***Restaurant Management System:***

***By:***

***Louay Serhal***

***Hassan Keserwani***

***A report submitted in partial fulfillment of the requirements for the degree of Bachelor of Science in computer science.***

***Lebanese International University***

***Beirut***

***2024***

***Advisor: Mr. Oussama Hatoum***

***Abstract***

**In the bustling world of restaurant management, efficiency and customer satisfaction are paramount. Traditional methods of managing reservations, menus, and services often fall short in meeting the demands of today's diners. This senior project aims to revolutionize restaurant management by developing a comprehensive Restaurant Management System (RMS) that empowers restaurants to streamline operations and enhance the dining experience for their customers.**

**The proposed RMS offers a multifaceted solution tailored to the unique needs of restaurants, allowing them to digitize and automate various aspects of their operations. Key features include online table reservations, customizable digital menus, and integrated services management. By leveraging cutting-edge technology, the RMS enables restaurants to efficiently manage bookings, showcase their offerings, and provide personalized services to patrons.**

**With a user-friendly interface and robust functionality, the RMS promises to revolutionize the way restaurants interact with their customers. Through seamless integration of online reservation systems and dynamic menu displays, restaurants can attract and retain clientele in an increasingly competitive market. Moreover, the system facilitates data management and analytics, empowering restaurants to make informed decisions and optimize their operations for success.**

**As this project progresses, meticulous attention will be paid to design, usability, and scalability to ensure widespread adoption and long-term viability. By empowering restaurants with advanced tools and technologies, this project aims to elevate the dining experience for customers while driving efficiency and profitability for businesses in the hospitality industry. play the important role in development of human, where they give science and information to students, where this step is not easy to be done. With the increase of students some processes take time to get done, where they use the hardcopy process, as an example the change of major or transfer of new students. Where the student fill a form in the registrar then this form passes to the coordinator to make a contract sheet approve it and submit it to the dean for revision and approval, where it finally reaches the academic director where he gives the final decision, to be functional.**

***Acknowledgment:***

**Our deepest gratitude is expressed to our instructor Mr. Oussama Hatoum for his support, guidance, and patience throughout the course of this project. His advices lightened us the road to complete this project.**

**Thank you all for guidance.**

***Table Of Content:***

**List of figures………………………………………………………………… II**

**Chapter One: Investigation………………………………………………… 1**

**Chapter Two: Feasibility Study……………………………………………. 7**

**Chapter Three: ERD and Data Dictionary………………………………..12**

**Chapter Four: Database Implementation………………………………... 14**

**Chapter Five: Data Flow Diagram…………………………………………. 17**

**Chapter Six: Documentation……………………………………………….. 35**

**Chapter Seven: Conclusion and Future Work……………………………40**

***List of Tables and Figures:***

**Entity Relation Diagram…………………………………………………… 12**

**Level 0: figure 6.1…………………………………………………………… 16**

**Level 1: figure 6.2…………………………………………………………… 17**

**Level 2 Approval 6.3………………………………………………………... 18**

**Level 3 Creation 6.4…………………………………………………………. 19**

**Level 3 Academic decision 6.5……………………………………………. 20**

**Level 3 Academic remarks 6.6……………………………………………. 21**

**Level 3 create contract sheet 6.7…………………………………………. 22**

**Level 3 dean submission 6.8……………………………………………… 23**

**Level 3 list courses 6.9…………………………………………………….. 24**

**Level 3 change password 6.10…………………………………………… 25**

**Level 3 view user 6.11 …………………………………………………….. 26**

**Level 4 delete user 6.12……………………………………………………. 27**

**Level 3 Add major Figure 6.13……………………………………………. 28**

**Level 3 Add department Figure 6.14…………………………………….. 29**

**Level 3 Add Course Figure 6.15………………………………………….. 30**

**Level 3 Backup Figure 6.16……………………………………………….. 31**

**Level 3 Restore Figure 6.17……………………………………………….. 32**

**Level 3 force change password Figure 6.18.…………………………... 33**

***Chapter One: Project Investigation***

**After we was handled the project at the beginning of the semester, we managed a meeting with the Shop Manager of McDonald’s Mr. Ahmed Al-Bekaii. These are the answers we got from them.**

