

**“dive”**

**WEB-BASED SYSTEM FOR POSEIDON DIVING STATION**

By

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IM/2014/057

A report submitted in partial fulfilment of the requirements for the degree of Bachelor of Science (Honors) in Management and Information Technology

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2018

## **DECLARATION**

I hereby certify that this project and the all the artifacts associated with it is my own work and it has not been submitted before nor is currently being submitted for any other degree programme.

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## **ACKNOWLEDGEMENT**

I convey my heartfelt gratitude to my Project Supervisor, Dr. Samya Dimitrije for her immense support and guidance given to me from the beginning of the project..

My sincere thanks extends to Dr. Shantha Jayalal, Our Project Coordinator for the continuous guidance and support.

I would like to express my sincere gratitude to Mr.Imantha Chanuka for the immense support during the requirements gathering phase of the project, because it was a huge impact on the project when identifying actual needs of the customer.

I also express gratitude to all the panelists from the senior lecture panel who assigned for the poster presentation evaluation in strengthening the core idea of the project with constructive suggestions made.

Last but not at the least, sincere thanks to all individual person assisting me directly or indirectly in turning this project design report a success.

## **ABSTRACT**

Technology development has become a major role in each and every industry in current business world. It is must to use new technologies in business organizations to keep their position in the market. Specially business organizations need to be improved with information technologies to compete with their competitors. IT brings competitive advantages to the organization.

**“dive”** – web based system designed for Poseidon diving center to manage their business processes effectively and efficiently. Currently they are doing some activities manually and use a website with less information. **“dive”** gives the best solutions for all their issues instantly.

This document contains the system analysis and design for a web based diving management System for Poseidon diving center which is a way more efficient source of support in production line. **“dive”** covers the overall process of diving, beginning from the booking and ending with diving.

The report expects to discuss the issues faced by the particular client, the findings of the system analysis done by the author and functionality and technical features of the proposed **“dive”**- Diving management system.

## Table of Contents

|   |    |
|---|----|
| DECLARATION .....   | 2  |
| ACKNOWLEDGEMENT .....   | 3  |
| ABSTRACT .....  | 4  |
| INTRODUCTION .....  | 1  |
| 1.1 Description About the Business Organization and The Business Area Chosen..... | 2  |
| 1.2 Business Process .....  | 3  |
| 1.3 Problem Definition.....   | 4  |
| 1.4 Aims and Objectives .....   | 5  |
| 1.5 Scope with Clear Boundaries .....   | 5  |
| 1.5.1 What facilitate to the Students.....  | 5  |
| 1.5.2 What facilitate to the Instructors .....                                    | 6  |
| 1.5.3 What facilitate to the Instructors .....                                    | 6  |
| 1.6 Organization of The Dissertation.....   | 7  |
| 1.7 Summary .....   | 7  |
| SYSTEM ANALYSIS.....  | 8  |
| 2.1 Use Case Diagrams for Existing System .....                                   | 9  |
| 2.2 Use-Case Descriptions for Existing System .....                               | 10 |
| 2.3 Activity Diagrams to Describe the Functionality of the Use Cases.....         | 14 |
| 2.3.1 Activity diagram for booking divers .....                                   | 14 |
| 2.3.2 Activity diagram for Registering Students .....                             | 15 |
| 2.3.3 Activity diagram for informing about the confirmed appointments.....        | 16 |
| 2.3.4 Activity diagram for paying salary.....                                     | 17 |
| 2.3.5 Activity diagram for recording equipment details.....                       | 18 |
| 2.4 System Requirement Analysis .....   | 19 |
| 2.4.1 Functional Requirements .....   | 19 |
| 2.4.2 Non-Functional Requirements.....  | 20 |
| 2.5 Requirement Specification.....  | 20 |
| 2.6 Business System Options (BSOs) .....  | 21 |
| 2.6.1 BSO 1 - Web based solution for users.....                                   | 22 |
| 2.6.2 BSO 2 –Mobile application for users .....                                   | 22 |
| 2.7 BSO Evaluation .....  | 22 |
| 2.7.1 Functional requirement vs. BSOs .....                                       | 22 |

|       |   |           |
|-------|---|-----------|
| 2.7.2 | Non-functional requirement vs. BSOs.....                | 23        |
| 2.8   | Cost Benefit Analysis .....                             | 24        |
| 2.8.1 | BSO 1 .....   | 24        |
| 2.8.2 | BSO 2 .....   | 24        |
| 2.9   | Selected BSO with a sound justification.....            | 25        |
| 2.10  | Summary .....   | 27        |
|       | <b>SYSTEM DESIGN.....</b>                               | <b>28</b> |
| 3.1   | Use Case Diagrams for Proposed System.....              | 29        |
| 3.1.1 | Overall Use Case Diagram for The Proposed System.....   | 29        |
| 3.2   | Use Case Descriptions for The Proposed System.....      | 30        |
| 3.2.1 | Use Case Description for User login .....               | 30        |
| 3.2.2 | Use Case Description for Registering Student .....      | 31        |
| 3.2.3 | Use Case Description for Registering Students.....      | 31        |
| 3.2.4 | Use Case Description for managing user profiles .....   | 32        |
| 3.2.5 | Use Case Description for handling diving equipment..... | 33        |
| 3.2.6 | Use Case Description for generating reports .....       | 33        |
| 3.2.7 | Use Case Description for generating reports .....       | 34        |
| 3.3   | Activity Diagrams for the Proposed System.....          | 35        |
| 3.3.1 | Activity Diagram for User Login .....                   | 35        |
| 3.3.2 | Activity Diagram for Registering Students .....         | 36        |
| 3.3.3 | Activity Diagram for booking divers.....                | 37        |
| 3.3.4 | Activity Diagram for Managing user profiles .....       | 38        |
| 3.3.5 | Handling Diving Equipment.....                          | 39        |
| 3.3.6 | Activity Diagram for Generating Reports .....           | 40        |
| 3.3.7 | Activity Diagram for rating, comments/ feedbacks.....   | 41        |
| 3.4   | Sequence Diagrams for the Proposed System .....         | 42        |
| 3.4.1 | Sequence diagram for user login .....                   | 42        |
| 3.4.2 | Sequence diagram for Registering Students .....         | 43        |
| 3.4.3 | Sequence diagram for booking divers .....               | 44        |
| 3.4.4 | Sequence diagram for Managing User Profiles .....       | 45        |
| 3.4.5 | Sequence diagram for Handling Diving Equipment .....    | 46        |
| 3.4.6 | Sequence diagram for Rating, Comments/ Feedbacks .....  | 47        |
| 3.5   | Class Diagram for Proposed System.....                  | 48        |
| 3.6   | ER Diagram .....  | 49        |
| 3.7   | Normalized database design .....                        | 50        |

