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OBJECTIVES

➤ Introduction to the problem being solved and our intended solution

➤ Discuss the Use Case Model *(Use Case Diagram, Use Case Description and Activity Diagram)*

➤ Discuss the Domain Model

PROBLEM DEFINITION

The University of the West Indies sits on 653 acres of land and houses seven faculties and has a population of approximately 19,000 students. While traversing this vast estate, students and staff face various issues such as extreme weather conditions, being late for class and fatigue. On the other hand, walking is beneficial to remaining fit and it is a good source for exercise, however this benefit can be overshadowed by the aforementioned issues.

PROPOSED SOLUTION

➤ In order to alleviate the issues raised and retain the benefit of exercise, the solution of a bicycle transportation system was implemented. The system, called **Rent A Bike (RAB)**, allows users to rent a bicycle via an app for a period of time of their choosing. This improves the efficiency and reduces the hassles of navigating the campus.

➤ Users can create an account in order to access the services the system provides. This will be done by using their UWI ID numbers to restrict access from those not affiliated to the university. After being enrolled the customer can select a bike of their choosing by entering a unique code attached to each bike. The amount of time a bike is assigned to a customer is used to calculate the amount to be paid after each journey.

PROPOSED SOLUTION

➢ The bikes are stationed at bike racks at each faculty which is used to determine when a bike is taken or returned; this helps the system list bikes available to each user. At the end or during a rental users can report faults or incidents as well as rate their experience.

➢ The RAB system will enable the collection of user data for account creation, payment processing, and system updates when a user takes or returns a bike. Smart racks located at each faculty will automatically detect when a bike is taken or returned, while user input within the mobile app will help synchronize the system's records. These combined inputs will be used to track rental durations and calculate service costs accurately. Additionally, the system provides real-time availability updates and supports fault reporting and user feedback to enhance service quality.
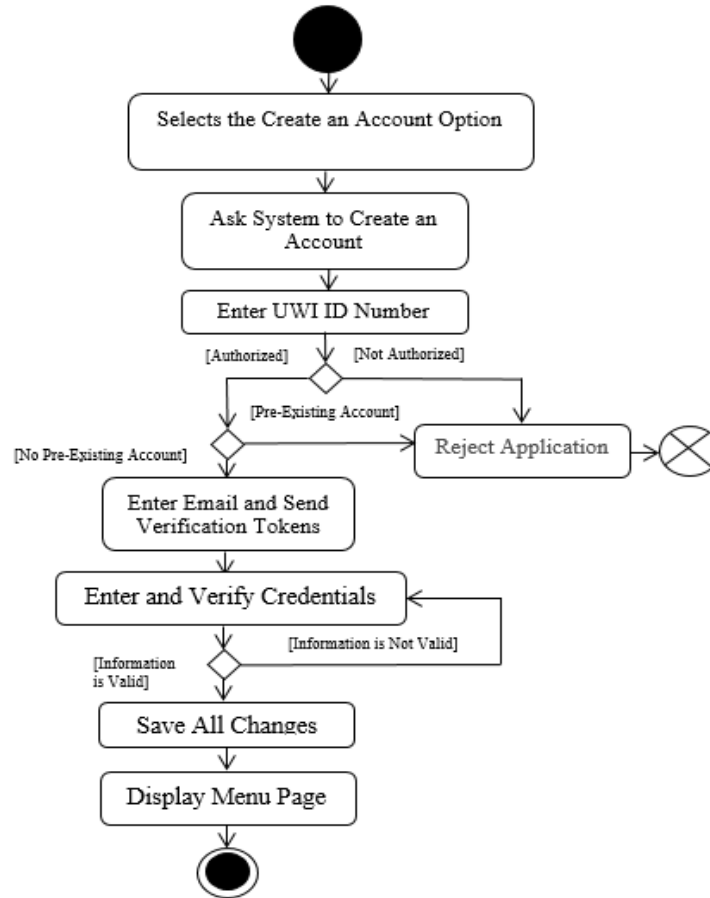
USE CASE MODEL

