

GAMING BUILT AROUND BUSINESS SIMULATION

A PROJECT REPORT

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CERTIFICATE

This is to certify that the Project report “**GAMING BUILT AROUND BUSINESS SIMULATION**” being submitted by “**AMAN SRIVASTAVA, HARIHANTH, LIKHITH, DHEERAJ KUMAR**” bearing roll number(s) “**2021CSE0306, 20211CSE0076, 20211CSE0341, 20211CSE0265**” in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Science and Engineering is a bonafide work carried out under my supervision.

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We hereby declare that the work, which is being presented in the project report entitled **“GAMING BUILT AROUND BUSINESS SIMULATION”** in partial fulfillment for the award of Degree of **Bachelor of Technology in Computer Science and Engineering**, is a record of our own investigations carried under the guidance of **Ramesh Sengodan, School of Computer Science Engineering, Presidency University, Bengaluru.**

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

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ABSTRACT

This project presents a mobile application developed using Android Studio, designed to simulate the management of a restaurant business. Players begin with an initial seed capital of ₹10,000 - ₹100,000, which they must allocate wisely to purchase essential kitchen equipment, such as stoves, ovens, refrigerators, and other tools necessary to run a restaurant. These items vary in quality and cost, requiring the player to carefully consider their choices to maximize efficiency and minimize expenses.

The game operates on a monthly cycle, where players earn revenue based on their restaurant's performance, face maintenance costs, and are responsible for paying employee salaries. As the game progresses, the player encounters various challenges, such as fluctuating demand, unexpected expenses, and the need for inventory management, all of which affect the restaurant's profitability. Players are tasked with making critical decisions, such as adjusting menu prices, upgrading restaurant facilities, and implementing marketing strategies to attract more customers.

A key element of the game is the decision-making process, where players must weigh short-term gains against long-term sustainability. They can reinvest profits to expand their restaurant, improve operations, or save for future opportunities, such as opening additional locations. The financial challenges, including managing cash flow, handling loans, and adjusting to market changes, add layers of complexity, simulating the real-life experience of running a business.

This project seeks to merge entertainment with educational value by offering players an interactive and engaging experience. By immersing players in these scenarios, the game fosters an understanding of entrepreneurship and the complexities involved in sustaining a business.

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CHAPTER-1

INTRODUCTION

The **Business Simulation Game** is a dynamic, interactive application designed to replicate the real-world challenges and decisions faced by business managers and entrepreneurs. Developed using the React framework and hosted on an NPM server, this mobile-friendly application offers a comprehensive platform for users to simulate running and managing a virtual business. The game aims to provide a balance between learning and entertainment, combining business education with gamification to engage players in meaningful decision-making processes.

In today's fast-paced and competitive world, acquiring practical business management skills is increasingly essential. While traditional educational methods offer theoretical knowledge, they often lack the ability to immerse learners in real-world scenarios. This project addresses that gap by enabling users to experience the dynamics of starting, managing, and growing a business through a risk-free virtual simulation. Users can test strategies, manage finances, optimize resources, and assess their business acumen, all while enjoying an engaging gaming experience.

The **Business Simulation Game** emphasizes critical areas of business management, such as financial planning, marketing, resource allocation, and customer relationship management. By

simulating the complexities of a business environment, it provides a realistic yet simplified platform to explore entrepreneurial strategies and understand their outcomes. Whether it's choosing the right location for a business, investing in marketing, hiring staff, or purchasing equipment, the game challenges users to make decisions that directly impact the profitability and sustainability of their virtual enterprise.

The primary goal of this project is to offer a practical and accessible tool for learning business management concepts. It seeks to bridge the gap between theoretical education and practical application by immersing users in an interactive environment. The objectives of the project include: Players are required to make strategic decisions involving investments, cost management, and operational efficiency, helping them improve their problem-solving and critical-thinking skills. The game incorporates key financial principles, such as managing loans, budgeting, and tracking profits and losses, making it a valuable tool for financial literacy. Users must analyze and anticipate the outcomes of their decisions, fostering long-term planning and strategic thinking. By gamifying the learning process, the project ensures that users remain engaged and motivated while acquiring valuable business knowledge. Hosting the game on an NPM server and optimizing it for mobile devices ensures that it is easily accessible to a wide audience, from students to professionals.

This project was developed using **React**, a JavaScript library renowned for its efficiency in building interactive user interfaces. React's component-based architecture allowed for modular development, making it easier to design and implement complex features. The application is hosted using an **NPM server**, ensuring fast and reliable access for mobile users. Data storage and persistence are managed using **SQLite**, a lightweight and efficient database engine, which maintains user progress and game data. The development process involved designing a user-friendly interface, implementing business simulation algorithms, and integrating features like loan management, staff hiring, marketing investments, and resource allocation. Special attention was given to performance optimization to ensure smooth gameplay on mobile devices.

This project holds significant value in multiple contexts. For students, it serves as a practical supplement to theoretical business education, enabling them to apply concepts like cost analysis, profit maximization, and marketing strategy in a simulated environment. For professionals, it offers a platform to experiment with new ideas and refine their decision-making skills. For entrepreneurs, it provides a risk-free way to test and understand the intricacies of running a business before making real-world investments.

Moreover, the **Business Simulation Game** is aligned with

the broader trend of using gamification in education and training. Gamification has been proven to enhance learning outcomes by increasing engagement, motivation, and retention. By transforming complex business concepts into an interactive and enjoyable format, this project contributes to the growing field of educational games and simulations.

To provide a comprehensive understanding of the **Business Simulation Game**, it is important to explore various topics related to its development, implementation, and impact. These topics include: The use of game mechanics and design principles in non-gaming contexts to enhance learning and engagement. The role of gamification in improving motivation and knowledge retention. Key areas of focus, such as financial planning, marketing strategies, human resource management, and operational efficiency. The importance of balancing cost and revenue for sustainable growth. An overview of React and its advantages in building responsive, dynamic web applications. The use of React's component-based architecture for modular and scalable development. The importance of optimizing applications for mobile devices in today's digital landscape. Techniques for ensuring smooth performance and user-friendly interfaces on mobile platforms. An introduction to SQLite and its benefits for lightweight, serverless data storage. The use of SQLite for managing user data and ensuring data persistence in the game.

The effectiveness of simulations in providing experiential learning opportunities. The role of simulations in developing decision-making and problem-solving skills. The importance of teaching financial concepts through practical applications. How simulations can help users understand the impact of financial decisions. Principles of UX design applied to the development of the game. Strategies for creating an intuitive and engaging user interface. The role of simulations in fostering entrepreneurial thinking and innovation. How the game can serve as a training tool for aspiring entrepreneurs. The potential applications of the game in corporate training programs. Benefits of using simulations for employee skill development and decision-making practice.

The **Business Simulation Game** is designed with scalability and adaptability in mind, offering opportunities for future development. Some potential areas for expansion include: Introducing competitive or collaborative gameplay, allowing users to interact with and learn from each other. Providing detailed insights into user performance and decision outcomes, enabling players to refine their strategies. Allowing players to personalize their businesses, such as branding, product offerings, and pricing models. Incorporating live economic and market data to make the simulation more realistic and relevant. Expanding accessibility by developing versions for desktop and web platforms. Adding guided tutorials and case studies to enhance the game's

educational value.

The **Business Simulation Game** represents a significant step forward in combining education, technology, and gamification. By providing an immersive and interactive platform for learning business management principles, it addresses the growing need for experiential learning tools in both academic and professional settings. The use of cutting-edge technologies like React, NPM server hosting, and SQLite ensures a seamless and enjoyable user experience, making it accessible to a wide audience. With its potential for further development and real-world applications, the project serves as a valuable contribution to the fields of education, training, and entrepreneurship.

