SCSJ2203: Software Engineering

PRJ3: Software Requirement Specification

UTM Alumni Integrated System (ALIS)

Version 1.0

Software Engineering/ School of Computing

Prepared by: <Uh-mazing>

Revision Page

a. Overview

The current version of this document mainly describes the introduction, specific requirements, design constraints and other requirements of the system. The introduction part contains purpose, scope, definitions, acronyms, abbreviations, references and overall functionalities of the system. System use case diagram is introduced to present the overall functionalities of the system. The class diagram and state diagram are included in the specific requirements section of this document. In that section, use case specifications, sequence diagram and activity diagram were constructed and documented for each use case.

b. Target Audience

The intended audiences of this documentation include the stakeholders (project manager), system analyst and the programmer.

c. Project Team Members

List the team members and respective assigned use case.

Team Member	Assigned use case
MOAID MOHAMED ABDELMONEIM MOHAMED ELHEFNY	2.1 Manage membership 2.2 Give endowment fund & donation 2.13 Arrange Payment
WONG EN SING [Leader]	2.3 View report and statistics 2.7 View event 2.9 Manage event 2.10 View Industrial linkages

	2.11 Manage Industrial linkages
NAZMUS SAKIB	2.4 Create report and statistics 2.5 Search alumni 2.12 Select Payment Method
MUHAMMAD JASIM BIN MOHD MOHIDEEN	2.6 Reserve facility 2.8 Register event 2.13 Arrange Payment

d. Version Control History

Version	Primary Author(s)	Description of Version	Date Completed
<Version 1.0>	ALL	First version of SRS	19/4/2019
<Version 2.0>	WONG EN SING	Updated use case model with module	24/4/2019
<Version 3.0>	MOAID MOHAMED	Corrected UC001 and UC002	24/4/2019
<Version 4.0>	NAZMUS SAKIB	Corrected sequence and activity diagram in UC004	24/4/2019
<Version 5.0>	MOAID MOHAMED, NAZMUS SAKIB	Added requirement matrixs	26/4/2019

<Version 6.0>	MUHAMMAD JASIM	Added online banking payment method in UC013	26/4/2019

Note:
This Requirements Specification and Analysis template is customized to meet the need of SCSJ2203 course at Faculty of Computing, UTM. Compiled and checked by Shahliza Abd Halim, 9th March 2017. Examples of use case description and models are from Satzinger (2011).

Table of Contents

1. Introduction

1.1 Purpose

This SRS describes the proposed model of the computerized UTM Integrated Alumni System (ALIS) which includes the product perspective, product function, user characteristics, constraints, assumption and dependencies, apportioning of requirements, external interface requirements, system features, performance requirements, design constraints, software system attributes and other requirements. The specific requirements are presented by using use case specification which shows the normal flow and alternative flow of carrying the tasks, sequence diagram, activity diagram for the specific use case and state diagram for two use cases which have the most complicated process. This document is intended for stakeholders to review the proposed system and understand more about the functionality of the system.

1.2 Scope

The software product to be produced is UTM Integrated Alumni System (ALIS). The main purpose of ALIS system is to connect people who is not only from UTM but also associated members like graduates of twinning programs with UTM, non-UTM alumni lecturer, individual that had covenant with UTM and others across the world. The importance of the alumni system is network. The main purpose of this system is to create an engaged, supportive alumni network which is crucial to an institution’s success.

Good alumni relationships bring many benefits to both the institution and the alumni. Alumni relations is an important part of an institution's advancement activities for various reasons: Alumni are an institution's most loyal supporters. Alumni are great role models for current students and are often well placed to offer practical support to students as they start their careers. Among the functions of alumni are supporting the UTM in terms of monetary funds and giving help in terms of time and support for the next generation students in UTM. Giving back to UTM will help in terms of scholarships, new facilities etc.

The stakeholders requires the system or the software because they want all the alumni members get involved and connect with each other through the alumni integrated system. They want us (current UTM students) to improve the existing UTM Alumni

system which provides the user access to large alumni community, to be user-friendly and connecting with the industrial networks with the reference of UTM.

The objectives of the proposed improved system are as follows:

i. Operational efficiency - Improve the operational efficiency by improving the quality of the process by enabling data integration from various sources such as SRAD, UTMSPACE etc.

ii. Cost cutting - Reduce the cost involved in the alumni process including manpower

iii. Income generation – Support UTM activities by contributing back to the university via UTM Alumni Endowment Fund

iv. One stop platform – Being a platform for all alumni from all over the world to connect and establish relationship and networking

The main goal of the proposed system is to improve and upgrade the current Alumni system. These are some of the higher-level specifications collected from our stakeholders:

i. Efficient membership management: allow data integration from various sources such as SRAD and UTMSPACE without data duplication.
ii. Accurate and user-friendly activity management
iii. Easy facility reservation
iv. Comprehensive report & statistics:
v. Convenient endowment & donation management
vi. Inter-industrial management
vii. Effective news distribution: alumni can retrieve and even share latest news with UTM and with alumni and vice versa, including sharing on social media platforms such as Facebook, Instagram and Twitter

1.3 Definitions, Acronyms and Abbreviation

1. Activity diagram: A graphical representation of an executed set of procedural system activities and considered a state chart diagram variation. Activity diagrams describe parallel and conditional activities, use cases and system functions at a detailed level.
2. Associated Members: Graduates of twinning programs with UTM, Non-UTM Alumni lecturer and Individual that had covenant with UTM (by invitation)

3. Class diagram: A type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations or methods, and the relationships among objects.
4. Endowment: an income or form of property given or bequeathed to someone.
5. Goal model: A conceptual model that document goals, their decomposition into sub-goals and goal dependencies.
6. Sequence diagram: A diagram that shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.
7. SIG: Special Interest group in UTM ALIS with mutual interest or shared characteristic.
8. State diagram: a diagram used in computer science to describe the behavior of a system considering all the possible states of an object when an event occurs.
9. Swimlane diagram: A type of flowchart that delineates who does what in a process and is used to have a clearer view on all the processes involved in the system. It can serve to highlight waste, redundancy and inefficiency in a process.
10. UTM ALIS: Universiti Teknologi Malaysia Alumni Integrated System is a product that creating an engaged, supportive alumni network among UTM alumni and integrated all alumnus information.
11. UTM Alumni: Graduates from Technical School, Technical College, National Technology Institutes (ITK) and in UTM varies form Certificate up till Doctorate level.
12. UTMSmart: Mobile application developed by CICT UTM as an initiative of digital campus lifestyle at UTM, to provide services which complement and facilitate the needs of students, staffs and even visitors.
13. UTMSPACE: Universiti Teknologi Malaysia School of Professional and Continuing Education
14. UTM SRAD: Universiti Teknologi Malaysia Student Recruitment & Admission.

1.4 References

1. Elicitation Workshop UTM-ALIS. Retrieved from: https://trello.com/b/lL0nJ7tQ/elicitation-workshop-utm-alis

2. H. Gomaa, Software Modeling and Design: UML, Use Cases, Patterns, and Software Architectures. New York, USA: Cambridge University Press, 2011.
3. K. Pohl and C. Rupp, Requirements Engineering Fundamentals, 1st edition. CA, USA: Rocky Nook, 2011
4. K. Wiegers and J. Beatty, Software Requirements, 3rd Edition. Washington: Microsoft Press, 2014.
5. Udit Agarwal (20012), “Software Engineering”, 1st Edition, S. Kataria and Sons, India.
6. UTM Alumni Liaison Unit. (20th May 2014). Retrieved from http://alumni.utm.my/content/post/view/id/9/s/corporate-profile.
7. UTM Alumni. Retrieved from: http://alumni.utm.my/
8. UTM alumni workshop.
9. Sommerville, 2010. “Software Engineering”, 9th Edition, Addison Wesley.
10. Tsui, F. and Karam, O., (2011), “Concise Guide to Software Engineering: From Fundamentals to Application Methods”, Springer, USA.Online

1.5 Overview

This SRS document is organized into 3 parts which are introduction, overall description and specific requirement. It describes the overall description of the system, specific requirements, design constraints, system software attributes and other requirements of the system. Overall description of the system includes the product perspective, product function, user characteristics, constraints, assumption and dependencies and apportioning of requirements. System use case diagram is introduced to present the overall functionalities of the system. The domain class diagram and state diagram are included in the specific requirements section of this document. In that section, use case specifications, sequence diagram and activity diagram were constructed and documented for each use case. The design constraints part describes the constraints of the system design in detail. The system software attribute describes the functional requirement of the system for specific user or the specific requirement requested by specific user.

2. Overall Description

First of all, customer is one of the important factors that affect the product and its requirements throughout the development life cycle. We should consider and study the requirements gathered from the customers via the requirement elicitation. This is to ensure the designed product satisfies customer needs and reduce the cost of development failure. Besides customers, the developers of the related product also influent the product. For instance, the developers and product manager will decide what software engineering tools and programming language use to develop the products. After the requirements gathering phase they will also able to provide feedbacks and thus change the initial requirements. It is undeniable that user requirement is a must consider factor. Since they are the ones who will be using the product, we must also know the factors and issues related to them in order to have the valid requirements. Sometime, cost of product development must also be considered as it also affects the products and some non-functional requirements. For the background of the gathered requirements, most of them are derived from the users, such as organizer, product manager, students and teachers. Most of the requirements discussed in this document are functional requirements. The requirements are divided into module and illustrated in the use case diagram with the actors. Each requirement is considered as a use case.

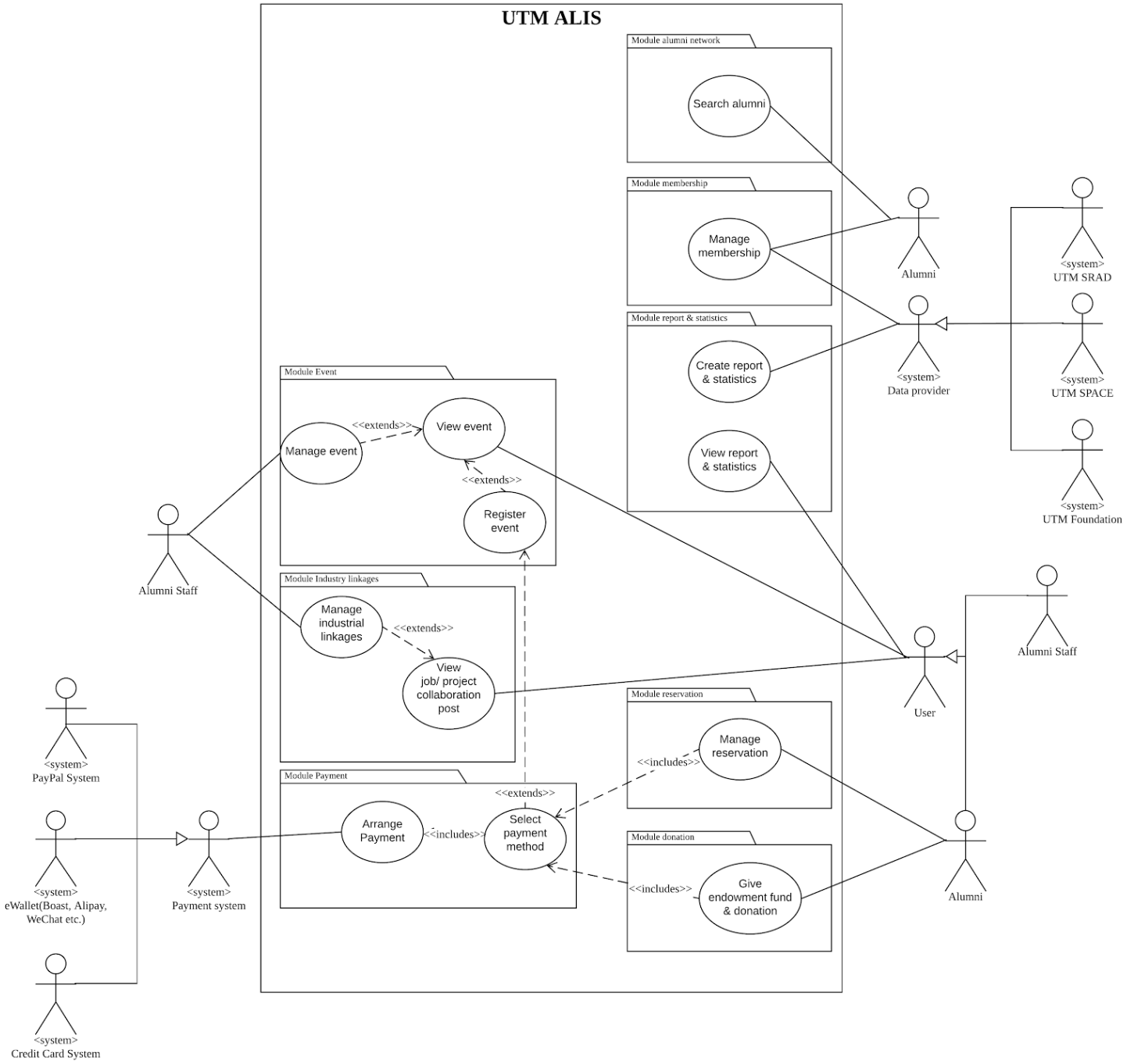

Figure 2.1: Use Case Diagram of <UTM ALIS>

2.1 Product Perspective

This system will consist of one part which is a web application. The web application will be used for managing the information about the users, competition and the system as a whole.

The web application will need the user to login using their username and password in order to have access to it. After login, the user will be able to access the related materials, depending on whether that user is a teacher or student. Since this is a data-centric product it will need somewhere to store the data. For that, a database will be used. The web application will communicate with the database to get, add and modify data. All of the database communication will go over the Internet.

2.1.1 System Interfaces

The system interface for this system is the cloud API used to store and display the data from the web server. It is considered as a system interface as it is not included in the system and the system from our server is interacting with it to get the resource needed.

2.1.2 User Interfaces

The interface for the system is Graphical User Interface(GUI). The GUI is used because the users can simply can performance the desired tasks there want using the self-explanatory interface. In addition, we hope that users spend most of the time using our application rather than figuring out how to use it, as no special skills are needed and first time user can instantly get used to it.

2.1.3 Hardware Interfaces

UTM ALIS is a web based system so that it is need to be run on any operating system and compatible with all hardware with internet access. Furthermore, this system can be accessed through any kind of hardware such as computer, laptop, tablet and smartphone. Thus smartphone or tablet is required in order to access in the system. Since the system must run over the internet, all the hardware shall

require connecting with the internet such as Modem, WAN – LAN or Ethernet Cross-Cable.

2.1.4 Software Interfaces

- The system shall communicate with database server to validate user information while trying to log in.
- The system shall communicate with database to retrieve relevant data when user request to create report or statistics.
- The system shall communicate with database to get user's personal info when user request to update their personal info.

2.1.5 Communication Interfaces

The communication between the different parts of the system is important since they depend on each other. However, in what way the communication is achieved is not important for the system and is therefore handled by the underlying operating systems for both the mobile application and the web portal. The mobile application module and web portal module must communicate with the server over a TCP/IP connection. The server and database components should be located on the same host.

2.1.6 Memory

For the web portal using on various platform especially the pc, should have no secondary and main memory constraints as there is no any installation on the user devices.

2.1.7 Operations

The operation of all types of users should be easy to use and intuitive through the interfaces. Also, no additional software dependency and tools are required to use the system besides the operating system. No special technical skills required to interact with the system tool. For the organizer, back up and maintenance operations should

be carried periodically to prevent any undesired data loss. Recovery operations full also be followed when there is network, machine and database failure.

2.1.8 Site Adaptation Requirements

The system's component change depending on the type of user who logged in. Every type of user has a different role inside the system.

2.2 Product Functions

2.2.1 Manage membership

Controlling alumni membership by the user and having access to update alumni user personal info such as address, phone number and so on.

2.2.2 Give endowment fund & donation

Alumni contribute to UTM through UTM Endowment fund and allow Alumni to donate.

2.2.3 View report and statistics

User (alumni staff or alumni) can view the existing report & statistics.

2.2.4 Create Report and Statistics

Alumni staff gathers the data from data providers (UTM SRAD, UTM space and UTM foundation) and merges it to create report and statistics.

2.2.5 Search Alumni

Alumni looks for other alumni in the system by interest group or by name.

2.2.6 Reserve Facility

User (alumni staff or alumni) reserve facility in UTM such as multipurpose hall and other facilities.

2.2.7 View event

User (alumni staff or alumni) can view the existing events.

2.2.8 Register event
Alumni register their attendance for the event they wish to attend.

2.2.9 Manage event
Alumni staff add new event when there is a new event and modify/delete the existing events.

2.2.10 View industrial linkages
User (alumni staff or alumni) can view the existing job/project specification posts.

2.2.11 Manage industrial linkages
Alumni staff add new job or project collaboration posts when there is a new email from industries after validation and modify/delete the existing job or project collaboration posts.

2.2.12 Select payment method
Alumni select payment method to pay event registration fee/ reservation fee/ endowment fund.

2.2.13 Arrange payment
Payment system arrange payment when Alumni is asked to pay in UTM ALIS.

2.3 User Characteristics

2.3.1 Alumni

Alumni are the largest number user group of the system. Alumni are an institution's most loyal supporters. Alumni are great role models for current students and are often well placed to offer practical support to students as they start their careers. Among the functions of alumni are supporting the UTM in terms of monetary funds and giving help in terms of time and support for the next generation students in UTM. Giving back to UTM will help in terms of scholarships, new facilities etc.

2.3.2 Alumni staff

The alumni staffs are the second largest user group of the system. Same as students they are performing almost similar actions on the system using the mobile

application, such as upload utility bills for school, analyze submission. No special technical skills are needed for them to use the system.

2.4 Constraints

2.4.1 Security

The system should provide secure authentication for use by only giving access to users with successful login credential to the system.

2.4.2 Internet connection

The Internet connection is also a constraint for the mobile application and the web portal. Since the application and web portal can only function when users have internet connection on their devices to fetch data from the web server.

2.4.3 User Interface Constraints

Using this system is fairly simple and intuitive. A user familiar with basic browser navigation skills should be able to understand all functionality provided by the system. The user interface develop is fairly simple and intuitive. Users who are used to common mobile application and web page should be able to navigate the application without much troubles and difficulties.

2.5 Assumption and Dependencies

2.5.1 The users are using up to date browser to browse the web portal.

2.5.2 The product is that it will always be used on devices with moderate internet speed. If the internet connection is bad, there may be scenarios where the application does not work as intended or even at all.

