Mini-Project Report On

Canteen Management System

Submitted in partial fulfillment of the requirements for the award of the degree of

Bachelor of Technology

in

Computer Science & Engineering

By

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(AUTONOMOUS)
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CERTIFICATE

This is to certify that the mini-project report entitled ***"Canteen Management System"*** *is a bonafide work done by* ***Mr. Abu Jose (U2003008), Mr. Akshay Ajit (U2003018), Mr. Alen Regi (U2003025), Mr. Binul Bijo (U2003056)****, submitted to the APJ Abdul Kalam Technological University in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology (B. Tech.) in Computer Science and Engineering during the academic year 2022-2023.*

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Abu Jose

Akshay Ajit

Alen Regi

Binul Bijo

ABSTRACT

The canteen management system is an innovative software solution designed to streamline and enhance the operations of a canteen. It provides a user-friendly platform for customers to browse the menu, place orders, and make secure payments. On the admin side, the system offers comprehensive tools to track sales, and monitor order status in real-time. With features like order tracking and automated billing the canteen management system optimizes efficiency, reduces costs, and improves customer satisfaction. This robust and scalable solution revolutionizes the canteen experience, creating a seamless and modern dining environment for both staff and customers.

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Chapter 1

Introduction

1.1 Background

In educational institutions, the college canteen serves as a vital hub for students, faculty, and staff, providing a space for refreshments, meals, and social interactions. However, managing a college canteen efficiently can be a challenging task, given the large number of customers and diverse requirements. The College Canteen Management System (CCMS) emerged as a comprehensive solution to address these challenges, streamline operations, and enhance the overall dining experience. Traditionally, college canteens were managed manually, involving paper-based order taking, cash transactions, and inventory tracking. This manual approach often led to long queues, operational inefficiencies, and difficulties in managing finances and inventory. As technology advanced, educational institutions sought ways to modernize canteen operations and improve customer service. The evolution of technology, particularly in the fields of software development and information technology, paved the way for the College Canteen Management System. The system integrates hardware, software, and data management components to create a centralized and automated platform for canteen operations.

1.2 Existing System

Existing applications of canteen management systems have transformed the way canteens operate, offering a range of benefits including streamlined operations, enhanced customer experience, improved inventory management, and data-driven decision making. There are several similar web and app applications like canteen management systems that cater to various industries and sectors. Here are a few examples: Restaurant Management Systems: Applications like Toast, Upserve, and TouchBistro offer comprehensive solutions for restaurant management. Platforms like Uber Eats, Grubhub, and DoorDash

provide online food ordering and delivery services School Cafeteria Management Systems: Applications such as NutriSlice and MealViewer are designed specifically for school cafeterias. Corporate Cafeteria Management Systems: Companies like Sodexo, Aramark, and CBORD offer cafeteria management solutions for corporate environments. Event Catering Management Systems: Applications like Caterease and Total Party Planner focus on managing catering operations for events and functions.

1.3 Problem Statement

The college canteen management system is a software solution that helps in managing the operations of a college canteen efficiently. This system automates the process of ordering food, managing inventory, and billing, which saves time and reduces errors.

With online ordering, students can order food from their smartphones or laptops before they reach the canteen which reduces waiting times and eliminates the need for paper menus. Each students has an account created through UID which serves as a secure environment for transactions.

The canteen management system aims to automate various manual processes, such as order taking, billing, inventory management, and reporting. By automating these tasks, the system reduces human errors, improves speed, and frees up canteen staff to focus on customer service.

1.4 Objectives

- **Improve efficiency**- The primary objective of Canteen management system is to streamline canteen operations and enhance overall efficiency. By automating processes such as order taking, billing, and inventory management, the system aims to reduce waiting times, minimize manual errors, and optimize resource utilization.
- **Enhance Customer Experience** -It aims to provide a positive and convenient dining experience for college students, faculty, and staff. Faster order processing and user-friendly interfaces contribute to improved customer satisfaction.

- **Enable Online Ordering** -facilitates online ordering through web applications. This objective aims to cater to the preferences of tech-savvy individuals who prefer to pre-order meals and make payments electronically.

- **Offer Menu Customization** -It provide menu customization.This allows canteens to offer diverse menu options that cater to the specific needs of their customers.

- **Simplify Administrative Tasks**- By automating various administrative tasks, CCMS aims to simplify the workload of canteen operators and staff. This allows them to focus on providing better service and maintaining the canteen's overall efficiency.

1.5 Scope

The Canteen Management System (CMS) aims to streamline canteen operations by offering efficient order processing, inventory management, and diverse payment options. It provides real-time reporting and analytics for data-driven decision making, ensures financial transparency, and accommodates customization of menus. The system promotes inclusivity, scalability, and user-friendliness, making it suitable for various establishments and enhancing the overall dining experience.

Chapter 2

Literature Review

2.1 Manual Record-Keeping

Method: Using pen and paper to record orders, sales, inventory, and financial transactions manually.

Drawbacks:

Prone to Errors: Manual data entry can lead to mistakes in

recording orders and financial transactions, leading to inaccuracies in inventory management and financial records.

Time-Consuming: It is a time-consuming process to record and update data manually, especially during peak hours in the canteen.

Difficult to Scale: As the canteen grows, managing records manually becomes more challenging and increases the likelihood of errors.

2.2 Cash-Based Transactions

Method: Accepting only cash payments for food orders.

Drawbacks:

Inconvenience: Customers need to carry cash, which may not always be practical or preferred in modern settings where digital payment methods are more common.

Security Risks: Handling cash increases the risk of theft or loss, and tracking cash transactions manually can be prone to errors.

Limited Insights: Cash-based transactions make it challenging to gather detailed insights into sales patterns and customer preferences.

2.3 Basic Software Solutions

Method: Using simple, standalone software applications to manage canteen operations.

Drawbacks:

Limited Functionality: Basic software may lack comprehensive features required for efficient inventory management, reporting, and user customization.

