

**NANYANG  
TECHNOLOGICAL  
UNIVERSITY**  

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**SINGAPORE**

**SC2006-24S1 Software Engineering**  
**#Lab 4 Deliverables**

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## **Black Box Testing**

### **Control Class - SearchSystemController**

The SearchSystemController class manages the search function in our application, which includes both address and carpark searches. When the user opens the application, the search box will be on the landing page and users can enter an address/carpark they wish to go to. Subsequently, the input will be validated and the top 10 addresses that are most relevant to the input will be displayed, and the user will be able to select from the given outputs, or edit their input.

### **Control Class - BookmarkController**

The BookmarkController class manages the bookmark functionality in our application, allowing users to add, retrieve, and remove bookmarks efficiently. When a user interacts with the application, they can navigate to the BookmarksPage, where they can view their saved locations. The BookmarkController processes user requests by interfacing with the underlying data structures, such as the BookmarkList, to perform operations like adding a new bookmark or retrieving existing ones. When a user adds a bookmark, the input data (location and coordinates) are validated and stored. If a user decides to remove a bookmark, the BookmarkController handles the deletion request and updates the user's bookmark list accordingly. This ensures that the bookmark-related functionality remains streamlined and responsive to user interactions on the BookmarksPage.

### **Equivalence Class Testing and Boundary Value Testing**

This is a test design technique where test cases are designed to execute representatives from equivalence partitions. Equivalence classes are sections of an input or output domain, and the output of the component/system is the same for each input value of an equivalence class. Test cases are designed to cover each class at least once. Valid equivalence classes should be handled correctly, whereas invalid ones should be rejected by the system.

Boundary value testing is an extension of equivalence class testing and applies only when members of the class are ordered. For our SearchSystemController, we will be using boundary value testing for the input length.

