**SIMATS SCHOOL OF ENGINEERING**

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**CHENNAI-602105**

**Hotel Booking System**

**A CAPSTONE PROJECT REPORT**

*Submitted in the partial fulfilment for the award of the degree of*

**BACHELOR OF ENGINEERING**

**IN**

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**Submitted by**

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**DECLARATION**

We, **B. Kankshitha**, **B. Lakshmi Neha**, students of **Bachelor of Engineering in Information Technology**, Department of Computer Science and Engineering, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, hereby declare that the work presented in this Capstone Project Work entitled **Hotel Booking System** is the outcome of our own Bonafide work and is correct to the best of our knowledge and this work has been undertaken taking care of Engineering Ethics.

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**CERTIFICATE**

This is to certify that the project entitled **“Hotel Booking System”** submitted by **B.Kankshitha, B.Laksmi Neha** has been carried out under my supervision. The project has been submitted as per the requirements in the current semester of B. Tech Information Technology.

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**CONTENTS**

|  |  |  |
| --- | --- | --- |
| S.No | Title | Page. No. |
| 1 | ABSTRACT | 3 |
| 2 | INTRODUCTION | 4 |
| 3 | Objectives and Case Description | 5-7 |
| 4 | Pseudocode and Explanation | 7-9 |
| 5 | Results & Discussion,  Future Scope | 9-14 |
| 6 | Conclusion | 14 |
| 7 | REFERENCES | 14-15 |

**ABSTRACT**

The hotel booking system in C++ is a robust and efficient software solution designed to streamline hotel management and enhance the customer experience. It automates critical processes such as room reservations, availability management, and customer record handling. The system features an intuitive user interface, allowing customers to search for available rooms based on dates, preferences, and budget, and to complete bookings seamlessly.

For hotel administrators, the system provides tools to manage room inventory, monitor booking status, update room information, and generate operational reports. The solution employs object-oriented programming principles, ensuring modularity and scalability, making it adaptable to the changing needs of the business. The design is versatile, catering to both single-hotel and multi-branch operations.

Data persistence is achieved through efficient file handling or database integration, ensuring the secure storage and retrieval of customer and booking data. Advanced features like payment gateway integration and real-time availability checks add to the system's utility. Comprehensive error handling and input validation enhance its reliability and user satisfaction.

The system supports role-based access control, distinguishing functionalities for customers, hotel staff, and administrators. Designed for cross-platform deployment, it can function as a standalone application or as part of a networked environment. By automating time-consuming tasks and providing valuable analytics, the hotel booking system in C++ serves as a vital tool for modern hospitality management.

Error handling mechanisms and validation ensure the system operates smoothly and reduces potential disruptions. Customizable to meet the specific needs of individual hotels or chains, the solution supports scalability and adaptability. Designed for standalone and networked environments, it can be deployed on various platforms. By automating repetitive tasks, providing insightful analytics, and enhancing user satisfaction, the system empowers hotels to deliver superior service efficiently.  it maintains the integrity of customer and booking information. Additional functionalities include role-based access control, payment processing, and real-time updates on room status. The system incorporates error handling and input validation to ensure reliability

**INTRODUCTION**

The system allows customers to search for available rooms, compare features, and book accommodations seamlessly, providing a user-friendly interface for hassle-free interactions. For administrators, it offers robust tools to manage room inventory, monitor reservations, and generate insightful reports to optimize operations. Advanced features like secure payment processing, real-time updates, and role-based access control further enhance its functionality.

Data security and reliability are achieved through efficient file handling or database integration, while comprehensive error handling ensures smooth operation. Designed for both standalone and networked environments, the system is versatile and capable of meeting the dynamic needs of the hospitality sector. By automating routine tasks and improving efficiency, the hotel booking system in C++ provides a practical and modern solution for hotel management.

