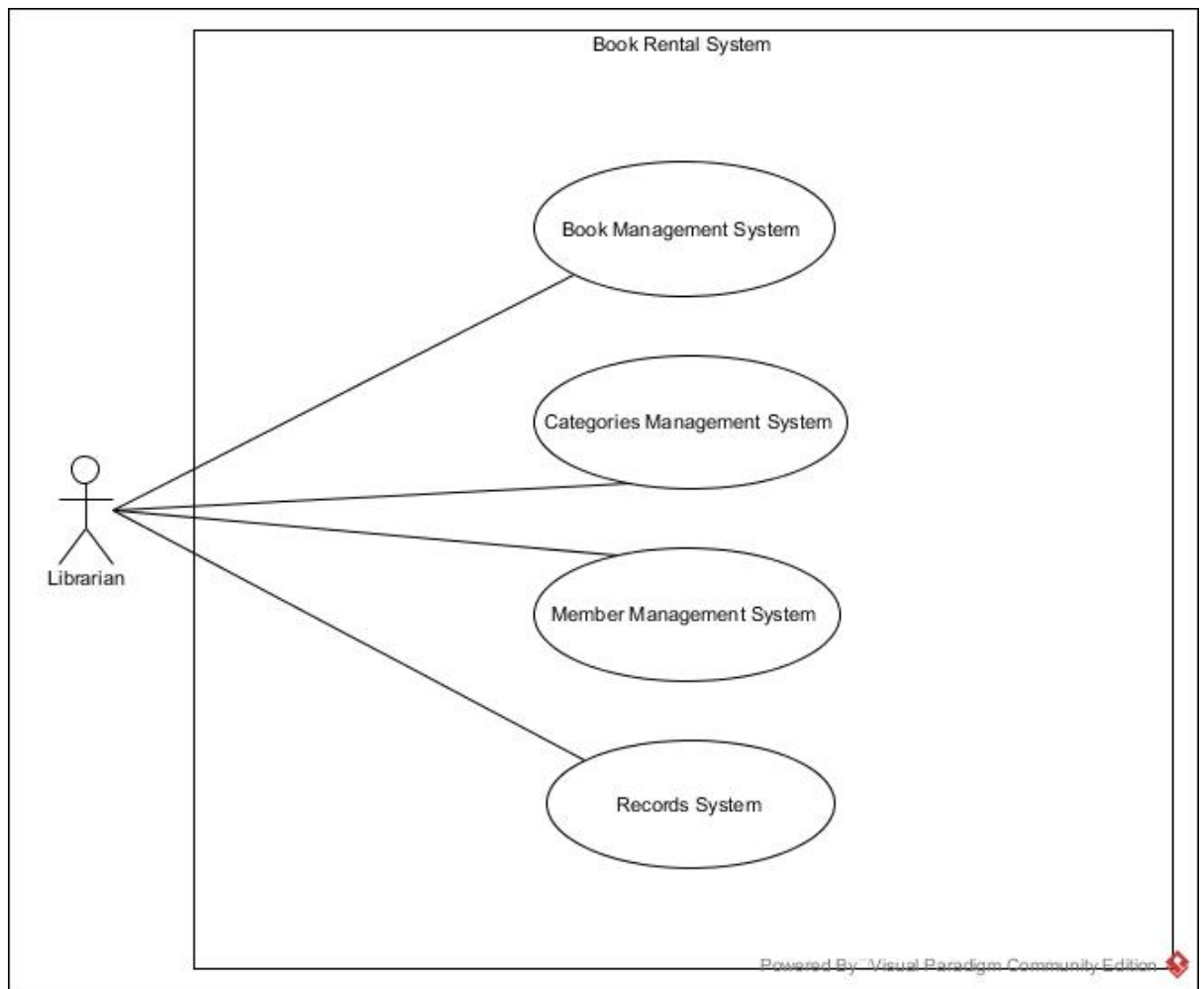
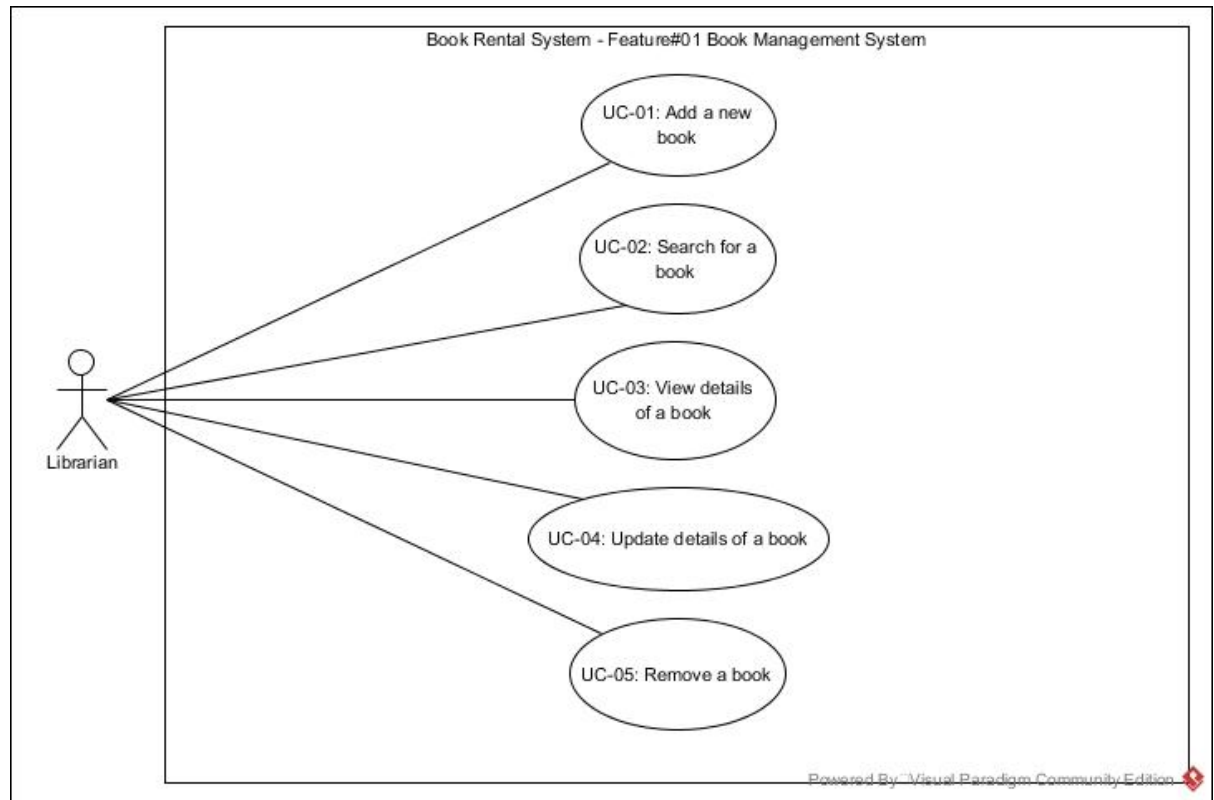


Use case diagram

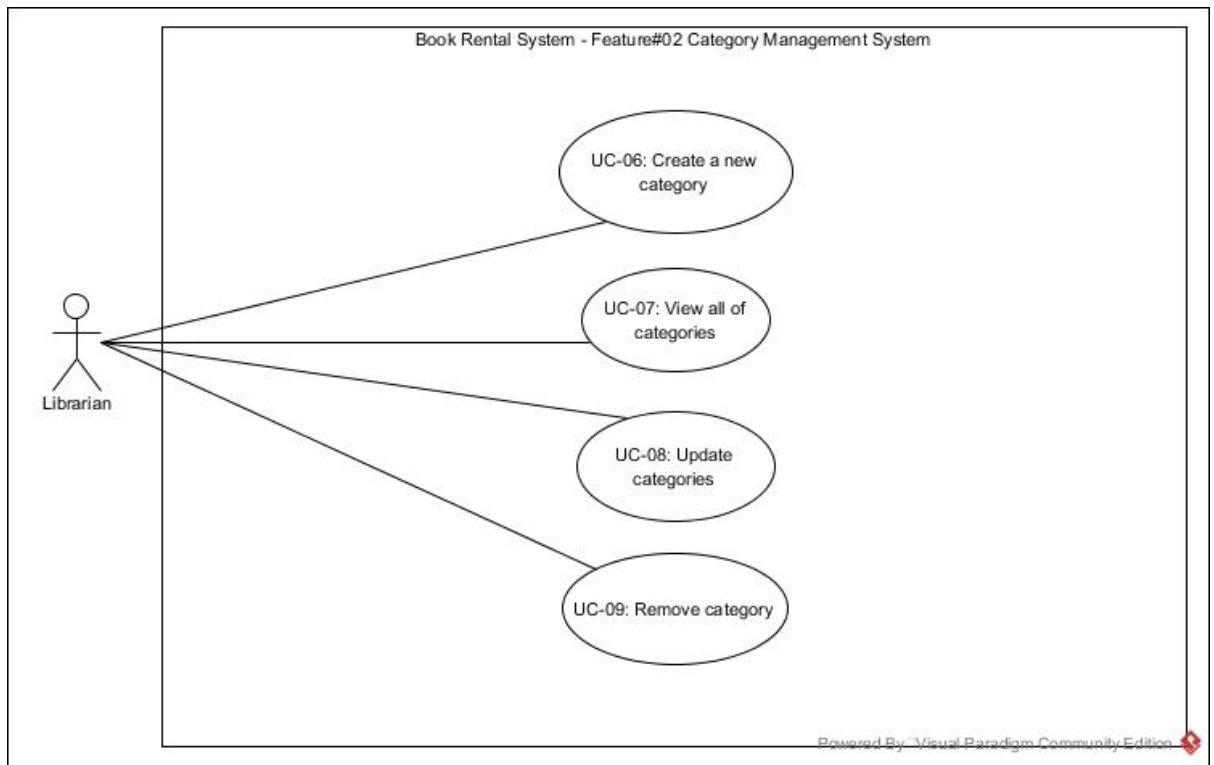
1. Use case diagram: Book Rental System (Overall system)



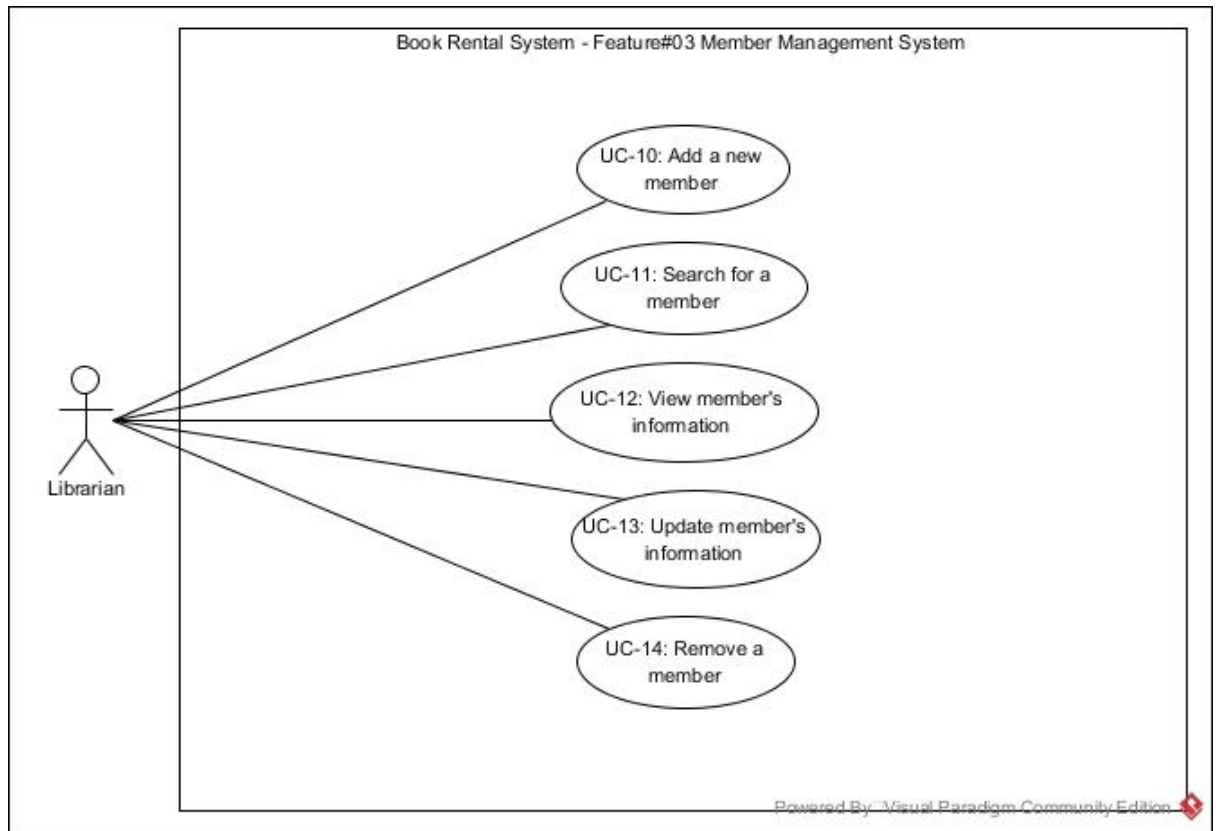
2. Use case diagram (Book Management System)



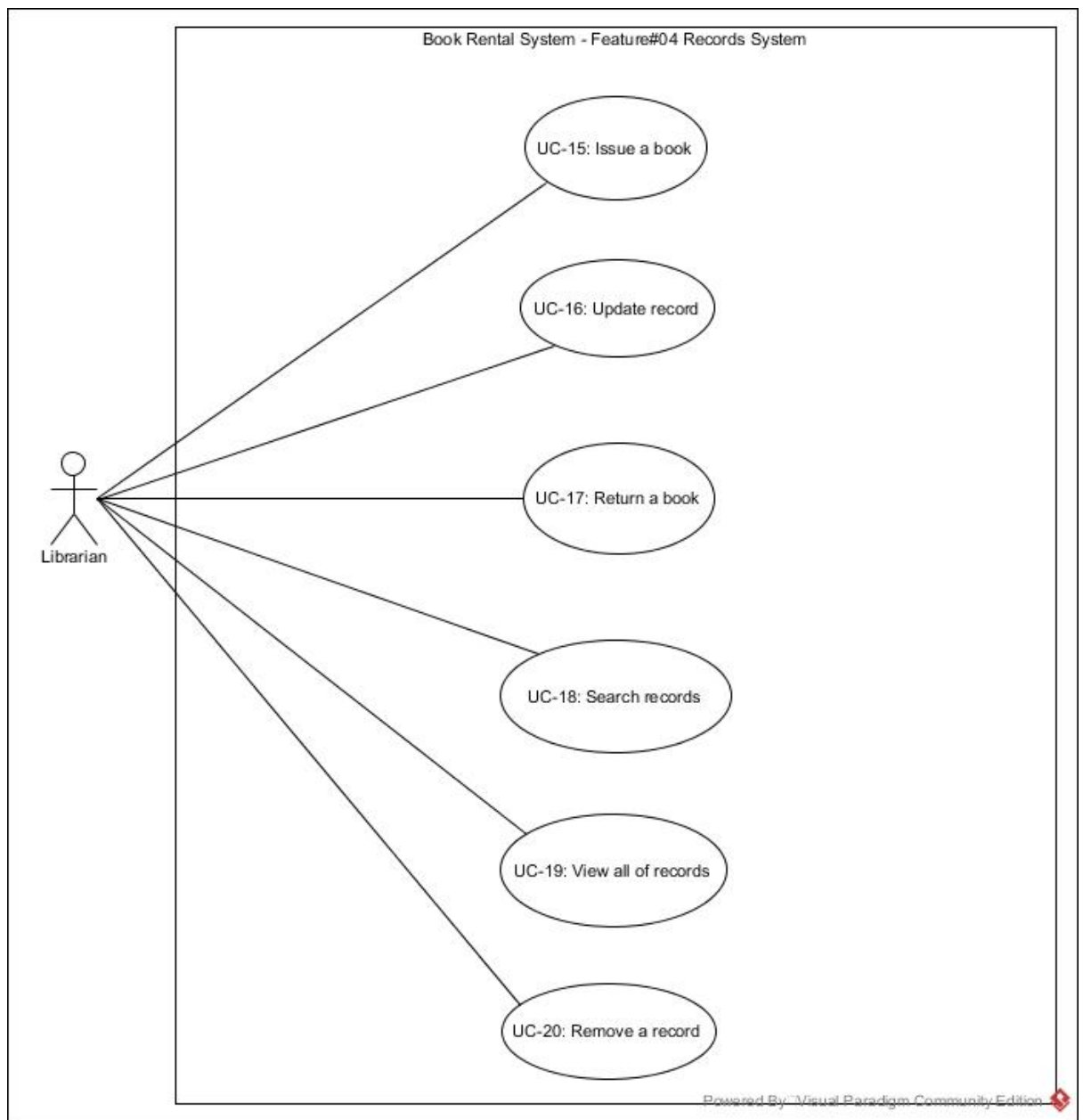
3. Use case diagram (Category Management System)



4. Use case diagram (Member Management System)



5. Use case diagram (Records System)



Use case description

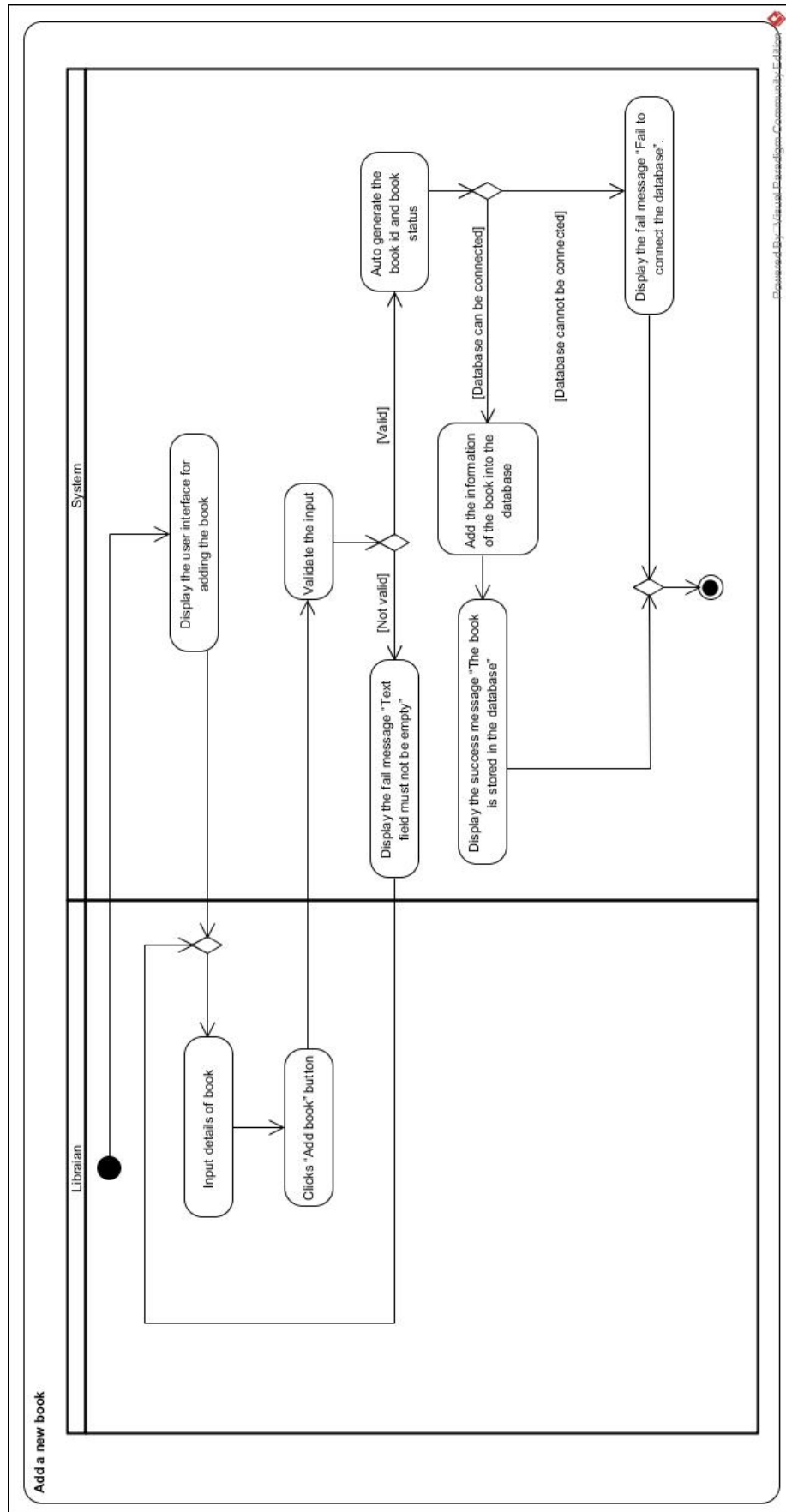
And

Activity diagram

Use Case ID	UC-01		
Use Case Name	Add a new book		
Created By	Mr. Pasakorn Kunchai	Last Update By	Mr. Apiwat Hantrakool
Date Created	15-04-2017	Last Revision Date	23-04-2017
Actors	Librarian		
Description	The librarian can add a new book into the system using book name, book category, price and author.		
Trigger	The librarian clicks “Add a new book” button at home page.		
Preconditions	-		
Use Case Input Specification			
Input	type	Constraint	Example
book name	String	Length must not exceed 50 characters.	Database
category	String	Must have in the database or null.	Computer
price	double	Decimal number with 2 decimal digits.	299.00
author	String	Length must not exceed 50 characters.	Dr. Natee
Post conditions	If the use case is successful, the new book is stored in the database. If not the system return to home page		
Normal Flows	User	System	
1.		The system shall display the user interface for adding the book consisting of 3 text fields for book name, price and author. And 1 data list for book category.	
2.		The system shall display a button labeled as “Add book”.	
3.	The librarian input information to the text fields.		
4.	The librarian clicks “Add book” button.		
5.		The system shall validate the input. [A1: Text field is empty].	
6.		The system shall auto generate the book id and book status by the following criteria. <div><div>○ book id => count form 1 (numeric input).</div><div>○ book status => available.</div></div>	

7.		<p>The system shall add the information of the book including book id, book name, book status, category, price and author into the database.</p> <p>[E1: Database cannot be connected]</p>
8.		<p>The system shall display the success message “The book is stored in the database”.</p>
Alternative Flow	<p>A1: Text field is empty</p> <ul style="list-style-type: none"> ● The system shall display the fail message “Text field must not be empty”. ● Return to normal flows 3. 	
Exception Flow	<p>E1: Database cannot be connected</p> <ul style="list-style-type: none"> ● The system shall display the fail message “Fail to connect the database”. ● Use case ends. 	
Assumption	<p>The Librarian must understand English.</p>	

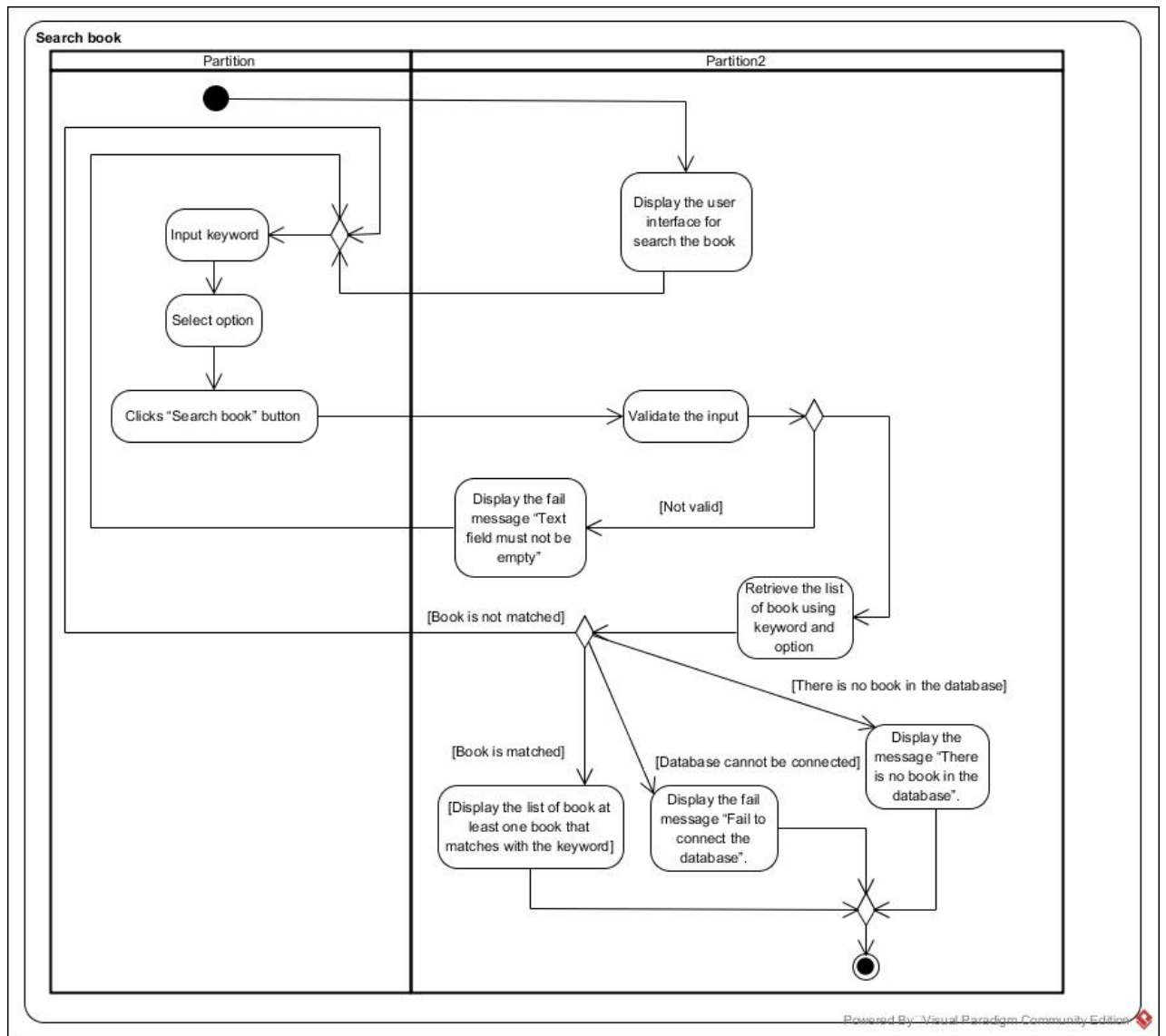
Activity diagram: AD-01



Use Case ID	UC-02		
Use Case Name	Search a book		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	16-04-2017	Last Revision Date	20-04-2017
Actors	Librarian		
Description	The librarian can search for a book from the database using keyword and option.		
Trigger	The librarian clicks “Search book” button at home page.		
Preconditions	-		
Use Case Input Specification			
Input	type	Constraint	Example
keyword	String	Length must not exceed 50 characters.	Math for SE
option	String	Select one of this set [book id, book name, book status, category, price, author].	book status
Post conditions	If the use case is successful, at least one book is displayed. If not the system return to home page.		
Normal Flows	User	System	
1.		The system shall display the user interface for search the book consisting of 1 text field for keyword.	
2.		The system provides options to search, which are book id, book name, book status, category, price and author.	
3.		The system shall display a button labeled as “Search book.”	
4.	The librarian input keyword to the text field.		
5.	The librarian selects the options.		
6.	The librarian clicks “Search book” button.		
7.		The system shall validate the input. [A1: Text field is empty].	
8.		The system shall retrieve the list of book using keyword and option in the book id, book name, book status, category, price and author into the database. [A2: Book is not matched] , [E1: Database cannot be	

