Ticketing Tool Application

Project report submitted in partial fulfilment of the requirement for
the degree of Bachelor of Technology
in
Computer Science and Engineering

By
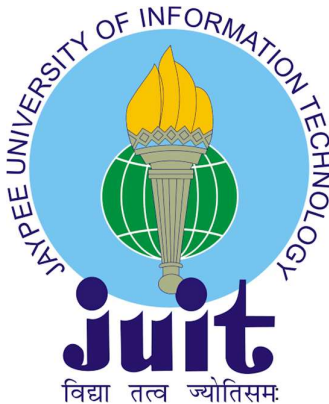
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to

Department of Computer Science & Engineering and the
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CANDIDATE'S DECLARATION

I hereby declare that all of the work carried out in this report with the title **"Ticketing Tool Application"** for partial fulfilment of the requirements for the award of the degree of Bachelor of Technology in Computer Science and Engineering/Information Technology submitted in the Computer Science & Engineering Department, the Jaypee University of Information Technology Waknaghat is a genuine record of my own effort carried out over a period from February 2023 to May 2023 under the supervision of Mr. Suraj Kumar, Deputy Vice President, Shivalik Small Finance Bank, Dr. Nishant Jain & Dr. Vipul Kumar Sharma (Electronics and Communication Department and Computer Science and Engineering Department). I also validate that I have carried out the above-mentioned project work under the proficiency stream Artificial Intelligence The matter embodied in the report has not been submitted for the award of any other degree or diploma.

Shreesh Tripathi 191329

This is to certify that the above statement made by the candidate is true to the best of my knowledge.

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LIST OF ABBREVIATIONS

- API: Application Programming Interface
- CASA: Current and Savings Account
- KYC: Know Your Customer
- OTP: One Time Password
- PAN: Permanent Account Number
- CIBIL: Credit Information Bureau (India) Limited
- CRIF: Center for Research in International Finance
- CIF: Customer Information File
- IMPS: Immediate Payment Service
- NEFT: National Electronic Funds Transfer
- RTGS: Real Time Gross Settlement
- WIP: Work In Progress
- AEPS: Aadhaar Enabled Payment System
- PIN: Personal Identification Number
- OD: Overdraft
- REST: Representational State Transfer
- SOAP: Simple Object Access Protocol
- JSON: JavaScript Object Notation
- MSME: Ministry of Micro, Small & Medium Enterprises
- SFB: Small Finance Bank
- SQL: Structured Query Language
- SSMS: SQL Server Management Studio
- CRM: Customer Relationship Management
- CRUD: Create, Read, Update, and Delete

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ABSTRACT

By developing this application, the bank will be able to keep track of notifications and tickets and avoid fines for missing the due date. Additionally, the application will email reminders as the deadline draws near. The compliance team will be notified first, followed by the supervisor of the relevant department, if the ticket is not resolved within the specified time.

The Income Tax Department, GST, Sales Tax, and Enforcement Department notices are currently either still waiting with the bank (in this case, Shivalik Bank), or they have been closed days beyond the due date. In order to monitor all opened, modified, and closed tickets, a ticketing tool application is being built to handle this problem. This application will act as a single hub for all tickets and allow the compliance team to track any ticket at any time.

CHAPTER 1 - INTRODUCTION

1.1 Introduction

1.1.1 About Company - Shivalik Bank – A Small Finance Bank

Shivalik was India's first Small Finance Bank to evolve from an Urban Co-operative Bank. In providing retail banking products and services, it is backed by more than 24 years of banking experience.

Shivalik has always placed a strong emphasis on technology, with customer centricity as a fundamental tenet. The Infosys Finacle Core Banking and Digital Banking Suite, which includes online and mobile banking, powers the Bank. The Bank has unequalled agility thanks to the cloud-based architecture, which enables cost-effective scale management and growth. Shivalik is a direct member of the National Financial Switch and is accessible on all retail payment platforms.

Fig 1.1 *Shivalik Small Finance Bank Logo*

Strengths & Strategy of the Business

- First Urban Cooperative Bank in India to be granted permission to convert to a Small Finance Bank
- Strong and experienced management team
- 24 years of retail banking expertise
- 90% of secured loans are guaranteed by collateral
- Strong retail deposits franchise with a 31% CASA ratio

Shivalik Bank API Banking

A broad range of APIs are available on Shivalik's developer portal that may be utilized to collaborate on developing original solutions. View and test out our APIs, use cases, guides, and documentation. For a fantastic user experience, include Shivalik Bank APIs in your digital goods and apps.

The APIs are easy to use, flexible, and quick to deploy. Some of these APIs are:

1. KYC
    i.   e-KYC with Aadhar-based OTP
    ii.   EKYC across Aadhaar-based Biometric
    iii.   PAN Authentication
    iv.   Aadhar Data Vault Management
    v.   CKYC Download and Search
    vi.   CIBIL/Experian/CRIF (Bureau Check)

2.   Customer On-boarding
    i.   Retail Customer On-boarding – CIF Creation and Updation
    ii.   Deduplication check
    iii.   Risk rating management and Customer KYC
    iv.   Aadhar Seeding/Update
    v.   Inquiry of Customer

3.   Accounts and Deposits
    i.   Manage and Open Savings Account
    ii.   Manage and OpenFixed Deposit Account
    iii.   Manage and Open Recurring Deposit Account
    iv.   Manage and OpenFlexi-Recurring Deposit Account
    v.   Get Effective Interest Rates for Deposit Accounts
    vi.   Closer of Deposit Accounts
    vii.   Get Information on Savings and Deposit Accounts

4.   Payments
    i.   Funds Transfer across IMPS
    ii.   Funds Transfer with NEFT/RTGS

iii.   Recurring Fund Transfer with NEFT/RTGS

iv.   Bulk Funds Transfer – WIP

v.   Fund Transfer and Cash Withdrawal across AEPS - WIP

5.   Lending

i.   Manage and Open Loan Account – EI/Non-EI

ii.   Link and Lodge Collateral

iii.   Disbursement with Loan Account - Internal

iv.   Disbursement with Loan Account – External Bank's A/c

v.   Loan Overdue Position Inquiry

vi.   Scheduled Collection through Loan Account

vii.   Inquiry about Loan Account

6.   Cards

i.   Hotlists Debit Cards

ii.   Verify using a Debit Card

iii.   Debit Card Management- Change PIN, Limit

iv.   Issuance of Virtual Debit Card – WIP

v.   Issuance of Prepaid Card – WIP

7.   Workflow

i.   Onboarding of Retail Customer

ii.   Saving Account Opening

iii.   Online Loan Sanctioning/Underwriting

iv.   Loan eligibility checks with CRIF for Microfinance

8.   Overdraft

i.   Manage and Open OD Account

ii.   Open an OD Account against FD

Shivalik – API Developer Portal

Small businesses, SMEs, Start-ups, FinTech, developers, and firms in the BFSI sector can use Shivalik Bank's open API platform to evaluate, test, and launch new products and services using our APIs. The acronym for it is an application programming interface or API. It is a software utility that permits information transmission between two programs. One application uses an API to make a standardized request to the other application in order to have it receive input, complete a job, and return standardized output to the original program. To connect to or communicate with another API, you need an API key.

An API key, which is an alphanumeric code, is transmitted by computer software. The program or application then contacts the API, or application programming interface, to identify its user, developer, or calling program to a website. An API key can be used with both a secret authentication token and a unique identifier. A set of access rights for the API to which the key is associated are frequently included with the key.

Any number of API Keys can be generated by a user. Reviewing and testing the APIs in the sandbox are free of charge. However, the costs associated with using our APIs to launch your products and services would be determined by the conditions of engagement that both parties agree to.

We offer REST APIs with JSON payloads (Get/Post) as a standard, and SOAP APIs can also be supported. To evaluate or test APIs with fictitious payloads, you must first register for access to the API sandbox. For any help or questions, please contact us using the "contact us" form or send an email to the address provided. Within two working days, a member of our staff will contact you with a solution or answer.

1.1.2 Description of Industry

Banking

The banking sector is crucial for the mobilization of capital and the advancement of the economy. Policy support, commercial fundamentals, product and service innovation, and underserved markets all contribute to industry expansion. Credit demand has grown over the previous 10 years as a result of strong economic growth, rising disposable incomes, rising expenditure, and more readily available loans.
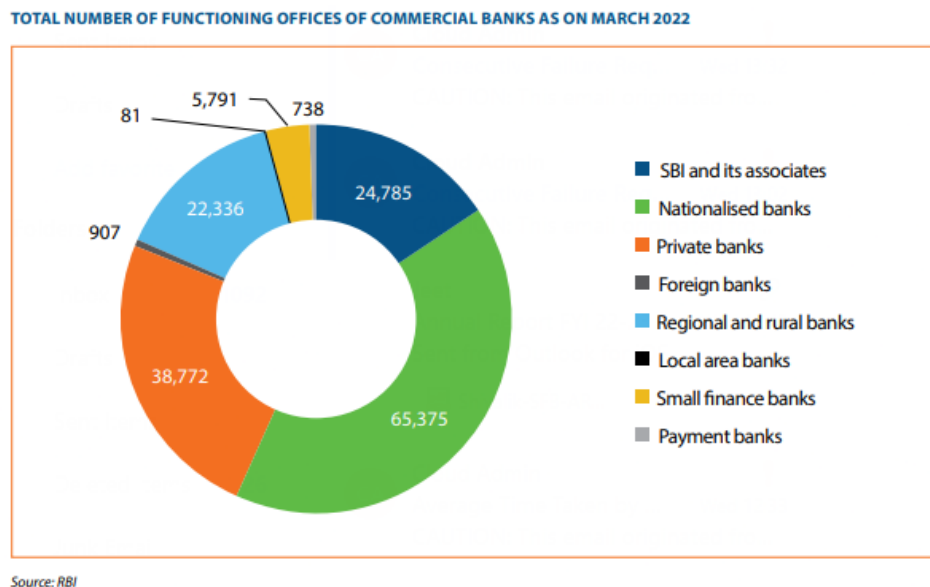
Fig 1.2 *Total Number of Functioning Offices of Commercial Banks as on March 2022*

Small Finance Banks (SFB)

Small Finance Banks, with a focus on financial inclusion, are a recent development in the Indian banking industry. The branch network and asset base of SFBs have grown quickly, with solid asset quality and a high return on assets being maintained. In addition to having outstanding coverage of clients with low credit needs, these banks have had some success in reaching out to underserved markets, such as Micro, Small, and Medium-Sized Enterprises (MSMEs). According to the SBI Ecowrap study, newly established small financing banks (SFBs) have already attained more than 1% of the overall banking market share.