USE CASE DIAGRAM
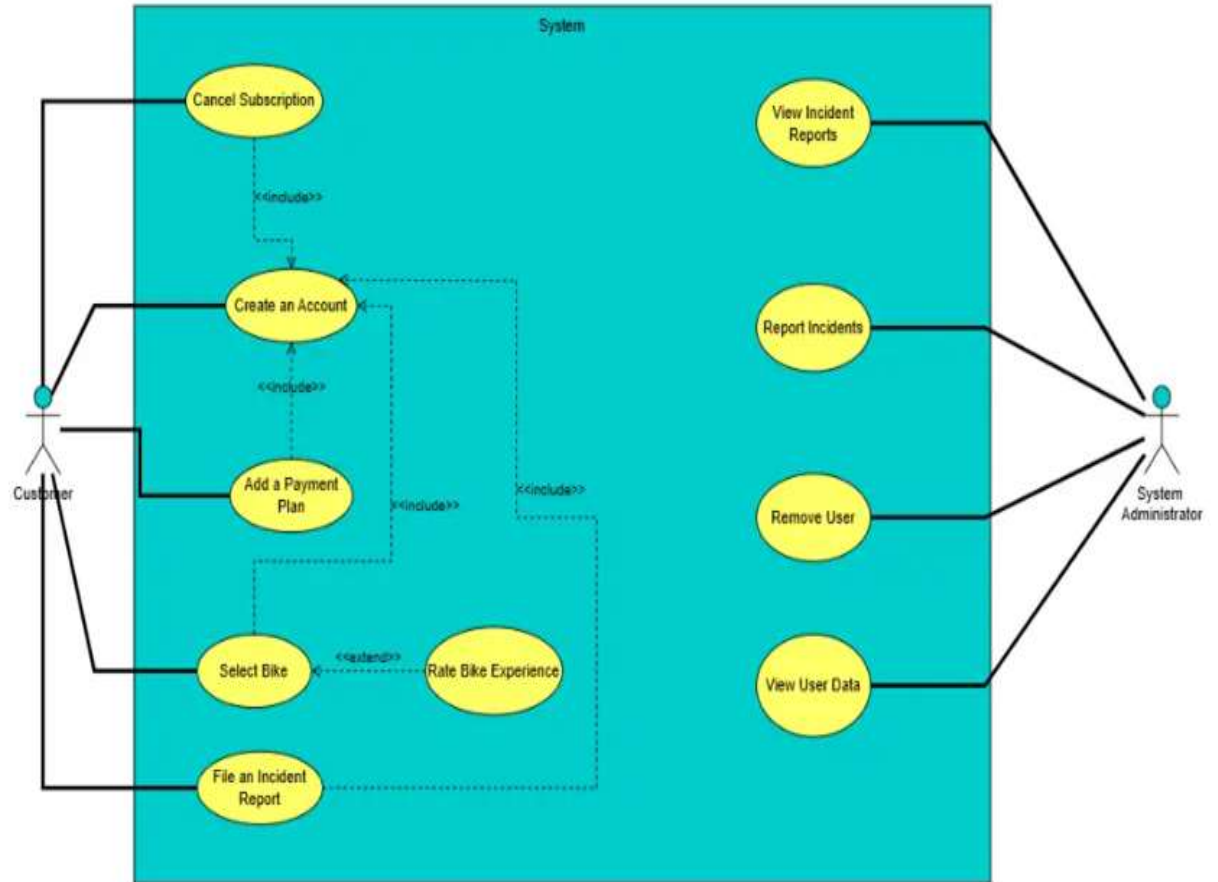
USE CASE DESCRIPTION

Requirement 1: Create an Account

Use case name	Create an Account
Related Requirements	Requirement 1
Goal in Context	Allows users to be able to create an account are given access through their UWI ID
Preconditions	The user had a UWI ID
Successful End Condition	Users are able to create an account, access their account using their UWI ID and access the services the system provides
Failed End Condition	Users' applications were denied
Primary Actors	Users with a UWI ID
Secondary Actors	System Admin
Trigger	The user selects the option to create an account

Main Flow	Step	Action
	1	The user selects the option to create an account.
	2	The system shall require the user to enter their UWI ID number.
	3	The system shall verify that they are in fact a UWI student or staff member.
	4	The system shall check the user's ID number to verify that they are not already attached to a pre-existing account.
	5	The system shall prompt the user to enter an email.
	6	The system shall send verification tokens to the user's email.
	7	The system shall allow the user to enter their information.
	8	The system shall allow the user to confirm information entered and save all changes.
	9	The system shall display the menu page to the user.