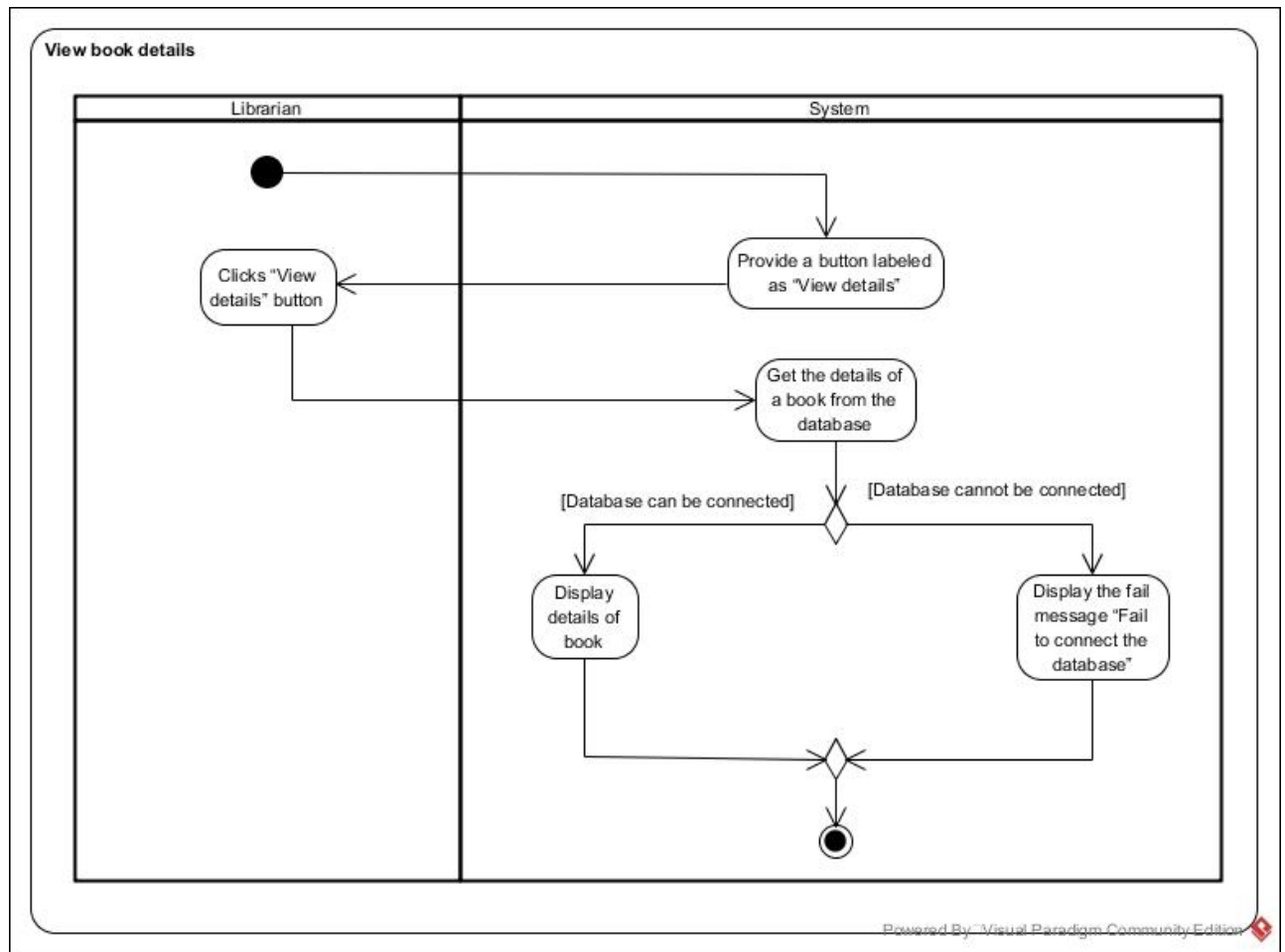
		connected] ,[E2: There is no book in the database].
9.		The system shall display the list of book at least one book that matches with the keyword.
Alternative Flow	A1: Text field is empty <ul style="list-style-type: none"> ● The system shall display the fail message "Text field must not be empty". ● Return to normal flows 4. A2: Book is not matched <ul style="list-style-type: none"> ● The system shall display the message "There is no book matched with the keyword". ● Return to normal flows 4. 	
Exception Flow	E1: Database cannot be connected. <ul style="list-style-type: none"> ● The system shall display the fail message "Fail to connect the database". ● Use case ends. E2: There is no book in the database. <ul style="list-style-type: none"> ● The system shall display the message "There is no book in the database". ● Use case ends. 	
Assumption	The Librarian must understand English.	

Activity diagram: AD-02



Use Case ID	UC-03		
Use Case Name	View details of book.		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	16-04-2017	Last Revision Date	22-04-2017
Actors	Librarian		
Description	The librarian can view details of book.		
Trigger	The librarian clicks “View details” button next to the book name.		
Preconditions	The librarian found the book by searching.		
Use Case Input Specification			
Input	type	Constraint	Example
-	-	-	-
Post conditions	If the use case is successful, the details of the book are displayed. If not the system return to home page.		
Normal Flows	User	System	
1.		The system shall provide a button labeled as “View details” for the librarian to view the details of a book.	
2.	The librarian clicks “View details” button.		
3.		The system shall be able to get the details of a book from the database. [E1: Database cannot be connected]	
4.		The system shall provide an interface, which displays the book id, book name, book status, category, price and author.	
Alternative Flow	-		
Exception Flow	E1: Database cannot be connected. <ul style="list-style-type: none">● The system shall display the fail message “Fail to connect the database”.● Use case ends.		
Assumption	The Librarian must understand English.		

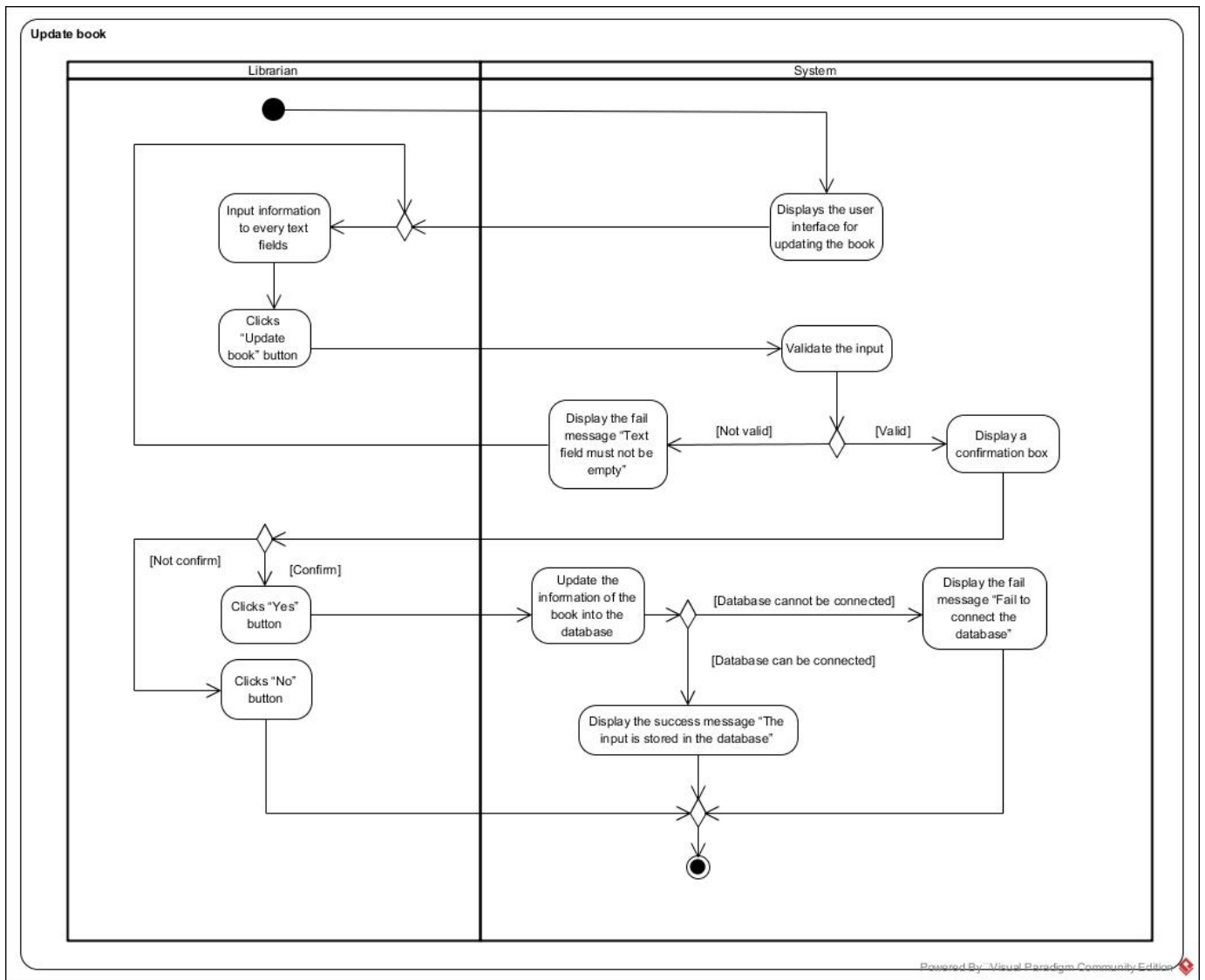
Activity diagram: AD-03



Use Case ID	UC-04		
Use Case Name	Update details of book.		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	16-04-2017	Last Revision Date	23-04-2017
Actors	Librarian.		
Description	The library can update details of a book, which are book name, category, price, author and book status.		
Trigger	The librarian clicks “Update book” button next to the book name.		
Preconditions	The librarian found the book by searching.		
Use Case Input Specification			
Input	type	Constraint	Example
book name	String	String of length 50.	Object oriented programming.
category	String	Data list (list of categories that was created) or null.	Computer
price	Double	Decimal number with 2 decimal digits.	300.25
author	String	String of length 50.	Dr. Prompong
book status	String	Select one of this set [borrowed, available, disappeared, corrupted, removed].	borrowed
Post conditions	If the use case is successful, the details of book are updated to the database. If not the system return to home page.		
Normal Flows	User	System	
1.		The system displays the user interface for updating the book consisting 3 text fields, which are book name, price, and author. And consisting 2 data lists, which is category and book status.	
2.		The system shall display a button labeled as “Update book”.	
3.	The librarian input information to every text fields.		
4.	The librarian clicks “Update book” button.		
5.		The system shall validate the input. [A1: Text field is empty]	

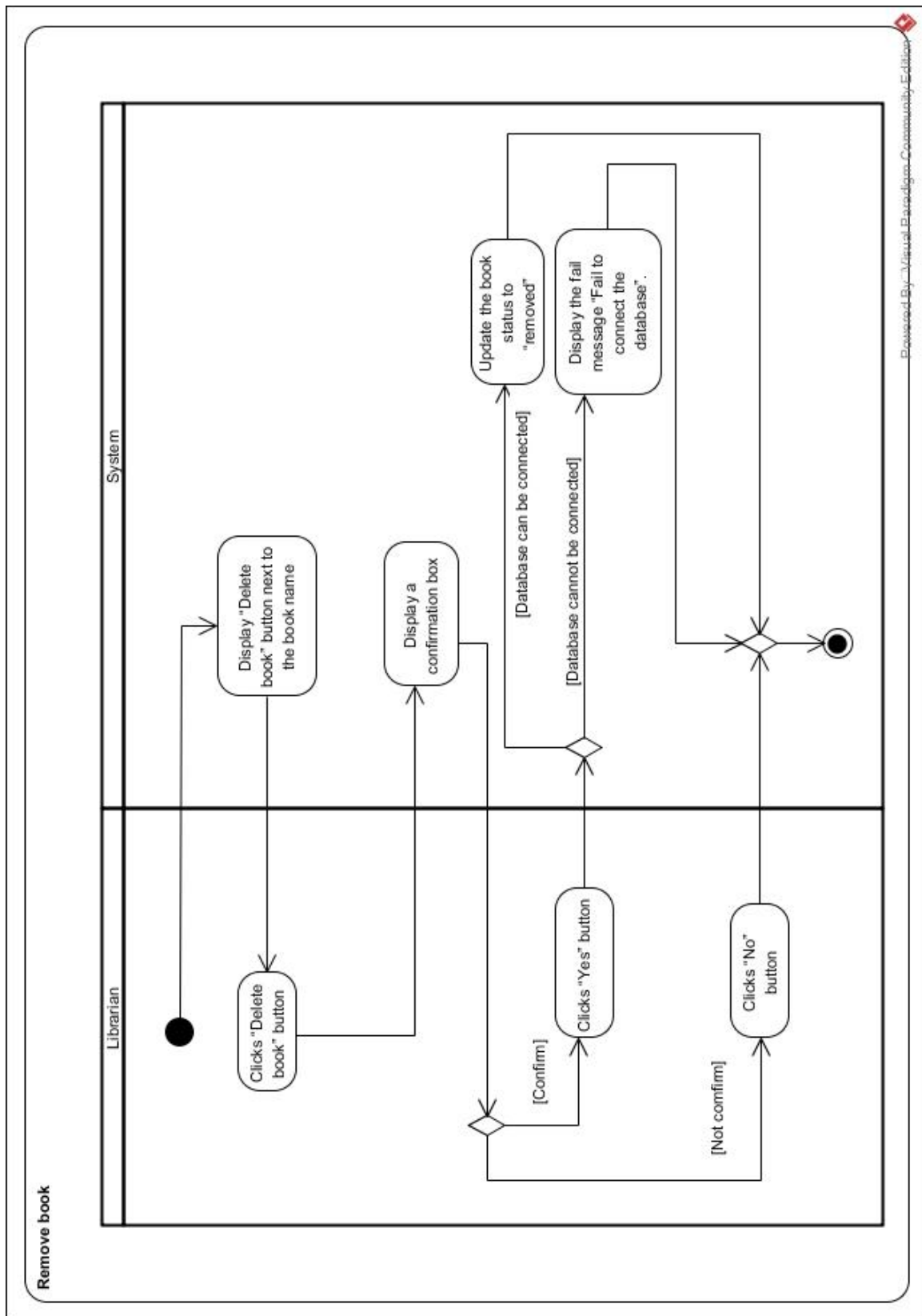
6.		The system shall display a confirmation box with message “Are you confirm to update this book” and “Yes” button and “No” button.
7.	The librarian clicks “Yes” button. [E1: clicks “No” button]	
8.		The system shall update the information of the book into the database. [E2: Database cannot be connected]
9.		The system shall display the success message “The input is stored in the database”.
Alternative Flow	A1: Text field is empty. <ul style="list-style-type: none"> ● The system shall display the fail message “Text field must not be empty”. ● Return to normal flows 3. 	
Exception Flow	E1: Clicks “No” button. <ul style="list-style-type: none"> ● Use case ends. E2: Database cannot be connected. <ul style="list-style-type: none"> ● The system shall display the fail message “Fail to connect the database” ● Use case ends. 	
Assumption	The librarian must understand English.	

Activity diagram: AD-04



Use Case ID	UC-05		
Use Case Name	Remove a book.		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	17-04-2017	Last Revision Date	22-04-2017
Actors	Librarian		
Description	The librarian can remove a book from the shop.		
Trigger	The librarian clicks “Delete book” button next to the book name.		
Preconditions	The librarian found the book by searching.		
Use Case Input Specification			
Input	type	Constraint	Example
-	-	-	-
Post conditions	If the use case is successful, the status of the book is update to “removed”. If not the system return to home page.		
Normal Flows	User	System	
1.		The system shall display a button labeled as “Delete book” next to the book name.	
2.	The librarian clicks “Delete book” button.		
3.		The system shall display a confirmation box with message “Are you confirm to deleted this book” and “Yes” button and “No” button.	
4.	The librarian clicks “Yes” button. [E1: clicks “No” button]		
5.		The system shall update the book status to “removed”. [E2: Database cannot be connected]	
Alternative Flow	-		
Exception Flow	E1: Clicks “No” button. <ul style="list-style-type: none">● Use case ends. E2: Database cannot be connected. <ul style="list-style-type: none">● The system shall display the fail message “Fail to connect the database”.● Use case ends.		
Assumption	The librarian must understand English.		

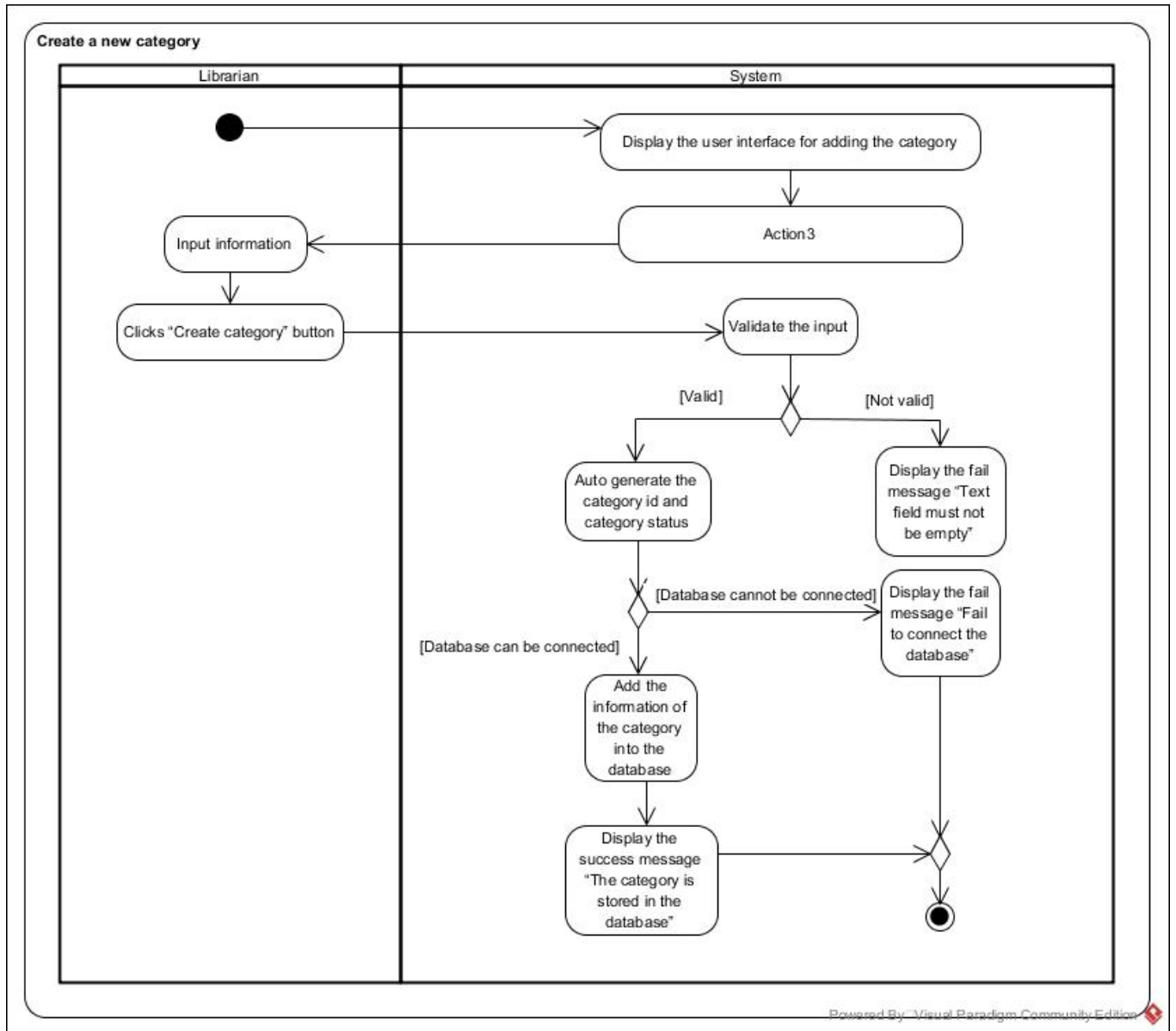
Activity diagram: AD-05



Use Case ID	UC-06		
Use Case Name	Create a new category.		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr.Apiwat Hantrakool
Date Created	17-04-2017	Last Revision Date	22-04-2017
Actors	Librarian		
Description	The librarian can create a new category into the system using category name.		
Trigger	The librarian clicks “Create category” button at home page.		
Preconditions	-		
Use Case Input Specification			
Input	type	Constraint	Example
category name	String	String of length 20.	Math
Post conditions	If the use case is successful, the category is stored in the database. If not the system return to home page		
Normal Flows	User	System	
1.		The system shall display the user interface for adding the category consisting of 1 text field for category name.	
2.		The system shall display a button labeled as “Create category.”	
3.	The librarian input information to text field.		
4.	The librarian clicks “Create category” button.		
5.		The system shall validate the input. [A1: Text field is empty]	
6.		The system shall auto generate the category id and category status by the following criteria. <div><div>○ category id => count from 1 (numeric input).</div><div>○ category status => active.</div></div>	
7.		The system shall add the information of the category including category id, category	

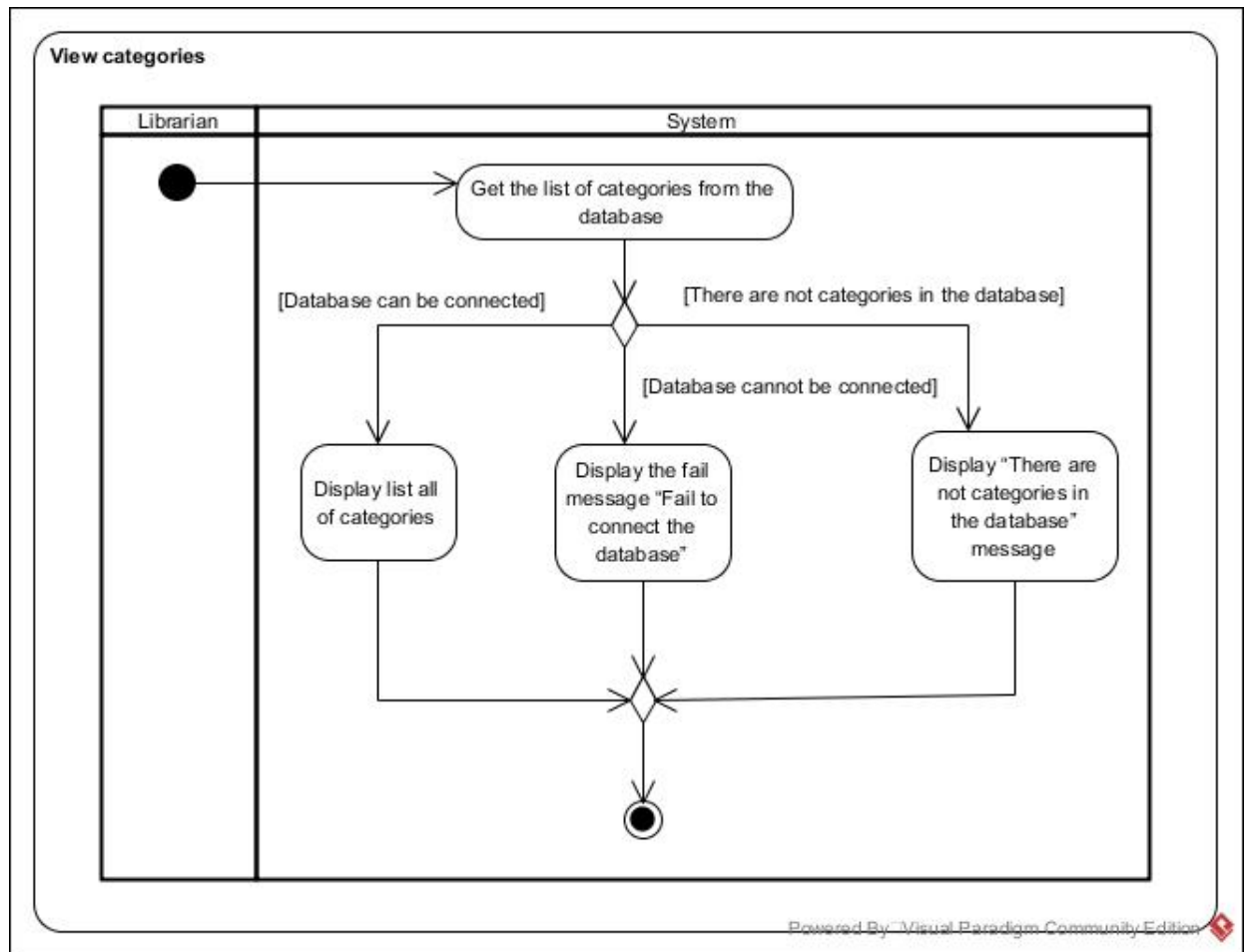
		name and category status into the database. [E1: Database cannot be connected.]
8.		The system shall display the success message "The category is stored in the database".
Alternative Flow	A1: Text field is empty <ul style="list-style-type: none"> • The system shall display the fail message "Text field must not be empty". • Return to normal flows 3. 	
Exception Flow	E1: Database cannot be connected. <ul style="list-style-type: none"> • The system shall display the fail message "Fail to connect the database". • Use case ends. 	
Assumption	The librarian must understand English.	