**Here what we asked Mr. Ahmad:**

**Q1. How do you currently handle reservations and table management?**

**a) Pen and paper**

**b) Excel spreadsheet**

**c) Reservation software**

**d) No system in place**

**Q2. How do you track customer preferences and feedback?**

**a) Comment cards**

**b) Verbal feedback**

**c) Social media monitoring**

**d) Combination of the above**

**Q3. Which aspect of customer service would you like to improve the most?**

**a) Order efficiency**

**b) Wait time management**

**c) Customer feedback collection**

**d) All of the above**

**Q4. How do you currently handle employee scheduling?**

**a) Manual scheduling**

**b) Spreadsheet scheduling**

**c) Scheduling software**

**d) No formal scheduling process**

**Q5. What functionalities are typically included in a restaurant management system?**

**A) Feedback option**

**B) Employee scheduling**

**C) Table reservation**

**D) Bills and payments**

**Q6. What challenges do you face in managing billing and payment processing?**

**a) Splitting bills accurately**

**b) Handling different payment methods**

**c) Generating invoices**

**d) None of the above**

**Q7. How do you handle special requests or dietary restrictions from customers?**

**a) Customized orders**

**b) Special menu options**

**c) Call reservation**

**d) Live reservation**

**Q8.Which aspect of security is particularly important for a restaurant management system?**

**a) The system is accessible only from the restaurant staff and the IT department**

**b) The crews are only able to take orders**

**c) Admins have special features accessible through an admin card**

**d) All the above**

**Q9.What is the purpose of integrating a restaurant management system with other existing software?**

**a) To avoid data duplication**

**b) To add customer feedback feature**

**c) To add online table reservations**

**d) All the above**

**Q10. How can a restaurant management system contribute to improving customer experience?**

**A) By facilitating online ordering**

**B) By managing customer feedback**

**C) By implementing online reservations**

**D) All of the above**

**Mr.** Ahmed oversees various aspects of restaurant operations with a keen eye for efficiency and customer satisfaction. Currently, reservations and table management are handled without a formal system in place, relying on a more spontaneous approach. Customer preferences and feedback are primarily tracked through verbal communication and social media monitoring, allowing for a dynamic understanding of patron sentiments. Ahmed is particularly focused on improving order efficiency and enhancing customer feedback collection methods to ensure a seamless dining experience. Employee scheduling is efficiently managed through scheduling software, streamlining the workforce organization process. In terms of typical functionalities, Ahmed emphasizes the importance of feedback options and table reservation capabilities in a restaurant management system. Challenges in billing and payment processing are mitigated through comprehensive system functionalities, ensuring accuracy and versatility in handling different payment methods. Special requests and dietary restrictions are addressed through a combination of call reservations and live interactions, demonstrating a commitment to personalized service. Security features are paramount, with the system accessible only to authorized restaurant staff and IT personnel, ensuring data integrity and confidentiality. Integration with existing software serves the purpose of avoiding data duplication and enhancing customer service offerings, such as feedback features and online reservations. Overall, Ahmed recognizes that a robust restaurant management system contributes significantly to enhancing the customer experience by facilitating online ordering, managing feedback effectively, and implementing seamless online reservations, aligning perfectly with McDonald’s commitment to excellence in service delivery.

***Concluding points of investigation:***

**In summary, the investigation into current practices and desired improvements in restaurant management has revealed several key insights. Many establishments still rely on manual methods or basic spreadsheets for tasks such as reservations, feedback tracking, and employee scheduling. There is a clear desire for systems that can streamline operations and enhance customer service across various aspects, including order efficiency, wait time management, and feedback collection. The functionalities typically sought after in a restaurant management system encompass feedback options, employee scheduling, table reservations, and billing processes. Challenges such as accurately splitting bills and handling different payment methods underscore the need for comprehensive solutions. Additionally, addressing special requests and dietary restrictions requires flexibility and customization within the system. Security is paramount, with restricted access to sensitive features and data being a priority. Integrating with existing software serves to avoid data duplication and enhance functionality, including features like online reservations and feedback collection. Ultimately, a well-implemented restaurant management system can significantly contribute to improving the overall customer experience by facilitating online ordering, managing feedback effectively, and implementing streamlined reservation processes. Just as in the academic setting, where privileges and processes are clearly defined and information is stored for future reference, the aim is to create a robust and user-friendly system that meets the diverse needs of the restaurant industry while ensuring efficiency, accuracy, and customer satisfaction.**

***Chapter Two: Feasibility Study:***

**The feasibility study informs us whether to proceed with our information system, or not. The previous investigation allowed us to gather the following information to perform this study.**

**The feasibility study includes the following:**

1. **Technical feasibility**
2. **Operational feasibility**
3. **Financial feasibility**

***Technical feasibility:***

**Since the project is going to be updated on the restaurant systems, we planned to implement the project using PHP, and mySQL for database management. We wanted to know of such combination can work properly in the current hardware combination.**

* **Familiarity with the application:**

**The concept of this project is similar to many processes in the restaurants systems. As an example adding: booking tables, and online reservations and ordering.**

* **Familiarity with technology:**

**In order to operate this system, we need a computer with a quad core CPU, 4GB RAM, 500 GB SSD for faster service and availability.**