Integration Challenges: Standalone software may not integrate well with other systems used in the institution, leading to manual data transfer and potential data discrepancies.

Maintenance and Support: Basic software may lack ongoing support and updates, making it challenging to address issues or adapt to changing needs.

2.4 Token or Coupon Systems

Method: Implementing a token or coupon system where customers exchange cash for tokens or coupons used for food purchases..

Drawbacks:

Additional Complexity: Introducing tokens or coupons adds complexity to the payment process and requires dedicated resources for their issuance and management.

Risk of Loss: Tokens or coupons can be lost, leading to potential financial losses for both customers and the canteen.

These existing methods may have served their purpose in the past, but as canteens evolve and technology advances, they become less efficient and may hinder smooth operations. To overcome these drawbacks, modern Canteen Management Systems with advanced features such as digital payment integration, inventory tracking, real-time reporting, and user-friendly interfaces offer a more efficient and effective solution for managing canteen operations.

Chapter 3

System Analysis

3.1 Hardware Requirements

The following are the system requirements to develop the Canteen Management System.

- Processor: Intel Core i5
- Hard Disk: Minimum 100GB
- RAM: Minimum 8GB

3.2 Software Requirements

The following are the softwares used in the development of the app.

Operating System: Windows or Linux

3.2.1 HTML and CSS

HTML stands for HyperText Markup Language. It is the standard markup language used for creating and structuring web pages. HTML uses various tags to define the structure and content of a webpage. These tags, such as ¡h1¿ for headings, ¡p¿ for paragraphs, and ¡img¿ for images, provide instructions to web browsers on how to display the content.

CSS stands for Cascading Style Sheets. It is a style sheet language used to describe the presentation and formatting of an HTML document. CSS separates the content from its visual representation, allowing web developers to control the layout, colors, fonts, and other design aspects of a webpage.

3.2.2 PHP

PHP, which stands for Hypertext Preprocessor, is a server-side scripting language used primarily for web development. It is embedded within HTML code and executed on a

web server, generating dynamic web pages. PHP allows developers to create dynamic and interactive websites by embedding PHP code directly into HTML files.

3.2.3 XAAMP

XAMPP bundles together Apache, MySQL, PHP, and Perl into a single package, making it convenient for developers to set up a local server environment on their computer. This allows them to build and test web applications locally before deploying them to a live web server. XAMPP also includes phpMyAdmin, a web-based tool for managing MySQL databases, making it even easier to handle database-related tasks during development.

3.2.4 MySQL

MySQL is widely used in web development and other applications where data needs to be stored and accessed in a systematic and organized manner. It is a fundamental part of many web applications and content management systems, enabling the storage and retrieval of data required for dynamic websites and software.

3.2.5 Salesforce CRM

Salesforce CRM helps companies organize and streamline their customer-related processes. It enables sales teams to track leads, deals, and customer communications, improving sales efficiency and customer engagement. Marketing teams can use it to plan and execute marketing campaigns, while customer support teams can manage and resolve customer inquiries effectively.

3.2.6 Javascript

JavaScript allows developers to add interactive elements, dynamic content, and functionality to websites. JavaScript code runs directly in the web browser, making it possible to respond to user actions, manipulate webpage elements, and communicate with servers in real-time. JavaScript is the language that brings web pages to life, enabling interactive features like pop-up messages, form validation, animations, and much more. It plays a vital role in creating a rich user experience on modern websites and web applications.