2.6 Apportioning of Requirements

2.6.1 The development application for iOS mobile application might be apportioned to in the future.

2.6.2 The development application for android mobile application might be apportioned to in the future.

2.6.3 The system will provide alumni the ability to search for other alumni with face recognition technology.

2.6.4 The system will provide alumni with the ability to apply for the available job/ project collaboration.

3. Specific Requirements

3.1 Functional Requirements

Index	Description	Priority	Use case
FR01	The system shall be able to gather alumni data from the data providers.	SHALL	UC001
FR02	The system shall be able to identify the alumni by his IC no. or Matric number.	SHALL	UC001
FR03	The system shall provide user the ability to manage personal profile.	SHALL	UC001
FR04	The system shall give the ability for the user to donate endowment fund.	SHALL	UC002
FR05	The system shall provide user the ability to view all reports and statistics.	SHALL	UC003
FR06	The system shall provide user the ability to view the details of selected reports and statistics.	SHALL	UC003
FR07	The system shall provide alumni staff the ability to create report and statistics.	SHALL	UC004
FR08	The system shall provide alumni the ability to search for other alumni by name.	SHALL	UC005
FR09	The system shall provide alumni the ability to search for other alumnus by interest group.	SHALL	UC005
FR10	The system will provide alumni the ability to search for other alumni with face recognition technology.	WILL	UC005

FR11	The system shall provide alumni with the ability to reserve facility.	SHALL	UC006
FR12	The system shall provide alumni with the ability to check previous reservation made by the alumni.	SHALL	UC006
FR13	The system shall provide user the ability to view all upcoming events.	SHALL	UC007
FR14	The system shall provide user the ability to view the details of selected events.	SHALL	UC007
FR15	The system shall provide alumni with the ability to register attendance for upcoming events.	SHALL	UC008
FR16	The system should notify alumni for the upcoming events.	SHOULD	UC008
FR17	The system shall provide alumni staff the ability to manage events.	SHALL	UC009
FR18	When there is modification of the registered events, the system should notify the user of the changes of the upcoming events.	SHOULD	UC009
FR19	The system shall provide user the ability to view all job/ project collaboration posts.	SHALL	UC010
FR20	The system shall provide user the ability to select the field of the job/ project collaboration posts.	SHALL	UC010
FR21	The system shall provide user the ability to view the details of selected job/ project collaboration posts.	SHALL	UC010
FR22	The system will provide alumni with the ability to apply for the	WILL	UC010

	available job/ project collaboration.		
FR23	The system shall provide alumni staff the ability to manage events.	SHALL	UC011
FR24	When there is modification of the posts, the system should notify the user of the changes.	SHOULD	UC011
FR25	The system shall provide alumni the ability to select payment method.	SHALL	UC012
FR26	The system shall provide alumni with the ability to pay required amount.	SHALL	UC013
FR27	The system shall provide alumni with the ability to pay by using various payment methods such as credit card, e-wallet, online banking .etc.	SHALL	UC013

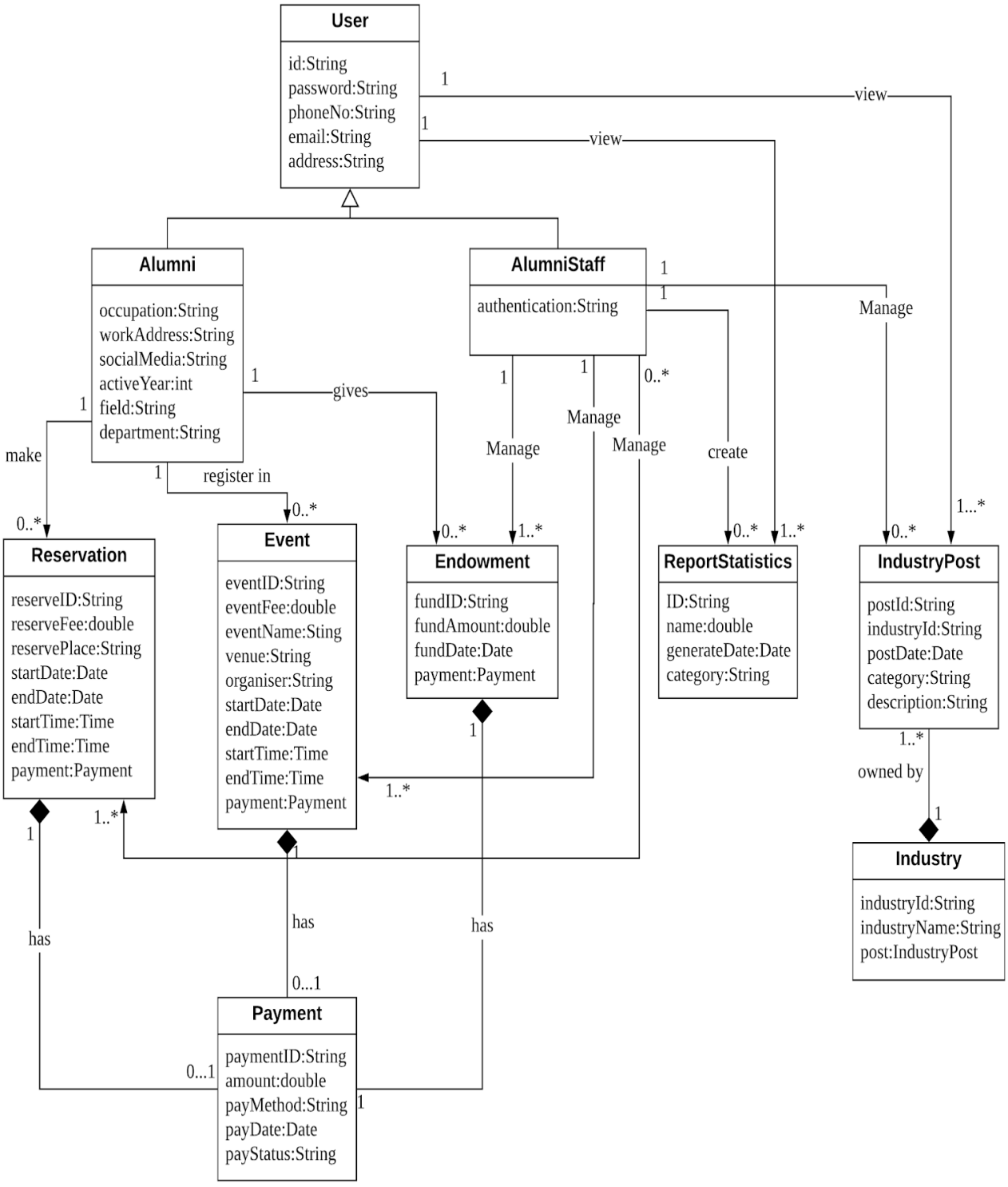

Figure 3.1: Domain Model of <UTM ALIS>

1. **User class**

The user class consists of the id and password attributes and some compulsory personal info from user which are phone number, email and address. The id attribute is for the user account identification purpose and password is for the user account to login.

The following classes are specialized classes inherited from the User class.

- **Alumni**

Alumni class inherits all the attribute from the User parent class. The attribute of this class is occupation, workAddress, socialMedia, activeYear, field and department which is the occupation of Alumni, the current working address , the link to their social media account such as Twitter, Facebook, Instagram etc., their active years, the field the alumni was active in UTM(Course studied for graduated students or past occupation in UTM for staff), department the alumni was in respectively.

- **Alumni staff**

Alumni staff class inherits all the attribute from the User parent class and has it owns authentication attribute for account identification when login and access in the system.

2. **Reservation**

Reservation class consists of the details of facility reservation when alumni make a facility reservation. The attributes included are:

i. reserveID: A unique reservation ID

ii. reserveFee: The cost of reservation

iii. reservePlace: The facility/ place to be reserved

iv. startDate: Starting date

v. endDate: Ending date

vi. startTime: Starting time

vii. endTime: Ending time

viii. payment: The instantiation of class Payment which record the payment details.

3. Event

Event class consists of the details of events. The attributes included are:

i. eventID: A unique event ID

ii. eventFee: The registration fee of the event

iii. eventName: The name of the event

iv. venue: The venue which the event to be held

v. startDate: Starting date

vi. endDate: Ending date

vii. startTime: Starting time

viii. endTime: Ending time

ix. payment: The instantiation of class Payment which record the payment details.

4. Endowment

Endowment class consists of the details of endowment fund/ donation donated by the alumni. The attributes included are:

i. fundID: A unique fund ID

ii. fundAmount: The amount of donation

iii. fundDate: The date which the donation initialized.

iv. payment: The instantiation of class Payment which record the payment details.

5. Payment

Payment class consists of the details of payment, which is instantiated when alumni need to pay something through the system. The attributes included are:

i. paymentID: An unique payment ID

ii. amount: The amount of payment

iii. payMethod: The payment method chosen by alumni, which might be PayPal/online banking,/credit card/eWallet.

iv. paymentDate: The date which the donation initialized.

v. payStatus: The status of the payment, which might be success/pending/fail.

6. ReportStatistics

ReportStatistics class consists of the details of Report or Statistics, which is generated by alumni staff according to need. The attributes included are:

i. ID: An unique ID of the report or statistics

ii. name: The name of the report or statistics

iii. generateDate: The date which the report or statistics generated..

iv. category: The category which the report or statistics belongs to.

7. IndustryPost

IndustryPost class consists of the details of Report or Statistics, which is generated by alumni staff according to need. The attributes included are:

i. postID: A unique ID of the job/project collaboration post

ii. industryId: The ID of the industry, the owner of this post

iii. postDate: The date which the job/project collaboration post posted.

iv. category: The category or field of job which the job/project collaboration post belongs to.

v. description: The detailed description for the job/project.

8. Industry

Industry class consists of the details of the industry, who own the job/project collaboration post. The attributes included are:

i. industryId: The ID of the industry, the owner of this post

ii. industryName: The name of the industry

iii. post: The instantiation of class IndustryPost which record the job/project collaboration post details.

Relationships between classes is shown clearly in the domain model.

3.2 External Interface Requirements

3.2.1 User Interfaces

The user inputs data and access the functions of the system via web portal GUI, through keyboard and mouse from computer respectively. The web server processes the request from the user application and response with relevant data back to users through the GUI. The user interface then displays results to the end-user through the web portal.

3.2.2 Hardware Interfaces

Since the system is internet-based, all the hardware shall be connected to internet via Modem, WAN – LAN or Ethernet Cross-Cable.

3.2.3 Software Interfaces

- The system shall communicate with database server to validate user information while trying to log in.
- The system shall communicate with database to retrieve relevant data when user request to create report or statistics.
- The system shall communicate with database to get user's personal info when user request to update their personal info.

3.2.4 Communication Interfaces

This system uses various network protocols while accessing the internet like HTTP, FTP for accessing internet. This application sends a request to the service by using protocol over HTTP; the service receives request; response to it; return a response. All the data transferred between server and client shall use TCP/IP networking protocol. This network is closed and is not accessible over the internet. This ensures unauthorized access is prohibited. The system is support by all of the browsers.

3.3 System Features

3.3.1 Module membership

3.3.1.1 UC001: Use Case Manage Membership

Use Case	Manage membership
ID	UC001
Brief description	Controlling alumni membership by the user and having access to update alumni user personal info such as address, phone number…etc.
Actors	Alumni, Data provider (UTM SRAD, UTM space and UTM foundation)

Related use case	-
Pre-conditions	● There is an active membership for the user. ● There is full personal information for the user provided in his membership. ● The alumni user has successfully logged into the system.
Normal Flow	1. The use case begins when alumni click “verify alumni” tab. 2. The system requests data from data providers, SRAD, UTM space and UTM foundation. 3. Data providers provides data to the system. 4. The system merges the data. 5. The system prompt alumni to fill IC/matric card number. 6. The user fills his IC/matric card. 7. The system verify if the alumni is UTM alumni by checking the existence of the IC/matric card number filled in Alumni database. 8. If Yes, the system retrieve all information about the user from the merged database and display it to the user in an editable form. 9. If No, go to Exception 1. 10. User updates his personal info and add password. 11. User click on update form button. 12. System store the updated information of the user in database.
Alternative Flow	-
Exception	1. The IC/matric card number is not found in the alumni database, system display “user not found” message and go back to Normal Flow 5.

Related Requirement	FR01, FR02, FR03
Post-Conditions	Successful updating info ● The updated personal information is successfully updated and stored in the system database.

Table 3.1: Use Case Specification for <Manage membership>

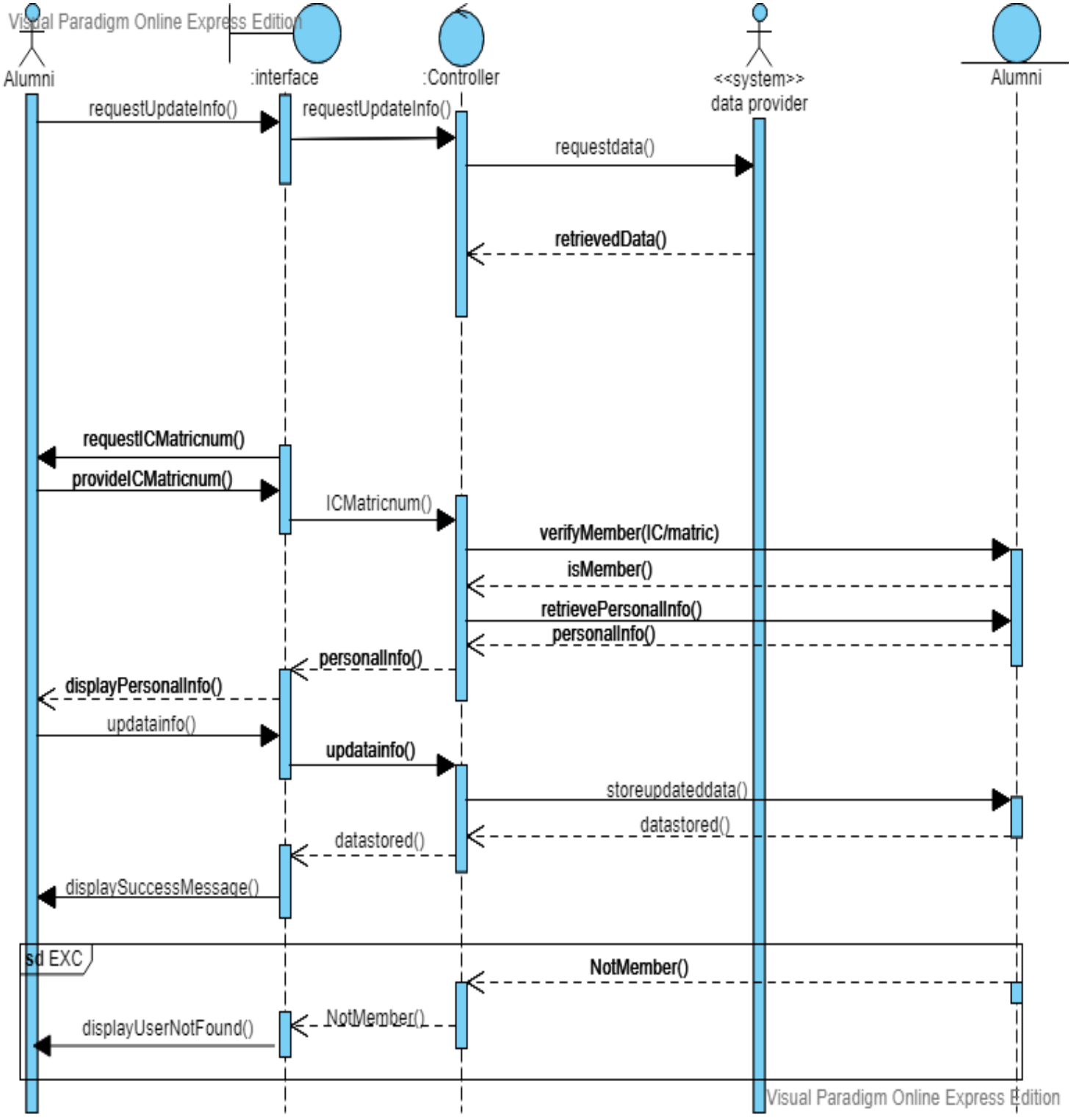

Figure 3.2: Sequence Diagram of <Manage membership>

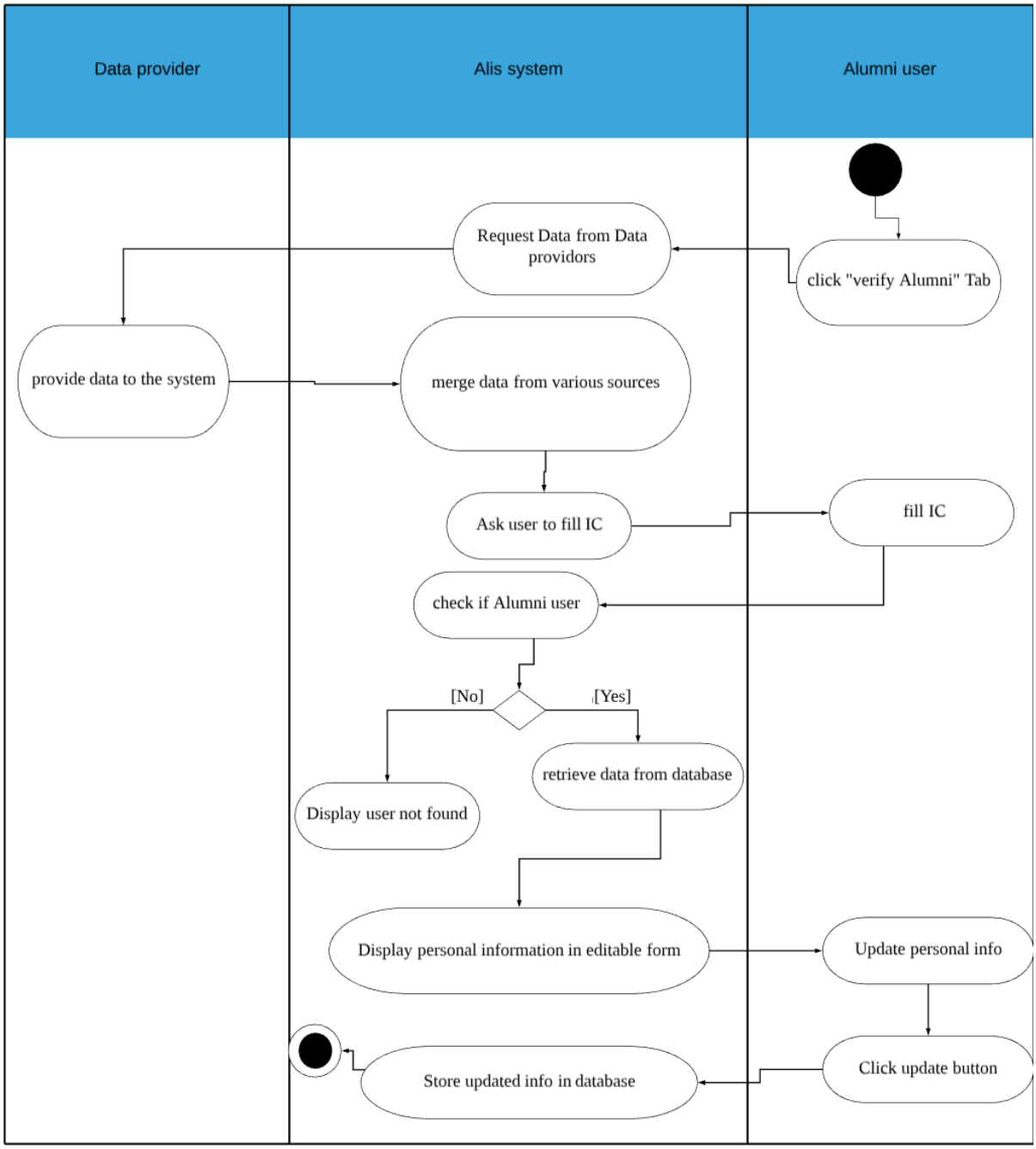

Figure 3.3: Activity Diagram of <Manage membership>

3.3.2 Module donation

3.3.2.1 UC002: Use Case Give endowment fund & donation

Use Case	Give endowment fund & donation
ID	UC002
Brief description	Alumni contribute to UTM activities through UTM Endowment fund and allow Alumni to donate.
Actors	Alumni
Related use case	UC012, UC013
Pre-conditions	The alumni user has successfully logged into the system.
Normal Flow	1. The use case begins when alumni click “endowment fund & donation” tab. 2. The system display the personal info form to the alumni. 3. Alumni fill and complete the form with personal information. 4. Proceed to use case UC012 to choose payment method. 5. Proceed with use case UC013 to complete payment. 6. System transfer the donation to Endowment fund. 7. System notify alumni successful payment.
Alternative Flow	-
Exception	-
Related Requirement	FR04

Post-Conditions	Successful transaction operation · The transaction has been successfully done and donation transferred to Endowment fund.

