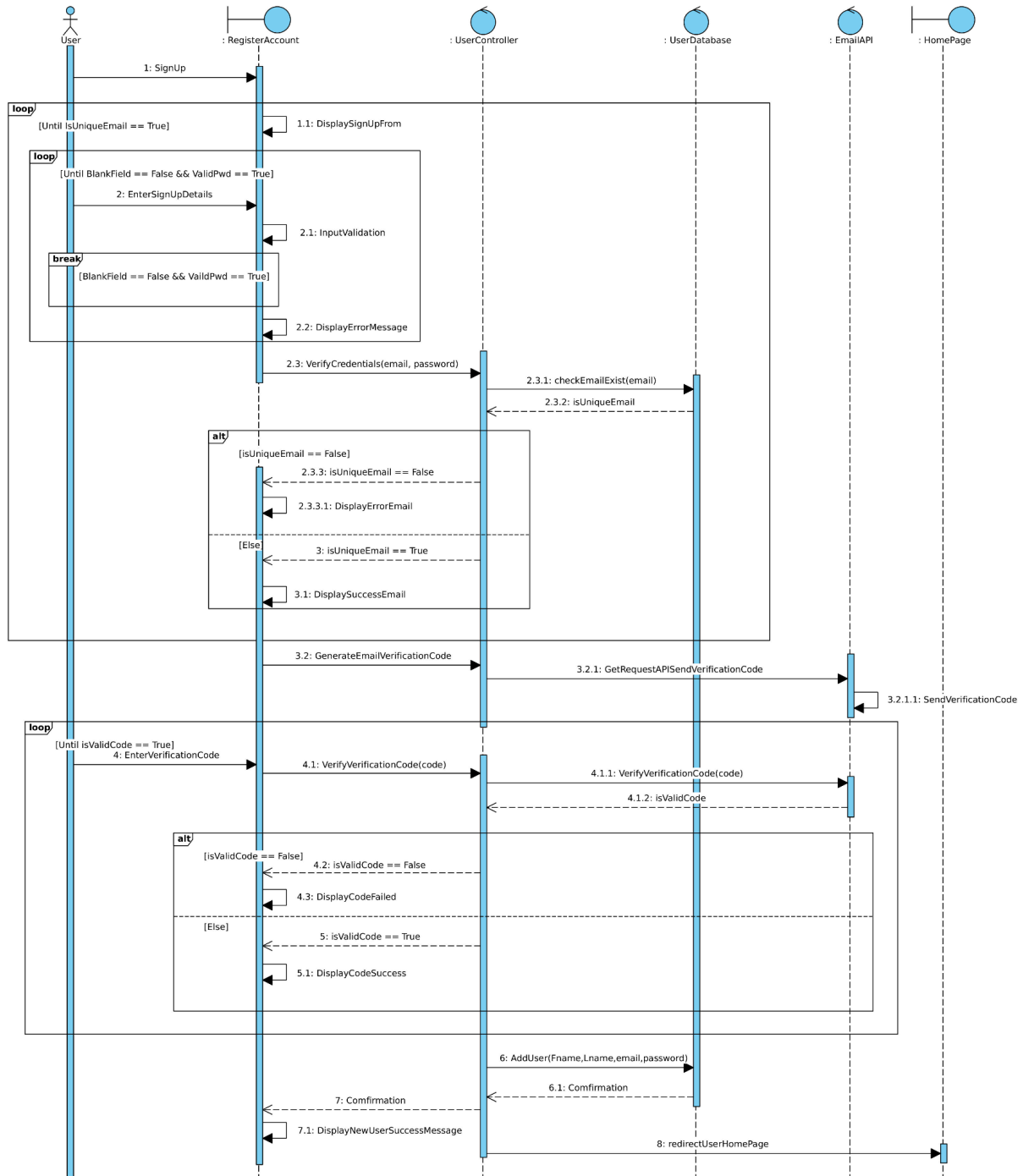


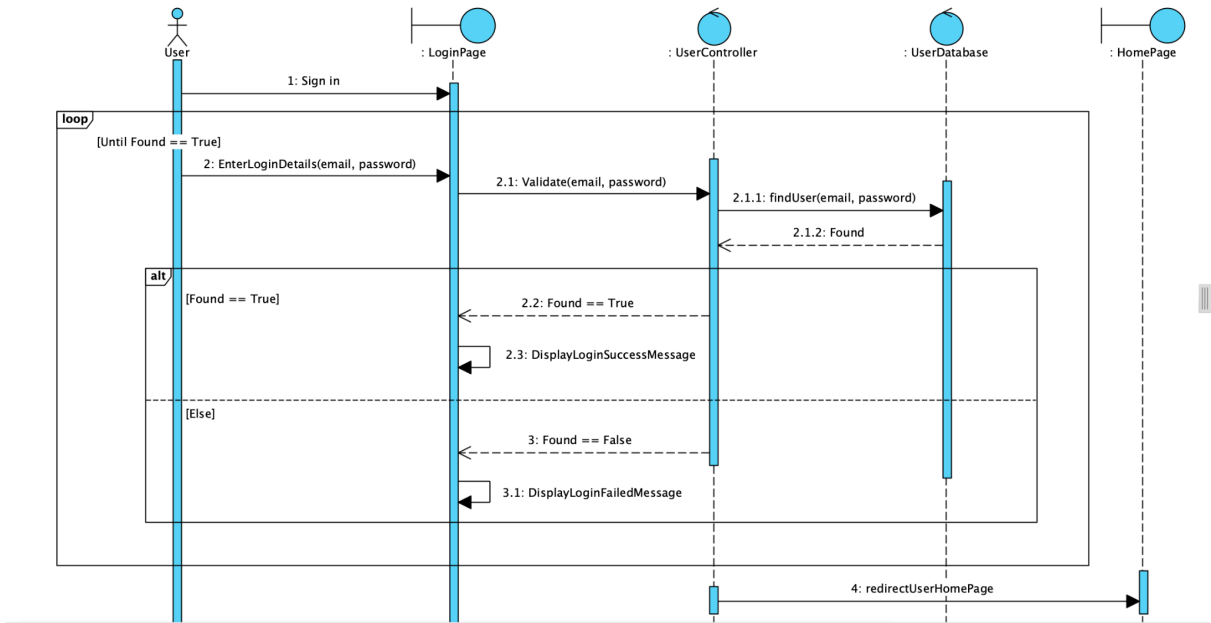
Sequence Diagrams

Functional Requirement 1

a. RegisterAccount

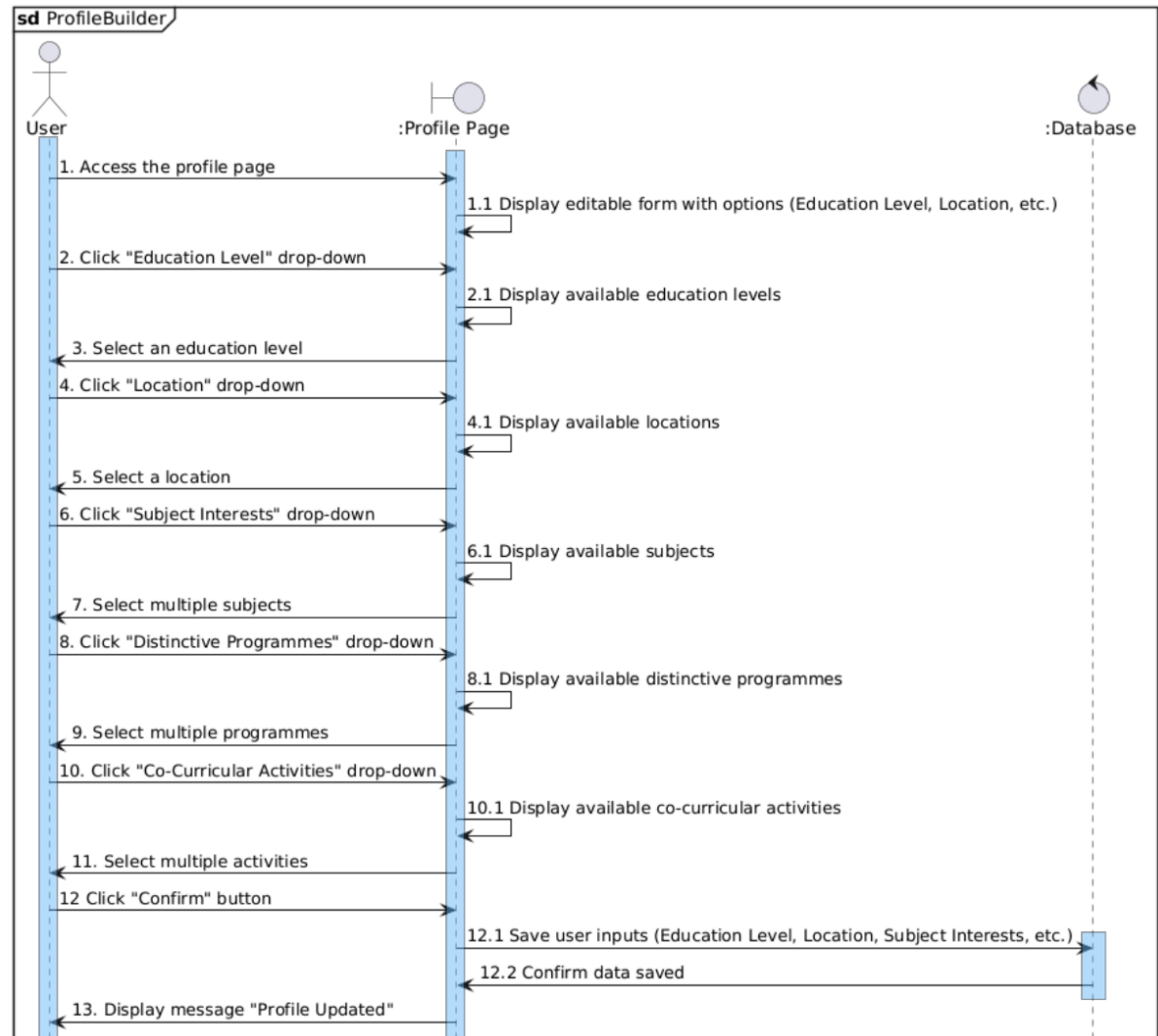


b. Login



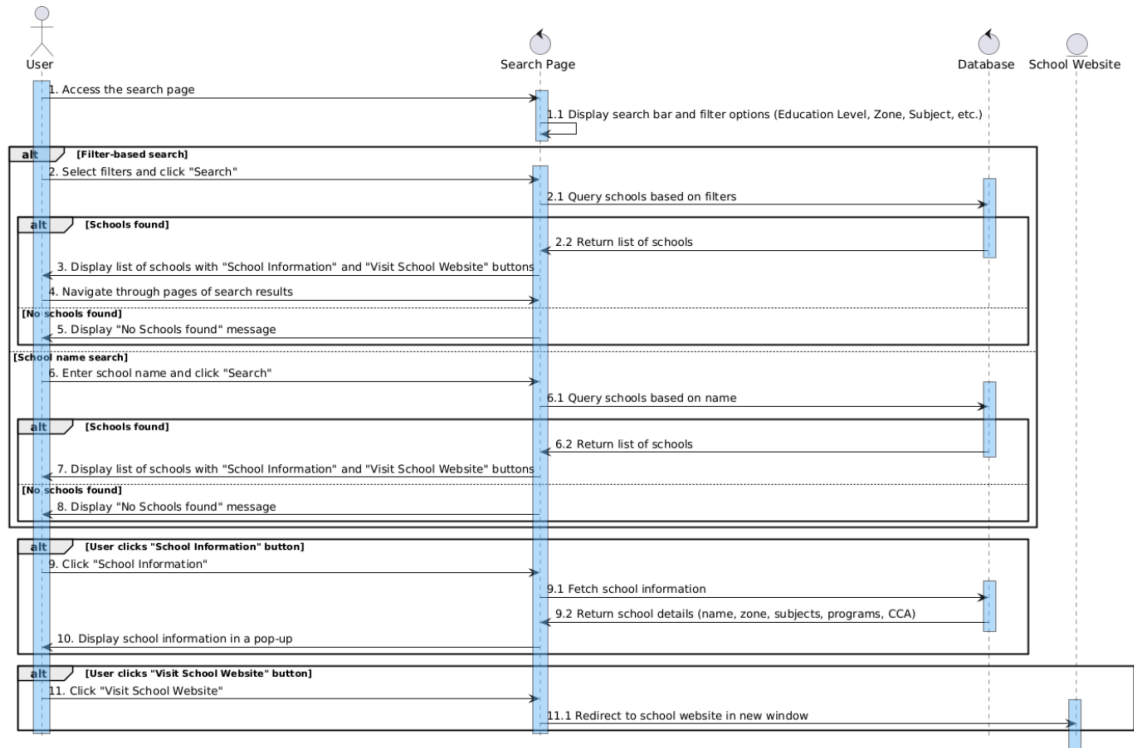
Functional Requirement 2

a. ProfileBuilderActivity



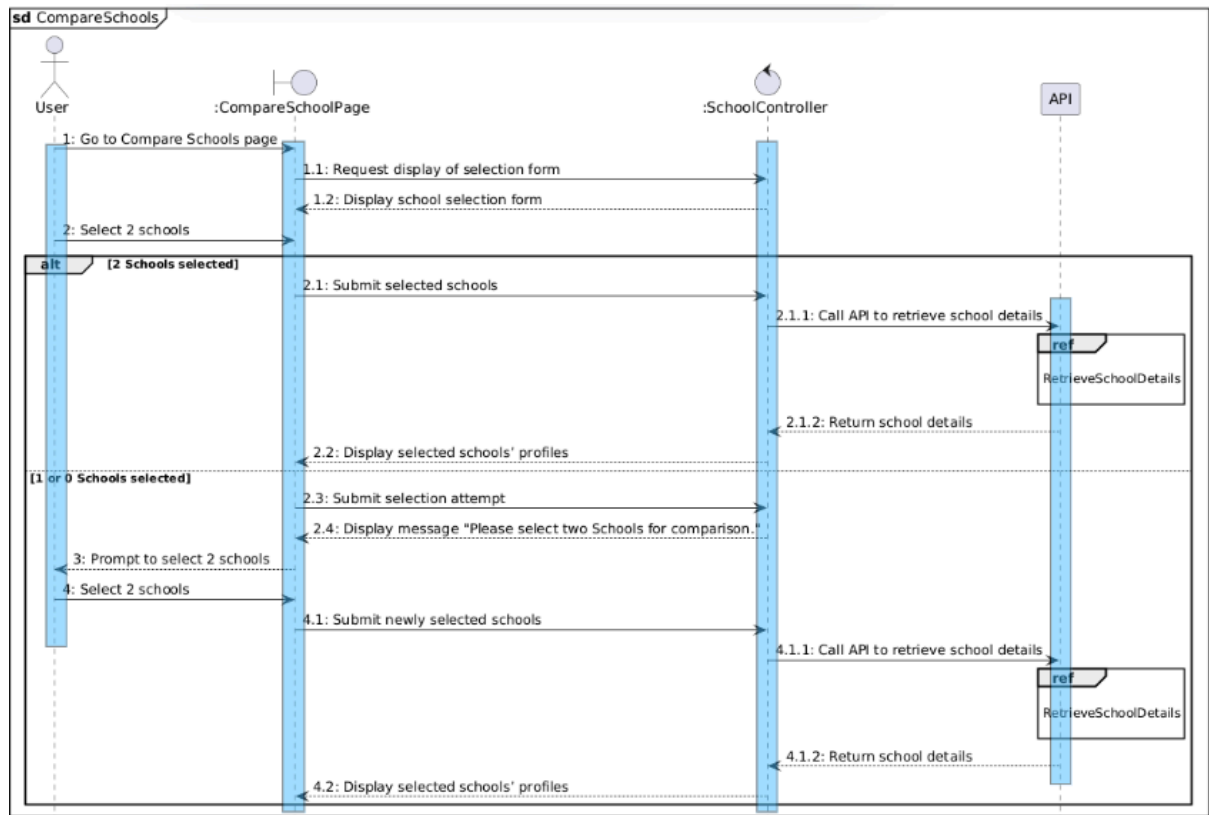
Functional Requirement 3

a. FindSchool



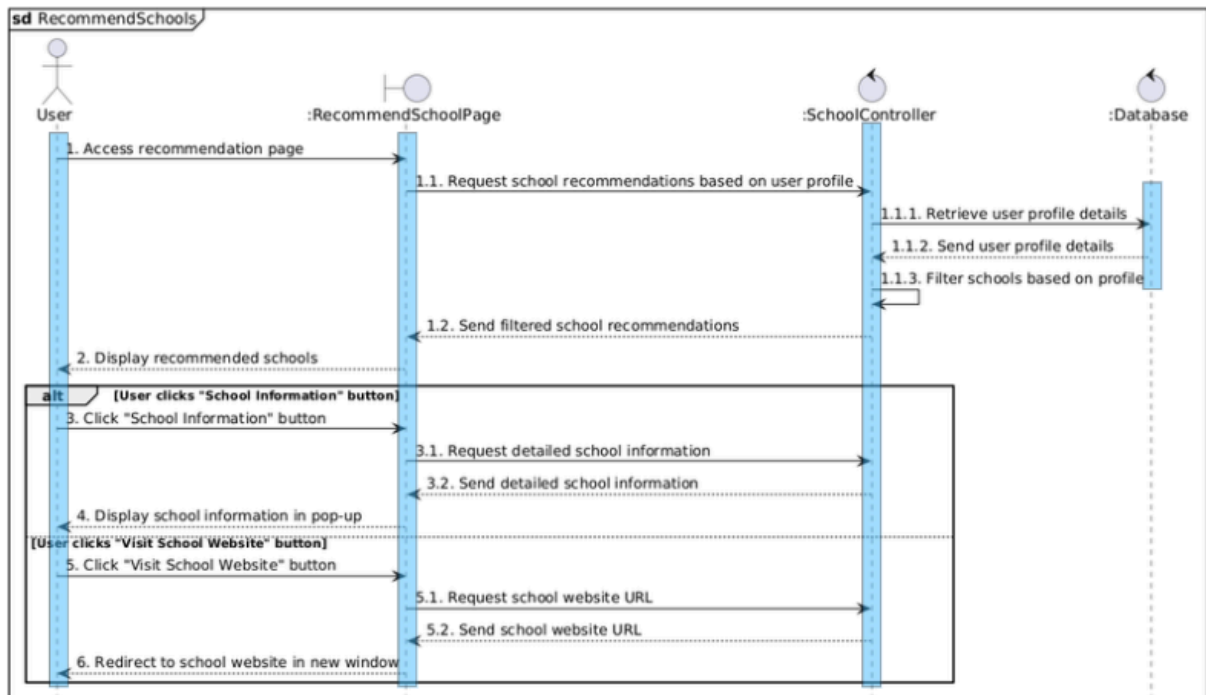
Functional Requirement 4

a. CompareSchool



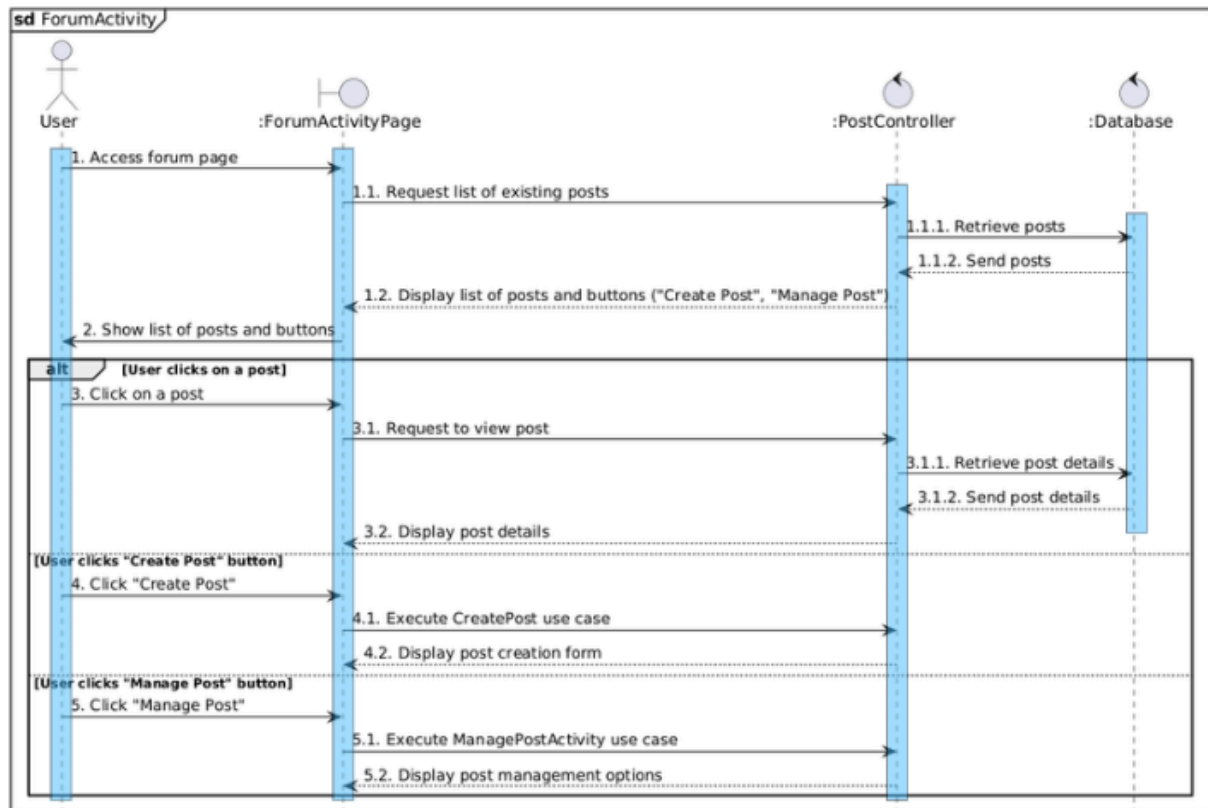
Functional Requirement 5

a. RecommendSchool

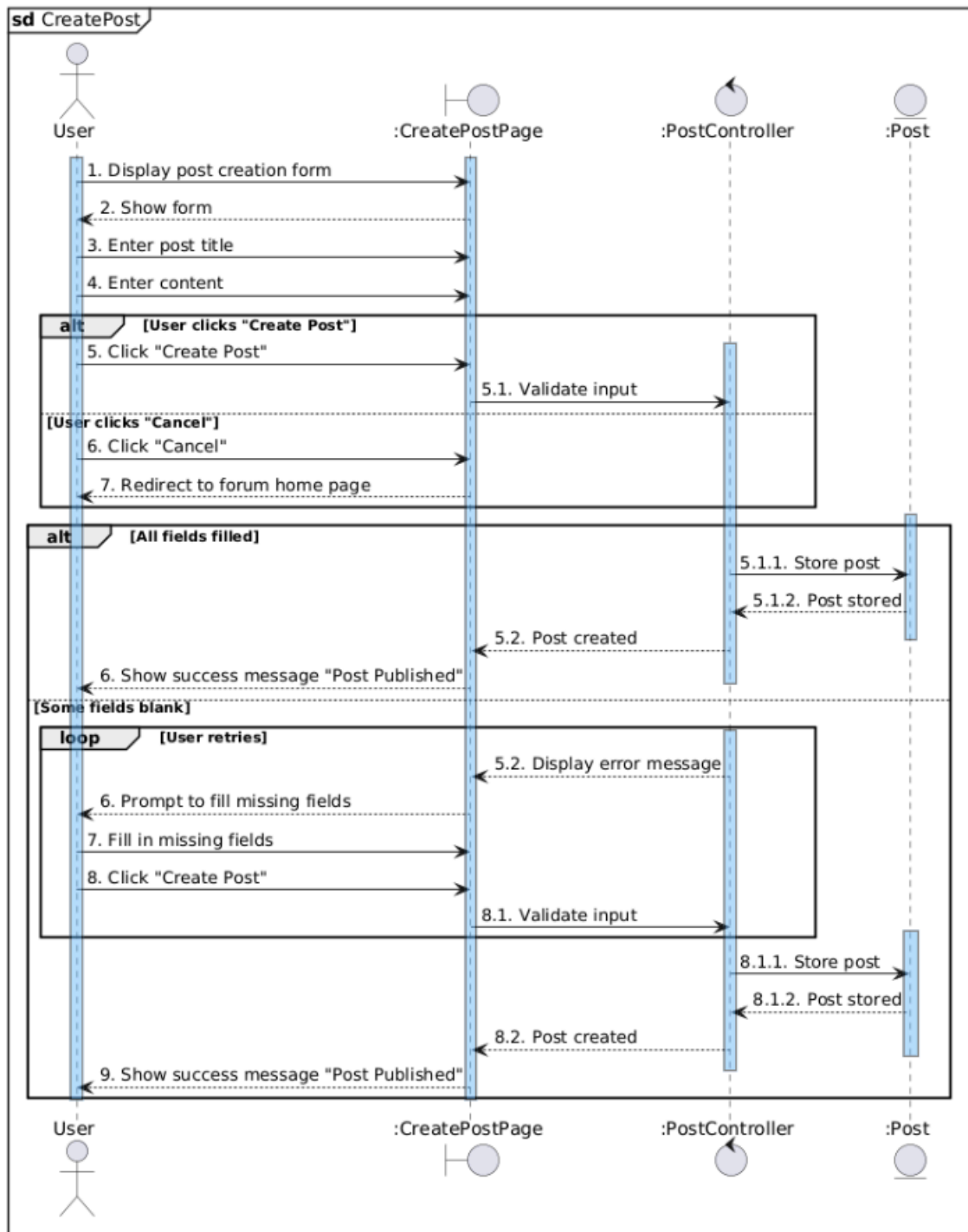


Functional Requirement 6

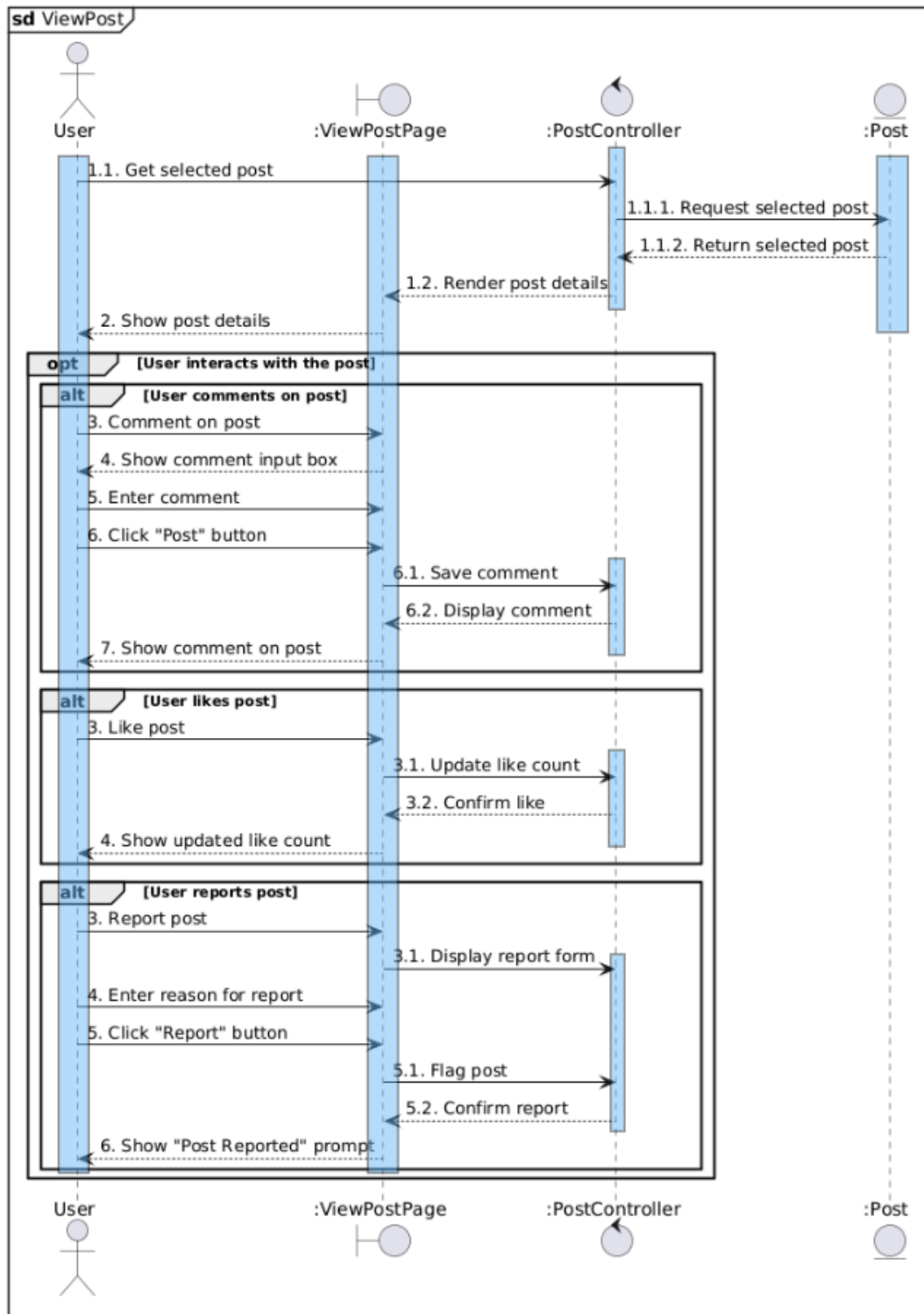
a. ForumActivity



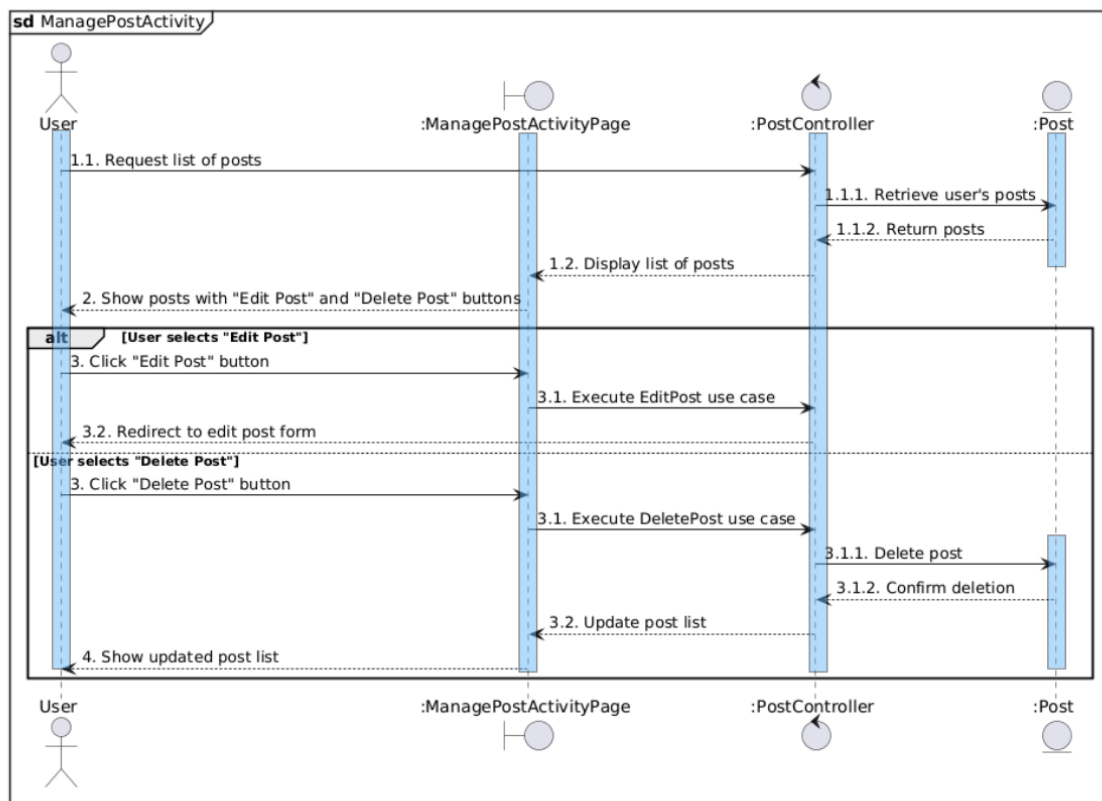
b. CreatePost



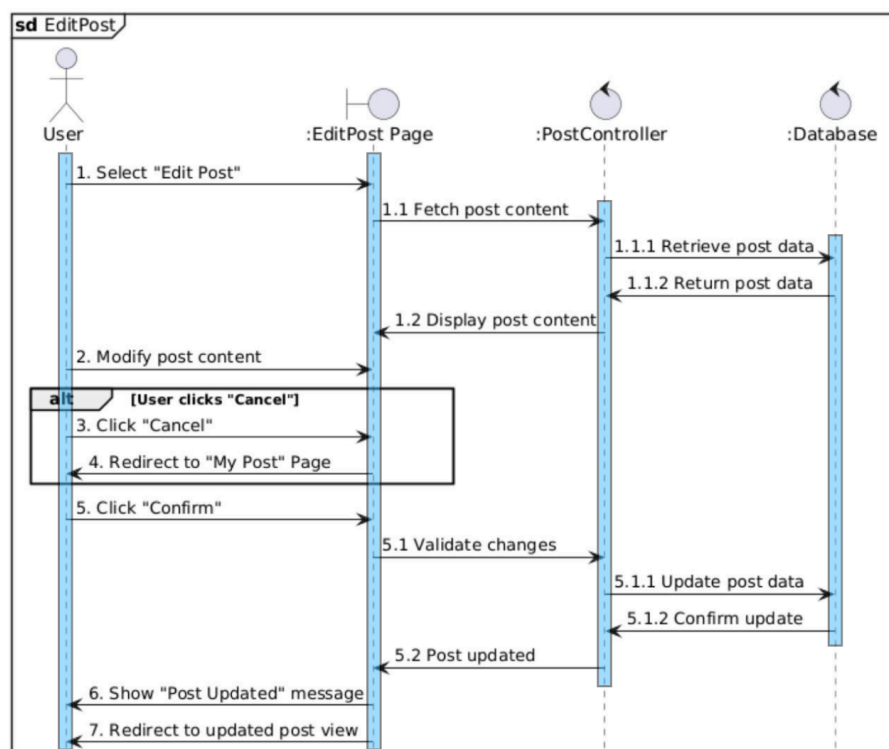
c. ViewPost



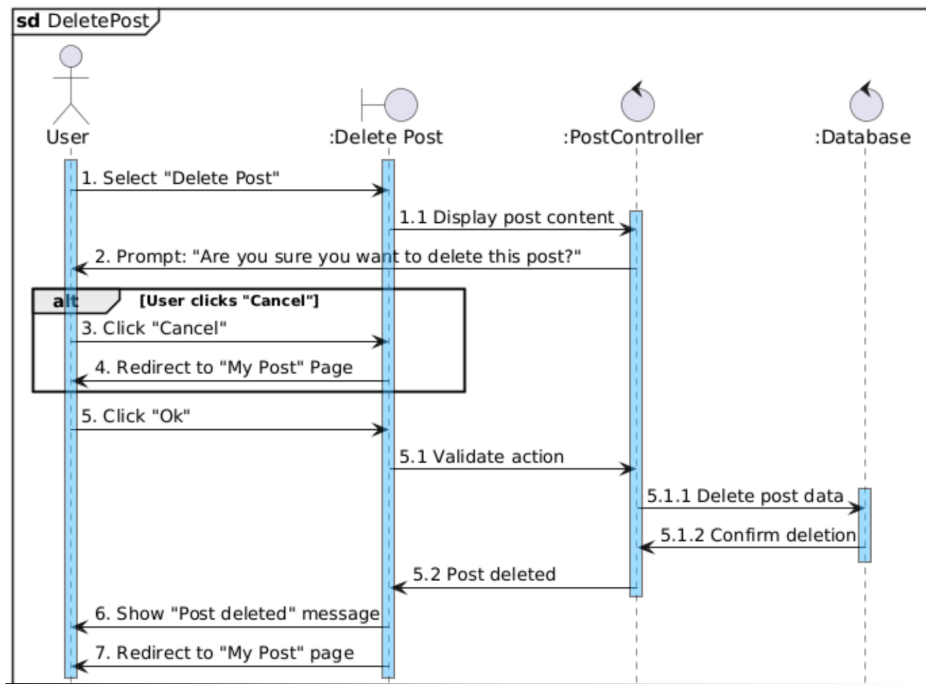
d. ManagePostActivity



e. EditPost

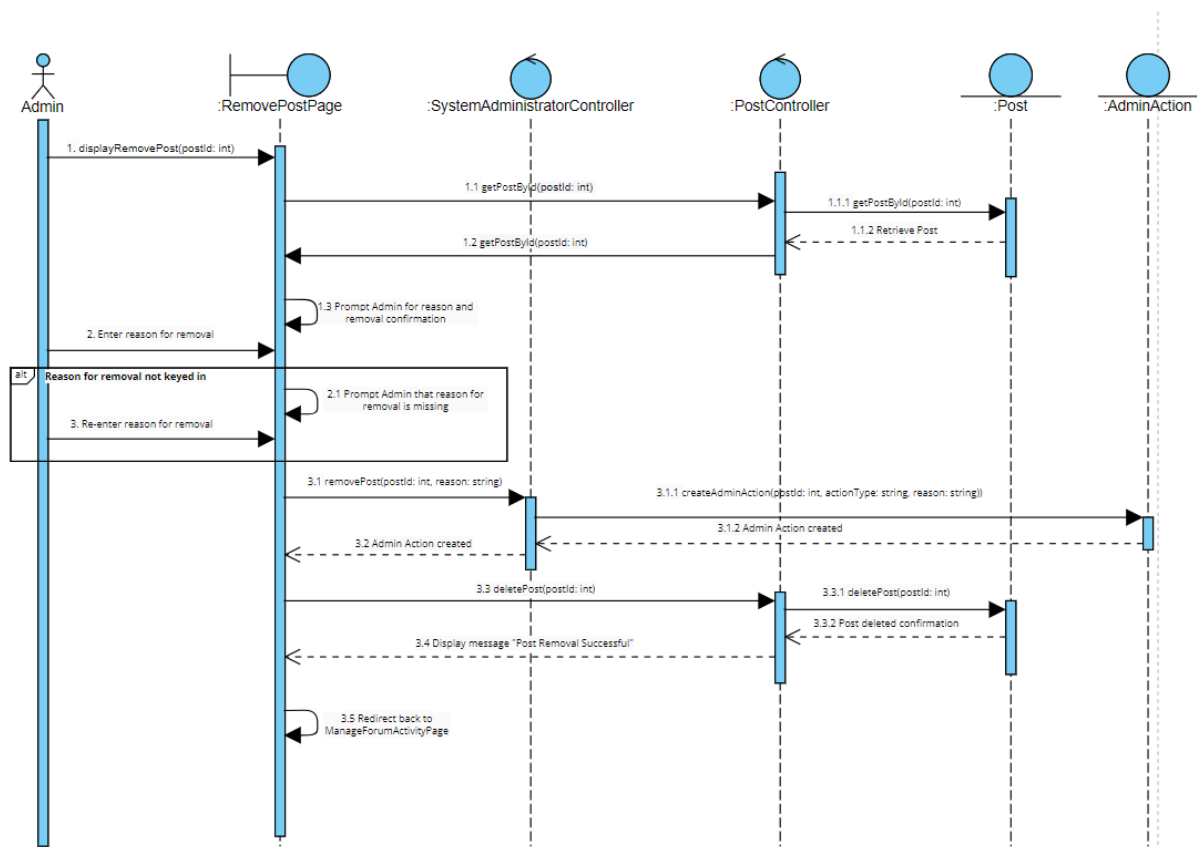


f. DeletePost



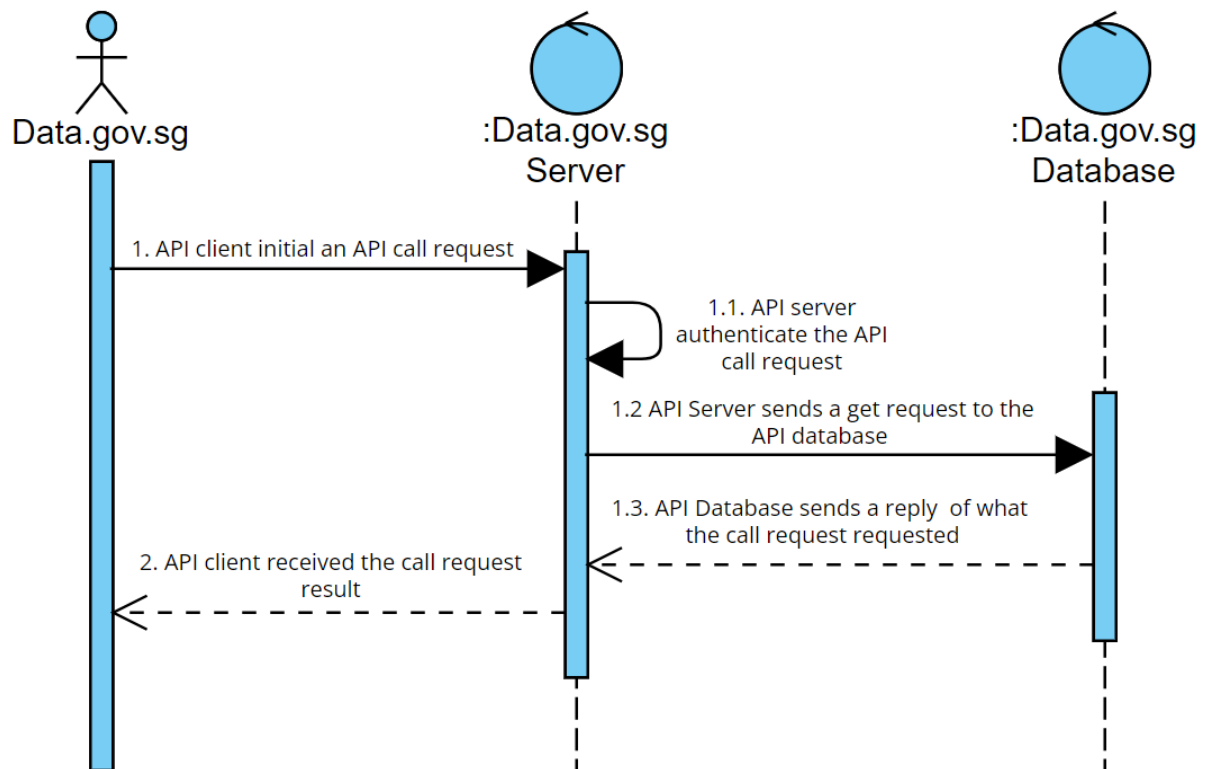
Functional Requirement 7

a. RemovePost



API Function

a. RetrieveSchoolDetails



Test Cases

1. Black Box Testing

I. AccountController - controller we are testing

The accountController manages any request for user authentication, including **register** and **login**.

When a user attempts to register, the controller requires the user to enter their first name, last name, email, password and re-confirmation of their password. Upon entering of the data, it would be validated for example whether a valid email or password is given. Prior to adding the user's password into the database, the password would be hashed.

