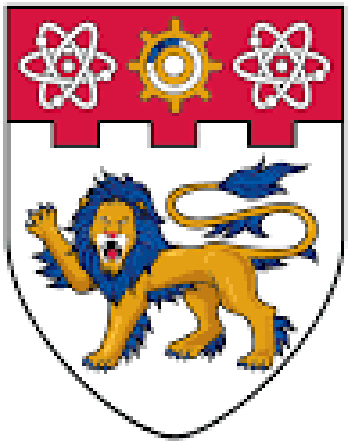

NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

SC2006 - Software Engineering
LAB 4 Deliverable

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Table of Contents

I. Black Box Testing

A. Selected Control Class

The control class that we have selected for black box testing is ReviewController. The ReviewController manages user review functions including submission, updation and deletion of reviews.

During the process of submitting a review, the user must specify a star rating, from 1 to 5, and add some review text for the selected attraction. This information will be stored in the database.

During the process of updating a review, the user must can change the rating, from and add edit their review text for the selected attraction. This information will be updated in the database. Users can only edit their own reviews.

During the process of deleting a review, the user must click the Delete button. The selected review will be deleted from the database. Users can only delete their own reviews.

B. Equivalent Class Testing

The ReviewController handles user interactions related to adding, updating, and deleting attraction reviews. Each function accepts structured input and user authentication, making Equivalence Class Testing suitable to validate expected behavior.

Add Review Function

- Valid Equivalence Class: The rating is between 1 and 5, and the review text is not empty.
- Invalid Equivalence Class: Rating outside the 1–5 range

Update Review Function

- Valid Equivalence Class: The user owns the review, provides a rating between 1 and 5, and provides non-empty updated review text.
- Invalid Equivalence Class: The user provides an invalid rating.

Delete Review Function

- Valid Equivalence Class: The user owns the review to be deleted.
- Invalid Equivalence Class: The user attempts to delete a review they do not own.

C. Test Cases and Results

1. AddReview
   Input Parameters
   1. Rating
   2. ReviewText

Test Case	**Test Input**	**Expected Output**	**Actual Output**	**Test Result**
Case 1	Rating = 4 ReviewText = “Amazing place for Children and family”	Success Message “Review submitted successfully”	Success Message “Review submitted successfully”	Pass
Case 2	Rating = ReviewText = “Amazing place for Children and family”	Error Message “Please enter a rating.”	Error Message “Please enter a rating.”	Pass
Case 3	Rating = 4 ReviewText =	Success Message “Review submitted successfully”	Success Message “Review submitted successfully”	Pass

2. Update Review
   Input Parameters
   1. ReviewID
   2. Rating
   3. ReviewText

Test Case	**Test Input**	**Expected Output**	**Actual Output**	**Test Result**
Case 1	ReviewID:7f6a5769-b62c-4059-ba20-ddac3fe9388b Rating = 4 ReviewText = “Amazing place for Children and family”	Success Message “Review Updated successfully”	Success Message “Review Updated successfully”	Pass
Case 2	ReviewID:7f6a5769-b62c-4059-ba20-ddac3fe9388b Rating = ReviewText = “Amazing	Success Message “Review Updated successfully”	Success Message “Review Updated successfully”	Pass

	place for Children and family”			
Case 3	ReviewID:7f6a5769-b62c-4059-ba20-ddac3fe9388b Rating = 4 ReviewText =	Success Message “Review Updated successfully”	Success Message “Review Updated successfully”	Pass

3. DeleteReview
    1. ReviewID

Test Case	**Test Input**	**Expected Output**	**Actual Output**	**Test Result**
Case 1	ReviewID:7f6a5769-b62c-4059-ba20-ddac3fe9388b Delete Button Clicked	Success Message “Review Deleted successfully”	Success Message “Review Deleted successfully”	Pass

4. FlagReview
    1. ReviewID

Test Case	**Test Input**	**Expected Output**	**Actual Output**	**Test Result**
Case 1	ReviewID:7f6a5769-b62c-4059-ba20-ddac3fe9388b Flag Button Clicked	Success Message “Review Flagged successfully”	Success Message “Review Flagged successfully”	Pass
Case 2	ReviewID:7f6a5769-b62c-4059-ba20-ddac3fe9388b UnFlag Button Clicked	Success Message “Review UnFlagged successfully”	Success Message “Review UnFlagged successfully”	Pass

Note: The ReviewID can never be invalid or null as it is automatically fetched from the database when clicked on the edit/delete/flag review button

II. White Box Testing

The following use cases will be used for white box testing:

