading, editing, viewing details, and deletion; browsing and filtering functions, including filtering by game platform, price range, game condition, and sorting; shopping cart and checkout processes (applicable for sale and rental); and order management functions, including receipt generation, "My Orders" record display, and logistics tracking number display. The test environment is a MacBook Air (M1 chip, 8GB memory) running macOS Sequoia 15.5, using an Apache 2.4.46 server built with XAMPP, PHP version 7.4.29, MySQL 8.0.22, and accessed through Chrome and Safari browsers. The main goal of the test is to verify whether the core processes of the system can operate correctly under normal and boundary conditions, ensure the integrity and consistency of data between order, shopping cart, and inventory modules, evaluate the performance of the system under normal and peak loads, confirm that the security control mechanisms can effectively prevent unauthorized operations and protect user data, assess the availability and response speed of the system on different devices, and evaluate the usability and response speed of the system on different devices. The test basis includes functional and non-functional requirement documents, user stories and acceptance criteria of both buyers and sellers, source code modules written in PHP and SQL (such as games, users, cart, orders, etc.), and AJAX interfaces used for search and shopping cart operations within the system. This test mainly adopts functional black-box testing methods, combined with system testing and user acceptance testing, and conducts end-to-end process testing through manual operations and Selenium automation tools. The exit criteria for the test are: all critical and high-severity issues must be fixed and retested; at least 95% of the planned test cases must be completed; the loading time of system pages under normal load does not exceed 2 seconds; there must be no unresolved high or severe security vulnerabilities.

ID	Feature	Steps	Test Data	Expected
TC-001	Register	1. Visit /register.php2. Fill valid data + upload avatar3. Submit	Test_sell@test.com / Test_sell	Redirect to login; record in users table
TC-002	Login	1. Visit /login.php2. Enter valid/invalid credentials	Test_sell@test.com /111111	Invalid shows error; valid redirects home w/ username

TC-003	Search + Filter	1. On /index.php search "Zelda"2. Set min=10, max=50, platform=Switch, cond=4, sort ↓	test——rent	Results only matching all filters
TC-004	Upload Product	1. Login as seller2. Go to /upload_product.php3. Fill form (sale/rent) + images	Rent, 12 days, $3/day + return addr	New games + game_images rows; appears in manage list
TC-005	Add to Cart	1. Login as buyer2. On game detail click "Add to Cart"	game_id=17	Row in cart table
TC-006	Checkout (sale)	1. /cart.php select item → Proceed2. Fill shipping → Place Order	—	New orders + order_items; stock status = sold
TC-007	Checkout (rent)	1. Cart item with rental=1 → Proceed → redirect to /rent_checkout.php2. Confirm	days=5	Rental fee/deposit correct; new orders + order_items

Table 1: Test process

ID	Result	Remarks	Defect ID	ID
TC01	Pass	NONE	NONE	TC01
TC02	Pass	NONE	NONE	TC02
TC03	Pass	NONE	NONE	TC03
TC04	Pass	NONE	NONE	TC04

TC05	Pass	NONE	NONE	TC05
TC06	Pass	NONE	NONE	TC06
TC07	Pass	NONE	NONE	TC07

Table 2: Test result

5.0 CONCLUSION

The SecondHand Game Marketplace website is a secure and user-friendly web-based platform designed to facilitate the buying, selling, and renting of second-hand video games. For buyers, the system offers categorized listings with detailed game descriptions and conditions, enabling users—especially younger gamers—to access affordable gaming options and overcome the financial barriers posed by high retail prices. For sellers, the platform provides tools to list games with detailed condition ratings and manage buyer communications directly, addressing the limitations of traditional, unregulated trading methods.The system is developed using the waterfall model, following a structured process of requirements analysis, system design, implementation, testing, and deployment. The platform is built using a technology stack consisting of HTML, CSS, JavaScript, PHP, and MySQL to ensure scalability, stability, and security. The expected outcome is a trusted and efficient marketplace that promotes accessible, sustainable gaming through safe and transparent second-hand transactions.

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