

Automated Ticketing System Design Manual

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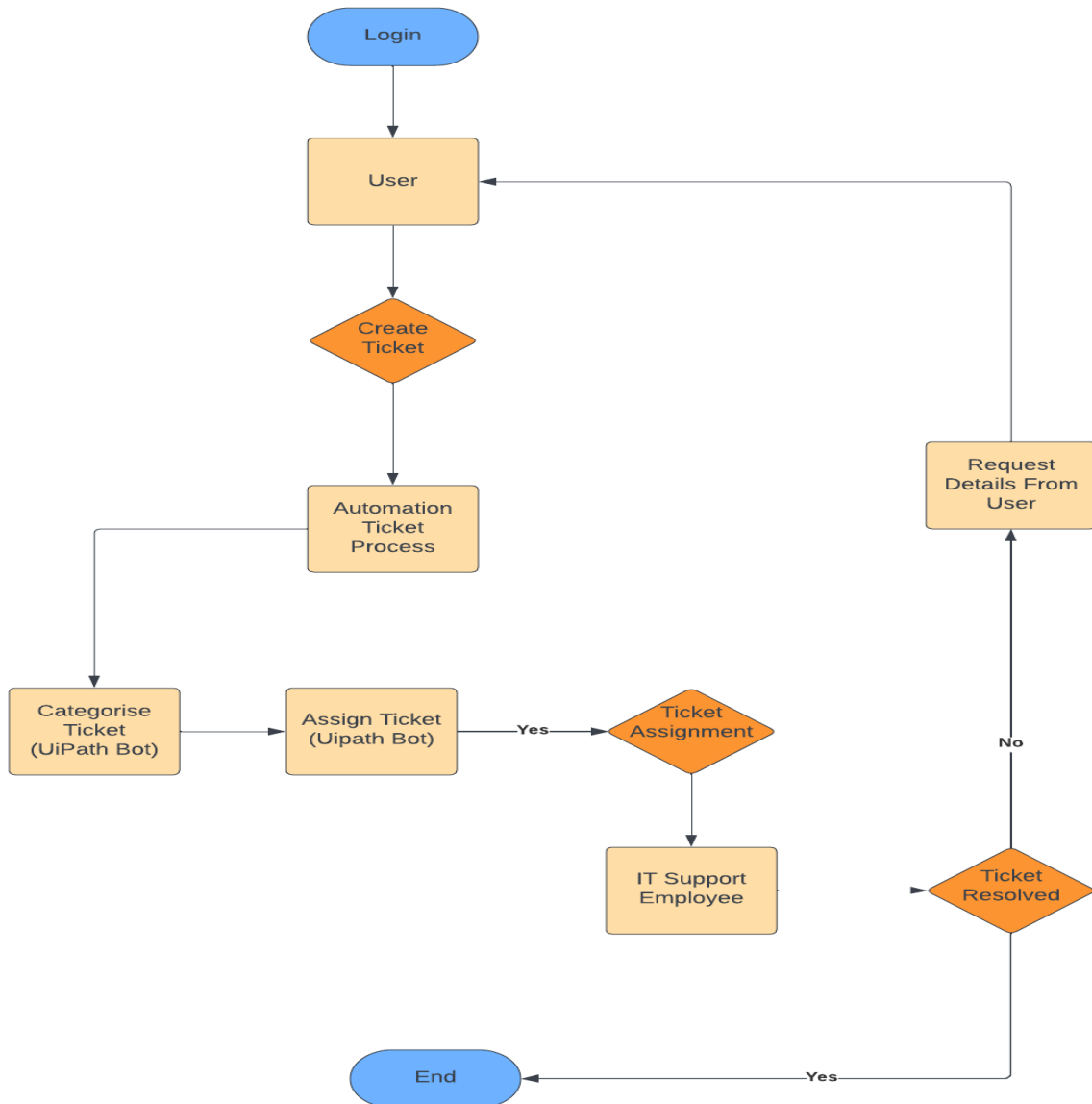
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Model Of Application

System Flow Diagram

The following flow diagram shows the process of a user logging into the system up until the process of a ticket being resolved.