1.1.3 Introduction

SSFB Ticketing Tool Application is a full-stack web application built using a Microsoft Developer Tool named Power App. SSFB Ticketing Tool is a web application that will be used by the people who work within the organization of Shivalik Bank. The users can assign, modify and close the tickets using the application. The compliance team of the Shivalik Bank overlooks all the tickets raised by any user. The application also has a feature to automatically send a reminder email to the concerned person when the due date is near and can further escalate the reminder to the compliance team if the appropriate action is not taken till the due date.

The users can sign up for the application and create its ID, using which they can log in and assign new tickets to the concerned person or modify existing tickets in the organization

1.2 Problem Statement

Currently in the bank (here Shivalik Bank), notices from various departments such as Income Tax Department, GST, Sales Tax, Enforcement Department either remain pending or get closed days after the due date has been passed. To tackle this problem, a ticketing tool application is being made so that all the tickets raised, modified and closed can be tracked. This application will be one stop for all the tickets and the compliance team can use this application to track any ticket, whenever they want.

The application will also send reminder emails when the due date is near and will escalate the matter to the superior of the concerned department if the ticket is not closed within the stipulated time and later to the compliance team.

1.3 Objective

Creating this application will help in keeping track of notices/tickets which will prevent the bank from penalties they might face for missing the due date.

When the due date is approaching, the application will also send reminder emails. If the ticket is not closed within the allotted time, the matter will then be escalated to the compliance team and later to the superior of the relevant department.

Currently, notices from a number of departments, including the Income Tax Department, GST, Sales Tax, and Enforcement Department, are either still pending in the bank (in this case, Shivalik Bank), or they are closed days after the due date has passed. To address this issue, a ticketing tool application is being developed so that all opened, changed, and closed tickets

may be monitored. The compliance team may track any ticket at any time using this application, which will serve as a central hub for all tickets.

1.4 Methodology

The project is divided into 3 main components, registering users and admins (compliance team) into our application so that people from the organization can get access to our application features; Creating or Raising Tickets, and assigning them to the concerned person from the organization; Closing the Tickets before the due date after getting confirmation from the compliance team.

- **User Registration**

    Users from the organization can create their account in the application and thereafter log in using the same credentials into the application and start using the same. The accounts created will be stored on a table from the bank's database. During the login, the details will also be fetched from the same database.

- **Ticket Creation/Updation**

    Once a user logs into the application, after that, they can create and assign tickets to the people of the organization. The tickets can also be modified and closed by the users. The compliance team users have extra rights over the application. They can view and update all the tickets whereas, other users can only update the tickets which they have created or assigned and view only tickets that are assigned to them or assigned by them.

- **Ticket Closure**

    After a ticket is created and assigned to the concerned person, then it's his/her job to perform the required task and update its status to "In Review" so that it can move to the compliance team and they can review the work and approve the same. Once the ticket is approved by the compliance team then the person can close the ticket with some closure remarks as per the requirement.

Functional Requirements

REQ-1: Computer (To run the application)

REQ-2: Internet (To connect to the PowerApps software)

Working Principle

Login and sign-up authentication are the first part of the application.

Whenever a new user wants to access the application, they can create their account by entering their details which include: First Name, Last Name, Organization's Email Address, Employee Code, and Password. If there is not already an account linked to the given email and employee code, the user will be registered successfully in our database i.e. in Bank's SQL Server. In the server, there is a table for the users, an entry will be created with the entered details for every successful signup.

After the signup, when the user tries to login into the application, they can log in using their Employee Code and the Password they used while signing up. On pressing the login button, the application looks up in our SQL table of users for the above-entered details, if they are found, then the user is redirected to the home screen of the application otherwise an error message with "Invalid Login Details" pops up on the screen.

When the user successfully logs in then they will be redirected to the home screen, where they will have several options like Add Ticket, View Tickets, Change Password, and Sign Out. They can choose any of the mentioned options and perform the required action.

On choosing the option of Add Ticket, the user will be redirected to a new page, where the user needs to enter details about the ticket such as Notice Type, Regulator Name, Place of Notice Received, Due Date, Notice Issuance Date, Account Number, CIF, etc. Once the user enters all the relevant details, then they can click on the Submit Button, then all the details will be sent to the TicketInfo Table of the Bank's SQL Server. This will create a new entry in the table which can be accessed or modified later.

By developing this application, the bank will be able to keep track of notifications and tickets and avoid fines for missing the due date.

Additionally, the application will email reminders as the deadline draws near. The compliance team will be notified first, followed by the supervisor of the relevant department, if the ticket is not resolved within the specified time.

To monitor all opened, modified, and closed tickets, a ticketing tool application is being built to handle this problem. This application will act as a single hub for all tickets and allow the compliance team to track any ticket at any time.

User Documentation

The application is very user-friendly and is designed for users without any technical expertise even though users are supposed to be aware of Banking terms such as CIF, Account Number, Regulators, and Branch Names.

Step 1: Registering Users -> Click on the Signup Button, the application will then redirect the user to the registration page and ask for some details such as First Name, Last Name, Organization's Email Address, Employee Code, and Password. After entering the details, users can click on the signup button and they will be redirected to the login page.

Step 2: Logging In -> Users can use their employee code and password to log in and access the features of the application which include Adding Tickets, Modifying Ticket, Closing Ticket, and Viewing Ticket.

Step 3: Adding Tickets -> Users can click on Add Ticket button on the home screen in order to add a ticket. On clicking the button, the user will be redirected to the add ticket page where they can enter the required details and submit the ticket. It will be created and the user can view it by clicking on the view tickets button, present on the home screen.

Step 4: View Tickets -> If the user wants to view a ticket, then they can click on the view/modify button on the home screen then will be redirected to the Tickets screen, where all the tickets, assigned by the user or assigned to the user will be present. The user can then select the required ticket from there and view it.

Step 5: Modify Tickets -> When a user clicks the view/modify button on the home screen, they are sent to the Tickets screen, where all of the tickets that the user has been allocated or who has been assigned to them are listed. The user may then choose and update the necessary ticket there.

Assumptions and Dependencies

Dependencies include:

- Every user must be from the Shivalik Bank so that they possess the email id with "shivalikbank" domain.
- Users should have knowledge of Banking terms such as Account Number, CIF, Regulator Name, etc.

1.5 Tools and Technologies

1.5.1 Microsoft Power Apps

Microsoft's PowerApps program enables you to quickly create and distribute robust low-code apps. It is a collection of software, services, and data platforms that enables quick application development to create unique software depending on corporate needs.

With Excel, Office 365, SharePoint, and other on-premises applications, as well as with data platforms (common data sources for apps), you can easily construct customized business apps that link to your company's data. or

At its heart, Power Apps is a platform as a service that enables you to develop programs that work with any mobile platform or web browser. To enable users to create apps with additional features without coding knowledge, Power Apps were created. Microsoft boasts that PowerApps have an initial visual design and drag-and-drop capability.

Power Apps provides links to several Microsoft-based and third-party programs, including Google Docs, Dropbox, Dynamics CRM, and Oracle, as well as SharePoint, SQL Server, and OneDrive in the Office 365 productivity package. PowerApps makes it easier for business users to create applications by providing a variety of templates, connectors, and third-party apps.

Connectors are the main factor in its popularity among developers. It supports the majority of on-premises data sources and gives you the ability to conduct CRUD operations.

1.5.2 Power Automate

Microsoft Power Automate is a solution for linking many platforms and apps to automate processes and operations. Users may establish connections between Microsoft Office 365 apps in both cloud and on-premises settings, as well as to a wide library of additional applications.

Users who merely have a fundamental grasp of Office 365 may quickly and simply construct simple automation to simplify day-to-day corporate operations. Advanced users can build unique business processes using Microsoft Power Apps or Power BI. Users may quickly diagram how apps should communicate with one another using workflows, often known as flows.