|   |    |
|---|----|
| 3.8 GUI Design .....  | 51 |
| 3.8.1 Welcome Page GUI.....   | 51 |
| 3.8.2 About Us GUI.....   | 52 |
| 3.8.4 PADI Courses GUI.....   | 53 |
| 3.8.6 Book Online   Rates GUI.....                                      | 55 |
| 3.8.7 Book Online   Student Registration GUI.....                       | 55 |
| 3.8.8 Book Online   Booking GUI.....                                    | 56 |
| 3.8.9 Equipment GUI.....  | 57 |
| 3.8.10 Login GUI .....  | 57 |
| 3.9 Summary .....   | 58 |
| DEVELOPMENT.....  | 59 |
| 4.1.Programming Languages and Development Tools.....                    | 60 |
| 4.1.1. HyperText Markup Language (HTML) .....                           | 60 |
| 4.1.2. Cascading Style Sheets (CSS).....                                | 60 |
| 4.1.3.Php.....  | 61 |
| 4.1.4.Javascript.....   | 61 |
| 4.1.5 WAMP Server.....  | 62 |
| 4.1.6 PhpMyAdmin .....  | 62 |
| 5.2.Summary .....   | 62 |
| TESTING.....  | 63 |
| 5.1.Test Plan and Test Strategy.....                                    | 64 |
| 5.1.1 Black box testing .....   | 64 |
| 5.1.1 White box testing .....   | 64 |
| 5.2.Sample Test Cases .....   | 65 |
| 5.2.1.Test Case 01 – Registration.....                                  | 65 |
| 5.2.2.Test Case 02 – User Login .....                                   | 66 |
| 5.2.3.Test Case 03 – Add Instructor Details .....                       | 66 |
| 5.2.4.Test Case 04 – Find Instructor Details .....                      | 67 |
| 5.2.5.Test Case 05 – Booking .....                                      | 67 |
| 5.2.6.Test Case 06 – Add New Equipment .....                            | 68 |
| 5.2.7.Test Case 07 – Generate Reports .....                             | 68 |
| 5.3 Test Report.....  | 69 |
| 5.4 Severity of the error / bug identified and possible solutions ..... | 69 |
| 7.5 Summary .....   | 70 |
| IMPLEMENTATION .....  | 71 |

|  |    |
|--|----|
| 6.1 Installation guide.....  | 72 |
| 6.1.1.Hardware Requirements .....                                    | 72 |
| 6.1.2.Software Requirements .....                                    | 72 |
| 6.1.3.Web Server Requirements.....                                   | 72 |
| 6.2 User guide .....   | 72 |
| 6.2.1. Student side web application.....                             | 73 |
| 6.2.2. Admin side web application .....                              | 84 |
| 6.2.3. Instructor side web application .....                         | 85 |
| CONCLUSION .....   | 87 |
| 7.1 Degree of objectives met .....                                   | 88 |
| 7.2 Usability, accessibility, reliability and friendliness .....     | 89 |
| 7.3 User's response .....  | 89 |
| 7.4 Limitations and drawbacks .....                                  | 89 |
| 7.5 Future modifications, improvements and extensions possible ..... | 90 |
| 7.6 Summary .....  | 90 |

## List of Tables

|  |    |
|--|----|
| Table 1:: UC01- Booking Divers.....                              | 10 |
| Table 2:UC 02- Register Students .....                           | 10 |
| Table 3::UC 03 Informing Confirmed Appointments .....            | 11 |
| Table 4:UC 04:Handling Payments .....                            | 11 |
| Table 5:UC 05 Pay Salary .....                                   | 12 |
| Table 6:UC 06 Record Equipment Details .....                     | 12 |
| Table 7:UC 07 Conduct Classroom session and Dive.....            | 13 |
| Table 8:Functional Requirements.....                             | 19 |
| Table 9:Non-Functional Requirements .....                        | 20 |
| Table 10:Functional requirement vs. BSOs.....                    | 22 |
| Table 11:Non-functional requirement vs. BSOs .....               | 23 |
| Table 12:: Cost for BSO 1 .....                                  | 24 |
| Table 13:: Cost for BSO 2 .....                                  | 25 |
| Table 14:Use Case Description for User Login.....                | 30 |
| Table 15:Use Case Description for Registering Students .....     | 31 |
| Table 16:Use Case Description for booking divers .....           | 31 |
| Table 17:Use Case Description for managing user accounts .....   | 32 |
| Table 18:Use Case Description for handling diving equipment..... | 33 |
| Table 19:Use Case Description for generating reports.....        | 33 |
| Table 20:Use Case Description for rate, comments/feedbacks ..... | 34 |
| Table 21:Registration Test Case.....                             | 65 |
| Table 22:User Login Test Case .....                              | 66 |
| Table 23:Add Instructor Details Test Case.....                   | 66 |
| Table 24:Find Instructors Details Test Case.....                 | 67 |
| Table 25:Booking Test Case.....                                  | 67 |
| Table 26:Add New Equipment Test Case .....                       | 68 |
| Table 27:-Generate Reports Test Case .....                       | 68 |