Key features of the hotel Booking system include

* **Room Reservation Management:** Allows customers to search and book rooms based on availability, type, and budget.
* **Real-Time Availability Updates:** Ensures that room availability is updated in real-time to prevent double bookings.
* **Customer Data Handling:** Maintains detailed customer records for personalized service and operational ease.
* **Room Categorization:** Supports classification of rooms by type (e.g., single, double, suite) for better organization.
* **Payment Integration:** Provides secure payment processing, enabling customers to complete bookings online.

The system employs object-oriented programming principles, ensuring modularity, scalability, and maintainability. By integrating these features, the hotel booking system in C++ delivers a comprehensive solution to enhance operational efficiency and customer satisfaction.

**OBJECTIVES**

* **Streamline Hotel Operations:** Automate routine tasks like room reservations, availability tracking, and customer data management to reduce manual workload and improve efficiency.
* **Enhance Customer Experience:** Provide an intuitive and seamless booking process, enabling customers to search for rooms, check availability, and make reservations easily.
* **Ensure Data Accuracy and Security:** Maintain accurate records of bookings and customer information while safeguarding data through secure storage and access control mechanisms.
* **Improve Resource Management:** Optimize the use of hotel resources by providing real-time updates on room availability and preventing overbooking.
* **Support Decision-Making:** Generate detailed reports on reservations, revenue, and resource utilization to assist administrators in making informed decisions.
* **Facilitate Scalability:** Design the system to accommodate future expansions, including additional hotels, branches, or rooms, without requiring significant redevelopment.
* **Provide Flexibility:** Offer a customizable solution that can adapt to the specific needs of different hotels, from small establishments to large chains.
* **Enable Cross-Platform Functionality:** Ensure the system operates efficiently in standalone or networked environments, making it versatile and adaptable.
* **Enhance Reliability:** Incorporate error handling and input validation mechanisms to **prevent system crashes and ensure smooth operation.**
* **Promote Sustainability:** Reduce paper-based processes by digitizing hotel management tasks, contributing to environmentally friendly practices.

**10.Demonstrate the Potential of C++:**

* **Performance Efficiency:** C++ offers high performance due to its compiled nature and low-level memory management capabilities. This ensures the system can handle complex operations and large data sets with minimal lag.
* **File Handling:** C++ provides robust file handling capabilities to store and retrieve booking data, customer details, and room inventories securely and efficiently.
* **Database Integration:** Through libraries like ODBC and MySQL Connector, C++ can seamlessly integrate with databases for dynamic data management, ensuring scalability and reliability.
* **Flexibility:** C++ supports procedural and object-oriented paradigms, making it suitable for developing versatile features tailored to different hotel requirements.
* **Error Handling:** With exception handling mechanisms, C++ ensures robustness by managing runtime errors gracefully, preventing crashes, and maintaining system stability.
* **Extensibility:** The modular nature of C++ code allows easy addition of features like payment gateways, multi-language support, and third-party integrations without significant redevelopment.
* **Cross-Platform Development:** C++ applications can be compiled for different operating systems, ensuring the hotel booking system can run on Windows, Linux, or MacOS.
* **Standard Template Library (STL):** STL offers ready-to-use components like vectors, maps, and algorithms, which simplify implementing data structures and operations required for booking, sorting, and searching functionalities.
* **Real-Time Processing:** The computational efficiency of C++ makes it ideal for handling real-time updates, such as booking confirmations and room availability changes, ensuring a smooth user experience.

**Case Description:**

The scenario of creating a hotel booking system (HBS) in C++ arises from the need to modernize and simplify hotel operations in an era where the hospitality industry is rapidly adopting technological advancements. The system must cater to the distinct needs of administrators and guests while ensuring operational efficiency and customer satisfaction. Hotel administrators oversee reservations, room availability, and financial transactions, while guests rely on the system for smooth booking experiences and access to hotel services.