A talent in power automation is useful in any industry. Business process automation may boost efficiency across divisions, inform stakeholders, and simplify daily operations. Power Automate's ability to automate workflows:

- Inform sales teams of new transactions and possibilities in the CRM.
- Alerts via push when important emails arrive
- Document organization and archiving
- Keep track of social media profiles and automate marketing procedures.
- Users should be reminded to take daily, weekly, or yearly action
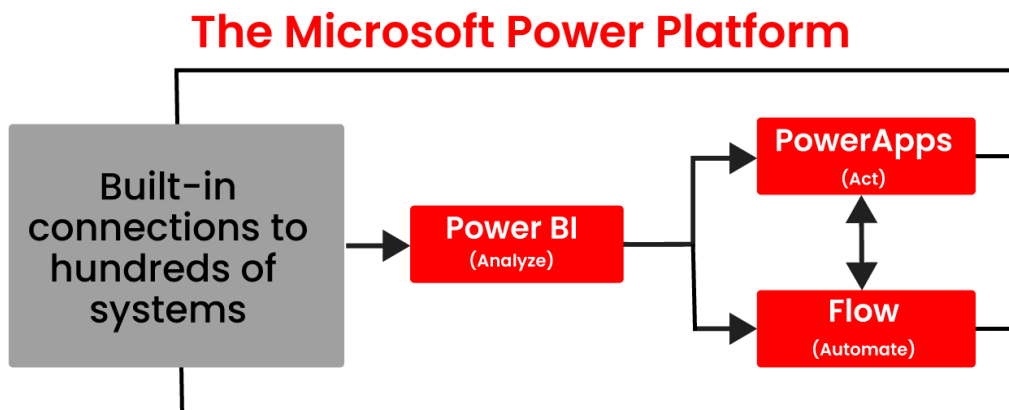
Fig 1.3: MS Power Platform Working

1.5.3 SQL Express

The main SQL Server relational database management system (RDBMS) from Microsoft is also available for free. SQL Server is essentially a database management system that may be used to store and access data that is kept in a variety of databases. A wide range of tools, including business intelligence, reporting, and in-depth advanced analytics, are included with SQL Server.

Enterprise-focused solutions like Oracle Database (DB) and MySQL compete with SQL Server's enterprise version. The maintenance costs of SQL Server Enterprise, which has a tonne of capabilities, might be prohibitive for smaller businesses. The most basic product on the market is SQL Server Express. It is a complete database engine that you can integrate in an application or distribute to a server. Many of the corporate edition's features are also included in the free Express version. The majority of smaller to medium enterprises' production applications are probably best supported by SQL Server Express. A deployment by developers who do not wish to construct applications with databases housed on servers would be a typical SQL Server Express use case. They would be able to create apps using Express and their SQL Server database.

Due to the fact that SQL Server Express is also free to distribute, many independent software suppliers (ISVs) include it in their programs. In reality, Microsoft has developed an even more lightweight version aimed at developers and independent software vendors (ISVs) called SQL Server Express LocalDB. This version runs "in-process" with applications rather than as a separate "Service."

1.5.4 SQL Server Management Studio (SSMS)

A workstation or client utility called MS SQL Server Management Studio is used to connect to and administer your SQL Server. Instead of utilizing the command line, SQL Server Management Studio (SSMS) is a Windows program or client tool that is used to connect to and operate with our SQL Server via a graphical interface. To deal with SQL Server and Azure SQL databases, Microsoft SQL Server 2005 released the management studio. All of the components of SQL Server may be configured, managed, and administered by DBAs and database developers. developing databases and tables, running SQL queries to insert, update, and delete data, and developing and maintaining stored procedures, triggers, views, and cursors are some of its primary capabilities. Additionally, it enables us to grant databases and their objects rights (security).

The SSMS also offers reporting, deployment, and database health monitoring capabilities. It comes with an SQL Profiler, which enables us to check the functionality of our SQL databases. It may be used to schedule background tasks as well. This GUI application or other similar software is required if we wish to connect to a distant SQL Server instance. Administrators, developers, testers, and others utilize it.
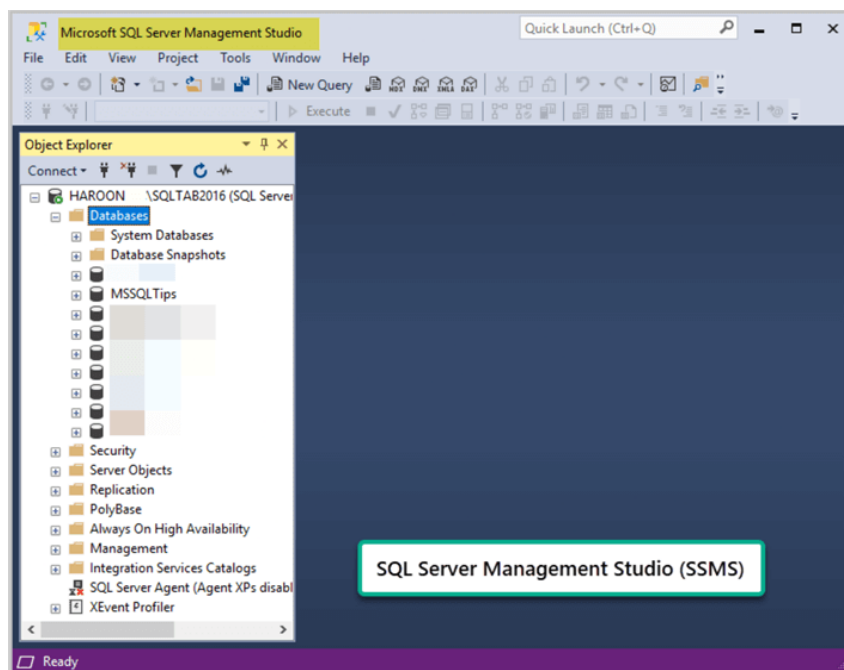
Fig 1.4 *SSMS Window*

1.5.5 Microsoft Power FX

Microsoft Power FX is a programming language that enables low-code development on the Microsoft Power Platform. It is an open-source language that was introduced at Ignite 2021 and the specification was released in March 2021. The language is designed to be accessible to a large audience, with a basis in spreadsheet-like formulas. Power Fx was influenced by programming languages and tools like Pascal, Mathematica, and Miranda.

Microsoft has described the language as heavily borrowing from the spreadsheet paradigm. In a spreadsheet, formulas can refer to the contents of other cells. If a user changes the content of a cell, the values of all its dependent cells are automatically updated. Similarly, components in a Power Fx program are connected by formulas, with syntax that is reminiscent of Excel, and their values are automatically updated if changes occur. For example, a simple formula might connect a component's color property to the value of a slider component, so that if the user moves the slider, the color changes.

Initially, Power Fx was developed as a low-code language for adding logic to PowerApps canvas applications. However, it is now being expanded for use across the entire Power Platform. Currently, Power Fx can be used in the following contexts:

- PowerApps Canvas Apps
- Dataverse Calculated Columns
- Model Driven App Modern Commanding
- Power Apps Ideas (which incorporates AI-assisted formulas)

CHAPTER 2 - LITERATURE SURVEY

1. **Ticketing System: A Descriptive Research on the Use of Ticketing System for Project Management and Issue Tracking in IT Companies**

KENT DARRYL AGLIBAR, GARRET CHRISTOPHER ALEGRE, GERALD DEL MUNDO, AND KENNY FRANCIS DURO

International Journal of Computing Sciences Research | February 2022

Due to the global expansion of technology, IT firms are becoming quite popular. Because they are daily transactions, incidents and requests for clients or internal use of the organization are difficult to manually track. IT companies use a ticketing system to track all the information they are collecting in order to maintain all the logs. The JIRA is one of the most well-liked ticketing systems. The usage of JIRA benefits both the support staff and internal business processes since it makes it simple to record all of the various transactions and maintains track of various problems and requests. The restricted features of JIRA are one of its drawbacks.

The researchers performed a study named "Ticketing System: A Descriptive Research on the Use of Ticketing System Among Employees of ABC Company" with the goal of determining JIRA's efficacy as a ticketing system despite its few features.

2. Exploring Computerized Trouble Ticketing System And Its Benefits In Vodafone Ghana

JEROME GILLES AKAMA

Master's Thesis Computer Science Informatics | March 2016

Computerised Trouble Ticketing System is developing into a thriving information technology system that determines whether a company can survive in the cutthroat international telecommunications industry. This quantitative exploratory survey used readily chosen study participants to investigate Vodafone Ghana Plc's computerized issue ticketing system and its inherent advantages. Descriptive statistics have been used to analyze a cross-section of important data that was gathered via structured questionnaires.

The study found that the organization benefits from the effective and efficient use of computerized issue ticketing systems in terms of customer happiness, competitive advantage, and business intelligence in the cutthroat telecom industry.

The complexity of managing large amounts of generated data, the fierce competition, the high cost of trouble ticketing systems, and the rapid technological obsolescence of computerized trouble ticketing applications in the telecommunications market all pose constant challenges to the smooth realization of these inherent benefits.

The study recommended that differentiation strategy, cost leadership strategy, and customer relationship management be quickly and effectively adopted because they are customer-centric strategies that can create valuable long-term customer relationships for both the business and the customers.

CHAPTER 3 - SYSTEM DEVELOPMENT

3.1 System Overview

At first, our application needs to be logged in by entering the login credentials and in case the credentials are not present then users need to sign up and obtain the credentials.

On successful login, users can view and edit the existing tickets assigned to the user or assigned by the user and add new tickets. The compliance team of the bank will overview and approve the tickets.

A bank's employees manage and keep track of client queries, concerns, and complaints using a software system called a ticketing tool. The system often enables users to submit support issues through phone, email, or a web portal. Each request is then given a specific reference number or ticket by the system.

Each client request is recorded with great detail by the system, including the customer's name, contact information, request kind, request urgency, and issue or problem description. Employees can easily access and handle consumer requests since this data is kept in a centralized database.