## List of Figures

|  |    |
|--|----|
| Figure 1:Use Case Diagram for existing system .....                            | 9  |
| Figure 2:Activity Diagram for booking divers .....                             | 14 |
| Figure 3:Activity diagram for Registering Students.....                        | 15 |
| Figure 4:Activity diagram for informing about the confirmed appointments ..... | 16 |
| Figure 5:Activity diagram for paying salary .....                              | 17 |
| Figure 6:Activity diagram for recording equipment details .....                | 18 |
| Figure 7:Overall Use Case Diagram for the Proposed System .....                | 29 |
| Figure 8:Activity Diagram for User Login.....                                  | 35 |
| Figure 9:Activity Diagram for registering students.....                        | 36 |
| Figure 10:: Activity Diagram for booking divers .....                          | 37 |
| Figure 11:: Activity Diagram for managing user profiles .....                  | 38 |
| Figure 12:Activity Diagram for handling diving equipment.....                  | 39 |
| Figure 13:: Activity Diagram for generating reports.....                       | 40 |
| Figure 15:Sequence diagram for user login.....                                 | 42 |
| Figure 16:Sequence diagram for Registering Students .....                      | 43 |
| Figure 17:: Sequence diagram for Booking Divers .....                          | 44 |
| Figure 18:Sequence diagram for Managing User Profiles .....                    | 45 |
| Figure 19:Sequence diagram for Handling Diving Equipment .....                 | 46 |
| Figure 20:Sequence diagram for Rating, Comments/ Feedbacks.....                | 47 |
| Figure 21:Class diagram for the proposed system.....                           | 48 |
| Figure 22:ER diagram for the proposed system .....                             | 49 |
| Figure 23:: Normalized database design for the proposed system .....           | 50 |
| Figure 24:GUI for Welcome Page .....   | 51 |
| Figure 25:GUI for About Us .....   | 52 |
| Figure 26:Diving Professionals GUI .....                                       | 52 |
| Figure 27:GUI for PADI Courses.....  | 53 |
| Figure 28:GUI for Book Online .....  | 54 |
| Figure 29:GUI for view rates.....  | 55 |
| Figure 30:GUI for Book Online   Student Registration.....                      | 55 |
| Figure 31:Book Online Update Details .....                                     | 56 |
| Figure 32:: Book Online   Student Registration GUI .....                       | 56 |
| Figure 33:GUI for Equipment .....  | 57 |
| Figure 34:Login GUI.....   | 57 |
| Figure 35:Navigation Bar .....   | 73 |
| Figure 36:Home Page Interface .....  | 74 |
| Figure 37:About Us Interface .....   | 75 |
| Figure 38:View details about diving sites .....                                | 75 |
| Figure 39:Hikkaduwa Diving sites .....   | 76 |
| Figure 40:Gallery .....  | 76 |
| Figure 41:View Diving courses details .....                                    | 77 |
| Figure 42:View more details about courses .....                                | 77 |
| Figure 43:View Equipment details .....   | 78 |
| Figure 44:View more details about equipment.....                               | 78 |
| Figure 45:Find information about instructors.....                              | 79 |

|  |    |
|--|----|
| Figure 46:Display Instructor Details ..... | 79 |
| Figure 47:Login form .....                 | 80 |
| Figure 48:Sign up form.....                | 80 |
| Figure 49:-View Rates.....                 | 81 |
| Figure 50:Online Registration .....        | 81 |
| Figure 51:-Online Booking form.....        | 82 |
| Figure 52:-Booking Result .....            | 82 |
| Figure 53:-Connect to PayPal.....          | 83 |
| Figure 54:Add New Equipment.....           | 84 |
| Figure 55:-select time duration.....       | 84 |
| Figure 56:Display results.....             | 85 |
| Figure 57:Add Instructor Details.....      | 86 |

# **CHAPTER 1**

## **INTRODUCTION**

### **Outline of The Chapter**

- 1.1. Description about the business organization and the business area chosen
- 1.2. Business Process
- 1.3. Problem Definition
- 1.4. Aims and objectives
- 1.5. Scope with clear boundaries
- 1.6. Organization of the dissertation
- 1.7 Summary

## **1.1 Description About the Business Organization and The Business Area Chosen**

### **Poseidon Diving Station Sri Lanka**

Poseidon Diving Station was started in 1973 by the combined efforts of S.K. Nandasena (Leslie) Sven Holmberg and Bertl Magnusson. Sven and Bertl arrived as tourists in Sri Lanka looking for somewhere to dive. There were no diving centers but Leslie was recommended as an outstanding skin diver to guide them to the best sites. They were so impressed that they invited Leslie to Sweden to train in SCUBA and later joined together to form Poseidon, the first dive shop in Hikkaduwa.

The business grew as more customers returned year after year for the friendly atmosphere and professional diving. Leslie went on to discover the Conch, Arcturus, Earl of Shaftesbury, Alliance, Orestes and Rangoon wrecks.

In 1998 the center was registered as a PADI Dive Center (S-19272) with Chami Sembakuttige as its principal instructor and has since grown but maintained the same friendly and professional reputation.

In 2004 we were recognized by PADI for our achievements, high standards and contribution to community and environment, and became the first PADI Five Star Center in Sri Lanka.

After nearly 40 years of training divers, in 2012 we became Sri Lanka's first PADI Instructor Development Center.



*Table 1: Company Logo*

## **1.2 Business Process**

Poseidon diving has three branches situated in Mirissa, Hikkaduwa and Trincomalee. Here we only consider about one diving center which is located in Hikkaduwa.. Apart from the diving facilities, Poseidon provide accommodations for their students. But we don't cover this part here. At present, Poseidon diving center record some activities manually. Though they have an official website, it doesn't enough to get vast knowledge about diving to their students.

Firstly customers (locals and foreigners) who are willing to do a diving can make an appointment by calling or mailing to the center. Some people come to the center and make their appointment. Admin provide details about the center, courses for their customers. Then customer selects the course according to his/her preference and inform to the admin. When the selecting date, customers have the chance to select any date. After all confirmations admin record the appointment details and register them for the courses.

This diving center uses rotating system for assigning diving instructors for diving. Then admin inform about the confirmed appointment to the relevant instructor. Sometimes the relevant instructor may not be free on that day, then he inform it to another instructor. Students who are registered to the courses pay money by cash or card to the admin. Then admin give wages to the instructors. Admin record details about all the payments manually.

Instructors request the equipment that they need to the admin and admin provide them. If the existing equipment are not enough, then admin hire them from suppliers. After the diving, instructor handover them to the admin. Admin record all the equipment details manually.

Before the diving, instructors conduct a classroom session for the students. They teach about the equipment and other necessary lessons to the students and students participation is compulsory for it. On the relevant day students go to dive with their instructors and get their diving experience.