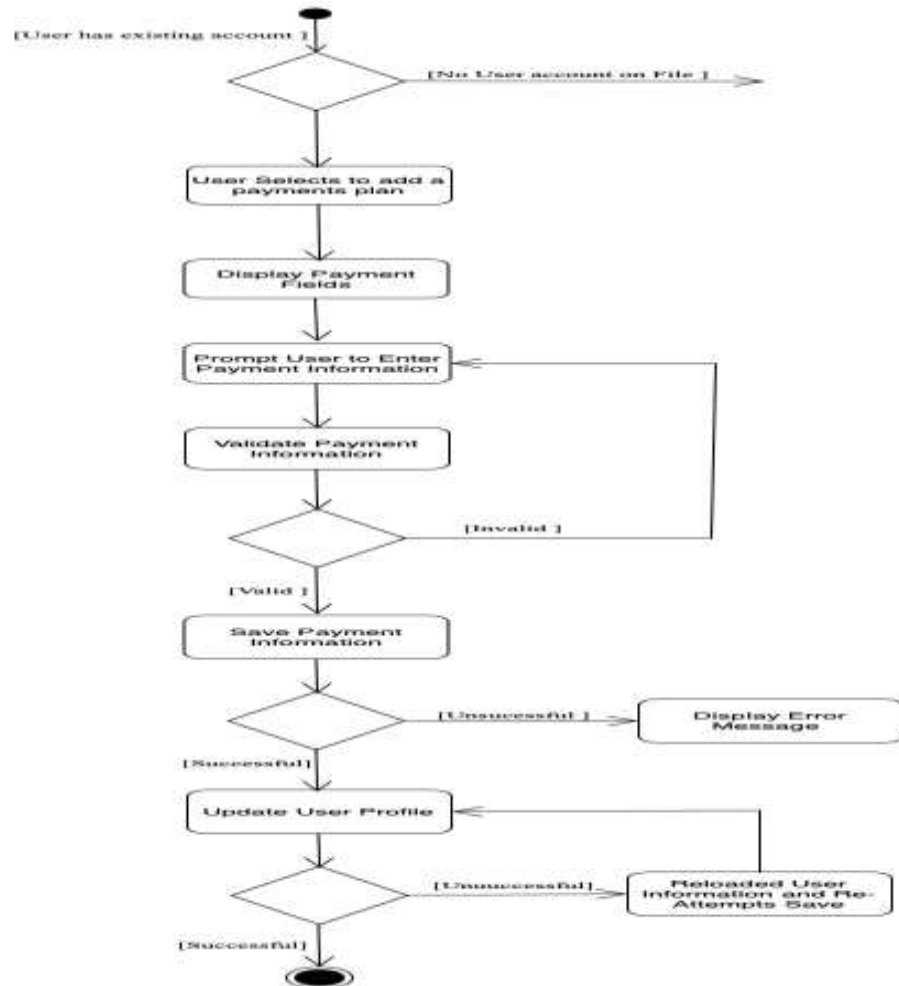| Extensions	Step	Action
	3.1	ID is invalid and the system tells the user that their application has been rejected.
	4.1	ID number is already attached to a pre-existing account and the new application is rejected.
	8.1	User's information was not confirmed and the system allows users to re-enter information.

ACTIVITY DIAGRAM

Selects the Create an Account Option

Ask System to Create an Account

Enter UWI ID Number

[Authorized]   [Not Authorized]

[Pre-Existing Account]

[No Pre-Existing Account]

Reject Application

Enter Email and Send Verification Tokens

Enter and Verify Credentials

[Information is Not Valid]

[Information is Valid]