## Testing Cases and Results

### SearchSystemController - Equivalence Class Testing

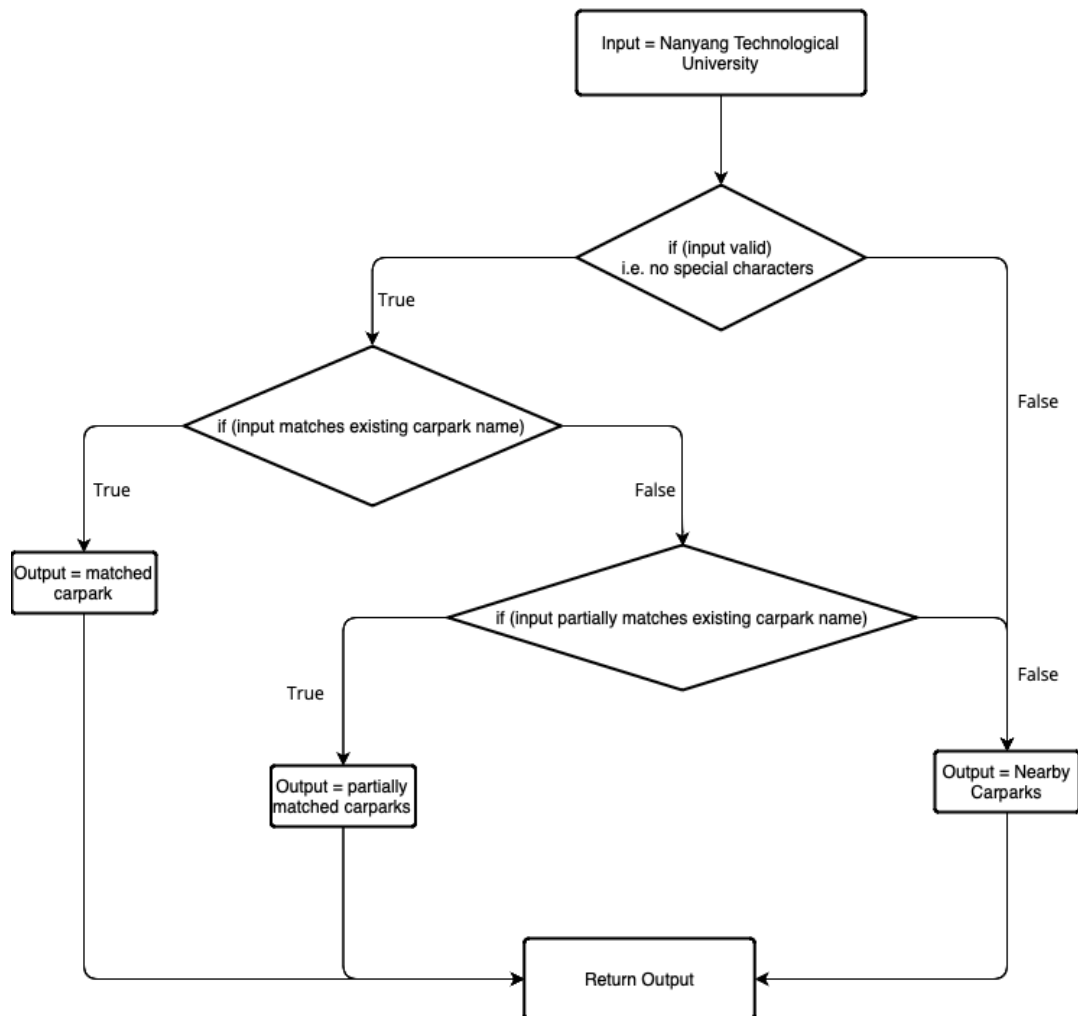
Category	Test Input	Expected Output	Actual Output	Pass/Fail
Valid exact match	<b>(Valid input)</b> "Nanyang Technological University"	Recommends correct address with other relevant addresses	Recommends correct address with other relevant addresses	Pass
Valid partial match	<b>(Valid input)</b> "Nanyang"	Recommends multiple matches containing "Nanyang"	Recommends multiple matches containing "Nanyang"	Pass
Case sensitivity	<b>(Valid input - all caps)</b> "NANYANG TECHNOLOGICAL UNIVERSITY"  <b>(Valid input - mixed case)</b> "nAnyAnG TeChNOloGical UniVerSiTy"	Recommends correct address with other relevant addresses	Recommends correct address with other relevant addresses	Pass
Invalid address	<b>(Invalid input - empty string)</b> ""  <b>(Invalid input - special characters)</b> "@#\$\$%"	No relevant search result appears, interface prints "No result found"	No relevant search result appears, interface prints "No result found"	Pass
Different address formats	<b>(Valid input - postal code)</b> "636960"	Recommends correct address with result "Singapore 636960"	Recommends correct address with result "Singapore 636960"	Pass
Coordinate Input	<b>(Invalid input - coordinates)</b> "1.3562498902845, 103.6860328622769"	No relevant search result appears	No relevant search result appears	Pass
Language	<b>(Valid input - languages other than English)</b> "滨海湾" "Teluk Marina" "மரீனா"	Recommends correct address with other relevant addresses	Recommends correct address with other relevant addresses	Pass

### SearchSystemController(Input length) - Boundary Value Testing

Test Case	Test Input Length (Characters)	Expected Output	Actual Output	Pass/Fail
Lower Boundary	2	Recommends address starting with the input letters	Recommends address starting with the input letters	Pass
Upper Boundary	256	Recommends relevant address that fulfils the 256 characters	Recommends relevant address that fulfils the 256 characters	Pass
Just below lower boundary	1	No recommendations will be shown	No recommendations will be shown	Pass
Just above upper boundary	257	Runtime error	Runtime error	Pass