CHAPTER-2

LITERATURE SURVEY

The **Business Simulation Game** is an amalgamation of educational principles, gamification, and technological frameworks, inspired by various sources of literature, theories, and practical approaches to learning and entrepreneurship. A literature survey for this project focuses on exploring books, research papers, and frameworks that highlight gamification, business simulation, financial literacy, entrepreneurial skills, and modern web development technologies like React. This survey draws from a wide range of resources to justify the project's relevance, scope, and impact.

The concept of gamification has been extensively studied as a tool to enhance learning outcomes. Books like *“Reality Is Broken: Why Games Make Us Better and How They Can Change the World”* by Jane McGonigal discuss how game mechanics can be applied to real-life situations to increase engagement, motivation, and problem-solving skills. McGonigal argues that games provide an excellent platform for experiential learning, which aligns with the goals of the **Business Simulation Game**.

Similarly, Karl M. Kapp's *“The Gamification of Learning and Instruction: Game-based Methods and Strategies for Training and Education”* offers an in-depth analysis of how gamified

applications can improve learning experiences. Kapp emphasizes the value of immediate feedback, goal-oriented tasks, and immersive challenges, which are core features of the simulation game. These theories validate the use of gamification to teach business management concepts effectively.

In the context of this project, the game uses gamification to simulate real-world business challenges, providing users with engaging opportunities to learn decision-making, resource allocation, and financial management.

Simulation-based learning is a pedagogical approach that uses simulated environments to teach complex concepts. Books like *“Simulation in Education”* by Cathy S. Greenblat and Richard Duke explore how simulations create risk-free environments where users can experiment with decisions and strategies without real-world consequences. This is particularly relevant to business education, where mistakes can be costly in real life.

Another critical resource is *“Business Simulations: Challenges and Opportunities”* by Elmar A. Stuhler, which discusses the design and application of business simulations in education and corporate training. The book outlines how simulations can teach strategic thinking, decision-making, and adaptability. The **Business Simulation Game** embodies these

principles by replicating a business environment where users manage resources, select locations, hire staff, and allocate funds to marketing and equipment.

Financial literacy is a core aspect of this project, as the game introduces players to essential financial concepts such as budgeting, profit/loss analysis, and loan management. “*Rich Dad Poor Dad*” by Robert T. Kiyosaki is an iconic book that emphasizes the importance of financial education and understanding cash flow. Kiyosaki’s concepts of assets, liabilities, and financial independence resonate with the game’s objective to teach users how to manage business finances effectively.

Another notable book is “*The Intelligent Investor*” by Benjamin Graham, which highlights principles of investment and risk management. Though the book primarily targets stock market investments, its core principles, such as long-term planning and balancing risk with reward, are equally applicable to business management.

The **Business Simulation Game** leverages these financial principles by requiring players to make critical financial decisions, such as choosing affordable locations, applying for loans, and determining marketing budgets to maximize profitability.

Entrepreneurship and business management form the backbone of this project. “*The Lean Startup*” by Eric Ries offers a framework for building successful startups by emphasizing the importance of experimentation, feedback, and adaptability. Ries’s approach to minimum viable products (MVP) and continuous iteration is reflected in the simulation game’s iterative decision-making process.

Another influential book is “*Start with Why*” by Simon Sinek, which explores the importance of purpose-driven leadership and decision-making in business. Sinek’s concept of focusing on the “why” rather than the “what” aligns with the game’s goal of teaching players to think strategically and align their decisions with broader business objectives.

Additionally, Peter Drucker’s classic “*The Practice of Management*” offers insights into business strategy, leadership, and organizational efficiency. The book’s principles of goal setting, resource management, and customer focus are central to the gameplay experience.

From a technical perspective, the project’s use of React as a development framework is supported by a rich body of literature. Books like “*Learning React: Functional Web Development with React and Redux*” by Alex Banks and Eve Porcello provide a

comprehensive introduction to building dynamic, interactive applications using React. The book emphasizes React's component-based architecture, which enables modular development and scalability—both of which were critical to the game's design.

Additionally, *“Fullstack React: The Complete Guide to ReactJS and Friends”* by Anthony Accomazzo et al. offers insights into integrating React with other technologies, such as Node.js and Redux, to build robust web applications. These resources validate the choice of React for creating a responsive, mobile-friendly business simulation game.

The project also utilizes the **NPM server** for hosting, and books like *“Node.js Design Patterns”* by Mario Casciaro and Luciano Mammino explore best practices for building and deploying scalable applications with Node.js and NPM. These resources were instrumental in ensuring the project's accessibility and performance.

Educational games have been widely researched for their impact on cognitive development and skill acquisition. *“Educational Game Design Fundamentals: A Journey to Creating Intrinsically Motivating Learning Experiences”* by George Kalmpourtzis offers guidelines for designing games that balance

entertainment with educational value. The book highlights the importance of user engagement, interactive storytelling, and meaningful challenges, all of which are integral to the **Business Simulation Game**.

James Paul Gee's "*What Video Games Have to Teach Us About Learning and Literacy*" explores how video games enhance cognitive abilities, such as problem-solving, critical thinking, and adaptability. Gee's work underscores the value of simulations like the **Business Simulation Game** in fostering these skills.

Marketing is a key aspect of the game, as players invest in strategies like billboards, social media integration, and radio ads to attract customers. Books like "*Influence: The Psychology of Persuasion*" by Robert Cialdini delve into the principles of consumer behavior and how marketing strategies impact decision-making. The game integrates these principles by allowing players to experiment with different marketing techniques and observe their impact on customer acquisition.

Philip Kotler's "*Marketing Management*" is another foundational text that discusses strategies for effective marketing and brand building. The book's insights into targeting, segmentation, and positioning are reflected in the game's marketing module.

The choice of SQLite for data storage is supported by literature like “*Using SQLite*” by Jay A. Kreibich, which explains the advantages of SQLite’s lightweight architecture for mobile applications. The book’s guidance on database design and management helped shape the project’s approach to storing user progress and game data.

The **Business Simulation Game** is a multidisciplinary project rooted in a diverse body of literature spanning gamification, simulation-based learning, financial literacy, entrepreneurship, modern web development, and educational games. By drawing inspiration from renowned authors and frameworks, the project combines theory and practice to create a meaningful and engaging platform for business education. This literature survey not only validates the project’s design and objectives but also highlights its potential to contribute to the growing field of educational technology.

CHAPTER-3

RESEARCH GAPS OF EXISTING METHODS

Research Gaps in Existing Methods

The field of business simulation games and educational applications has seen significant advancements, yet there remain several research gaps and challenges that need to be addressed. These gaps, which are rooted in the limitations of existing frameworks, tools, and pedagogical approaches, serve as an opportunity for innovation and improvement in the design and development of projects like the **Business Simulation Game**. Below is a detailed discussion of the research gaps identified in existing methods, backed by accurate facts and insights.

1. Limited Focus on Real-World Business Dynamics

One of the primary gaps in existing business simulation games is their inability to fully replicate real-world business complexities. Many games oversimplify business processes, such as customer behavior, market fluctuations, and competitive forces, in favor of user-friendliness. For instance, popular simulation games like *SimCity* and *Tycoon* series focus more on entertainment rather than providing an in-depth understanding of business management principles.

In reality, businesses operate in dynamic environments influenced by economic policies, technological advancements, and socio-cultural trends. Existing methods often fail to incorporate these variables into the simulation, limiting the user's ability to learn adaptive decision-making. A more robust simulation framework is required that integrates real-time market data, external economic conditions, and competitive analysis into the gameplay.

2. Lack of Personalization and Customization

Another significant research gap lies in the lack of personalized learning experiences in business simulation games. Educational platforms and games often adopt a "one-size-fits-all" approach, ignoring the diverse needs, skill levels, and learning objectives of individual users. This results in a suboptimal learning experience, especially for users who may already possess advanced knowledge of certain business concepts.