System Components

The system consists of the following components

- **Web application front-end:** the front end is the part of the system that users interact with. It provides the users with the ability to create tickets, view the status of the tickets and communicate with support agents.
- **Back-end:** the back end processes the information received from the front end e.g. ensure that email and password are valid.
- **Database:** The database stores all of the ticket data, including the ticket description, priority, status, and assigned agent

Technology Stack

Frontend

Framework: Angular

Angular is a development platform that is built on TypeScript. Angular includes the following for development:

- A component based framework that is used for building scalable web applications
- It includes libraries that have a wide range of features including, routing, forms management and client-server communication

Backend

Language: C#

C# is an object-oriented programming language that runs on the .NET Framework. C# can be used for the developing the following:

- Web applications
- Web sites
- Desktop applications
- Mobile applications

Automation and Ticketing System

Robotic Process Automation (RPA): UiPath

UiPath is a leading RPA platform that enables the automation of repetitive tasks. In the context of the automated ticketing system, UiPath is utilized for automating ticket creation, categorization and assignment.

Integration Of Technologies

Frontend-Backend Interaction

Angular interacts with the C sharp backend through APIs. The frontend sends requests to the backend, which processes the requests and returns the data.

Backend-UiPath Integration

The C sharp backend communicates with the UiPath processes using integration methods. This integration ensures that there is a flow of data between the backend logic and UiPath bots.

Shared Data Storage (Database)

A shared databased will be used to store and retrieve data that needs to be accessed by both the frontend (Angular) and backend (C#). This shared storage serves as a centralized repository for ticket information and system configuration

How the Application Will Be Used

Users can access the automated ticketing system through a web browser (portal) using their credentials (email and password).

Once a user is logged in, they can create a new ticket by filling out a form with the following information:

- Ticket subject
- Ticket priority
- Ticket description

The system will then automatically route the ticket to the appropriate support team. The support team can then view and respond to the ticket.

Users can track the status of their tickets by logging in to the system and viewing the "My Tickets" page. This page shows a list of all of the user's tickets, along with their current status.

Ticket Description

Within the content of a business or organisation, a ticketing issue refers to a problem, request or an inquiry that is raised by a user or customer that requires resolution or assistance from an IT team or support within the organisation. It is the interaction between a customer and service representative. These issues can come from various channels such as email, live chat or a customer support portal that involves tracking, assignment and resolution. A ticket is resolved once the issue is fixed.

Ticket Issue Examples

Hardware

Hardware issues can involve issues such as malfunctions or problems with devices such as laptops or phones.

Software

Software issues can include problems with software applications or system malfunctions. Examples of the types of tickets that could be raised include software errors or connectivity issues.

Access Requests

Users may require special access to specific applications or systems based on their role or responsibilities.

Onboarding Issues

New hires may need to submit tickets to request necessary equipment such as laptops, phones or any other necessary office equipment.

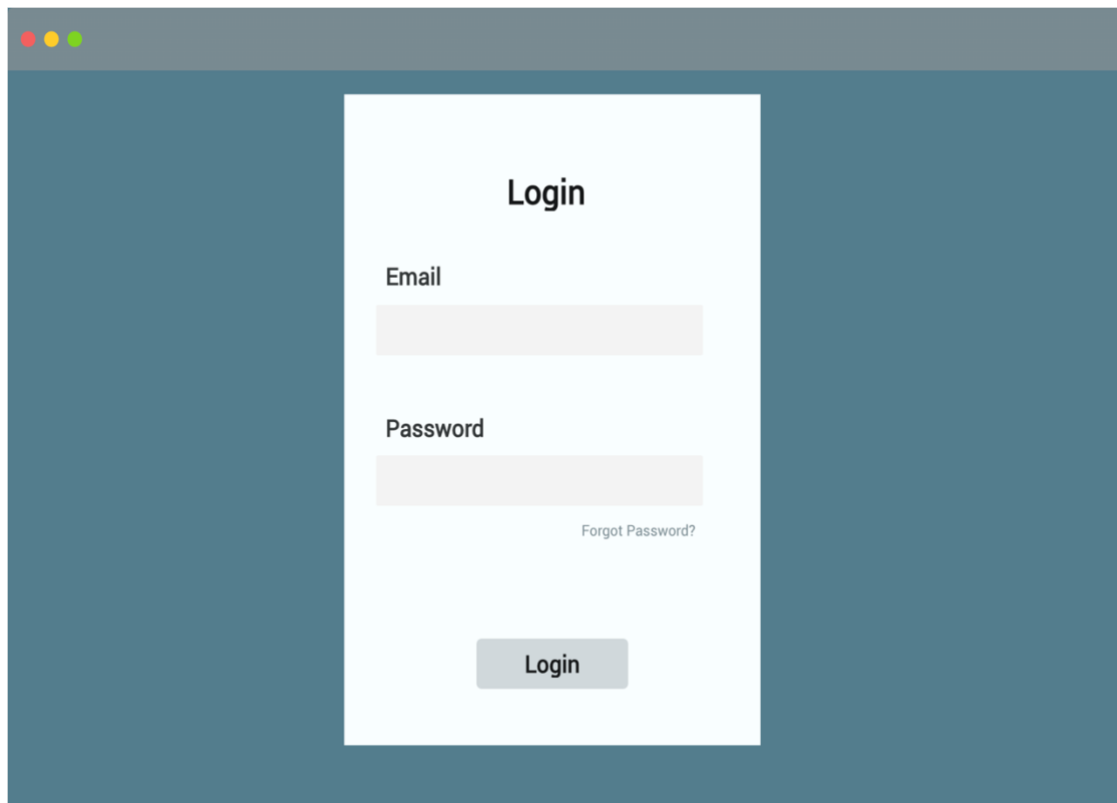
Steps to Using the Automated Ticketing System As A User