3.2 System Algorithm

The bank's ticketing tool is a software application that manages customer support requests and complaints. The tool helps the bank to track and manage customer issues to ensure that they are handled efficiently and effectively. The system algorithm of the ticketing tool is described below.

1) Customer Request/Complaint:

   A customer contacts the bank with a request or complaint. The request or complaint can be made through various channels such as phone, email, chat, or in person at a bank branch.

2) Ticket Creation:

   The ticketing tool creates a new ticket for the customer issue. The ticket is assigned a unique identifier and is tagged with relevant information such as the customer's account number, request type, and issue severity.

3) Ticket Assignment:

   The ticket is then assigned to a support agent or team, based on the request type and agent availability. The ticketing tool assigns tickets to the appropriate agent or team automatically.

4) Agent Review:

   The assigned agent or team reviews the ticket and contacts the customer to gather more information or provide assistance. The agent updates the ticket with any relevant information gathered during the customer interaction.

5) Issue Resolution:

   The agent or team works to resolve the issue or escalates it to a higher level of support if necessary. The ticket status is updated and closed once the issue is resolved.

6) Ticket Closure:

If the issue is resolved, the agent or team updates the ticket status to reflect the resolution and closes the ticket. If the issue is not resolved, the agent or team continues to work on the ticket until it is resolved.

7) Reporting and Metrics:

The ticketing tool generates reports on metrics such as the number and types of tickets received and the time taken to resolve each ticket. The metrics can help the bank to identify trends in customer requests and complaints and adjust its customer support process accordingly.

The ticketing tool enables the bank to track customer issues and ensure that customer requests are handled efficiently and effectively. By identifying trends in customer requests and complaints, the bank can improve its products and services. The ticketing tool is a vital part of the bank's customer support process, ensuring that customer issues are addressed promptly, and customer satisfaction is enhanced.

In conclusion, the system algorithm of the bank's ticketing tool involves creating a new ticket for customer requests and complaints, assigning the ticket to an appropriate agent or team, reviewing the ticket, resolving the issue or escalating it if necessary, updating the ticket status and closing it if the issue is resolved, and generating reports and metrics to improve the customer support process. The ticketing tool plays a crucial role in ensuring customer satisfaction and loyalty, making it an indispensable tool for any bank.

3.3 System Design

The flow of the Ticketing Tool Application is shown in the flowchart given below:
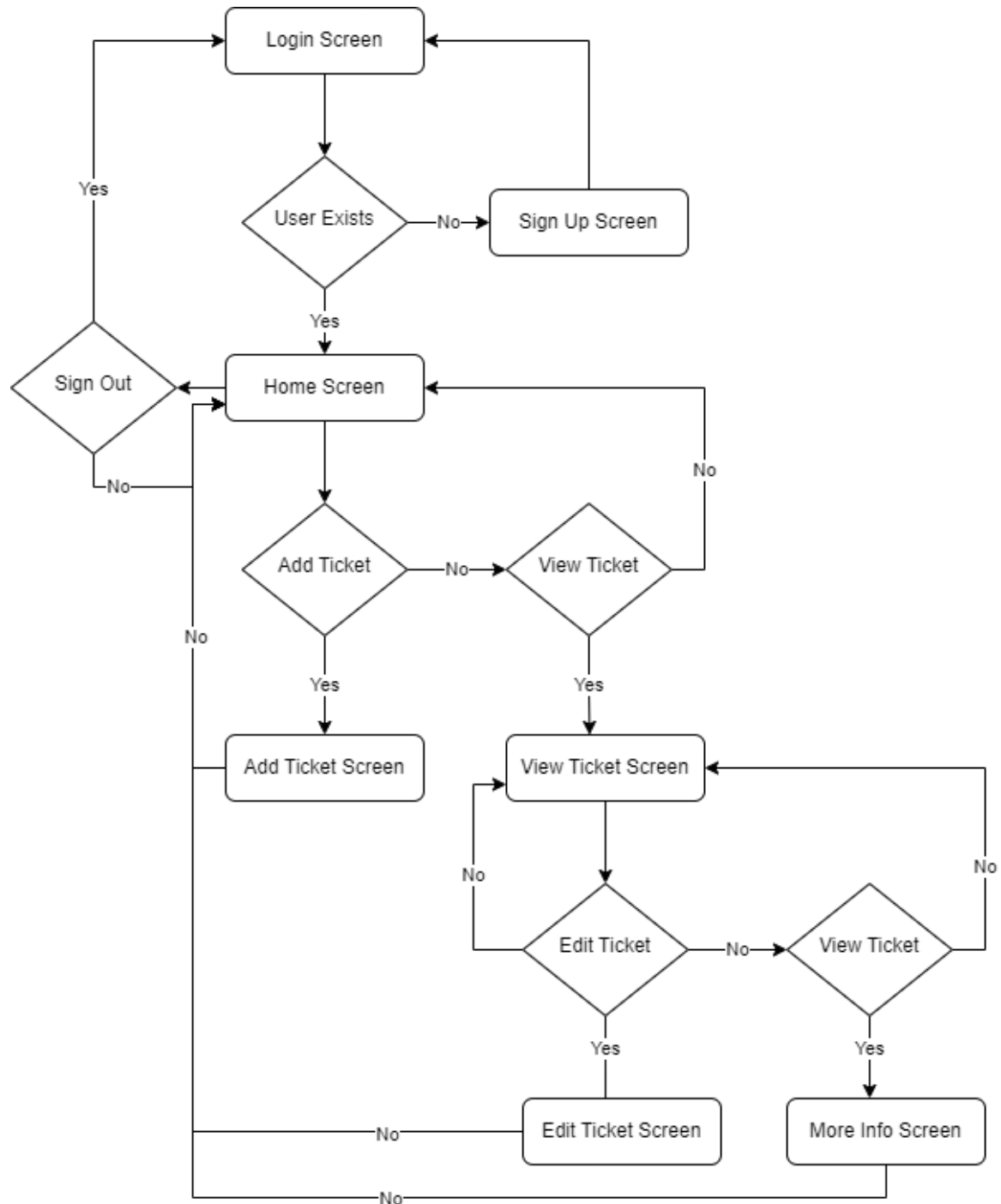
Fig 3.1 *Flowchart of Ticketing Tool Application*

3.4 System Implementation

The implementation of a ticketing tool in a bank is a complex process that requires careful planning and execution. The following are the steps involved in implementing a ticketing tool in a bank:

1. **Assessing the Needs and Requirements**:
   The first step in the implementation process is to assess the needs and requirements of the bank. This involves identifying the types of customer issues the bank typically handles, the current process for addressing those issues, and the resources available for implementing a new system. The bank may also need to consider any regulatory requirements or compliance issues that could impact the implementation process.

2. **Selecting the Right Ticketing Tool:**
   Once the needs and requirements have been assessed, the bank needs to select the right ticketing tool. The bank should consider factors such as cost, ease of use, scalability, and integration with other systems. The bank may also want to conduct a pilot test to evaluate the effectiveness of the tool. In our case, the bank decided to create a tool developed within the organization by the developers present with them in the technology department.

3. **Customizing the Ticketing Tool:**
   After selecting the right tool, the bank needs to customize it to meet its specific needs. This involves configuring the tool to capture the required information, such as customer account information, issue severity, and type of request. The bank may also need to customize the tool to meet regulatory and compliance requirements. Currently, the requirements were to add tickets with the following inputs: Notice Type (Garnishee Order, Attachment Order, Prohibitory Order, Revocation Order), Regulator Name (Income Tax Department, Enforcement Directorate, Cyber Crime, Sales Tax, GST, Commercial Tax, SFIO, Department, CBI), Notice Issuance Date, Notice Due Date,

Customer Name, Account Number, CIF, PAN, Priority, Assigned To, Description, Attachment, etc.

4. **Training the Staff:**

    Once the tool has been customized, the bank needs to train its staff on how to use the tool. This includes training the support agents on how to create, manage, and resolve tickets, as well as training the management team on how to use the reporting and analytics features of the tool.

5. **Testing and Deployment:**

    Before deploying the tool, the bank needs to conduct thorough testing to ensure that it is functioning correctly and that it meets the bank's needs. This includes testing the tool's performance under various conditions, such as high volume and different types of requests. Once the testing is complete, the tool can be deployed to the production environment.

6. **Monitoring and Maintenance:**

    After deploying the tool, the bank needs to monitor its performance and make any necessary adjustments or updates. This includes monitoring the system for issues or errors, analyzing the metrics to identify areas for improvement, and making any necessary updates to the tool to address any issues. In our app, monitoring of tickets will be done by the compliance team, they will be overlooking all the tickets raised and closed. Without approval from the compliance team, no ticket can be closed. The compliance team can also create several admin accounts as per their need using which they can overlook the tickets and approve them.

Overall, the implementation of a ticketing tool in a bank requires careful planning and execution to ensure that the tool meets the bank's needs and is effective in improving the customer support process. The bank must assess its needs and requirements, select the right tool, customize it, train its staff, test and deploy it, and monitor and maintain the tool to ensure its continued effectiveness. With proper implementation and use, a ticketing tool can significantly improve the bank's customer support process and enhance customer satisfaction and loyalty.

CHAPTER 4 - PERFORMANCE ANALYSIS

4.1 Analysis

Fig 4.1 *Login Screen of Ticketing Tool Application*

Screen 1: Registering User

- Input: first name(String), last name(String), email(String), employeeID(Integer), password and confirm password(String)

- EmailID has the validation of having the domain of @shivalikbank.com so that only employees of Shivalik Bank can access the application.