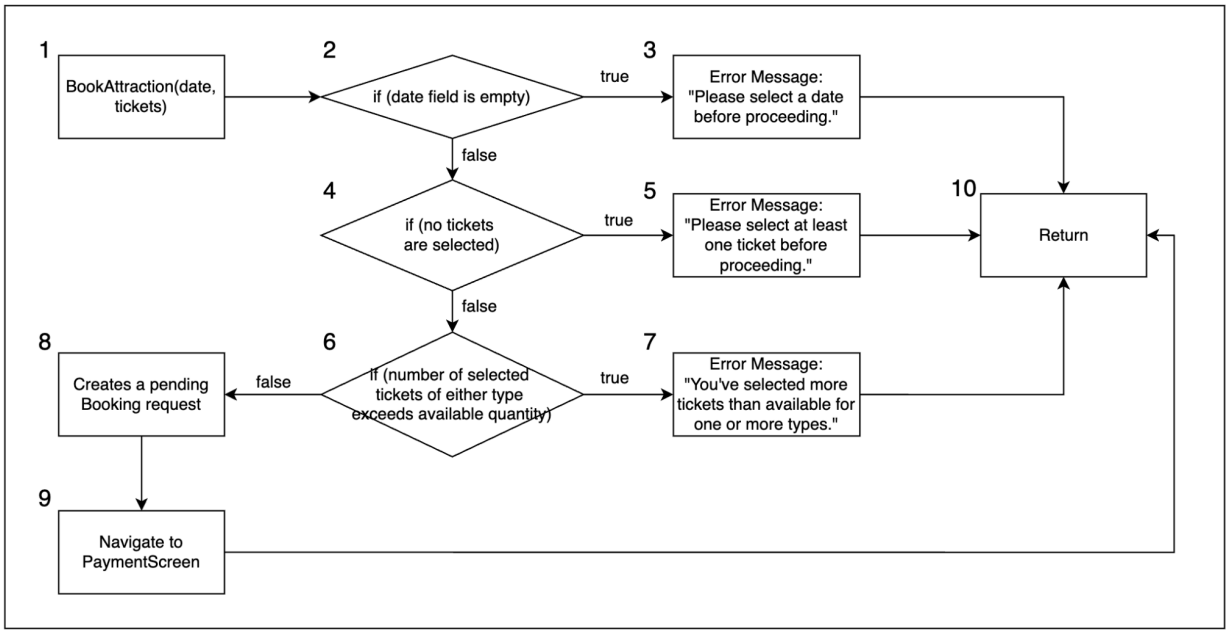
A. BookAttraction
B. UpdateAttraction

A. BookAttraction:

The BookAttraction use case allows users to view attraction details and book tickets.

Users can check the attraction details like type, location and rating. They can then select a date and number of tickets, before proceeding to book.

1. Control Flow Graph



2. Cyclomatic Complexity

Cyclomatic complexity is a software metric that measures the complexity of a program's source code by quantifying the number of linearly independent paths through it, essentially counting the number of decision points

Cyclomatic complexity = | Binary Decision Nodes | + 1 = 3 + 1 = 4

3. Basis Paths

Basis Path #1 (Baseline Path): 1, 2, 4, 6, 8, 9, 10
Basis Path #2: 1, 2, 3, 10
Basis Path #3: 1, 2, 4, 5, 10