Chapter 4

Methodology

4.1 Architecture diagram

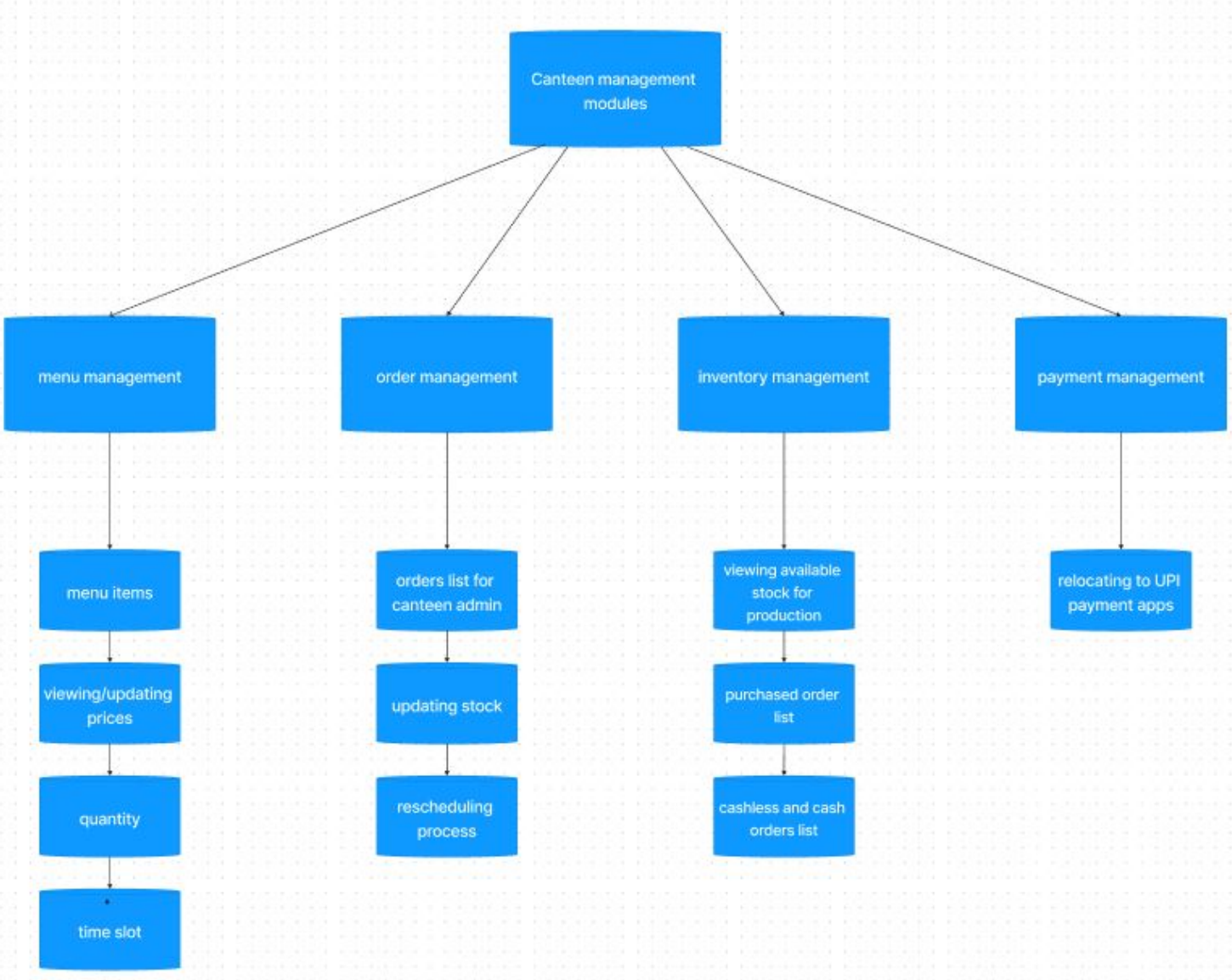

Figure 4.1

The above figure 4.1 explains the 4 modules in the system:

- 1. Menu management:- It contains the menu items and helps to choose the required quantity and time slot for the order.
- 2. Order Management:- It returns the list of orders to the Admin panel for the Admin to verify. It send the Email of the bill to the User's login Email id.
- 3.Inventory Management:- It involves updating the stock and the managing the inventory
- 4.Payment Management:- It involves relocating to payment gateway for paying through different methods

4.2 Use Case diagram

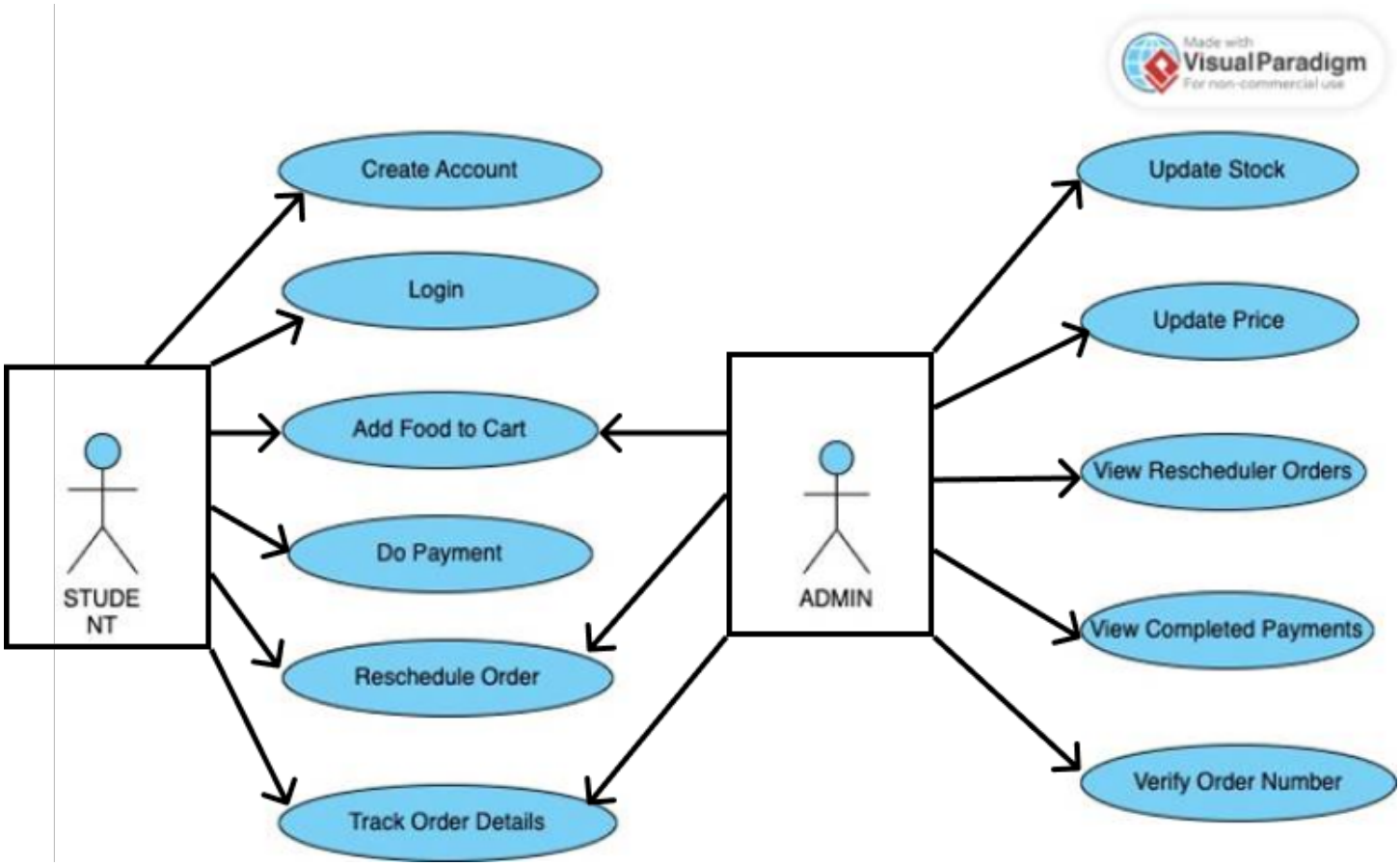

Figure 4.2

The above figure 4.2 shows the use case diagram where the student can create account, login, add food to cart, do payment, reschedule order, track order details; whereas the Admin can view the food added to the cart, view the rescheduled orders, track order details, update stock, update prices, view completed orders and verify order.