Activity diagram: AD-06



Use Case ID	UC-07		
Use Case Name	View categories.		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	17-04-2017	Last Revision Date	22-04-2017
Actors	The librarian		
Description	The librarian can view all of categories in the system.		
Trigger	The librarian clicks “View categories” button at home page.		
Preconditions	-		
Use Case Input Specification			
Input	type	Constraint	Example
-	-	-	-
Post conditions	If the use case is successful, the list of categories is displayed. If not the system return to home page.		
Normal Flows	User	System	
1.		The system shall be able to get the list of categories from the database [E1: there are not categories in the database.] , [E2: Database cannot be connected.]	
2.		The system shall provide an interface, which displays category id, category name and category status.	
Alternative Flow	-		
Exception Flow	E1: there are not categories in the database. <ul style="list-style-type: none">● The system shall display “There are not categories in the database” message.● Use case ends. E2: Database cannot be connected. <ul style="list-style-type: none">● The system shall display the fail message “Fail to connect the database”.● Use case ends.		
Assumption	The librarian must understand English.		

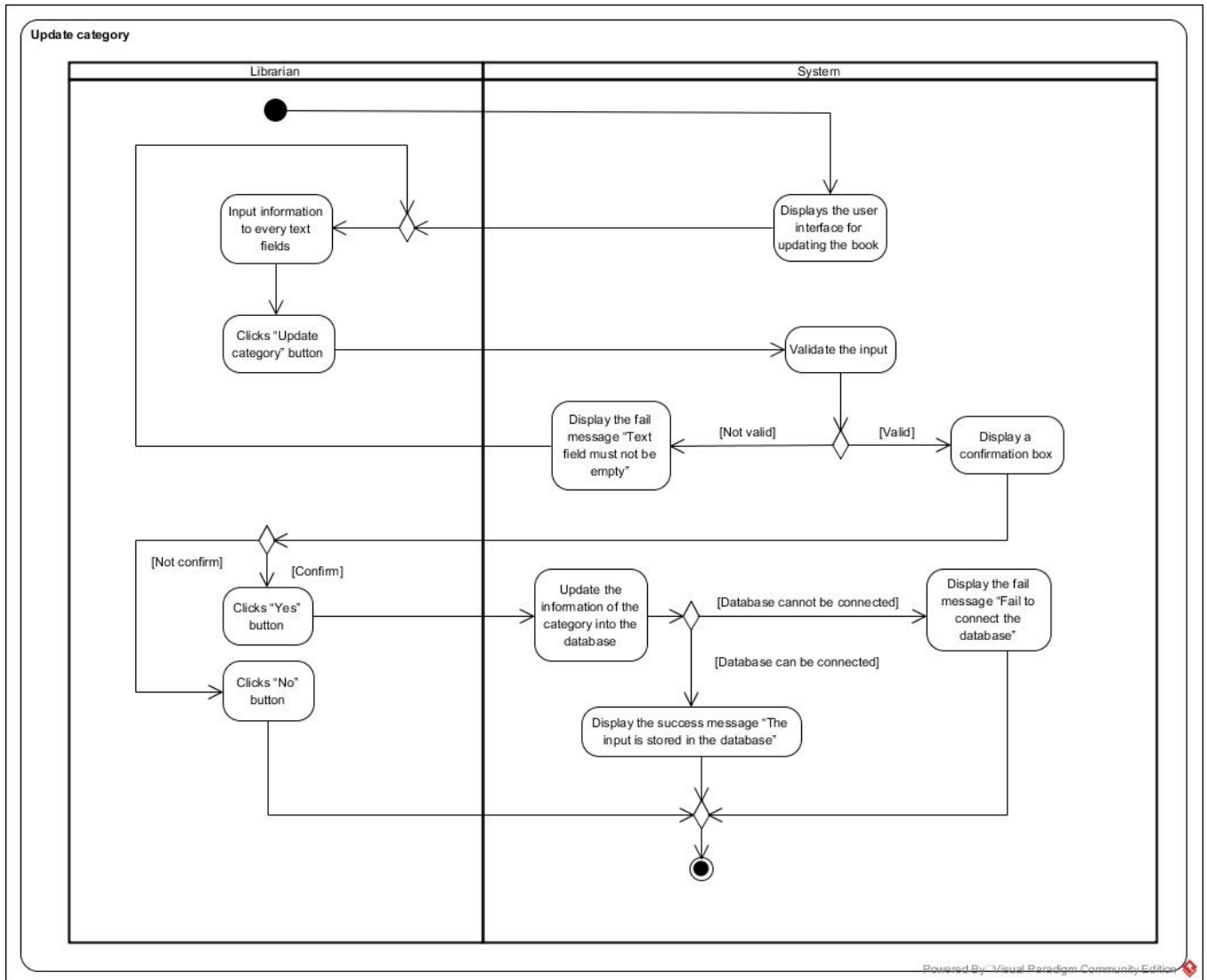
Activity diagram: AD-07



Use Case ID	UC-08		
Use Case Name	Update category		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	17-04-2017	Last Revision Date	23-04-2017
Actors	Librarian		
Description	The librarian can update category in the system, which are category name and category status.		
Trigger	The librarian clicks “Update category” button next to the category name.		
Preconditions	The librarian clicked view all of categories at homepage.		
Use Case Input Specification			
Input	type	Constraint	Example
category name	String	string of length 20.	Biology
category status	String	[active, not active]	active
Post conditions	If the use case is successful, the details of category are updated to the database. If not the system return to home page.		
Normal Flows	User	System	
1.		The system displays the user interface for updating the book consisting 1 text field, which are category name. And 1 data list, which is category status.	
2.		The system shall display a button labeled as “Update category”.	
3.	The librarian input to text field and data list.		
4.	The librarian click “Update category” button.		
5.		The system shall validate the input. [A1: Text field is empty]	
6.		The system shall display a confirmation box with message “Are you confirm to update this category” and “Yes” button and “No” button.	
7.	The librarian click “Yes” button. [E1: Click “No” button]		

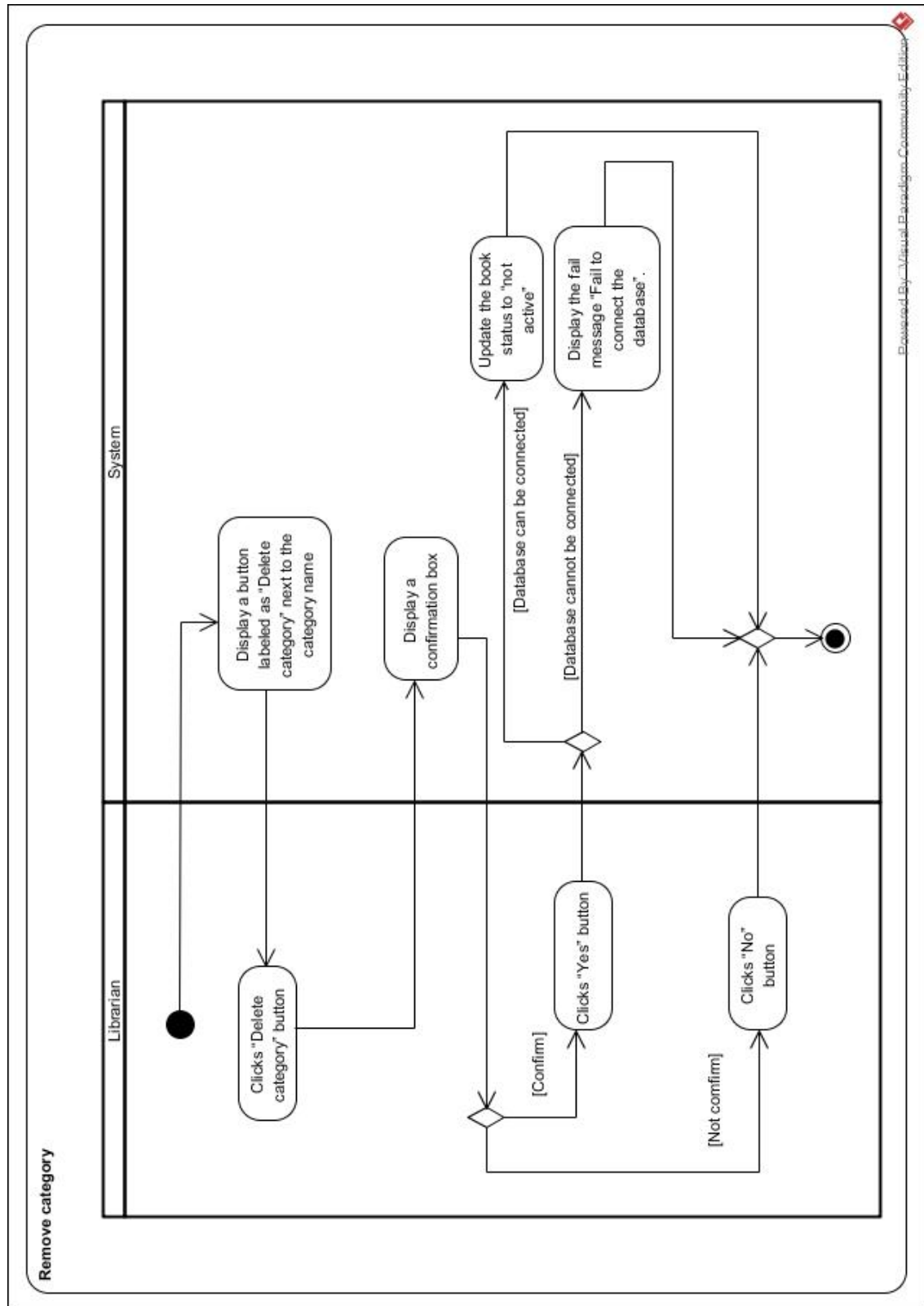
8.		The system shall update the information of the category including category name and category status into the database.
9.		The system shall display the success message "The input is stored in the database". [E2: Database cannot be connected]
Alternative Flow	A1: Text field is empty. <ul style="list-style-type: none"> The system shall display the fail message "Text field must not be empty". Return to normal flows 3. 	
Exception Flow	E1: click "No" button. <ul style="list-style-type: none"> Use case ends. E2: Database cannot be connected. <ul style="list-style-type: none"> The system shall display the fail message "Fail to connect the database". Use case ends. 	
Assumption	The librarian must understand English.	

Activity diagram: AD-08



Use Case ID	UC-09		
Use Case Name	Remove category.		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	17-04-2017	Last Revision Date	22-04-2017
Actors	Librarian.		
Description	The librarian can remove category.		
Trigger	The librarian clicks “Delete category” button next to the category name.		
Preconditions	The librarian clicked view all of categories at home page.		
Use Case Input Specification			
Input	type	Constraint	Example
-	-	-	-
Post conditions	If the use case is successful, the status of the category is updated to “not active”. If not the system return to home page		
Normal Flows	User	System	
1.		The system shall display a button labeled as “Delete category” next to the category name.	
2.	The librarian clicks “Delete category” button.		
3.		The system shall display a confirmation box with message “Are you confirm to deleted this category” and “Yes” button and “No” button.	
4.	The librarian click “Yes” button. [E1: clicks “No” button]		
5.		The system shall update the category status to “not active”. [E2: Database cannot be connected]	
Alternative Flow	-		
Exception Flow	E1: Clicks “No” button. <ul style="list-style-type: none">● Use case ends. E2: Database cannot be connected. <ul style="list-style-type: none">● The system shall display the fail message “Fail to connect the database”.● Use case ends.		
Assumption	The librarian must understand English.		

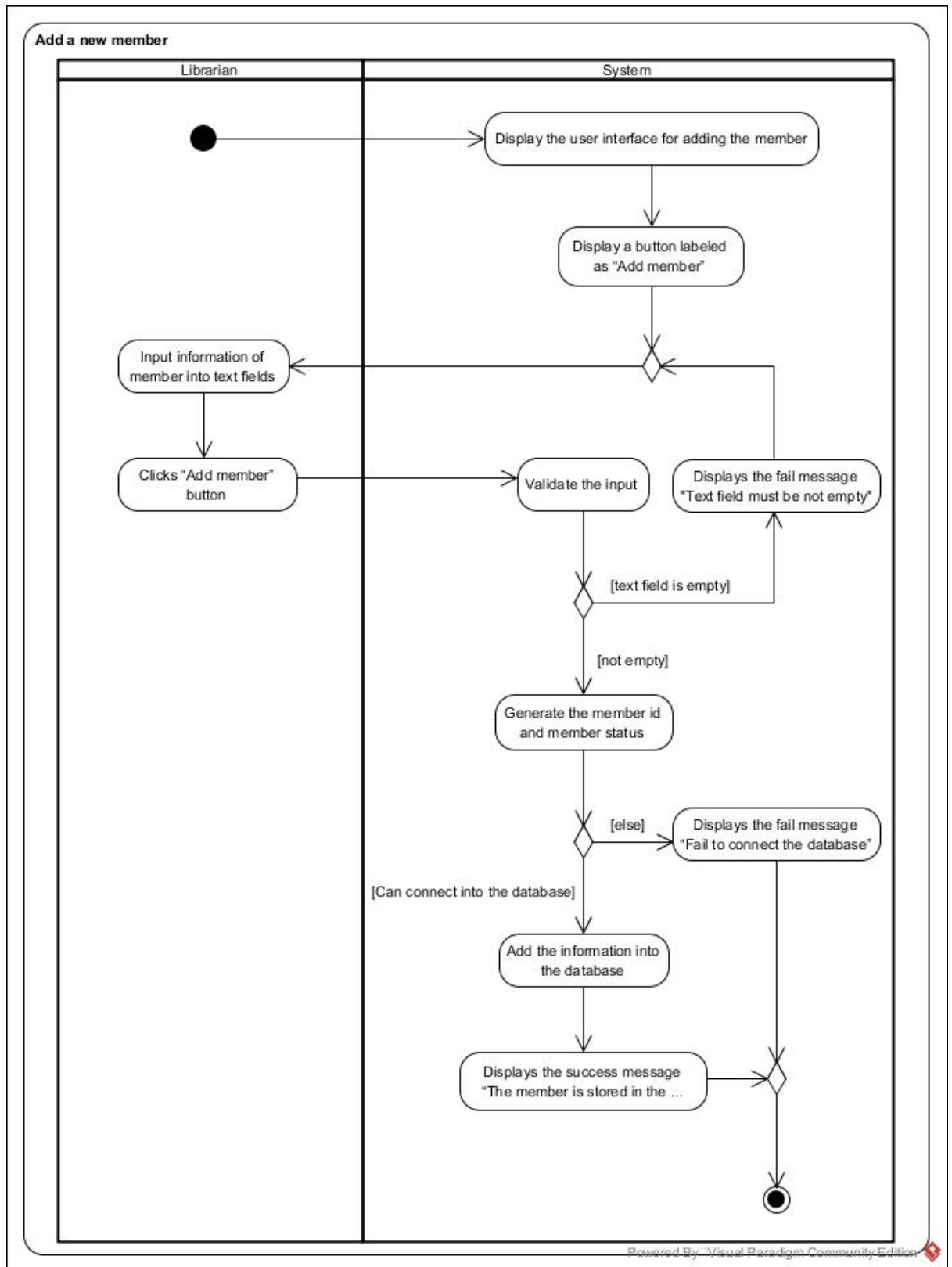
Activity diagram: AD-09



Use Case ID	UC-10		
Use Case Name	Add new member.		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	17-04-2017	Last Revision Date	22-04-2017
Actors	Librarian		
Description	The librarian can add a new member into the system using member name, citizen id, and telephone number.		
Trigger	The librarian clicks “Add member” button at home page.		
Preconditions	-		
Use Case Input Specification			
Input	type	Constraint	Example
member name	String	String of length 50.	Apiwat Hantrakool
citizen id	int	Numeric input only.	1579900690678
telephone	int	Numeric input only.	0875652347
Post conditions	If the use case is successful, the information of member is inserted into the database. If not the system return to home page.		
Normal Flows	User	System	
1.		The system shall display the user interface for adding the member consisting of 3 text fields for member name, citizen id and telephone number.	
2.		The system shall display a button labeled as “Add member”.	
3.	The librarian input member name, citizen id and telephone number to 3 text fields.		
4.	The librarian clicks “Add member” button.		
5.		The system shall validate the input. [A1: Text field is empty]	
6.		The system shall auto generate the member id and member status by the following criteria. ○ member id => count form 1 (numeric input).	

		○ member status => active.
7.		The system shall add the information of the member including member id, member name, citizen id, telephone number and member status into the database. [E1: Database cannot be connected.
8.		The system shall display the success message "The member is stored in the database".
Alternative Flow	A1: Text field is empty <ul style="list-style-type: none"> ● The system shall display the fail message "Text field must not be empty". ● Return to normal flows 3. 	
Exception Flow	E1: Database cannot be connected. <ul style="list-style-type: none"> ● The system shall display the fail message "Fail to connect the database". ● Use case ends. 	
Assumption	The librarian must understand English.	

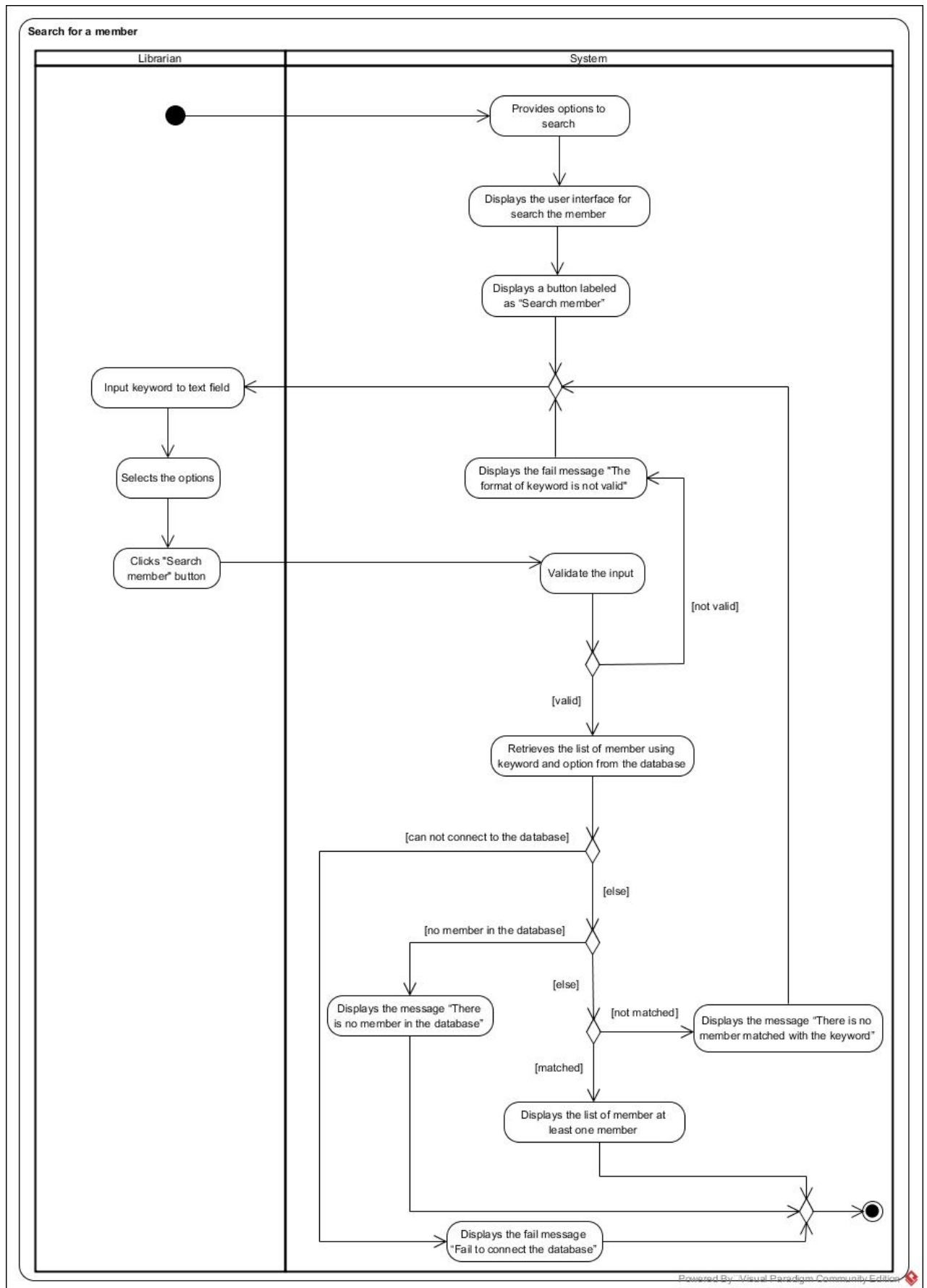
Activity diagram: AD-10



Use Case ID	UC-11		
Use Case Name	Search member.		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	17-04-2017	Last Revision Date	21-04-2017
Actors	Librarian.		
Description	The librarian can search for a member from the database using keyword and option.		
Trigger	The librarian clicks “Search member” button at home page.		
Preconditions	-		
Use Case Input Specification			
Input	type	Constraint	Example
keyword	String	the length of the keyword. It must not exceed 50 characters.	Kanatip
options	String	[member id, member name, citizen id, telephone number, member status]	member id
Post conditions	If the use case is successful, the list of member is displayed to librarian. If not the system return to home page.		
Normal Flows	User	System	
1.		The system shall provide options to search, which is member id, member name, citizen id, telephone number and member status.	
2.		The system shall display the user interface for search the member consisting of 1 text field for keyword.	
3.		The system shall display a button labeled as “Search member”.	
4.	The librarian input keyword to text field.		
5.	The librarian select the options.		
6.	The librarian click “Search member” button.		
7.		The system shall validate the input. [A1: keyword is wrong in format]	
8.		The system shall retrieve the list of member using keyword and option in the is member id, member name, citizen id, telephone number and member status into the	

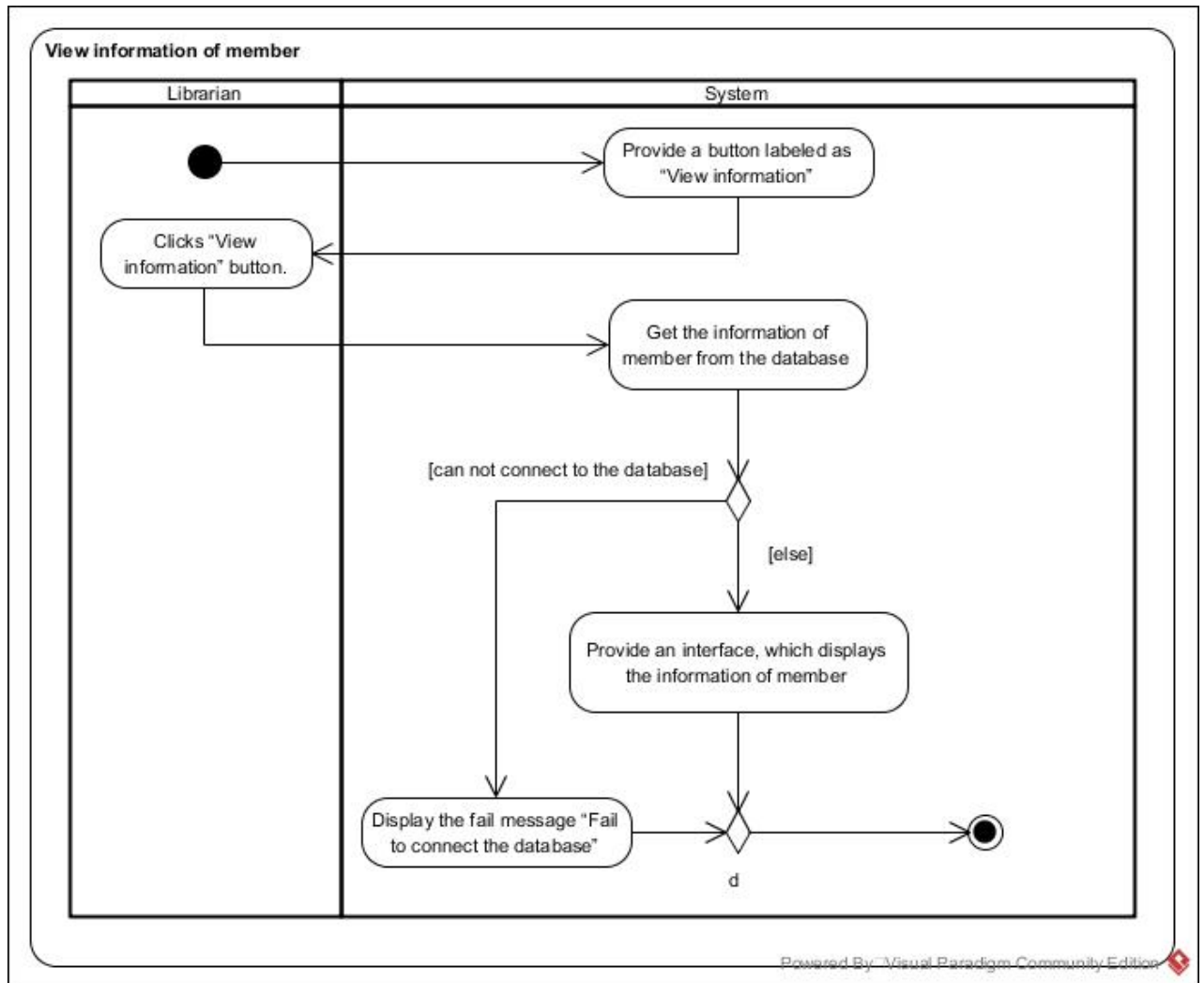
		database. [A2: member is not matched], [E1: Database cannot be connected], [E2: There is no member in the database]
9.		The system shall display the list of member at least one member that matches with the keyword.
Alternative Flow	A1: keyword is wrong in format. <ul style="list-style-type: none"> ● The system shall display the fail message next to the keyword text fields "The format of keyword is not valid". ● Return to normal flows 4. A2: Book is not matched <ul style="list-style-type: none"> ● The system shall display the message "There is no member matched with the keyword". ● Return to normal flows 4. 	
Exception Flow	E1: Database cannot be connected. <ul style="list-style-type: none"> ● The system shall display the fail message "Fail to connect the database". ● Use case ends. E2: There is no member in the database. <ul style="list-style-type: none"> ● The system shall display the message "There is no member in the database". ● Use case ends. 	
Assumption	The Librarian must understand English.	