Table 3.2: Use Case Specification for <Give endowment fund & donation >

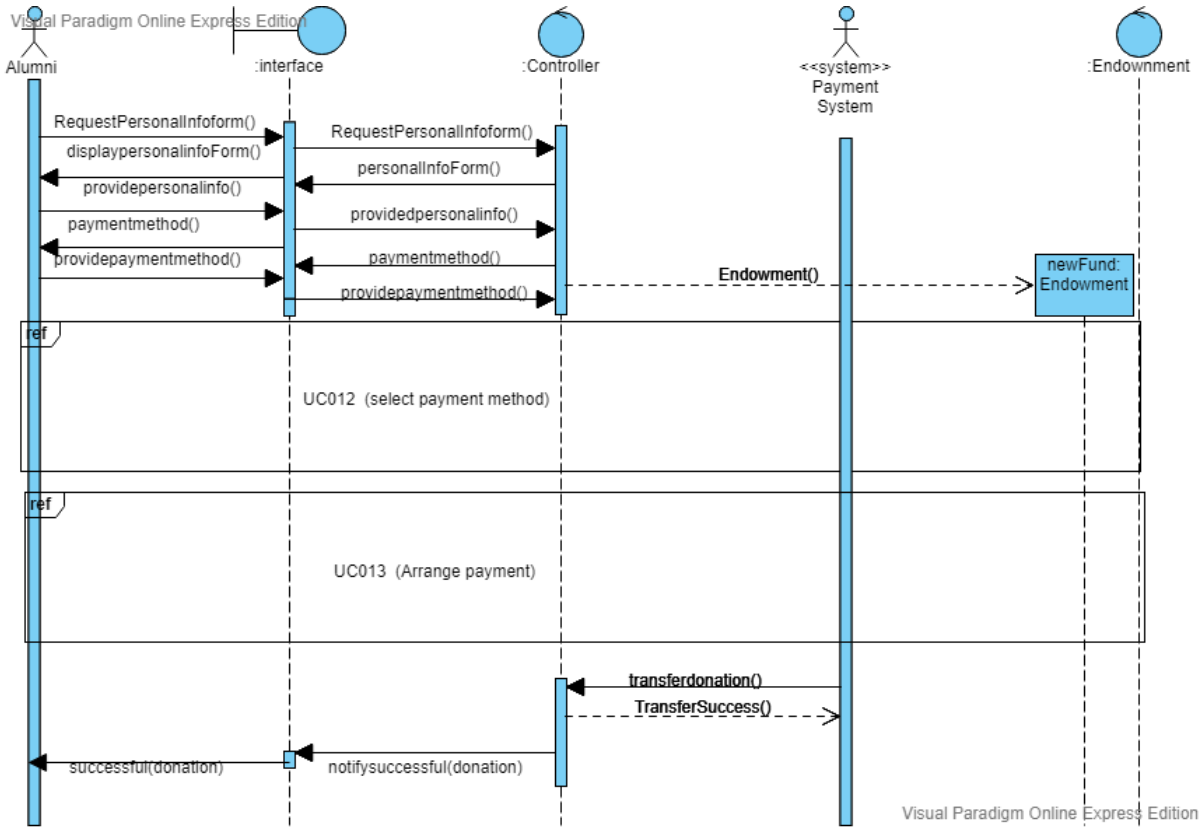

Figure 3.4: Sequence Diagram of <Give endowment fund & donation >

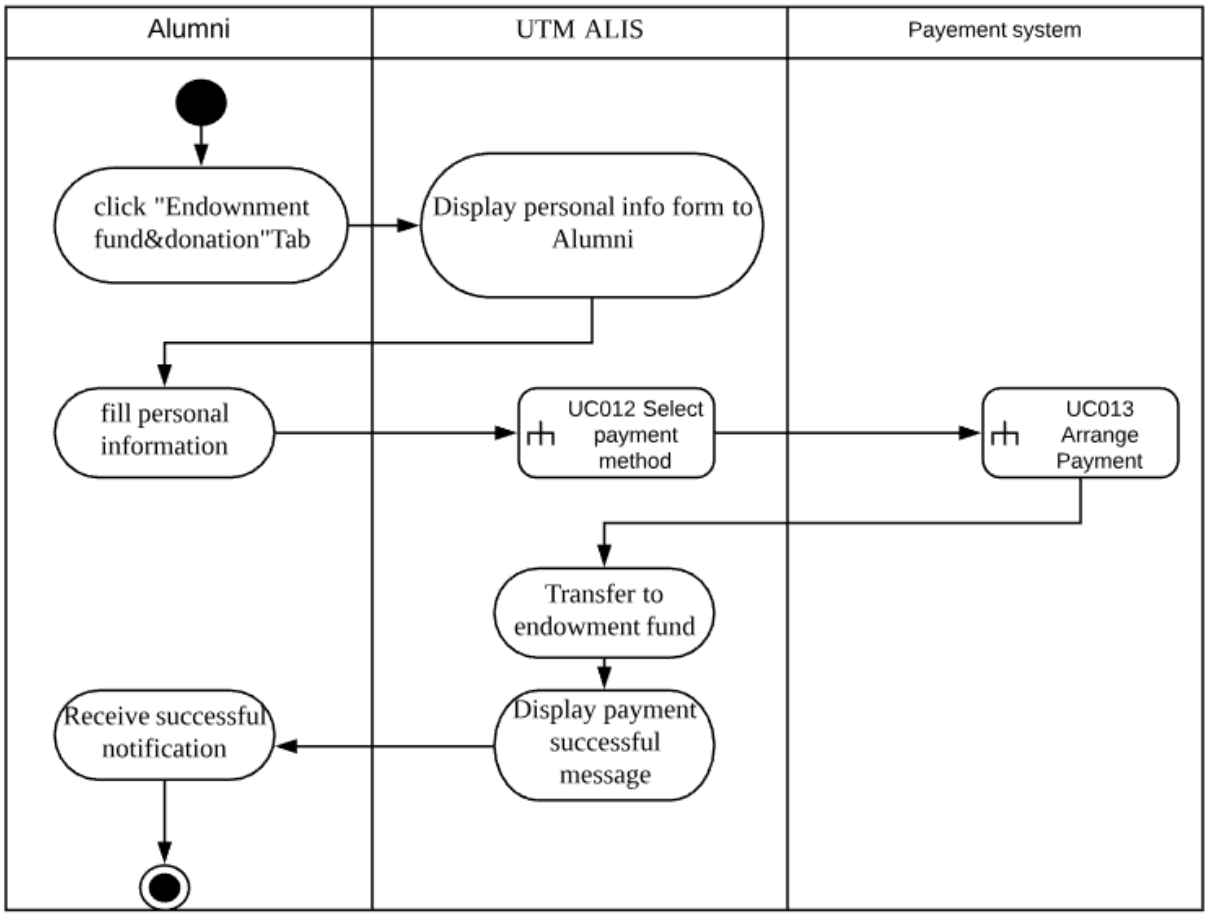

Figure 3.5: Activity Diagram of <Give endowment fund & donation >

3.3.3 Module report and statistics

3.3.3.1 UC003: Use Case View report and statistics

Use Case	View report and statistics
ID	UC003
Brief description	Alumni staff and alumni can view the existing report & statistics.
Actors	User (alumni staff or alumni)
Related use case	-

Pre-conditions	● There is an active network connection to the platform. ● The user has successfully logged into the system. ● There exists at least one report & statistics to be shown.
Normal Flow	1. The use case begins when the user clicks on the tab “report & statistics”. 2. The system displays list of report and statistics. 3. If user wish to see the details of a particular report and statistics, Alternative Flow 1 is performed. 4. The use case ends.
Alternative Flow	1. See the report and statistics details 1.1. User clicks on the particular event. 1.2. System retrieve and display the event details. 1.3. If user click on the “Back” button on the right bottom of the page, back to Normal Flow 2.
Exception	-
Related Requirement	FR05, FR06
Post-Conditions	Successful Completion ● The report and statistics are successfully displayed. The users may proceed with other operations.

Table 3.3: Use Case Specification for <View Report and Statistics>

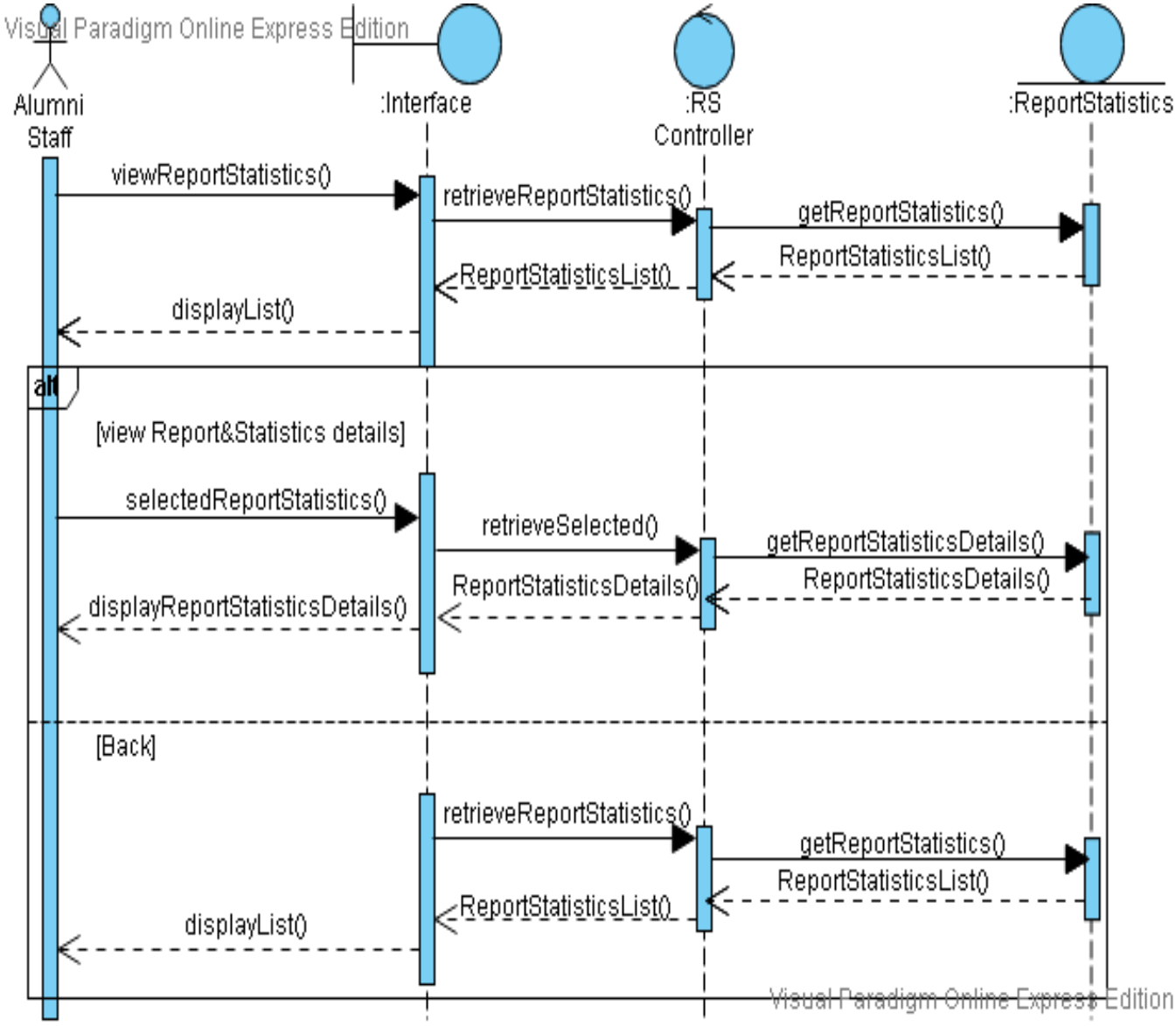

Figure 3.6: Sequence Diagram of <View Report and Statistics>

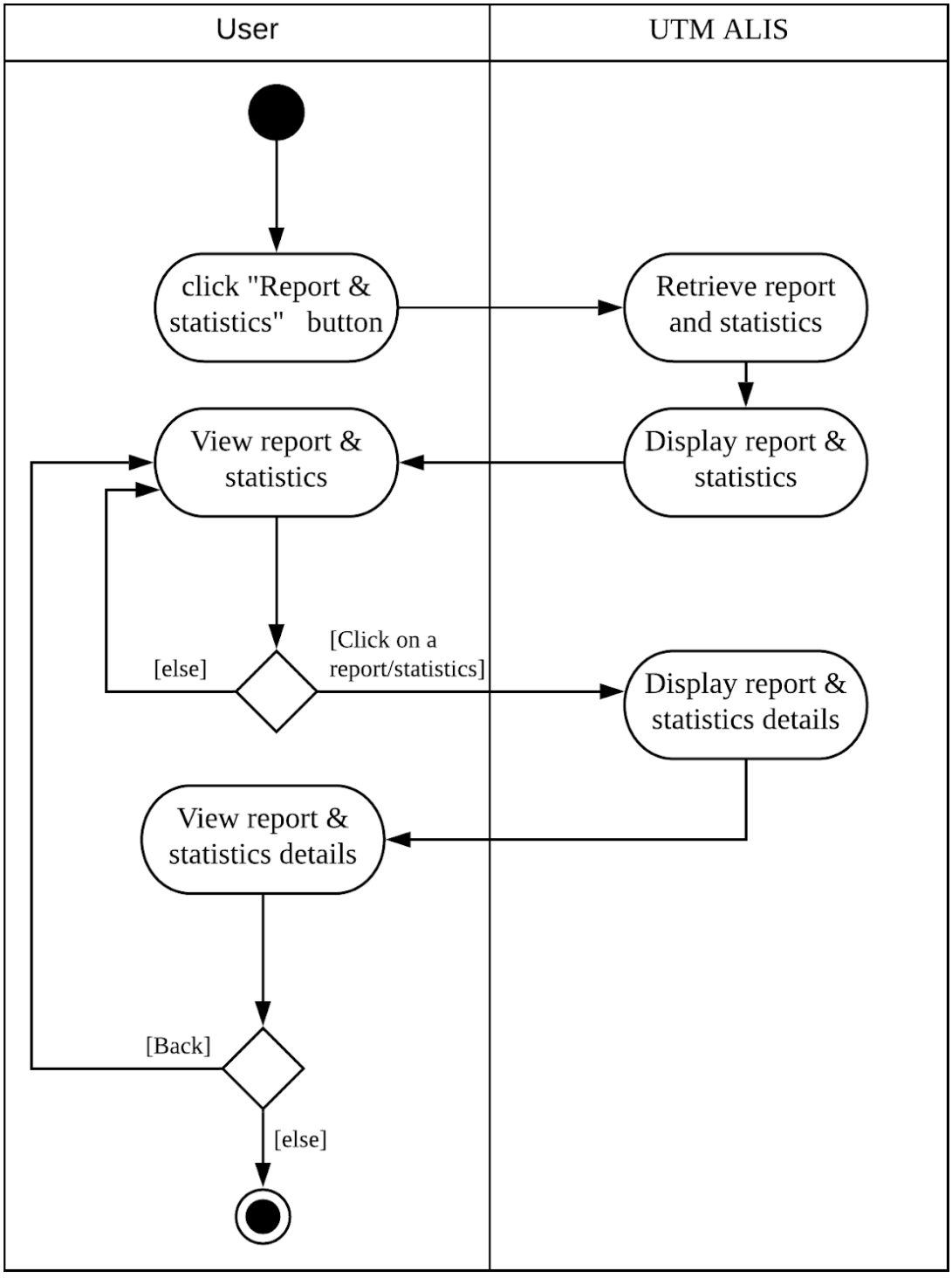

Figure 3.7: Activity Diagram of <View Report and Statistics>

3.3.3.2 UC004: Use Case Create report & statistics

Use Case	Create Report and Statistics
ID	UC004
Brief description	The alumni staff gathers the data and merges it to create report and statistics.
Actors	Alumni Staff, Data providers (UTM SRAD, UTM space and UTM foundation)
Related use case	-
Pre-conditions	1. A stable network connection. 2. Proper and precise information of alumni and faculty. 3. The alumni staff has successfully logged into the system.
Normal Flow	1. The alumni staff request access to the database of the system. 2. If the request is not granted, Alternative Flow 1 is performed. 3. The alumni staff retrieves the latest data from the system which is gathered by the data providers. 4. The alumni staff creates the report and update into the database provided by the data provider.. 5. Alumni staff collects the reviewed report and update them on ALIS system in ReportSatistics database. 6. The use case ends when the system displays the latest ReportStatistics..
Alternative Flow	1. Request not granted for accessing the database. 1.1 The system displays the request is not granted. 1.2 The system reloads the page. 1.3 The system notifies the alumni staff to request for data again.

Exception	-
Related Requirement	FR07
Post-Conditions	System admin displays the report on the main page for reviewing.