4.3 Proposed Method

- In this mini-project, the main objective is to create a user-friendly website that allows students to order food and make payments conveniently. The system includes two key components: the user-facing website and an admin page accessible to the canteen manager.

- Improved User Experience: The user-friendly website and potential mobile application make it convenient for students to order food and make payments easily.

- Efficient Order Management: The admin page helps the canteen manager track orders efficiently, ensuring timely food preparation and delivery.

- Secure Payments: The integration of a payment gateway with strong security measures ensures safe and secure online transactions for both students and the canteen.

- Overall, this mini-project aims to streamline the food ordering process for students and optimize canteen operations while ensuring security and user satisfaction. The integration of a mobile application in the future will further enhance accessibility and user convenience.

Chapter 5

System Implementation

5.1 Menu Management

Menu management is a crucial aspect of a canteen management system as it involves creating, updating, and organizing the food items and their related information that the canteen offers to its customers. Here's a description of menu management in a canteen management system:

5.1.1 Menu Item Creation :

- Admin or authorized staff can add new food items to the system's menu.
- Each item is associated with essential details like item name, description, category, price, and availability status.
- An image of the item can also be uploaded to enhance visual appeal.

5.1.2 Menu Item Modification :

- Admin can modify existing menu items to update their details, such as price changes or item descriptions.
- The system should allow for easy editing of item attributes.

By efficiently managing the menu in a canteen management system, the canteen can streamline food offerings, improve customer experience, and keep track of stock and sales effectively.

5.2 Order Management :

Order management is a critical component of a canteen management system as it involves handling customer orders from the time they are placed until they are fulfilled and delivered. Here's a description of order management in a canteen management system:

5.2.1 Order placement :

- Customers can place orders through the user interface on the website
- They browse the menu, select desired food items, and add them to their cart.
- The system calculates the total order amount, including taxes and delivery charges if applicable.

5.2.2 Order confirmation :

Order management is a critical component of a canteen management system as it involves handling customer orders from the time they are placed until they are fulfilled and delivered. Here's a description of order management in a canteen management system:

- After adding items to the cart, customers proceed to the checkout process.
- At checkout, the system displays an order summary with the selected items and the total amount.
- Customers can review the order and confirm before making the payment.

Efficient order management in a canteen management system ensures smooth operations, improves customer satisfaction, and optimizes the canteen's resources for timely and accurate order processing.

5.3 Bill generation and receipt sending :

Billing and receipt sending are crucial aspects of a canteen management system that involve generating accurate bills for customer orders and sending receipts to customers after successful payments. Here's a description of billing and receipt sending in a canteen management system:

5.3.1 Bill generation :

- After a customer places an order and completes the payment process, the canteen management system generates a detailed bill that includes the order summary, item names, quantities, individual prices, taxes, and any applicable discounts.
- Once the payment is successfully processed, the system generates a digital receipt for the customer, confirming the transaction and providing details about the order.

5.3.2 Receipt generation :

- Once the payment is successfully processed, the system generates a digital receipt for the customer, confirming the transaction and providing details about the order.
- The receipt includes the order number, transaction date and time, billing details, payment method, and any other necessary information.

5.3.3 Receipt Sending :

- The digital receipt can be sent to the customer via email or as an in-app notification on the website.
- The receipt is also stored in the customer's account for easy access and reference

Efficient billing and receipt sending in a canteen management system contribute to a smooth and reliable transaction process for both the canteen and its customers. It helps in maintaining transparency, reducing errors, and providing customers with a seamless experience when making payments and receiving order confirmations.

Chapter 6

Testing

6.1 Functional Testing results

All functionalities of the Canteen Management System work as intended, including menu selection, order processing, payment handling, and inventory management.

6.2 User Interface (UI) Testing Results

The UI is visually appealing, responsive, and consistent across different devices and screen sizes.

6.3 Integration Testing Results

The Canteen Management System integrates seamlessly with other systems, such as payment gateways and inventory databases, and data exchange is accurate and reliable.

6.4 Security Testing Results

The Canteen Management System is secure from vulnerabilities and potential security breaches.

6.5 Performance Testing Results

The Canteen Management System performs well under expected user loads, with acceptable response times and resource utilization.

6.6 Usability Testing Results

Positive user feedback, indicating high satisfaction with the system's usability and user-friendliness.

6.7 Regression Testing Results

Existing functionalities remain unaffected by new updates or changes, and new features work as intended without introducing unexpected issues.

6.8 Load Testing Results

The Canteen Management System handles heavy user traffic smoothly, maintaining acceptable response times and stability.

6.9 Data Integrity Testing Results

The data stored in the Canteen Management System's database is accurate, consistent, and without errors or corruption.

Chapter 7

Results

Fig 7.1 denotes home page and fig 7.2 shows user account registration respectively

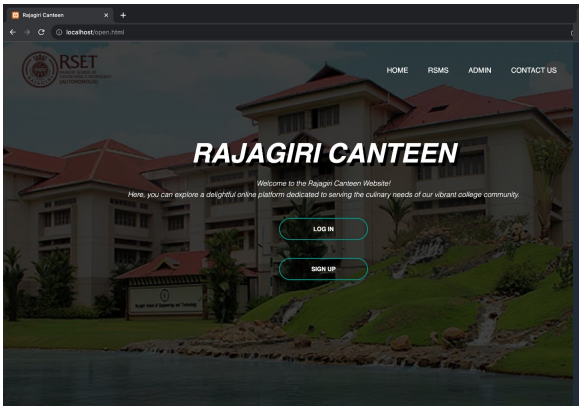

Figure 7.1

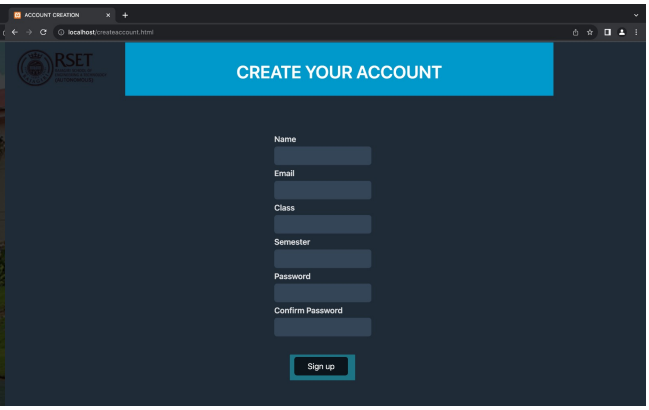

Figure 7.2

Fig 7.3 displays the items offered by the canteen which can be added to the cart as a menu and 7.4 shows login to Admin panel