When a user attempts to login, the controller would require the user to enter their email and password which would be validated for correctness. To authenticate the user, the controller would get the hashed password from the database and compare it with the user's provided password. If the password matches, the user would be redirected to the home page.

II. Equivalence Class and Boundary Value Testing

Equivalence Class Testing

For the web users:

Email variables being used for the signup function cannot be repeated, all emails must be unique. Attempting to signup for a web user using an email that exists in the system database will not create a new webuser account. The email variable also checks for the format of the input to see if it is a properly formatted email input. If the email input variable is not a proper format for an email, the webuser account will not be created.

Password variables used for the webuser have a structure to follow to ensure the password created is strong (fulfills our password requirement criteria). The password restriction used in this application checks if the password is at least 8 characters long and includes the usage of at least 1 lowercase, uppercase letter and a number. Passwords not matching this requirement will be rejected and the webuser account will not be created.

First name and last name variables will be checked to see if they are empty or null. If these fields are empty, webuser will not be created.

Boundary Value Testing

1. Signup Function

Valid Equivalence Class: First name, Last name, Email, Password, Confirm Password, Terms & Conditions with correct formats and fulfills conditions.

Invalid equivalence Class: First name, Last name, Email, Password, Confirm Password, Terms & Conditions with incorrect formats or missing conditions.

2. Sign in Function

Valid Equivalence Class: Email, password with correct formats and fulfills conditions.

Invalid Equivalence Class: Email, password with incorrect formats or missing conditions.

Equivalence Class	Boundary Conditions
Password	Minimum length of 8 (Minimum boundary) Contains the following character variation: A, a, 1 Password123 (accepted) Password123 (rejected) Password (rejected) Pass1 (rejected)
Email	Must be unique (non-existent in the system) Minimum format a@b.com (Minimum boundary) Formatted with an '@', characters in between, and with a "." and characters afterward user@gmail.com (valid) user.com (rejected) user@ (rejected) user@.com (rejected) iexistedalready@gmail.com (rejected, existed)

1) Signup

Input parameters: First name, Last name, Email, Password, Confirm Password, Terms & Conditions

No	Test Input	Expected Output	Actual Output	Pass ?
1	(All valid Inputs) First Name: "Tang" Last Name: "Guan Yu" Email: "TangGuanYu@gmail.com" Password: "Password123" Confirm Password: "Password123" Terms & Conditions: selected	Successful signup	Successful signup	Pass
2	(All Input Empty) (All invalid Inputs) First Name: "" Last Name: "" Email: "" Password: "" Confirm Password: "" Terms & Conditions: not selected	Unsuccessful signup, system notify: - Email is required -First name is required -Last name is required -Password is required - Confirmation password is required - Please tick this box if you want to proceed.	Unsuccessful signup, system notify: - Email is required -First name is required -Last name is required -Password is required - Confirmation password is required - Please tick this box if you want to proceed.	Pass