Table 3.4: Use Case Specification for <Create Report and Statistics>

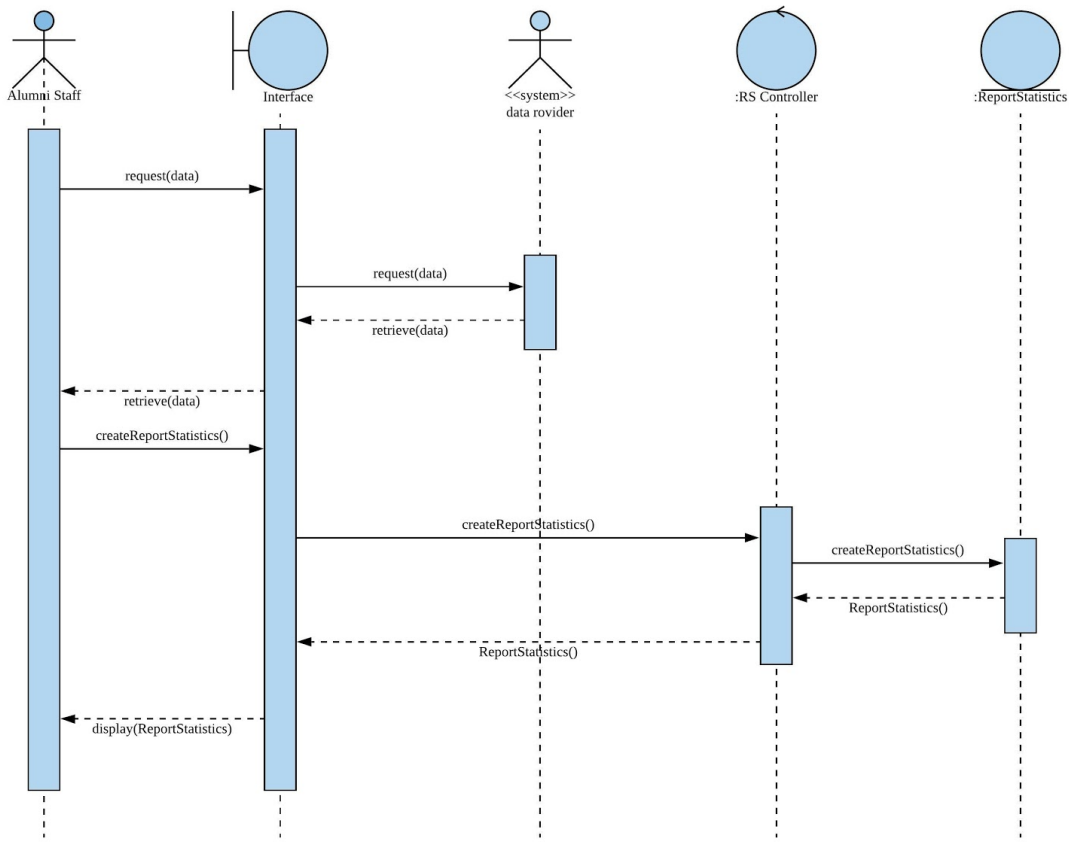

Figure 3.8: Sequence Diagram of <Create Report and Statistics>

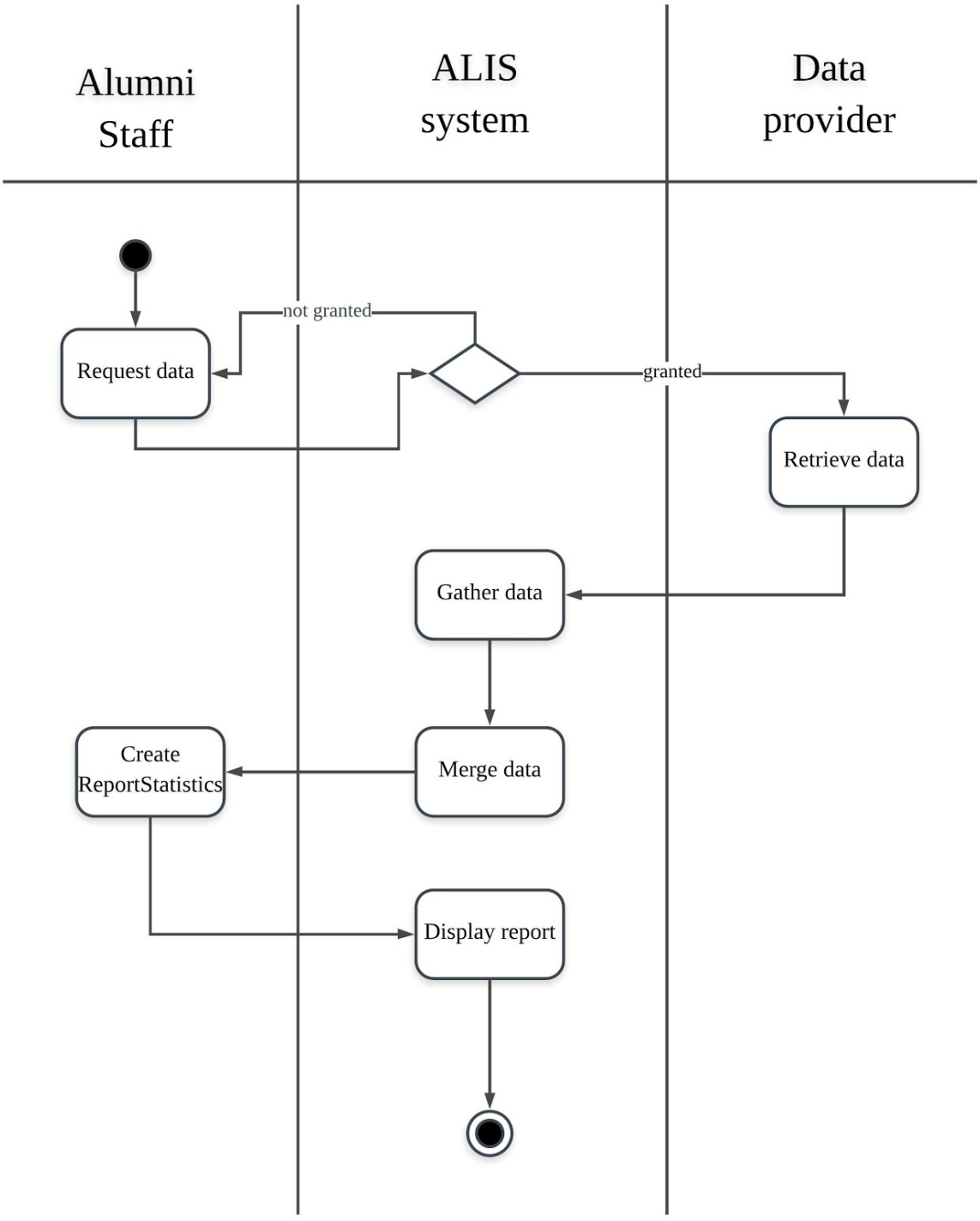

Figure 3.9: Activity Diagram of <Create Report and Statistics>

3.3.4 Module alumni network

3.3.4.1 UC005: Use Case Search alumni

Use Case	Search Alumni
ID	UC005
Brief description	Alumni looks for other alumni in the system by interest group or by name.
Actors	Alumni
Related use case	-
Pre-conditions	• There is an active network connection to the platform. • The alumni have successfully logged into the system. • Valid search information has been entered
Normal Flow	1. The use case begins when the alumni clicks on the tab “Find a friend”. 2. The system prompts the search page 3. If alumni wishes to search by name, Alternative Flow 1 is performed. 4. If the alumni wishes to search by interest group, Alternative Flow 2 is performed. 5. The system displays the latest list alumni. 6. The alumni selects the name or profile they were looking for. 7. The system displays information about the selected alumni. 8. The use case ends.
Alternative Flow	1. Search by name 1.1. the user input the name in the field provided for name. 2. Search by interest groups

	2.1. The alumni provides the interest group description or name in the field provided for search by groups.
Exception	Failure Conditions • If the internet connection is disrupted, the system has a fixed duration to recover, otherwise alert will be shown to users if the recovery process failed.
Related Requirement	FR08, FR09, FR10
Post-Conditions	-

Table 3.5: Use Case Specification for <Search Alumni>

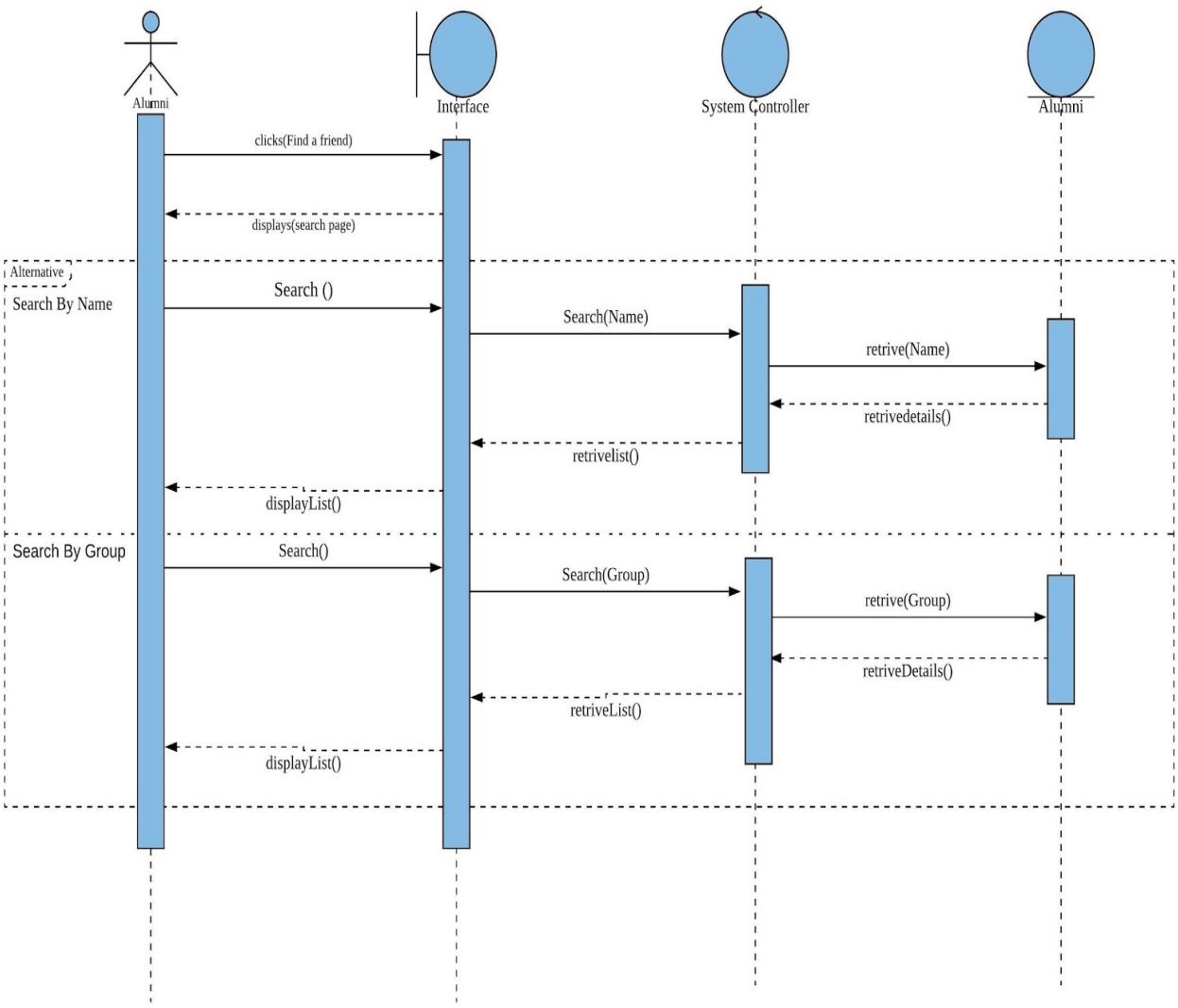

Figure 3.10: Sequence Diagram of <Search Alumni>

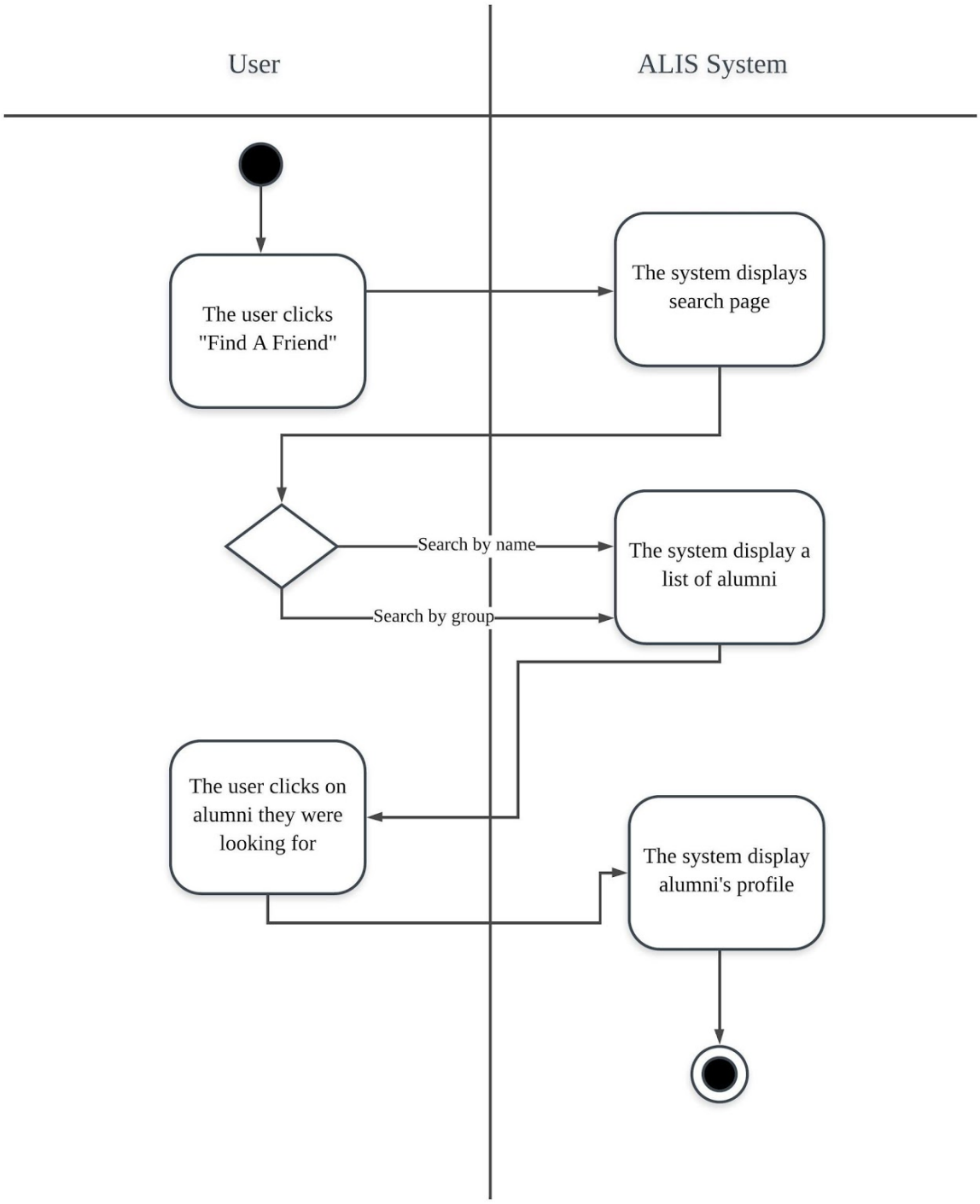

Figure 3.11: Activity Diagram of <Search Alumni>

3.3.5 Module reserve facility

3.3.5.1 UC006: Use Case Reserve facility

Use Case	Reserve Facility
ID	UC006
Brief description	Alumni reserve facility in UTM such as multipurpose hall and other facilities.
Actors	1. Alumni
Related Use Case	1. UC012
Pre-conditions	-
Normal Flow	1. The use case begins when the alumni clicks on the tab “Facility Reservation”. 2. If the user clicks “Reserve Facility”, Alternative Flow 1 is performed. 3. If the user clicks “Check Reservation”, Alternative Flow 2 is performed.
Alternative Flow	1. Reserve Facility 1.1 User selects facility to reserve 1.2 Checks date & time availability for the selected facility 1.3 Choose type of package based on event 1.4 User enters credentials 1.5 The system ensures the entered credentials are valid. 1.6 If not, Exception 1 is performed. 1.7 If yes, system store all the information about the facility reservation in Alumni Reservation Database and display a successful message to the user. 1.9 System sends a confirmation email to user email based on the credentials entered. Use case ends.

	2. Check reservation 2.1 User enters credentials to login to the system. 2.2 The system ensures the entered credentials are valid. 2.3 If not, Exception 2 is performed. 2.4 If yes, user will update the reservation details. 2.5 The system ensures whether the user have made the payment for the reservation. 2.6 If yes, Alternative Flow 1.8 performed. 2.7 If no, use case UC0012 is performed.
Exception	1. Credentials entered is invalid. Please enter correct credentials. Go back to alternative flow 1.4. 2. Credentials entered is invalid. Please enter correct credentials. Go back to alternative flow 2.1
Related Requirement	FR11, FR12
Post-conditions	Successful completion ● The alumni staff may proceed with other operations to book the facility.