Save All Changes

Display Menu Page

Requirement 2: Add a Payment Plan

USE CASE DESCRIPTION

| Use Case Name	Add Payment Plan	
Related Requirements	Requirement 2	
Goal In Context	All users are required to enter a payment option in order to gain access to renting a bicycle	
Preconditions	User must have created an account in the system	
Successful End Condition	The payment plan is added and the user profile is updated with payment information	
Failed End Condition	The payment plan is not added and the user cannot access rental services	
Primary Actors	User	
Secondary Actors	Payment System	
Trigger	The user selects to add a payment plan	
Main Flow	Step	Action
	1	The user selects to add a payment plan
	2	The system shall display input fields for payment information to the user
	3	The user will enter their payment information
	4	The system shall validate the entered payment information
	5	The system shall save the payment information
	6	The system shall update the user's profile with the payment plan
Extensions	Step	Branching Action
	4.1	Payment information is invalid
	4.2	The system shall prompt the user to re-enter payment information
	5.1	The system fails to save payment information to file
	5.2	The system shall display an error message
	6.1	The system fails to update the user profile
	6.2	The system will roll back payment information save

ACTIVITY DIAGRAM

[User has existing account]

[No User account on File]

User Selects to add a payments plan

Display Payment Fields

Prompt User to Enter Payment Information

Validate Payment Information

[Invalid]

[Valid]

Save Payment Information

[Unsuccessful] → Display Error Message

[Successful]

Update User Profile

[Unsuccessful] → Reloaded User Information and Re-Attempts Save

[Successful]

Requirement 3: Select Available Bike

USE CASE DESCRIPTION

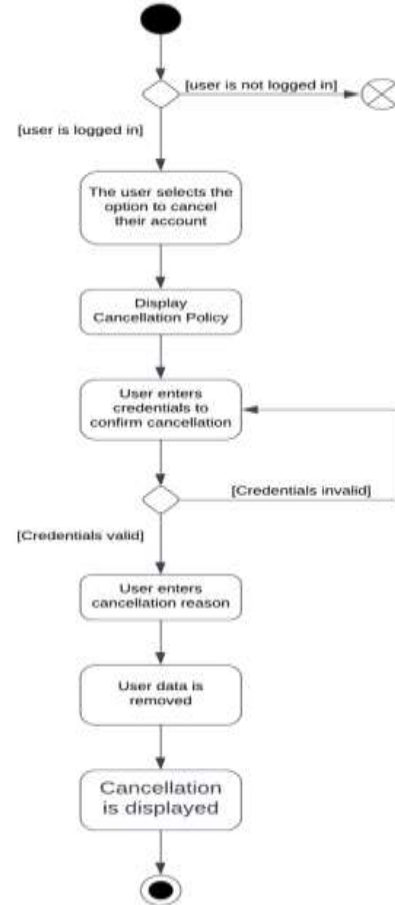| Use case name	Select Available Bike	
Related Requirements	Requirement 3	
Goal in Context	Allows users to select a bike of their choice from a list of available bikes.	
Preconditions	1.The user created an account to have access to the system. 2.A payment method was added to the user account.	
Successful End Condition	Users are now assigned a bike for their duration of travel.	
Failed End Condition	Users are unable to access a bike.	
Primary Actors	Users of the app with a UWI ID	
Secondary Actors	System Admin	
Trigger	The user selects the option to select an available bike	
Main Flow	Step	Action
	1	The user selects the option to select an available bike
	2	The users enter the code displayed on the bike into the code entry field.
	3	The bike is then linked to that particular user.
	4	The system then updates the list of bikes now available to other users.
Extensions	Step	Branching Action
	1.1	Users cannot select a bike due to payment issues.
	2.1	Bike was not linked to the user due to invalid code entered.