3	(All valid inputs except	Unsuccessful	Unsuccessful	Pass

	password) (Valid) First Name: "Guan Yu" (Valid) Last Name: "Tang" (Valid) Email: "Supergy@gmail.com" (Invalid) Password: "pass123" (Invalid) Confirm Password: "pass123" (Valid) Terms & Conditions: selected	signup, system notify "Password did not meet requirements"	signup, system notify "Password did not meet requirements"	
4	(All valid inputs except confirm password) (Valid) First Name: "Guan Yu" (Valid) Last Name: "Tang" (Valid) Email: "Supergy@gmail.com" (Valid) Password: "Pass1234" (Invalid) Confirm Password: "Pass4567" (Valid) Terms & Conditions: selected	Unsuccessful signup, system notify "Passwords do not match"	Unsuccessful signup, system notify "Passwords do not match"	Pass
5	(All valid inputs except first name) (Invalid) First Name: "" (Valid) Last Name: "Guan Yu" (Valid) Email: "TangGuanYu@gmail.com" (Valid) Password: "Password123" (Valid) Confirm Password: "Password123" (Valid) Terms & Conditions: selected	Unsuccessful signup, system notify "First name is required"	Unsuccessful signup, system notify "First name is required"	Pass
6	(All valid inputs except last name) (Invalid) First Name: "Guan Yu" (Invalid) Last Name: "" (Valid) Email: "TangGuanYu@gmail.com" (Valid) Password: "Pword123" (Valid) Confirm Password: "Pword123" (Valid) Terms & Conditions: selected	Unsuccessful signup, system notify "Last name is required"	Unsuccessful signup, system notify "Last name is required"	Pass