### **1.3 Problem Definition**

There are several drawbacks in the existing system. This has caused inefficiency and less productivity in the entire business process. Ex-

- Students have to pay high calling charges and admin can't handle multiple callers at once
- Information is recorded manually. Therefore it may occur to miss some details
- A lot of paper usage and wastage.
- In current process there is no any reliable way to get a summary about the diving they have done in the month/year. That means it is very difficult to take future decision on income or their progress
- It is very difficult to find the availability of the divers. Sometimes students request divers who had dived with them previously. But there is no way to do that.
- Insufficient details about the users, courses and equipment in their current website.
- No way to give feedbacks and rate their service
- It is inconvenient to go through the customer history to provide discounts for the regular customers.
- The human inefficiency and the errors caused are significant.

## **1.4 Aims and Objectives**

The main objectives of the proposed system are to minimize the above mentioned issues with designing detailed website. . This will improve efficiency and productivity in the business process.

The main objectives of the system are as follows

- Online Booking
- Online Registration
- Manage diving schedule
- Provide enough details about diving courses and equipment
- Manage user accounts (students, Instructors, Admin)
- Generate reports to support decision making process
- Feedbacks and Ratings

This will ensure provide better service for online customers and it will ensure to enhance their online diving booking experience. Customers can get vast knowledge about the diving field before they go for diving.

## **1.5 Scope with Clear Boundaries**

The web-based system will developed to manage all the business processes related to the diving activity. In this system there are mainly three user categories named students, diving instructors and administrator. System will maintain a profile for each user and will provide various functionalities for user.

### **1.5.1 What facilitate to the Students**

Basically there are two types of students for this system such as registered student and new student. There are several functions are facilitated to the students by proposed system. ex-

- New student can sign up and registered student can login to the system □  
Any can view the history of the diving center, diving sites and photo gallery
- Students can register and maintain their user profiles.
- Registered students can view the diving professionals' profiles

- Students can view the PADI courses provided by diving center
- Students can search and view diving equipment
- Registered students can book their diving by adding details. They can check the availability of the instructors and choose any instructor according to their preference
- Students can do their transactions online through PayPal account
- After diving students can give comments and rate about the service

### **1.5.2 What facilitate to the Instructors**

There are several functions are facilitated to the diving Instructors by proposed system. ex-

- Diving instructors can login to the system by entering their username and password.
- Instructors can manage their profile such as update their profile picture, update availability calendar, update details
- Instructors can provide information about courses and equipment that are available in the website
- Instructors can view the comments and ratings given by their students

### **1.5.3 What facilitate to the Instructors**

The functions that are facilitated for the administrator by the system as follows

- Admin can login to the system by entering username and password
- Admin can enter, update and delete the details about diving center, diving courses and diving equipment
- Admin can enter the details of students and instructors
- Admin can handle the online student registration
- Admin manage the online booking and transactions
- Admin can generate the reports such as income reports, inventory reports which are supported to the decision making process
- Admin can view the comments and ratings

## **1.6 Organization of The Dissertation**

This thesis covers the System Analysis and Design segments of the proposed system for the manufacturing company.

Chapter 1 introduces the nature of the business, current business process, problems and the objectives of the proposed system. It clearly defines the scope and the boundaries.

Chapter 2 presents the clear analysis of the existing system and the requirement analysis of the system. It further analyses the available business system options (BSOs) and defines the best option to proceed with

Chapter 3 is the depiction of the furtherance of the project after the requirement analysis and specification. This will provide a better understanding of the system behavior and interactions with the diagrams used. One diagram will lead to another to explain the functionality, entities and their relationships. By the end of the chapter, database design will show the tables which will be used in the system and Graphical User Interfaces will further elaborate its performance.

## **1.7 Summary**

In Chapter 1, the nature of the business process, current functionalities and the business process were identified. Then the problems and issues were defined, through which the objectives were emphasized. Furthermore, clear boundaries and scope for the system were defined.

# **CHAPTER 2**

## **SYSTEM ANALYSIS**

### **Outline of The Chapter**

- 2.1 Use -Case Diagrams for Existing System
- 2.2 Use-Case Descriptions for Existing System
- 2.3 Activity Diagrams to describe the functionality of the Use-Cases
- 2.4 System Requirement Analysis
- 2.5 Requirement Specification
- 2.6 Business System Options (BSOs)
- 2.7 BSO Evaluation
- 2.8 Cost benefit analysis
- 2.9 Selected BSO with a sound justification
- 2.10 Summary

## 2.1 Use Case Diagrams for Existing System

The Use-Case diagrams are used to study the current system and analyze the requirements of the system. Use-Case diagrams help to identify the users who are involved with the system and the interactions and the interfaces which those users are having with the system. Below Use-Case shows that the overall scope of the current system of Poseidon diving station.