## White Box Testing

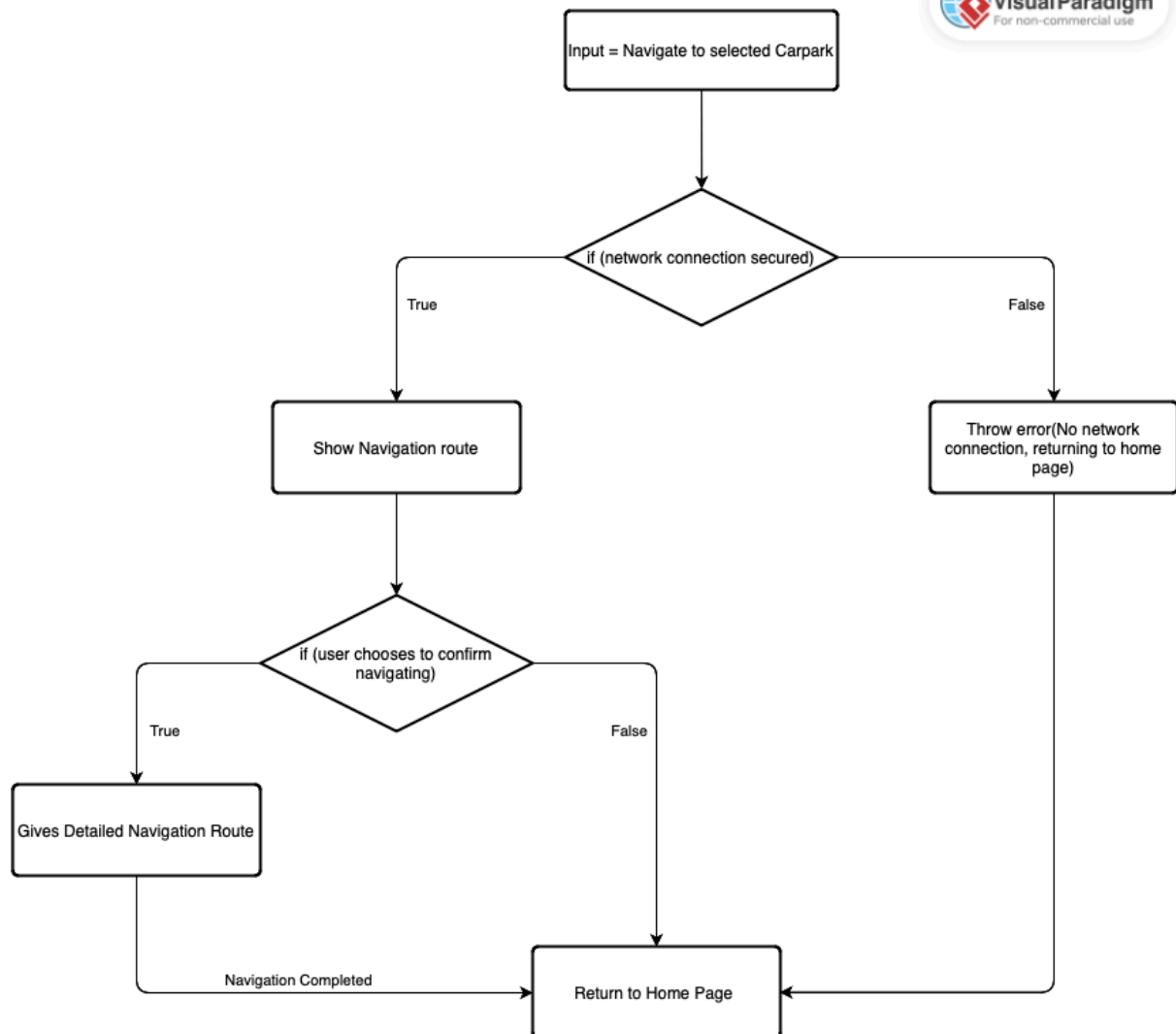
### Search Carparks



Test Case ID	Search-1		Test Case Priority	High	
Test Case Description	Searching - Positive Test Case				
Prerequisite	Stable Internet Connection		Postrequisite	NA	
Test Execution Steps					
Step No.	Action	Input	Expected Output	Actual Output	Test Result
1	Launch Application	-	Landing Page	Landing Page	Pass
2	Wait for Home Page to load	-	Home Page	Home Page	Pass
3	Enter location/ carpark into searchbox	Valid location input	Searched location on Map	Searched location on Map	Pass
Test Case Status					
Comments					