7	(All valid inputs except email) (Valid) First Name: "Guan Yu" (Valid) Last Name: "Tang" (Invalid) Email: "Supergy" (Valid) Password: "Pass1234"	Unsuccessful signup, system notify "Please include an '@' in the email address.	Unsuccessful signup, system notify "Please include an '@' in the email address.	Pass

	(Valid) Password: "Pass1234" (Valid) Terms & Conditions: selected	'Supergy' is missing an '@'."	'Supergy' is missing an '@'."	
8	(All valid inputs except email) (Valid) First Name: "Guan Yu" (Valid) Last Name: "Tang" (Invalid) Email: "Supergy@" (Valid) Password: "Pass1234" (Valid) Password: "Pass1234" (Valid) Terms & Conditions: selected	Unsuccessful signup, system notify "Please enter a part following '@' in the email address. 'e@' is incomplete."	Unsuccessful signup, system notify "Please enter a part following '@' in the email address. 'e@' is incomplete."	Pass
9	(All valid inputs except email) (Valid) First Name: "Guan Yu" (Valid) Last Name: "Tang" (Invalid) Email: "Supergy@gmail" (Valid) Password: "Pass1234" (Valid) Password: "Pass1234" (Valid) Terms & Conditions: selected	Unsuccessful signup, system notify "Email is invalid"	Unsuccessful signup, system notify "Email is invalid"	Pass
10	(All valid Inputs except terms & conditions) (Valid) First Name: "Tang" (Valid) Last Name: "Guan Yu" (Valid) Email: "TangGuanYu@gmail.com" (Valid) Password: "Password123" (Valid) Confirm Password: "Password123" (Invalid) Terms & Conditions: not selected	Unsuccessful signup, system notify "Please tick this box if you want to proceed."	Unsuccessful signup, system notify "Please tick this box if you want to proceed."	Pass