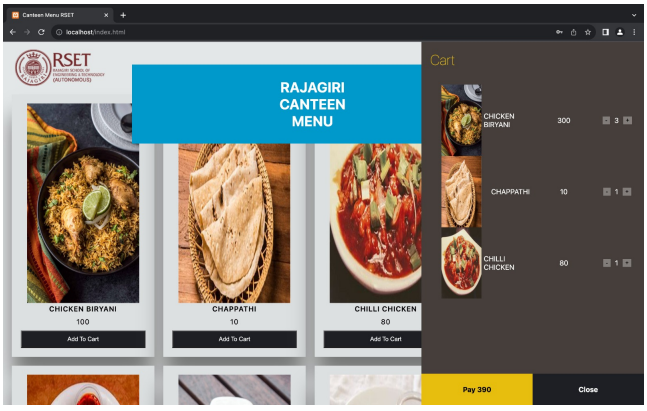

Figure 7.3

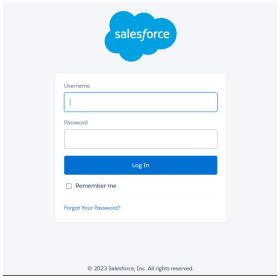

Figure 7.4

Fig 7.5 shows student login and fig 7.6 shows the bill which is sent as a mail to the Student's mail id.

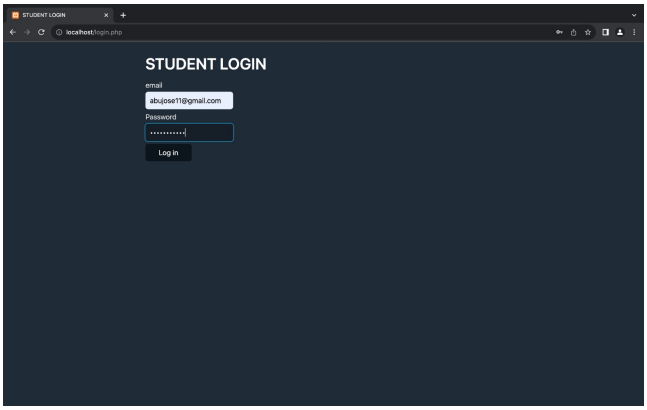

Figure 7.5

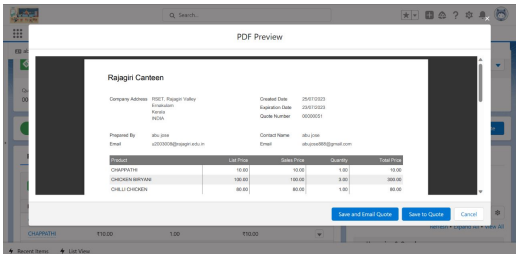

Figure 7.6

Fig 7.7 shows the list of orders which can be seen in the Admin's in the Sales force CRM and Fig 7.8 shows the Menu of food items which are available in the canteen

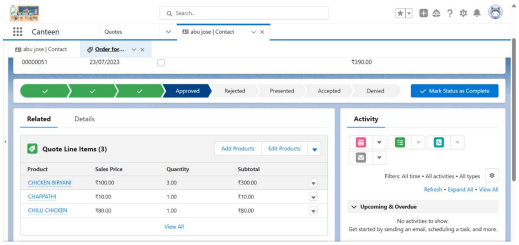

Figure 7.7

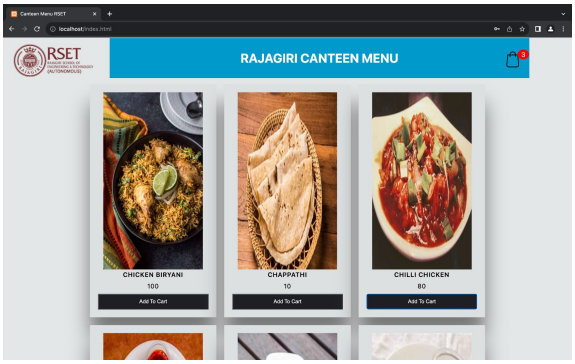

Figure 7.8

Chapter 8

Risks and Challenges

1. Resistance to change is a common challenge when implementing new systems, including canteen management systems, in any organization. In the case of canteen management, staff members who are used to traditional methods may have concerns or reservations about adopting new technologies and processes.

2. The possibility of technical glitches or system malfunctions is a valid concern when implementing any new technology, including a canteen management system. These issues can potentially disrupt the smooth operation of the canteen and cause inconvenience for both staff and customers.

3. Data security and privacy are paramount in a canteen management system, as the system involves handling sensitive information such as customer details, payment information, and order history. Ensuring the confidentiality, integrity, and availability of this data is crucial to building trust with customers and complying with relevant data protection regulations.

Chapter 9

Conclusion

In conclusion, implementing a college canteen management system can lead to a multitude of significant benefits for the canteen's operations and overall experience. By leveraging modern technology and streamlining various processes, this system can transform the way the canteen functions, resulting in increased efficiency, reduced costs, and improved customer satisfaction.

The automation and digitization offered by the management system can greatly enhance efficiency. Tasks such as order processing and billing can be handled seamlessly and accurately, reducing the burden of manual work on canteen staff. This not only saves time but also minimizes the likelihood of human errors, ensuring smoother operations.