Test Case ID	Search-2		Test Case Priority	High	
Test Case Description	Searching - Negative Test Case				
Prerequisite	Stable Internet Connection		Postrequisite	NA	
Test Execution Steps					
Step No.	Action	Input	Expected Output	Actual Output	Test Result
1	Launch Application	-	Landing Page	Landing Page	Pass
2	Wait for Home Page to load	-	Home Page	Home Page	Pass
3	Enter invalid location/ carpark into searchbox	Inputs of the type (Empty string, Special characters, Coordinates)	No results	No results	Pass
Test Case Status					
Comments					

## Navigate to Carpark

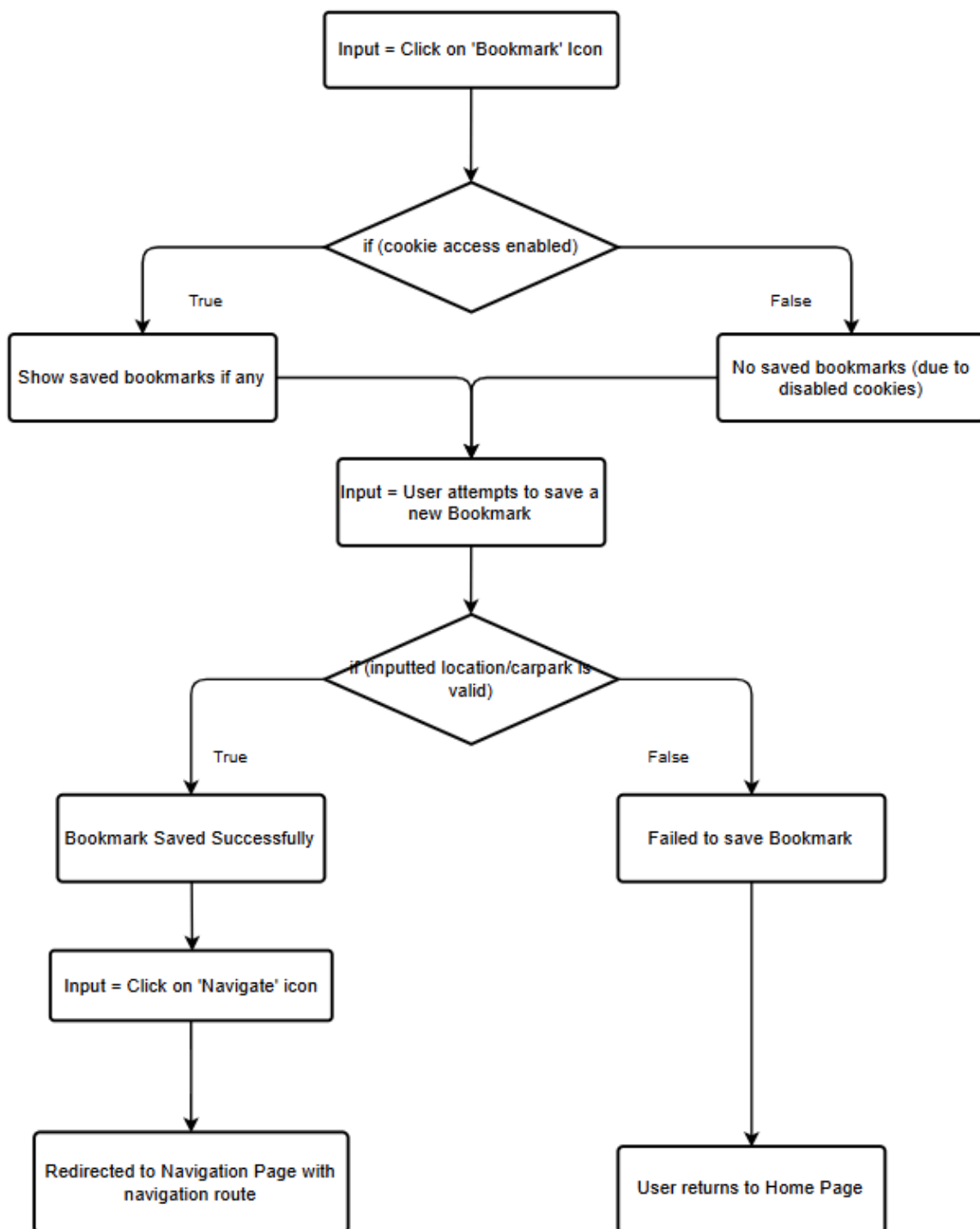


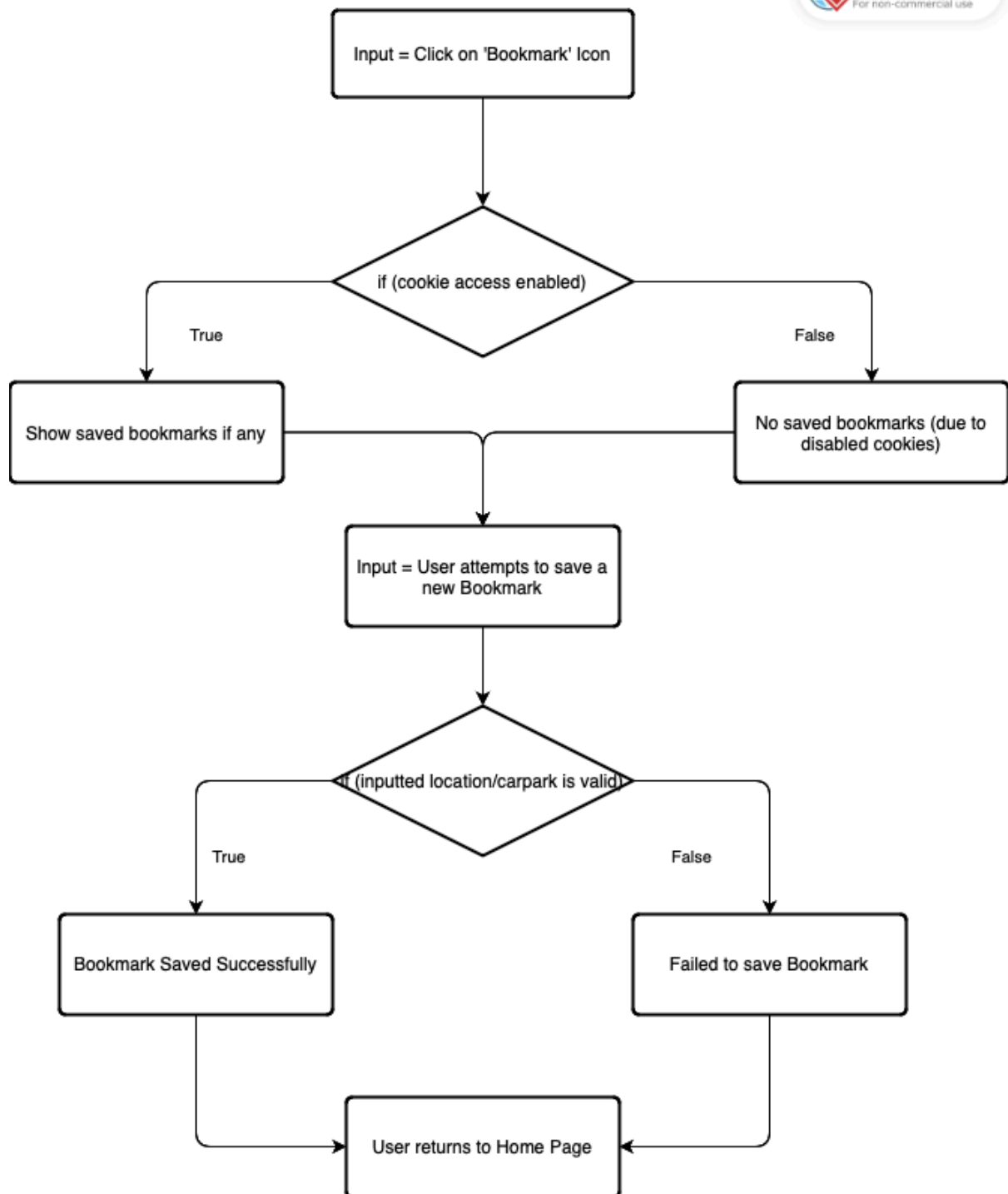


Test Case ID	Navigate-1		Test Case Priority	High	
Test Case Description	Navigating - Positive Test Case				
Prerequisite	Stable Internet Connection and Valid Location/Carpark Input and Location Access Allowed		Postrequisite	NA	
Test Execution Steps					
Step No.	Action	Input	Expected Output	Actual Output	Test Result
1	Click on Searched Location/Car park	Current Location, Searched Location	Navigation Route to Destination	Navigation Route to Destination	Pass
Test Case Status					
Comments					

Test Case ID	Navigate-2		Test Case Priority	High	
Test Case Description	Navigating - Negative Test Case				