2) Sign In

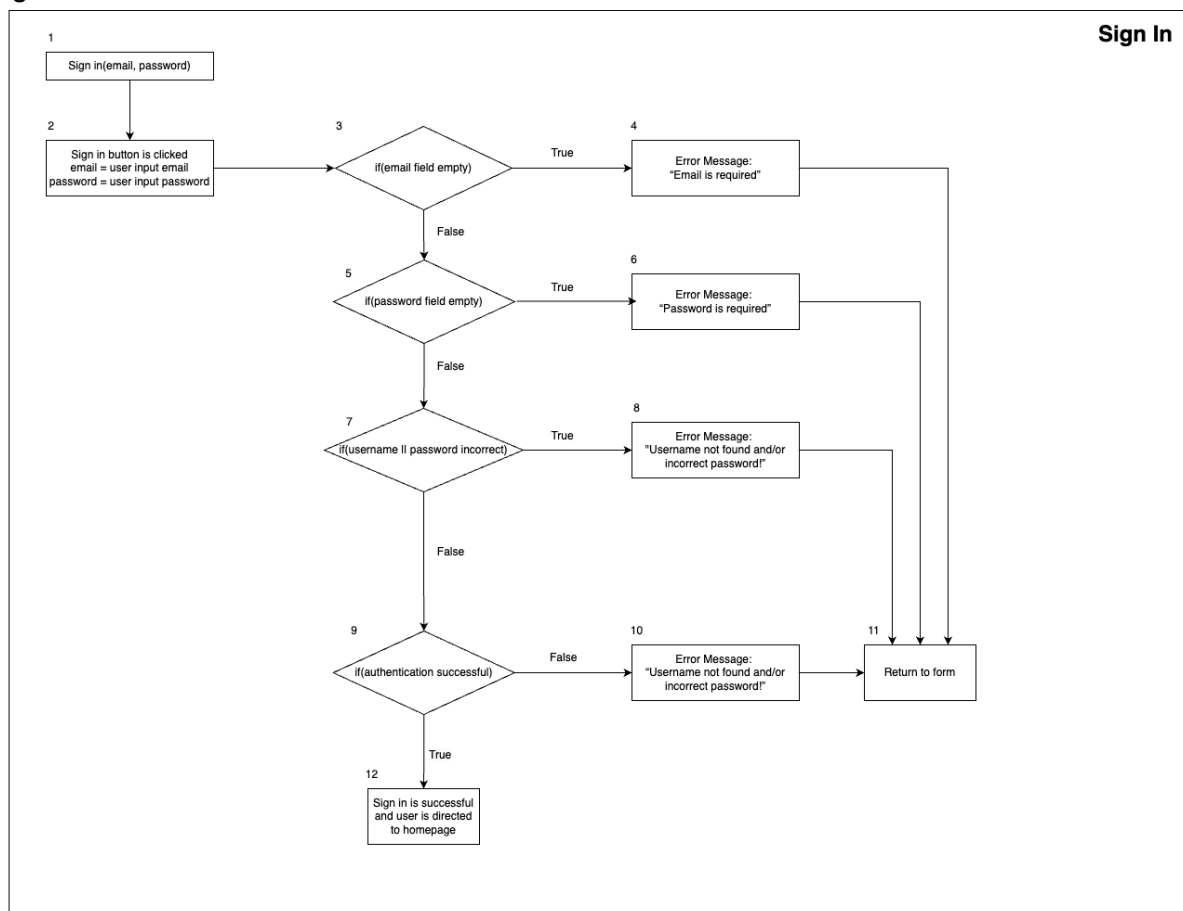
Input parameters: Email, Password

No	Test Input	Expected Output	Actual Output	Pass ?
1	(Valid) Email: "TangGuanYu@gmail.com" (Valid) Password: "Password123"	Successful sign in	Successful sign in	Pass
2	(Invalid) Email: "TangGuanYu@gmail.com" (Invalid) Password: "Password124"	Unsuccessful sign in, system notify "Username not found and/or	Unsuccessful sign in, system notify "Username not found and/or	Pass

		incorrect password!"	incorrect password!"	
3	(Valid) Email: "SuperGuanYu@gmail.com" (Invalid) Password: ""	Unsuccessful sign in, system notify "Password is required"	Unsuccessful sign in, system notify "Password is required"	Pass
4	(Invalid) Email: "HandsomeGuanYu" (Valid) Password: "Password123"	Unsuccessful sign in, system notify "Email is invalid"	Unsuccessful sign in, system notify "Email is invalid"	Pass
5	(All Input Empty) (All invalid Inputs) Email: "" Password: ""	Unsuccessful sign in, system notify "Email is required" "Password is required"	Unsuccessful sign in, system notify "Email is required" "Password is required"	Pass

2. White Box Testing

Sign In



Cyclomatic Complexity = 4 + 1 = 5

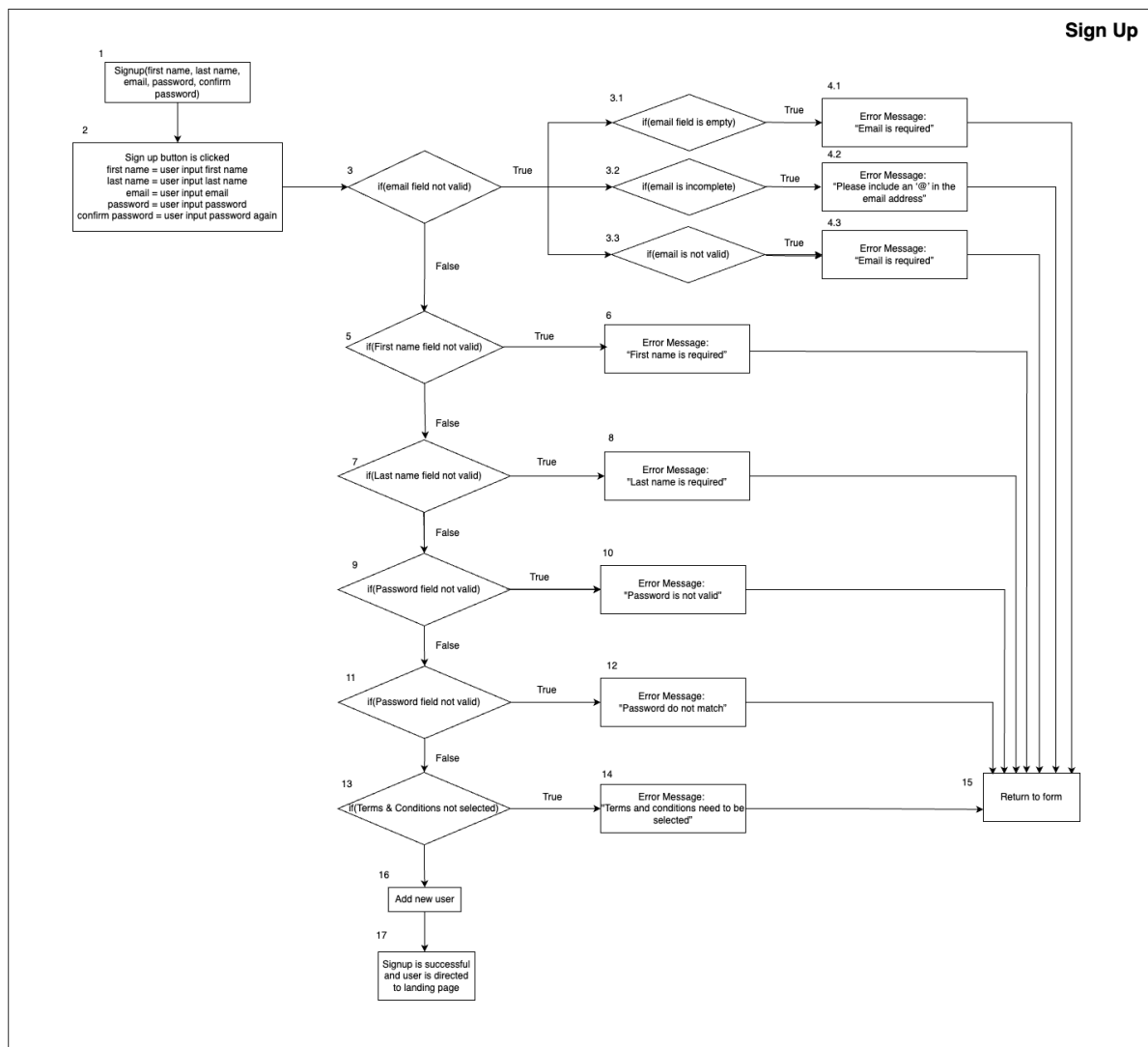
Basic Paths

1. Basispath 1: 1, 2, 3, 4, 11
2. Basispath 2: 1, 2, 3, 5, 6, 11
3. Basispath 3: 1, 2, 3, 5, 7, 8, 11
4. Basispath 4: 1, 2, 3, 5, 7, 9, 10, 11
5. Baseline path: 1, 2, 3, 5, 7, 9, 12

Sign In

Path	Sequence	Description
1	1 → 2 → 3 (True) → 4 → 11	Email field is empty; displays "Email is required" error and returns to the form.
2	1 → 2 → 3 (False) → 5 (True) → 6 → 11	Email is filled, but password field is empty; displays "Password is required" error and returns.
3	1 → 2 → 3 (False) → 5 (False) → 7 (True) → 8 → 11	Email and password are filled, but authentication fails; displays "Incorrect credentials" error.
4	1 → 2 → 3 (False) → 5 (False) → 7 (False) → 9 (False) → 10 → 11	Email and password are filled; authentication is not successful, display "Username not found and/or incorrect password".
5	1 → 2 → 3 (False) → 5 (False) → 7 (False) → 9 (True) → 12	Email and password are filled; authentication is successful, and the user is directed to the homepage.