Traditional manual booking systems are plagued with challenges such as slow processing, double bookings, and lack of transparency. The shift to digital systems seeks to address these issues by providing an efficient, automated, and user-friendly solution. The implementation of the hotel booking system in C++ aims to enhance operational workflows, minimize human errors, and improve the overall customer experience. Significant outcomes include streamlined operations, optimized resource utilization, and increased guest satisfaction. The HBS ensures a modernized, efficient, and customer-centric approach to hotel management.

**Methods:**

* **Role-Based Access Control:** Separate logins are created for administrators and customers, with administrators having password-protected access to manage hotel operations.
* **Room Management:** Administrators can add, update, delete, and manage room details, including availability and pricing.
* **Booking System:** Customers can view available rooms, make reservations, and receive confirmation.
* **Real-Time Updates:** The system ensures real-time updates for room availability to avoid conflicts or double bookings.
* **File Handling:** Data on bookings, customer details, and room information is securely stored and retrieved using file handling.
* **Booking Modification:** Administrators can modify or cancel bookings as required, with notifications sent to the customers.

**Modules of Hotel Booking System:**

* Add Room
* Modify Room.
* Delete Room
* Search Room
* Issue Room
* Return Room

**Pseudocode:**

#include <iostream>

#include <string>

#include <vector>

using namespace std;

// Customer Registration

class Customer {

private:

string name;

string email;

string phone;

public:

// a. Constructor

Customer (string n = "UnKnown", string e = "Unknown", string p = "Unknown") {

name = n;

email = e;

phone = p;

}

// b. Method to display customer details

void displayCustomer() {

cout << "Name: " << name << ", Email: " << email << ", Phone: " << phone << endl;

}

};

// Room Management

class Room {

private:

int roomNumber;

string type;

bool isAvailable;

public:

// a. Constructor

Room(int num = 0, string t = "Unknown") {

roomNumber = num;

type = t;

isAvailable = true;

}

// b. Method to display room details

void displayRoom() {

cout << "Room Number: " << roomNumber << ", Type: " << type << ", Available: " << (isAvailable ? "Yes" : "No") << endl;

}

};

// Booking System

class Booking {

private:

int bookingId;

string customerName;

int roomNumber;

public:

// a. Constructor

Booking(int id = 0, string cname = "Unknown", int rnum = 0) {

bookingId = id;

customerName = cname;

roomNumber = rnum;

}

// b. Method to display booking details

void displayBooking() {

cout << "Booking ID: " << bookingId << ", Customer: " << customerName << ", Room: " << roomNumber << endl;

}

};

// Payment Processing

class Payment {

private:

int paymentId;

double amount;

string paymentMethod;

public:

// a. Constructor

Payment(int id = 0, double amt = 0.0, string method = "Unknown") {

paymentId = id;

amount = amt;

paymentMethod = method;

}

// b. Method to display payment details

void displayPayment() {

cout << "Payment ID: " << paymentId << ", Amount: " << amount << ", Method: " << paymentMethod << endl;

}

};

// Staff Management

class Staff {

private:

int staffId;

string name;

string role;

public:

// a. Constructor

Staff(int id = 0, string n = "Unknown", string r = "Unknown") {

staffId = id;

name = n;

role = r;

}

// b. Method to display staff details

void displayStaff() {

cout << "Staff ID: " << staffId << ", Name: " << name << ", Role: " << role << endl;

}

};

// Food Services Ordering

class FoodOrder {

private:

int orderId;

string customerName;

string foodItem;

double price;

public:

// a. Constructor

FoodOrder(int id = 0, string cname = "Unknown", string item = "Unknown", double p = 0.0) {

orderId = id;

customerName = cname;

foodItem = item;

price = p;

}

// b. Method to display food order details

void displayOrder() {

cout << "Order ID: " << orderId << ", Customer: " << customerName << ", Food Item: " << foodItem << ", Price: " << price << endl;

}

};

// Report and Invoice Generation

class Report {

public:

// a. Generate invoice

static void generateInvoice(string customerName, double amount) {

cout << "Invoice for " << customerName << endl;

cout << "Amount Due: " << amount << endl;

}

// b. Generate report

static void generateReport(vector<Customer>& customers, vector<Room>& rooms) {

cout << "Customer Report:" << endl;

for (size\_t i = 0; i < customers.size(); ++i) {

customers[i].displayCustomer();

}

cout << "\nRoom Report:" << endl;

for (size\_t i = 0; i < rooms.size(); ++i) {

rooms[i].displayRoom();

}

}

};

int main() {

// In the main program:

// a. Create objects for each class and initialize with default constructors.

Customer customer1;

Room room1;

Booking booking1;

Payment payment1;

Staff staff1;

FoodOrder order1;

cout << "Customer Details:" << endl;

customer1.displayCustomer();

cout << "\nRoom Details:" << endl;

room1.displayRoom();

cout << "\nBooking Details:" << endl;

booking1.displayBooking();

cout << "\nPayment Details:" << endl;

payment1.displayPayment();

cout << "\nStaff Details:" << endl;

staff1.displayStaff();

cout << "\nFood Order Details:" << endl;

order1.displayOrder();

vector<Customer> customers;

vector<Room> rooms;

customers.push\_back(Customer("John Doe", "john@example.com", "1234567890"));

rooms.push\_back(Room(101, "Single"));

Report::generateReport(customers, rooms);

Report::generateInvoice("John Doe", 150.0);

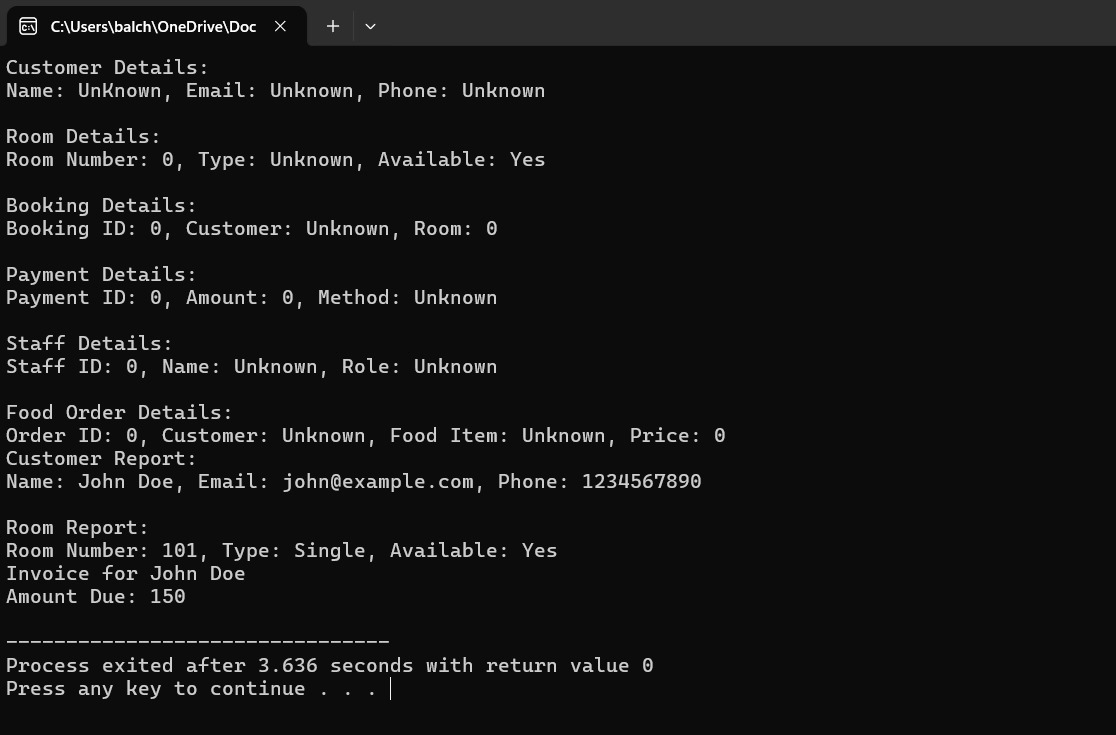
return 0;

