

**NANYANG
TECHNOLOGICAL
UNIVERSITY**
SINGAPORE

College of Computing and Data Science

SC2006 - Software Engineering Lab 1 Deliverables

FDAB Team 1

Name	Matriculation No.
Adam Soh Shi Jie	U2320112A
Joyce Lee Jia Xuan	U2320463F
Soong Jun Shen	U2340460H
Tan Kai Hooi	U2420694C
Liew Jia Wei	U2320233G

1. Documentation of functional and non-functional requirements

A. Functional Requirements

1. PeePal will flag reviews that are reported more than or equal to 3 times
2. PeePal shall allow **Admins** to perform administrative tasks.
 - 2.1. If there are unfair or inappropriate reviews, PeePal shall allow Admins to remove the reviews from the platform.
 - 2.1.1. If any review left by any user contains vulgar language, inappropriate content, or violates community guidelines, PeePal shall allow Admins to remove the reviews from the platform.
 - 2.1.2. If the reviews for toilets contain information not relevant to the cleanliness or the availability of the toilet, PeePal shall allow Admins to remove the review from the platform.
 - 2.2. PeePal shall allow Admins to view a list of flagged reviews.
 - 2.2.1. PeePal shall allow Admins to ignore and unflag the flagged reviews.
 - 2.2.2. PeePal shall allow Admins to delete flagged reviews.
 - 2.2.3. PeePal shall allow Admins to delete and ban users when reviewing flagged reviews.
 - 2.3. PeePal shall allow Admins to make changes to information about toilets
 - 2.3.1. PeePal shall allow Admins to edit the name, reviews, status of maintenance and bidet availability of the toilet.
 - 2.3.2. PeePal shall allow Admins to add new toilets.
 - 2.3.3. PeePal shall allow Admins to delete toilets.
 - 2.4 PeePal shall allow Admins to make changes to user information.
 - 2.5 PeePal shall allow Admins to delete users.
3. PeePal shall allow **Users** to perform specific tasks.
 - 3.1. PooPal shall allow Users to view detailed information about toilets via a map interface.
 - 3.1.1. PeePal shall recommend to Users the best toilet based on distance, cleanliness, crowd density and personal preferences.
 - 3.1.2. PeePal shall allow Users to search for nearby toilets by using Users' current location.
 - 3.1.3. PeePal shall allow Users to key in locations to search for toilets nearby to that location.
 - 3.1.4. For each toilet, PeePal shall allow Users to view the toilet's name, location, distance, cleanliness rating, crowd density, the status of maintenance, accessibility features, sanitiser/bidet availability, other Users' reviews and photos, upvotes and downvotes of the reviews.
 - 3.2. PeePal shall allow Users to leave comments on the toilets.

- 3.2.1. PeePal shall allow Users to rate the toilet based on cleanliness on a scale out of 10.
- 3.2.2. PeePal shall allow Users to leave reviews including texts for the toilet.
- 3.2.3. PeePal shall allow Users to leave reviews including images for the toilet.
- 3.3. PeePal shall allow users to report toilets.
 - 3.3.1. PeePal shall allow Users to report faulty toilets.
 - 3.3.2. PeePal shall allow Users to report toilets that are functioning on PeePal but are actually under maintenance.
- 3.4. PeePal shall allow Users to update user information.

B. Non-Functional Requirements

Usability	Responsive User Interface <ul style="list-style-type: none"> The user interface should be responsive, ensuring smooth navigation with minimal delays. Users should be able to perform common tasks with a response time of less than 5 seconds for each task.
	Mobile Responsive <ul style="list-style-type: none"> The app must be fully mobile-responsive, displaying 100% of the content on all mobile devices without clipping or hidden elements.
	Different Languages <ul style="list-style-type: none"> The app must support multiple languages (English, Chinese, Malay) and display content based on the user's locale.
Performance	Data Retrieval Efficiency <ul style="list-style-type: none"> Data retrieval must be efficient, ensuring that information such as nearby toilets and additional information of toilets is displayed promptly. 95% of data retrieval operations should be completed in less than 1 second.
Reliability	Quick App Startup <ul style="list-style-type: none"> The app should load and all functionalities should be available within 5 seconds after rebooting/launching the app.
Supportability	The database must be replaceable with any commercial product supporting standard SQL / NoSQL queries.