Step 1: Log in to the portal

Example employee for scenario: John Smith

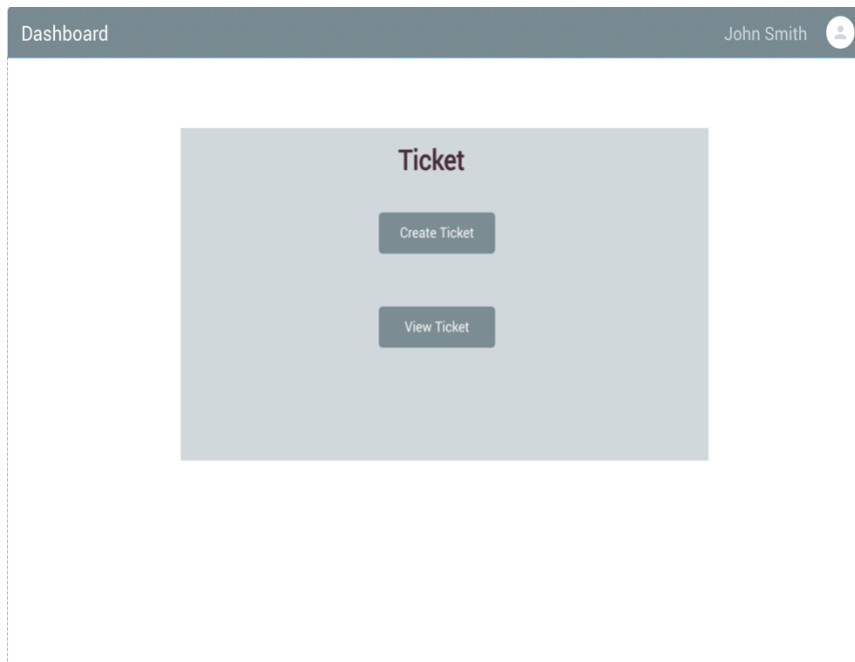
Example department: Sales

John Smith logs into the companies portal using his credentials. He is then presented with an option to “Create ticket”.



The image shows a screenshot of a web browser window displaying a login form. The browser's title bar is visible at the top with three colored window control buttons (red, yellow, green). The login form is centered on a dark blue background. The form itself is white and contains the following elements:

- The word "Login" in a bold, black font at the top center.
- The label "Email" followed by a light gray rectangular input field.
- The label "Password" followed by a light gray rectangular input field.
- The text "Forgot Password?" in a smaller, gray font, positioned below the password field.
- A gray rectangular button with the word "Login" in black text, centered at the bottom of the form.