Table 3.6: Use Case Specification for <Reserve Facility>

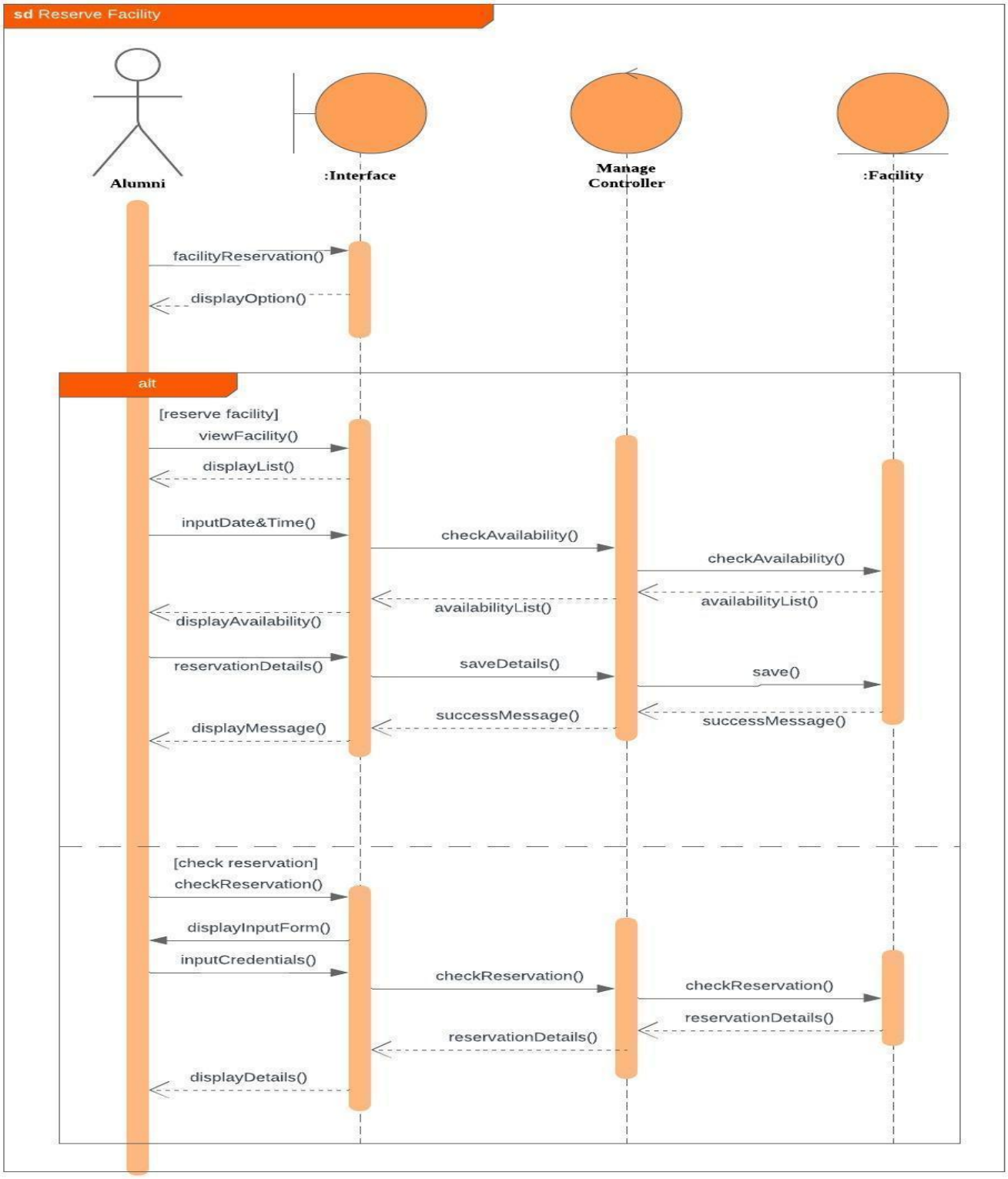

Figure 3.12: Sequence Diagram of Reserve Facility

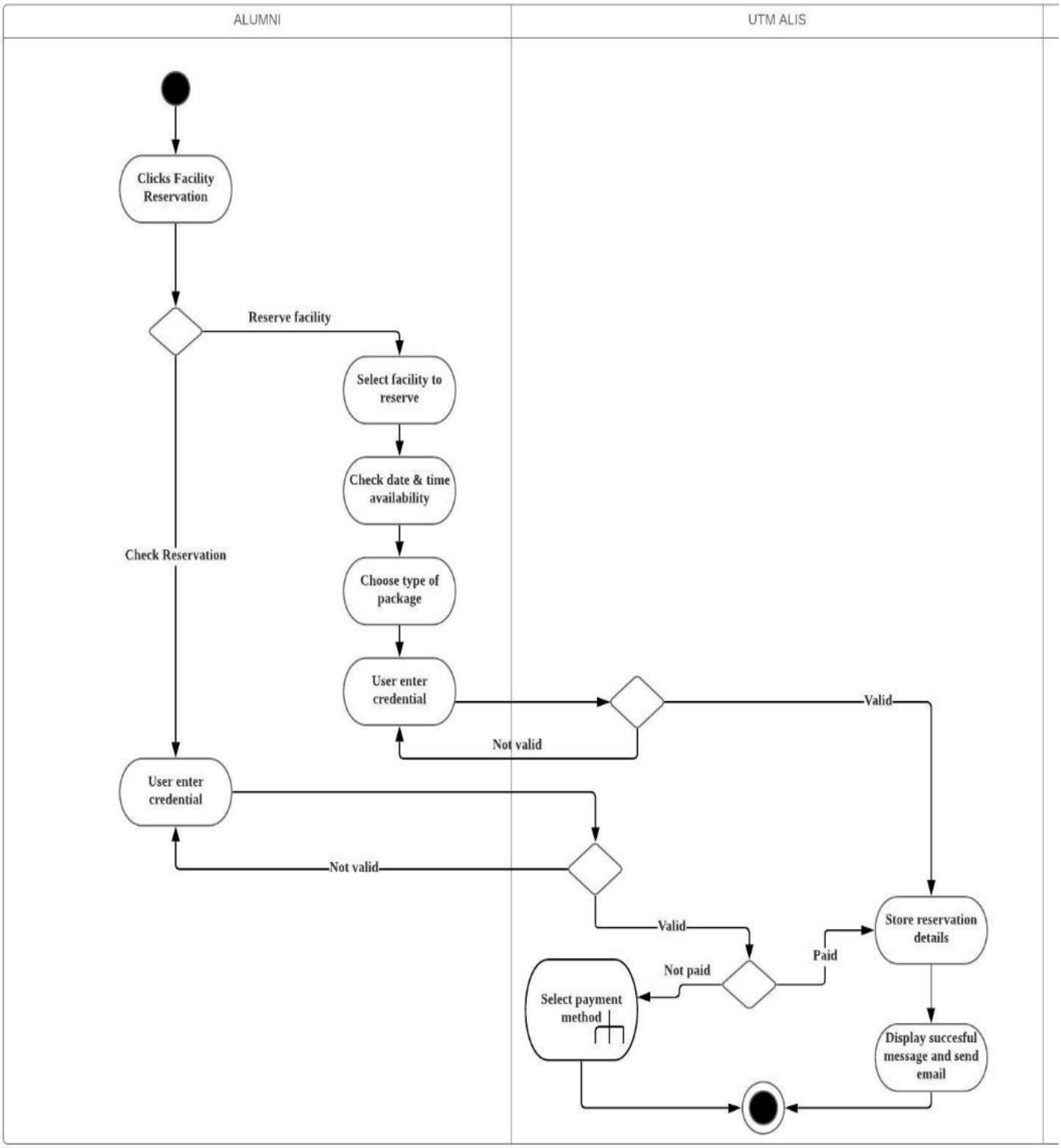

Figure 3.13: Activity Diagram of Reserve Facility

3.3.6 Module event

3.3.6.1 UC007: Use Case View event

Use Case	View event
ID	UC007
Brief description	Alumni staff and alumni can view the existing events.
Actors	User (alumni staff or alumni)
Related use case	UC008, UC009
Pre-conditions	• There is an active network connection to the platform. • The user has successfully logged into the system. • There exists at least one event to be shown.
Normal Flow	1. The use case begins when the alumni staff clicks on the tab “Event”. 2. The system displays list of events. 3. If user wish to see the details of an event, Alternative Flow 1 is performed. 4. If alumni staff wish to manage the event, UC009 is performed. 5. The use case ends.
Alternative Flow	1. See the event details 1.1. User clicks on the particular event. 1.2. System retrieve and display the event details. 1.3. If user click on the “Back” button on the right bottom of the page, back to Normal Flow 2. 1.4. If user click on the “Register” button on the right bottom of the page, proceed to use case UC008.
Exception	-

Related Requirement	FR13, FR14
Post-Conditions	Successful Completion • The event is successfully displayed. The users may proceed with other operations.

Table 3.7: Use Case Specification for <View event>

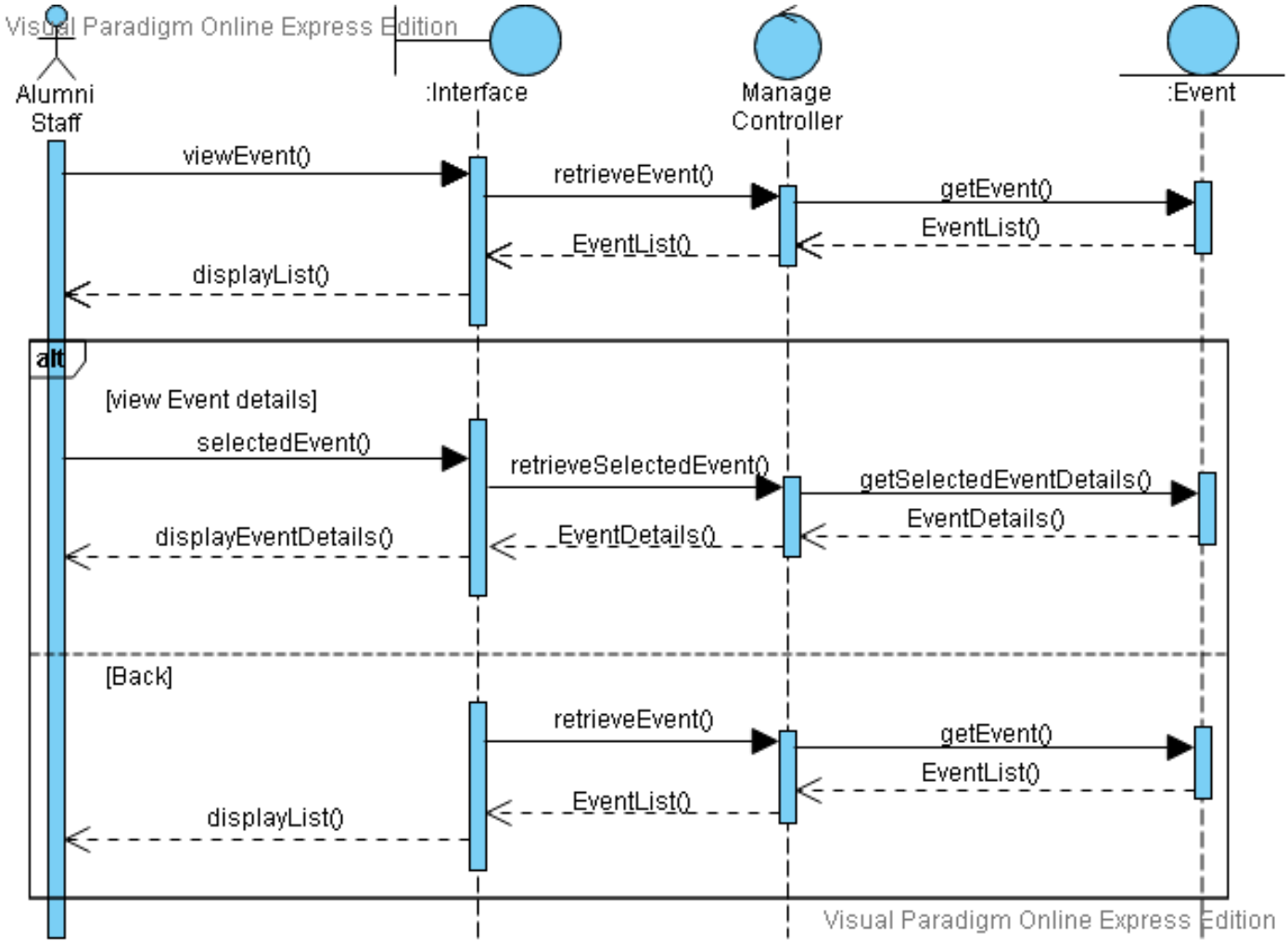

Figure 3.14: Sequence Diagram of <View event>

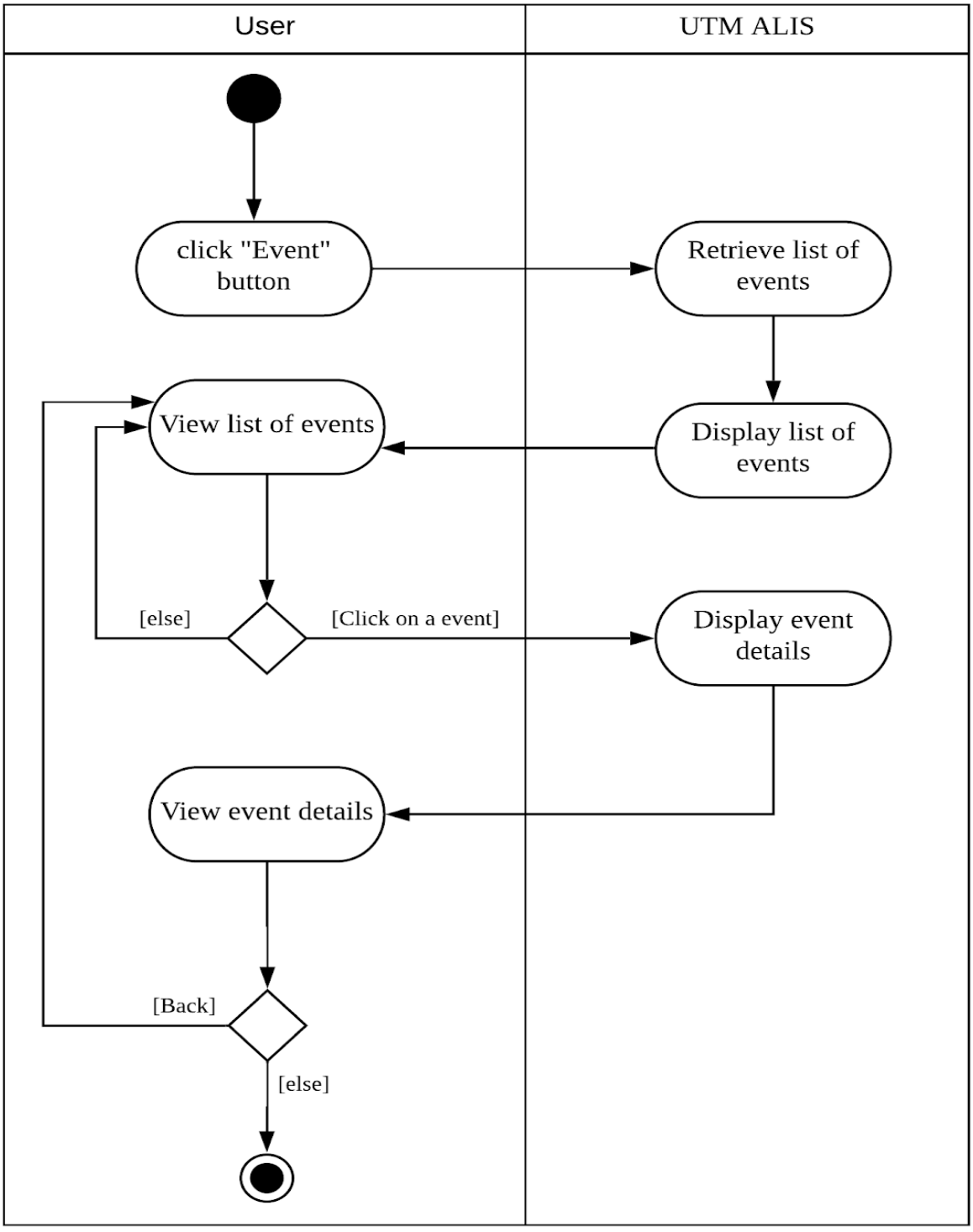

Figure 3.15: Activity Diagram of <View event>

3.3.6.2 UC008: Use Case Register event

Use Case	Register Event
ID	UC008
Brief description	Alumni register their attendance for the event they wish to attend.
Actors	1. Alumni
Related Use Case	1. UC007 2. UC012
Pre-conditions	• There is an active network connection to the platform. • The user has successfully logged into the system. • UC007 should have performed.
Normal Flow	1. Use case begins when the alumni select an event and clicks register. 2. The alumni enter attendance details. 3. If the alumni are required to pay for the event, UC012 is performed. 4. System stores the attendance details in Event Management Database. 5. The use case ends.
Alternative Flow	-
Exception	-
Related Requirement	FR15, FR16
Post-conditions	Successful Completion • The event is successfully displayed. The alumni may proceed with other operations.

Table 3.8: Use Case Specification for Register Event

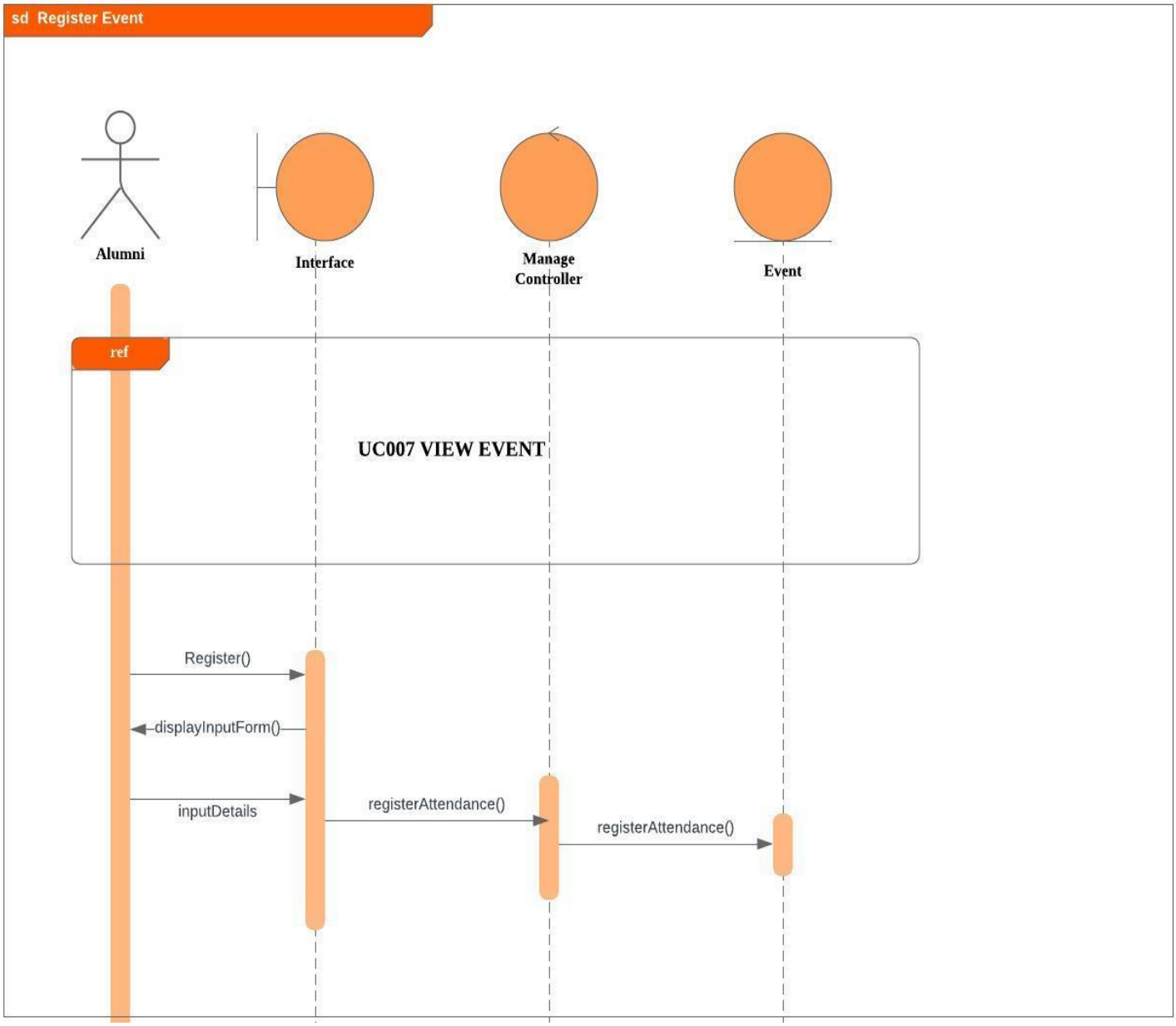

Figure 3.16: Sequence Diagram of <Register Event>

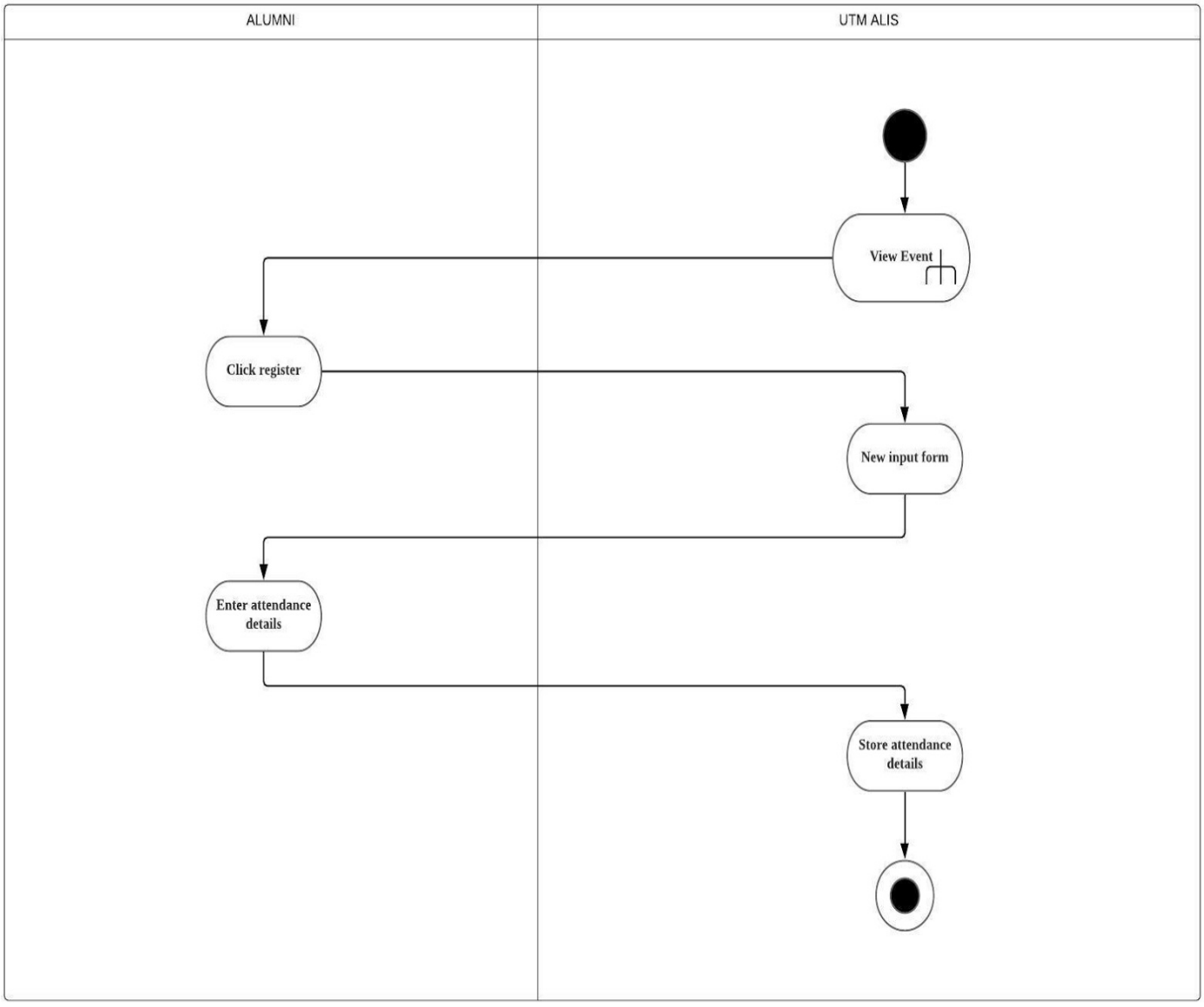

Figure 3.17: Activity Diagram of <Register event>

3.3.6.3 UC009: Use Case Manage event

Use Case	Manage event
ID	UC009
Brief description	Alumni staff add new event when there is a new event and modify/delete the existing events.
Actors	Alumni staff
Related use case	UC007
Pre-conditions	• There is an active network connection to the platform. • The alumni staff has successfully logged into the system. • There exists at least one job or project collaboration posts to be modified/deleted. • There is a new event.
Normal Flow	1. The use case begins when the alumni staff clicks on the tab “Manage event”. 2. The system displays list of events. 3. If alumni staff wish to post a new event, Alternative Flow 1 is performed. 4. If alumni staff wish to modify events, Alternative Flow 2 is performed. 5. If alumni staff wish to delete events, Alternative Flow 3 is performed. 6. The system displays the latest list of events. 7. The use case ends.
Alternative Flow	1. Add new event 1.1. Alumni staff click “Add new” button at the bottom of the page. 1.2. System displays a new input form.