2. Data Dictionary

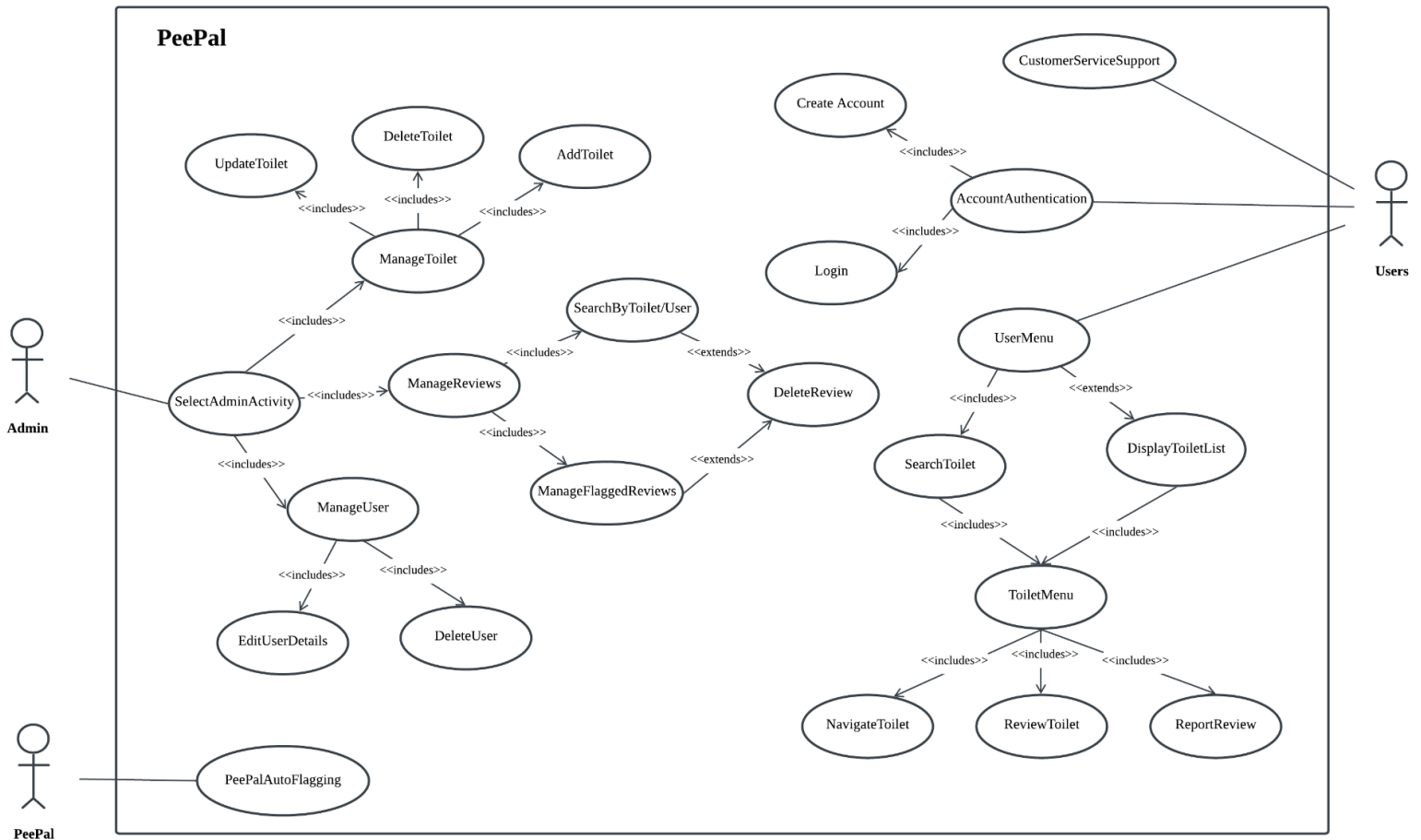
Entity	Attribute	Data Type	Description
Account	UserID	Integer	Unique identifier for each user.
	Username	String	Display the name of the user.
	Email	String	User's email address for login and communication.
	LanguagePreference	String	User's preferred language (e.g., English, Chinese, Malay).
	RegistrationDate	DateTime	Date and time when the user registered.
	LastLogin	DateTime	Date and time of the user's last login.
Admin	AdminID	Integer	Unique identifier for each admin.
	AdminName	String	Display the name of the admin.
	Password	String	Encrypted password for secure login.
	Permissions	String	Admin's access level (e.g., full access, limited access).
Toilet	ToiletID	Integer	Unique identifier for each toilet.
	Name	String	Name of the toilet.
	Location	String	Physical address or coordinates of the toilet.
	CleanlinessRating	Float	Average cleanliness rating based on user reviews (scale of 0-10).
	CrowdDensity	String	Current crowd density (e.g., Low, Medium, High).

	MaintenanceStatus	Boolean	Indicates if the toilet is under maintenance (True/False).
	BidetAvailability	Boolean	Indicates if the toilet has a bidet (True/False).
	AccessibilityFeatures	String	List of accessibility features (e.g., wheelchair-friendly, baby-changing table).
	SanitiserAvailability	Boolean	Indicates if the toilet has sanitiser (True/False).
	CreatedBy	Integer	AdminID of the admin who created the toilet entry.
	LastUpdated	DateTime	Date and time of the last update to the toilet's information.
Review	ReviewID	Integer	Unique identifier for each review.
	ToiletID	Integer	ToiletID of the toilet being reviewed.
	UserID	Integer	UserID of the user who left the review.
	CleanlinessRating	Integer	Cleanliness rating provided by the user (scale of 0-10).
	ReviewText	String	Text content of the review.
	ReviewImage	String	URL of the image uploaded with the review (if any).
	Downvotes	Integer	Number of downvotes the review has received.
	Timestamp	DateTime	Date and time when the review was posted.
Report	ReportID	Integer	Unique identifier for each report.
	ToiletID	Integer	ToiletID of the toilet being reported.
	UserID	Integer	UserID of the user who submitted the report.