Step 2: Providing ticket details

After John clicks on the "Create ticket" button. This action opens a new ticket creation form. In this form, John will provide the following information:

- **Subject:** Title of the issue
- **issue description:** John provides a description that says "Monitor isn't working correctly." The bot uses keyword recognition to identify the keywords "monitor" and "isn't working," categorizing the ticket as a "Hardware" issue.
- **Priority level:** He selects "high" for the issue.
- **Attachment:** John can attach an image of his issue if he chooses to do so.

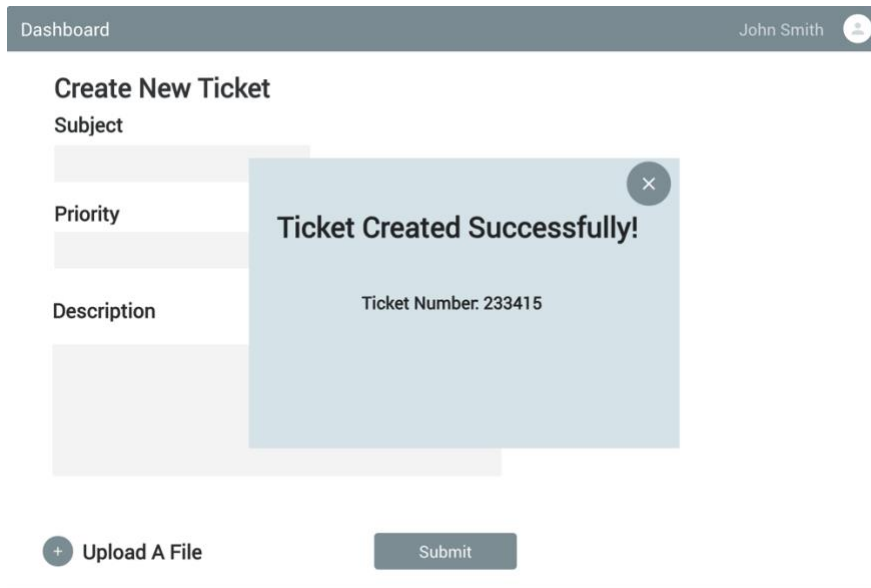
John then clicks the "Submit" button to submit the ticket.

A screenshot of a "Create New Ticket" form. The form is contained within a white box with a light grey border. At the top of the form, the title "Create New Ticket" is displayed. Below the title, there are three input fields: "Subject", "Priority", and "Description". Each field is represented by a light grey rectangular box. At the bottom of the form, there are two buttons: a dark grey button with a white plus sign and the text "Upload A File", and a dark grey button with the text "Submit". The background of the form is white, and the overall layout is clean and modern.

In this scenario, the category is automatically determined based on the issue description using keyword recognition. This simplifies ticket creation for users and can help prevent users from selecting the wrong category.

Step 3: Confirming ticket and notification

John receives a notification to confirm that his ticket has been successfully created. John is also given a ticket number.



The screenshot shows a web interface for creating a new ticket. At the top, there is a dark grey header with 'Dashboard' on the left and 'John Smith' with a user icon on the right. Below the header, the main content area is titled 'Create New Ticket'. It contains three input fields: 'Subject', 'Priority', and 'Description'. A light blue notification box with a close button (X) is overlaid on the form, displaying the text 'Ticket Created Successfully!' and 'Ticket Number: 233415'. At the bottom of the form, there is a '+ Upload A File' button and a 'Submit' button.

Step 4: Tracking

John can now track his ticket and check its progress through the portal. John can see the tickets category (Hardware) and if it's assigned.

Step 5: Automation Assignment

The UiPath bot categorizes the ticket and identifies the issue (Hardware), it then assigns the ticket to the IT support team responsible for hardware-related issues.



The above is the view of John Smith's tickets after his ticket has been categorised and assigned.

Step 6: IT Support Team Is Notified

An automated notification is sent to the IT support team, this alerts them that a new ticket has been assigned to their queue. The notification includes the ticket details and the issue description provided by John.

Step 7: Ticket resolution

The IT support team reviews the ticket, contacts John for further details if needed, and works on resolving the issue. Once the issue is resolved, they update the ticket with the resolution details.

Step 8: Closure for Johns ticket

After the issue is resolved, John receives a notification that his ticket has been marked as "Resolved." The notification includes a summary of the resolution and asks for his feedback on the support experience.