Activity diagram: AD-11



Use Case ID	UC-12		
Use Case Name	View information of member.		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	17-04-2017	Last Revision Date	22-04-2017
Actors	Librarian		
Description	The librarian can view information of member.		
Trigger	The librarian clicks “View information” button next to the member name.		
Preconditions	The librarian found the member by searching.		
Use Case Input Specification			
Input	type	Constraint	Example
-	-	-	-
Post conditions	If the use case is successful, the information of the member is displayed. If not the system return to home page.		
Normal Flows	User	System	
1.		The system shall provide a button labeled as “View information” for the librarian to view the member’s information in the system.	
2.	The librarian clicks “View information” button.		
3.		The system shall be able to get the information of member from the database. [E1: Database cannot be connected]	
4.		The system shall provide an interface, which displays member id, member name, citizen id, telephone number and member status.	
Alternative Flow	-		
Exception Flow	E1: Database cannot be connected. <ul style="list-style-type: none">● The system shall display the fail message “Fail to connect the database” if the database cannot be connected.● Use case ends.		
Assumption	The Librarian must understand English.		

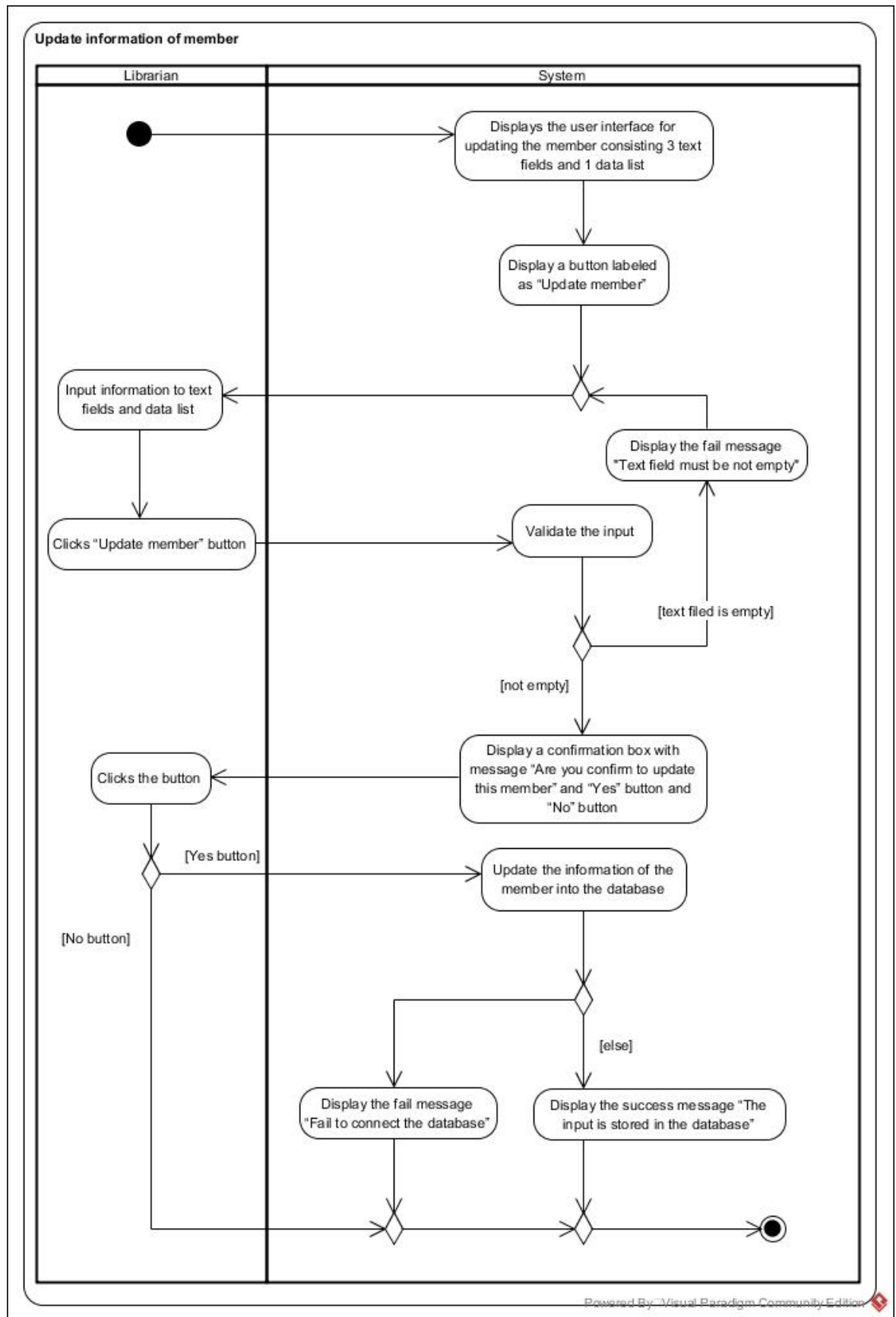
Activity diagram: AD-12



Use Case ID	UC-13		
Use Case Name	Update information of member.		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	16-04-2017	Last Revision Date	23-04-2017
Actors	Librarian.		
Description	The library can update details of a member, which are member name, citizen id, member status and telephone number.		
Trigger	The librarian clicks “Update member” button next to the information of member.		
Preconditions	The librarian found the member by searching.		
Use Case Input Specification			
Input	type	Constraint	Example
member name	String	String of length 50.	Apiwat Hantrakool
citizen id	int	Numeric input only.	1579900690678
telephone	int	Numeric input only.	0875652347
member status	String	Select one of this set [active, not active]	active
Post conditions	If the use case is successful, the information of member is updated into the database. If not the system return to home page.		
Normal Flows	User	System	
1.		The system displays the user interface for updating the member consisting 3 text fields, which are member name, citizen id and telephone. And 1 data list which is member status.	
2.		The system shall display a button labeled as “Update member”.	
3.	The librarian input information to every text fields and data list.		
4.	The librarian clicks “Update member” button.		
5.		The system shall validate the input. [A1: Text field is empty]	
6.		The system shall display a confirmation box with message “Are you confirm to update this member” and “Yes” button and “No” button.	

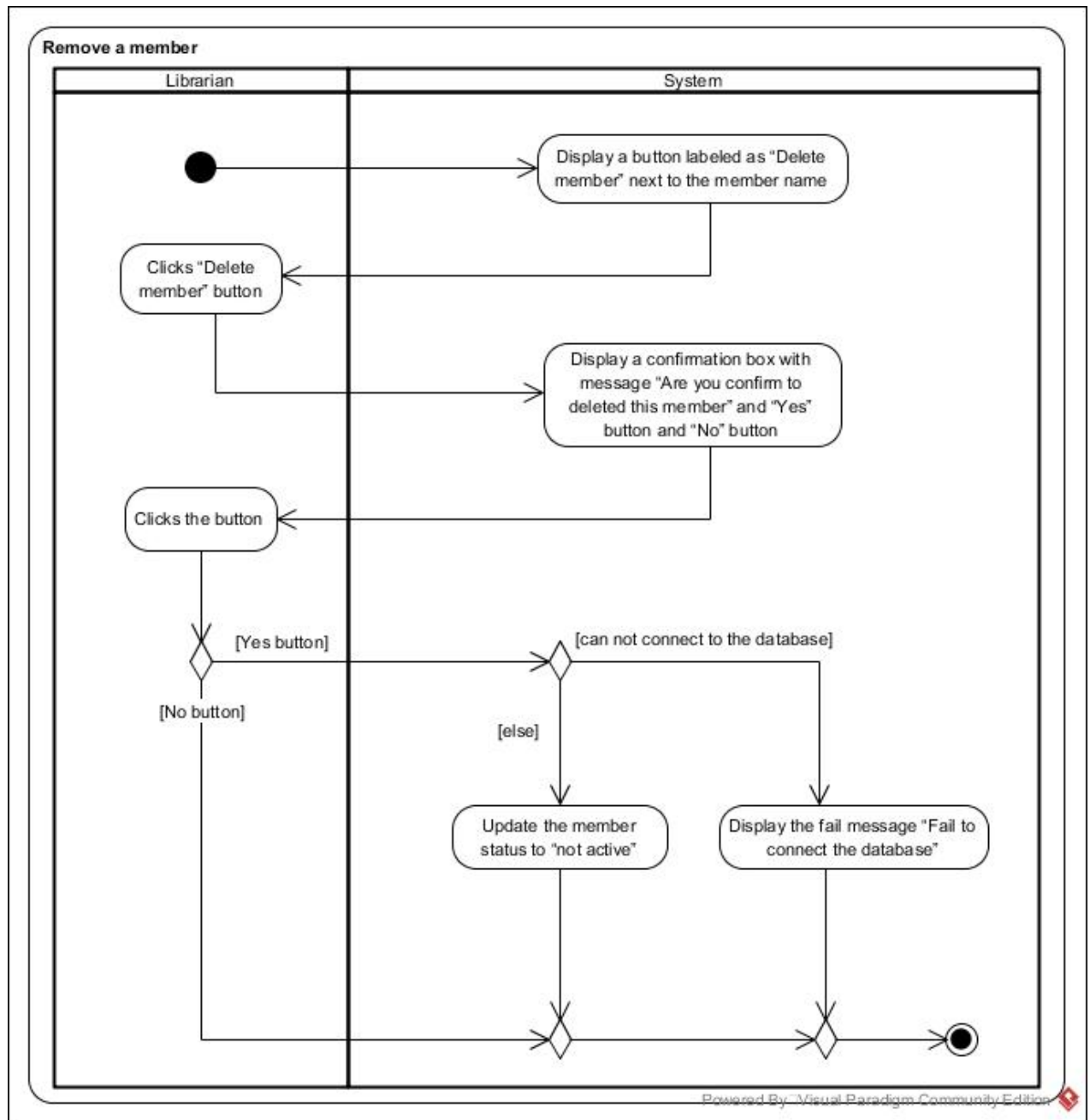
7.	The librarian click "Yes" button. [E1: Clicks "No" button]	
8.		The system shall update the information of the member into the database. [E2: Database cannot be connected]
9.		The system shall display the success message "The input is stored in the database".
Alternative Flow	A1: Text field is empty. <ul style="list-style-type: none"> ● The system shall display the fail message "Text field must not be empty". ● Return to normal flows 3. 	
Exception Flow	E1: Click "No" button. <ul style="list-style-type: none"> ● Use case ends. E2: Database cannot be connected. <ul style="list-style-type: none"> ● The system shall display the fail message "Fail to connect the database" if the database cannot be connected. ● Use case ends. 	
Assumption	The librarian must understand English.	

Activity diagram: AD-13



Use Case ID	UC-14		
Use Case Name	Remove a member.		
Created By	Mr. Apiwat Hantrakool	Last Update By	Mr. Apiwat Hantrakool
Date Created	17-04-2017	Last Revision Date	22-04-2017
Actors	Librarian		
Description	The librarian can remove a member.		
Trigger	The librarian clicks “Delete member” button next to the member name.		
Preconditions	The librarian found the member by searching.		
Use Case Input Specification			
Input	type	Constraint	Example
-	-	-	-
Post conditions	If the use case is successful, the status of the member is update to “not active”. If not the system return to home page		
Normal Flows	User	System	
1.		The system shall display a button labeled as “Delete member” next to the member name.	
2.	The librarian clicks “Delete member” button.		
3.		The system shall display a confirmation box with message “Are you confirm to deleted this member” and “Yes” button and “No” button.	
4.	The librarian clicks “Yes” button. [E1: click “No” button]		
5.		The system shall update the member status to “not active”. [E2: Database cannot be connected]	
Alternative Flow	-		
Exception Flow	E1: Click “No” button. <ul style="list-style-type: none">● Use case ends. E2: Database cannot be connected. <ul style="list-style-type: none">● The system shall display the fail message “Fail to connect the database”.● Use case ends.		
Assumption	The librarian must understand English.		

Activity diagram: AD-14

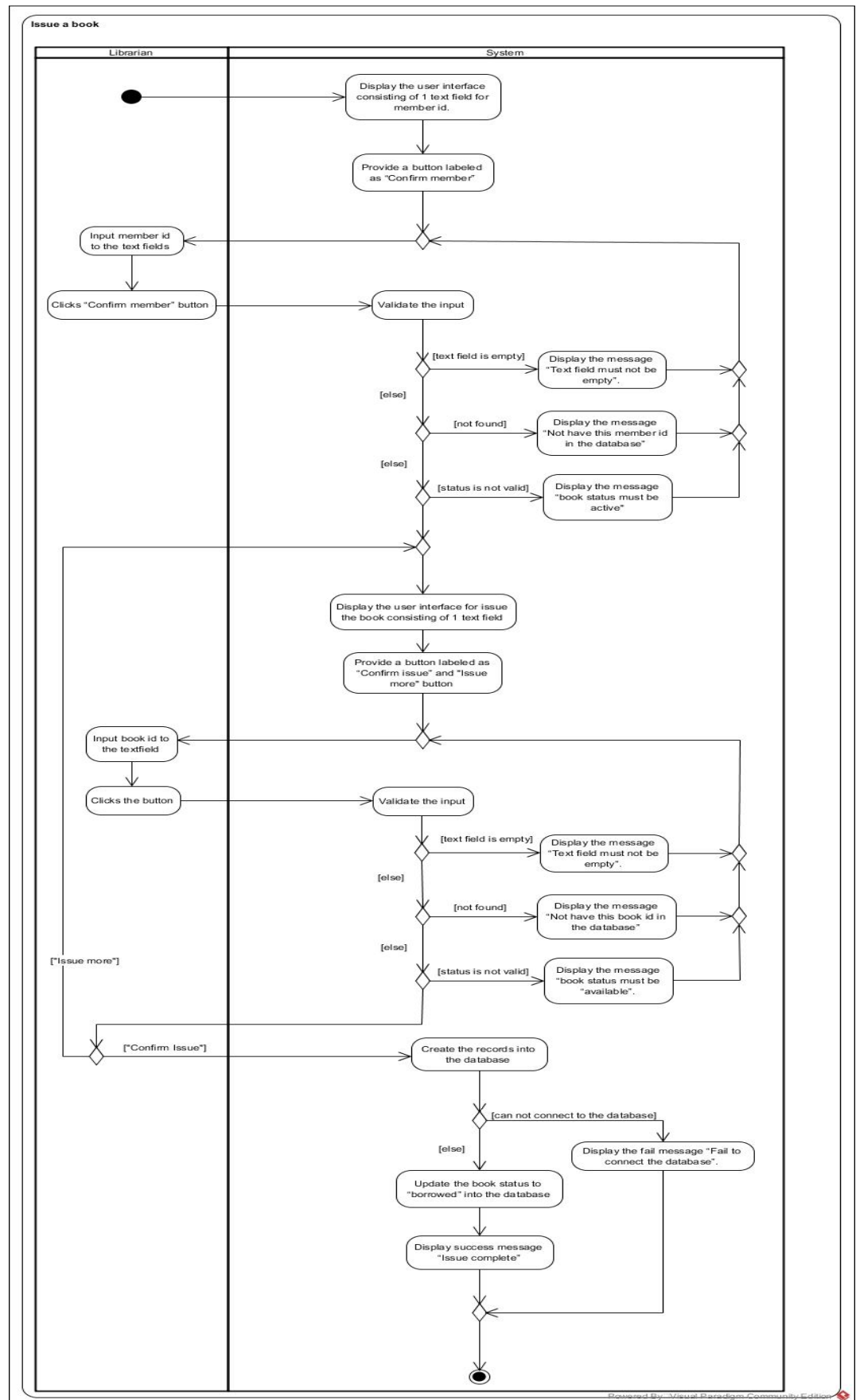


Use Case ID	UC-15		
Use Case Name	Issue a book		
Created By	Mr. Pasakorn Kunchai	Last Update By	Mr. Pasakorn Kunchai
Date Created	15-04-2017	Last Revision Date	22-04-2017
Actors	Librarian		
Description	The librarian can issue a book using member id and book id.		
Trigger	The librarian clicks “Issue a book” button.		
Preconditions	-		
Use Case Input Specification			
Input	type	Constraint	Example
member id	String	Numeric input.	214
book id	String	Numeric input	1028
Post conditions	If the use case is successful, <ul style="list-style-type: none">• The Records in the database is created.• Status of the book is updated to “borrowed”. If not the system return to home page		
Normal Flows	User	System	
1.		The system shall display the user interface for issue the book consisting of 1 text fields for member id.	
2.		The system shall provide a button labeled as “Confirm member” for the librarian to validate the member id.	
3.	The librarian input member id to the text fields.		
4.	The librarian clicks “Confirm member” button.		
5.		The system shall validate the input. [A1: status of the member is not valid], [A2: Not have this member id in the database], [A3: Text fields is empty].	
6.		The system shall display the user interface for issue the book consisting of 1 text fields for book id. if the input passes the validation.	

7.		The system shall provide a button labeled as "Confirm issue" for the librarian to confirm issue and do not need to want to issue more book.
8.		The system shall provide a button labeled as "Issue more" for the librarian to issue more book.
9.	The librarian input book id to the text fields and clicks "Confirm issue" button. [A4: The librarian clicks "Issue more"]	
10.		The system shall validate the input. [A5: Not have this book id in the database], [A6: Text fields is empty], [A7: status of the book is not valid].
11.		The system shall create the records in the database using record number, member id, book id and issue date, which auto generated by the system. [E1: Database cannot be connected]
12.		The system shall update the book status to "borrowed" into the database.
13.		The system shall display success message "Issue complete".
Alternative Flow	<p>A1: status of the member is not valid.</p> <ul style="list-style-type: none"> ● The system shall display the message "book status must be active". ● Return to normal flows 3. <p>A2: Not have this member id in the database.</p> <ul style="list-style-type: none"> ● The system shall display the message "Not have this member id in the database" ● Return to normal flows 3. <p>A3: Text field is empty.</p> <ul style="list-style-type: none"> ● The system shall display the message "Text field must not be empty". ● Return to normal flows 3. <p>A4: The librarian clicks "Issue more".</p> <ul style="list-style-type: none"> ● Go to normal flow 10. 	

	<ul style="list-style-type: none"> ● Return to normal flow 6. <p>A5: Not have this book id in the database.</p> <ul style="list-style-type: none"> ● The system shall display the fail message “Not have this book id in the database”. ● Return to normal flows 9. <p>A6: Text field is empty.</p> <ul style="list-style-type: none"> ● The system shall display the message “Text field must not be empty”. ● Return to normal flows 9. <p>A7: status of the book is not valid.</p> <ul style="list-style-type: none"> ● The system shall display the message “book status must be available”. ● Return to normal flows 9.
Exception Flow	<p>E1: Database cannot be connected</p> <ul style="list-style-type: none"> ● The system shall display the fail message “Fail to connect the database”. ● Use case ends.
Assumption	The Librarian must understand English.

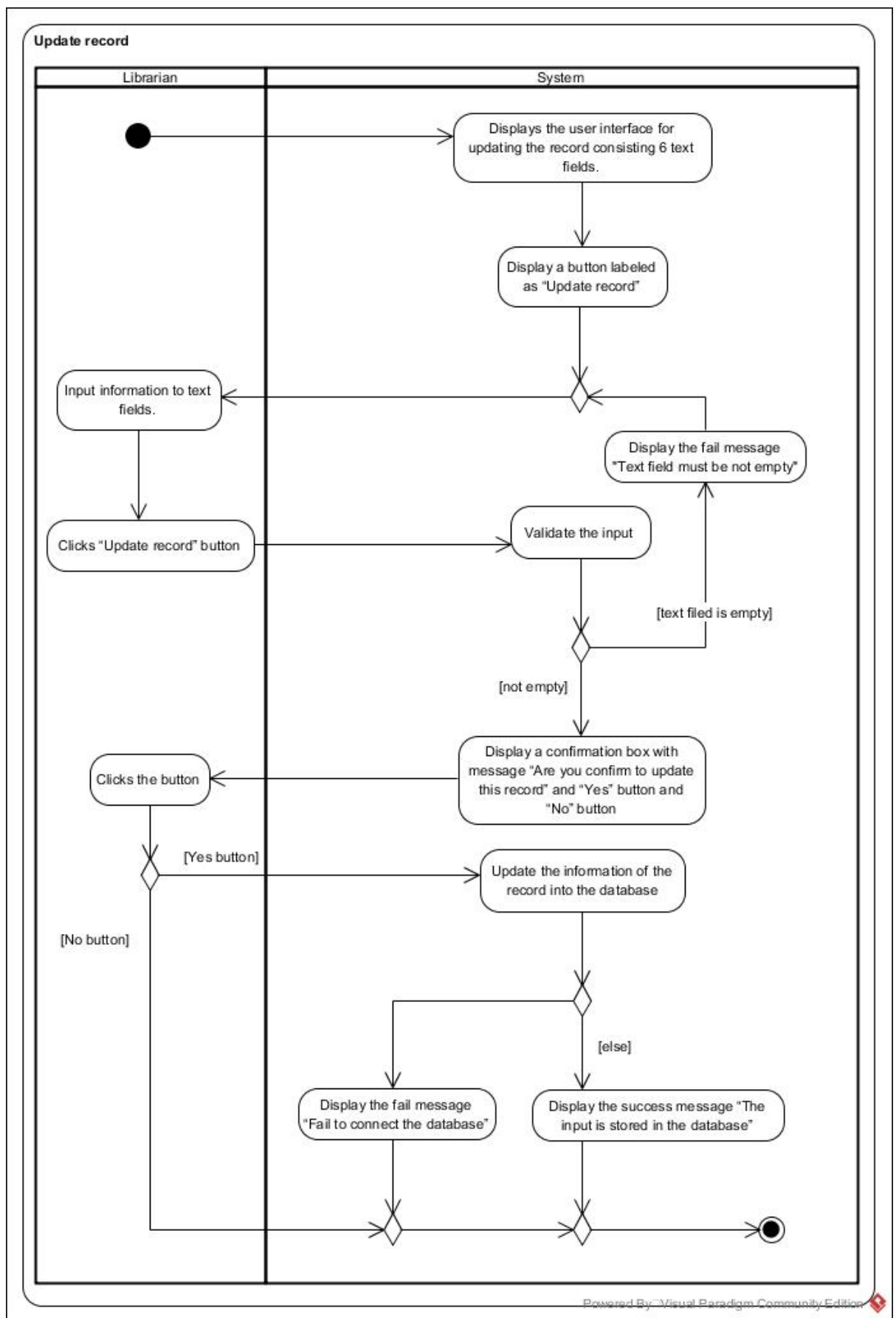
Activity diagram: AD-15



Use Case ID	UC-16		
Use Case Name	Update a record.		
Created By	Mr. Pasakorn Kunchai	Last Update By	Mr. Pasakorn Kunchai
Date Created	17-04-2017	Last Revision Date	22-04-2017
Actors	Librarian.		
Description	The librarian can update the records of a book into the database, which is member id, book id, issue date, return date, rental price and fine.		
Trigger	The librarian click “Update record” button next to the information of records.		
Preconditions	The librarian clicked view all records at home page.		
Use Case Input Specification			
Input	type	Constraint	Example
member id	String	Numeric input	214
book id	String	Numeric input	1204
issue date	Date	Date format	17-04-2017 10:30:00
return date	Date	Date format	17-04-2017 10:30:00
rental price	Double	Decimal number with 2 decimal digits	5.00
fine	Double	Decimal number with 2 decimal digits	60.00
Post conditions	If the use case is successful, the record is updated and stored in the database. If not the system return to home page.		
Normal Flows	User	System	
1.		The system displays the user interface for updating the record consisting 6 text fields, which are member id, book id, issue date, return date, rental price and fine.	
2.		The “Update record” changes to “Confirm update” button.	
3.	The librarian input information for updating.		
4.	The librarian clicks “Confirm update” button.		
5.		The system shall validate the input. [A1: member id is in the wrong format], [A2: book id is in the wrong format], [A3: issue date is in the wrong format], [A4: return date is in the wrong format], [A5: rental price is in the wrong format] , [A6: fine is in the wrong format].	