	ReportType	String	Type of report (e.g., faulty toilet, under maintenance).
	Description	String	Additional details were provided by the user about the issue.
	Timestamp	DateTime	Date and time when the report was submitted.

3. Initial Use Case Model, consisting of Use Case Diagram and Use Case Descriptions

A. Use Case Diagram



B. Use Case Descriptions

1. For Functional Requirement #1 (PeePal)

Use Case ID:	#1-1		
Use Case Name:	PeePalAutoFlagging		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	09/02/2025	Date Last Updated:	09/02/2025

Actor:	PeePal
Descriptions:	Allows PeePal to automatically flag reviews based on predefined rules.
Preconditions:	None
Postconditions:	Inappropriate reviews are flagged.
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none">1. If a review contains vulgar language, inappropriate content, or violates community guidelines, the system flags the review.2. If a review was reported more than or equal to 3 times, the system flags the review.3. If a review for toilets contains information not relevant to the cleanliness or the availability of the toilet, the system flags the review.4. The flagged reviews are stored in the system for administrative review.
Alternative Flows:	None
Exceptions	None
Includes:	None
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

2. For Functional Requirement #2 (Admin)

Use Case ID:	#2-1		
Use Case Name:	SelectAdminActivity		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	09/02/2025	Date Last Updated:	09/02/2025

Actor:	Admin
Descriptions:	The admin selects an administrative task to manage users, reviews, or toilet-related information.
Preconditions:	The admin must be logged in and authenticated.
Postconditions:	None
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none">1. The admin logs in and authenticates using the Login use case.2. Once successfully logged in, the system prompts the admin to select MANAGEUSER, MANAGEREVIEW, MANAGETOILET, or QUIT.3. If the admin selects MANAGEUSER, the system invokes the ManageUser use case.4. If the admin selects MANAGEREVIEW, the system invokes the ManageReview use case.5. If the admin selects MANAGETOILET, the system invokes the ManageToilet use case.6. If the admin selects QUIT, The system returns to the Login use case.
Alternative Flows:	None
Exceptions:	None
Includes:	<ol style="list-style-type: none">1. ManageReview2. ManageUser3. ManegeToilet4. Login
Special Requirements:	None

Assumptions:	None
Notes and Issues:	None

Use Case ID:	#2-2		
Use Case Name:	ManageReview		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	09/02/2025	Date Last Updated:	09/02/2025

Actor:	Admin
Descriptions:	The admin can review and manage the reviews.
Preconditions:	Admin is logged in and authenticated.
Postconditions:	Flagged review is deleted or removed from the flagged list.
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none"> 1. The system will display the search bar and the navigation tab to the flagged reviews. 2. If the admin clicks on the navigation tab to the flagged reviews, the system invokes included ManageFlaggedReviews use case. 3. If the admin wants to search the reviews by toilet/user, the system invokes the included SearchByUser/Toilet use case.
Alternative Flows:	<ol style="list-style-type: none"> 1. If the admin selects to return at any time, the system will return back to the SelectAdminActivity use case.
Exceptions:	None
Includes:	<ol style="list-style-type: none"> 1. SelectAdminActivity 2. ManageFlaggedReviews 3. SearchByUser/Toilet
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

Use Case ID:	#2-3		
Use Case Name:	ManageFlaggedReviews		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	11/02/2025	Date Last Updated:	11/02/2025

Actor:	Admin
Descriptions:	The admin can review the flagged reviews and decide to ignore or delete the reviews.
Preconditions:	<ol style="list-style-type: none"> 1. Admin is logged in and authenticated. 2. Review data is available in the system.
Postconditions:	The flagged review is either ignored or deleted.
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none"> 1. The system displays the list of the flagged reviews information and the user information who left the review. 2. The admin can select a review to manage. 3. The system will prompt the admin to IGNORE or DELETE the review. 4. If the admin selects DELETE, the system will invoke the DeleteReview use case.
Alternative Flows:	SF-4: <ol style="list-style-type: none"> 1. If the admin selects IGNORE, the system will unflag the review and remove it from the flagged reviews. 2. The system will update the review status from flagged to unflagged.
Exceptions	<ol style="list-style-type: none"> 1. If the flagged review has already been deleted, the system displays an error message and returns to the flagged review list. 2. If the system encounters an error changing the review's flagged status, it prompts the admin to retry. 3. If the system takes too long to process the request, it displays an error message prompting the admin to refresh the page.
Includes:	<ol style="list-style-type: none"> 1. DeleteReview

Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

Use Case ID:	#2-4		
Use Case Name:	SearchByToilet/User		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	11/02/2025	Date Last Updated:	11/02/2025