In this example scenario, John successfully logs a support ticket for a hardware issue, and the automated ticketing system guides the process from ticket creation to resolution.

Steps to Using the Automated Ticketing System As An IT Support Employee

Step 1: Notifications to support team

Example employee for scenario: Alex

Example department: Technical Support

Step 1: Notification to support team

- Alex begins with logging into the portal. Upon logging in, he notices a notification indicating a new ticket has been assigned to his team

Step 2: Ticket Details

- Alex begins with reviewing the tickets details. The ticket is categorised as a “Hardware” issue, and the description provided by John states that his monitor isn’t working correctly. The priority level is marked as “high”.

Step 3: Communication with the user

- Alex decides to send a message to John to request more information. He asks John for details about the issue surrounding the monitor's problem. John responds with additional details such as the monitor is not displaying anything on its screen.

Step 4: Troubleshooting

- Alex determines the issue is hardware related. He proceeds to provide John with a resolution plan which involves checking connection cables, trying a different monitor or scheduling a technician to inspect the hardware.

Step 7: Issue Resolution

- Following the resolution plan, John follows the instructions provided by Alex. If the issue is resolved through troubleshooting, Alex marks the ticket as "Resolved." If further action is needed, he updates the ticket with details about the next steps (i.e. if a technician is required to be sent to Johns home or removal of the equipment)

Step 8: Closure and Feedback

- (If resolved) John receives a notification that his ticket has been marked as "Resolved." The notification includes a summary of the resolution steps.

Step 9: Record Keeping

- The support ticket is saved in the system's database for reference and audit purposes. It includes information about the tickets issue, the steps taken for resolution, who it was assigned to, the date it was created.

UiPath RPA Description

UiPath is a Robotic Process Automation (RPA) platform. RPA allows organisations to automate repetitive tasks through software robots. These bots can perform tasks such as collecting and interpreting data, document processing and workflow automation. RPA are configured to mimic human-like interactions within software applications. These bots can interact with various applications and systems in the same way that human user would if they were entering data, clicking buttons and navigating throughout interfaces

In the context of the automated ticketing system, UiPath is utilized to automate the process of ticket categorization and assignment, allow for efficiency and reducing manual intervention

Why UiPath over any other tool

There are many other tools available on the market such as Automation Anywhere and Blue Prism. However, for this specific problem at hand, UiPath has been chosen as the preferred tool. Below are the reasons for this selection:

1. Efficiency:

Allows businesses to automate tasks that are repetitive and time consuming.

2. Accuracy:

UiPath bots are highly accurate in their execution. By using UiPath in the ticketing system, we can ensure precise categorization and assignment of tickets which can help with reducing risk of errors with a manual process.

3. User-Friendly:

UiPath requires low coding skills, which makes implementing it and training employees less time consuming. UiPath is accessible to a broader range of users. UiPath is designed to cater to various user personas across the automation lifestyle. Some examples of these users are software engineers, product owners and business technologists.

The points above outline UiPath's strengths in terms of efficiency and accuracy. For more information on UiPath or RPA, links will be provided in the 'References' section of this document.

UiPath Studio is an integrated development environment (IDE) where users can design, build and test automation workflows. It makes it easier to automate complex systems due to its features and capabilities that simplify the automation development process. Below are some key features of UiPath.

Key Features of UiPath include:

Workflow Drag-and-Drop Interface: UiPath allows users to design automation workflows by creating tasks, events and steps in an automation process using icons that that you can drag and drop into your workspace.

Robotic Process Automation: UiPath bots can perform a wide range of tasks, such as data entry, data extraction, form filling, and more. The bots interact with applications and systems just like a human user would.

Recording and Playback:

- **Recording:** UiPath provides a recording feature that allows users to record their interactions with applications. This includes mouse clicks, keyboard inputs, and other actions.
- **Playback:** Recorded actions can be played back by UiPath bots to automate the same series of steps. This feature is particularly useful for automating repetitive tasks quickly.

Flexibility and Customization: UiPath enables users to customize automation workflows with the flexibility to include conditions statements and exception handling. This ensures that the automation meets specific business requirements.