ACTIVITY DIAGRAM
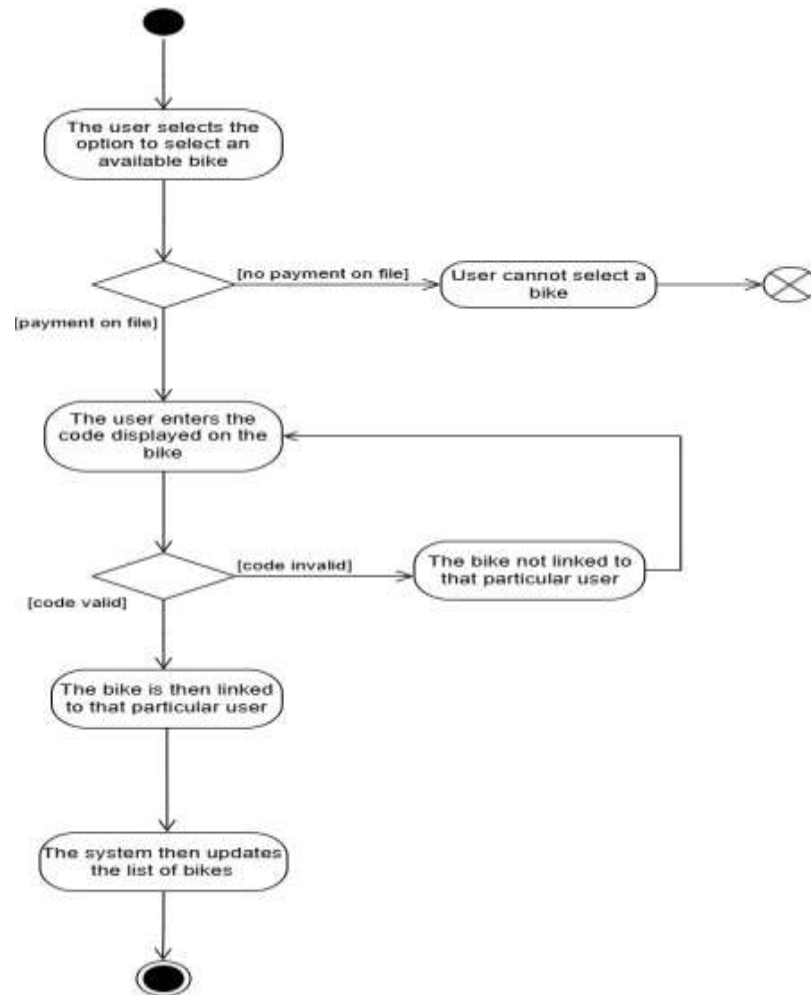
Requirement 4: Cancellation of Subscription

USE CASE DESCRIPTION

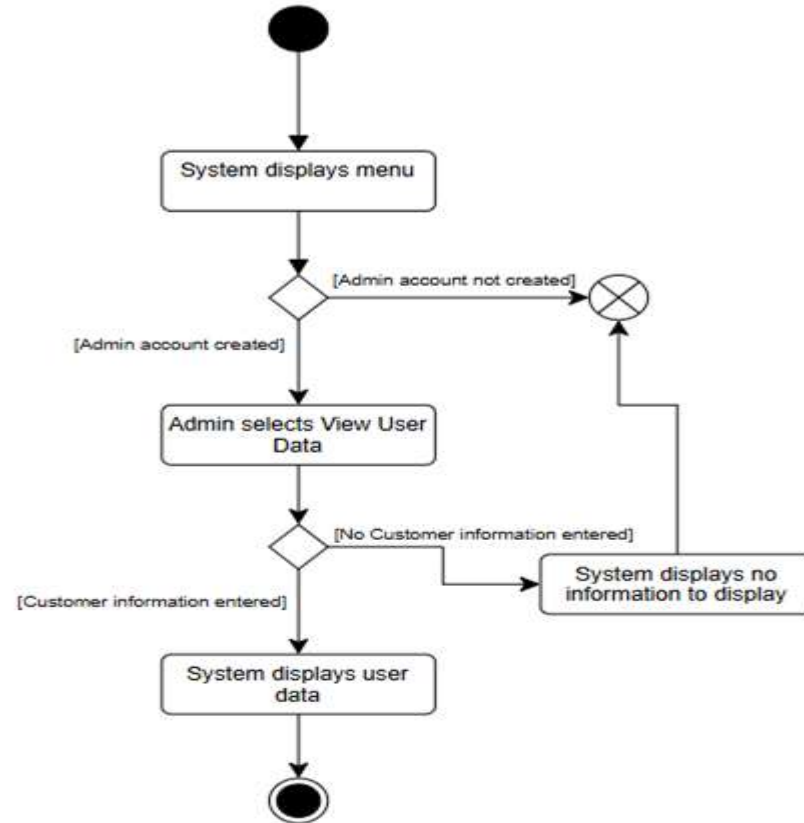| Use case name	Cancellation of Subscriptions	
Related Requirements	Requirement 4	
Goal in Context	Allow users shall be able to cancel their rental subscription/ user account from the file.	
Preconditions	1.The user has an active account and is logged into the system.	
Successful End Condition	The user's account is successfully canceled, and all user data is removed from the system.	
Failed End Condition	The user's account cancellation request is rejected.	
Primary Actors	Users of the app	
Secondary Actors	System Administrator	
Trigger	The user selects the option to cancel their account.	
Main Flow	Step	Action
	1	The user selects the option to cancel their account.
	2	The system shall display the cancellation policy to the user.
	3	The system shall ask the user to confirm that they want to delete their account.
	4	The system shall ask the user to re-enter their ID number and password to confirm the account to be deleted.
	5	The system shall prompt the user to enter the reason for their cancellation.
	6	The system shall remove their user data from the system.
	7	The system shall display that the cancellation was successful.
Extensions	Step	Branching Action
	1.1	The user's credentials are not verified and they are not logged in.
	4.1	The user's credentials are not verified and are asked to re-enter them.