- EmployeeID is of type number and with a fixed length of 5 digits so that the user enters only valid employee code.

- Password and Confirm password fields should have the same values.

- If any of the above conditions are not matched then an error popup will rise with the reason mentioned there (An example can be seen in the image attached below)

Fig 4.2 *Error Pop-up in Signup Screen*

- Upon successful signup, the user is redirected to the home page, and a success message is popped up (can be seen in the image attached below)
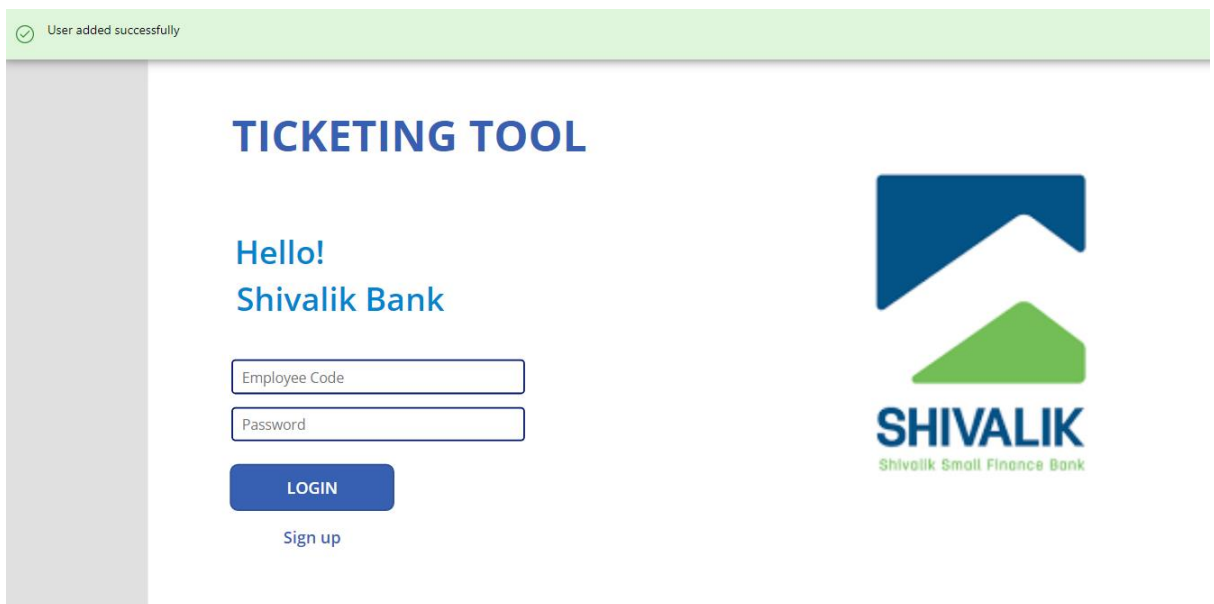
Fig 4.3 *Success Message Pop-up after successful Signup*

Screen 2: Logging In User

- Input: Employee Code (Integer) and Password (String)
- Login Button: Upon clicking the button, the application looks into the SQL database for the entered employee code.
- If the employee code is present then it checks if the password entered is the same as the employee code, if it is the same then the user is logged in successfully and redirected to Home Screen otherwise an error message with an "invalid credentials" message is popped up.

Fig 4.4 *Login Screen*

Fig 4.5 *Home Screen*

Screen 3: Raising/Adding a Ticket

- Add Ticket consists of several inputs, mentioned below:
    - Notice Type (Drop Down)
    - Regulator Name (Drop Down)
    - Place of Notice Received(Drop Down)
    - Case Date (Date)
    - Notice Issuance Date (Date)
    - Customer Name (Text Input)
    - Department Concerned (Drop Down)
    - Notice Receiving Date(Date)
    - Notice Due Date (Date)
    - Account Number (Number Input)
    - CIF (Number Input)
    - Assigned To (Drop Down)
    - PAN (Text Input)
    - Priority (Drop Down)
    - Current Status (Drop Down)
    - Description (Text Input)
    - Closure Remarks (Text Input)
    - Attachment/s

- Submit Button only gets enabled only when all the mandatory fields are filled.
- On successfully filling in all the details, the submit button submits the ticket and refreshes all the fields.
- Reset Button is used to reset all the fields present on the page to default values.
- Back Button takes us back to the previous screen and resets all the details filled till then.

Fig 4.6 *Add Ticket Screen - 1*

Fig 4.7 *Add Ticket Screen - 2*

Screen 4: View Tickets

- When we click on the "View/Edit Ticket" button on Home Screen, it will redirect us to the View Tickets page.

- On this page we can view all the tickets Assigned By the user or Assigned to the user by any other user.

- This Screen has 3 buttons: Home, Add Ticket, and Closed Ticket.

- Home Button takes us back to the Home Screen.

- Add Ticket Button is used to Add a new Ticket.

- Closed Ticket Button is used to see all the tickets that have been closed by the user.

- Additionally, users can modify and view their tickets in detail.

- Users can also search among the tickets also.

- Filter option is also present where the user can filter out the results/tickets based on priority, current status, department, and regulator name.

Fig 4.8 View Ticket Screen

TICKETS

View closed tickets

🔍 Se...

Filter ✕

Ticket No:	1
Customer Name:	Shreesh
Regulator Name:	Sales Tax
Department:	1
Assigned By:	testing1

Assigned To:	Suveer Kumar Gupta
Priority:	Low
Status:	In Review
Due Date:	April 27, 2023

Priority
[▾]

Status
[▾]

Regulator Name
[▾]

Department
[1 ▾]

Apply   Clear

Ticket No:	2
Customer Name:	Testing2
Regulator Name:	Enforcement Directorate
Department:	1

Assigned To:	Ashish Mohan Pradhan
Priority:	Medium
Status:	Done
Due Date:	May 6, 2023

Fig 4.9 *Filter Menu*

CLOSED TICKETS

Ticket No:	2
Customer Name:	Testing2
Regulator Name:	Enforcement Directorate
Department:	1

Assigned To:	Ashish Mohan Pradhan
Priority:	Medium
Status:	Done
Due Date:	May 6, 2023

Ticket No:	3
Customer Name:	te
Regulator Name:	GST
Department:	2

Assigned To:	Suveer Kumar Gupta
Priority:	Low
Status:	Done
Due Date:	May 4, 2023

Fig 4.10 *Closed Tickets Screen*

Screen 5: Modify Tickets

- In the View Tickets Screen, upon clicking the Edit Button (Pen Icon) of any particular ticket, the user will be redirected to the Modify Ticket Screen.
- In this Screen, users can modify the ticket as per their requirements.
- Once the user has made all the required changes, they can click on Update Button and patch the changes.
- On clicking the Update Button, the application will patch the updated details into the SQL Server.
- Cancel and Back buttons will undo the changes made and redirect to the View Tickets Screen.

Fig 4.11 Edit Ticket Screen

Screen 6: More Info about Tickets

- In the View Tickets Screen, upon clicking the More Info Button (I Icon) of any particular ticket, the user will be redirected to the More Info Ticket Screen.

- In this screen, the user will get to know more about the selected ticket.

- All the details available about the ticket will be present on this screen.

TICKET NO: 1		
* Notice Type	*** Regulator Name**	*** Place of Notice Recieved**
Garnishee Order	Sales Tax	DEHRADUN
* Case Date	*** Notice Issuance Date**	*** Customer Name**
April 27, 2023	April 27, 2023	Shreesh
* Department Concerned	*** Notice Recieving Date**	*** Notice Due Date**
1	April 27, 2023	April 27, 2023
* Account No	*** CIF**	*** Assigned To**
1234	2132	Suveer Kumar Gupta
* PAN	*** Priority**	*** Current Status**
QW123	Low	In Review
Description	**Closure Remarks**	**Attachments (Max Limit 10 MB)**

Fig 4.12 More Info Screen

SQL Schema

1. **TicketInfo**
   - This table is used to store all the information about the tickets.
   - Primary Key: TicketNo

Column Name	Data Type	Required
TicketNo	integer	Yes
NoticeType	varChar	Yes
RegulatorName	varChar	Yes
PlaceOfNotice	varChar	Yes
CaseDate	date	Yes
IssuanceDate	date	Yes
CustomerName	varChar	Yes
Department	varChar	Yes
ReceivingDate	date	Yes
DueDate	date	Yes
AccountNumber	integer	Yes
CIF	integer	Yes
AssignedTo	varChar	Yes
PAN	varChar	Yes
Priority	varChar	Yes
CurrentStatus	varChar	Yes
Description	varChar	No

Column Name	Data Type	Required
TicketNo	integer	Yes
NoticeType	varChar	Yes
RegulatorName	varChar	Yes
PlaceOfNotice	varChar	Yes
CaseDate	date	Yes
IssuanceDate	date	Yes
ClosureRemarks	varChar	No

Table 4.1 *TicketInfo Table Details*

2. UserInfo

- This table is used to store the user details and login credentials of every user.
- Primary Key: EmployeeCode.