Sign Up



Cyclomatic Complexity = 8 + 1 = 9

Basic Paths

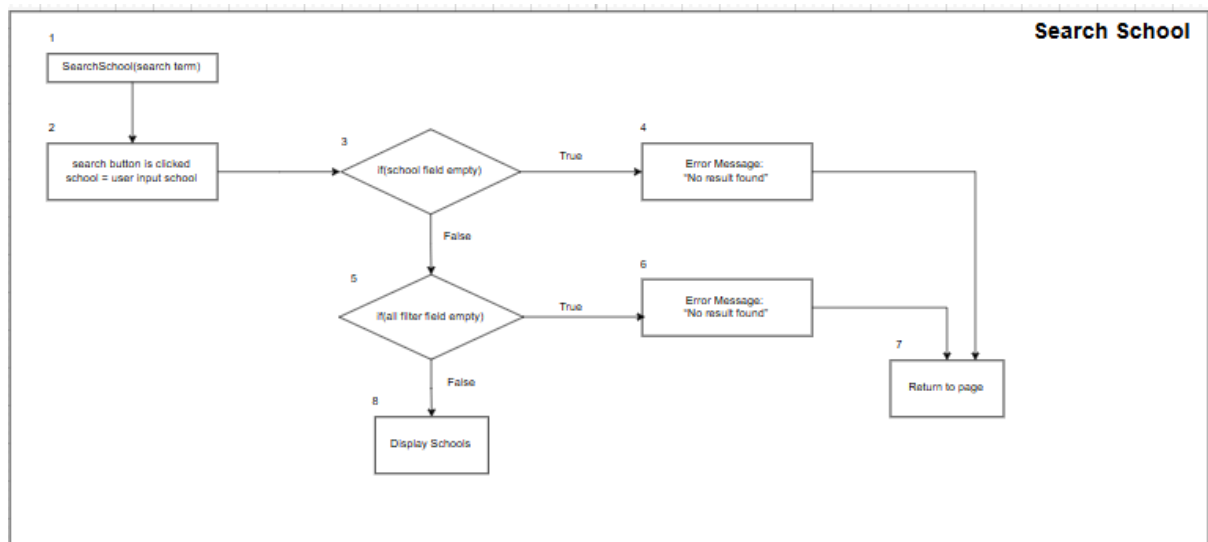
1. Basispath 1: 1, 2, 3, 3.1, 4.1, 15
2. Basispath 2: 1, 2, 3, 3.2, 4.2, 15
3. Basispath 3: 1, 2, 3, 3.3, 4.3, 15
4. Basispath 4: 1, 2, 3, 5, 6, 15
5. Basispath 5: 1, 2, 3, 5, 7, 8, 15
6. Basispath 6: 1, 2, 3, 5, 7, 9, 10, 15
7. Basispath 7: 1, 2, 3, 5, 7, 9, 11, 12, 15
8. Basispath 8: 1, 2, 3, 5, 7, 9, 11, 13, 14, 15
9. Baseline path: 1, 2, 3, 5, 7, 9, 11, 13, 16, 17

Path	Sequence	Description
1	1 → 2 → 3 (True at 3.1) → 4.1 → 15	The email field is empty; displays "Email is required" error and returns to the form.

2	1 → 2 → 3 (False) → 3.2 (True) → 4.2 → 15	The email field is incomplete; displays "Please include an '@' in the email address" error and returns to the form.
3	1 → 2 → 3 (False) → 3.3 (True) → 4.3 → 15	The email is provided but invalid; displays "Email is not valid" error and returns to the form.
4	1 → 2 → 3 (False) → 5 (True) → 6 → 15	The first name field is invalid; displays "First name is required" error and returns to the form.
5	1 → 2 → 3 (False) → 5 (False) → 7 (True) → 8 → 15	The last name field is invalid; displays "Last name is required" error and returns to the form.
6	1 → 2 → 3 (False) → 5 (False) → 7 (False) → 9 (True) → 10 → 15	The password field is invalid; displays "Password is not valid" error and returns to the form.
7	1 → 2 → 3 (False) → 5 (False) → 7 (False) → 9 (False) → 11 (True) → 12 → 15	The passwords do not match; displays "Password does not match" error and returns to the form.
8	1 → 2 → 3 (False) → 5 (False) → 7 (False) → 9 (False) → 11 (False) → 13 (True) → 14 → 15	The terms and conditions are not selected; displays "Terms and conditions need to be selected" error and returns to the form.
9	1 → 2 → 3 (False) → 5 (False) → 7 (False) → 9 (False) → 11 (False) → 13 (False) → 16 → 17	All fields are valid; user is successfully signed up and directed to the landing page.

3. Other Test Cases

This section contains the Whitebox testing of specific functions on the application SearchSchool



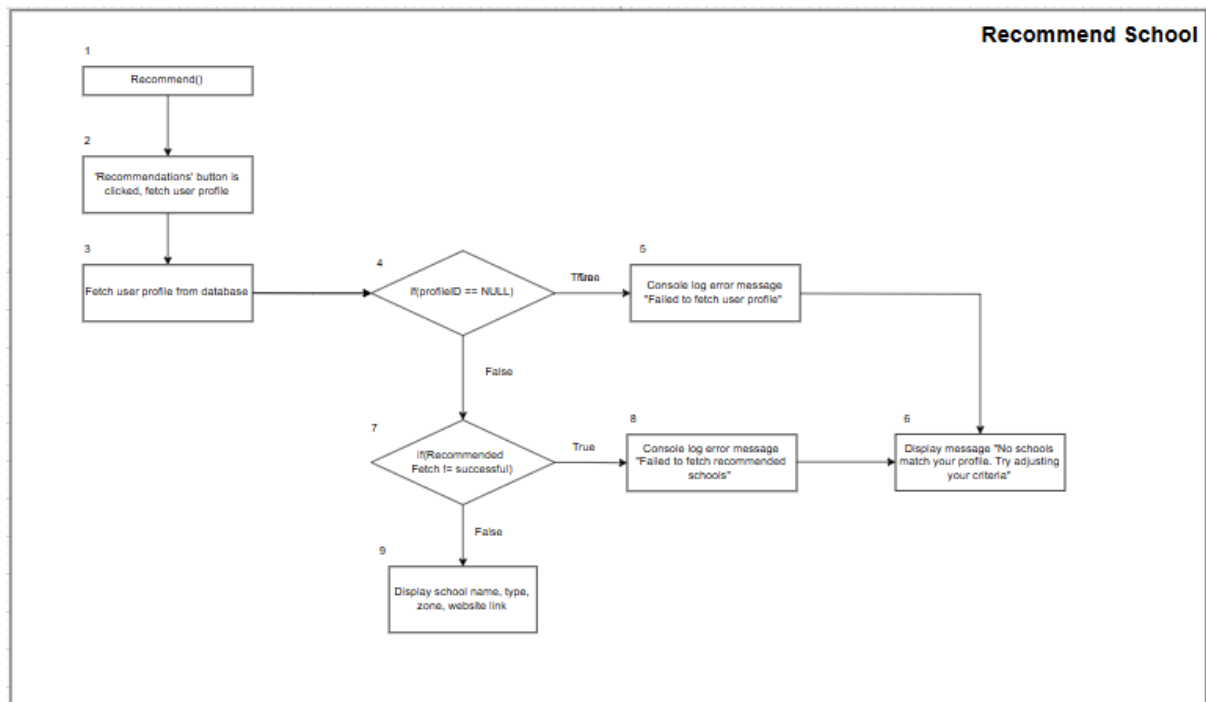
Cyclomatic Complexity = 2 + 1 = 3

Basic Paths

1. Basispath: 1, 2, 3, 5, 8
2. Basic path: 1, 2, 3, 4, 7
3. Basic path: 1, 2, 3, 5, 6, 7

Path	Sequence	Description
1	1 -> 2 -> 3 -> 5 (False) -> 8 (False)	Webpage displays the results of schools found based on the school name field and filter results.
2	1 -> 2 -> 3 -> 4 (True) -> 7	Webpage displays "No results found" based on the school name field search.
3	1 -> 2 -> 3 -> 5 (False) -> 6 (True) -> 7	Webpage displays "No results found" based on the filter search results.

Recommended School



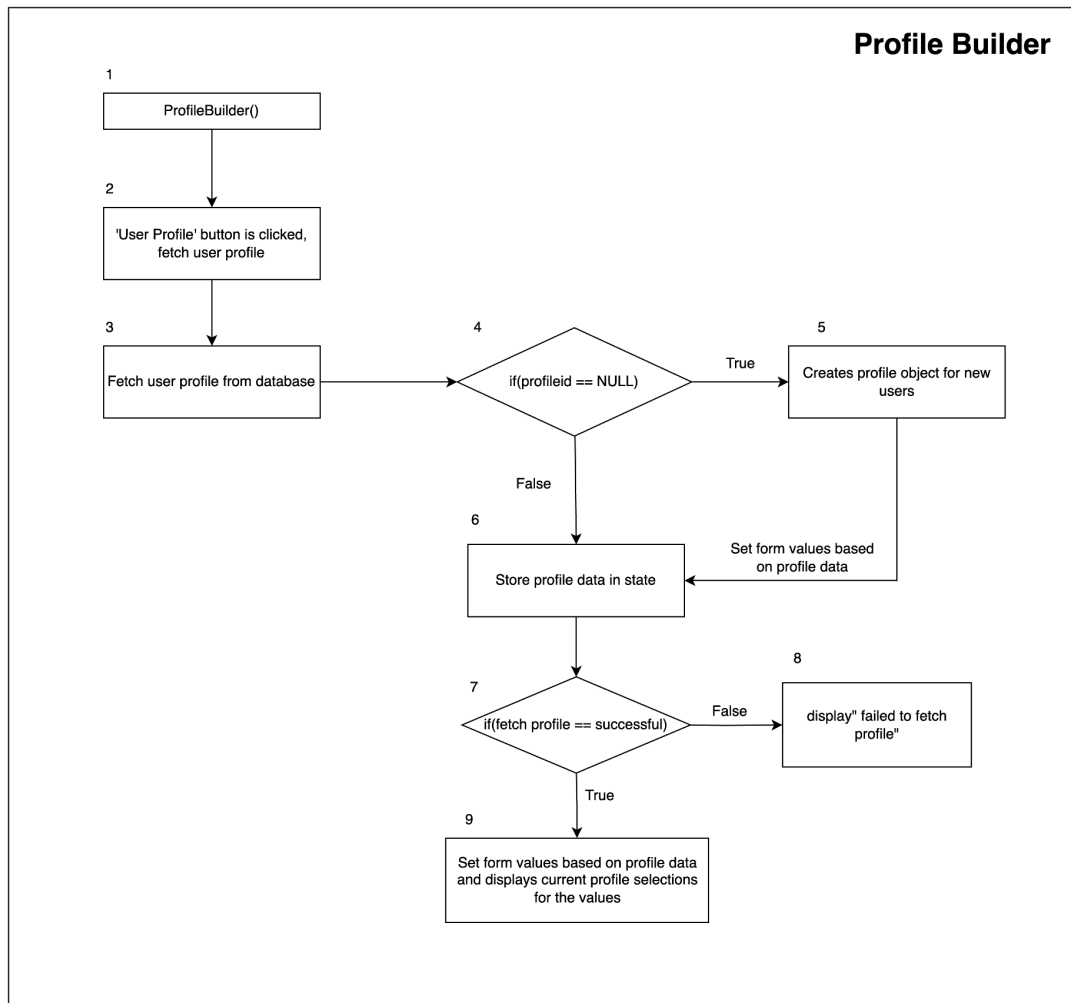
Cyclomatic Complexity = 2 + 1 = 3

Basic Paths

1. Basispath 1: 1,2,3,4,7,9
2. Basispath 2: 1,2,3,4,5,6
3. Baseline path: 1,2,3,4,7,9

Path	Sequence	Description
1	1 -> 2 -> 3 -> 4(False) -> 7(False) -> 9	User profile created by user and recommendation displayed to user
2	1 -> 2 -> 3 -> 4(False) -> 5(True) -> 6	User Profile not created
3	1 -> 2 -> 3 -> 4(False) -> 7(True) -> 8(True) -> 6	User Profile exists, but no schools found under User's criteria