ACTIVITY DIAGRAM

Requirement 5: View User Data

USE CASE DESCRIPTION

| Use case name	View User Data	
Related Requirements	Requirement 5	
Goal in Context	Allows admin users to be able to view information that customers enter into the system	
Preconditions	1.The user created an Admin account, which would be given access to all user data 2.Information must be inputted by the customer.	
Successful End Condition	Users are able to view customers' inputted data in a table.	
Failed End Condition	Users are unable to view the inputted information.	
Primary Actors	System Admin	
Secondary Actors	Users of the app (Customers)	
Trigger	The user selects the option to view user information.	
Main Flow	Step	Action
	1	The user selects the option to view user information.
	2	The system displays a menu containing the option of viewing user information.
	3	The user selects the option to view data.
	4	The system displays all data that was entered by that user in a table.
Extensions	Step	Action
	3.1	System tells the user that there is no information to be displayed

ACTIVITY DIAGRAM

Requirement 6: View Incident Report

USE CASE DESCRIPTION

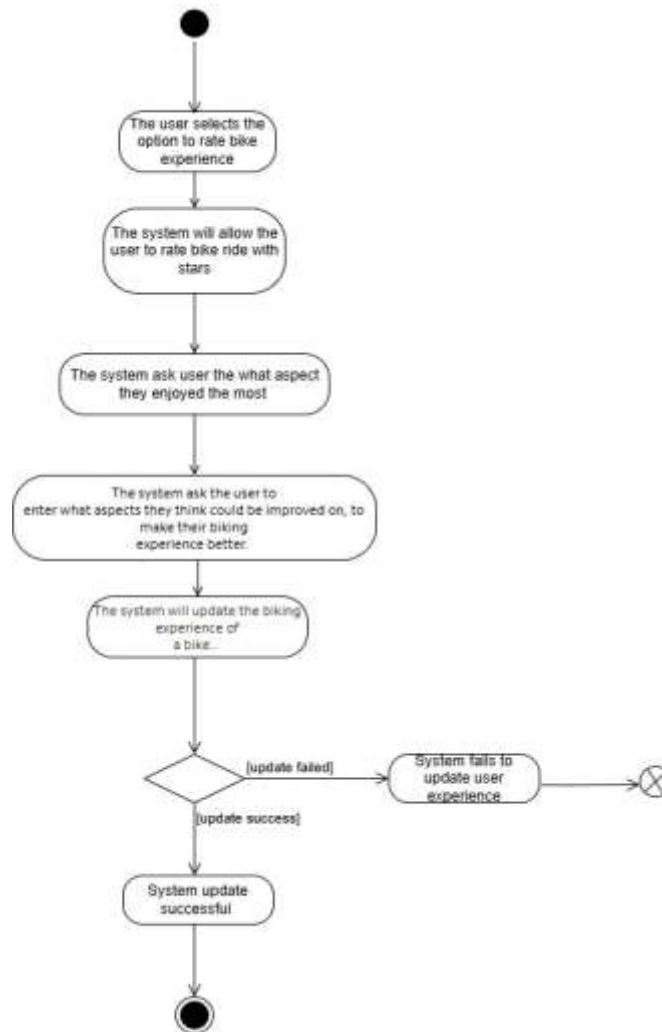| Use Case Name	Viewing incident report	
Related Requirement	Requirement 6	
Goal in Context	An administrator looks at a report of an incident submitted by an existing user	
Preconditions	1.User has an account 2.User accessing incident reports is an administrator 3.The incident report is completed	
Successful End Condition	Administrator accesses and inspects incident report	
Failed End Condition	User denied access to submitted incident reports	
Primary Actors	Administrator	
Secondary Actors	User of the app	
Trigger	Administrator selects the option to view submitted reports of an incident.	
Main Flow	Step	Action
	1	Administrator selects the option to view submitted reports of an incident.
	2	The system prompts the administrator to select an incident report
	3	The administrator selects an incident report
	4	The administrator's details are verified using the database.
	5	The administrator inspects incident report
Extensions	Step	Branching Action
	4.1	The database does not verify the administrator's details.
	4.2	The administrator is not given access to incident report