Basis Path #4: 1, 2, 4, 6, 7, 10

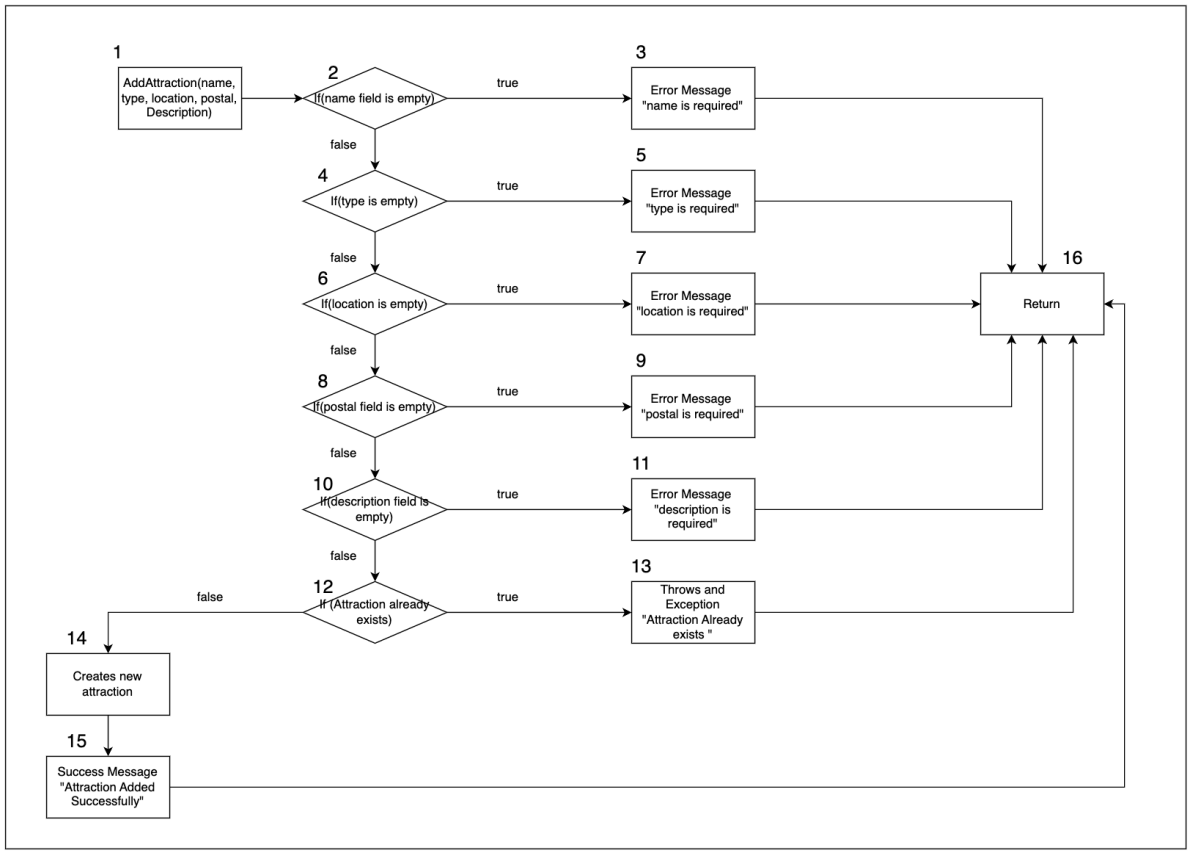
4. Test Cases and Results

Test Case	**Test Input**	**Expected Output**	**Actual Output**	**Test Result**
Case 1	Date: “02-05-2025” Adult Tickets: 2 Child Tickets: 2	Navigation to Payment Page	Navigation to Payment Page	Pass
Case 2	Date: “” Adult Tickets: 2 Child Tickets: 2	Error Message: "Please select a date before proceeding."	Error Message: "Please select a date before proceeding."	Pass
Case 3	Date: “02-05-2025” Adult Tickets: 0 Child Tickets: 0	Error Message: "Please select at least one ticket before proceeding."	Error Message: "Please select at least one ticket before proceeding."	Pass
Case 4	Date: “02-05-2025” Adult Tickets: 2 Child Tickets: 100	Error Message: "You've selected more tickets than available for one or more types."	Error Message: "You've selected more tickets than available for one or more types."	Pass

B. AddAttraction:

The AddAttraction use case allows admins to add new attraction into the database. In this process, admins are required to add the name, type, location, postal code and description of a particular attraction they wish to add. The admin will then receive a confirmation message upon successful completion of the request or a failure message in the event of an error.

1. Control Flow Graph



2. Cyclomatic Complexity

Cyclomatic complexity is a software metric that measures the complexity of a program's source code by quantifying the number of linearly independent paths through it, essentially counting the number of decision points

Cyclomatic complexity = |Binary Decision Nodes | + 1 = 6 + 1 = 7

3. Basis Paths

Basis path 1 (Baseline): 1, 2,4,6,8,10,12,14,15,16
Basis path 2 : 1,2,3,16
Basis path 3: 1,2,4,5,16
Basis path 4: 1,2,4,6,7,16
Basis path 5: 1,2,4,6,8,9,16
Basis path 6: 1,2,4,6,8,10,11,16
Basis path 7: 1,2,4,6,8,10,12,13,16

4. Test Cases and Results

Input Parameters

1. Name
2. Type
3. Location
4. Postal
5. Description

Test Case	**Test Input**	**Expected Output**	**Actual Output**	**Test Result**
Case 1	Name: “Luge” Type: “Activity” Location: “45 Siloso Beach Walk, Sentosa Island” Postal: 099003 Description: “Skyline Luge Singapore offers 4 purpose-built tracks with hairpin corners, exhilarating tunnels and downhill slopes through a tropical rainforest”	Success Message “Attraction added successfully”	Success Message “Attraction added successfully”	Pass
Case 2	Name: Type: “Activity” Location: “45 Siloso Beach Walk, Sentosa Island”	Error Message “Attraction name is required field”	Error Message “Name is required”	Pass

	Postal: 099003 Description: “Skyline Luge Singapore offers 4 purpose-built tracks with hairpin corners, exhilarating tunnels and downhill slopes through a tropical rainforest”			
Case 3	Name: “Luge” Type: Location: “45 Siloso Beach Walk, Sentosa Island” Postal: 099003 Description: “Skyline Luge Singapore offers 4 purpose-built tracks with hairpin corners, exhilarating tunnels and downhill slopes through a tropical rainforest”	Error Message “Attraction type is a required field”	Error Message “Attraction type is a required field”	Pass
Case 4	Name: “Luge” Type: “Activity” Location: Postal: 099003 Description: “Skyline Luge Singapore offers 4 purpose-built tracks with hairpin corners, exhilarating tunnels and downhill slopes through a tropical rainforest”	Error Message “Attraction Location is a required field”	Error Message “Attraction Location is a required field”	Pass
Case 5	Name: “Luge” Type: “Activity” Location: “45 Siloso Beach Walk, Sentosa Island” Postal: Description: “Skyline Luge Singapore offers	Error Message “Attraction Postal Code is a required field”	Error Message “Attraction Postal Code is a required field”	Pass