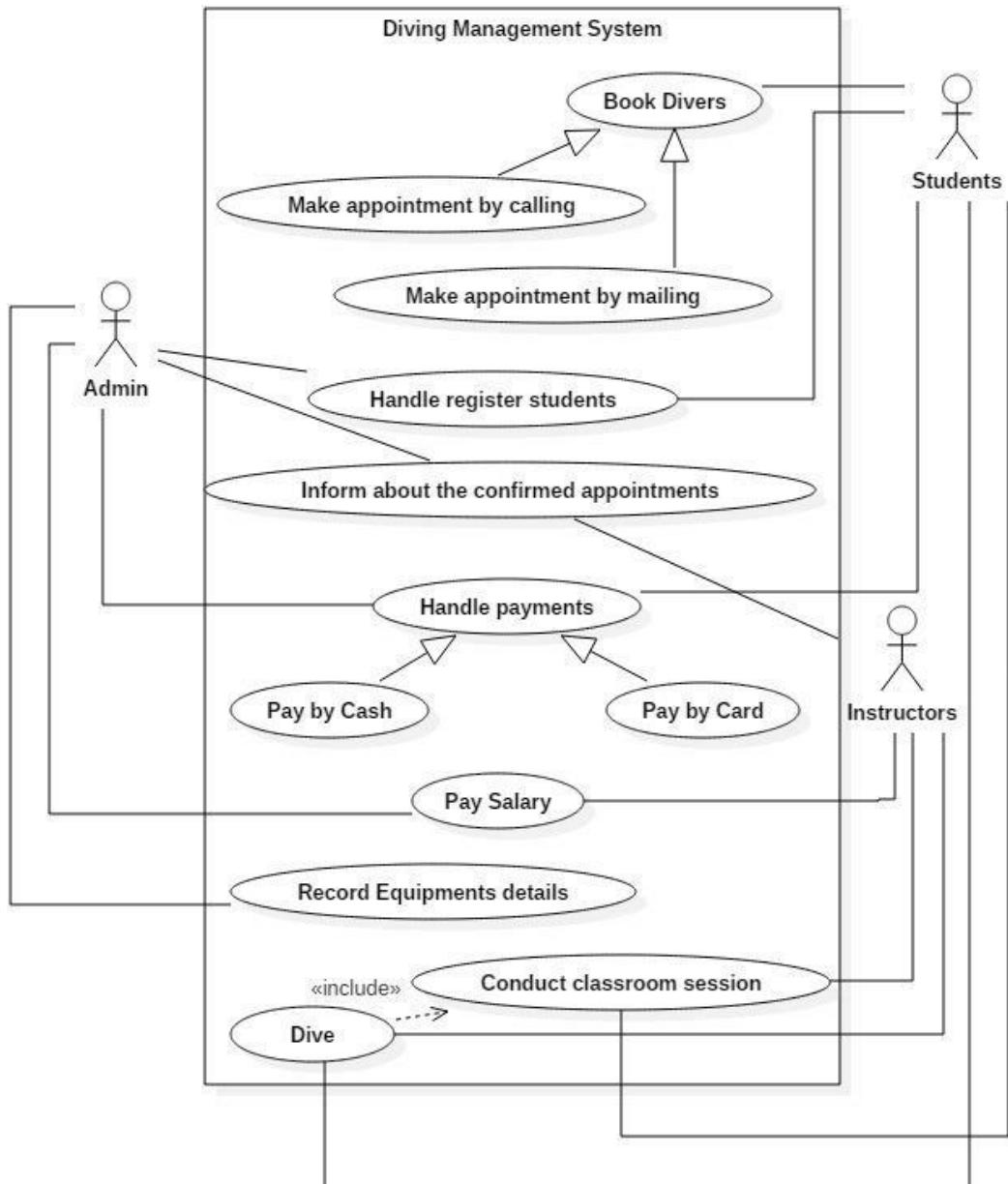


Figure 1: Use Case Diagram for existing system

## 2.2 2.2 Use-Case Descriptions for Existing System

Below Use-Case descriptions describe the functionalities of current main Use-Cases one by one.

*Table 2:: UC01- Booking Divers*

|                      |  |
|----------------------|--|
| Use case ID          | UC 01  |
| Use case Description | Booking divers   |
| Roles                | Admin, Students  |
| Course of Event      | People who like to follow a diving course, firstly they have to make an appointment by calling or mailing to the admin of the diving center for booking divers |
| Pre-Conditions       | Students have to make an appointment   |
| Post –Conditions     | Students receive the date and time with a diving instructor for their diving   |
| Exceptions           | If the admin is not responded to the calls or mails, then students have to come to the diving center   |

*Table 3:UC 02- Register Students*

|                      |  |
|----------------------|--|
| Use case ID          | UC 02  |
| Use case Description | Registering students   |
| Roles                | Admin, Students  |
| Course of Event      | After making an appointment , admin record details about the students and register them to the courses |
| Pre-Conditions       | Students have to make an appointment   |
| Post –Conditions     | Admin keeps the details about the students   |
| Exceptions           | If the admin not records some details, thy have to call the students                                   |

*Table 4::UC 03 Informing Confirmed Appointments*

|                      |   |
|----------------------|---|
| Use-Case ID          | UC 03   |
| Use-Case Description | Informing about the confirmed appointments  |
| Roles                | Admin, Diving Instructors   |
| Course of Event      | After registering students, admin inform about the appointment to the instructor.<br>According to the rotating system, the relevant instructor allocate his time and date for the relevant course |
| Pre-Conditions       | Students must register for the system   |
| Post –Conditions     | Relevant instructor allocate their date and time  |
| Exceptions           | The relevant instructor can't do the course that date, then he inform it to the another instructor  |

*Table 5:UC 04:Handling Payments*

|                      |   |
|----------------------|---|
| Use case ID          | UC 04   |
| Use case Description | Handling payments   |
| Roles                | Admin, Students   |
| Course of Event      | Students pay money by cash or card for their courses to the admin after confirmed their appointment |
| Pre-Conditions       | Diving course has confirmed by the instructor   |
| Post –Conditions     | Admin record details about payments   |
| Exceptions           | If students don't pay money, admin can cancel the course  |

*Table 6:UC 05 Pay Salary*

|                      |  |
|----------------------|--|
| Use case ID          | UC 05  |
| Use case Description | Paying salary  |
| Roles                | Admin, Diving Instructors  |
| Course of Event      | After getting payments, admin pay money by cash to instructors for confirmed courses |
| Pre-Conditions       | Students must pay for their course   |
| Post –Conditions     | Instructors put their salary for salary conformation                                 |
| Exceptions           |  |

*Table 7:UC 06 Record Equipment Details*

|                      |   |
|----------------------|---|
| Use case ID          | UC 06   |
| Use case Description | Recording equipment details   |
| Roles                | Admin   |
| Course of Event      | Admin records all the details about the equipment and supply them to the students and instructors.<br>After diving he also record details about the submitted equipment |
| Pre-Conditions       | Instructors request the equipment   |
| Post –Conditions     | Instructors and students have to handover them safely   |
| Exceptions           | If there any insufficiencies, admin have to hire them from outer supplier   |

*Table 8:UC 07 Conduct Classroom session and Dive*

|                      |  |
|----------------------|--|
| Use case ID          | UC 07  |
| Use case Description | Conducting classroom session and diving  |
| Roles                | Diving Instructors, Students   |
| Course of Event      | Instructors conduct a classroom session for learning about the course.<br>Students' participation is compulsory for it.<br>After the session students go for their diving with their instructors |
| Pre-Conditions       | Confirm their participation (Students, Instructors)  |
| Post –Conditions     | -  |
| Exceptions           | If any student didn't come to the classroom session, he/she will be assigned to the next session   |

## 2.3 Activity Diagrams to Describe the Functionality of the Use Cases

Activity diagrams are used to identify the process, workflow of the activities taking place in the current system in the study of the current system to identify the requirements.

Following are the activity diagrams for the current process that elaborate the major activities undertaken in the current systems.