6.		The system shall display a confirmation box with message "Are you confirm to update this record" and "Yes" button and "No" button.
7.	The librarian click "Yes" button. [E1: The librarian clicks "No" button]	
8.		The system shall update the information of the record into the database. [E2: Database cannot be connected]
9.		The system shall display the success message "The input is stored in the database"
Alternative Flow	<p>A1: member id is in the wrong format.</p> <ul style="list-style-type: none"> ● The system shall display the fail message "The format of member id is not valid". ● Return to normal flows 3. <p>A2: book id is in the wrong format.</p> <ul style="list-style-type: none"> ● The system shall display the fail message "The format of book id is not valid". ● Return to normal flows 3. <p>A3: issue date is in the wrong format.</p> <ul style="list-style-type: none"> ● The system shall display the fail message "The format of issue date is not valid". ● Return to normal flows 3. <p>A4: return date is in the wrong format.</p> <ul style="list-style-type: none"> ● The system shall display the fail message "The format of return date is not valid". ● Return to normal flows 3. <p>A5: rental price is in the wrong format.</p> <ul style="list-style-type: none"> ● The system shall display the fail message "The format of rental price is not valid". ● Return to normal flows 3. <p>A6: fine is in the wrong format.</p> <ul style="list-style-type: none"> ● The system shall display the fail message "The format of fine is not valid". ● Return to normal flows 3. 	
Exception Flow	<p>E1: The librarian clicks "No" button.</p> <ul style="list-style-type: none"> ● Use case ends. <p>E2: Database cannot be connected.</p> <ul style="list-style-type: none"> ● The system shall display the fail message "Fail to connect the database" ● Use case ends. 	
Assumption	The librarian must understand English.	

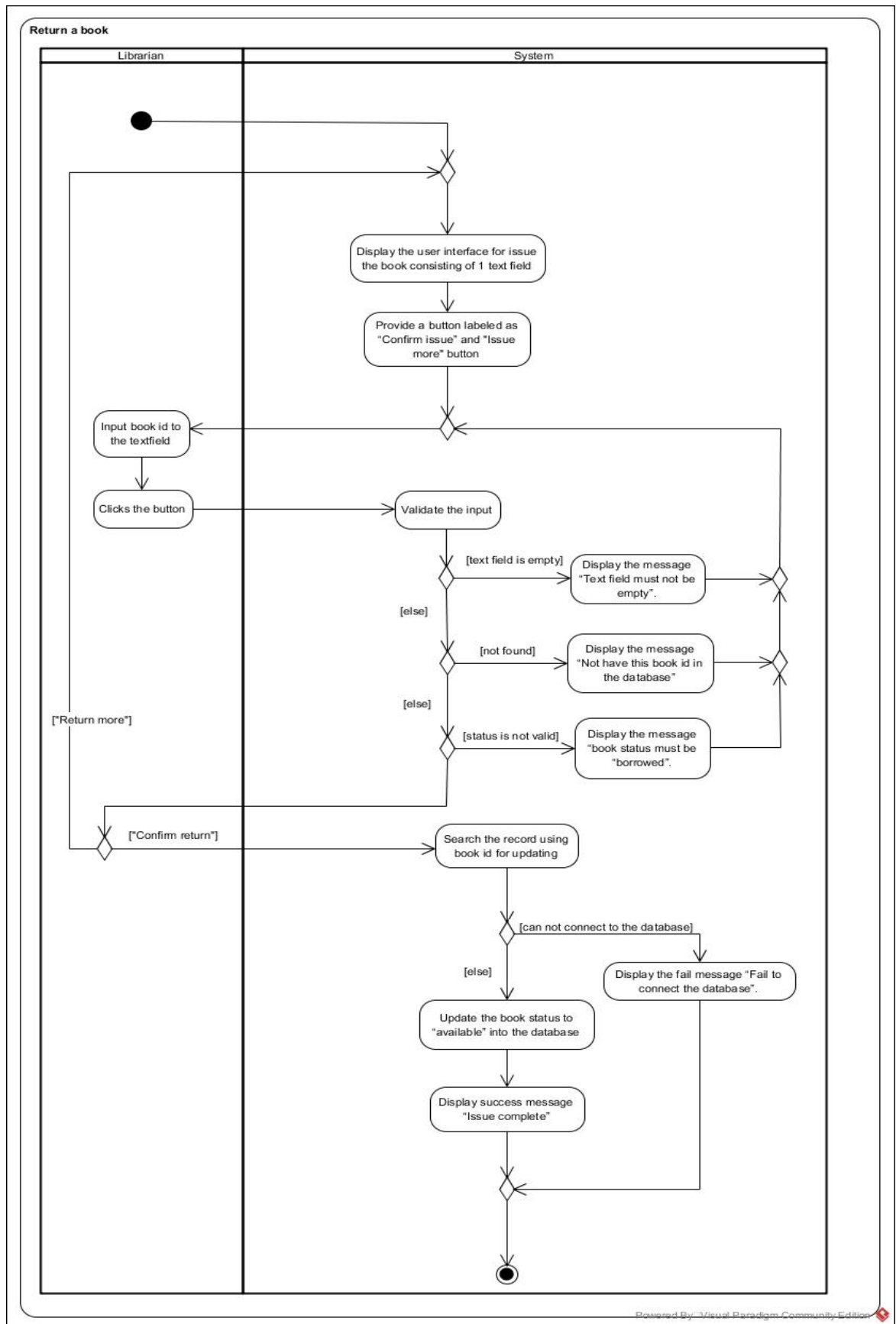
Activity diagram: AD-16



Use Case ID	UC-17		
Use Case Name	Return a book		
Created By	Mr. Pasakorn Kunchai	Last Update By	Mr. Pasakorn Kunchai
Date Created	15-04-2017	Last Revision Date	23-04-2017
Actors	Librarian		
Description	The librarian can return a book using book id.		
Trigger	The librarian clicks “Return a book” button at home page.		
Preconditions	-		
Use Case Input Specification			
Input	type	Constraint	Example
book id	String	Numeric input.	1028
Post conditions	If the use case is successful, <ul style="list-style-type: none">● The Records in the database is updated.● Status of the book is updated to “available” If not the system return to home page.		
Normal Flows	User	System	
1.		The system shall display the user interface for issue the book consisting of 1 text fields for book id.	
2.		The system shall provide a button labeled as “Confirm return” for the librarian to confirm issue and do not need to want to issue more book.	
3.		The system shall provide a button labeled as “Return more” for the librarian to issue more book.	
4.	The librarian input book id to the text fields.		
5.	The librarian clicks “Confirm return” button. [A1: The librarian clicks “return more”]		
6.		The system shall validate the input. [A3: Not have this book id in the database], [A4: Text field is empty], [A5: status of the book is not valid]	

7.		The system shall search the book id in the records using book id for update the return date, rental price and fine in the records. [E1: Database cannot be connected]
8.		The system shall update the book status to "available" into the database.
9.		The system shall display success message "Return complete" when the records is stored in the database.
Alternative Flow	<p>A1: The librarian clicks "Issue more".</p> <ul style="list-style-type: none"> Go to normal flow 6. Return to normal flow 1. <p>A2: book id is in the wrong format.</p> <ul style="list-style-type: none"> The system shall display the fail message "The format of book id is not valid". Return to normal flows 4. <p>A3: Not have this book id in the database.</p> <ul style="list-style-type: none"> The system shall display the fail message "Not have this book id in the database". Return to normal flows 4. <p>A4: Text field is empty.</p> <ul style="list-style-type: none"> The system shall display the fail message "Text field must not be empty". Return to normal flows 4. <p>A5: status of the book is not valid.</p> <ul style="list-style-type: none"> The system shall display the message "book status must be "borrowed". Return to normal flows 4. 	
Exception Flow	<p>E1: Database cannot be connected</p> <ul style="list-style-type: none"> The system shall display the fail message "Fail to connect the database". Use case ends. 	
Assumption	The Librarian must understand English.	

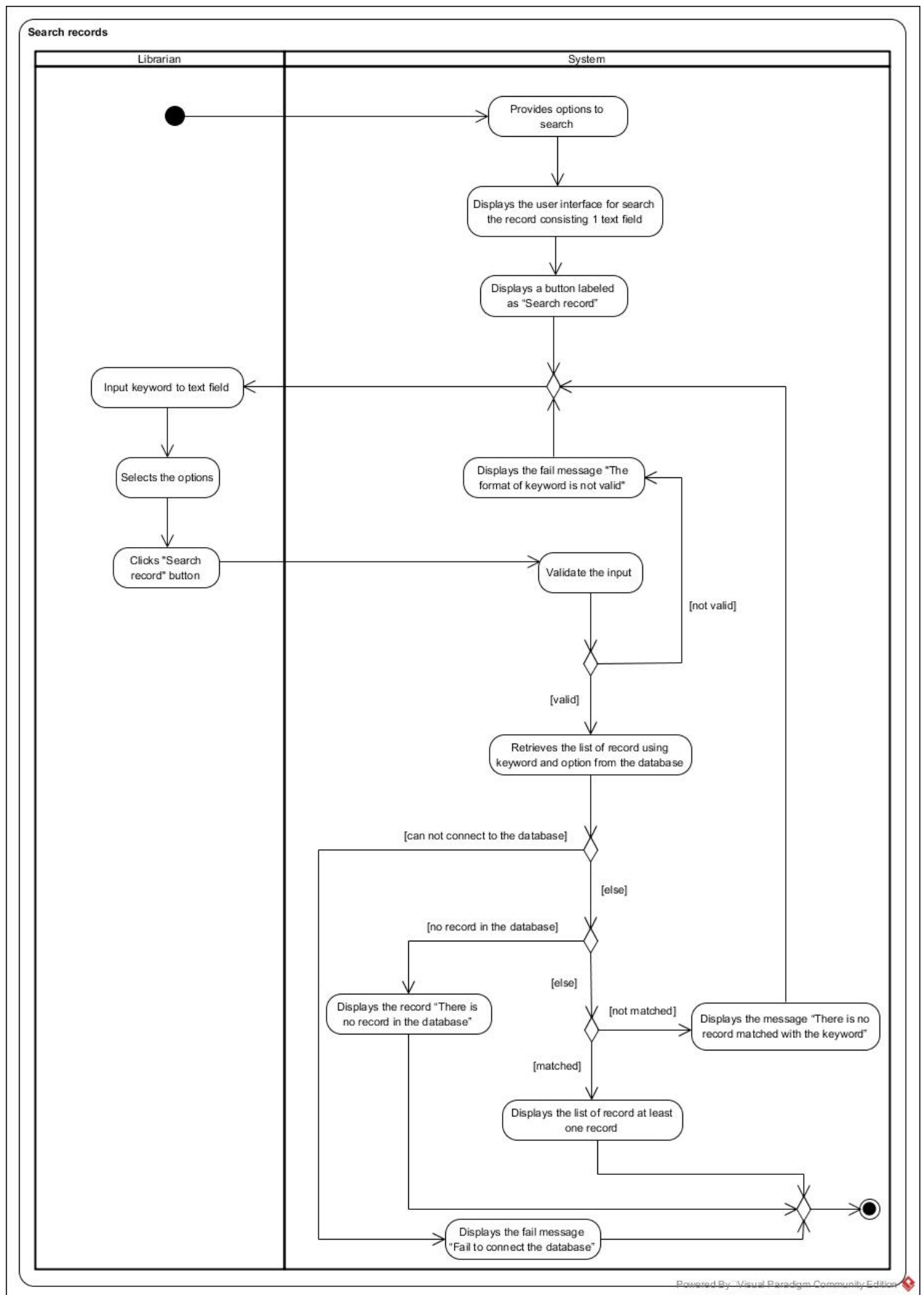
Activity diagram: AD-17



Use Case ID	UC-18		
Use Case Name	Search a record.		
Created By	Mr. Pasakorn Kunchai	Last Update By	Mr. Pasakorn Kunchai
Date Created	17-04-2017	Last Revision Date	23-04-2017
Actors	Librarian		
Description	The librarian can search a record from the database using keyword and option.		
Trigger	The librarian clicks “Search a record” button at home page.		
Preconditions	-		
Use Case Input Specification			
Input	type	Constraint	Example
keyword	String	Length must not exceed 50 characters.	1234
option	String	Select one of this set [record number, book id, issue date, return date, rental price and fine].	book id
Post conditions	If the use case is successful, At least one record is displayed. If not the system return to home page.		
Normal Flows	User	System	
1.		The system shall display the user interface for search the book consisting of 1 text field for keyword.	
2.		The system provides options to search, which are record number, member id, book id, issue date, return date, rental price and fine.	
3.		The system shall display a button labeled as “Search record.”	
4.	The librarian input keyword to the text field.		
5.	The librarian select the options.		
6.	The librarian clicks “Search record” button.		
7.		The system shall validate the input. [A1: keyword is wrong in format]	
8.		The system shall retrieve the list of record using keyword and option in the record number, member id, book id, issue date, return date, rental price and fine into the	

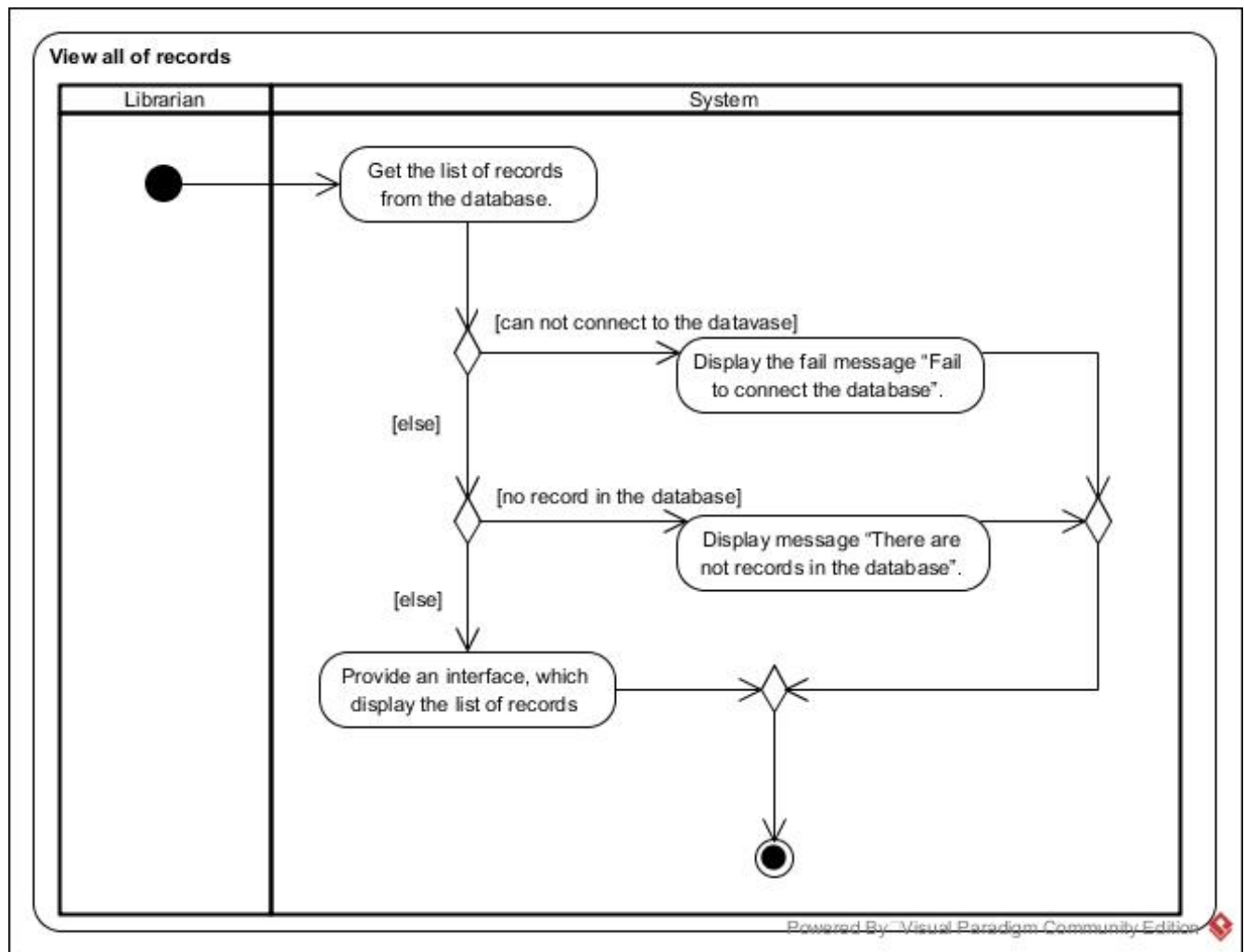
		database. [A2: record is not matched with the keyword], [E1: There is no record in the database]. [E2: Database cannot be connected]
9.		The system shall display the list of record when there is at least one record that matches with the keyword.
Alternative Flow	<p>A1: keyword is wrong in format.</p> <ul style="list-style-type: none"> ● The system shall display the fail message next to the keyword text fields "The format of keyword is not valid". ● Return to normal flows 4. <p>A2: record is not matched with the keyword.</p> <ul style="list-style-type: none"> ● The system shall display the message "There is no record matched with the keyword" ● Return to normal flows 4. 	
Exception Flow	<p>E1: There is no record in the database.</p> <ul style="list-style-type: none"> ● The system shall display the message "There is no record in the database" ● Use case ends. <p>E2: Database cannot be connected.</p> <ul style="list-style-type: none"> ● The system shall display the fail message "Fail to connect the database". ● Use case ends. 	
Assumption	The Librarian must understand English.	

Activity diagram: AD-18



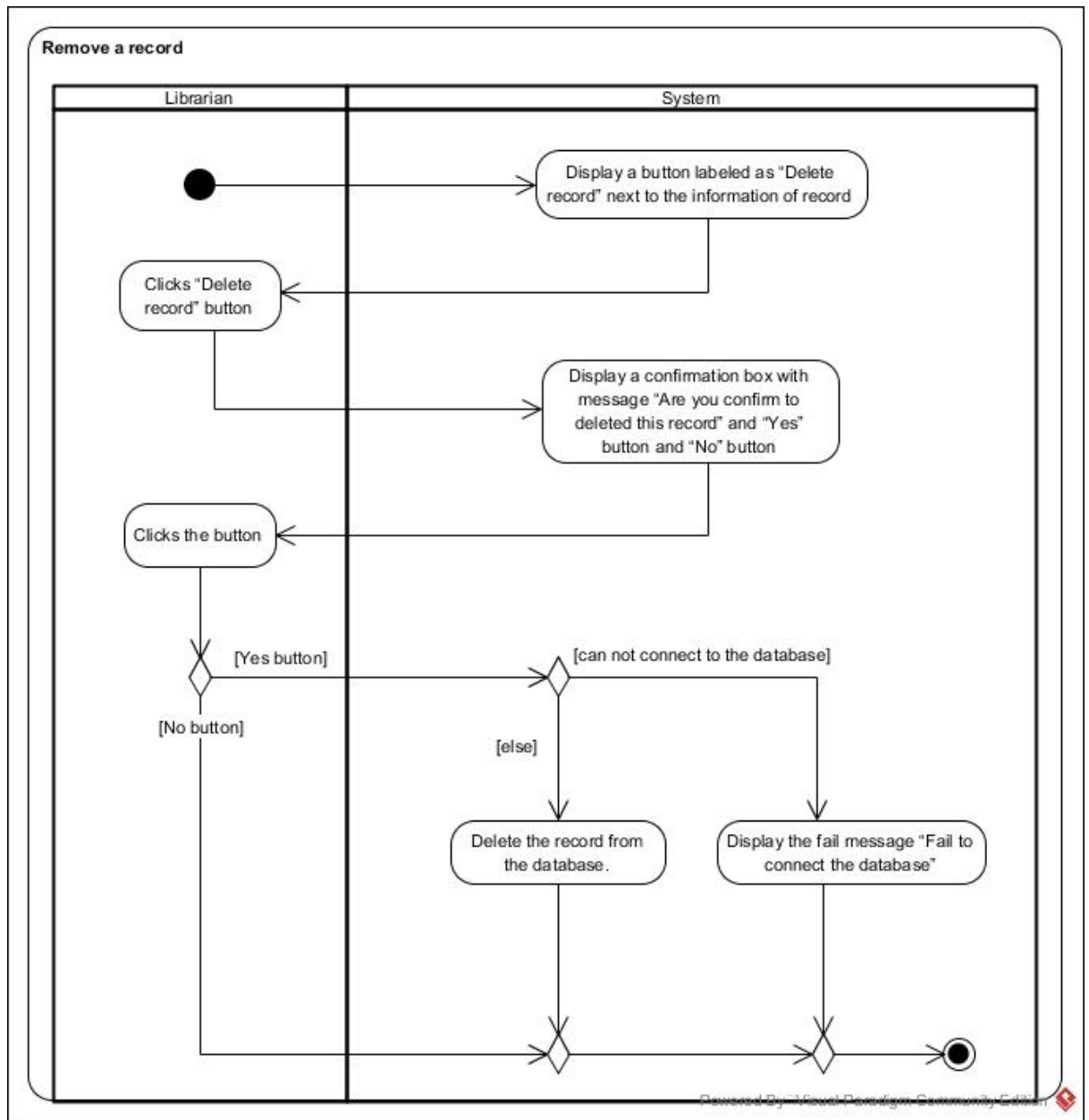
Use Case ID	UC-19		
Use Case Name	View all of records.		
Created By	Mr. Pasakorn Kunchai	Last Update By	Mr. Pasakorn Kunchai
Date Created	17-04-2017	Last Revision Date	22-04-2017
Actors	Librarian		
Description	The library can view all of records in the system.		
Trigger	The librarian clicks “View all records” button at home page.		
Preconditions	-		
Use Case Input Specification			
Input	type	Constraint	Example
-	-	-	-
Post conditions	If the use case is successful, the list of record is displayed. If not the system return to home page.		
Normal Flows	User	System	
1.		The system shall be able to get the list of records from the database [E1: there are not records in the database.], [E2: Database cannot be connected.]	
2.		The system shall provide an interface, which display the list of records, which are record number, book id, issue date, return date, rental price and fine.	
Alternative Flow	-		
Exception Flow	E1: there are not records in the database. <ul style="list-style-type: none">● The system shall display message “There are not records in the database”.● Use case ends. E2: Database cannot be connected. <ul style="list-style-type: none">● The system shall display the fail message “Fail to connect the database”.● Use case ends.		
Assumption	The librarian must understand English.		