Advanced Scraping Options:

- **Data Scraping:** UiPath provides a Data Scraping Wizard that allows users to extract structured data from websites, applications, or documents. This is useful for automating data entry tasks.
- **Screen Scraping:** UiPath offers advanced screen scraping options to extract information from graphical interfaces, including legacy systems and PDF's. This feature has been optimised to work with almost any program such as SQL, Java and .NET.

Assembly Line Automation with Two UiPath Bots

Description for the two bots used for the automated ticketing system:

- **Bot for Categorization:**
 - **Role:** This bot is dedicated to the initial categorization phase of the automated ticketing system. Its primary responsibility is to analyse the issue descriptions provided by users and categorize the tickets based on predefined keywords. It acts as the first step in the assembly line, determining the nature of each support ticket.
 - **Operation:** Utilizing UiPath Studio's visual programming interface, this bot employs a custom code script to perform keyword recognition.
- **Bot for Assigning Tickets:**
 - **Role:** The second bot takes over from where the categorization bot left off. Its primary task is to assign the categorized tickets to the appropriate support teams or departments. This bot plays a crucial role in ensuring that the right specialists handle each ticket efficiently.
 - **Operation:** Using UiPath Studio, this bot retrieves the categorized tickets from a database, processes each ticket, assigns it to the relevant team, and updates the ticket status accordingly. This completes the assembly line, providing a streamlined workflow from categorization to assignment.

Keyword Recognition

Keyword recognition refers to the process of identifying specific words or phrases within a text or document. It is a text analysis technique that helps with identifying the most important words and expressions from a text. These keywords are typically predetermined and chosen based on their relevance to a particular context, topic, or category.

In the context of the provided UiPath script for ticket categorization, keyword recognition is used to analyse the issue description provided by a user when creating a ticket. The script checks for the presence of certain keywords related to different categories (e.g., hardware, software, network) to determine the appropriate category for the ticket.

UiPath Script for Ticket Categorization

```
// UiPath Script for Ticket Categorization

Input: issueDescription (String)
Output: category (String)

// Define keywords for different categories
hardwareKeywords = {"monitor", "hardware", "computer", "printer"}
softwareKeywords = {"software", "application", "bug", "error"}
networkKeywords = {"network", "internet", "connection"}

// Initialize category with a default value
category = "General"

// Check for keywords in the issue description and assign category
If ContainsKeyword(issueDescription, hardwareKeywords) Then
    category = "Hardware"
ElseIf ContainsKeyword(issueDescription, softwareKeywords) Then
    category = "Software"
ElseIf ContainsKeyword(issueDescription, networkKeywords) Then
    category = "Network"
End If

// Output the category
category
```

Explanation for the above script:

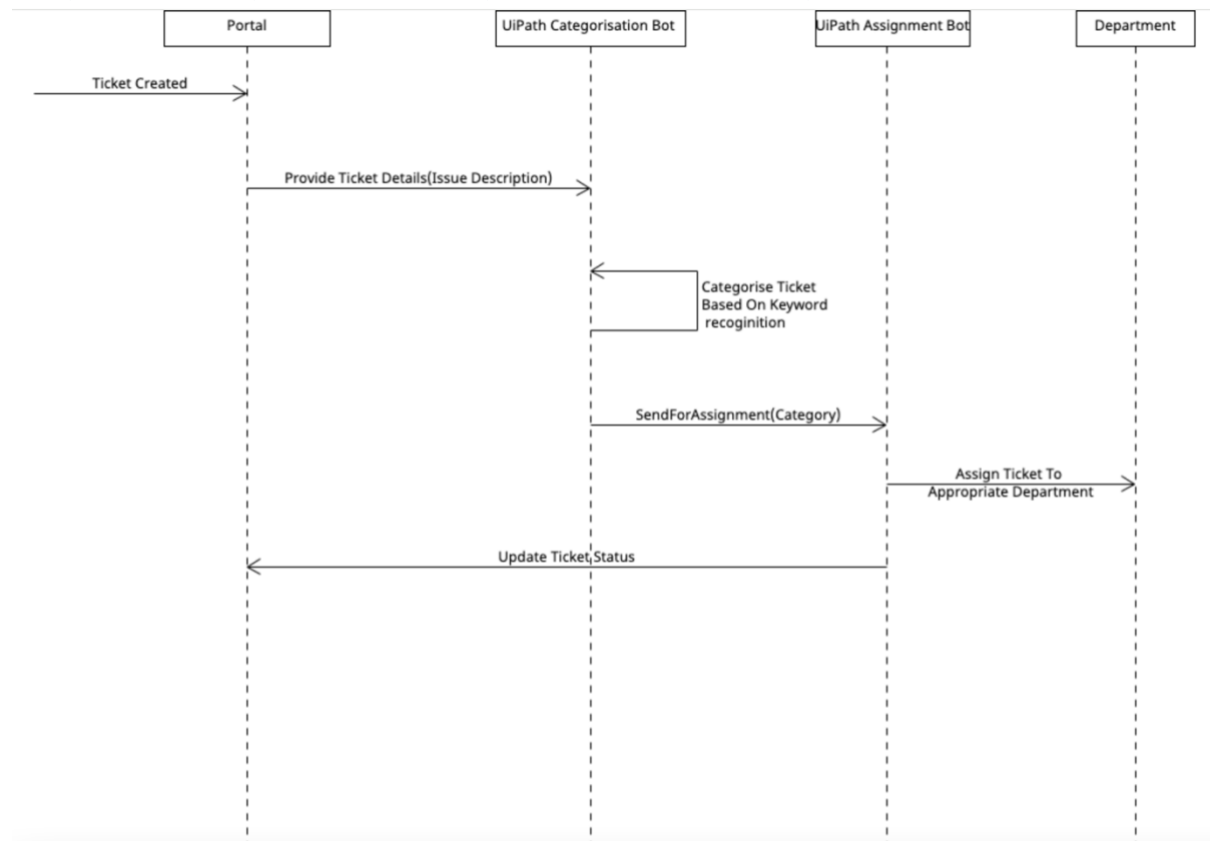
1. **Input and Output:** The script takes an **issueDescription** as input (the text of the ticket) and outputs a determined **category** based on keyword recognition.
2. **Keyword Definition:** The script defines arrays (**hardwareKeywords**, **softwareKeywords**, **networkKeywords**) containing keywords associated with different ticket categories.
3. **Category Initialization:** The **category** variable is initialized with a default value ("General").
4. **Keyword Recognition:** The script checks if the **issueDescription** contains keywords associated with specific categories. If a match is found, the **category** variable is updated accordingly.
5. **Output:** The determined **category** is the output of the script.

This script automates the categorization of tickets based on the presence of specific keywords in the issue description. The implementation of keyword recognition in the script is crucial to automating the ticket categorization process.