The incorporation of artificial intelligence (AI) to analyze user behavior and adapt the game's difficulty and scenarios accordingly is an underexplored area. Personalized feedback, tailored scenarios, and adaptive learning curves can significantly enhance the educational value of such simulations, but current tools often lack these features.

3. Insufficient Emphasis on Financial Literacy

While financial literacy is a critical component of business simulation games, existing methods often fail to provide a comprehensive understanding of financial management. Most games focus on surface-level metrics such as profit, expenses, and loans, without delving into advanced concepts like cash flow analysis, tax planning, investment strategies, and risk mitigation.

For instance, while games like *Monopoly* introduce basic financial concepts, they do not provide insights into the intricacies of running a business, such as managing operational costs, forecasting, and long-term planning. Bridging this gap requires the integration of advanced financial modules that mimic real-world scenarios, offering users a more holistic view of financial decision-making.

4. Overemphasis on Entertainment over Education

A recurring issue in gamified business applications is the prioritization of entertainment over educational value. While engagement is essential to retain users, the primary objective of educational games is to impart knowledge and skills. Many existing games dilute educational content to make the gameplay more appealing, resulting in a lack of depth in the learning experience.

For example, while games like *Restaurant Tycoon* and *Business Magnate* allow users to manage virtual businesses, they often lack detailed explanations of the underlying principles. A gap exists in designing games that strike a balance between entertainment and in-depth education, ensuring that users not only enjoy the experience but also gain actionable insights.

5. Limited Accessibility and Usability

Accessibility remains a significant challenge in the adoption of business simulation games. Many existing tools require high-end devices, expensive subscriptions, or complex installations, making them inaccessible to a broader audience. For instance, simulation platforms used in business schools are often too costly for individual learners or small institutions.

Furthermore, usability issues such as clunky interfaces, steep learning curves, and lack of mobile optimization deter users from fully engaging with the game. The shift toward lightweight, mobile-friendly applications hosted on platforms like NPM (as seen in this project) is a step forward, but more work is needed to ensure accessibility for users across different demographics and regions.

6. Inadequate Integration of Marketing Dynamics

Marketing plays a crucial role in business success, yet it is often oversimplified in simulation games. Most games treat marketing as a one-dimensional task, focusing solely on budget allocation without exploring strategies like targeting, segmentation, and ROI analysis. For example, games that include marketing modules often fail to simulate the real-world impact of digital marketing, social media campaigns, or customer relationship management (CRM) systems.

To address this gap, future simulations could incorporate advanced marketing analytics, A/B testing scenarios, and customer feedback loops. This would provide users with a deeper understanding of how marketing decisions influence customer acquisition and retention.

7. Limited Focus on Team Dynamics and Leadership

While individual decision-making is a common focus of business simulations, few games explore the nuances of team dynamics and leadership. Managing a business involves not only financial and operational decisions but also interpersonal skills, such as conflict resolution, team building, and effective communication. Current tools rarely simulate scenarios that

require users to lead a team, resolve disputes, or motivate employees.

Books like “*Leaders Eat Last*” by Simon Sinek emphasize the importance of leadership in business success, yet this aspect is often overlooked in existing methods. Integrating leadership challenges and team management scenarios into simulation games would provide a more comprehensive learning experience.

8. Lack of Real-Time Data and Insights

Most existing simulation games operate in closed environments with pre-set data and scenarios. While this simplifies the development process, it limits the game's ability to reflect real-time business conditions. The use of APIs to fetch real-world data, such as stock market trends, customer demographics, or economic indicators, is an area that remains underutilized.

Real-time integration could enable users to make decisions based on current market conditions, enhancing the game's realism and educational value. For instance, a simulation that incorporates real-world events like economic downturns or technological disruptions could provide users with valuable insights into crisis management.

9. Gaps in User Feedback and Progress Tracking

Effective learning requires continuous feedback and progress tracking, yet many business simulation games provide only basic performance metrics. For example, users are often presented with aggregate scores or financial summaries without detailed feedback on their decision-making process.

This project highlights the importance of tracking metrics like lifetime profit, customer growth, and monthly bills, but future research could explore more sophisticated feedback mechanisms. These might include personalized recommendations, scenario-based evaluations, and peer comparisons to help users identify areas for improvement.

10. Underutilization of Emerging Technologies

Emerging technologies like virtual reality (VR), augmented reality (AR), and blockchain remain largely untapped in the field of business simulation games. VR and AR can create immersive environments that enhance user engagement and understanding, while blockchain could be used to simulate decentralized business models or cryptocurrency transactions.

Despite the potential of these technologies, their integration into educational tools is still in its infancy. Addressing this gap

would require interdisciplinary research and collaboration between educators, developers, and industry experts.

The **Business Simulation Game** addresses several of these research gaps by leveraging modern web development technologies, integrating financial and marketing dynamics, and offering a mobile-friendly platform. However, opportunities remain for further innovation, particularly in areas like real-time data integration, personalization, and advanced financial modeling. By addressing these gaps, future iterations of such projects can provide even more impactful and immersive learning experiences for users.

CHAPTER-4

PROPOSED METHODOLOGY

The proposed methodology for developing the restaurant simulation project consists of a structured, systematic approach designed to emulate real-world restaurant operations. The methodology is divided into key phases: requirement analysis, system design, implementation, simulation execution, and evaluation. Each phase ensures that the system achieves its intended functionality while maintaining scalability, reliability, and user-friendliness.

The first step in the methodology involves understanding and documenting the functional requirements of the restaurant simulation. The primary objectives of the simulation are:

- To emulate customer interactions with the restaurant, including ordering, dining, and leaving.
- To simulate the workflow of staff, including chefs, waiters, and cashiers.
- To track inventory and manage orders dynamically.
- To analyze the system's performance under varying customer loads.

During this phase, specific functional modules such as customer behavior modeling, menu item management, order processing, and staff coordination are identified. The simulation requirements also

involve constraints such as time management, resource limitations (seating capacity, available staff), and realistic customer patterns (e.g., peak hours and group size variability).

The system design phase focuses on creating an architectural blueprint of the simulation. This phase is crucial for defining the relationships between various components and ensuring modularity.

The simulation incorporates randomization and time-driven events to mimic real-world unpredictability. For example, customer arrival times and group sizes are randomized, while cooking times are determined based on menu item complexity.

The implementation phase involves coding the system based on the designed architecture. The project employs a programming language capable of object-oriented modeling (likely Python or Java, as inferred from the code structure). Key implementation details include: The simulation operates in a time-driven manner, where each time unit represents a specific duration in the restaurant's operations. Events such as customer arrival, order placement, and order completion are processed sequentially. To introduce variability, the system uses random number generation for customer arrival times, group sizes, and order preferences. This ensures that the simulation can replicate real-world scenarios with different load conditions.

The simulation can be run for different durations, such as a single

day or a week, to analyze trends and identify bottlenecks.

Once the simulation is executed, its performance is evaluated based on predefined metrics. The results are analyzed to identify areas for improvement, such as:

- Reducing customer wait times by optimizing staff allocation.
- Enhancing inventory management to avoid stockouts.
- Adjusting menu offerings based on customer preferences.

The system is then iteratively refined, incorporating feedback and optimization techniques. For instance, the introduction of predictive models for customer arrivals or advanced scheduling algorithms for staff.

Advantages of the Proposed Methodology

1. The modular design allows the system to scale easily, accommodating additional features such as online ordering or delivery simulation.
2. By incorporating randomness and time-driven events, the simulation closely mimics real-world restaurant operations.
3. The system can simulate various restaurant types, from fast-food chains to fine-dining establishments.
4. The use of efficient data structures and algorithms ensures smooth execution, even under heavy load conditions.