Actor:	Admin
Descriptions:	The admin can filter the reviews based on either the toilet or user.
Preconditions:	<ol style="list-style-type: none"> 1. Admin is logged in and authenticated. 2. Review data is available in the system.
Postconditions:	<ol style="list-style-type: none"> 1. The selected review is deleted if the admin initiates the delete action. 2. The system reflects the updated list of reviews.
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none"> 1. The system presents options for the admin to search reviews by toilet or user. 2. The admin can search for the toilet or user. 3. A list of reviews based on the selected criteria is displayed. 4. The admin can select and view the details of any review. 5. If any review violates regulations, the admin selects the review for deletion. 6. The system invokes the DeleteReview use case and removes the selected review from the database.
Alternative Flows:	<ol style="list-style-type: none"> 1. If the admin selects to return at any time, the system will return back to the ManageReview use case.
Exceptions	<ol style="list-style-type: none"> 1. If the admin enters an invalid search value (e.g., empty search or special characters), the system prompts for a valid input. 2. If no reviews match the search criteria, the system displays a "No Results Found" message. 3. If the system fails to execute the search query, it displays a database error message and logs the issue.

Includes:	1. ManageReview 2. DeleteReview
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

Use Case ID:	#2-5		
Use Case Name:	DeleteReview		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	11/02/2025	Date Last Updated:	11/02/2025

Actor:	Admin
Descriptions:	The admin can delete a specific review and ban the associated user. This use case can be invoked by either the ManageFlaggedReview or SearchByToilet/User use cases.
Preconditions:	<ol style="list-style-type: none"> 1. The admin is logged in and authenticated. 2. Review data is available in the system. 3. The review to be deleted is selected.
Postconditions:	The selected review is removed from the system.
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none"> 1. The system presents a message asking the admin to choose between DELETEREVIEW OR DELETEREVIEWANDBANUSER. 2. If the admin selected the DELETEREVIEW, The system removes the review from the database. 3. If the admin selected DELETEREVIEWANDBANUSER, The system removes the review and bans the associated user permanently. 4. The system updates the database accordingly. 5. A confirmation message is displayed indicating the successful deletion and/or user ban.
Alternative Flows:	<ol style="list-style-type: none"> 1. If the admin cancels at any point, the system returns to the invoking use case ManageFlaggedReviews or SearchByUser/Toilet without deleting the review.
Exceptions	<ol style="list-style-type: none"> 1. If the selected review has already been deleted or is no longer accessible, the system displays an error message. 2. If the system fails to delete the review due to a technical error, it displays a message prompting the

	admin to retry.
Includes:	<ul style="list-style-type: none">1. ManageFlaggedReviews2. SearchByUser/Toilet
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

Use Case ID:	#2-6		
Use Case Name:	ManageUser		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	09/02/2025	Date Last Updated:	09/02/2025

Actor:	Admin
Descriptions:	The admin can manage user accounts in the system by searching for users and either deleting the user or editing their details.
Preconditions:	<ol style="list-style-type: none"> 1. Admin is logged in and authenticated. 2. User data is available in the system.
Postconditions:	The user's details are updated or the user is deleted from the system.
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	<ol style="list-style-type: none"> 1. The system prompts the admin to search for users by ID or name. 2. After Admin searches for a user, the system displays a list of users that match the search criteria. 3. Admin can select a user to view the detailed information about the selected user. 4. The system prompts admin to select DELETEUSER or EDITUSERDETAILS. 5. Admin selects an action: 6. If the admin chooses DELETEUSER, the system invokes the DeleteUser use case. 7. If the admin chooses EDITUSERDETAILS, the system invokes the EditUserDetails use case.
Alternative Flows:	<ol style="list-style-type: none"> 1. If the admin selects to return at any time, the system will return back to the ManageUser use case.
Exceptions	<ol style="list-style-type: none"> 1. If the admin enters an invalid search value (e.g., empty search or special characters), the system prompts for a valid input.

Includes:	<ul style="list-style-type: none">1. ManageUser2. DeleteUser3. EditUserDetails
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

Use Case ID:	#2-7		
Use Case Name:	EditUserDetails		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	09/02/2025	Date Last Updated:	09/02/2025

Actor:	Admin
Descriptions:	The admin can update the details of an existing user.
Preconditions:	<ol style="list-style-type: none"> 1. The admin is logged in and authenticated. 2. User data is available in the system. 3. The user is selected.
Postconditions:	The user information is successfully updated.
Priority:	High
Frequency of Use:	Medium
Flow of Events:	<ol style="list-style-type: none"> 1. The admin modifies the relevant fields, such as name, email and any additional details. 2. The system prompts the admin to confirm the changes. 3. The system saves the updated details and refreshes the user list. 4. A confirmation message is displayed indicating that the user details have been successfully updated.
Alternative Flows:	<ol style="list-style-type: none"> 1. If the admin selects to return at any time, the system will return back to the ManageUser use case.
Exceptions	<ol style="list-style-type: none"> 1. If the selected user no longer exists, the system displays an error message. 2. If the system fails to update the user details due to a technical error, it displays a message prompting the admin to retry.
Includes:	<ol style="list-style-type: none"> 1. ManageUser
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