	1.3. Enter the new events details, which may include the date, time, venue, organiser etc... 1.4. If the alumni staff clicks on “back” icon situated at the right bottom of the page, the system returns to Normal Flow 2. 1.5. If the alumni staff clicks “save” button at the bottom of the page, the flow returned to Normal Flow 6. 2. Modify event 2.1. Alumni staff select which event to be modified by checking the checkbox at the left side of each event. Selection can be more than one. 2.2. Alumni staff click “Modify” button at the bottom of the page. 2.3. System displays editable events’ details. 2.4. Alumni staff edit the descriptions of events. 2.5. If the alumni staff clicks on “back” icon situated at the right bottom of the page, the system returns to Normal Flow 2. 2.6. If the alumni staff clicks “save” button at the bottom of the page, the flow returned to Normal Flow 6. 3. Delete event 3.1. Alumni staff select which event to be deleted by checking the checkbox at the left side of each event. Selection can be more than one. 3.2. Alumni staff click “Delete” button at the bottom of the page.

	3.3. System pops out message “Confirm delete?”. 3.4. If the alumni staff clicks “Yes” button at the bottom of the pop out message, the flow returned to Normal Flow 6. 3.5. If the alumni staff clicks “No” button at the bottom of the page, the flow returned to Alternative Flow 3.1. 3.6. If the alumni staff clicks on “back” icon situated at the right bottom of the page, the system returns to Normal Flow 2.
Exception	-
Related Requirement	FR17, FR18
Post-Conditions	Successful Completion • The events are successfully added/modified/deleted. The alumni staff may proceed with other operations.

Table 3.9: Use Case Specification for <Manage event>

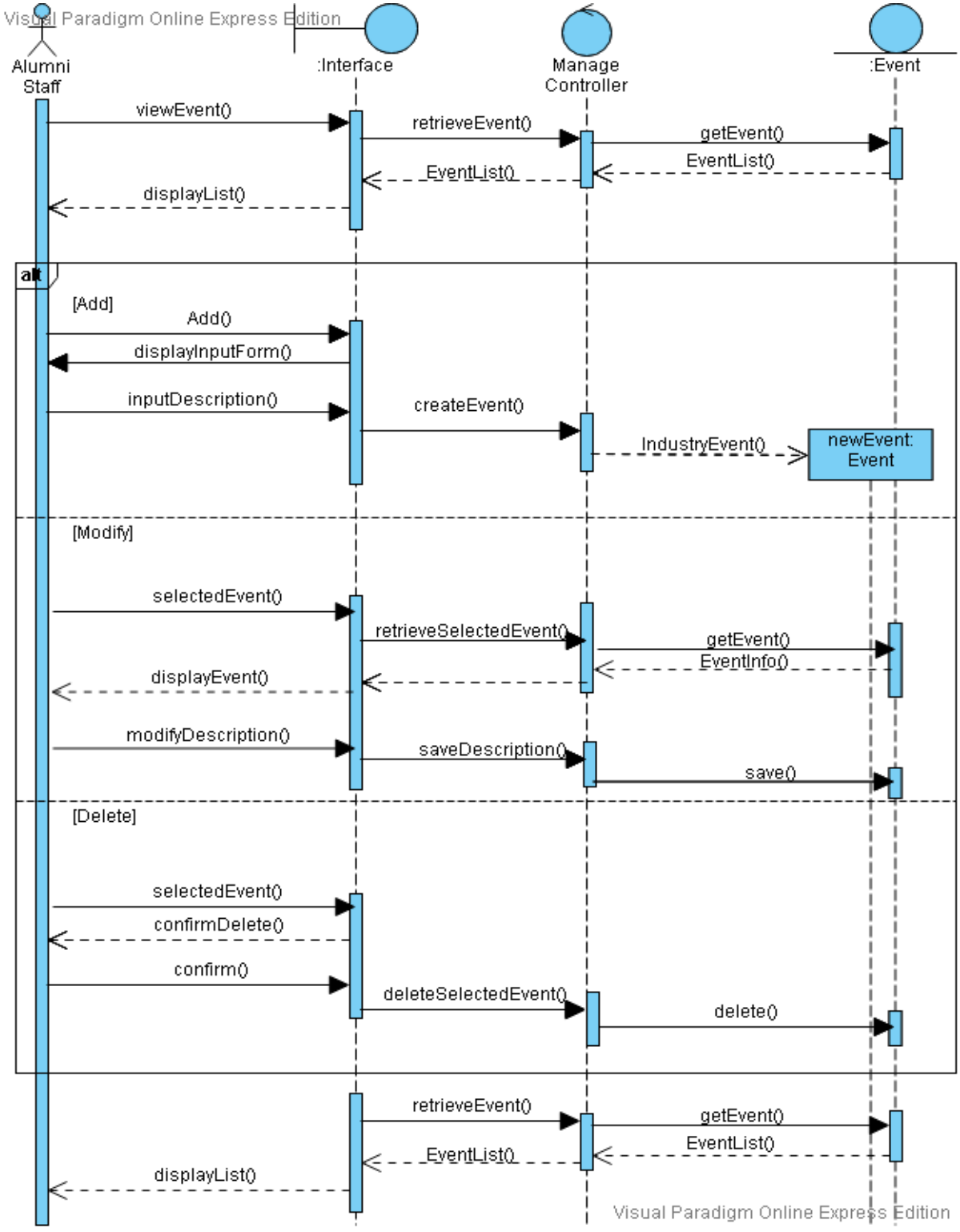

Figure 3.18: Sequence Diagram of <Manage event>

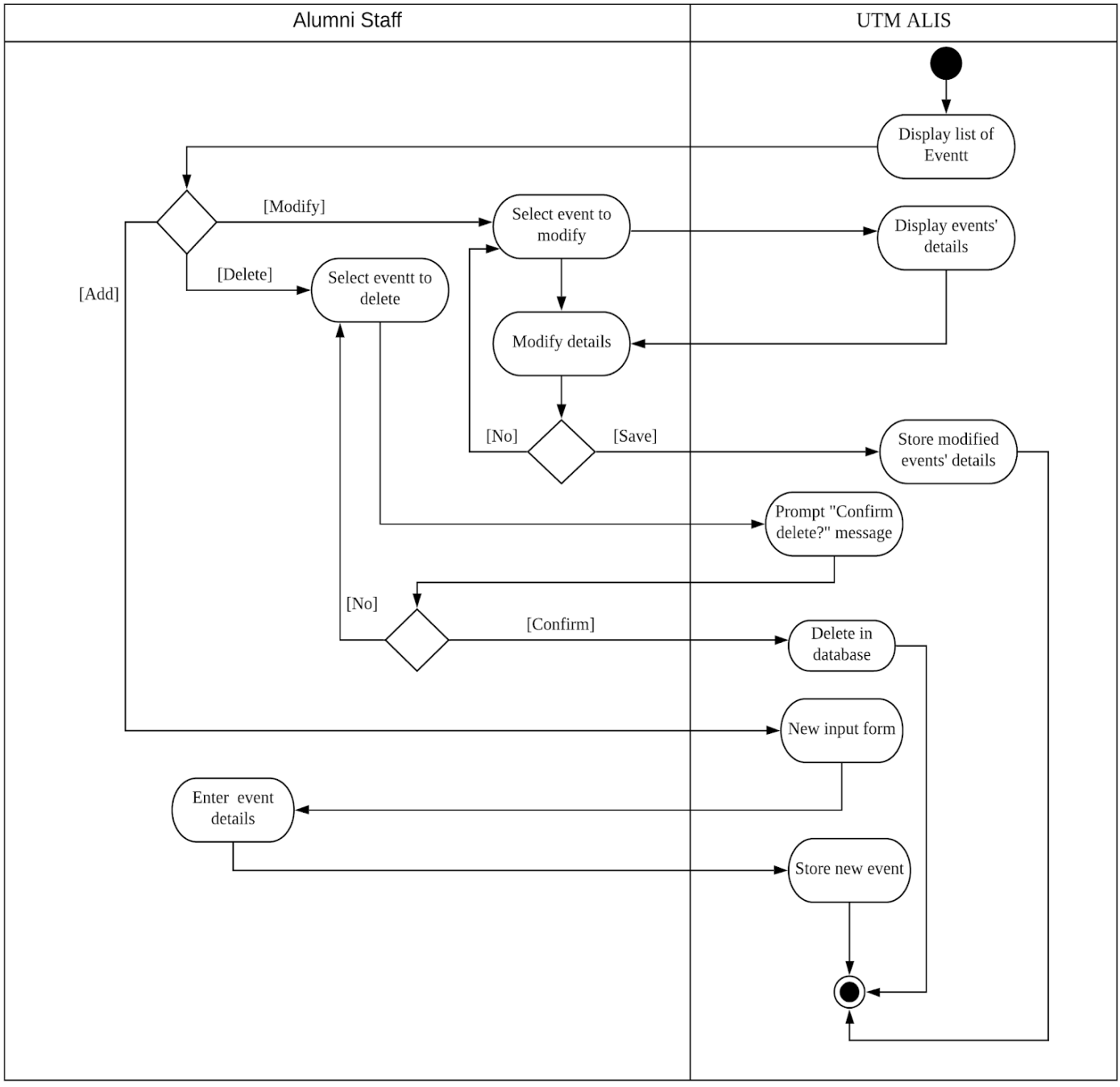

Figure 3.19: Activity Diagram of <Manage event>

3.3.7 Module industrial linkages

3.3.7.1 UC010: Use Case View industrial linkages

Use Case	View industrial linkages
ID	UC010
Brief description	Alumni staff and alumni can view the existing job/project specification posts.
Actors	User (alumni staff or alumni)
Related use case	UC011
Pre-conditions	• There is an active network connection to the platform. • The user has successfully logged into the system. • There exists at least one job or project collaboration posts to be shown.
Normal Flow	1. The use case begins when the alumni staff clicks on the tab “Industrial linkages”. 2. The system displays list of job or project collaboration posts. 3. If user wish to see the details of a particular job or project collaboration posts, Alternative Flow 1 is performed. 4. If alumni staff wish to manage the posts, use case UC011 is performed. 5. The use case ends.
Alternative Flow	1. See the job or project collaboration details 1.1. User click on the particular job or project collaboration post. 1.2. System retrieve and display the job or project collaboration details. 1.3. If user click on the “Back” button on the right bottom of the page, back to Normal Flow 2.

Exception	-
Related Requirement	FR19, FR20, FR21, FR22
Post-Conditions	Successful Completion • The job/ project collaboration posts are successfully displayed. The users may proceed with other operations.

Table 3.10: Use Case Specification for <View industrial linkages>

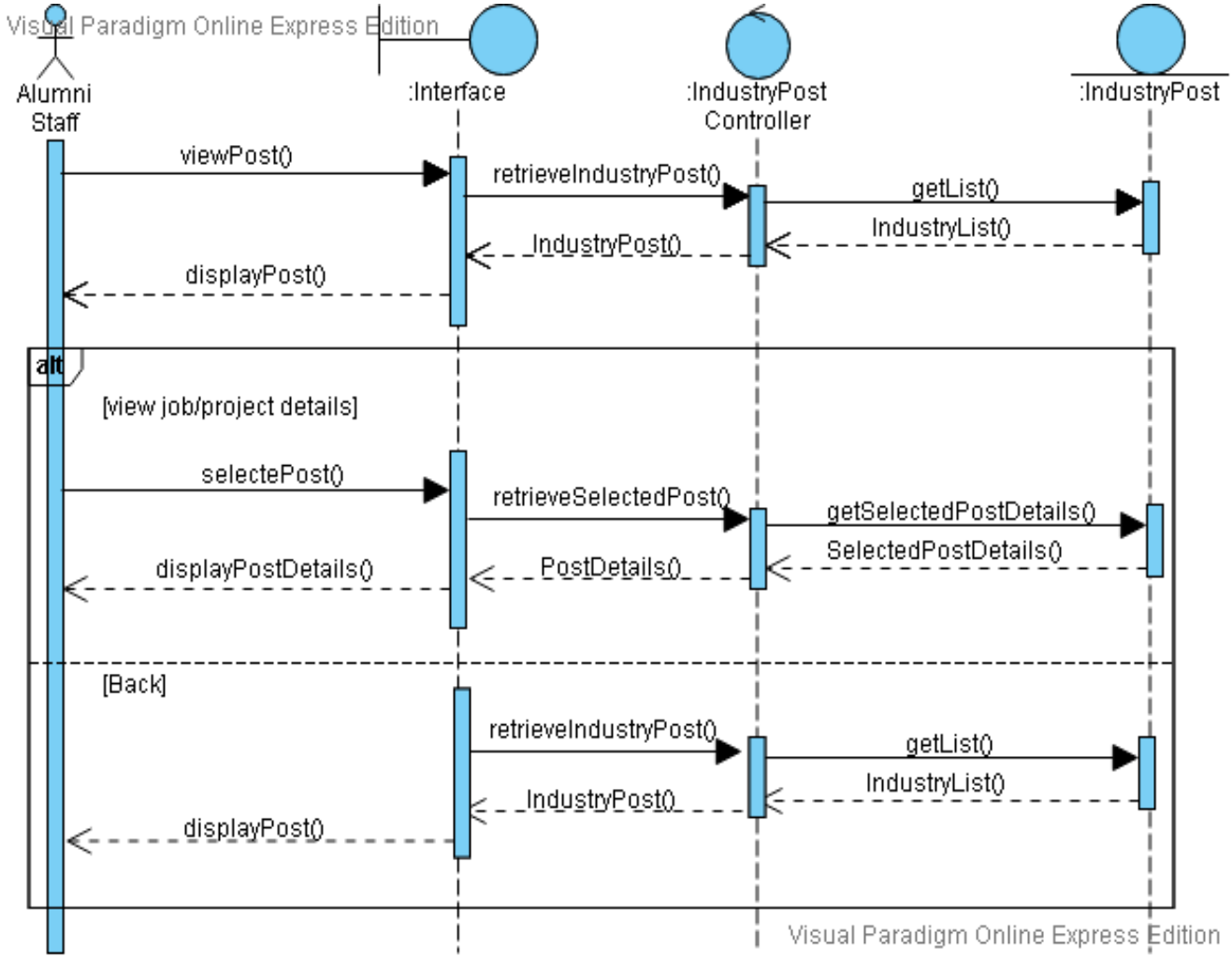

Figure 3.20: Sequence Diagram of <View industrial linkages >

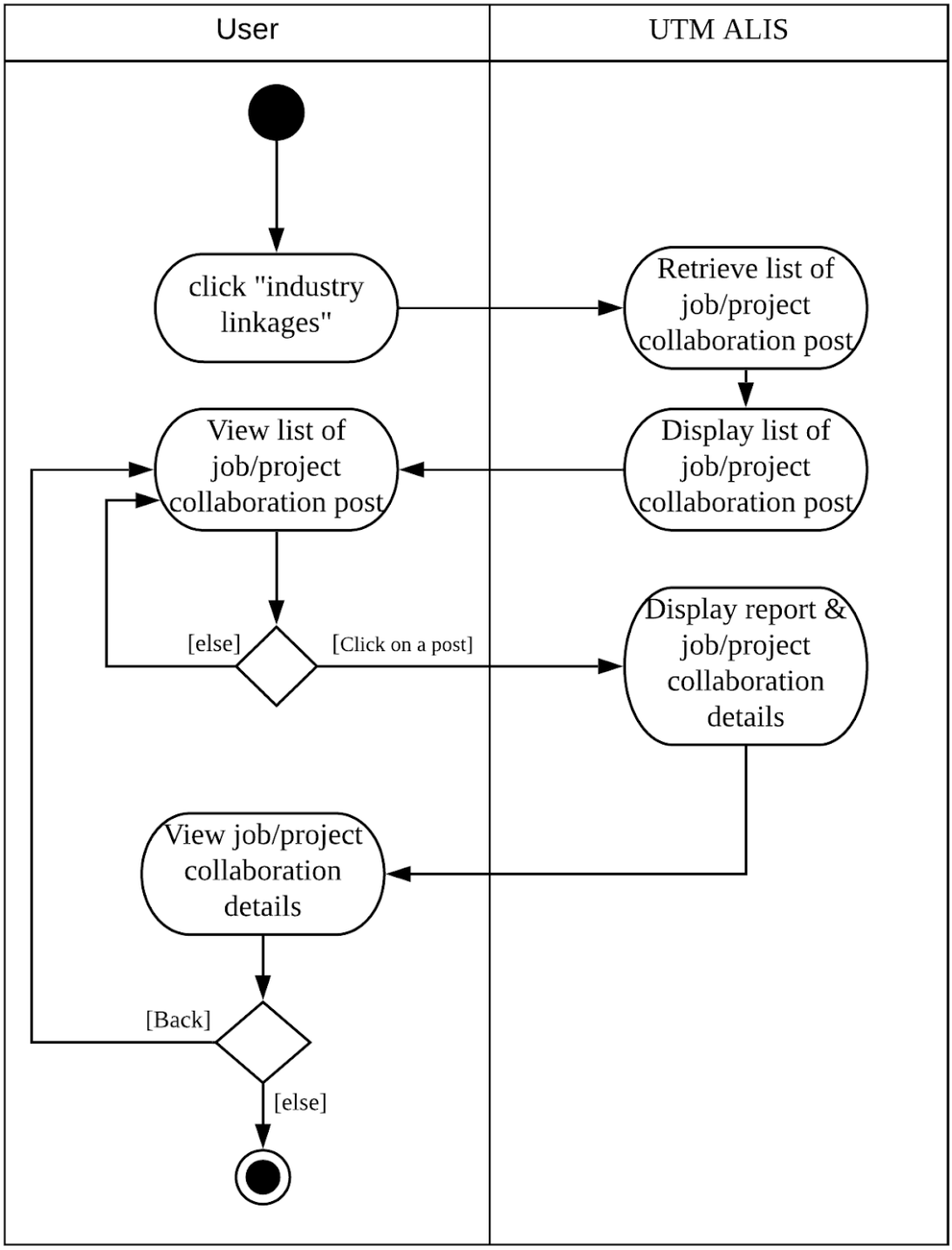

Figure 3.21: Activity Diagram of <View industrial linkages >

3.3.7.2 UC011: Use Case Manage industrial linkages

Use Case	Manage industrial linkages
ID	UC011
Brief description	Alumni staff add new job or project collaboration posts when there is a new email from industries after validation and modify/delete the existing job or project collaboration posts.
Actors	Alumni staff
Related use case	UC010
Pre-conditions	• There is an active network connection to the platform. • The alumni staff has successfully logged into the system. • There exists at least one job or project collaboration posts to be modified/deleted. • There is a new email from industries related to new job or project to be posted.
Normal Flow	1. The use case begins when the alumni staff clicks on the tab “Manage industrial linkages”. 2. The system displays list of job or project collaboration posts. 3. If alumni staff wish to post a new job/project collaboration, Alternative Flow 1 is performed. 4. If alumni staff wish to post a new job/project collaboration, Alternative Flow 2 is performed. 5. If alumni staff wish to post a new job/project collaboration, Alternative Flow 3 is performed. 6. The system displays the latest list of job or project collaboration posts. 7. The use case ends.
Alternative Flow	1. Add new job/ project collaboration post

	1.1. Alumni staff click “Add new” button at the bottom of the page. 1.2. System displays a new input form. 1.3. Enter the new job/ project collaboration description, which may include the criteria, contact of the industry etc. 1.4. If the alumni staff clicks on “back” icon situated at the right bottom of the page, the system returns to Normal Flow 2. 1.5. If the alumni staff clicks “save” button at the bottom of the page, the flow returned to Normal Flow 6. 2. Modify job/ project collaboration post 2.1. Alumni staff select which post to be modified by checking the checkbox at the left side of each post. Selection can be more than one. 2.2. Alumni staff click “Modify” button at the bottom of the page. 2.3. System displays editable descriptions of job/ project collaborations. 2.4. Alumni staff edit the descriptions of job/ project collaborations. 2.5. If the alumni staff clicks on “back” icon situated at the right bottom of the page, the system returns to Normal Flow 2. 2.6. If the alumni staff clicks “save” button at the bottom of the page, the flow returned to Normal Flow 6.