The future scope for a canteen management system website is promising, with various potential enhancements and expansions that can further improve its functionality and user experience such as mobile application integration, contactless ordering ordering, bometric authentication and so on.

Implementing a canteen management system does require careful planning and coordination to ensure its successful integration into the existing canteen operations. As with any technology adoption, challenges may arise during the process. However, with proper support and training, these challenges can be addressed, and the system's benefits can be fully realized.

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Appendix: Sample Code

ORDER DETAIL

```
public class OrderDetail {
        @AuraEnabled
        public String orderNumber;
        @AuraEnabled
        public String studentName;
        @AuraEnabled
        public String studentEmail;
        @AuraEnabled
        public String pricebookId ;
        @AuraEnabled
        public List<OrderItems> orderItems;
        @AuraEnabled
        public String studentFirstName;
        @AuraEnabled
        public String studentLastName;

    }
```

ORDER ITEMS

```
public class OrderItems {
        @AuraEnabled
        public String productName;
        @AuraEnabled
        public Integer price;
        @AuraEnabled
        public Decimal quantity;
        @AuraEnabled
        public String sfProductId;
        @AuraEnabled
        public String sfPricebookEntryId;
        @AuraEnabled
        public Decimal sfUnitPrice;
    }
```

LOGIN PAGE HTML

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<html>\

<head>\

  <title>Login Page</title>\

  <style>\

    body \

    \{\

      font-family: Arial, sans-serif;\

      background-color: #f1f1f1;\

    \}\

\

    .container \

    \{\

      max-width: 400px;\

      margin: 0 auto;\

      padding: 20px;\

      background-color: #fff;\

      border-radius: 5px;\

      box-shadow: 0 0 10px rgba(0, 0, 0, 0.1);\

    \}\

\

    h2 \{\

```
    text-align: center;\
    margin-bottom: 20px;\
  \}\
\
  .form-group \{\
    margin-bottom: 20px;\
  \}\
\
  .form-group label \{\
    display: block;\
    margin-bottom: 5px;\
  \}\
\
  .form-group input[type="text"],\
  .form-group input[type="password"] \{\
    width: 100%;\
    padding: 10px;\
    border: 1px solid #ccc;\
    border-radius: 3px;\
  \}\
\
  .form-group button \{\
    width: 100%;\
    padding: 10px;\
    background-color: #4CAF50;\
```

```
      border: none;\
      color: #fff;\
      font-weight: bold;\
      cursor: pointer;\
      border-radius: 3px;\
    \}\
\
    .form-group button:hover \{\
      background-color: #45a049;\
    \}\
  </style>\
</head>\
<body>\
  <div class="container">\
    <h2>Student Login</h2>\
    <form action="student_login.php" method="POST">\
      <div class="form-group">\
        <label for="student_username">Username:</label>\
        <input type="text" id="student_username" name="student_username" required>\
      </div>\
      <div class="form-group">\
        <label for="student_password">Password:</label>\
        <input type="password" id="student_password" name="student_password" required>\
      </div>\
      <div class="form-group">\
```

```
      <button type="submit">Login</button>\
    </div>\
  </form>\
 </div>\
\
 <div class="container">\
  <h2>Admin Login</h2>\
  <form action="admin_login.php" method="POST">\
   <div class="form-group">\
    <label for="admin_username">Username:</label>\
    <input type="text" id="admin_username" name="admin_username" required>\
   </div>\
   <div class="form-group">\
    <label for="admin_password">Password:</label>\
    <input type="password" id="admin_password" name="admin_password" required>\
   </div>\
   <div class="form-group">\
    <button type="submit">Login</button>\
   </div>\
  </form>\
 </div>\
</body>\
</html>\
}
```

GENERATE ORDERS

```
@RestResource (urlmapping = '/newOrder/*')
global class generateOrder{
   @HttpPost
   global static void processOrders() {
      system.debug('Request body1'+RestContext.request.requestBody);
      system.debug('Request body2'+RestContext.request.requestBody.toString());
      //Map<String, Object> requestBody = (Map<String, Object>) JSON.deserializeUntyped(RestContext.r
equest.requestBody.toString());
      //do something with the resulting map - this is the body of the POST request
      OrderDetail ordDeets = (OrderDetail)System.JSON.deserialize(RestContext.request.requestBody.toS
tring(), OrderDetail.class);
      system.debug('studentName'+ordDeets.studentName);
      system.debug('studentEmail'+ordDeets.studentEmail);
      if(String.isNotBlank(ordDeets.studentName)){
         List<String> splitNames = ordDeets.studentName.split(' ');
         system.debug('First Name'+splitNames[0]);
         system.debug('Last Name'+splitNames[1]);
         ordDeets.studentFirstName = splitNames[0];
```

```
        ordDeets.studentLastName = splitNames[1];
    }
    system.debug('oder items'+ordDeets.orderItems);
    Map<String, PricebookEntry > pricebookEntryMap = new Map<String, PricebookEntry >();
    for(pricebookEntry p : [Select Product2Id,Product2.Name,Id,Pricebook2Id,UnitPrice from Pricebook
Entry Where Pricebook2.Name = 'Standard Price Book']){
        pricebookEntryMap .put(p.Product2.Name, p);
    }
    if(!ordDeets.orderItems.isEmpty()){
      for(OrderItems oi : ordDeets.orderItems){
        if(pricebookEntryMap .containsKey(oi.productName)){
          oi.sfProductId = pricebookEntryMap.get(oi.productName).Product2Id;
          oi.sfPricebookEntryId = pricebookEntryMap.get(oi.productName).Id;
          oi.sfUnitPrice = pricebookEntryMap.get(oi.productName).UnitPrice;
          ordDeets.pricebookId = pricebookEntryMap.get(oi.productName).Pricebook2Id ;
        }
      }
    }
    Map < String , Object > flowParams = new Map < String , Object >();
    flowParams.put('incomingOrder', ordDeets  );
    Flow.Interview.generate_Quote_from_orders myFlow = new Flow.Interview.generate_Quote_from_
orders( flowParams );
```

```
        myFlow.start();
    }

    /*public class OrderDetail {
        public String orderNumber;
        public String studentName;
        public String studentEmail;
        public List<OrderItems> orderItems;
    }

    public class OrderItems {
        public String productName;
        public Integer price;
        public Integer quantity;
    }*/

}
```