* **Familiarity with programming languages:**

**As a computer science student, we know various programming language such as PHP, C#, Java, HTML, SQL, etc.. For that aim I am going to use PHP for backend and rendering the website, since we finished before websites as freelancing.**

***Operational Feasibility:***

* **Time consumption**
* **Loss of documents**

**Those are the two main problems that face the manual system in the university.**

**These problems motivated us to accept this project as a solution (proposed system). The system will be easy to use and practical, and we will be always ready to hear for all users in order to make the program the most user-friendly.**

* **System programming:**

**We are aware of the duties to implements the system in such a way that the end-user will realize the improvement of work in the absence of problems. Also, as a programmer we will do our best to make the system familiar with the end user’s daily activity providing him with all he needs to finish his work fast and properly.**

* **End-users:**

**This system is done for registrar and booking tables and all users will be able to use the system to avoid waste time.**

* **System performance and purpose:**

**The main purpose of this system is to solve the previously implemented, this system will save time, provide accuracy and reliability with the ability of keeping track of the tables availability as planned.**

***Economic feasibility:***

**The project will be implemented in this semester (approximately 4 months).**

* **Time-based study:**

**It’s important to schedule our time to finish implementation of the project.**

|  |  |  |
| --- | --- | --- |
| **Tasks** | **Activities** | **Time required(week)** |
| **Data gathering** | **Proposal** | **1** |
| **Investigation and documentation** | **1** |
| **Feasibility study and documentation** | **2** |
| **Total for data gathering** | | **4** |
| **Data flow and mapping** | **ERD and database implementation** | **1** |
| **Data flow diagram** | **1** |
| **Total dataflow and mapping** | | **2** |
| **Data development** | **Implementation and coding** | **6** |
| **Testing** | **2** |
| **Installation** | **1** |
| **Total time for data development** | | **9** |
| **Total time needed** | | **15** |

* **Cost-based study:**

**The most important study to identify cost and factors, it can be divided into:**

* **Development costs.**
* **Operational costs.**

**Those can determine, and analysis the cost of the system and the benefit derivable out of the system.**

**Cost analysis:**

**15 weeks of working, 6 days each week, 2 hour each day, 5$**

**15\*6\*2\*5=900$**

**Software required:**

**PHP (available)= 0$**

**mySQL(available) =0$**

**Package(Domain name, Hosting, SSL certificate) = 150$**

**Training cost:**

**The training will be 5 days, 1.5 hour each day, 10$ for each hour.**

**5\*1.5\*10=75$**

**Total cost= 900+150=1050$.**

**Benefit:**

**Speed up the process of transfer.**

**Save time and money.**

***Concluding points:***

**After the study we conclude that the time need to finish the system is feasible financially, this will be the price of the system and also the time required since it can be done during the semester, according to the plan. The plan is to develop a system that more reliable and that provides more efficiency.**

**As we are senior students we are planning to develop and implement a system that solves the problem in an easy way. To make the end-user don’t find any difficulty while using the system.**

***Chapter Three: ERD and Data Dictionary:***

**Data Dictionary**

**A proper ERD is developed by properly understanding the system and**

**its contents.**

**Entity relationship Dictionary:**

**This data dictionary contains the database entity and attributes that are**

**going to be implemented in our system. It shows all the relations**

**between entities and specifies the attribute of the whole database.**

**The ERD diagram consists of 7 entities:**

1. **User**
2. **Admin**
3. **Bookings**
4. **Orders**
5. **Reviews**
6. **Foods**
7. **Cart**



**Chapter Four: Database Implementation:**

**The entities with their specific attribute are recognizing in the Database**

**as follows:**

**I. User entity has the attributes:**

**1. Id number attribute is the primary key that identifies the user.**

**2. Username attribute that represents the name of the user.**

**3. Email attribute that represents the email of the user.**

**4. Password attribute that represents the password for the user’s account.**

**5. Created at attribute that represents the time of account creation.**

**II. Admin entity contains the following attributes:**

**1. Id number attribute is the primary key that identifies the admin.**

**2. Admin name attribute that represents the name of the admin.**

**3. Email attribute that represents the email of the admin.**

**4. Password attribute that represents the password for the admin’s account.**

**5. Created at attribute that represents the time of account creation.**

**III. Bookings entity has the following attributes:**

**1. Id number attribute is the primary key that identifies the booking.**

**2. Name attribute that represents the name of the booker.**

**3. Email attribute that represents the email of the booker.**

**4. Status attribute that represents the status of the booking (confirmed, pending, or declined).**

**5. Created at attribute that represents the time of booking creation.**

**6. Date booking attribute represents the date the booker chose for the booking.**

**7. Num people attribute represents the number of people for the booking.**

**8. Special request attribute represents a special request made by booker for the booking.**

**9. User id is a foreign key which is provided by the 1-to-many relationship between Bookings and User entities where it indicates the id of the user who made a booking.**