Activity diagram: AD-19



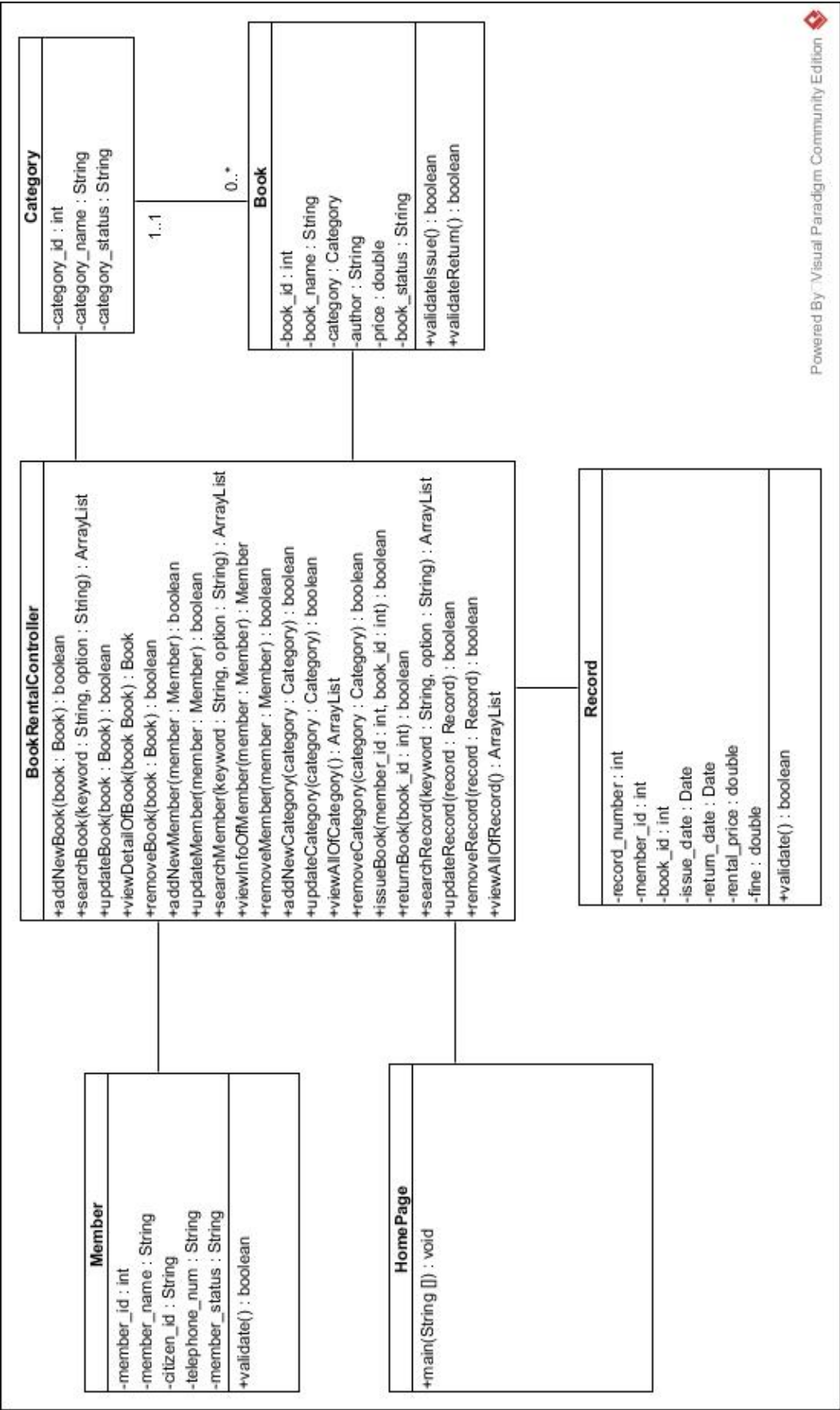
Use Case ID	UC-20		
Use Case Name	Remove a record.		
Created By	Mr. Pasakorn Kunchai	Last Update By	Mr. Pasakorn Kunchai
Date Created	17-4-2017	Last Revision Date	22-04-2017
Actors	Librarian		
Description	The librarian can remove a record from the database.		
Trigger	The librarian clicks “Delete record” button.		
Preconditions	The librarian clicked “View all of records” button already.		
Use Case Input Specification			
Input	type	Constraint	Example
-	-	-	-
Post conditions	If the use case is successful, the record was deleted from the database. If not the system return to home page		
Normal Flows	User	System	
1.		The system shall display a button labeled as “Delete record” next to the information of records.	
2.	The librarian clicks “Delete record” button.		
3.		The system shall display a confirmation box with message “Are you confirm to deleted this record” and “Yes” button and “No” button.	
4.	The librarian clicks “Yes” button. [E1: The librarian clicks “No” button]		
5.		The system shall delete the record from the database. [E2: Database cannot be connected]	
Alternative Flow	-		
Exception Flow	E1: The librarian clicks “No” button. <ul style="list-style-type: none">● Use case ends. E2: Database cannot be connected. <ul style="list-style-type: none">● The system shall display the fail message “Fail to connect the database”.● Use case ends.		
Assumption	The librarian must understand English.		

Activity diagram: AD-20



Class diagram

1.Book Rental System Class Diagram(Overview)



Member
-member_id : int -member_name : String -citizen_id : String -telephone_num : String -member_status : String
+validate() : boolean

Attributes:

No.	Name	Description	Access Modifier	Data Type
1.	member_id	The unique identifier of member.	Private	int
2.	member_name	Name of member.	Private	String
3.	citizen_id	Citizen ID of member.	Private	String
4.	telephone_num	Telephone number of member.	Private	String
5.	member_status	Status of member, which are active or not active.	Private	String

Methods:

No.	Name	Description	Access Modifier	Input Arguments	Return Type
1.	validate	Verify status of member. If the status is "active", it will return true. Otherwise, it will return false	Public	-	boolean

Book
-book_id : int -book_name : String -category : Category -author : String -price : double -book_status : String
+validateIssue() : boolean +validateReturn() : boolean

Attributes:

No.	Name	Description	Access Modifier	Data Type
1.	book_id	The unique identifier of book.	Private	int
2.	book_name	Name of book.	Private	String
3.	category	Category of book	Private	Category
4.	author	Author of book	Private	String
5.	price	Price for rental the book	Private	double

Methods:

No.	Name	Description	Access Modifier	Input Arguments	Return Type
1.	validateIssue	Verify status of book for issuing. If the status is "available", it will return true. Otherwise, it will return false	Public	-	boolean
2.	validateReturn	Verify status of book for issuing. If the status is "borrowed", it will return true. Otherwise, it will return false	Public	-	boolean

Category
-category_id : int -category_name : String -category_status : String

Attributes:

No.	Name	Description	Access Modifier	Data Type
1.	category_id	The unique identifier of category.	Private	int
2.	category_name	Name of category.	Private	String
3.	category_status	Status of category.	Private	String

Methods:

No.	Name	Description	Access Modifier	Input Arguments	Return Type
-	-	-	-	-	-

Record
-record_number : int -member_id : int -book_id : int -issue_date : Date -return_date : Date -rental_price : double -fine : double
+validate() : boolean

Attributes:

No.	Name	Description	Access Modifier	Data Type
1.	record_number	The unique identifier of record.	Private	int
2.	member_id	The unique identifier of member.	Private	int
3.	book_id	The unique identifier of book.	Private	int
4.	issue_date	Date that issue the book.	Private	Date
5.	return_date	Date that return the book.	Private	Date
6.	rental_price	Price of rental	Private	double
7.	fine	Fine of rental	Private	double

Methods:

No.	Name	Description	Access Modifier	Input Arguments	Return Type
1.	validate	Verify the correctness of record	Public	-	boolean

BookRentalController
+addNewBook(book : Book) : boolean +searchBook(keyword : String, option : String) : ArrayList +updateBook(book : Book) : boolean +viewDetailOfBook(book Book) : Book +removeBook(book : Book) : boolean +addNewMember(member : Member) : boolean +updateMember(member : Member) : boolean +searchMember(keyword : String, option : String) : ArrayList +viewInfoOfMember(member : Member) : Member +removeMember(member : Member) : boolean +addNewCategory(category : Category) : boolean +updateCategory(category : Category) : boolean +viewAllOfCategory() : ArrayList +removeCategory(category : Category) : boolean +issueBook(member_id : int, book_id : int) : boolean +returnBook(book_id : int) : boolean +searchRecord(keyword : String, option : String) : ArrayList +updateRecord(record : Record) : boolean +removeRecord(record : Record) : boolean +viewAllOfRecord() : ArrayList

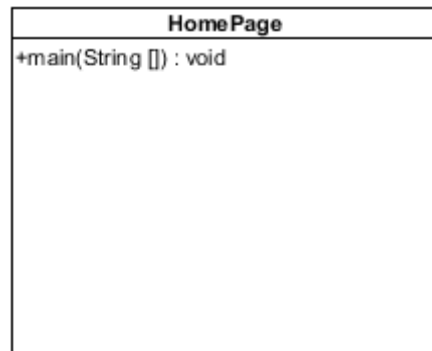
Attributes:

No.	Name	Description	Access Modifier	Data Type
-	-	-	-	-

Methods:

No.	Name	Description	Access Modifier	Input Arguments	Return Type
1.	addNewBook	Add book's data to the database	Public	book : Book	boolean
2.	searchBook	Search book form the database by using keyword and option.	Public	keyword : String, option : String	ArrayList
		If the keyword does not match.			Null
3.	updateBook	Update book's data to the database	Public	book : Book	boolean
4.	viewDetailOfBook	View book's data from the database	Public	book : Book	Book
5.	removeBook	Update book status becomes to "removed" to the database	Public	book : Book	boolean

6.	addNewMember	Add member's data to the database	Public	member : Member	boolean
7.	searchMember	Search member form the database by using keyword and option.	Public	keyword : String, option : String	ArrayList
		If the keyword does not match.			Null
8.	updateMember	Update member's data to the database	Public	member : Member	boolean
9.	viewInfoOfMember	View member's data from the database	Public	member : Member	Member
10.	removeMember	Update member status becomes to "not active" to the database	Public	member : Member	boolean
11.	addNewCategory	Add category's data to the database	Public	category : Category	boolean
12.	updateCategory	Update category's data to the database	Public	category : Category	boolean
13.	viewAllOfCategory	View all category's data from the database	Public	-	ArrayList
14.	removeCategory	Update category status becomes to "not active" to the database	Public	category : Category	boolean
15.	issueBook	Create record of issuing and update the book status to "borrowed" to the database	Public	member_id : int, book_id : int	boolean
16.	returnBook	Update record of issuing and update the book status to "available" to the database	Public	book_id : int	boolean
17.	updateRecord	Update record's data to the database	Public	record : Record	boolean
18.	searchRecord	Search record form the database by using keyword and option.	Public	keyword : String, option : String	ArrayList
		If the keyword does not match			Null
19.	viewAllOfRecord	View all record's data from the database	Public	-	ArrayList
20.	removeRecord	Remove record's data from the database	Public	record : Record	boolean



Attributes:

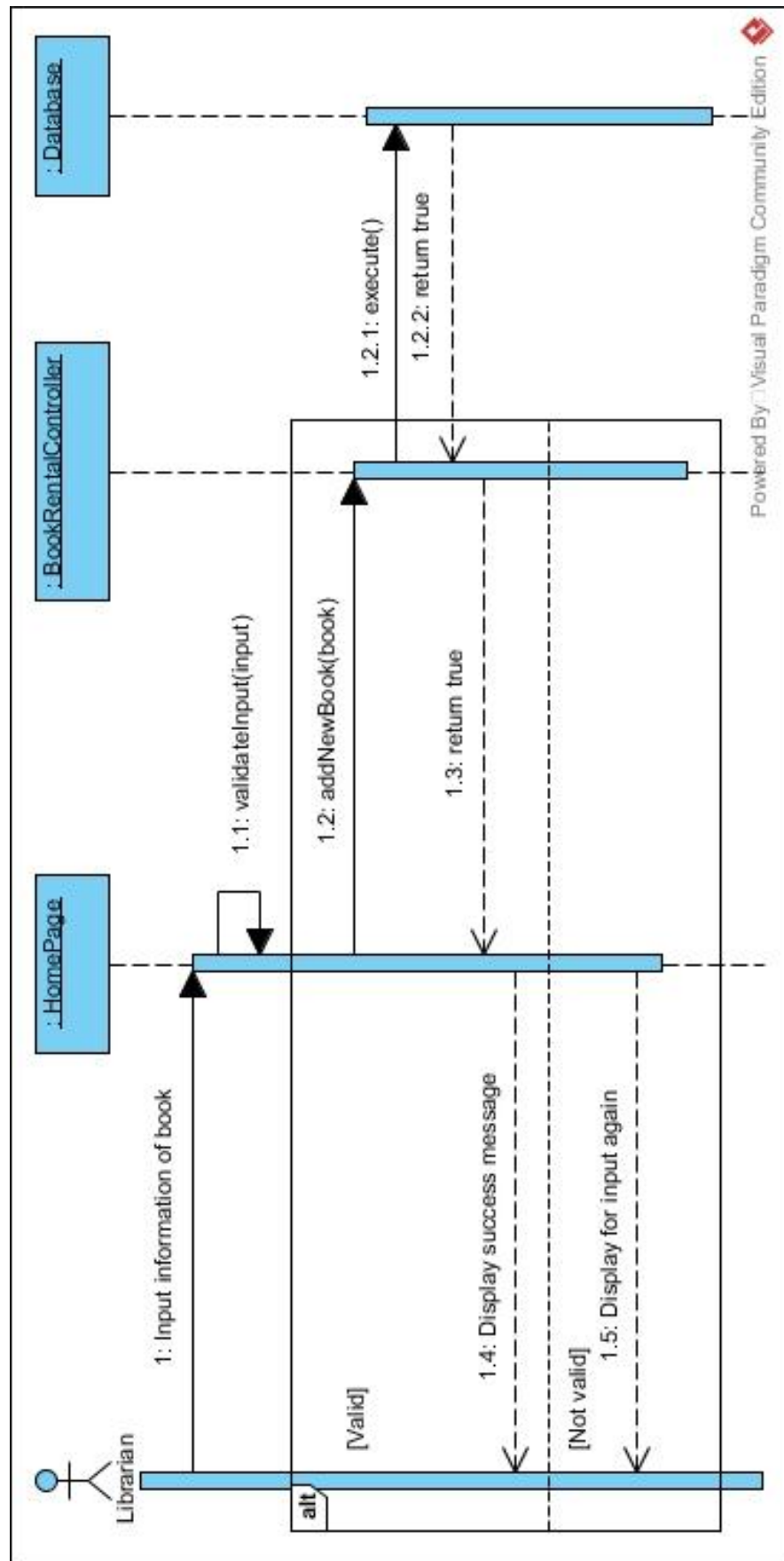
No.	Name	Description	Access Modifier	Data Type
-	-	-	-	-

Methods:

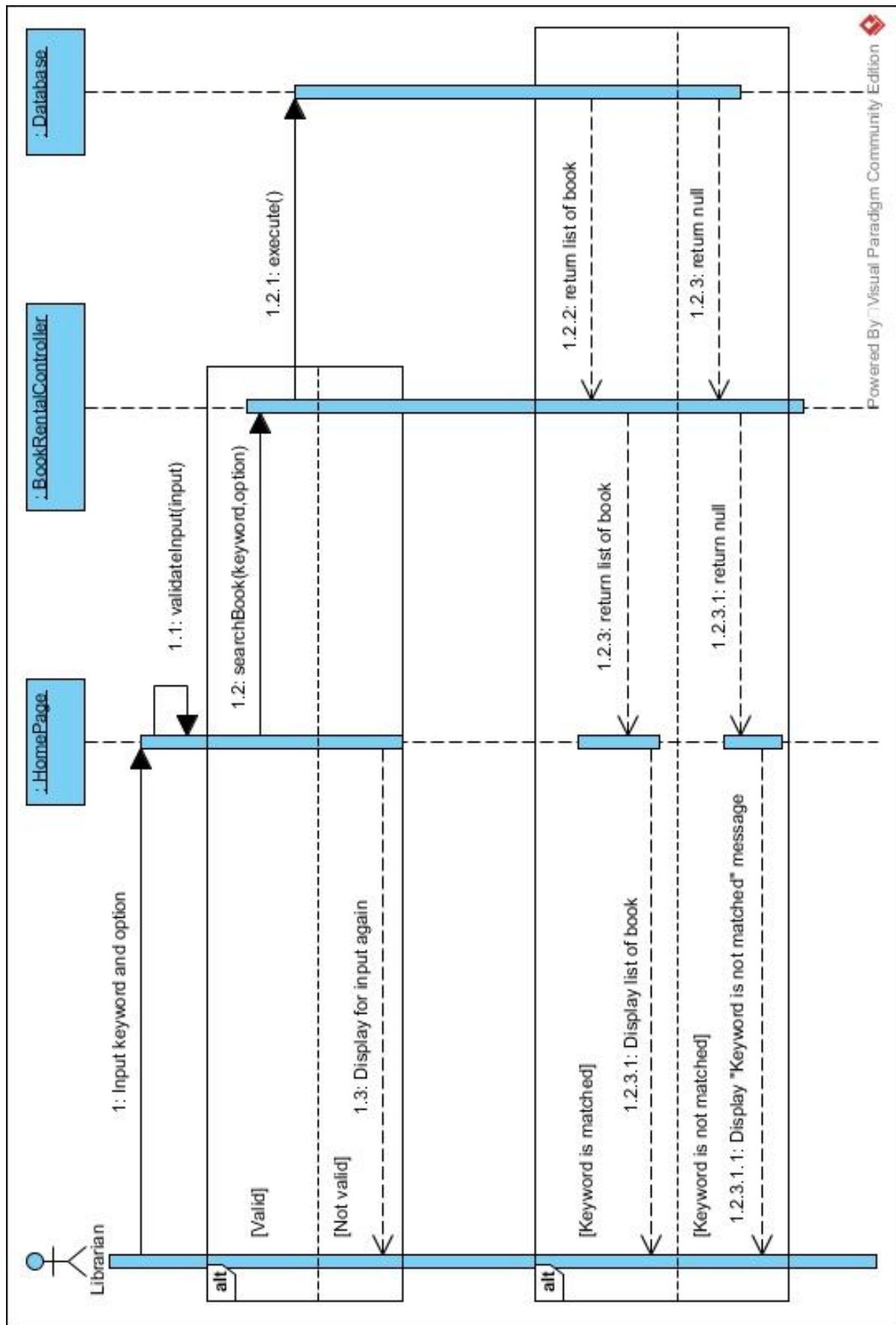
No.	Name	Description	Access Modifier	Input Arguments	Return Type
1.	main	Used to run the system.	Public	String []	void