ACTIVITY DIAGRAM
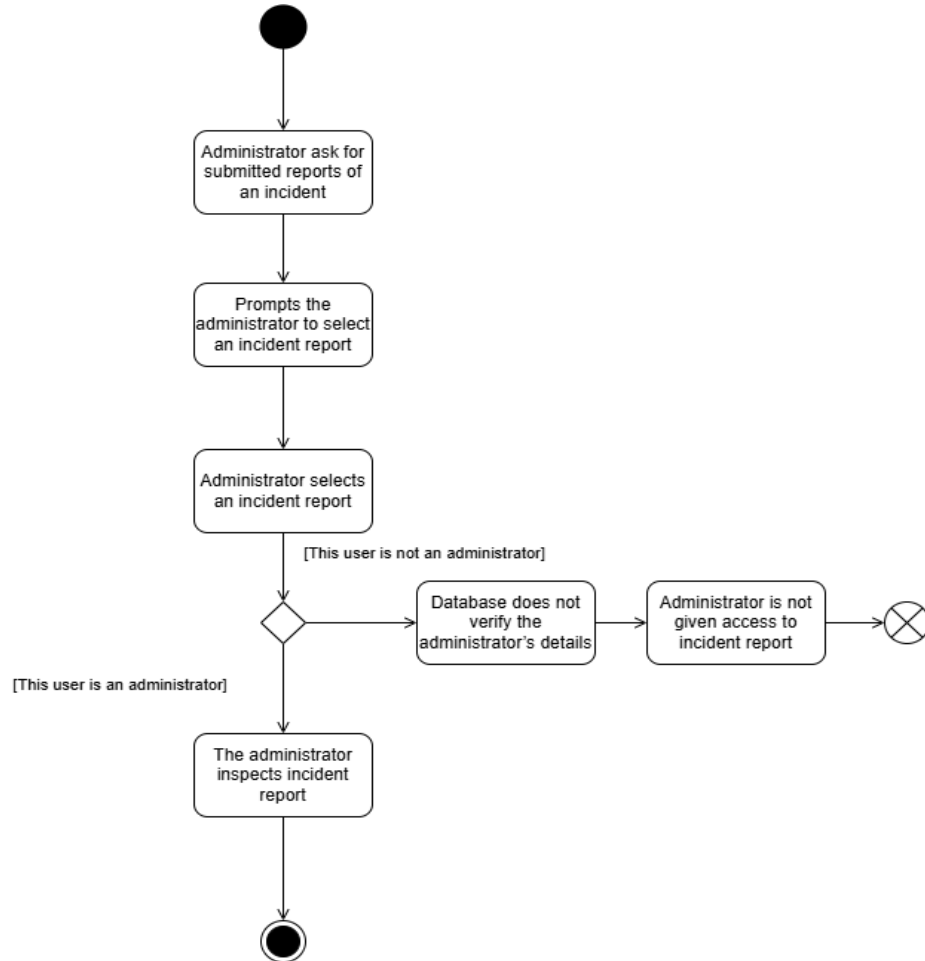
Requirement 7: Rate User Bike Experience

USE CASE DESCRIPTION

Use case name	Rate User Bike Experience	
Related Requirements	Requirement 7	
Goal in Context	Allows users to be able to rate their bike rental experience	
Preconditions	1.The user created an account, which would be given access to the services provided by the system. 2.The user previously rented a bike.	
Successful End Condition	Users are able to rate their biking experience	
Failed End Condition	Users are not able to rate their biking experience	
Primary Actors	Users with a UWI ID	
Secondary Actors	System Admin	
Trigger	The user selects the option to rate user bike experience	
Main Flow	Step	Action
	1	The user selects the option to rate bike experience
	2	The system will allow the user to rate bike with stars.
	3	The system asks the user to enter what aspect of their biking experience they enjoyed the most.
	4	The system prompts the user to enter what aspects they think could be improved on, to make their biking experience better.
	5	The system will update the biking experience of a bike.
	6	Update was successful
Extensions	Step	Branching Action
	6.1	System fails to update the user experience.