	3. Delete job/ project collaboration post 3.1. Alumni staff select which post to be deleted by checking the checkbox at the left side of each post. Selection can be more than one. 3.2. Alumni staff click “Delete” button at the bottom of the page. 3.3. System pops out message “Confirm delete?”. 3.4. If the alumni staff clicks “Yes” button at the bottom of the pop out message, the flow returned to Normal Flow 6. 3.5. If the alumni staff clicks “No” button at the bottom of the page, the flow returned to Alternative Flow 3.1. 3.6. If the alumni staff clicks on “back” icon situated at the right bottom of the page, the system returns to Normal Flow 2.
Exception	-
Related Requirement	FR23, FR24
Post-Conditions	Successful Completion • The job/ project collaboration post is successfully added/modified/deleted. The alumni staff may proceed with other operations.

Table 3.11: Use Case Specification for <Manage industrial linkages>

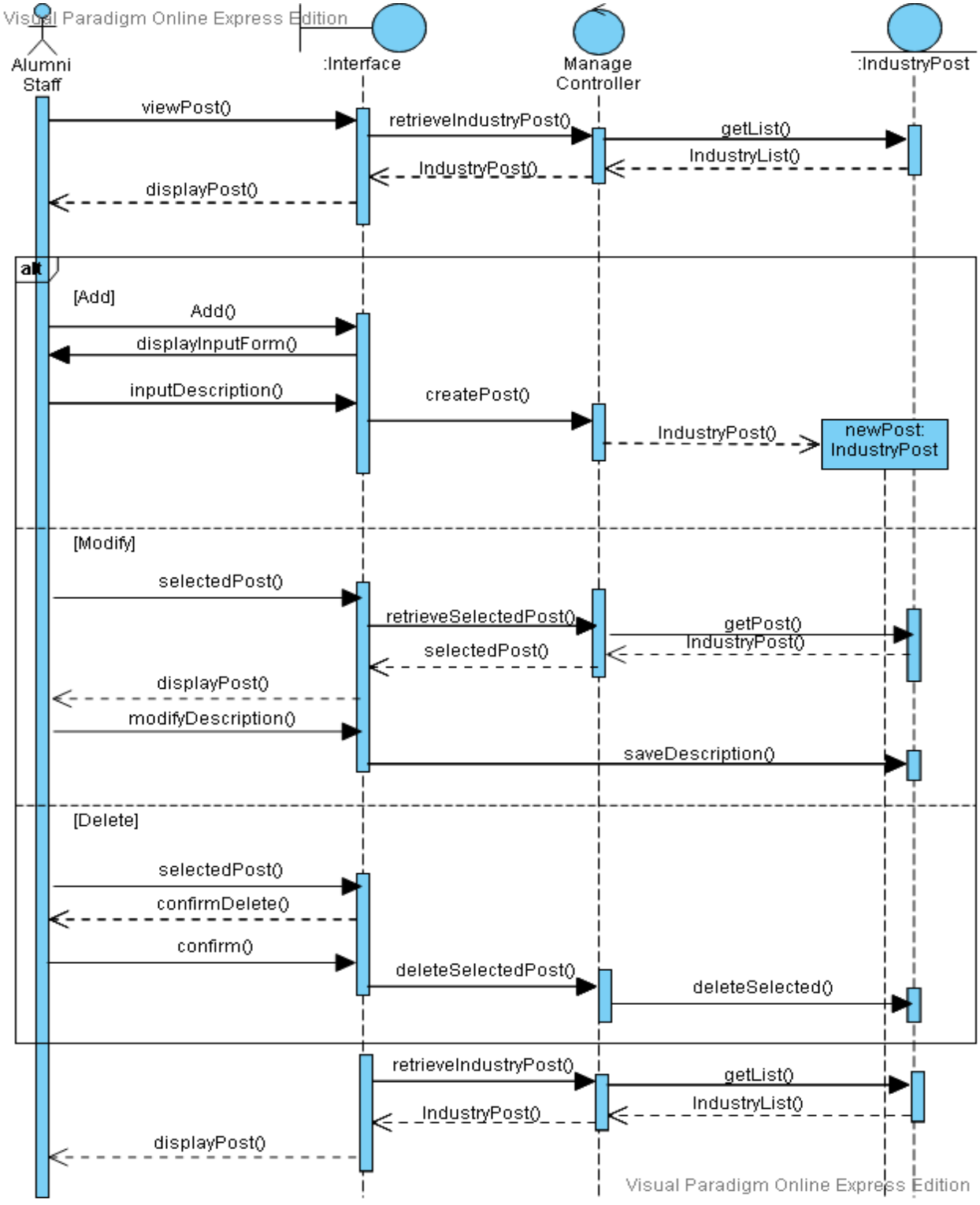

Figure 3.22: Sequence Diagram of <Manage industrial linkages >

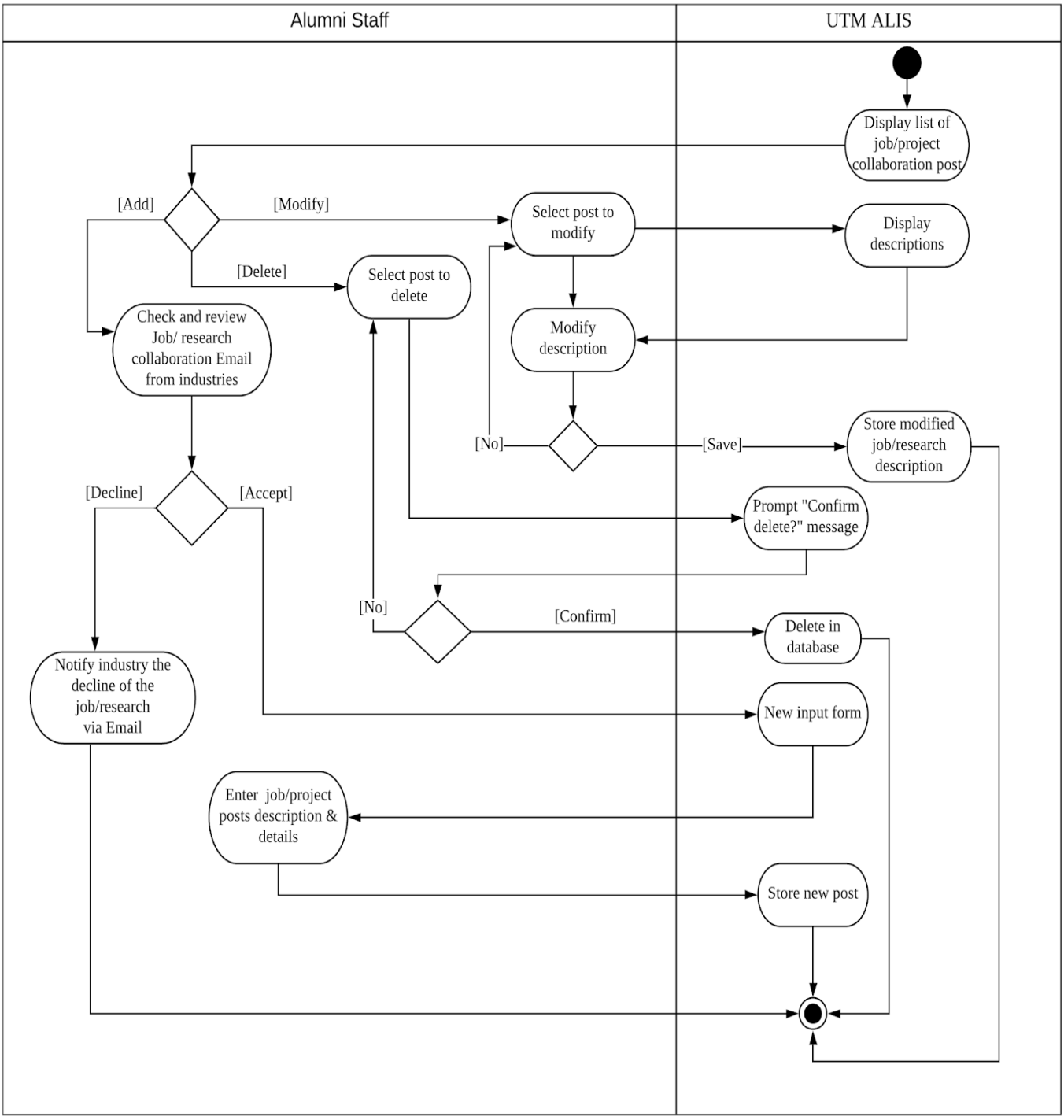

Figure 3.23: Activity Diagram of <Manage industrial linkages >

3.3.8 Module payment

3.3.8.1 UC012: Use Case Select payment method

Use Case	Select payment method
ID	UC012
Brief description	Alumni select payment method to pay event registration fee/ reservation fee/ endowment fund.
Actors	Alumni
Related use case	UC002, UC006, UC008, UC013
Pre-conditions	• There is an active network connection to the platform. • The alumni staff has successfully logged into the system. • Alumni is asked to pay in the system.
Normal Flow	1. The use case begins by redirecting to pay page. 2. The system shows the amount of payment. 3. The system displays list of payment method. 4. Alumni select payment method by clicking on the tab that represent different payment method. 5. If the alumni staff clicks on “back” icon situated at the right bottom of the page, the system returns to normal flow 2. 6. If alumni click “Proceed to pay” button at the right bottom of the page. Use case UC013 is followed. 7. The use case ends.
Alternative Flow	-
Exception	-
Related Requirement	FR25

Post-Conditions	Successful Completion • The alumni select an appropriate payment method and proceed to use case UC012 to complete the payment.

Table 3.12: Use Case Specification for <Select payment method>

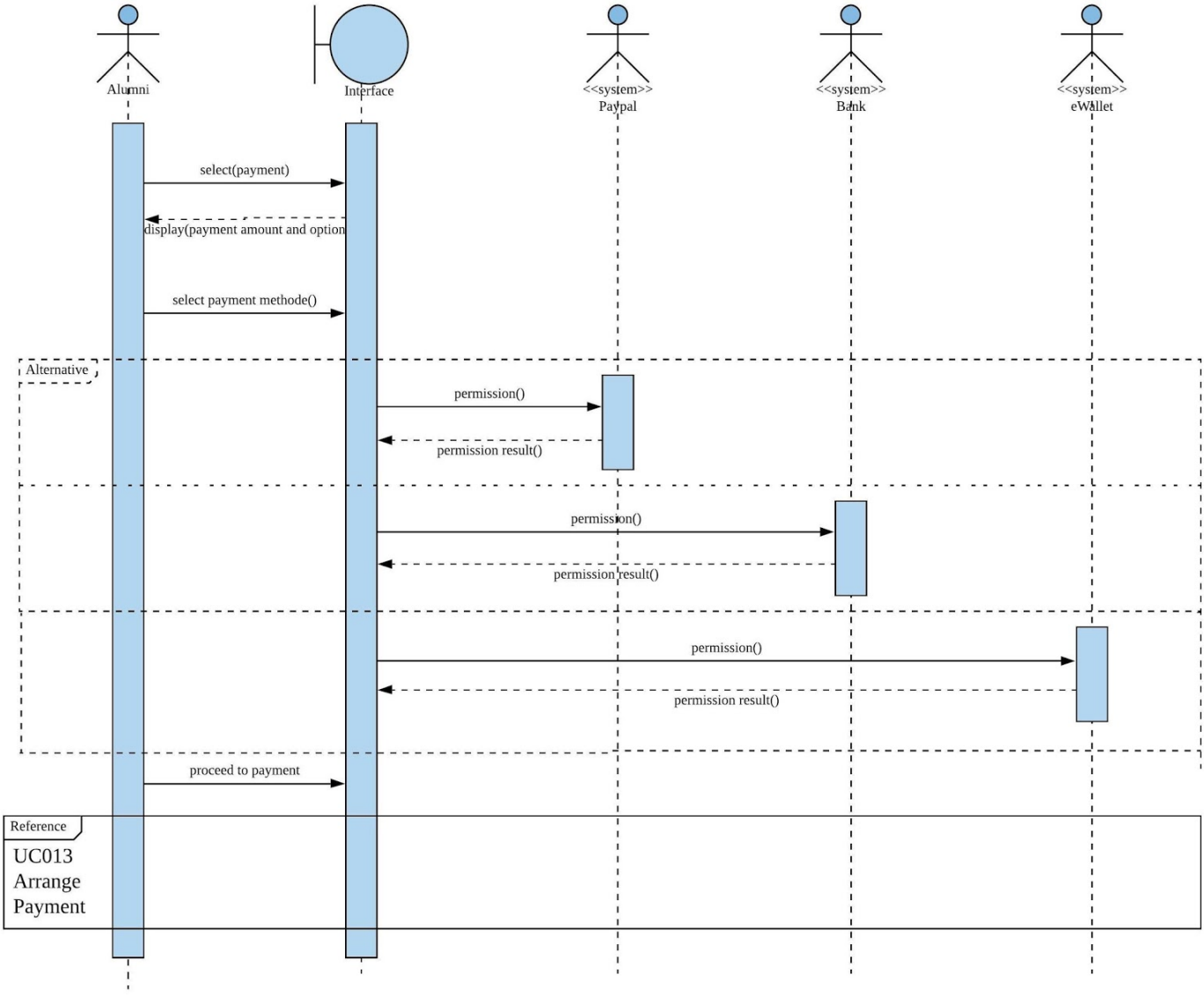

Figure 3.24: Sequence Diagram of <Select payment method>

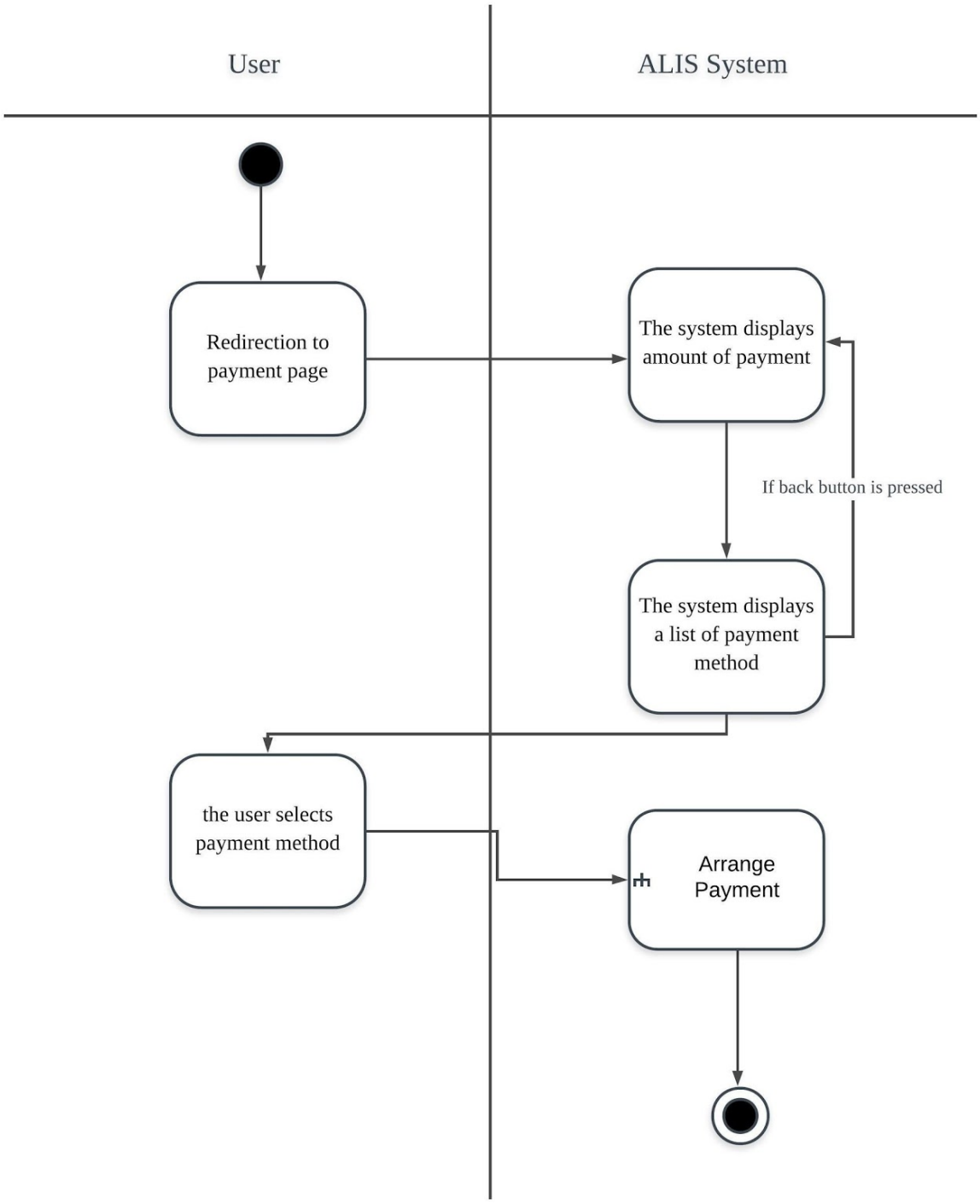

Figure 3.25 Activity Diagram of <Select payment method>

3.3.8.2 UC013: Use Case Arrange payment

Use Case	Arrange payment
ID	UC013
Brief description	Payment system arrange payment when Alumni is asked to pay in UTM ALIS.
Actors	Payment system
Related use case	UC002, UC006, UC008, UC012
Pre-conditions	• There is an active network connection to the platform. • The alumni staff has successfully logged into the system. • Alumni is asked to pay in the system. • Alumni has chosen payment method in UC012.
Normal Flow	1. If alumni choose to pay in PayPal, Alternative flow 1 is followed. 2. If the member chooses to pay in credit card or online banking, Alternative Flow 2 is followed. 3. If the member chooses to pay in eWallet, Alternative Flow 3 is followed. 4. If payment not successful, proceed with Exception 1. 5. If the alumni staff clicks on “back” icon situated at the right bottom of the page, the system returns to use case UC012. 6. If payment is successful, the system stores the payment in the payment history of alumni with payment status “Success”. 7. The use case ends.
Alternative Flow	1. Pay by PayPal 1.1. System redirect to the PayPal site. 1.2. Member log in to their account.