Sequence diagram

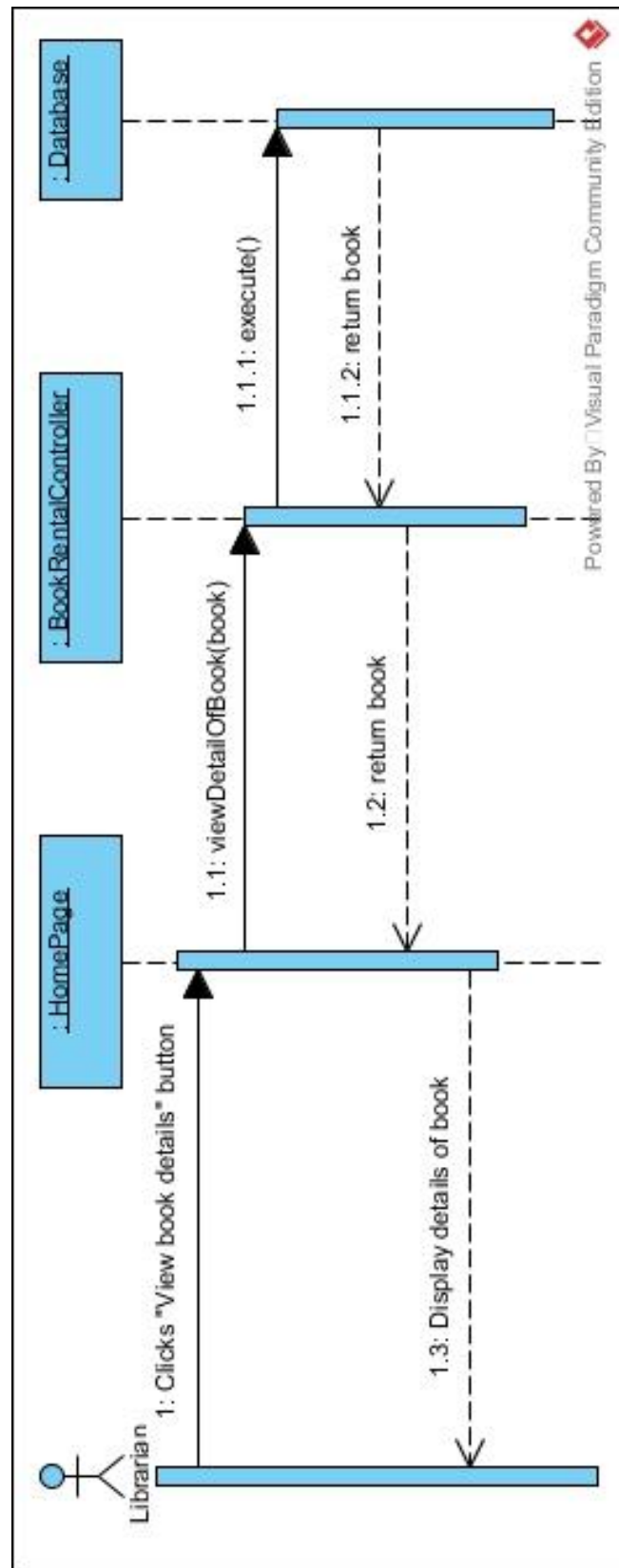
SD-01: Add a new book



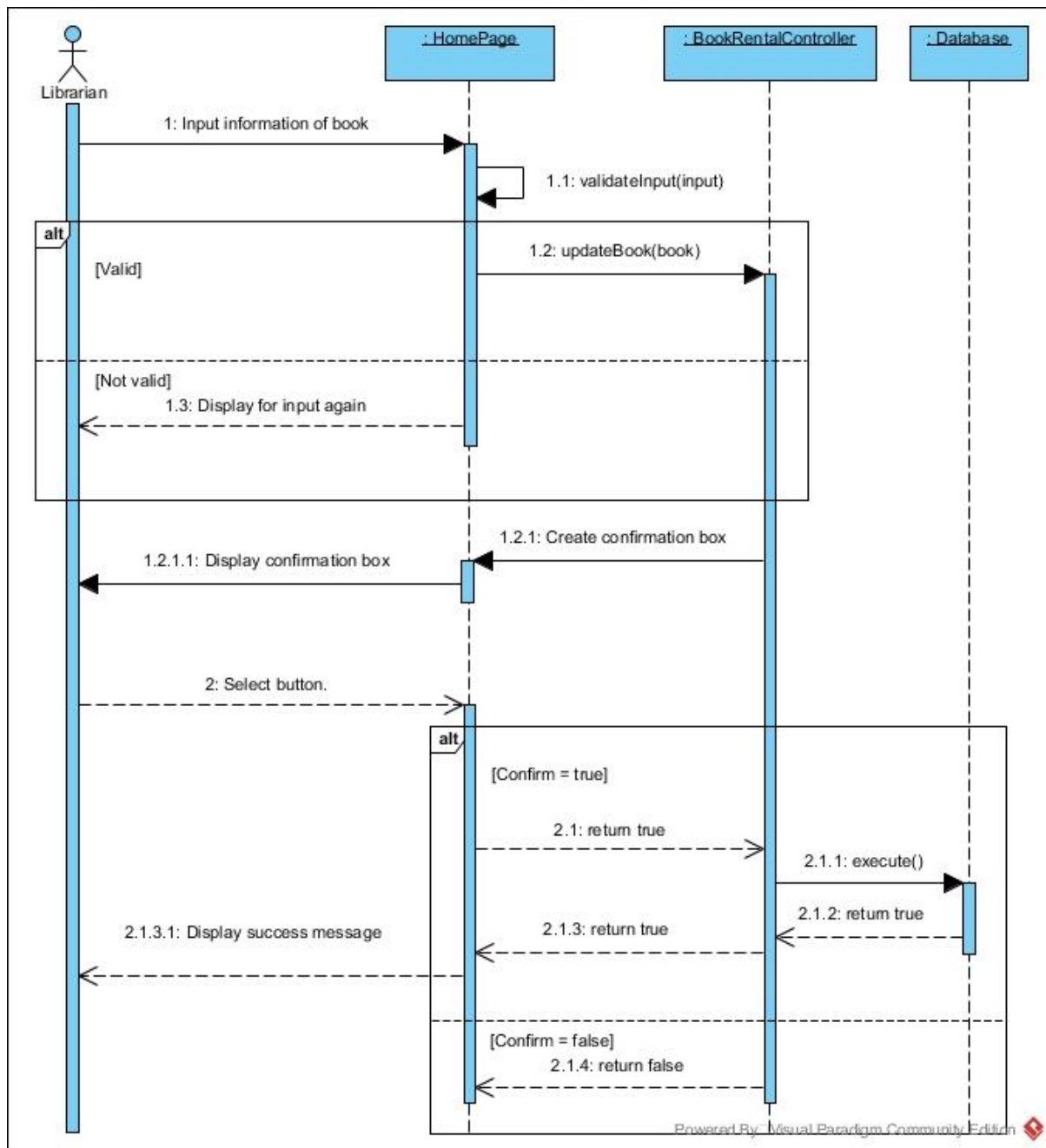
SD-02: Search for a book



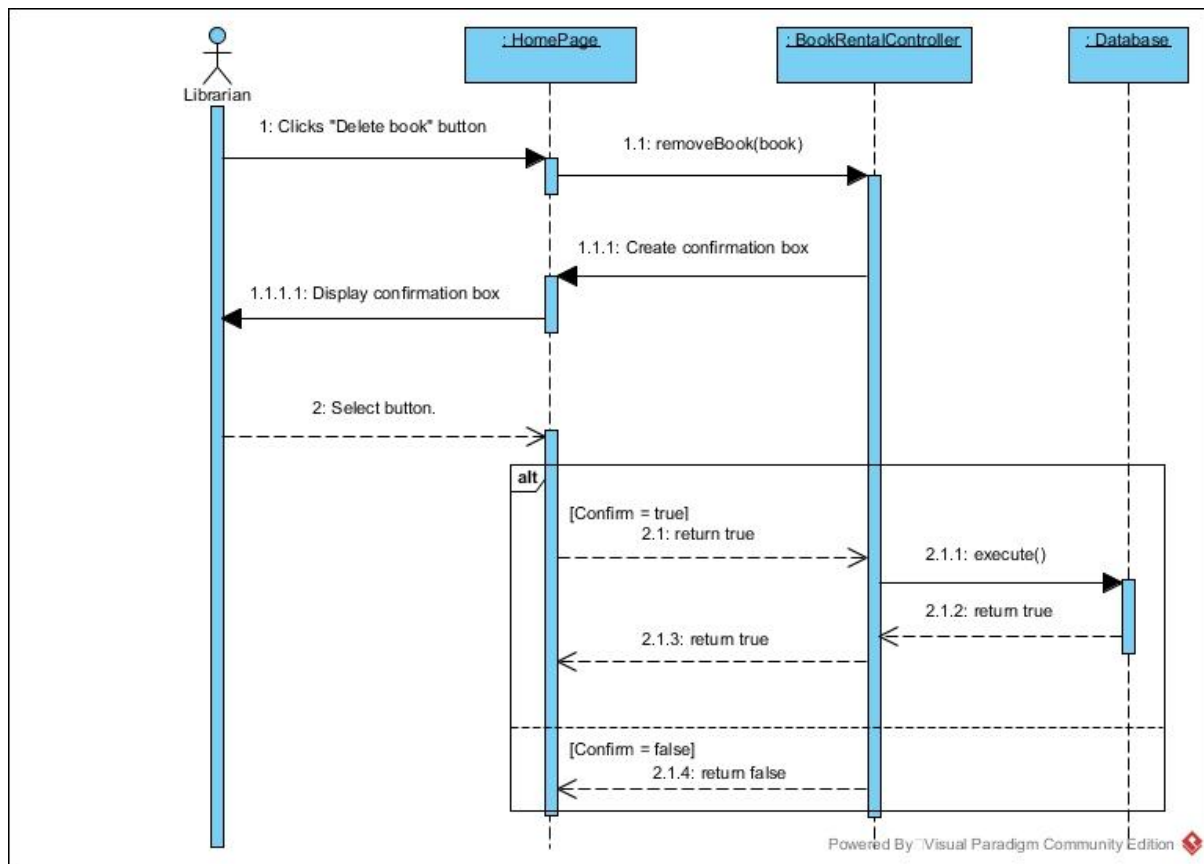
SD-03: View details of a book



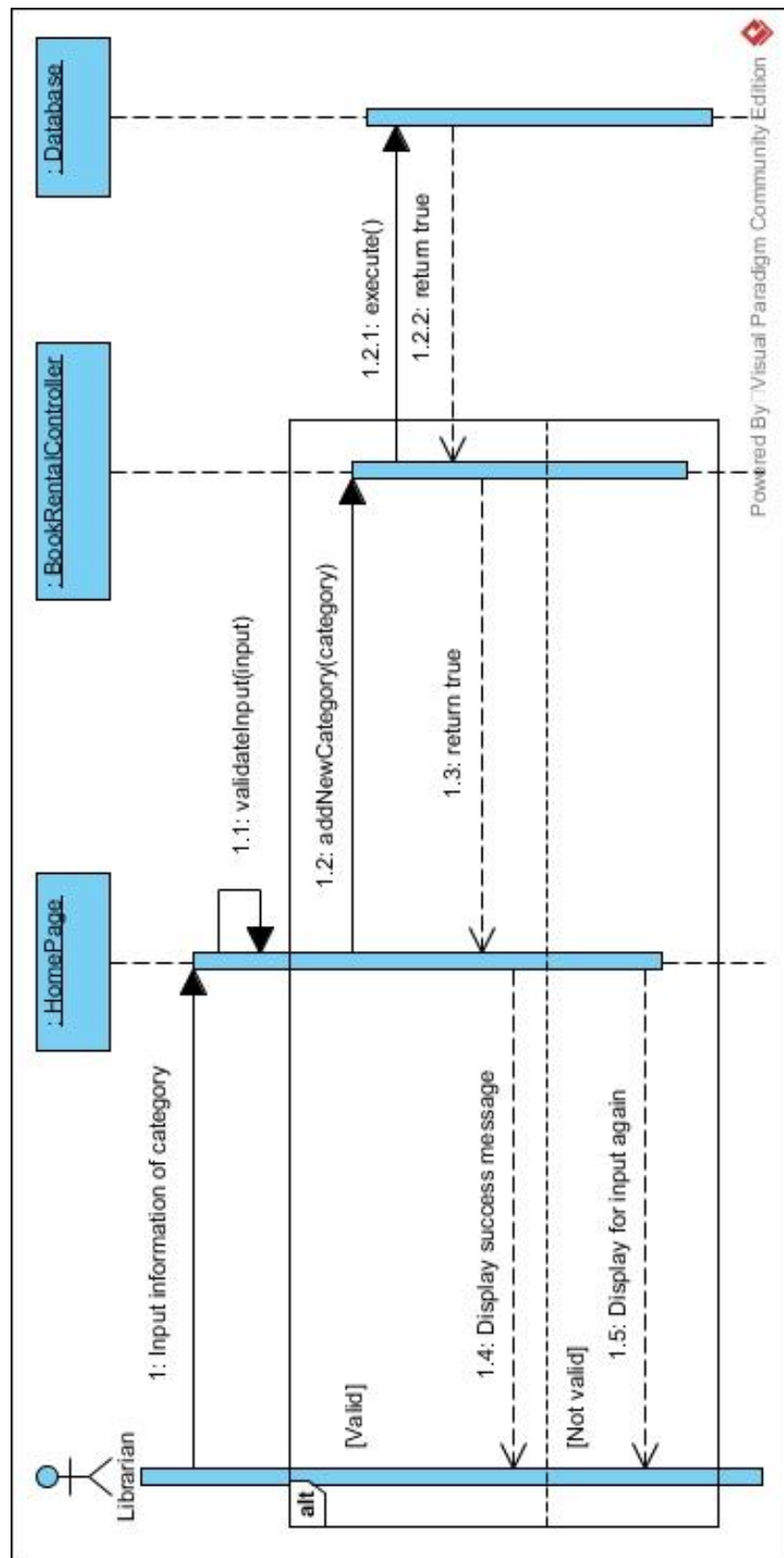
SD-04: Update details of a book



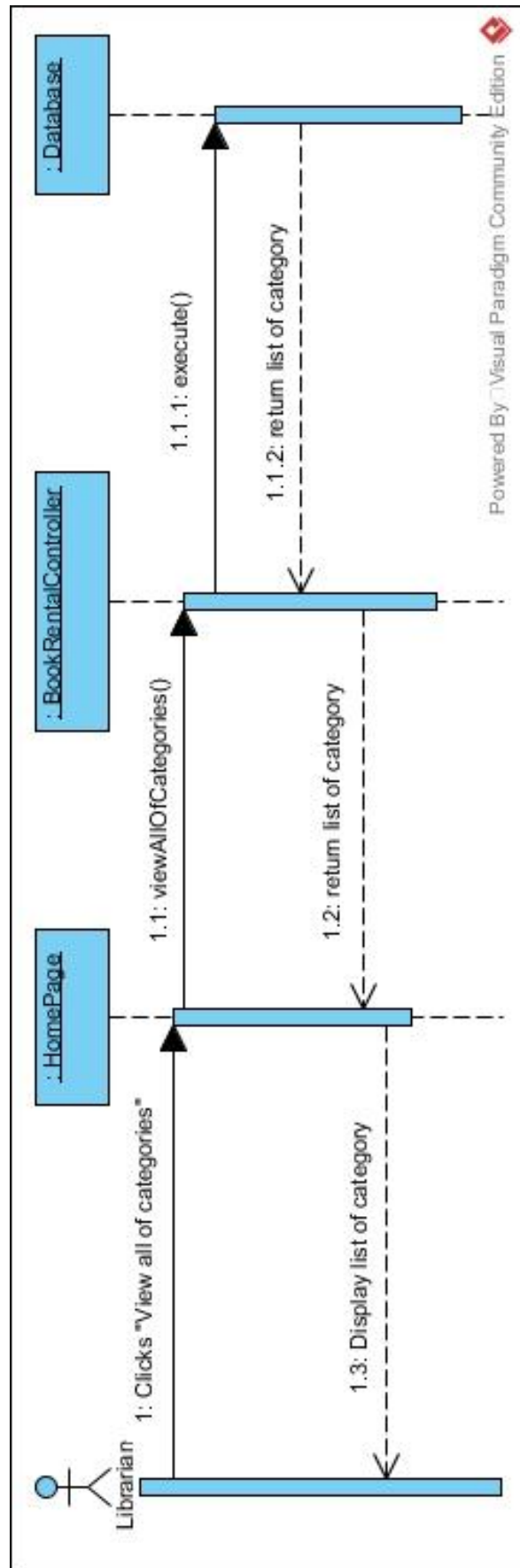
SD-05: Remove a book



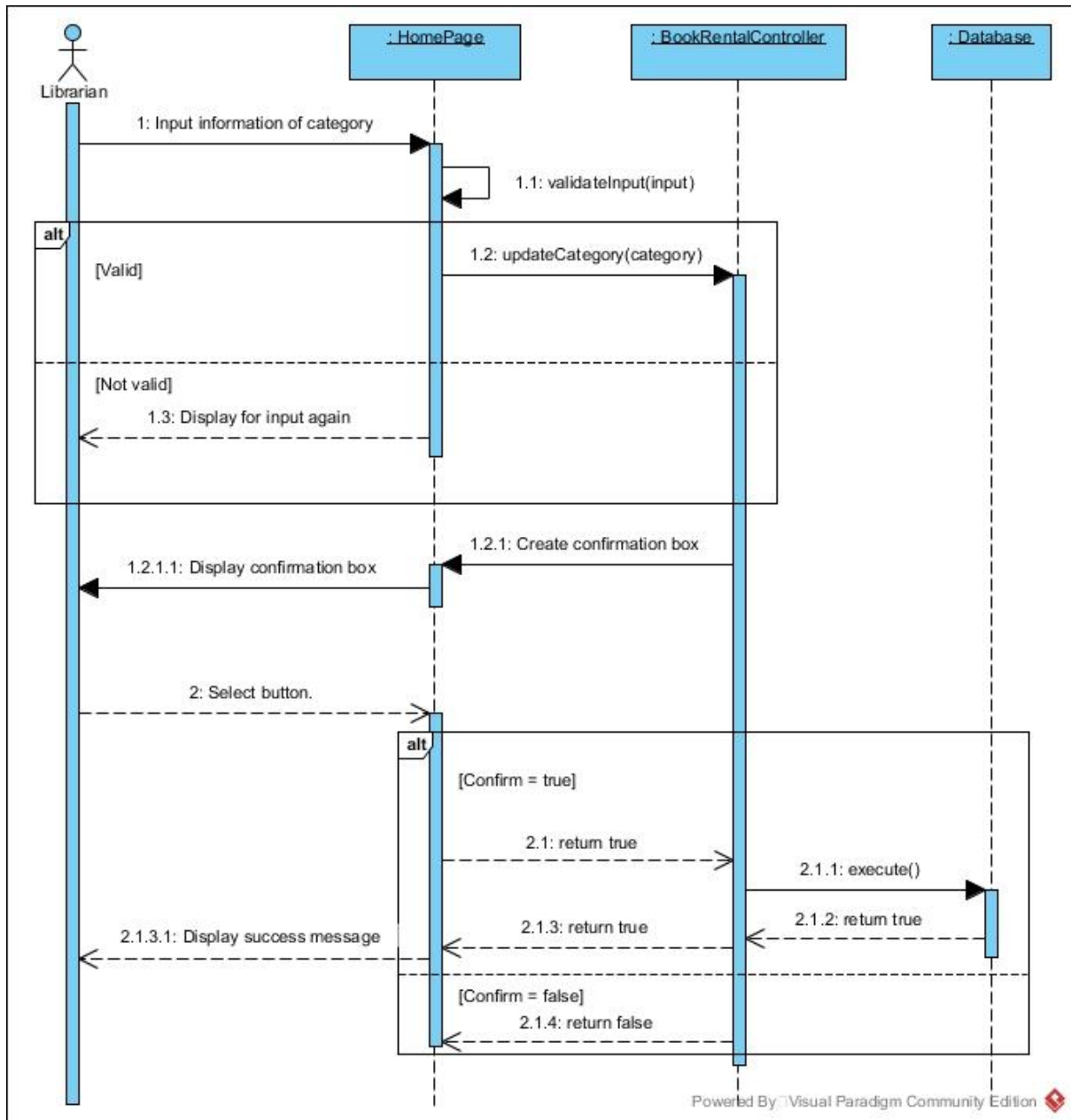
SD-06: Create a new category



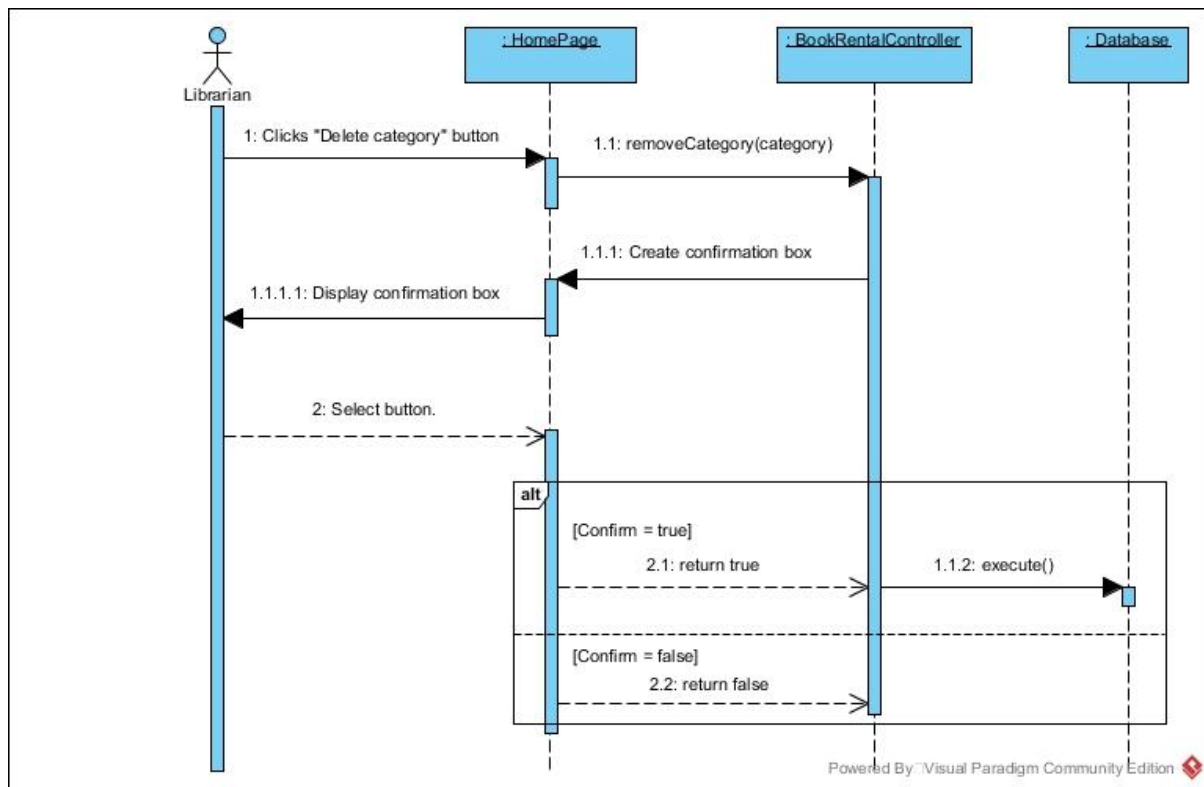
SD-07: View all of category



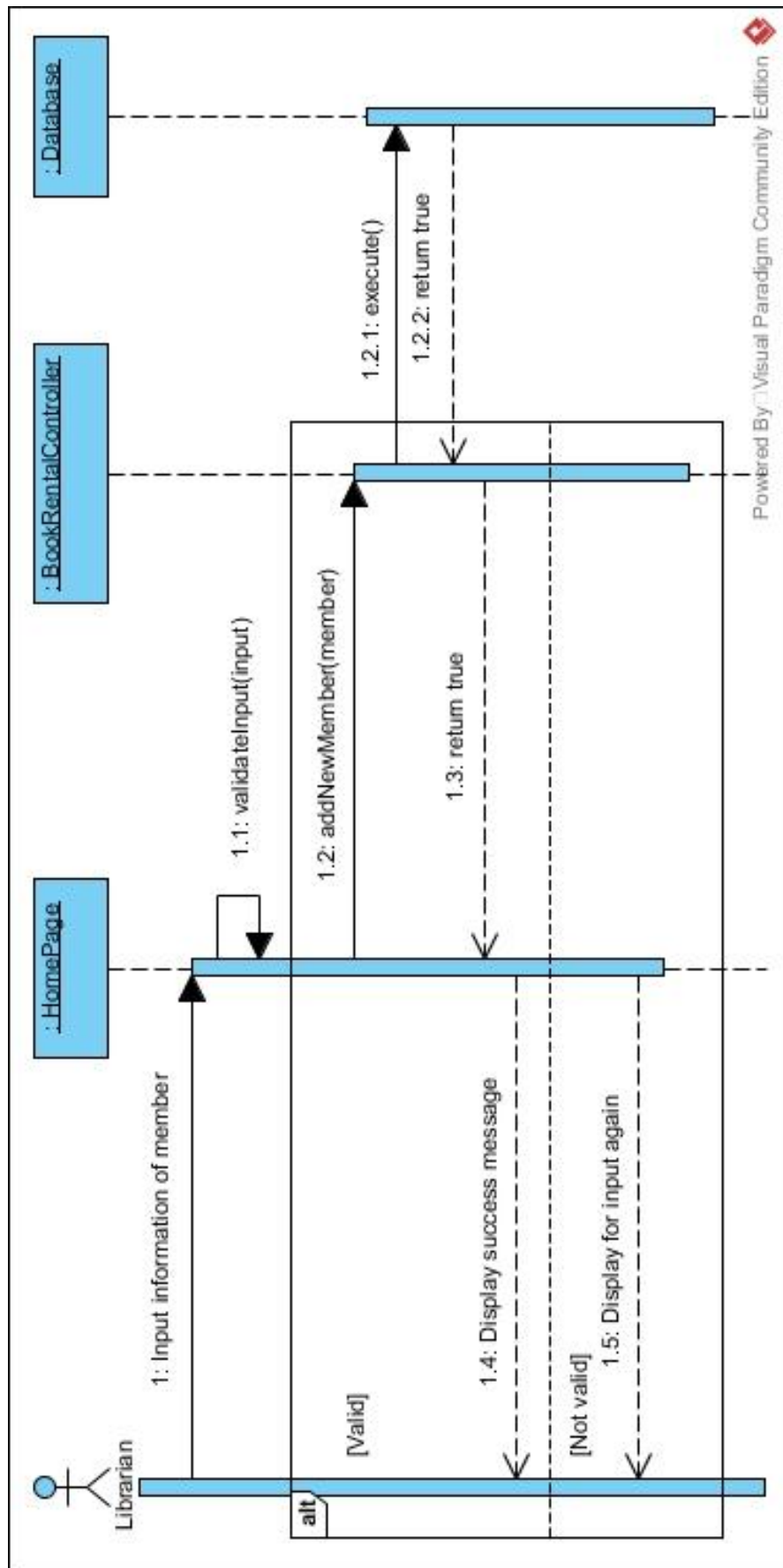
SD-08: Update categories



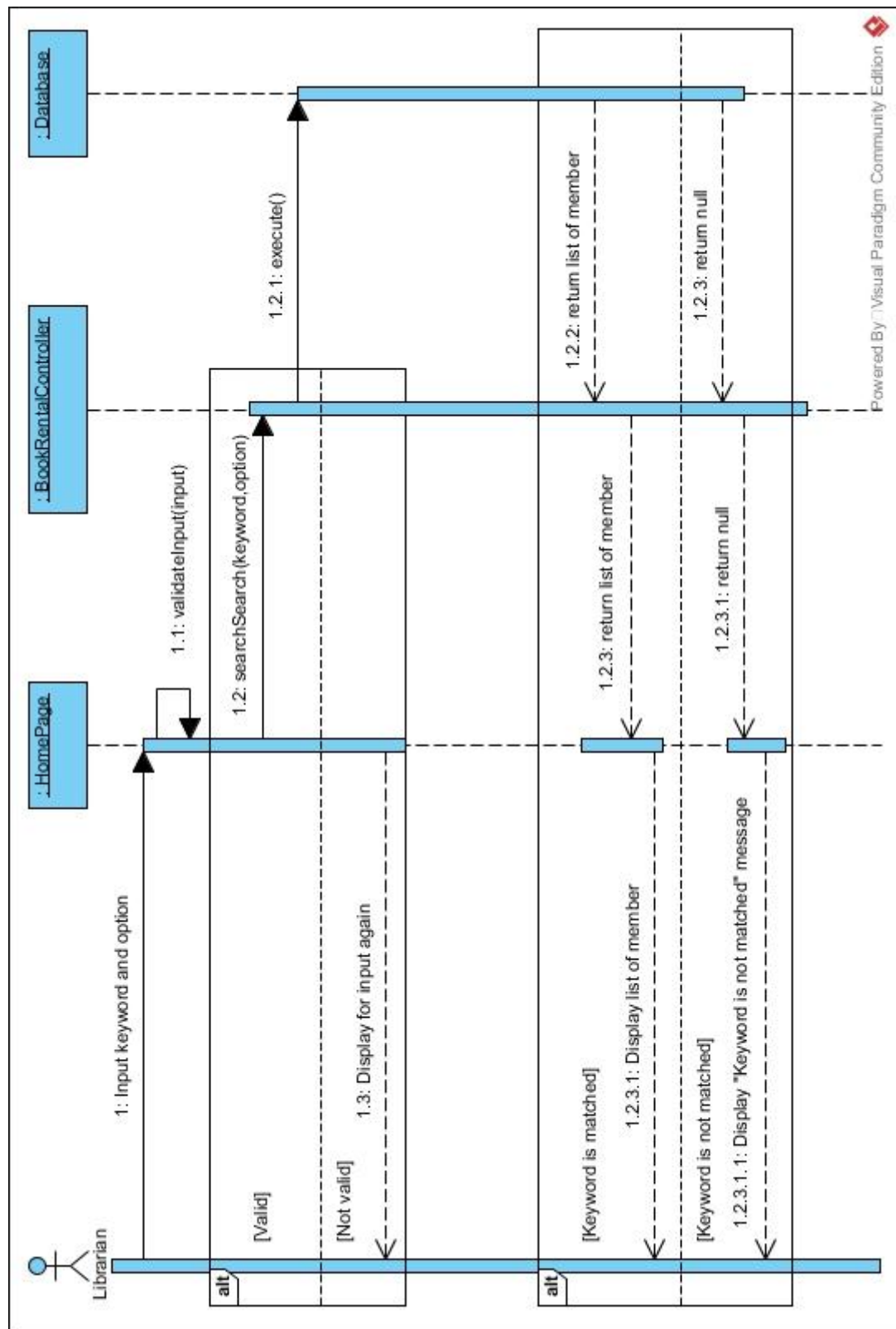
SD-09: Remove category