Column Name	Data Type	Required
FirstName	varChar	Yes
LastName	varChar	No
Email	varChar	Yes
EmployeeCode	integer	Yes
Password	varChar	Yes

Table 4.2 *UserInfo Table Details*

Email Reminder:

- Every day the application is going to check if any reminder needs to be sent according to the table given below:

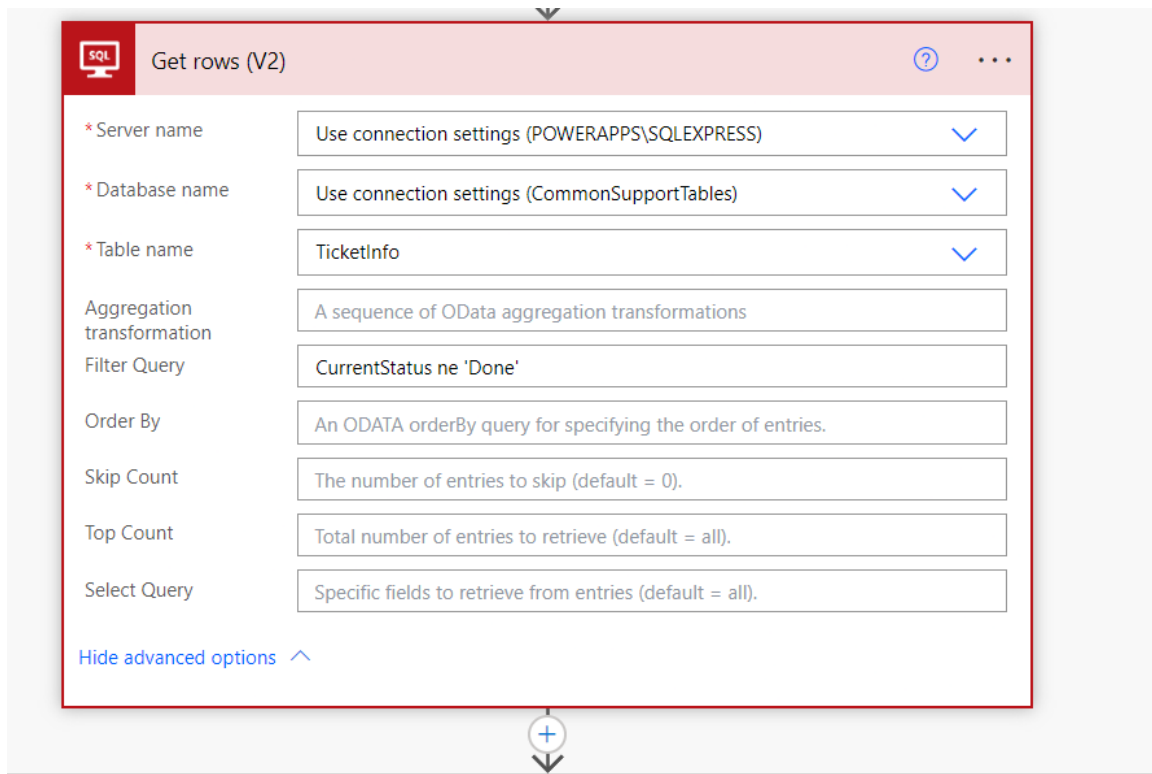| First Level Escalation	Second Level Escalation	Escalation timeline
Department Head/Branch Head	Compliance Department	1. All cases where the due date is within 2 days are to be escalated to both Department Head/Branch Head (As applicable) and Compliance Team 2. All cases where the due date is within 4-7 days are to be escalated to the first level. Second-level escalation is to be alerted 2 days prior to the due date. 3. All cases received with the expiry of the due date are to be immediately escalated to the Compliance department.

Table 4.3 Notice Escalation Matrix

Power Automate

- According to the escalation matrix provided above, a Power Automate cloud flow was needed which can check from our database daily and send emails when conditions meet.

- Before testing for conditions, future time was needed in Power Automate, the flow for the same can be seen below:
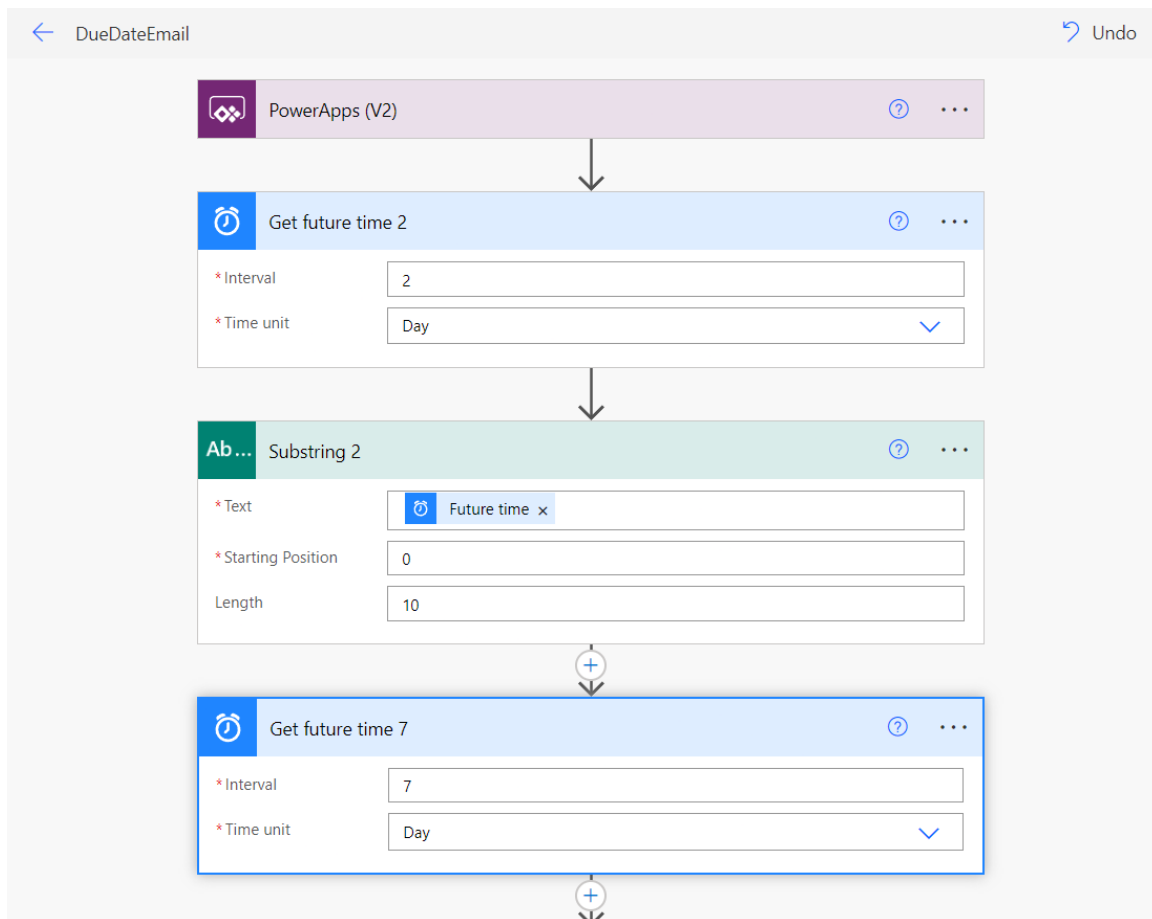
Fig 4.13 *Get Future Time, Power Automate*

- After we compute future time in proper format using substring, we need to retrieve data from our SQL Server and compare it with the time we got from the FUTURE TIME function.


Fig 4.14 *Get Rows from SQL Server, Power Automate*

- Once we retrieve all the data from SQL Server, we apply the condition as per the escalation matrix and then send emails to the concerned authority.

- The power automate flow designed for various conditions are:

Condition 1: All cases where the due date is within 2 days are to be escalated to both Department Head/Branch Head (As applicable) and Compliance Team.
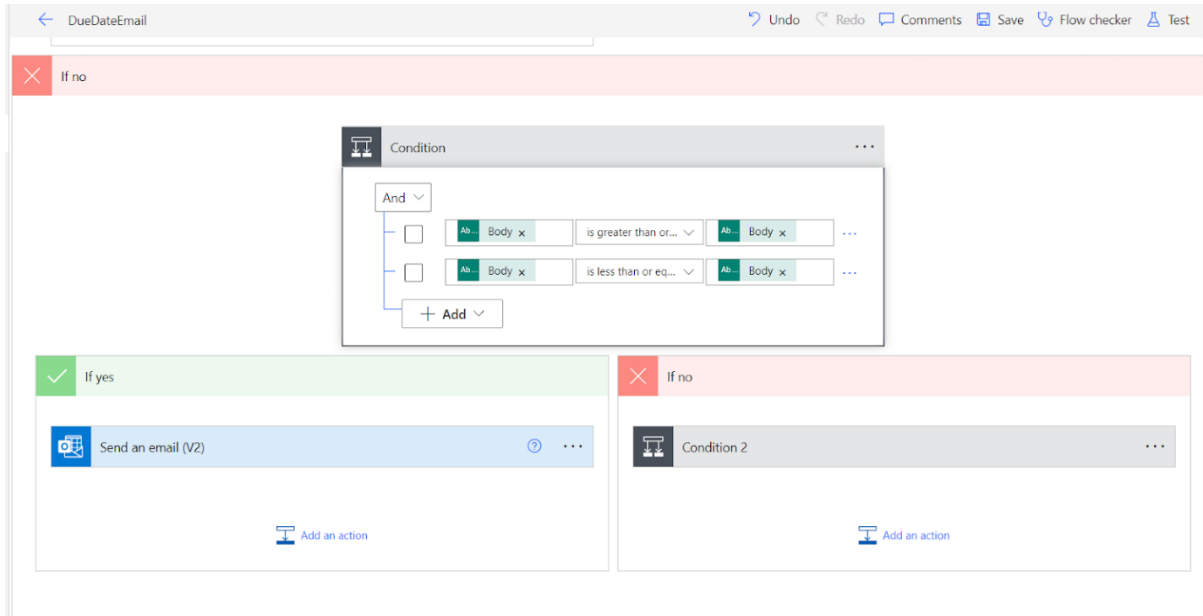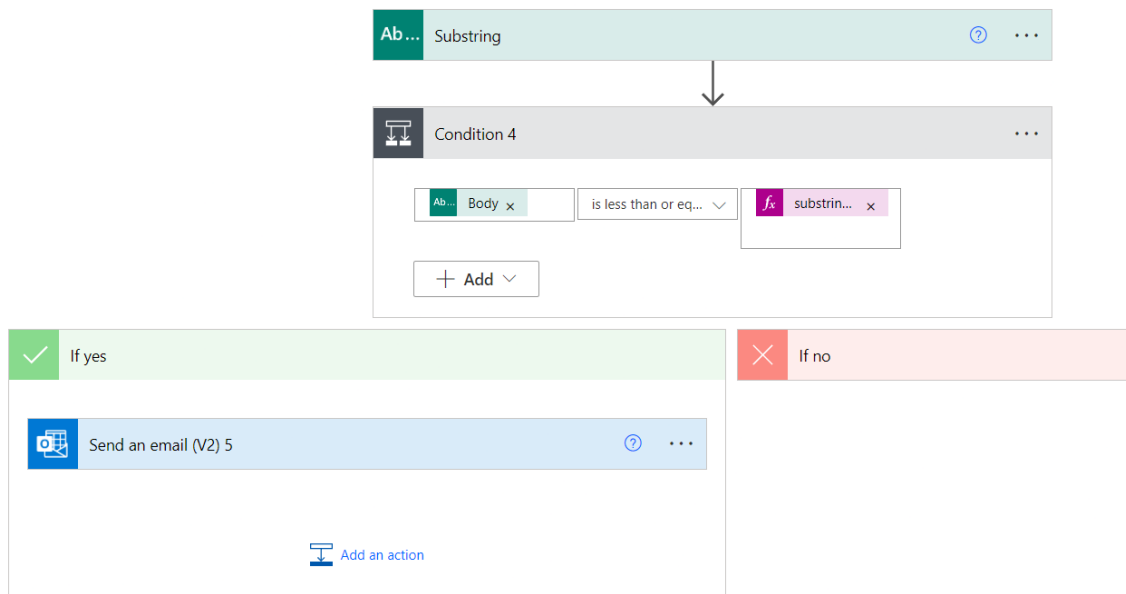

Fig 4.15 Condition 1 setup, Power Automate

Condition 2: All cases where the due date is within 4-7 days are to be escalated to the first level. Second-level escalation is to be alerted 2 days prior to the due date.
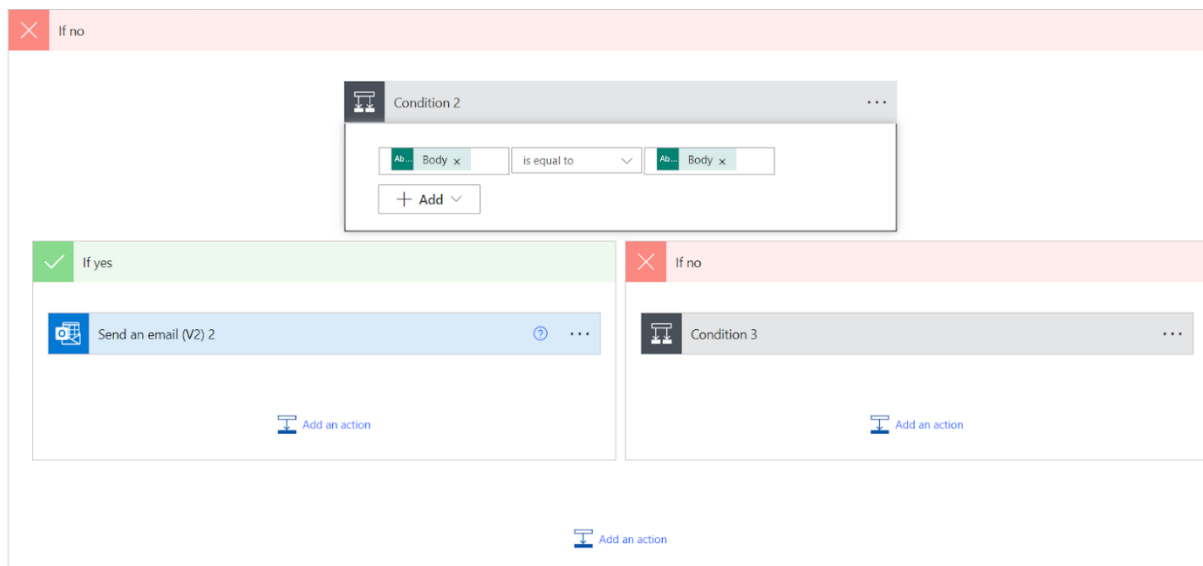
Fig 4.16 Condition 2 Setup, Power Automate

Condition 3: All cases received with the expiry of the due date are to be immediately escalated to the Compliance department.

Fig 4.17 Condition 3 Setup, Power Automate

Output

This completes our flow from registering users, and creating tickets to the closing of the tickets. The data is being sent to the Banks SQL server and the same is also being fetched and modified as per the requirement. Reminders are also being sent when the due date comes near and the ticket has not been closed till then.

Fig 4.18 *Home Screen of Ticketing Tool Application*

4.2 Performance Requirements

When using the application, the better the quality of the internet, the faster data can be sent to the SQL server. The Internet plays a crucial role in sending and receiving data from SQL servers in our application.

The user must be from Shivalik Bank and possess the organization's email ID so that they can register themselves into the application.

4.3 Security Requirements

The Ticketing Tool Application is an application that contains very sensitive information. The data which is entered as input in the application is very sensitive from the perspective of the Bank as well as the customers. The data entered such as PAN, Customer Account Number, and CIF must not be shared with any person outside the organization.

In order to tackle this problem, the application is made in such a way that only people from the organization i.e. Shivalik Bank can access the application. The tickets raised are also only visible to the concerned person i.e. the users can only view the tickets if they are raised by them or assigned to them. This makes the data more secure as only concerned people will be able to access the information.

CHAPTER 5 - RESULT

5.1 Result

The steps involved in setting up our application are listed below:

STEP 1: User Registration

1. User has to enter the following details to sign up:

    - First Name

    - Last Name

    - Email ID

    - Employee Code

    - Password

2. After entering all the valid details, the user's ID will be created.

3. Users can now use its Employee Code and Password for login.

STEP 2: Login

1. User has to enter the following details to log in:

    - Employee Code

    - Password

2. On entering valid credentials, the user will be logged in and will be redirected to the Home Screen of the Application.

TICKETING TOOL

Hello!
Shivalik Bank

19329

....

LOGIN

Sign up

SHIVALIK
Shivalik Small Finance Bank

Fig 5.1 *Login Screen*

STEP 3: Ticket Creation

1. In Home Screen, the user can click on the Add Ticket Button to raise a ticket.
2. On clicking the Add Ticket Button, the user will be redirected to the Add Ticket Screen.
3. On this screen, the user needs to enter the following details to add the ticket:
   - Notice Type
   - Regulator Name
   - Place of Notice Received
   - Case Date
   - Notice Issuance Date
   - Customer Name
   - Department Concerned
   - Notice Receiving Date
   - Notice Due Date
   - Account Number
   - CIF
   - Assigned To
   - PAN
   - Priority
   - Current Status
   - Description
   - Closure Remarks
   - Attachment/s

STEP 4: Ticket Closure

1. In order to close the ticket, the assignee can go to the Ticket Screen by clicking on the View/Edit Ticket button on the Home Screen.
2. Once the user reaches the Ticket Screen then the user can select the required ticket and click on its edit button.
3. On clicking the edit button, the user will be redirected to the Modify Ticket Screen.
4. Here, the user can change the Current Status of the ticket from Pending/In Review to Closed and click on the Update Button.
5. After this, the ticket's status will be changed to Closed.

MODIFY TICKET NO: 2

* Department Concerned

1

* Notice Recieving Date

April 27, 2023

* Notice Due Date

May 6, 2023

* Account No

1234

* CIF

123

* Assigned To

Ashish Mohan Pradhan

* PAN

ABC123

* Priority

Medium

* Current Status

Done

Description

Test

Closure Remarks

N/A

Attachments (Max Limit 10 MB)

There is nothing attached.