Use Case ID:	#2-8		
Use Case Name:	DeleteUser		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	09/02/2025	Date Last Updated:	09/02/2025

Actor:	Admin
Descriptions:	Admin can delete users that have been selected.
Preconditions:	<ol style="list-style-type: none"> 1. Admin is logged in and authenticated. 2. User data is available in the system. 3. The user to be deleted is selected.
Postconditions:	The user is either deleted or not deleted.
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	<ol style="list-style-type: none"> 1. The system displays a confirmation notification asking the admin to confirm the permanent deletion of the user. The admin is prompted to choose between YES or CANCEL. 2. If the admin selects YES, the system permanently deletes the user's data and associated reviews. 3. The system updates the database accordingly. 4. A confirmation message is displayed indicating the successful deletion of the user.
Alternative Flows:	<p>AF-SF2:</p> <ol style="list-style-type: none"> 1. If the admin selects CANCEL, the system returns to the ManageUser use case.
Exceptions	<ol style="list-style-type: none"> 1. If the selected user has already been deleted or is no longer accessible, the system displays an error message. 2. If the system fails to delete the user due to a technical error, it displays a message prompting the admin to retry.

Includes:	1. ManageUser
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

Use Case ID:	#2-9		
Use Case Name:	ManageToilet		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	09/02/2025	Date Last Updated:	09/02/2025

Actor:	Admin
Descriptions:	Allows admin to manage and update toilet details, including updating existing information, adding new toilets, or deleting toilet entries.
Preconditions:	Admin must be logged in and authenticated.
Postconditions:	Toilet data is updated, added, or deleted.
Priority:	High
Frequency of Use:	Medium
Flow of Events:	<ol style="list-style-type: none"> 1. The system will prompt the admin to select UPDATETOILET, ADDTOILET, DELETETOILET. 2. If the admin chooses UPDATETOILET, the system invokes the UpdateToilet use case. 3. If the admin chooses ADDTOILET, the system invokes the AddToilet use case. 4. If the admin chooses DELETETOILET, the system invokes the DeleteToilet use case.
Alternative Flows:	<ol style="list-style-type: none"> 1. If the admin selects to return at any time, the system will return back to the SelectAdminActivity use case.
Exceptions	<ol style="list-style-type: none"> 1. If the selected user no longer exists, the system displays an error message.
Includes:	<ol style="list-style-type: none"> 1. UpdateToilet 2. AddToilet 3. DeleteToilet 4. SelectAdminActivity
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

Use Case ID:	#2-10		
Use Case Name:	UpdateToilet		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	09/02/2025	Date Last Updated:	09/02/2025

Actor:	Admin
Descriptions:	The admin can update the details of an existing toilet, including its location, status, or any additional information stored in the system.
Preconditions:	<ol style="list-style-type: none"> 1. The admin is logged in and authenticated. 2. Toilet data is available in the system.
Postconditions:	The toilet information is successfully updated.
Priority:	High
Frequency of Use:	Medium
Flow of Events:	<ol style="list-style-type: none"> 1. The system prompts the admin to search the toilet. 2. After Admin searches for a toilet, the system displays a list of toilets that match the search criteria. 3. Admin can select a toilet to edit the detailed information about the selected toilet. 4. The admin modifies the relevant fields, such as location, status and any additional details. 5. The system prompts the admin to confirm the changes. 6. The system saves the updated details and refreshes the toilet list. 7. A confirmation message is displayed indicating that the toilet details have been successfully updated.
Alternative Flows:	<ol style="list-style-type: none"> 1. If the admin selects to return at any time, the system will return back to the ManageToilet use case.
Exceptions	<ol style="list-style-type: none"> 1. If the admin enters an invalid search value (e.g., empty search or special characters), the system prompts for a valid input. 2. If the selected toilet no longer exists, the system displays an error message.

	3. If the system fails to update the toilet due to a technical error, it displays a message prompting the admin to retry.
Includes:	1. ManageToilet
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

Use Case ID:	#2-11		
Use Case Name:	AddToilet		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	11/02/2025	Date Last Updated:	11/02/2025

Actor:	Admin
Descriptions:	Allow admin to add a new toilet.
Preconditions:	1. Admin is logged in and authenticated.
Postconditions:	A new toilet is added.
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	<ol style="list-style-type: none"> 1. The system prompts the admin to enter toilet details, including name, location, status, bidet availability, and optional reviews. 2. The admin enters the required details. 3. The system validates the input. 4. If the input is valid, the system proceeds to the next step. 5. The system saves the new toilet data. 6. The system confirms that the toilet has been added successfully.
Alternative Flows:	<ol style="list-style-type: none"> 1. If the user selects CANCEL at any time, the system returns back to ManageToilet user case.
Exceptions	<ol style="list-style-type: none"> 2. If the admin enters an invalid search value (e.g., empty search or special characters), the system prompts for a valid input. 3. If the system fails to add the toilet due to a technical error, it displays a message prompting the admin to retry.
Includes:	None
Special Requirements:	None
Assumptions:	None