Profile Builder



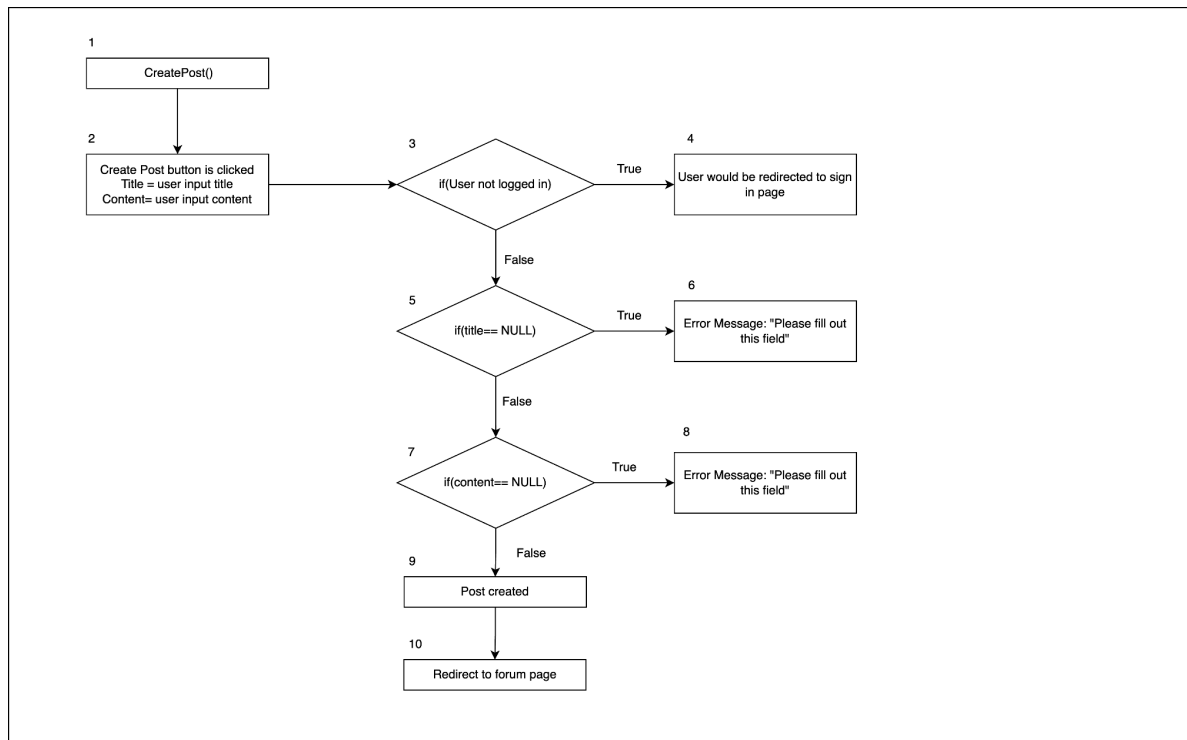
Cyclomatic Complexity = $2 + 1 = 3$

Basic Paths

1. Basis path 1: 1,2,3,4,5,9
2. Basis path 2: 1,2,3,4,6,7,8
3. Baseline path: 1,2,3,4,6,7,9

Path	Sequence	Description
1	1 → 2 → 3 → 4 (True) → 5 → 9	The profile ID is NULL, indicating a new user; creates a profile object for the new user and sets form values.
2	1 → 2 → 3 → 4 (False) → 6 → 7 (True) → 9	The profile ID exists, meaning it is an existing user; fetches profile data, stores it in state, and sets form values.
3	1 → 2 → 3 → 4 (False) → 6 → 7 (False) → 8	The profile ID exists, but fetching profile data fails; displays an error message "Failed to fetch profile."

Create Post



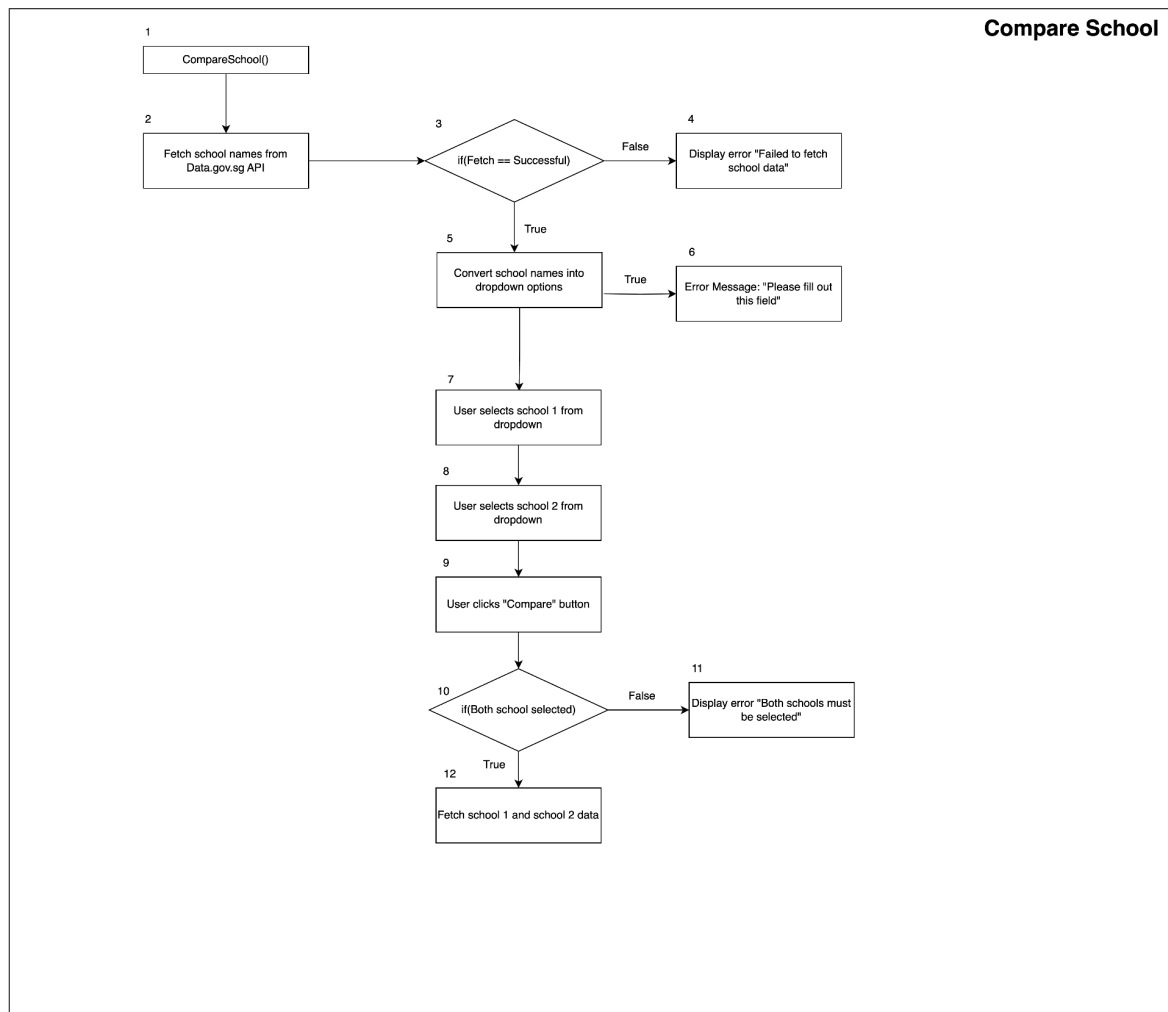
Cyclomatic Complexity = 3 + 1 = 4

Basic Paths

1. Basis path 3: 1,2,3,4
2. Basis path 5: 1,2,3,5,6
3. Basis path 7: 1,2,3,5,7,8
4. Baseline path: 1,2,3,5,7,9,10

Path	Sequence	Description
1	1 → 2 → 3 (True) → 4	The user is not logged in, so they are redirected to the sign-in page.
2	1 → 2 → 3 (False) → 5 (True) → 6	The user is logged in, but the title field is empty; an error message "Please fill out this field" is displayed.
3	1 → 2 → 3 (False) → 5 (False) → 7 (True) → 8	The user is logged in, the title is provided, but the content field is empty; an error message "Please fill out this field" is displayed.
4	1 → 2 → 3 (False) → 5 (False) → 7 (False) → 9 → 10	The user is logged in, both the title and content fields are filled; the post is successfully created, and the user is redirected to the forum page.

Compare School



Cyclomatic Complexity = 2 + 1 = 3

Basic Paths

1. Basis path 1: 1,2,3,4
2. Basis path 2: 1,2,3,5,6
3. Basis path 3: 1,2,3,5,7,8,9,10,11
4. Baseline path: 1,2,3,5,7,8,9,10,12

Path	Sequence	Description
1	1 → 2 → 3 (False) → 4	The fetch from the Data.gov.sg API fails, and an error message "Failed to fetch school data" is displayed.
2	1 → 2 → 3 (True) → 5 → 6	The fetch is successful, but dropdown options are empty; an error message "Please fill out this field" is shown.
3	1 → 2 → 3 (True) → 5 → 7 → 8 → 9 → 10 (False) → 11	Both schools are not selected when the user clicks "Compare"; an error message "Both schools must be selected" is displayed
4	1 → 2 → 3 (True) → 5 → 7 → 8 → 9 → 10 (True)	The fetch is successful, both schools are selected, and the "Compare" button is clicked; data for both schools is

	→ 12	fetches.
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