LOGIN PAGE PhP

```
<?php
```

```
if ($_SERVER["REQUEST_METHOD"] === "POST") {

    $mysqli = require __DIR__ . "/database.php";

    $sql = sprintf("SELECT * FROM user
                    WHERE email = '%s'",
                   $mysqli->real_escape_string($_POST["email"]));

    $result = $mysqli->query($sql);

    $user = $result->fetch_assoc();

    if ($user) {

        if (password_verify($_POST["password"], $user["password_hash"])) {

                                        header("Location: index.html");
                                        }
                                }

            if ($stmt->execute()) {

    header("Location: index.html");
    exit;
```

```
}

                    $is_invalid=true;

}

?>
<!DOCTYPE html>
<html>
<head>
   <title>STUDENT LOGIN</title>
   <meta charset="UTF-8">
   <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/water.css@2/out/water.css">
</head>
<body>

   <h1>STUDENT LOGIN</h1>

   <?php if ($is_invalid): ?>
      <em>Invalid Login</em>
   <?php endif; ?>

   <form method="post">
```

```
        <label for="email">email</label>
        <input type="email" name="email" id="email"
            value="<?= htmlspecialchars($_POST["email"] ?? "") ?>">

        <label for="password">Password</label>
        <input type="password" name="password" id="password">

        <button>Log in</button>
    </form>

</body>

</html>
```

COURSE OUTCOMES:

After completion of the course the student will be able to

SL. NO	DESCRIPTION	Blooms' Taxonomy Level
CO1	Identify technically and economically feasible problems (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO2	Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processes (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO3	Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions of minimal complexity by using modern tools & advanced programming techniques (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO4	Prepare technical report and deliver presentation (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO5	Apply engineering and management principles to achieve the goal of the project (Cognitive Knowledge Level: Apply)	Level 3: Apply

CO-PO AND CO-PSO MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	3	3	3	3		2	2	3	2	2	2	3	2	2	2
CO2	3	3	3	3	3	2		3	2	3	2	3	2	2	2
CO3	3	3	3	3	3	2	2	3	2	2	2	3			2
CO4	2	3	2	2	2			3	3	3	2	3	2	2	2
CO5	3	3	3	2	2	2	2	3	2		2	3	2	2	2

3/2/1: high/medium/low

JUSTIFICATIONS FOR CO-PO MAPPING

MAPPING	LOW/ MEDIUM/ HIGH	JUSTIFICATION
100003/CS622T.1-PO1	**HIGH**	Identify technically and economically feasible problems by applying the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
100003/CS622T.1-PO2	**HIGH**	Identify technically and economically feasible problems by analysing complex engineering problems reaching substantiated conclusions using first principles of mathematics.
100003/CS622T.1-PO3	**HIGH**	Design solutions for complex engineering problems by identifying technically and economically feasible problems.
100003/CS622T.1-PO4	**HIGH**	Identify technically and economically feasible problems by analysis and interpretation of data.
100003/CS622T.1-PO6	**MEDIUM**	Responsibilities relevant to the professional engineering practice by identifying the problem.
100003/CS622T.1-PO7	**MEDIUM**	Identify technically and economically feasible problems by understanding the impact of the professional engineering solutions.
100003/CS622T.1-PO8	**HIGH**	Apply ethical principles and commit to professional ethics to identify technically and economically feasible problems.
100003/CS622T.1-PO9	**MEDIUM**	Identify technically and economically feasible problems by working as a team.
100003/CS622T.1-PO10	**MEDIUM**	Communicate effectively with the engineering community by identifying technically and economically feasible problems.
100003/CS622T.1-P011	**MEDIUM**	Demonstrate knowledge and understanding of engineering and management principles by selecting the technically and economically feasible problems.
100003/CS622T.1-PO12	**HIGH**	Identify technically and economically feasible problems for long term learning.
100003/CS622T.1-PSO1	**MEDIUM**	Ability to identify, analyze and design solutions to identify technically and economically feasible problems.
100003/CS622T.1-PSO2	**MEDIUM**	By designing algorithms and applying standard practices in software project development and Identifying technically and economically feasible problems.
100003/CS622T.1-PSO3	**MEDIUM**	Fundamentals of computer science in competitive research can be applied to Identify technically and economically feasible problems.
100003/CS622T.2-PO1	**HIGH**	Identify and survey the relevant by applying the knowledge of mathematics, science, engineering fundamentals.

100003/CS622T.2-PO2	**HIGH**	Identify, formulate, review research literature, and analyze complex engineering problems get familiarized with software development processes.
100003/CS622T.2-PO3	**HIGH**	Design solutions for complex engineering problems and design based on the relevant literature.
100003/CS622T.2-PO4	**HIGH**	Use research-based knowledge including design of experiments based on relevant literature.
100003/CS622T.2-PO5	**HIGH**	Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processes by using modern tools.
100003/CS622T.2-PO6	**MEDIUM**	Create, select, and apply appropriate techniques, resources, by identifying and surveying the relevant literature.
100003/CS622T.2-PO8	**HIGH**	Apply ethical principles and commit to professional ethics based on the relevant literature.
100003/CS622T.2-PO9	**MEDIUM**	Identify and survey the relevant literature as a team.
100003/CS622T.2-PO10	**HIGH**	Identify and survey the relevant literature for a good communication to the engineering fraternity.
100003/CS622T.2-PO11	**MEDIUM**	Identify and survey the relevant literature to demonstrate knowledge and understanding of engineering and management principles.
100003/CS622T.2-PO12	**HIGH**	Identify and survey the relevant literature for independent and lifelong learning.
100003/CS622T.2-PSO1	**MEDIUM**	Design solutions for complex engineering problems by Identifying and survey the relevant literature.
100003/CS622T.2-PSO2	**MEDIUM**	Identify and survey the relevant literature for acquiring programming efficiency by designing algorithms and applying standard practices.
100003/CS622T.2-PSO3	**MEDIUM**	Identify and survey the relevant literature to apply the fundamentals of computer science in competitive research.
100003/CS622T.3-PO1	**HIGH**	Perform requirement analysis, identify design methodologies by using modern tools & advanced programming techniques and by applying the knowledge of mathematics, science, engineering fundamentals.
100003/CS622T.3-PO2	**HIGH**	Identify, formulate, review research literature for requirement analysis, identify design methodologies and develop adaptable & reusable solutions.