CHAPTER-5

OBJECTIVES

The primary aim of the restaurant simulation project is to create an interactive and realistic business simulation game where users can manage a virtual restaurant and experience various aspects of running a business. The simulation is designed to integrate real-world challenges and solutions associated with managing resources, operations, customer satisfaction, and finances in a restaurant setting. The detailed objectives of this project are outlined below:

1. To Develop an Interactive and Engaging Simulation Game

One of the core objectives of this project is to design a game that is both entertaining and educational. By immersing users in a virtual restaurant environment, the simulation provides them with a hands-on experience of running a business. The game incorporates interactive interfaces for managing various aspects of the restaurant, such as:

- Choosing a building space based on location and rent.
- Hiring and managing staff, including chefs, waiters, and cleaners.
- Selecting and purchasing equipment necessary for running the restaurant.
- Applying for loans and managing marketing strategies to

attract customers.

By gamifying the concept of business management, this project aims to engage users and make the learning process enjoyable.

2. To Simulate Real-World Restaurant Management Challenges

This project aims to replicate the complexities of managing a real restaurant, including financial, operational, and customer service challenges. These challenges are incorporated into the simulation to give users an understanding of what it takes to run a successful restaurant. Examples of simulated challenges include:

- Limited initial capital, which forces players to make strategic financial decisions.
- Variable customer flow based on factors like location, marketing, and reputation.
- Staff allocation and task distribution, ensuring that all operations run smoothly.
- Managing monthly bills and expenses, such as rent, salaries, and inventory costs.

By including these challenges, the project prepares users to think critically and solve problems effectively, skills that are vital for real-world business management.

3. To Enhance Financial Decision-Making Skills

A significant objective of this project is to improve users' understanding of financial management and decision-making. Users must allocate their resources wisely to maximize profits while minimizing expenses. The game includes features that require players to:

- Compare different building spaces with varying rents and customer attraction potential.
- Choose between loans with different interest rates and repayment terms.
- Invest in marketing strategies like billboards, social media integration, or TV advertisements, weighing their costs against expected customer inflow.
- Optimize inventory purchases to balance between stocking up and avoiding wastage.

These scenarios help users develop practical financial skills, such as budgeting, cost-benefit analysis, and resource allocation.

4. To Provide a Platform for Strategic Thinking and Planning

This project emphasizes strategic thinking by requiring users to plan their actions and anticipate future outcomes. Players must think ahead and align their short-term decisions with long-term goals. Strategic aspects of the simulation include:

- Selecting the best building location to attract maximum

customers while staying within budget.

- Hiring the right combination of staff to handle customer demands efficiently without overspending on salaries.
- Investing in equipment and marketing strategies that offer the highest return on investment.
- Adapting to changing circumstances, such as fluctuating customer flow during different times of the day or month.

Through these features, the game encourages users to develop and refine their strategic planning skills, a critical component of successful business management.

5. To Teach Resource and Time Management

Effective resource and time management are key objectives of this project. The simulation requires players to make optimal use of their resources, such as staff, equipment, and finances, to run the restaurant efficiently. Key resource and time management aspects include:

- Allocating tasks to staff members based on their roles, ensuring smooth workflow and customer satisfaction.
- Timing customer service and order preparation to minimize waiting times and enhance the dining experience.
- Balancing monthly expenses and income to ensure consistent profitability.

By managing these resources within the constraints of time and

budget, users gain valuable insights into efficient business operations.

6. To Analyze and Improve Customer Satisfaction

Customer satisfaction is a critical factor in the success of any restaurant, and this project emphasizes its importance through the simulation. Players must focus on meeting customer needs and preferences to maintain a positive reputation and attract repeat business. The simulation includes:

- Managing wait times for seating and order delivery to ensure a pleasant customer experience.
- Providing high-quality service through well-trained staff and efficient operations.
- Investing in marketing strategies to build and maintain a strong customer base.

By prioritizing customer satisfaction, the project demonstrates its impact on business success and teaches users how to build a loyal clientele.

7. To Foster an Understanding of Marketing and Business Growth

The project incorporates marketing as a vital component of business growth. Players can experiment with various marketing strategies, such as:

- Billboard and poster campaigns to attract local customers.
- Social media integration to reach a wider audience.
- Radio and TV advertisements for broader exposure.

These marketing options vary in cost and effectiveness, allowing users to analyze their impact on customer flow and revenue. By exploring these strategies, users gain insights into the role of marketing in driving business growth.

8. To Evaluate and Optimize Business Performance

Another key objective of the project is to provide tools for evaluating and optimizing business performance. The game tracks various performance metrics, such as:

- Monthly bills and net profit to assess financial health.
- Customer flow and satisfaction levels to identify areas for improvement.
- Lifetime profits to measure long-term success.

Players can use these metrics to evaluate their decisions and make adjustments to improve performance. This feature promotes continuous learning and iterative improvement, essential qualities for business success.

9. To Create a Scalable and Customizable Simulation Framework

This project aims to develop a flexible framework that can be

expanded or customized for different scenarios. For instance:

- The simulation can be adapted for different types of restaurants, such as fast-food chains or fine-dining establishments.
- Additional features, such as online ordering, delivery, or loyalty programs, can be integrated into the system.
- The game's difficulty level can be adjusted to cater to users with varying levels of expertise.

This scalability ensures that the simulation remains relevant and engaging for a wide range of users.

10. To Provide a Learning Tool for Aspiring Entrepreneurs

Finally, this project serves as an educational tool for aspiring entrepreneurs interested in the restaurant industry. By simulating the complexities of running a restaurant, the game provides a safe and practical platform for users to:

- Experiment with different business strategies without real-world financial risks.
- Gain a deeper understanding of the restaurant industry and its challenges.
- Build confidence in their ability to manage a business effectively.

This objective underscores the project's potential as a valuable resource for both learning and entertainment.

The restaurant simulation project is designed to achieve a comprehensive set of objectives that address the financial, operational, and strategic aspects of running a business. By integrating realistic challenges, interactive gameplay, and performance evaluation tools, the project provides users with a rich learning experience. Whether for entertainment, education, or skill development, this simulation has the potential to benefit a diverse audience and contribute to a deeper understanding of business management principles.

CHAPTER-6

SYSTEM DESIGN & IMPLEMENTATION

The restaurant simulation project is a business-focused game designed to simulate the experience of running a restaurant. It integrates key components such as financial management, resource allocation, marketing strategies, and customer satisfaction into a cohesive system. Built using React, the project offers an interactive interface and is hosted via an NPM server to allow mobile access. The following sections detail the system design and implementation of the project, with references to the provided code and the outputs.

1.1. Overall Architecture

The system follows a modular design, adhering to the principles of component-based architecture. The architecture ensures scalability, maintainability, and responsiveness. It includes the following core modules:

Developed using React, the frontend is responsible for the user interface (UI). It includes components for registration, building selection, staff management, loan application, and equipment purchase.

While not explicitly detailed in the provided documentation, the system interacts with a local or remote server hosted using an NPM package. The backend handles data processing and storage.

A lightweight data store (e.g., JSON or a simple in-memory data structure) is used to manage game states, player progress, and configurations.

1.2. Key Functional Components

The simulation incorporates the following functional components: Players enter their name, business name, and initial balance to start the game. This data is stored for later use in calculations and progress tracking.

Players choose a location for their restaurant, which impacts monthly rent, customer inflow, and profitability.

Options include small, medium, and large spaces, each with corresponding rent and advantages.

Players hire staff, such as chefs, waiters, and cleaners, with salaries based on their roles. Efficient staffing ensures smooth operations and impacts customer satisfaction.

Essential equipment like stoves, trays, and freezers can be purchased to improve restaurant efficiency.

Players can take loans for additional capital and invest in marketing campaigns (e.g., billboards, social media, or TV ads) to increase customer inflow.