Notes and Issues:	None
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Use Case ID:	#2-12		
Use Case Name:	DeleteToilet		
Created By:	Joyce Lee	Last Updated By:	Joyce Lee
Date Created:	09/02/2025	Date Last Updated:	09/02/2025

Actor:	Admin
Descriptions:	Allows admin to delete an existing toilet.
Preconditions:	<ol style="list-style-type: none"> 1. Admin is logged in and authenticated. 2. Toilet data is available in the system. 3. The toilet to be deleted is selected.
Postconditions:	An existing toilet is deleted.
Priority:	Medium
Frequency of Use:	Medium
Flow of Events:	<ol style="list-style-type: none"> 1. The system prompts the admin to search the toilet. 2. After Admin searches for a toilet, the system displays a list of users that match the search criteria. 3. Admin selects a toilet to delete. 4. The system asks for confirmation before deleting the toilet. 5. The admin confirms the deletion. 6. The system removes the toilet from the database. 7. The system confirms that the toilet has been deleted successfully.
Alternative Flows:	<ol style="list-style-type: none"> 1. If the user selects CANCEL at any time, the system returns back to ManageToilet user case.
Exceptions	<ol style="list-style-type: none"> 1. If the selected toilet no longer exists, the system displays an error message. 2. If the system fails to delete the toilet due to a technical error, it displays a message prompting the admin to retry.
Includes:	<ol style="list-style-type: none"> 1. ManageToilet
Special Requirements:	None

Assumptions:	None
Notes and Issues:	None

3. For Functional Requirement #3 (Users)

Use Case ID:	#3-1		
Use Case Name:	CreateAccount		
Created By:	Tan Kai Hooi	Last Updated By:	Tan Kai Hooi
Date Created:	9/2/2025	Date Last Updated:	9/2/2025

Actor:	User
Descriptions:	Allows a visitor to create a new account in the system.
Preconditions:	1. The visitor must click on the 'Create Account' button.
Postconditions:	1. A new user account is created and stored in the database. 2. The user receives a confirmation email.
Priority:	High
Frequency of Use:	Medium
Flow of Events:	<ol style="list-style-type: none">1. Visitor opens the application.2. Visitor clicks on the "Create Account" button.3. Visitor enters required details (e.g., name, email, username, password).4. System validates the input fields.5. If all details are correct:<ol style="list-style-type: none">a. System stores the user's information in the database.b. System sends an account verification email.c. System confirms account creation and redirects the user to the login page.
Alternative Flows:	<ul style="list-style-type: none">- Invalid Input:<ul style="list-style-type: none">- If required fields are missing, the system prompts the user to complete them.- If the password is weak, the system suggests a stronger password.- Username/Email Already Exists:<ul style="list-style-type: none">- The system notifies the user and asks them to enter a different username/email.- Verification Required:<ul style="list-style-type: none">- If email verification is enabled, the user must verify their email before logging in.

Exceptions	<ul style="list-style-type: none"> - If the database is down, account creation fails, and an error message is displayed. - If the email service is down, the confirmation email may not be sent immediately.
Includes:	<ul style="list-style-type: none"> - InputValidation - PasswordEncryption
Special Requirements:	None
Assumptions:	<ul style="list-style-type: none"> - The visitor does not already have an account. - The system has sufficient storage capacity for new user data.
Notes and Issues:	None

Use Case ID:	#3-2		
Use Case Name:	Login		
Created By:	Tan Kai Hooi	Last Updated By:	Tan Kai Hooi
Date Created:	9/2/2025	Date Last Updated:	9/2/2025

Actor:	User
Descriptions:	Allows a user to login to an existing account.
Preconditions:	1. User must click on the login button.
Postconditions:	1. User logs in and is brought to the home page. 2. User menu appears
Priority:	High
Frequency of Use:	Low
Flow of Events:	<ol style="list-style-type: none"> 1. User opens the application. 2. User clicks on the login button. 3. User enters a username and password. 4. System validates credentials against the database. 5. If credentials are correct: 6. User is authenticated and redirected to the appropriate menu.
Alternative Flows:	<ul style="list-style-type: none"> - Invalid Credentials: <ul style="list-style-type: none"> - If the username or password is incorrect: - The system displays an error message. - User is prompted to re-enter credentials. - Forgot Password: <ul style="list-style-type: none"> - User clicks on "Forgot Password." - System prompts user to reset password via email verification.
Exceptions	<ul style="list-style-type: none"> - If the database is down, the login process fails, and an error message is displayed. - If there are multiple failed login attempts, the account may be locked for security reasons.
Includes:	None
Special Requirements:	None
Assumptions:	<ul style="list-style-type: none"> - Users have already registered and have valid credentials.