### 2.3.1 Activity diagram for booking divers

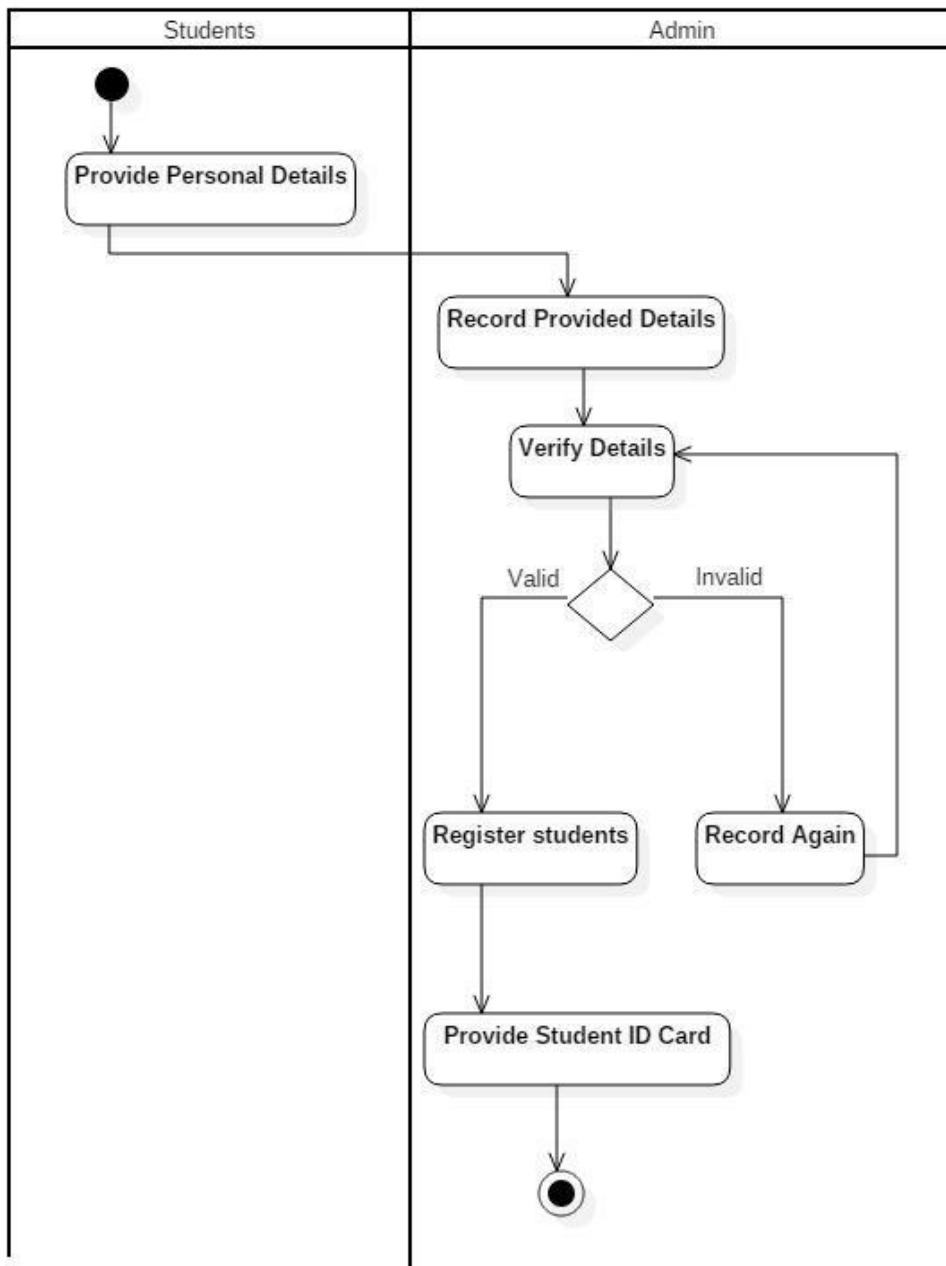


Figure 2:Activity Diagram for booking divers

### 2.3.2 Activity diagram for Registering Students

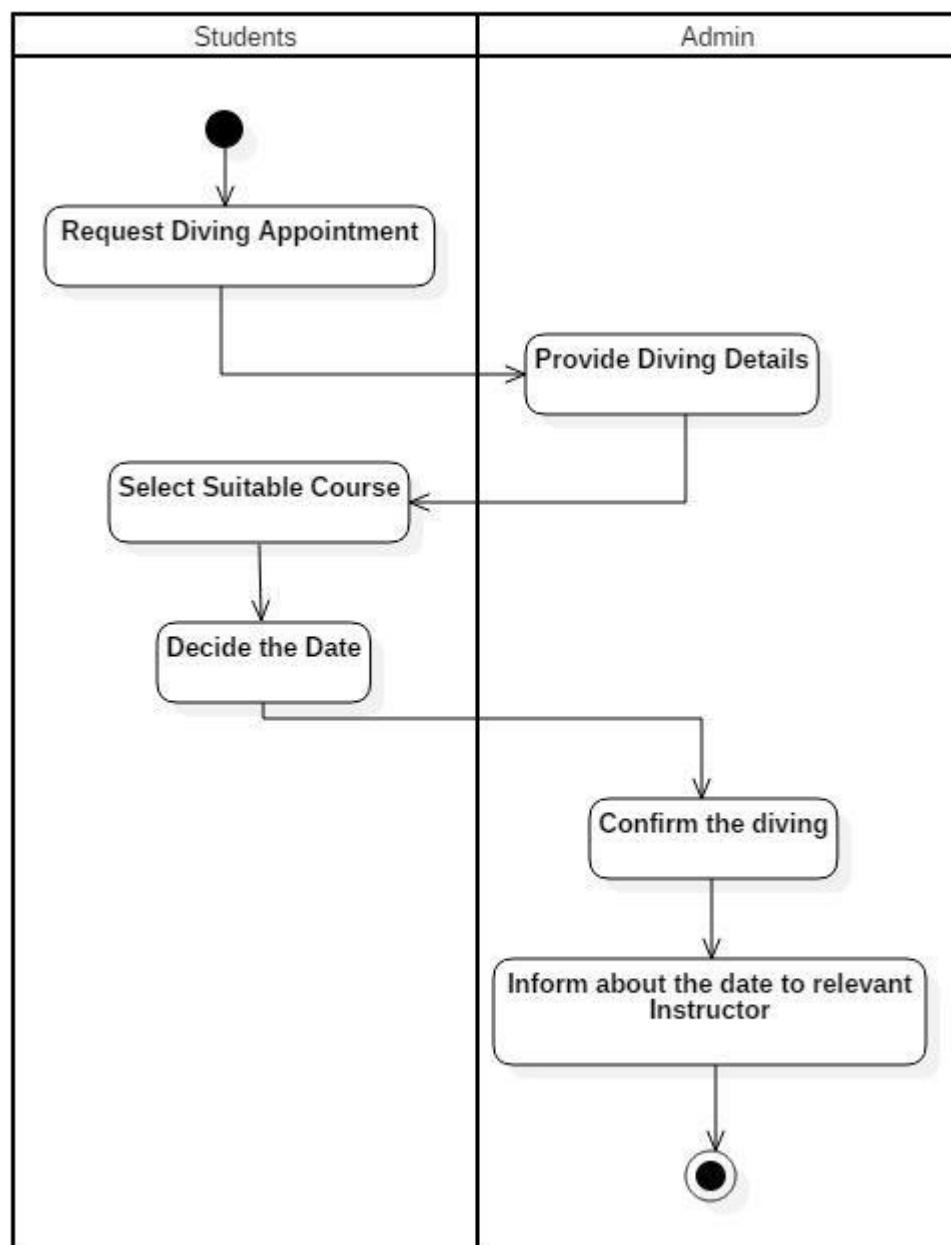


Figure 3:Activity diagram for Registering Students