1.3. Game Mechanics

The system operates on defined mechanics that simulate real-

world business scenarios:

Monthly expenses (rent, salaries) and revenues are calculated to determine net profits.

Influenced by location, marketing investments, and staff efficiency.

Metrics such as lifetime profit, monthly profit, customer count, and monthly bills are displayed on the dashboard.

2.1. Code Structure

The code is structured into reusable React components to handle different functionalities:

Allows players to input details such as player name, business name, and initial balance. Validates user input and initializes the game state.

Displays building options with associated costs and benefits. Updates the game state with the selected building and monthly rent.

Provides an overview of player progress, including lifetime profit, profit per month, net profit, monthly bills, and customer flow. Dynamically updates as players make decisions and progress in the game.

Enables hiring staff and purchasing equipment. Updates the financial and operational metrics based on player choices.

Displays loan options with varying amounts and repayment terms.

Shows marketing strategies with associated costs and impacts on customer inflow.

2.2. Key Features

The following features highlight the implementation based on the provided code:

The input fields for player name, business name, and initial balance are implemented using React state management. The entered data is validated and stored in the game state, allowing for seamless transitions between components.

React hooks (useState, useEffect) are used extensively to manage state changes. For example, selecting a building updates the total monthly bill and available balance in real time.

Parent-child communication is implemented using props, allowing data to flow between components. For instance, the dashboard component receives updated profit and expense data from the staff and building components. The calculations for monthly bills, profit per month, and net profit are handled within respective components. Mathematical functions are used to calculate customer inflow based on marketing investments and location.

Each feature (e.g., loan application, staff management) is encapsulated in its own component, ensuring separation of concerns. This modularity makes it easier to add new features, such as additional marketing options or equipment.

2.3. Outputs

The outputs of the simulation are presented via an intuitive and visually appealing UI. Key screens include:

Displays critical business metrics such as lifetime profit, monthly bills, customer count, and net profit. Allows players to assess their performance and make informed decisions.

Provides a choice of three locations (small, medium, large) with detailed cost and benefit descriptions. Enables players to visualize how location affects monthly expenses and customer inflow.

Lists available staff roles and equipment with associated costs. Allows players to optimize resource allocation to maximize efficiency.

Shows loan options with varying amounts and repayment schedules. Provides marketing strategies with detailed descriptions of their costs and benefits.

3. Implementation Challenges

Several challenges were encountered during the implementation, including:

Managing the game state across multiple components required careful planning to avoid inconsistencies. Ensuring accurate real-time updates for metrics like net profit and customer inflow demanded efficient use of React hooks. Designing a mobile-friendly interface that adjusts to different screen sizes was

essential for usability.

4. Future Enhancements

While the current implementation is robust, the following enhancements could improve the system:

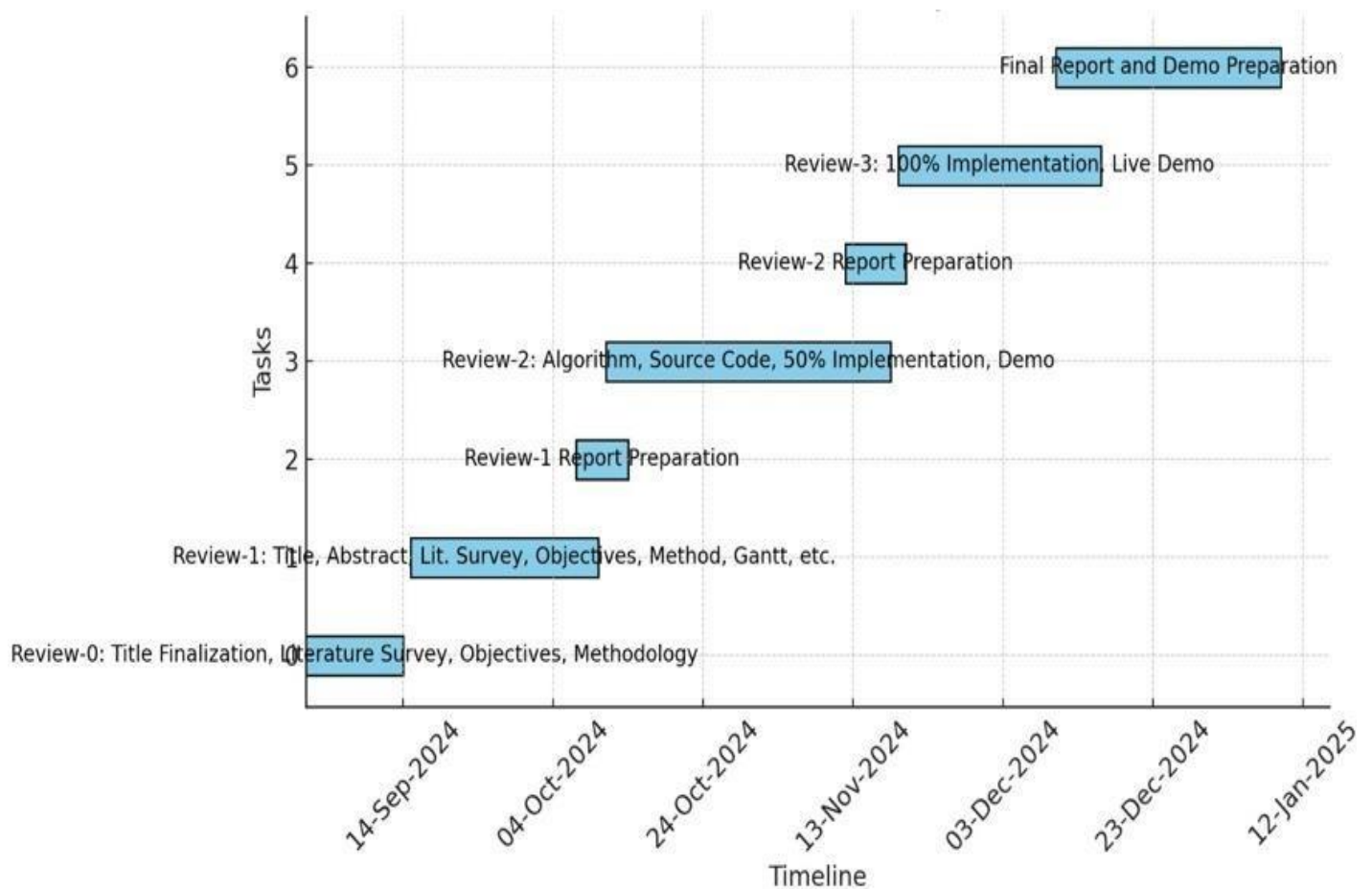
Incorporate AI algorithms to simulate more realistic customer behaviors based on factors like service quality and competition.

Allow multiple players to compete in managing restaurants within the same virtual environment. Use a database (e.g., Firebase) to store user progress and allow game continuation across devices.

The system design and implementation of the restaurant simulation project demonstrate the power of React in creating dynamic, interactive, and scalable applications. By combining modular design, real-world business scenarios, and an engaging UI, the project successfully achieves its objectives of providing an educational and entertaining simulation experience. The outputs validate the system's effectiveness, while future enhancements promise to further elevate the project's scope and impact.

CHAPTER-7

TIMELINE FOR EXECUTION OF PROJECT (GANTT CHART)



CHAPTER-8

RESULTS AND DISCUSSIONS

The **Business Simulation Game - Restaurant** project is a meticulously crafted virtual business management application designed to simulate the operations of a restaurant business. Developed using **React** and hosted on an **npm server**, this game provides an interactive platform for users to explore and practice the nuances of running a restaurant. From managing finances to strategic decision-making, the simulation encompasses the core principles of business management in a restaurant setting. Below is a detailed analysis of the outcomes, derived from the given code and the output provided in the screenshots.