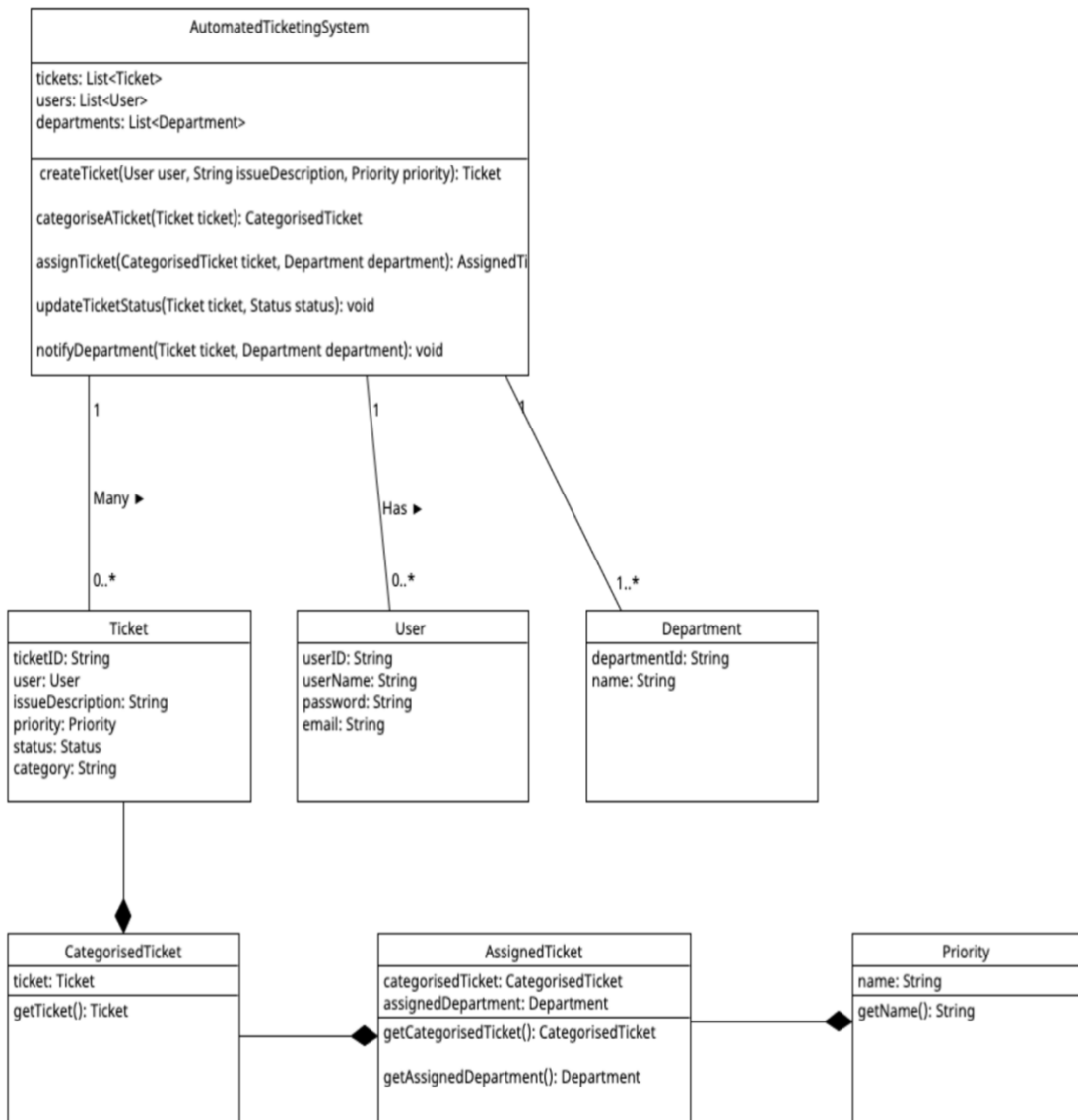
Use Case Scenario

In this scenario, imagine that a user submits a ticket with the issue description "Printer is not functioning". The script, through keyword recognition, identifies the keyword "Printer" and categorizes the ticket as a "hardware" issue.

Sequence Diagram for Categorisation and Assignment



Class Diagram For System



Use Cases For Bots

Brief Use Cases

Process Ticket Information

Actors: Automated ticketing system (UiPath bot)

Description: this use case begins when a new ticket has been created. The UiPath bot then processes the ticket information, such as categorizing the ticket.

Categorize Ticket

Actors: Automated Ticketing System (UiPath bot)

Description: The UiPath bot automatically categorizes newly created tickets based on their issue descriptions using keyword recognition.

Detailed Uses Cases

Process Ticket Information

Actors: Automated ticketing system (UiPath bot)

Main Success Scenario

Preconditions:

- A ticket was successfully created
 - The UiPath bot is functioning correctly
1. The UiPath bot retrieves the ticket information from the system
 2. The UiPath bot categorises the ticket using keyword recognition.
 3. The UiPath bot assigns the ticket to the department that is responsible for the ticket category.
 4. The UiPath bot updates the ticket status to “Assigned”.
 5. The UiPath bot then sends a notification to the assigned department informing them that they have been assigned a new ticket.

Categorize Ticket

Actors: Automated Ticketing System (UiPath bot)

Main Success Scenario:

1. The UiPath bot retrieves the details of the newly created ticket from the system.
2. The bot analyses the issue description of the ticket using keyword recognition.
3. Based on the identified keywords, the bot assigns a category to the ticket (e.g., hardware, software, network).
4. The categorized ticket is updated with the assigned category

Database tables columns

User tables

UserID (primary key)

Username

Email

Department

Role (e.g. IT Support, Sales, Administrator)

Ticket tables

TicketID (Primary key)

UserID(foreign key)

Subject

Description

Priority (e.g. High, medium, low)

Status (e.g. assigned, resolved, closed)

AssignedTo (foreign key)

DateCreated

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