### 2.3.3 Activity diagram for informing about the confirmed appointments

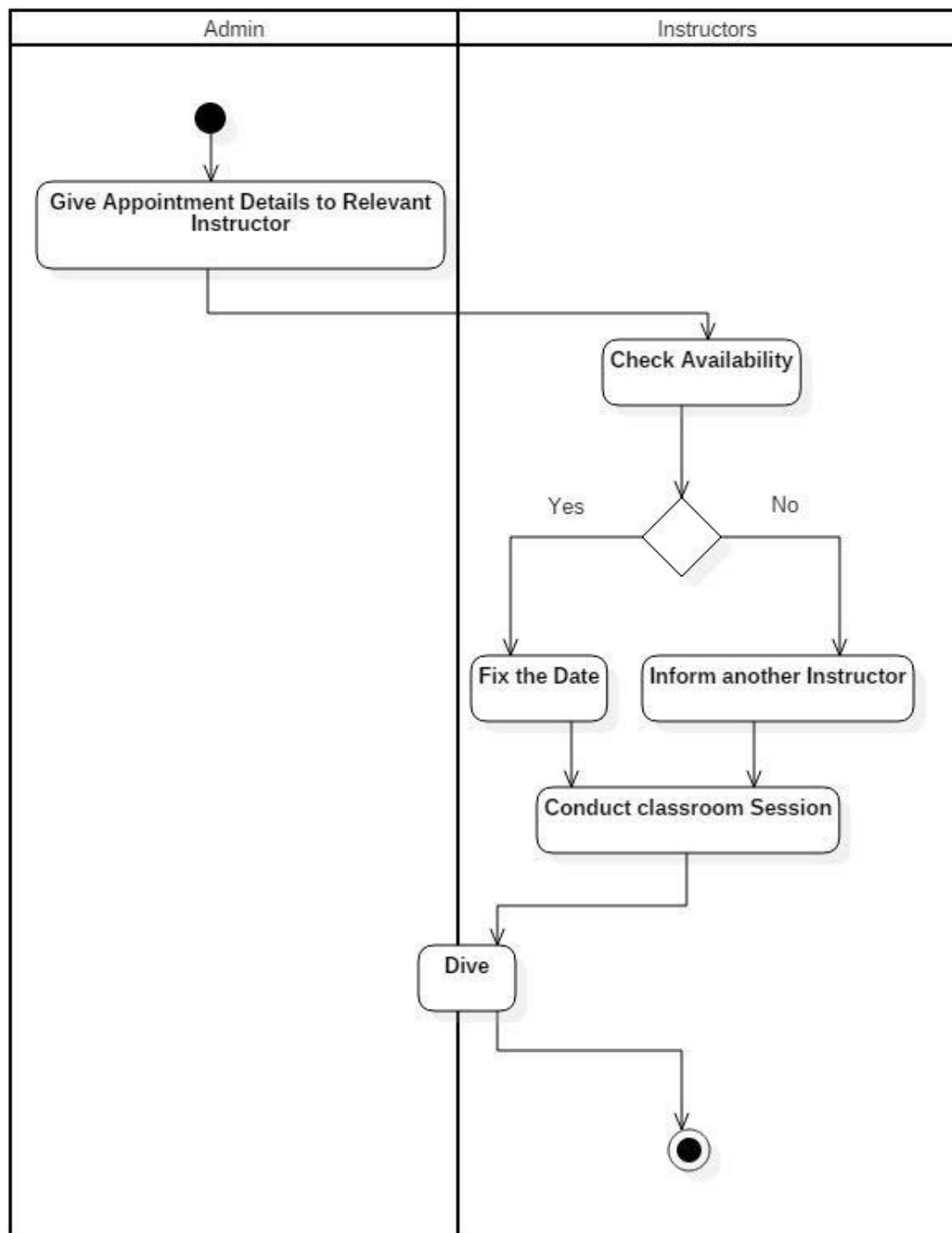


Figure 4:Activity diagram for informing about the confirmed appointments

#### 2.3.4 Activity diagram for paying salary

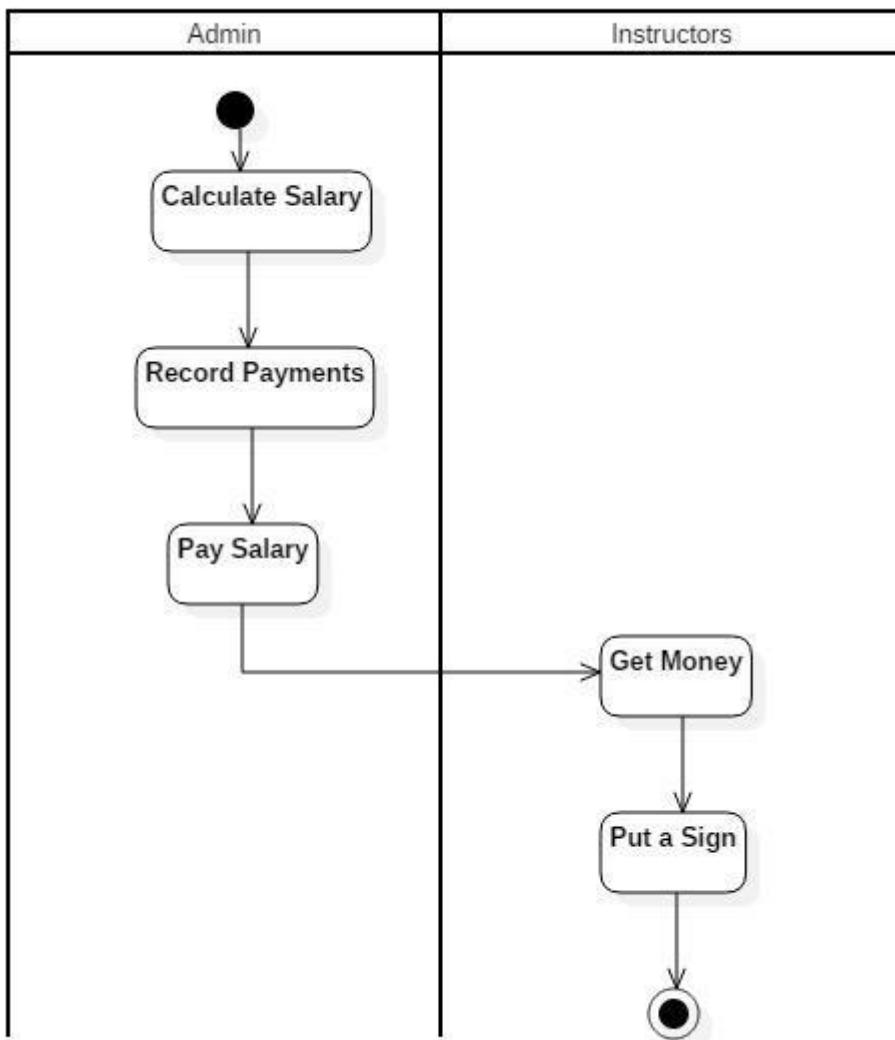