Notes and Issues:	None
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Use Case ID:	#3-3		
Use Case Name:	CustomerServiceSupport		
Created By:	Tan Kai Hooi	Last Updated By:	Tan Kai Hooi
Date Created:	9/2/2025	Date Last Updated:	9/2/2025

Actor:	User
Descriptions:	Communicate via text between a User and an Admin respectively.
Preconditions:	1. Users must be logged in and authenticated.
Postconditions:	None.
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none"> 1. User navigates to the Customer Service Support screen. 2. User selects to send a text message to Admin. 3. Admin sends a message back to reply to User message.
Alternative Flows:	None
Exceptions	None
Includes:	None
Special Requirements:	None
Assumptions:	None
Notes and Issues:	None

Use Case ID:	#3-4		
Use Case Name:	SearchToilet		
Created By:	Tan Kai Hooi	Last Updated By:	Tan Kai Hooi
Date Created:	9/2/2025	Date Last Updated:	9/2/2025

Actor:	User
Descriptions:	Allows users to search for toilets in any location.
Preconditions:	1. The User must be logged in and authenticated.
Postconditions:	1. Successfully display a detailed list of toilets closest to the location inputted by the user.
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none"> 1. The system allows the User to view Toilets either through an interactive map or a list interface. 2. User selects the list interface option. 3. The System shall display a list of Toilets in Singapore using . 4. For each Toilet, the system will display detailed information about the Toilet such as location, details, operating hours and reviews given by Users.
Alternative Flows:	<ol style="list-style-type: none"> 1. User selects the interactive map option. 2. The system shall display a real-time map that displays the locations of all toilets. 3. The system allows the User to zoom in, zoom out, and pan the map. 4. When the User selects a specific Toilet, a pop-up modal containing the Toilet information, such as location, details, operating hours and reviews given by Users will be displayed.
Exceptions:	- Location does not exist.
Includes:	ToiletMenu
Special Requirements:	None
Assumptions:	- Toilet is in Singapore.
Notes and Issues:	None

Use Case ID:	#3-5		
Use Case Name:	NavigateToilet		
Created By:	Tan Kai Hooi	Last Updated By:	Tan Kai Hooi
Date Created:	9/2/2025	Date Last Updated:	9/2/2025

Actor:	User
Descriptions:	Allows users to navigate to the chosen toilet.
Preconditions:	<ol style="list-style-type: none"> 1. The User must be logged in and authenticated. 2. The User must have their location service turned on.
Postconditions:	Successfully return the optimal route to the chosen toilet.
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none"> 1. If the User selects the “Directions” feature button, the system will return the optimal route from the current location of the User to the Toilet.
Alternative Flows:	None.
Exceptions:	<ul style="list-style-type: none"> - Location service is not turned on.
Includes:	None
Special Requirements:	None
Assumptions:	<ul style="list-style-type: none"> - Toilet is in Singapore. - The user is able to travel there by foot.
Notes and Issues:	None

Use Case ID:	#3-6		
Use Case Name:	ReviewToilet		
Created By:	Tan Kai Hooi	Last Updated By:	Tan Kai Hooi
Date Created:	9/2/2025	Date Last Updated:	9/2/2025

Actor:	User
Descriptions:	Allows users to review the chosen toilet.
Preconditions:	1. The User must be logged in and authenticated.
Postconditions:	A review of the toilet is published by the user
Priority:	High
Frequency of Use:	Medium
Flow of Events:	1. If the User selects the “Review” feature button, the system will allow the user to publish a review using the included use case ReviewToilet .
Alternative Flows:	None.
Exceptions:	None.
Includes:	None.
Special Requirements:	None.
Assumptions:	- Toilet exists in the database.
Notes and Issues:	None

Use Case ID:	#3-7		
Use Case Name:	ReportReview		
Created By:	Tan Kai Hooi	Last Updated By:	Tan Kai Hooi
Date Created:	9/2/2025	Date Last Updated:	9/2/2025

Actor:	User
Descriptions:	Allows users to report a chosen review.
Preconditions:	1. The User must be logged in and authenticated.
Postconditions:	The chosen review is flagged by the system.
Priority:	High
Frequency of Use:	Medium
Flow of Events:	<ol style="list-style-type: none"> 1. The User selects the "Report" feature button. 2. The system will flag the review, pending approval from Admins side.
Alternative Flows:	None.
Exceptions:	None.
Includes:	None.
Special Requirements:	None.
Assumptions:	- Review exists in the database.
Notes and Issues:	None

Use Case ID:	#3-8		
Use Case Name:	ToiletMenu		
Created By:	Adam Soh	Last Updated By:	Adam Soh
Date Created:	9/2/2025	Date Last Updated:	9/2/2025

Actor:	User
Descriptions:	Allows User to choose options provided in the toilet menu.
Preconditions:	<ol style="list-style-type: none"> 1. The User must be logged in and authenticated. 2. User must select one toilet.
Postconditions:	-
Priority:	Low
Frequency of Use:	Medium
Flow of Events:	<ol style="list-style-type: none"> 1. User will be able to view the information details of the selected toilet. 2. User can perform the actions provided in the menu. 3. If User selects NAVIGATE, the system will invoke the NavigateToilet use case.
Alternative Flows:	AF-S3: <ol style="list-style-type: none"> 1. If User selects REVIEW, the system will invoke the ReviewToilet use case. 2. If User selects REPORT, the system will invoke the ReportReview use case.
Exceptions:	None.
Includes:	<ol style="list-style-type: none"> 1. NavigateToilet 2. ReviewToilet 3. ReportReview
Special Requirements:	None.
Assumptions:	None.
Notes and Issues:	None