Prerequisite	Stable Internet Connection and Valid Location/Carpark Input		Postrequisite	NA	
Test Execution Steps					
Step No.	Action	Input	Expected Output	Actual Output	Test Result
1	Deny Location Access when Prompted	-	Home Page	Home Page	Pass
2	Click on Searched Location/Carpark	Searched Location	No Route	No Route	Pass
Test Case Status					
Comments					

## Bookmarks





Test Case ID	Bookmark-1		Test Case Priority	High	
Test Case Description	Bookmarking - Positive Test Case				
Prerequisite	Stable Internet Connection and Cookies Enabled and Valid Location/Carpark		Postrequisite	NA	
Test Execution Steps					
Step No.	Action	Input	Expected Output	Actual Output	Test Result
1	Click on 'Bookmark' Icon	-	Bookmark Page	Bookmark Page	Pass
2	Automaticall y Fetch Saved Bookmarks	Server cookie	Saved Bookmarks (if any)	Saved Bookmarks (if any)	Pass
3	Save New Bookmark	Valid Location/Carpark	Bookmark saved successfully	Bookmark saved successfully	Pass
4	Click on 'Navigate' Icon for Saved Bookmark	-	Navigation Page with Navigation Route	Navigation Page with Navigation Route	Pass
Test Case Status					
Comments					

Test Case ID	Bookmark-2		Test Case Priority	High	
Test Case Description	Bookmarking - Negative Case				