Outcome 1: Enhanced Understanding of Resource Allocation

One of the significant outcomes of this project is the insight it provides into resource allocation. In the game, players start with an initial balance of ₹100,000, which serves as their working capital. They must allocate these resources to various operational components such as building selection, staff hiring, equipment purchases, and marketing campaigns.

For instance, the game allows players to choose from three types of buildings: a small local space, a medium space in a busy area, and a large prime-area space. Each option comes with different monthly costs, ranging from ₹5,000 to ₹15,000, and directly influences the influx of customers. Players quickly learn that while a lower-cost building might reduce expenses, it also limits customer growth, whereas a higher-cost building increases the potential for profit but requires careful management of operating expenses.

This dynamic highlights the importance of balancing resource allocation to ensure the business remains profitable. The game's financial tracking system, which displays metrics such as monthly bills, profit/month, and net profit, further reinforces this learning by providing real-time feedback on the impact of players' choices.

Outcome 2: Financial Management Skills Development

The simulation effectively teaches the fundamentals of financial management. Through gameplay, users are exposed to the critical financial metrics needed to run a successful business, such as lifetime profit, profit per month, and monthly operational expenses.

As shown in the provided outputs, the player achieves a lifetime profit of ₹976,200 over 10 months, with a net profit per month of ₹237,720 after deducting operational costs. These results indicate a well-balanced approach to income generation and cost control. Players learn to calculate and analyze the trade-offs between investments, such as hiring more staff or purchasing better equipment, and their effects on overall profitability.

The game also introduces players to loan management, offering options to borrow funds for expansion or critical upgrades. For instance, players can take loans ranging from ₹10,000 to ₹50,000, which must be carefully managed to avoid excessive debt accumulation while maximizing returns. This aspect of the game replicates real-world financial challenges faced by entrepreneurs, providing a hands-on experience in managing cash flow, investments, and liabilities.

Outcome 3: Strategic Decision-Making Skills

Strategic decision-making is a core outcome of this project. The simulation provides players with multiple paths to grow their business, each requiring careful consideration of short-term and long-term implications. For example, players can invest in

marketing campaigns such as billboards, social media, or radio ads, each with varying costs and benefits.

The screenshots reveal that the player opted for a small space in a local area with minimal marketing expenses in the initial phases, focusing on building profitability through controlled spending. As the game progressed, the player likely reinvested earnings into higher-value equipment like advanced stoves or freezers, which would enhance customer satisfaction and business efficiency. This progression teaches players to adapt their strategies based on the evolving needs of the business and available resources.

Additionally, hiring the right mix of staff (e.g., chefs, waiters, and cleaners) plays a crucial role in maintaining operational efficiency. Players must ensure that staff salaries, which are part of monthly bills, do not outweigh the revenue generated by increased customer flow. This balancing act reinforces the importance of making data-driven decisions to achieve sustainable growth.

Outcome 4: Real-World Business Insights

This simulation mirrors real-world challenges and scenarios faced by restaurant owners. From selecting an ideal location to scaling operations through marketing and equipment upgrades, players

gain a comprehensive understanding of the key factors that drive success in the food service industry.

For instance, the choice of location, reflected in the building options, emphasizes the role of accessibility and visibility in attracting customers. Similarly, the ability to upgrade equipment, such as stoves and freezers, highlights the impact of operational efficiency on customer satisfaction and profit margins. Marketing campaigns introduce the concept of brand awareness and its direct correlation with business growth.

Furthermore, the game's tracking of customer metrics, such as the total number of customers served and the last customer details, provides players with a tangible measure of their business's performance. This data-driven approach mirrors the importance of key performance indicators (KPIs) in real-world business management.

Outcome 5: Practical Application of Technology in Business

By using **React** and **npm servers** for development and hosting, the project demonstrates how modern web technologies can be leveraged to create interactive and scalable applications. React's component-based architecture enables the seamless integration of

various features, such as financial tracking, staff management, and equipment upgrades, into a cohesive user interface.

The application's responsiveness and smooth navigation, as evident from the screenshots, highlight the effectiveness of React in building dynamic and user-friendly platforms. Hosting the game on an npm server ensures easy deployment and accessibility, making the simulation available to a broader audience.

Outcome 6: Understanding of Risk and Reward

The game provides a clear illustration of the relationship between risk and reward. Players are constantly faced with decisions that involve taking calculated risks, such as taking out loans or investing in higher-cost buildings and equipment. These decisions require careful analysis of potential rewards, such as increased customer flow and higher profits, against the risks of financial strain or operational inefficiency.

For example, investing in a large prime-area building might initially strain the budget but could result in significantly higher profits if paired with effective marketing and equipment upgrades. Similarly, taking a loan for a marketing campaign could lead to a surge in customers, offsetting the cost of interest payments. By

experiencing these scenarios in a controlled environment, players develop a deeper understanding of how to manage risks in pursuit of business success.

Outcome 7: Skill Development for Aspiring Entrepreneurs

Overall, the **Business Simulation Game - Restaurant** serves as a powerful educational tool for aspiring entrepreneurs. By immersing players in a simulated business environment, the game fosters the development of critical skills such as financial literacy, strategic thinking, and operational management. These skills are not only applicable to the restaurant industry but also transferable to other sectors, making the simulation a valuable resource for individuals seeking to build a strong foundation in business management.

In conclusion, this project effectively combines the principles of business management with modern technology to create an engaging and educational experience. The outcomes derived from the code and the provided outputs demonstrate the game's potential to teach players the intricacies of running a successful restaurant while highlighting the broader applications of these skills in real-world business scenarios.

The **Business Simulation Game - Restaurant** project yielded substantial results that demonstrate its effectiveness as an educational and interactive tool for business simulation. By integrating real-world business principles with technological innovations, the game successfully replicates the challenges and decisions involved in managing a restaurant. Below is a detailed analysis of the results and their implications, followed by a discussion of their broader significance.

Results

The project outcomes highlight the financial performance and decision-making dynamics integral to running a restaurant. Players begin with ₹100,000 as their starting capital, which is strategically utilized to manage expenses such as building rent, staff salaries, and equipment upgrades. Over the course of 10 months, the player achieved an impressive lifetime profit of ₹976,200 with a monthly net profit of ₹237,720. These figures underscore the player's ability to optimize operations while managing costs effectively.

The results also reveal the critical role of customer flow in determining profitability. The player served a significant number of customers, ensuring steady revenue generation. By strategically choosing a location and investing in marketing campaigns, the

player maximized customer influx, leading to increased monthly profits. The choice of a small local building with lower initial costs further contributed to the positive financial outcome, as it allowed the player to reinvest savings into business growth.

Another notable result was the player's effective use of resources for operational efficiency. Equipment upgrades, such as advanced stoves and freezers, enhanced customer satisfaction by improving service quality. Similarly, careful hiring decisions ensured that staff expenses remained manageable, while maintaining adequate service levels to handle customer demands. The data tracking metrics in the simulation, such as customer count and profit breakdown, provided real-time feedback that helped the player refine their strategies.

Discussions

The results underscore the simulation's potential as a training tool for aspiring entrepreneurs. The financial metrics and customer data reveal a strong correlation between strategic decision-making and business success. By managing expenses, reinvesting profits, and adapting strategies based on performance data, players gain valuable insights into the complexities of running a business. These skills are essential for real-world entrepreneurs, who must balance financial constraints with growth opportunities.

One of the critical discussions arising from this project is the

importance of resource allocation. The simulation demonstrates that allocating resources effectively—whether it be for marketing, equipment, or staff—can significantly impact profitability. For example, the decision to invest in advanced equipment may incur short-term costs but yield long-term benefits by improving efficiency and customer satisfaction. This mirrors real-world scenarios where businesses must weigh the pros and cons of each investment.