ACTIVITY DIAGRAM

Requirement 8: Generate Incident Reports

USE CASE DESCRIPTION

Use case name	Generate Incident Reports	
Related Requirements	Requirement 8	
Goal in Context	Allows users to be able to generate an incident report	
Preconditions	The user had a UWI ID and an account to have access to the services provided by the system	
Successful End Condition	Users are able to generate an incident report	
Failed End Condition	Users are not able to generate an incident report	
Primary Actors	Users with a UWI ID	
Secondary Actors	System Admin	
Trigger	The user selects the option to generate an incident report.	
Main Flow	Step	Action
	1	The user selects the option to generate an incident report.
	2	The system prompts the user to enter their ID number, name, telephone number, location of incident and a detailed description of the incident.
	3	The system allows the user to submit the incident form.
	4	The system stores the incident report.
	5	The system allows the Admins to view this report.
Extensions	Steps	Branching Action
	4.1	System fails to store the report.
	4.2	Admin cannot view the report.

ACTIVITY DIAGRAM

The user selects the option to generate an incident report.

Fill out incident form

Submit form

Store form to system

[update failed] → System fails to store report → Admin cannot view report → ⊗

[update successful]

Admin views report
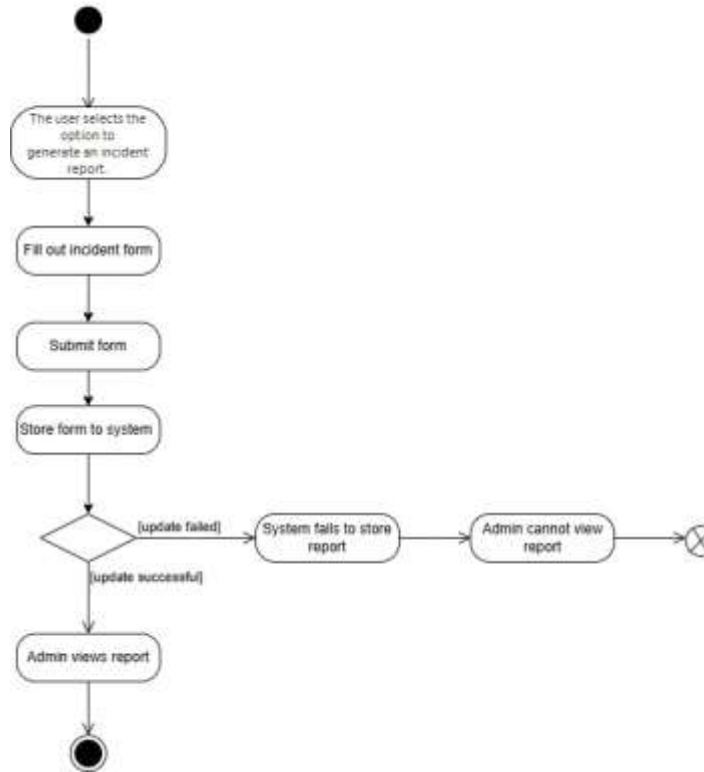
Requirement 9: Remove User Data

Use case name	Remove User Data	
Related Requirements	Requirement 9	
Goal in Context	Allows administrators to remove user data.	
Preconditions	The user has an admin account	
Successful End Condition	Users are able to remove user data	
Failed End Condition	Users are unable to remove user data	
Primary Actors	System Admin	
Secondary Actors		
Trigger	The Admin selects the option to remove user data	
Main Flow	Step	Action
	1	The Admin selects the option to remove user data
	2	The Admin deletes the user data.
	3	User data gone from system completely.
Extensions	Steps	Branching Action
	2.1	User data failed to get removed by system.

ACTIVITY DIAGRAM

The admin selects the option to remove user data

The admin deletes user data

[failed to delete] → User data failed to get removed by system

[delete successful]

User data gone from system completely