Prerequisite	Stable Internet Connection and Valid Location/Carpark		Postrequisite	NA	
Test Execution Steps					
Step No.	Action	Input	Expected Output	Actual Output	Test Result
1	Click on 'Bookmark' Icon	-	Bookmark Page	Bookmark Page	Pass
2	Deny cookie access	-	Bookmark Page	Bookmark Page	Pass
3	Automaticaly Fetch Saved Bookmarks	-	No saved bookmarks	No saved bookmarks	Pass
3	Save New Bookmark	Valid Location/Car park	Bookmark saved successfully	Bookmark saved successfully	Pass
Test Case Status					
Comments					

Test Case ID	Bookmark-3		Test Case Priority	High	
Test Case Description	Bookmarking - Negative Test Case				
Prerequisite	Stable Internet Connection and Cookies Enabled		Postrequisite	NA	
Test Execution Steps					
Step No.	Action	Input	Expected Output	Actual Output	Test Result
1	Click on 'Bookmark' Icon	-	Bookmark Page	Bookmark Page	Pass
2	Automaticaly Fetch Saved Bookmarks	Server cookie	Saved Bookmarks (if any)	Saved Bookmarks (if any)	Pass
3	Save New Bookmark	Invalid Location/Carpark of the type <ul style="list-style-type: none"><li>- Empty string</li><li>- Special characters</li><li>- Coordinates</li></ul>	Failed to save bookmark	Failed to save bookmark	Pass
Test Case Status					
Comments					