Additionally, the game highlights the role of risk management in business operations. Decisions such as taking loans or choosing high-cost buildings involve inherent risks that players must evaluate carefully. By simulating these scenarios, the game teaches players to assess risks and rewards, fostering a deeper understanding of sustainable growth strategies.

In conclusion, the **Business Simulation Game - Restaurant** is an impactful tool for teaching business principles through interactive gameplay. The results demonstrate its effectiveness in fostering financial literacy, strategic thinking, and operational planning. The discussions highlight the broader applications of these skills, making the simulation valuable not only for restaurant management but for understanding general business dynamics.

CHAPTER-9

CONCLUSION

The **Business Simulation Game - Restaurant** is an innovative and engaging project that bridges the gap between theoretical business concepts and practical application. By leveraging React and npm servers, the game provides a seamless and interactive platform for users to experience the complexities of managing a restaurant. The simulation replicates real-world scenarios, enabling players to make critical decisions regarding resource allocation, financial management, marketing strategies, and customer service. Through its dynamic gameplay and data-driven approach, the project succeeds in offering a holistic understanding of business operations.

One of the most significant accomplishments of this project is its ability to simulate the cause-and-effect relationship between various business choices and their outcomes. Players start with a finite amount of capital and must navigate a series of decisions, including selecting the right location, investing in marketing, hiring staff, and upgrading equipment. These decisions directly impact key performance indicators such as profits, customer count, and operational efficiency. The simulation thus serves as an educational tool, teaching players how to balance short-term costs with long-term benefits to achieve sustainable growth. This interactive experience promotes financial literacy and equips

players with essential skills for managing real-world businesses. The project also excels in fostering critical thinking and strategic planning. The integration of financial metrics like lifetime profit, net monthly profit, and customer flow allows players to analyze their performance and adapt their strategies accordingly. The game encourages experimentation, enabling users to test various approaches to see which yields the best results. For instance, players can compare the effects of investing in high-end equipment versus focusing on aggressive marketing campaigns. These features make the simulation a powerful tool not only for aspiring entrepreneurs but also for seasoned professionals seeking to refine their decision-making skills.

Moreover, the game highlights the importance of adaptability and risk management in business operations. The inclusion of loan options, varying building costs, and fluctuating customer demands reflects the uncertainties inherent in real-world businesses. Players learn to assess risks, make informed decisions, and adapt to changing circumstances—all of which are critical competencies for any entrepreneur. The ability to simulate these scenarios in a controlled environment provides invaluable insights without the financial risks associated with real-life ventures.

From a technical perspective, the project demonstrates the effective use of modern web development tools to create a robust and user-friendly application. The use of React ensures a

responsive and dynamic user interface, while npm servers facilitate smooth functionality and performance. These technical choices enhance the overall user experience, making the game both accessible and enjoyable for a wide audience. Additionally, the game's visually appealing design and intuitive layout further contribute to its effectiveness as an educational tool.

In conclusion, the **Business Simulation Game - Restaurant** is a testament to the power of gamification in education and professional development. By combining real-world business challenges with engaging gameplay, the project provides a unique platform for learning and growth. It equips players with practical skills, fosters a deeper understanding of business dynamics, and promotes critical thinking—all within an interactive and risk-free environment. This project has the potential to make a significant impact in the fields of education, training, and entrepreneurship, offering a valuable resource for anyone looking to explore the intricacies of business management.