Cancel　　Update

Fig 5.2 *Modify Ticket Screen*

5.2 Other Minor Features

5.2.1 Search Ticket

The Ticket Screen has a Search Bar, using which the user can search among the tickets assigned to him or assigned by him. The View Ticket Screen has the following fields to display about any Ticket:

- Ticket Number
- Customer Name
- Assigned To
- Assigned By
- Regulator Name
- Department
- Current Status
- Priority
- Due Date

The Search Bar can be used to search among the above fields and provide the required results. The text field of the search bar is used to search among the columns using the Search feature of Power FX language. The Power FX Code used for the logic is shown below:
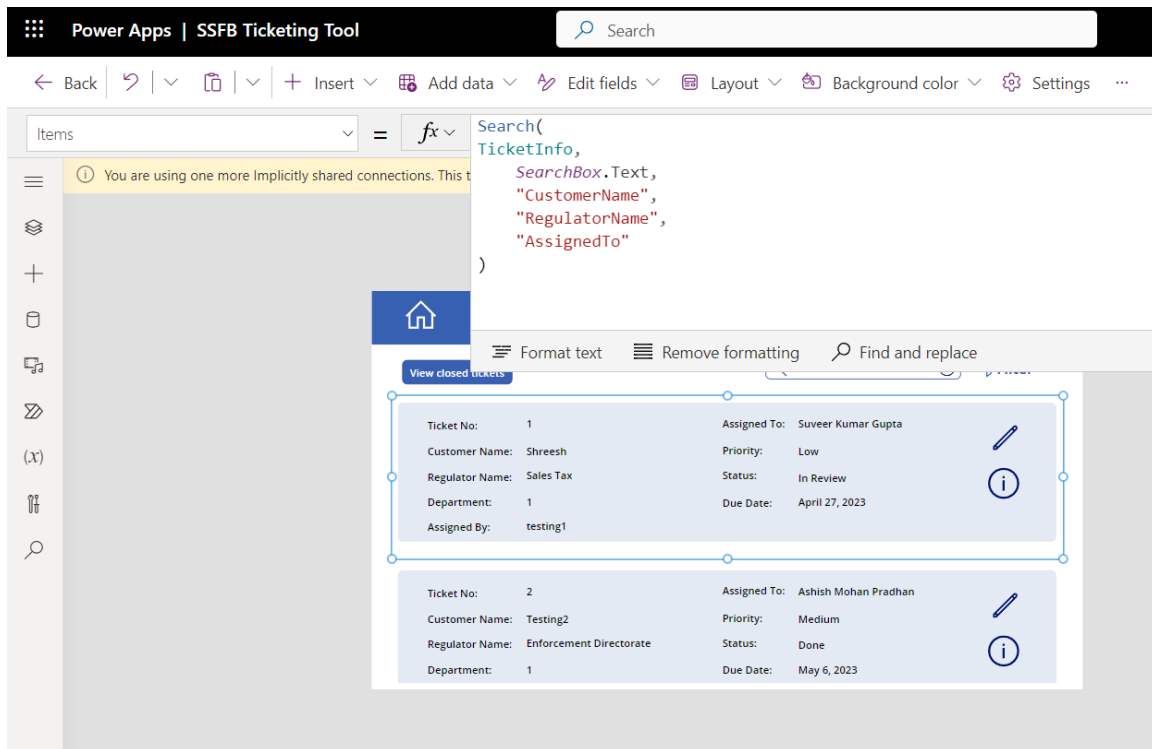
Fig 5.3*: Search Box Logic, Power FX*

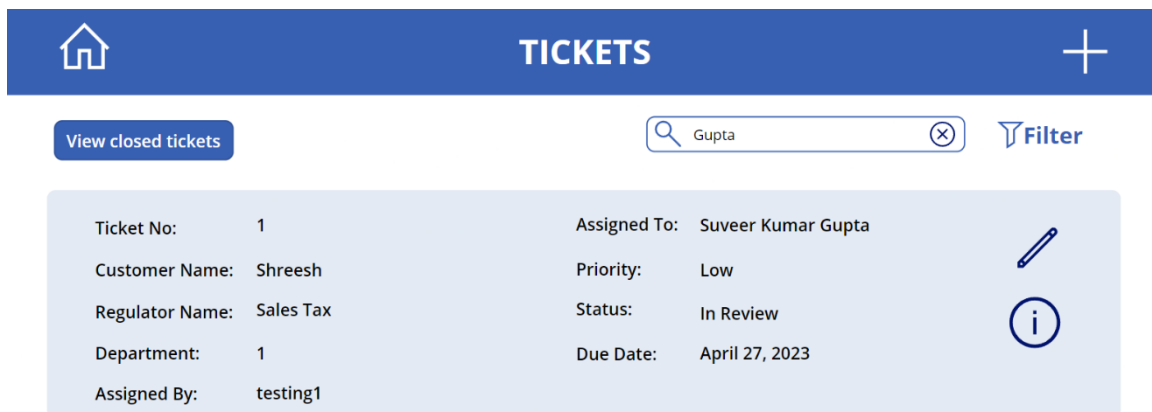***Fig 5.4*** *Search Box in View Ticket Screen*

5.2.2 Filter Tickets

When there are a lot of tickets present on the Ticket Screen, it will take a lot of time for the user to find all the Pending Tickets so for that, a filter is also present in the Ticket Screen. Users can filter out the tickets based on the following conditions:

- Priority
- Status
- Regulator Name
- Department

Fig 5.5 *Filter Menu in View Ticket Screen*

The logic behind the filter function can be seen in the below image:

```
Search(
    If(
        UserType = "E",
        Filter(
            TicketInfo,
            Priority_drp.Selected.Value = Blank() Or Priority = Priority_drp.Selected.Value,
            Status_drp.Selected.Value = Blank() Or CurrentStatus = Status_drp.Selected.Value,
            Regulator_drp.Selected.Value = Blank() Or RegulatorName = Regulator_drp.Selected.Value,
            Department_drp.Selected.Value = Blank() Or Department = Department_drp.Selected.Value,
            If(
                UserType = "E",
                AssignedBy = UserEmail Or AssignedTo = UserEmail
            )
        ),
        Filter(
            TicketInfo,
            Priority_drp.Selected.Value = Blank() Or Priority = Priority_drp.Selected.Value,
            Status_drp.Selected.Value = Blank() Or CurrentStatus = Status_drp.Selected.Value,
            Regulator_drp.Selected.Value = Blank() Or RegulatorName = Regulator_drp.Selected.Value,
            Department_drp.Selected.Value = Blank() Or Department = Department_drp.Selected.Value
        )
    ),
    SearchBox.Text,
    "CustomerName",
    "RegulatorName",
    "AssignedTo"
)
```

Format text   Remove formatting   Find and replace

Show scrollbar   On

Fig 5.6 *Logic Behind Filter Menu, Power FX*

50

5.2.3 Change Password

In order to improve the application's user experience, there is an option to change the password as well. If any user feels like their password has been compromised then they can change their password very easily. The Change Password option is present in the Home Screen under the tab of More Options.

The user can simply click on the Change Password Button and fill out the following fields:

- Current Password
- New Password
- Confirm Password

After filling out all the details their Password will be changed in the SQL Server. They can simply use the new password the next time to Sign In.
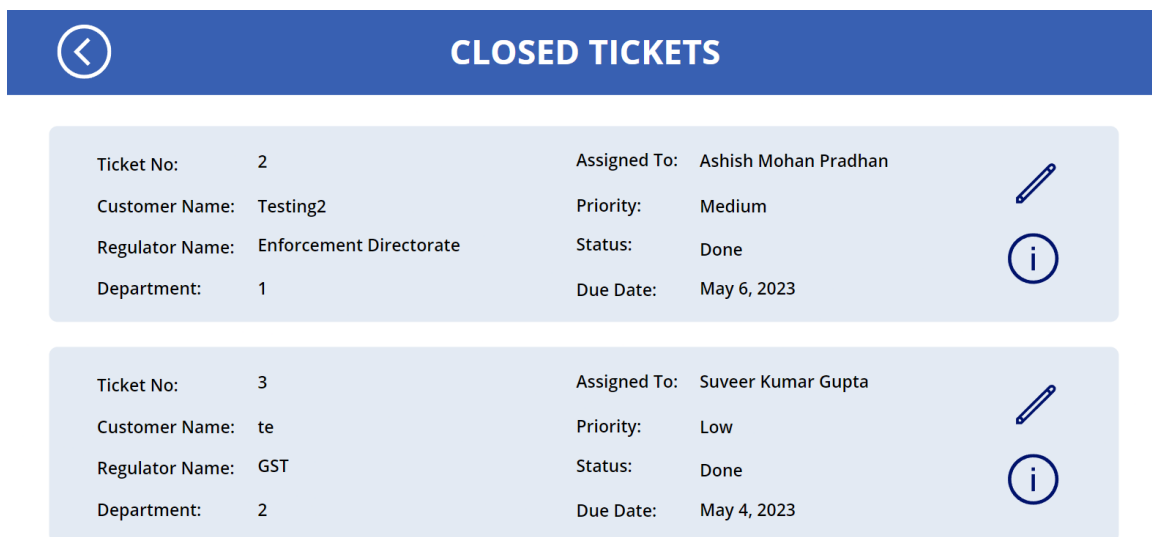

Fig 5.7 *Home Screen*

5.2.4 Some Other Screens

Sign Out Screen

Fig 5.8 *Sign out Pop-up*

Closed Ticket Screen

Fig 5.9 *Closed Tickets Screen*

5.3 Future Scope

In the future, the following features can be added to the application to make it even better:

1. Two Factor Authentication can be added for the Log-In, so that application becomes more secure.
2. The database can be shifted from SQL Express to Microsoft Azure i.e. on the cloud so that users can access the app from their PCs as well.
3. Make the application more extensive

CHAPTER 6 - CONCLUSION

The problem with manual procedures in the existing system is addressed by this application in the organization of Shivalik Bank. We have developed an application that registers the ticket and tracks its status in an efficient manner. All the details about the tickets are also securely stored in the Bank's SQL Server which is highly secure.

This application will also help the organization by meeting the deadline to close the ticket as it keeps notifying the concerned authorities well within the timeline. In case the deadline is not met, the concern is raised to the compliance team about that particular ticket. Due to the regular reminders, the ticket is monitored and closed on time which helps the organization as it prevents them from paying fines and penalties to the regulators.

Hence, the Ticketing Tool Application is a one-stop solution for all ticket-related queries in the organization.

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