**IV. Orders entity has the following attributes:**

**1. Id number attribute is the primary key that identifies the order.**

**2. Name attribute that represents the name of the user who made an order.**

**3. Email attribute that represents the email of the user who made an order.**

**4. Status attribute that represents the status of the order (confirmed, pending, or declined).**

**5. Created at attribute that represents the time of order creation.**

**6. Phone number attribute represents the phone number of the user who made an order.**

**7. Country attribute represents the country of the user who made an order.**

**8. Town attribute represents the town of the user who made an order.**

**9. User id is a foreign key which is provided by the 1-to-many relationship between Orders and User entities where it indicates the id of the user who made an order.**

**10. Zip code attribute represents the zip code of the user who made an order.**

**11. Address attribute represents the address of the user who made an order.**

**12. Total price attribute represents the total price of the order.**

**V. Reviews entity contains the following attributes:**

**1. Id number attribute is the primary key that identifies the review.**

**2. Username attribute that represents the name of the user who wrote the review.**

**3. Review attribute that represents review written by the user.**

**4. Created at attribute that represents the time of review creation.**

**VI. Foods entity contains the following attributes:**

**1. Id number attribute is the primary key that identifies the food.**

**2. Name attribute that represents the name of the food.**

**3. Description attribute that represents a description of the food.**

**4. Created at attribute that represents the time of food creation.**

**5. Price attribute that represents a price of the food.**

**6. Image attribute that represents an image of the food.**

**VI. Cart entity contains the following attributes:**

**1. Id number attribute is the primary key that identifies the cart.**

**2. Name attribute that represents the name of the food in the cart.**

**3. Created at attribute that represents the time of cart creation.**

**4. Price attribute that represents a price of the food in the cart.**

**5. Image attribute that represents an image of the food in the cart.**

**6. Item id is a foreign key which is provided by the 1-to-many relationship between Foods and Cart entities where it indicates the id of the food that is in the cart.**

**Chapter Five: Data Flow Diagram:**

**The data flow diagram (DFD) is a chart that represents the flow of data in a certain computer system giving how data are going to proceed. We will show this flow using Edraw Max 6.8. We will construct our DFD using four levels:**

* **Level 0 shows the users who are involved in the whole system.**
* **Level 1 presents the main processes that will result from the change in data flow, describes each process, and explodes detailed processes more.**





**Chapter *Six: Documentation***

**When we implemented our program we made a website for a virtual Restaurant to book tables and manages the menu, tables, orders from the admin panel.**

* **User Panel:**

**The User can at first check the website and discover the services provided by the restaurant and contact the restaurant planners through email via website.**

**To be able to book a table, the User must login to the account or create one through the register page.**

**When booking a table, the User enters his credentials and specifies the numbers of people for the table and the orders they desire.**

**They also can change password, by giving their old password writing new password and confirming new password and press save to save new password to database.**

* **Admin Panel:**

**The admins supervise the restaurant though this website and approve orders and booking, also they can create new accounts, admins and can manage the accounts that needs changing their passwords and troubleshoot the issues.**

***Chapter Seven: Conclusion***

**Our project focused on developing a comprehensive restaurant management system aimed at enhancing efficiency and customer satisfaction. Under the guidance of our instructor, we embarked on this endeavor, drawing on our collective knowledge and skills to tackle various challenges along the way.**

**One of the initial hurdles we encountered was designing the Data Flow Diagram (DFD), which presented complexities that required careful navigation. Additionally, implementing the printing functionality for forms proved to be a challenging task, as we had to devise creative solutions to ensure compatibility with diverse menu offerings and customer preferences. Another significant challenge arose during the implementation of backup and restore processes, where we had to devise methods to save and retrieve data from text files efficiently.**

**Despite these challenges, our team embraced the opportunity for growth and learning. Through perseverance and collaboration, we overcame each obstacle, emerging with a robust and functional restaurant management system that meets the needs of our users.**

**As we reflect on our journey, we express gratitude to our friends and instructors for their support and guidance. We are proud of what we have accomplished thus far and look forward to continuing our journey of innovation and improvement in the realm of restaurant management.**

***Chapter Eight: Future Work***

**Looking ahead, there are several areas where we envision further refinement and enhancement of our restaurant management system. These include:**

* ***Implementing a program to automatically generate contract sheets.***
* ***Refining the printing method to provide customized forms for each scenario.***
* ***Integrating email notifications to alert responsible users upon application submission.***
* ***Incorporating electronic signatures for added security and convenience.***

**By focusing on these areas, we aim to further improve the system's efficiency, user-friendliness, and overall functionality, ensuring it continues to meet the evolving needs of our users.**