Use Case ID:	#3-9		
Use Case Name:	AccountAuthentication		
Created By:	Adam Soh	Last Updated By:	Adam Soh
Date Created:	9/2/2025	Date Last Updated:	9/2/2025

Actor:	User
Descriptions:	To allow the User to log into the account, and create an account if the User doesn't have an account.
Preconditions:	If the User wants to log into the account, the user account must exist in the database.
Postconditions:	-
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none"> 1. User will be prompted to log into the account. 2. If User don't have an account, User can select the option to creata a new account.
Alternative Flows:	None.
Exceptions:	None.
Includes:	
Special Requirements:	None.
Assumptions:	None.
Notes and Issues:	None

Use Case ID:	#3-10		
Use Case Name:	DisplayToiletList		
Created By:	Adam Soh	Last Updated By:	Adam Soh
Date Created:	9/2/2025	Date Last Updated:	9/2/2025

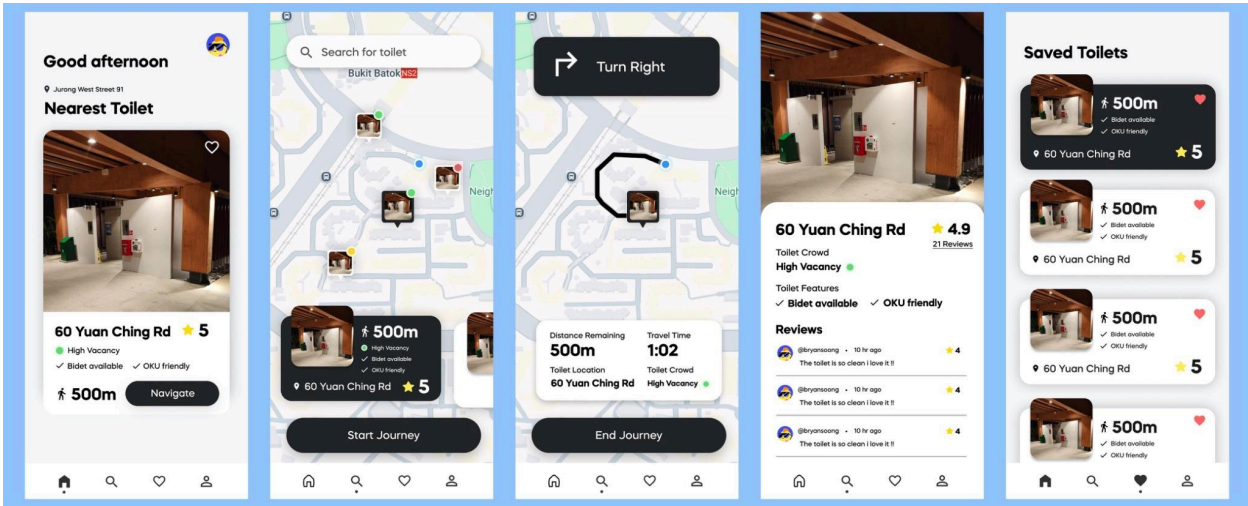
Actor:	User
Descriptions:	The list of toilets nearby will displayed to User.
Preconditions:	The User must be logged in and authenticated.
Postconditions:	Successfully display a detailed list of toilets closest to the user's current location.
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none"> 1. The system shall display a real-time map that displays the nearby locations of all toilets. 2. The system allows the User to zoom in, zoom out, and pan the map. 3. When the User selects a specific Toilet, a pop-up modal containing the Toilet information, such as location, details, operating hours and reviews given by Users will be displayed.
Alternative Flows:	None.
Exceptions:	None.
Includes:	ToiletMenu
Special Requirements:	None.
Assumptions:	Toilets in Singapore
Notes and Issues:	None

Use Case ID:	#3-11		
Use Case Name:	UserMenu		
Created By:	Adam Soh	Last Updated By:	Adam Soh
Date Created:	9/2/2025	Date Last Updated:	9/2/2025

Actor:	User
Descriptions:	Display User Menu.
Preconditions:	The User must be logged in and authenticated.
Postconditions:	Successfully display a detailed list of toilets closest to the user's current location.
Priority:	High
Frequency of Use:	High
Flow of Events:	<ol style="list-style-type: none"> 1. The system shall display a real-time map that displays the nearby locations of all toilets. 2. Users can use the search bar to search for a specific toilet location, and the system will invoke SearchToilet use case.
Alternative Flows:	<ol style="list-style-type: none"> 1. If the User chooses to detect the current location, the system will invoke the DisplayToiletList use case.
Exceptions:	<ul style="list-style-type: none"> - User doesn't allow permission to detect the current location.
Includes:	Search Toilet, DisplayToiletList
Special Requirements:	None.
Assumptions:	None.
Notes and Issues:	None

4. UI Mockups

A. PeePal Apps



B. PeePal Admin Management Website