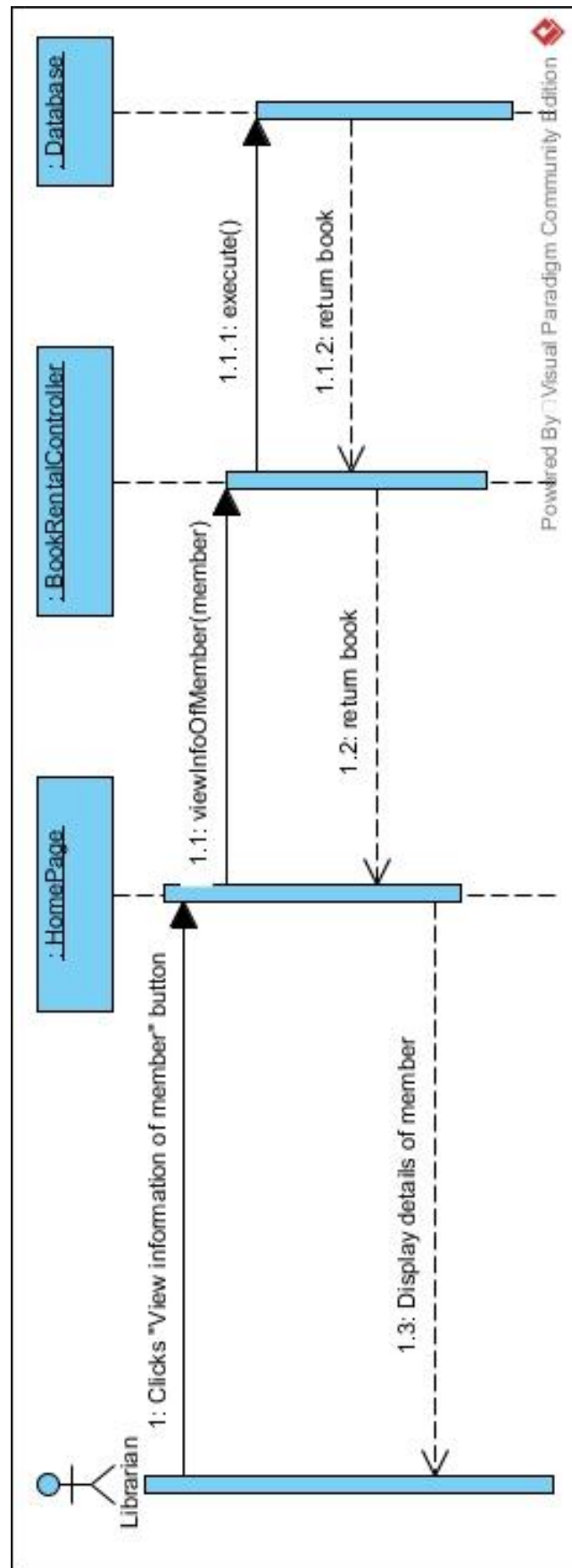
SD-10: Add a new member



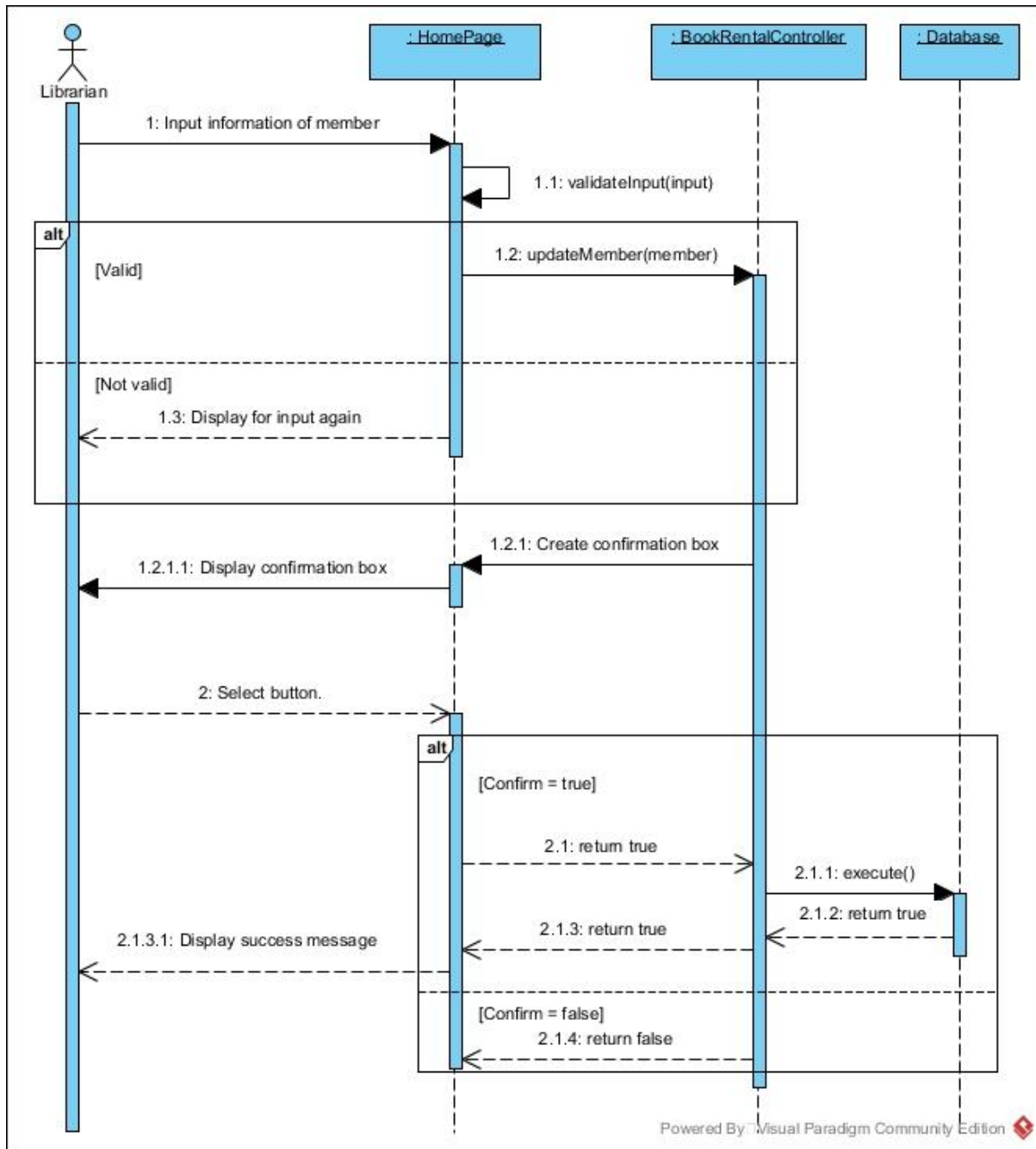
SD-11: Search for a member



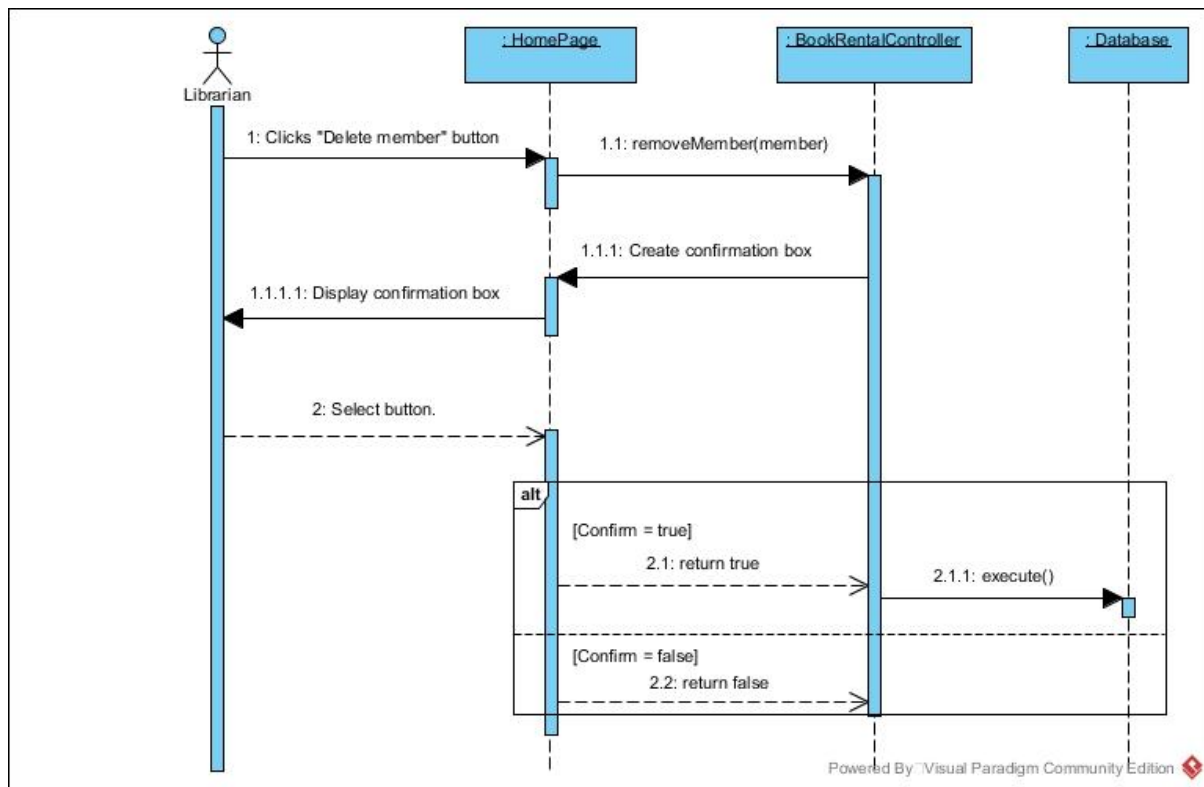
SD-12: View member's information



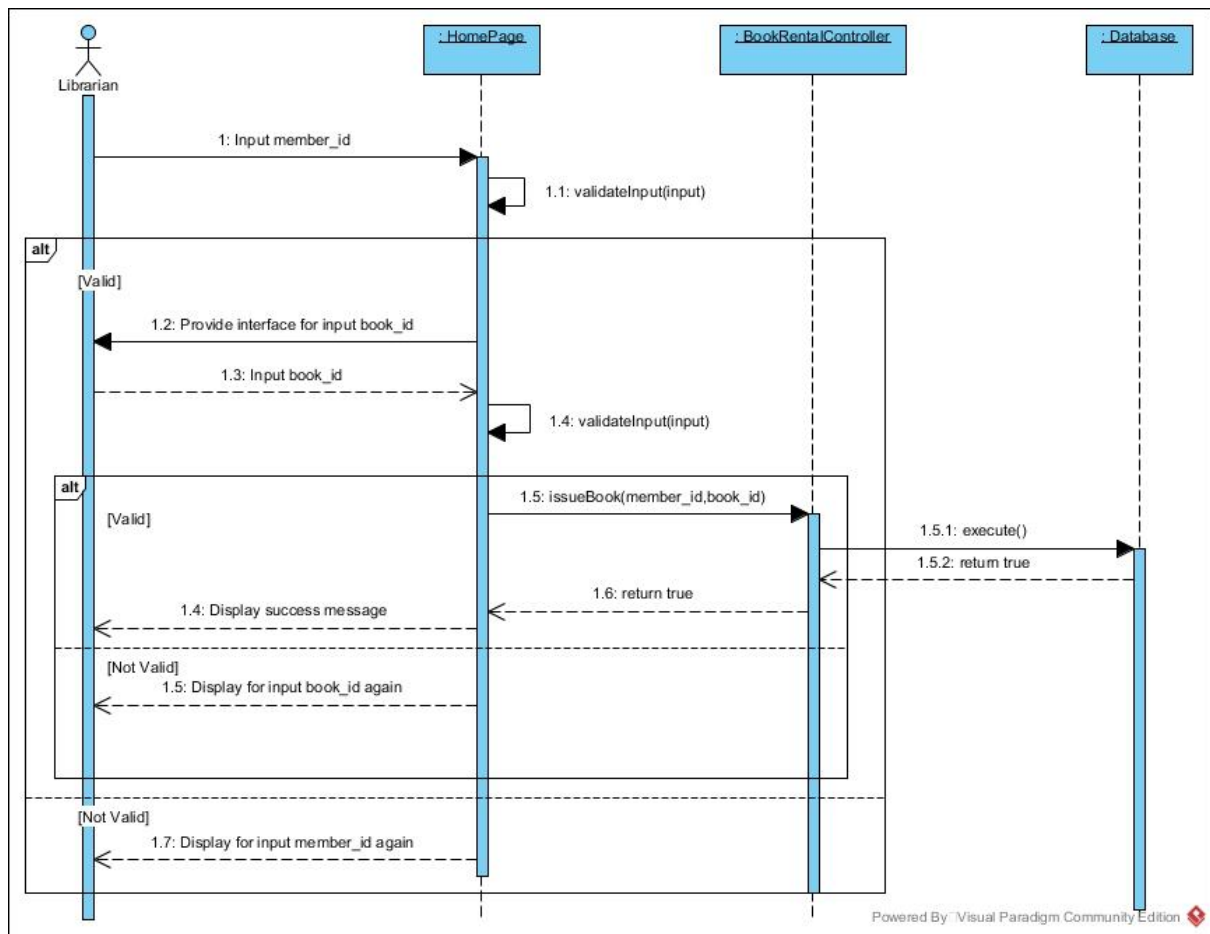
SD-13: Update member's information



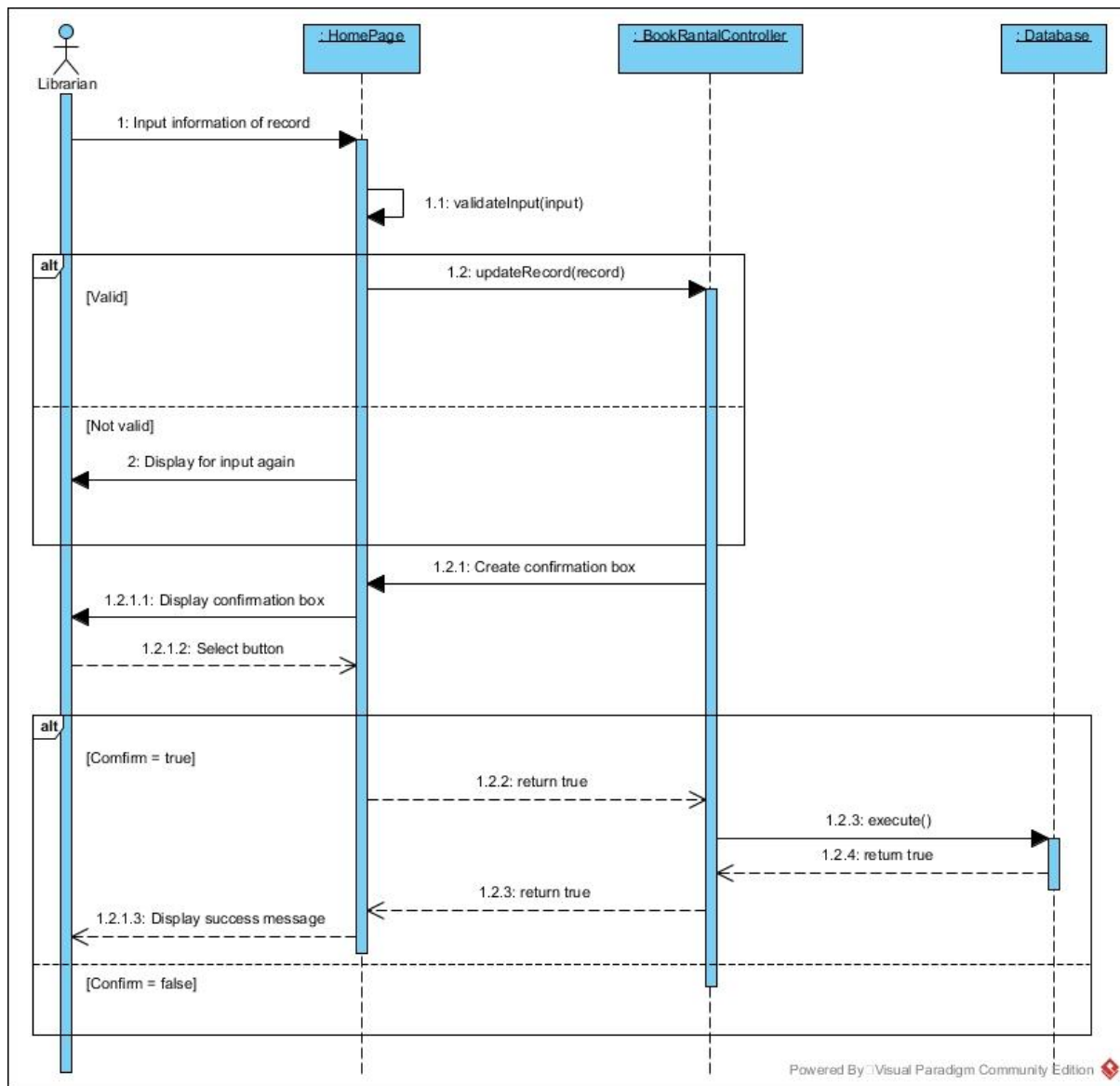
SD-14: Remove a member



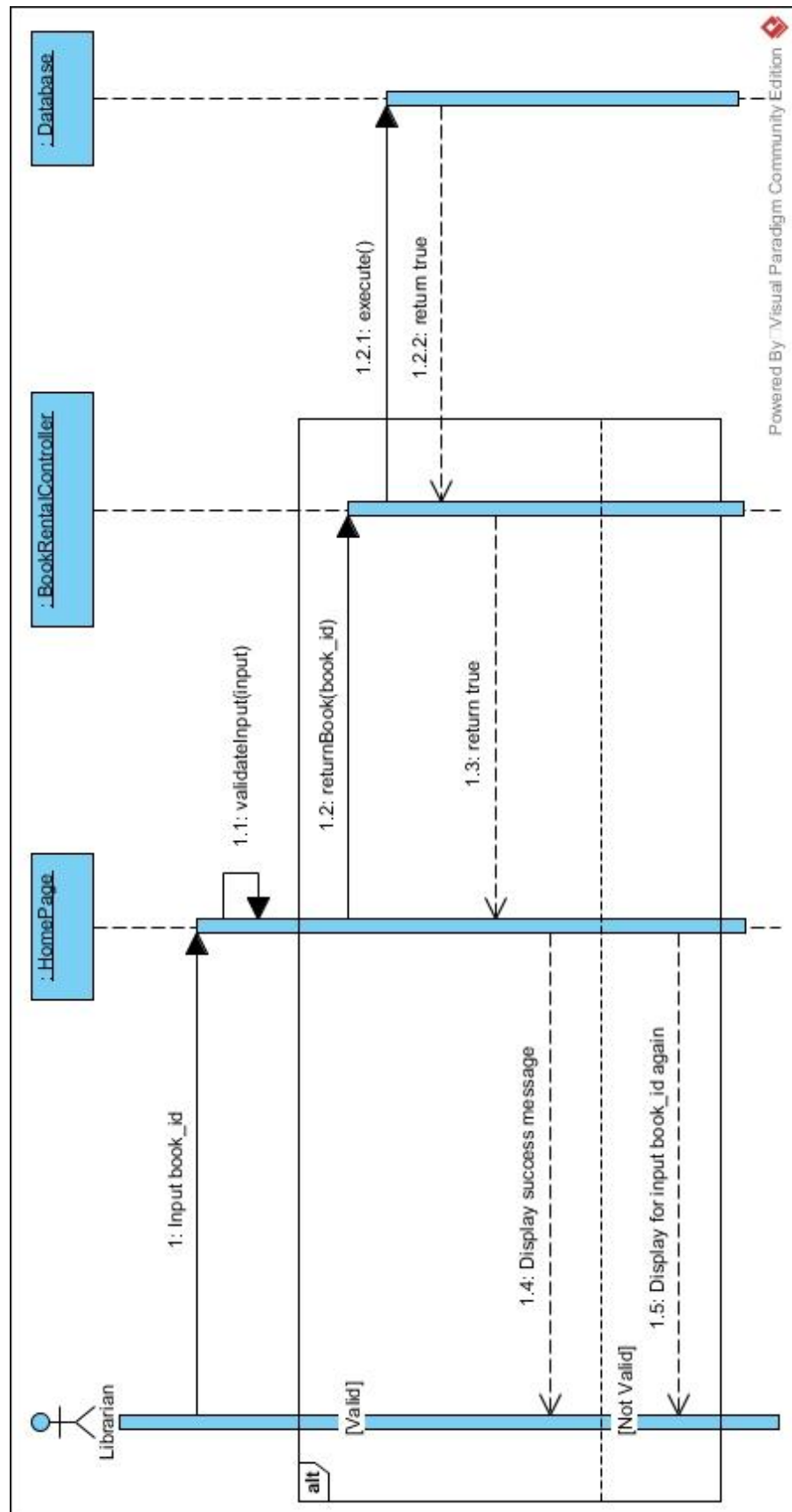
SD-15: Issue a book



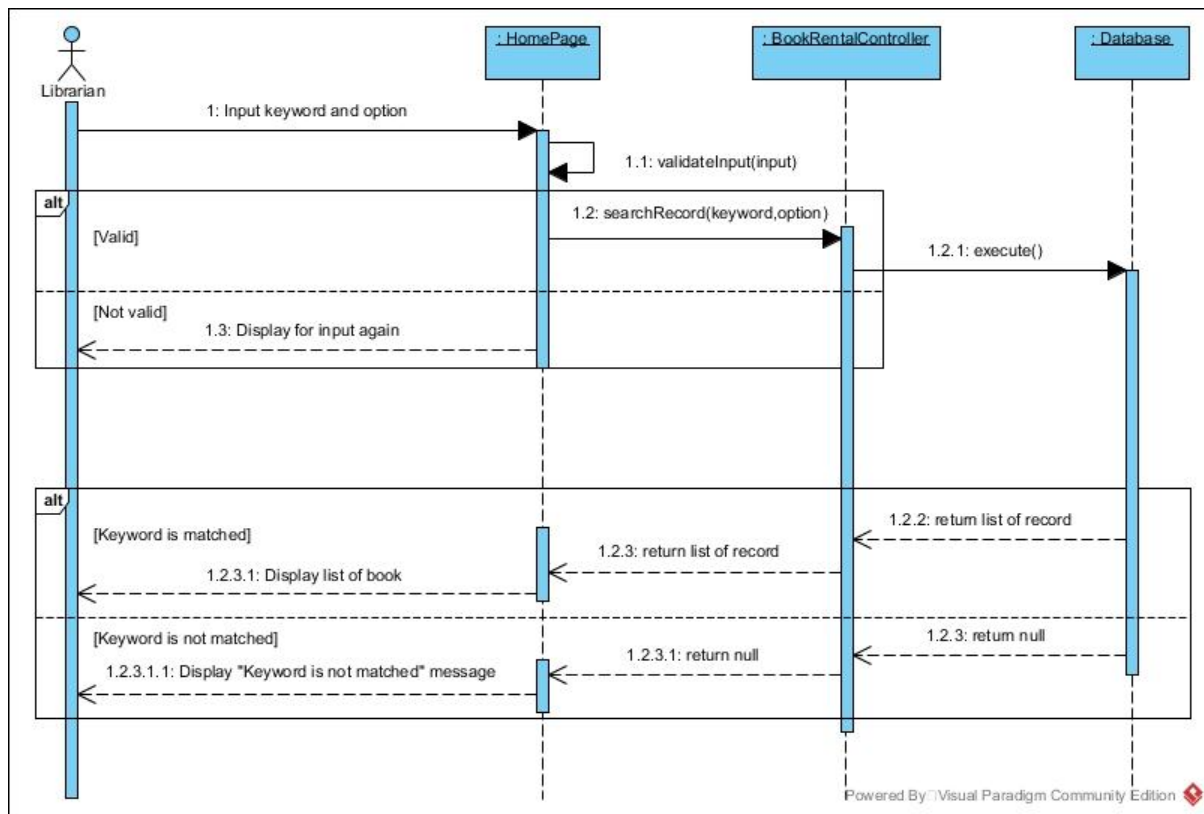
SD-16: Update record



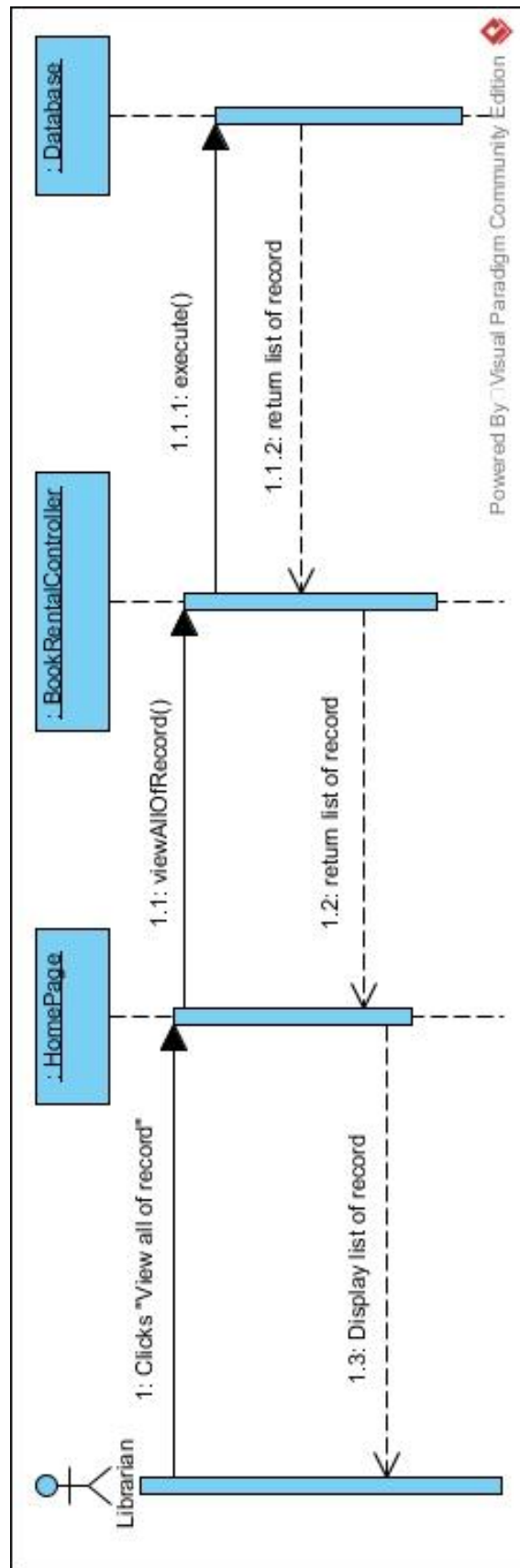
SD-17: Return a book



SD-18: Search records



SD-19: View all of records



SD-20: Remove a record