	1.3. If fail to login, go to Exception 2. 1.4. Click “Pay the required amount”. 2. Pay by using credit card/online banking 2.1. Enter the credit card/online banking information 2.2. System redirect to the bank payment site. 2.3. Member receive a MSOS code/ TAC code. 2.4. Member enter the code received. 2.5. Member receive payment confirmation message on their phone. 3. Pay by using eWallet 3.1. System redirect to the chosen eWallet site. 3.2. eWallet system display the amount needed to pay along with a payment QR code. 3.3. Alumni scan the QR code by using their eWallet apps on their phone. 3.4. Alumni receive payment confirmation message on their phone.
Exception	1. Payment not successful 1.1. The system stores the payment in the payment history of alumni with payment status “unpaid”. 1.2. Alumni can click the “pay” button beside the payment and proceed to Normal Flow 1 again. 2. User inputs wrong banking account, credit card and e-Wallet information then the system shows “wrong information” massage then back to Alternative Flow 1.1, 2.1& 3.1 respectively.
Related Requirement	FR26, FR27

Post-Conditions	Successful Completion • The alumni select an appropriate payment method and proceed to use case UC012 to complete the payment. • System store the payment into alumni's payment history.

Table 3.13: Use Case Specification for <Arrange payment>

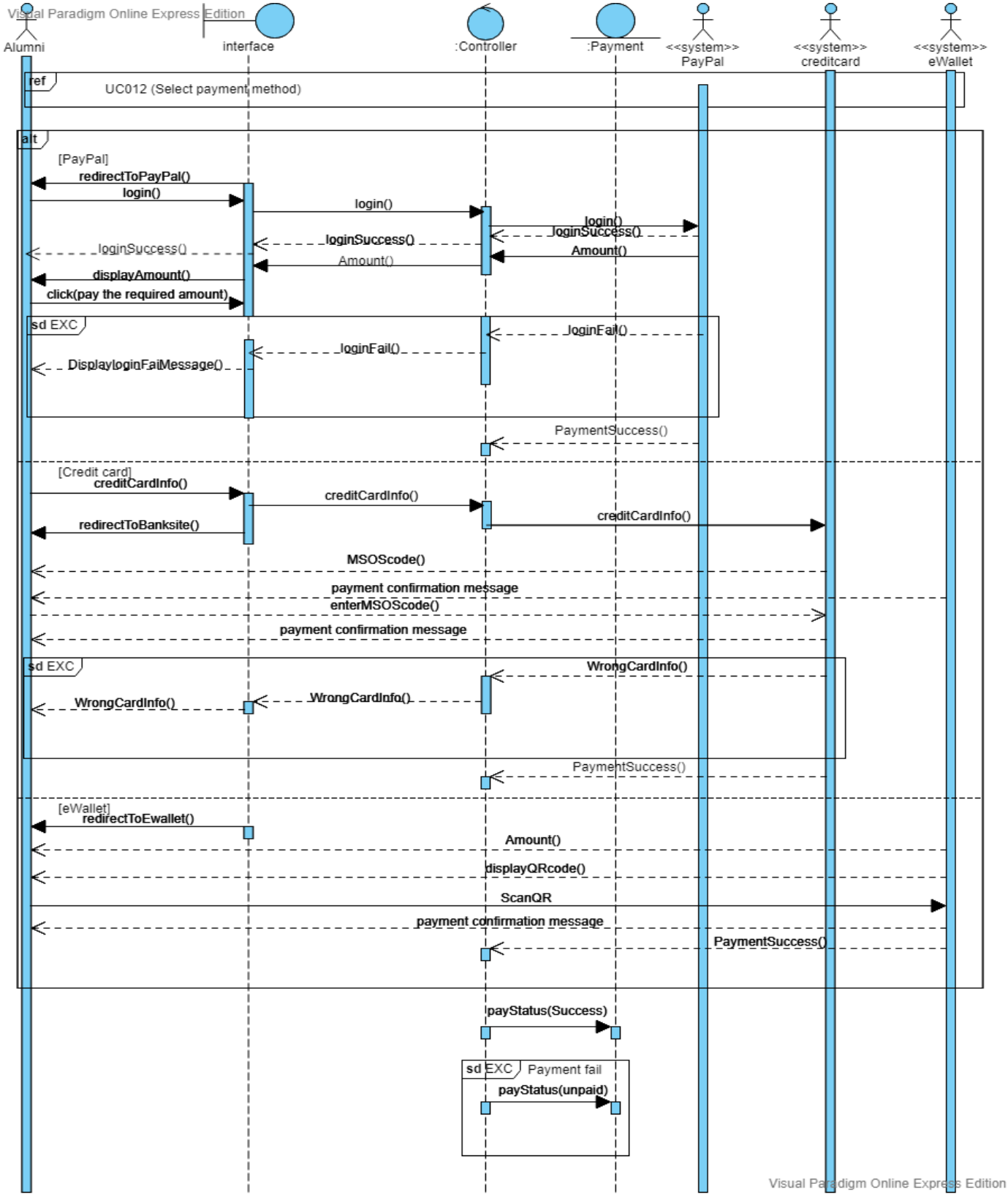

Figure 3.26: Sequence Diagram of <Arrange Payment>

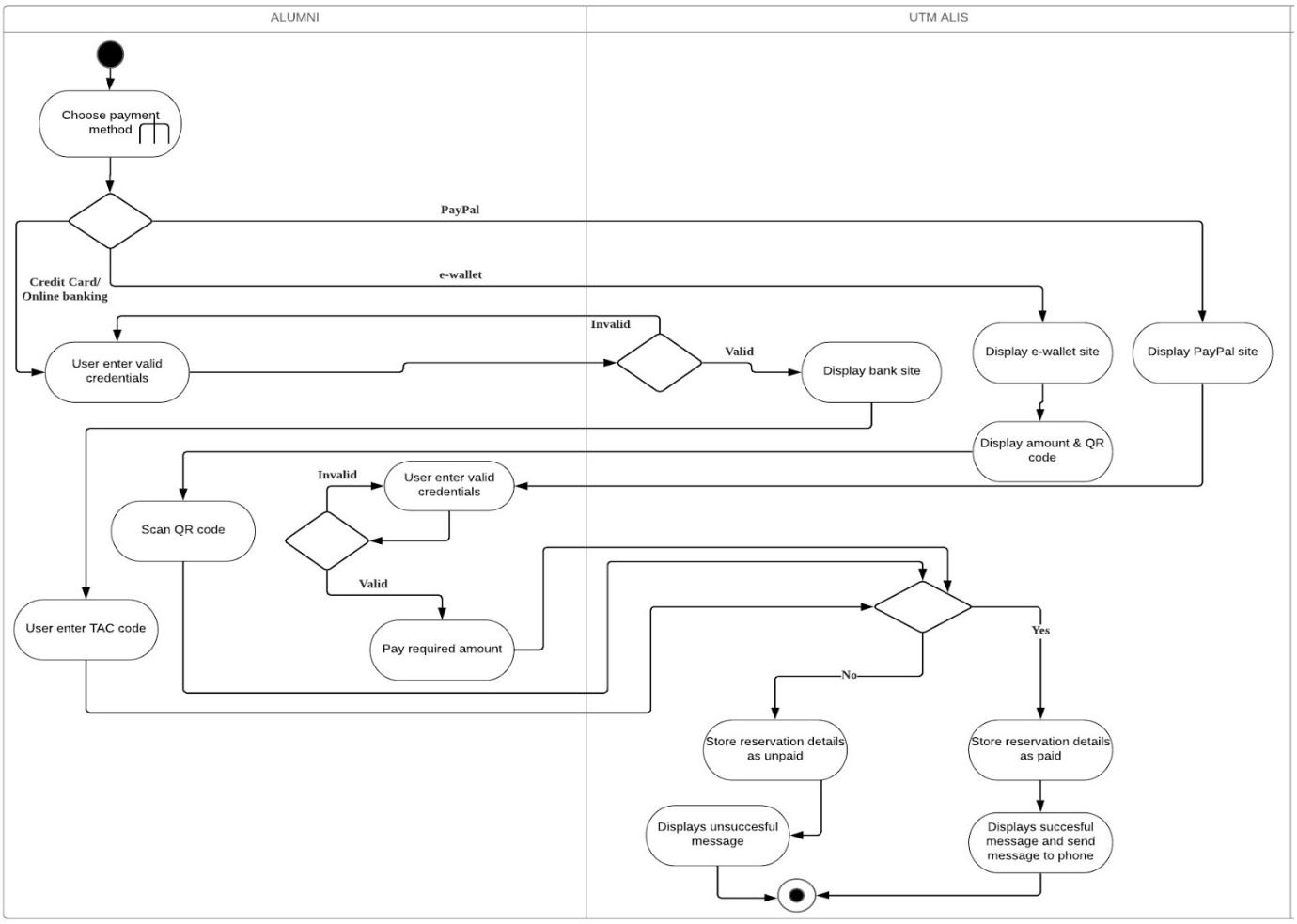

Figure 3.27: Activity Diagram of <Arrange Payment>

3.4 Performance Requirements

- The system shall be able to load each page in less than 20 seconds with stable internet connection.
- The system shall be able to respond for each action in less than 15 seconds.
- The system shall be able to function in real-time: any operation on the stored information, triggered by the Alumni, shall complete in less than 10 seconds.
- The system shall be able to allow simultaneous use by at least 100 users, without data corruption.

3.5 Design Constraints

- The system shall provide interface only in English.
- The system shall provide the users with the ability to access from devices that has Internet browsing capabilities and an Internet connection.
- The system shall be able to store data in MySQL.
- The system shall be coded with HTTP requests by JavaScript and PHP language for the web-portal interface.

3.6 Software System Attributes

- The system shall be able to provide an interface that is easy to learn and navigate.
- When there are complicated steps involved, the shall be able to provide help frames.
- The system should use the language which is expressive, intuitive and universal so that it can understand by all users.
- The system shall be able to provide user the ability to learn how to use the system in less than 10 minutes.

3.7 Other Requirements

3.7.1 Security

- The system shall be able to provide authorization only for specific person such as alumni and alumni staff.

3.7.2 Efficiency

- The system shall be able to perform data cleaning immediately after getting the data from various databases (UTM SRAD, UTMSPACE, UTM FOUNDATION).

- The system should be able to complete data cleaning in 10 seconds after getting the data from various databases (UTM SRAD, UTMSPACE, UTM FOUNDATION).

- The system shall provide user the ability to accomplish the goals with less than 5 minutes.

3.7.3 Compatibility

- The system shall provide user the ability to access the system from many platforms such as PC, smartphone, tablets etc.

3.7.4 Integration

- For every 12 hours, the system shall synchronize the data collected from data providers in databases.
- The system shall synchronize the data collected from data providers in databases within 5 minutes.

3.7.5 Culture

- The system shall not contain any sensitive issues that is abusive to any culture nor encourage racism.

3.7.6 Privacy

- The system shall not expose the personal data of user to third party.

3.7.7 Effectiveness

- The system shall provide user the ability to accomplish the desired tasks with less than 3 errors.

3.7.8 Usability

- The system shall be able to provide user the ability to learn how to use the system in less than 10 minutes.

4. State diagram

4.1 Payment

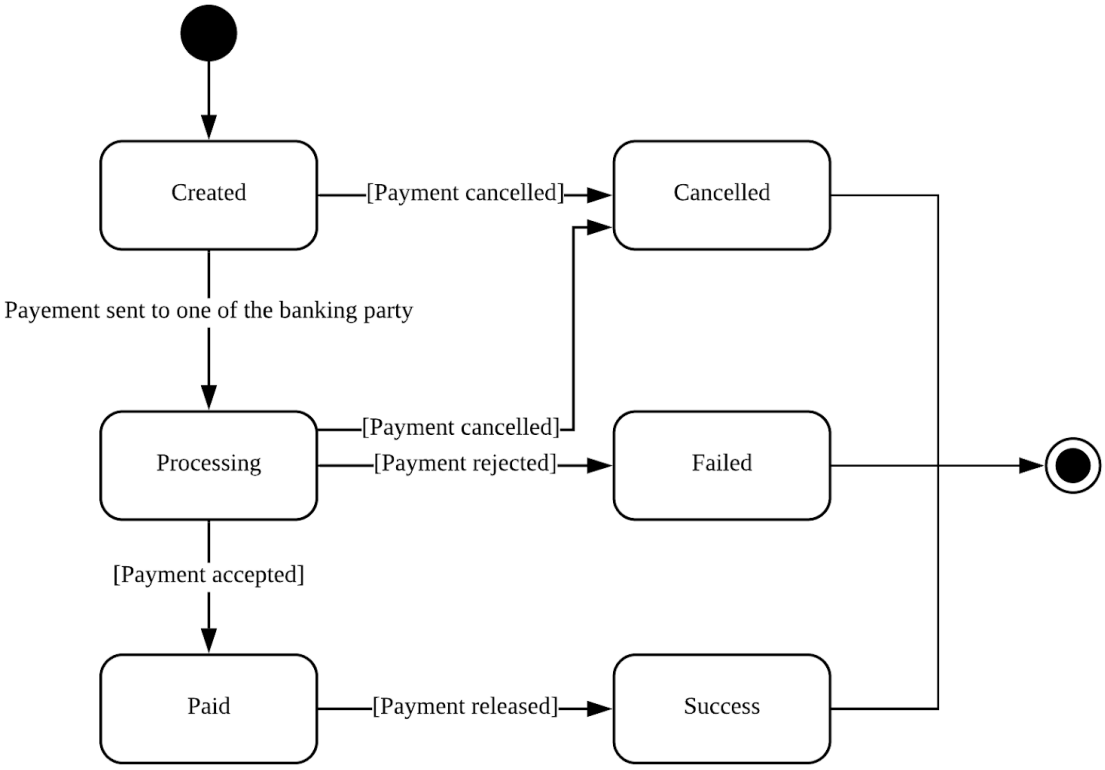

Figure 5.1 State diagram of Payment

4.2 Reservation

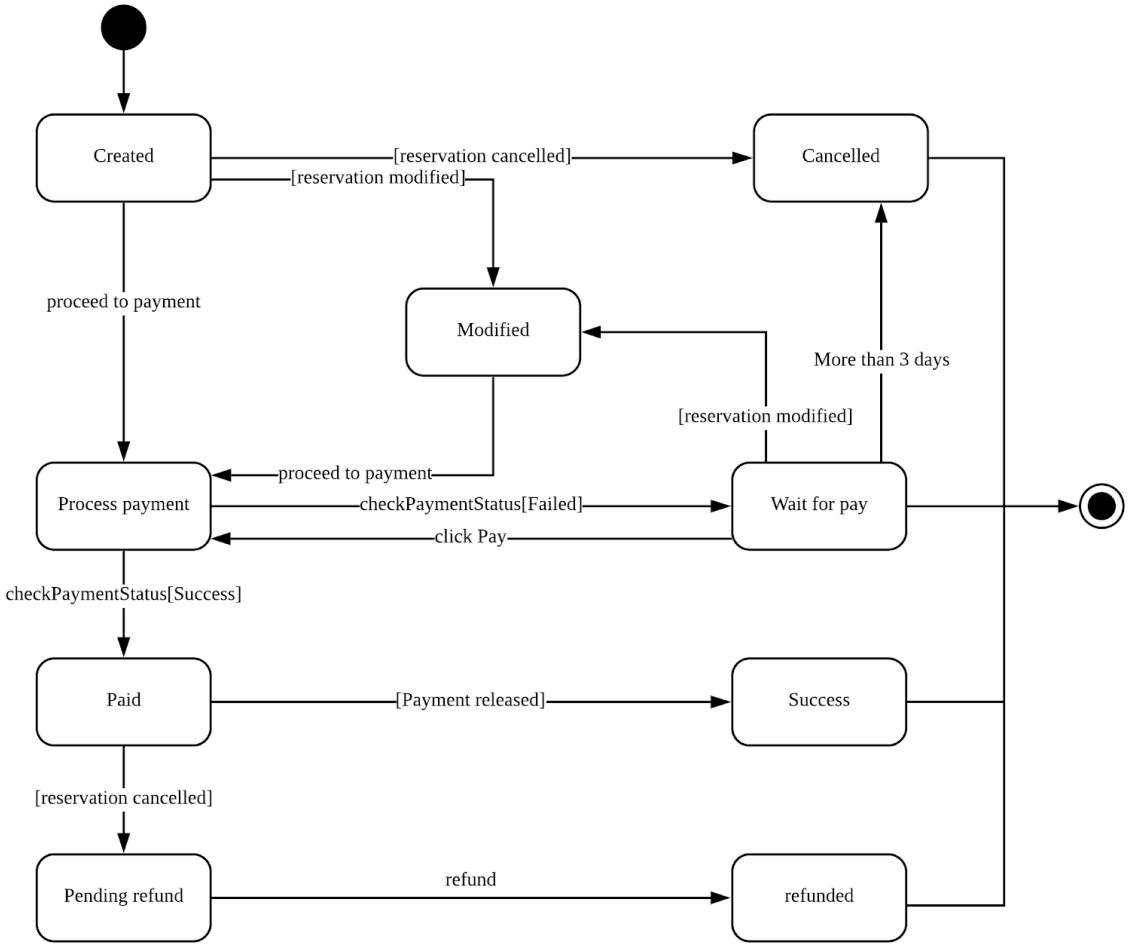

Figure 5.2: State diagram of Reservation

5. Requirements Matrix

5.1 The use cases and respective modules are as below.

	Membership	Donation	S0 0 3	…
Use case 1, UC001	X			
Use case 2, UC002		X		
Use case 3, UC003			X	
Use case 4, UC004				X

Use case 5, UC005		X		
.				
.				
.				
Use case *n*				

5.2 The Functional requirement and respective use case are as below.

	FR01	FR02	FR03		
Use case 1, UC001	X				
Use case 2, UC002	X				
Use case 3, UC003	X				
Use case 4, UC004		X			
Use case 5, UC005		X			
Use case 6, UC006					
Use case 7, UC007					
Use case 8, UC008					
Use case 9, UC009					
Use case 10, UC010					
Use case 11, UC011					
Use case 12, UC012					
Use case 13, UC013					