100003/CS622T.3-PO3	**HIGH**	Design solutions for complex engineering problems and perform requirement analysis, identify design methodologies.
100003/CS622T.3-PO4	**HIGH**	Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
100003/CS622T.3-PO5	**HIGH**	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools.
100003/CS622T.3-PO6	**MEDIUM**	Perform requirement analysis, identify design methodologies and assess societal, health, safety, legal, and cultural issues.
100003/CS622T.3-PO7	**MEDIUM**	Understand the impact of the professional engineering solutions in societal and environmental contexts and Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions.
100003/CS622T.3-PO8	**HIGH**	Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions by applying ethical principles and commit to professional ethics.
100003/CS622T.3-PO9	**MEDIUM**	Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
100003/CS622T.3-PO10	**MEDIUM**	Communicate effectively with the engineering community and with society at large to perform requirement analysis, identify design methodologies.
100003/CS622T.3-PO11	**MEDIUM**	Demonstrate knowledge and understanding of engineering requirement analysis by identifying design methodologies.
100003/CS622T.3-PO12	**HIGH**	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change by analysis, identify design methodologies and develop adaptable & reusable solutions.
100003/CS622T.3-PSO3	**MEDIUM**	The ability to apply the fundamentals of computer science in competitive research and prior to that perform requirement analysis, identify design methodologies.
100003/CS622T.4-PO1	**MEDIUM**	Prepare technical report and deliver presentation by applying the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
100003/CS622T.4-PO2	**HIGH**	Identify, formulate, review research literature, and analyze complex engineering problems by preparing technical report and deliver presentation.

100003/CS622T.4-PO3	**MEDIUM**	Prepare Design solutions for complex engineering problems and create technical report and deliver presentation.
100003/CS622T.4-PO4	**MEDIUM**	Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions and prepare technical report and deliver presentation.
100003/CS622T.4-PO5	**MEDIUM**	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools and Prepare technical report and deliver presentation.
100003/CS622T.4-PO8	**HIGH**	Prepare technical report and deliver presentation by applying ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
100003/CS622T.4-PO9	**HIGH**	Prepare technical report and deliver presentation effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
100003/CS622T.4-PO10	**HIGH**	Communicate effectively with the engineering community and with society at large by prepare technical report and deliver presentation.
100003/CS622T.4-PO11	**MEDIUM**	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work by prepare technical report and deliver presentation.
100003/CS622T.4-PO12	**HIGH**	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change by prepare technical report and deliver presentation.
100003/CS622T.4-PSO1	**MEDIUM**	Prepare a technical report and deliver presentation to identify, analyze and design solutions for complex engineering problems in multidisciplinary areas.
100003/CS622T.4-PSO2	**MEDIUM**	To acquire programming efficiency by designing algorithms and applying standard practices in software project development and to prepare technical report and deliver presentation.
100003/CS622T.4-PSO3	**MEDIUM**	To apply the fundamentals of computer science in competitive research and to develop innovative products to meet the societal needs by preparing technical report and deliver presentation.
100003/CS622T.5-PO1	**HIGH**	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
100003/CS622T.5-PO2	**HIGH**	Identify, formulate, review research literature, and analyze complex engineering problems by applying engineering and management principles to achieve the goal of the project.

100003/CS622T.5-PO3	**HIGH**	Apply engineering and management principles to achieve the goal of the project and to design solutions for complex engineering problems and design system components or processes that meet the specified needs.
100003/CS622T.5-PO4	**MEDIUM**	Apply engineering and management principles to achieve the goal of the project and use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
100003/CS622T.5-PO5	**MEDIUM**	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools and to apply engineering and management principles to achieve the goal of the project.
100003/CS622T.5-PO6	**MEDIUM**	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities by applying engineering and management principles to achieve the goal of the project.
100003/CS622T.5-PO7	**MEDIUM**	Understand the impact of the professional engineering solutions in societal and environmental contexts, and apply engineering and management principles to achieve the goal of the project.
100003/CS622T.5-PO8	**HIGH**	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice and to use the engineering and management principles to achieve the goal of the project.
100003/CS622T.5-PO9	**MEDIUM**	Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings and to apply engineering and management principles to achieve the goal of the project.
100003/CS622T.5-PO11	**MEDIUM**	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments and to apply engineering and management principles to achieve the goal of the project.
100003/CS622T.5-PO12	**HIGH**	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change and to apply engineering and management principles to achieve the goal of the project.
100003/CS622T.5-PSO1	**MEDIUM**	The ability to identify, analyze and design solutions for complex engineering problems in multidisciplinary areas. Apply engineering and management principles to achieve the goal of the project.

100003/CS622T.5-PSO2	**MEDIUM**	The ability to acquire programming efficiency by designing algorithms and applying standard practices in software project development to deliver quality software products meeting the demands of the industry and to apply engineering and management principles to achieve the goal of the project.
100003/CS622T.5-PSO3	**MEDIUM**	The ability to apply the fundamentals of computer science in competitive research and to develop innovative products to meet the societal needs thereby evolving as an eminent researcher and entrepreneur and apply engineering and management principles to achieve the goal of the project.