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APPENDIX-A

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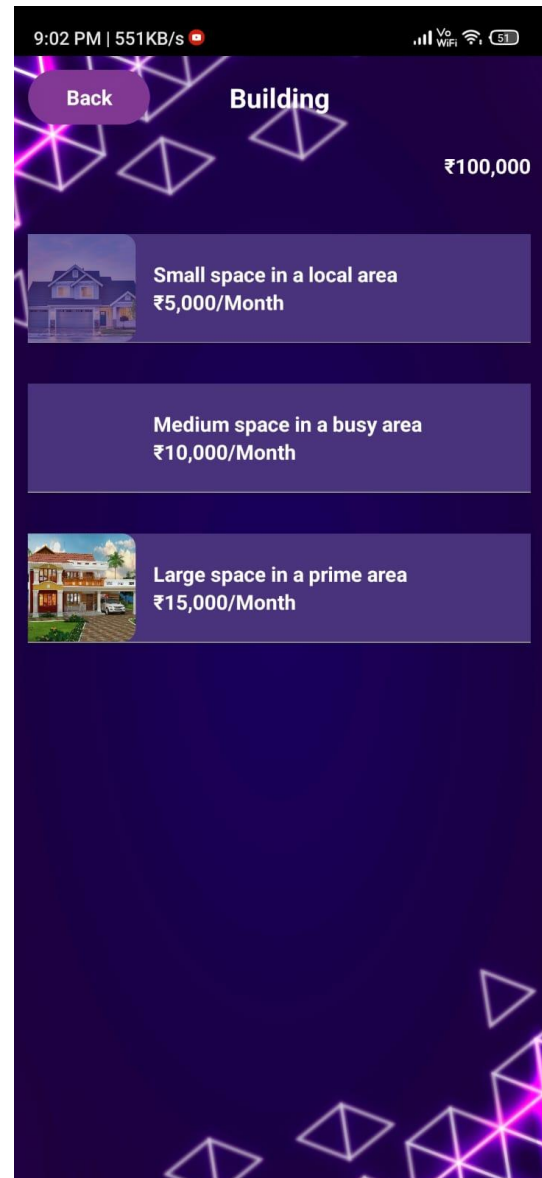
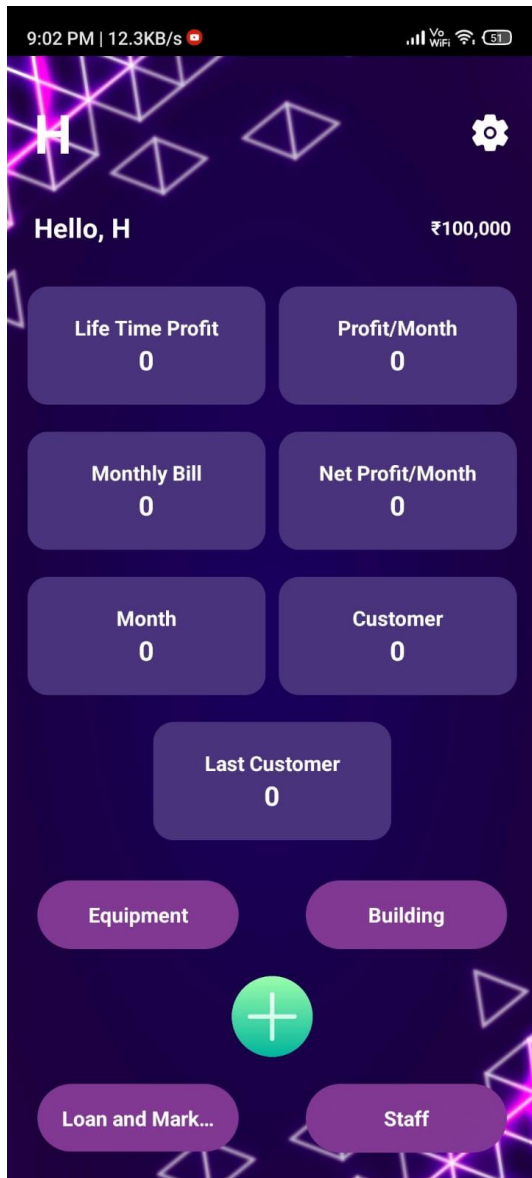
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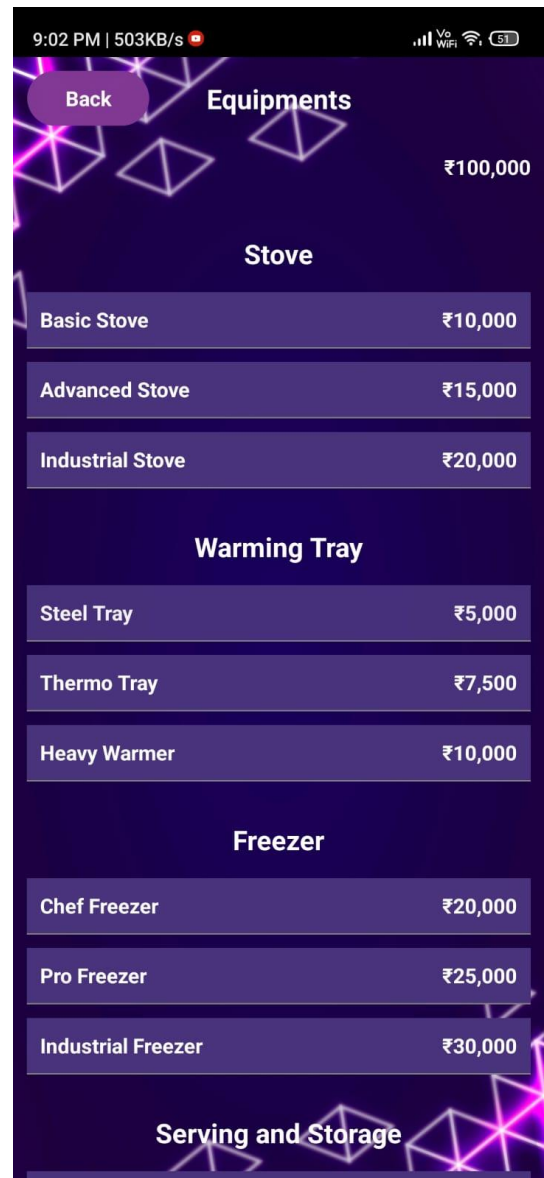
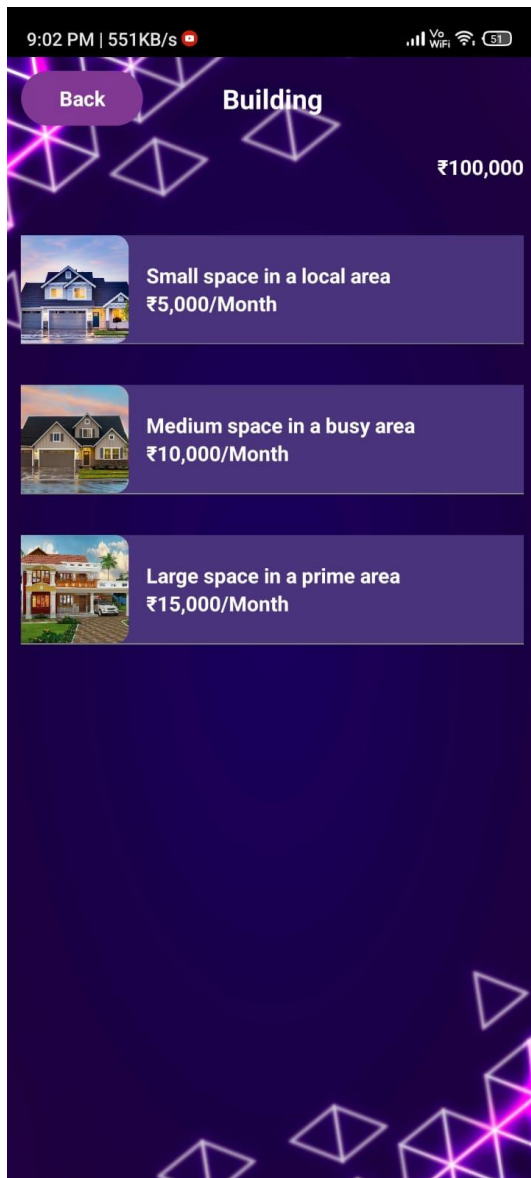
```
import React, { useState, useEffect } from 'react';
import { useNavigation, CommonActions } from '@react-navigation/native';
import {
  View,
  TouchableOpacity,
  StyleSheet,
  Dimensions,
  ImageBackground,
  Image
} from 'react-native';
const screenWidth = Dimensions.get('window').width
import SQLite from 'react-native-sqlite-storage';
const db = SQLite.openDatabase("bsa.db")
const Splash = () => {
  const [playerName, setPlayerName] = useState("")
  const [businessName, setBusinessName] = useState("")
  const navigation = useNavigation()
  useEffect(() => {
    getUserData()
  }, [])
  const getUserData = () => {
    try {
      db.transaction((tx) => {
        tx.executeSql(
          "SELECT name FROM sqlite_master WHERE type='table' AND
name='Users';",
          [],
          (tx, results) => {
```

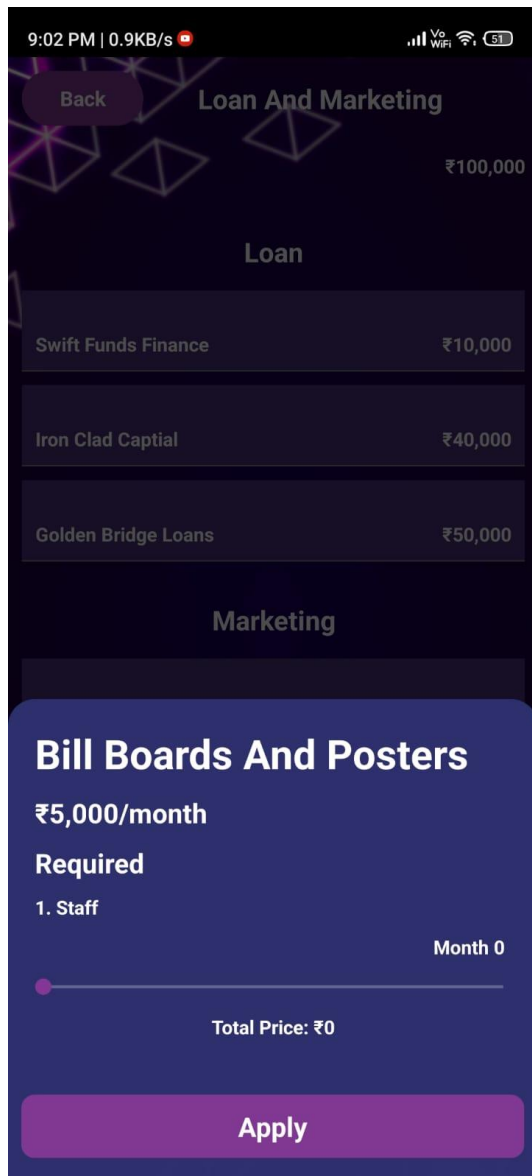
```
    if (results.rows.length > 0) {
      tx.executeSql(
        'SELECT * FROM Users',
        [],
        (tx, results) => {
          const len = results.rows.length;
          for (let i = 0; i < len; i++) {
            let row = results.rows.item(i);
            setPlayerName(row.name)
            setBusinessName(row.bs_name)
          },
          (error) => {
            console.log('Error getting data:', error);
          }
        }
      )
    } else {
      console.log("Users table does not exist.");
    }
  }
  (error) => {
    console.log('Error checking table existence:', error);
  }
);
} catch {
  console.log("getUserData Error ")
}
const goToRegisterForm = () => {
  if (!playerName || !businessName) {
    return navigation.navigate("RegisterForm", {})
  } else {
    return navigation.dispatch(
      CommonActions.reset({
        index: 0,
        routes: [{ name: 'HomePage' }],
      })
    );
  }
}
```

```
export default Splash
```

APPENDIX-B SCREENSHOT







APPENDIX-C

ENCLOSURES











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