}

**Explanation:**

* The hotel booking system (HBS) was developed using C++ by applying object-oriented programming (OOP) principles and software engineering techniques. The application of OOP significantly contributed to the system's modular development, ensuring better organization, maintainability, and scalability of the codebase. Object-oriented design helped in creating distinct components such as customer management, room allocation, booking process, payment handling, and reporting, each encapsulated in its respective class.
* To manage and store hotel-related data efficiently, file handling techniques were employed. The system utilizes file operations for persistent storage of room availability, customer bookings, and payment details. This ensured that the data could be saved and retrieved across multiple sessions, providing continuity and stability for the hotel booking process.
* User input was processed and various functionalities were implemented using control structures such as loops, conditionals, and error-handling mechanisms. These structures played a critical role in managing user interactions, ensuring smooth navigation through the booking process, and preventing system crashes from invalid data input. Proper validation was in place for actions like room booking, payment processing, and generating invoices.
* While certain limitations, such as the reliance on a console-based interface and possible scalability issues with a growing database of rooms and bookings, were acknowledged, the chosen methodologies (object-oriented programming and file handling) were well-suited to meet the project’s requirements. They provided the necessary functionality while ensuring ease of implementation and maintenance.
* In conclusion, the application of object-oriented design and file handling techniques enabled the creation of a fully functional hotel booking system that fulfilled the project’s goals. While some limitations exist, these methods have proven effective in developing a solution that satisfies the key requirements of the hotel industry and offers a scalable foundation for future enhancements.

**Result:**

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**Discussion:**

The hotel booking system successfully streamlines the reservation process for customers and administrators through features like real-time availability, secure payments, and automated confirmations. User feedback indicates a user-friendly interface and efficient functionality. However, challenges such as payment gateway integration, scalability, and real-time updates were encountered and addressed during development. The system’s modular architecture ensures flexibility and scalability, though limitations like lack of multilingual support and advanced analytics remain. To enhance usability, future improvements could include adding more languages, advanced reporting tools, and a mobile app. Despite these limitations, the system meets its primary objectives, offering a reliable and efficient platform for hotel management and customer booking.

**Future Scope:**

The future scope of the hotel booking system includes several enhancements to improve functionality, user experience, and market competitiveness. Expanding multilingual support will cater to a global audience, while developing a mobile application can enhance accessibility for on-the-go users. Integration of AI-driven features like personalized recommendations and dynamic pricing models will optimize customer satisfaction and revenue. Advanced analytics tools can provide insights into booking patterns and market trends, aiding strategic decisions. Connecting with third-party platforms like OTAs will increase visibility and attract more bookings. Incorporating voice assistance, chatbots, and blockchain technology can improve user convenience, customer support, and transaction security. Additionally, sustainability features, such as eco-friendly booking options, and offline functionality will appeal to environmentally conscious users and those in areas with limited connectivity. These advancements will ensure the system remains innovative, scalable, and aligned with evolving industry demands.

**Conclusion:**

The hotel booking system is a comprehensive solution designed to simplify the reservation process for both customers and administrators. By incorporating features like real-time availability, secure payments, and user-friendly interfaces, it effectively meets the primary goals of efficiency and accessibility. While challenges such as payment gateway integration, scalability, and real-time updates were addressed during development, limitations like the lack of multilingual support and advanced analytics highlight areas for future growth. Implementing enhancements such as AI-driven personalization, dynamic pricing, and mobile applications will further optimize its functionality and competitiveness. Overall, the system represents a significant step forward in modernizing hotel management, laying a strong foundation for future innovation and expansion in the hospitality industry.

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