Figure 5:Activity diagram for paying salary

### 2.3.5 Activity diagram for recording equipment details

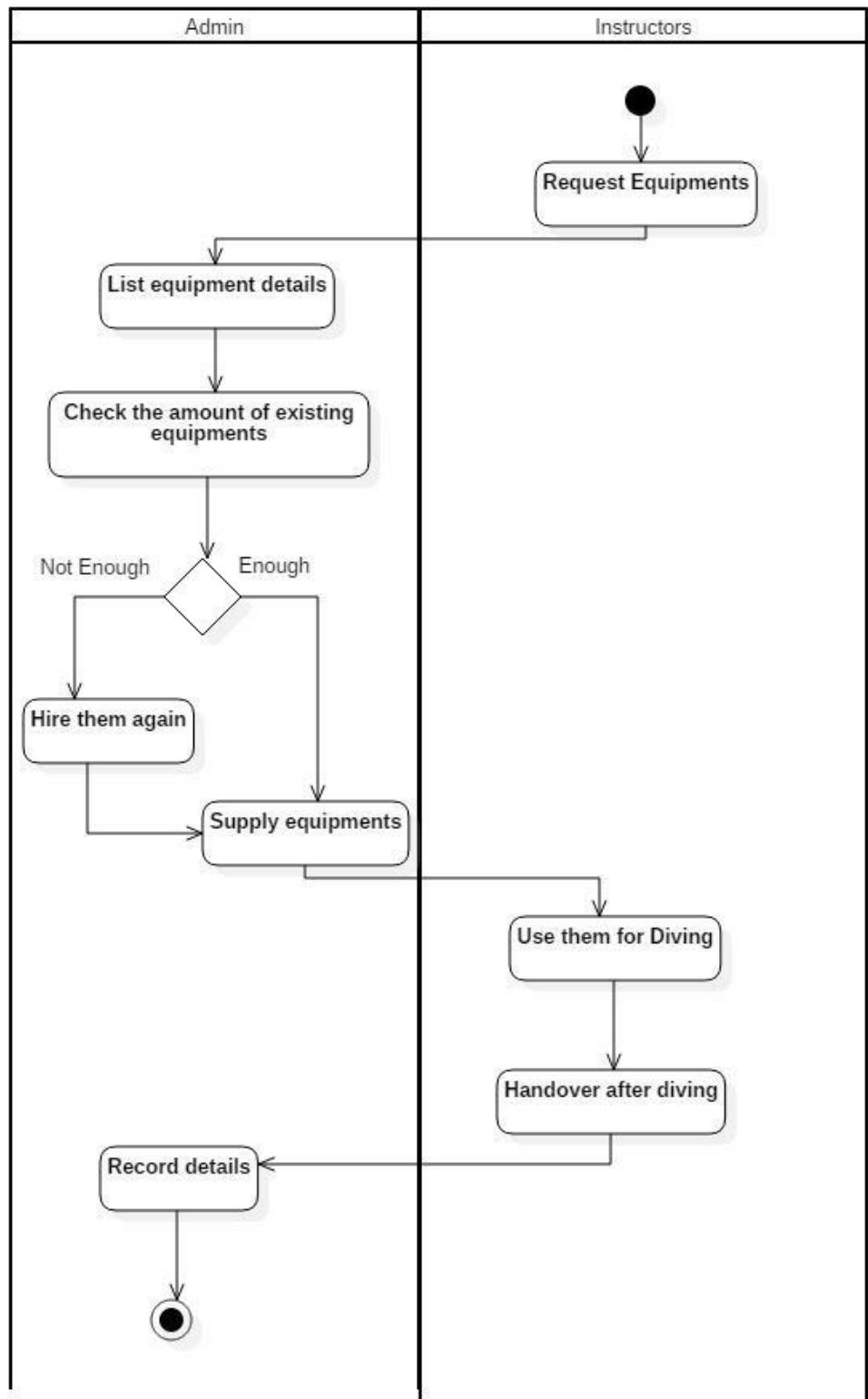


Figure 6:Activity diagram for recording equipment details

## 2.4 System Requirement Analysis

System Requirement Analysis includes the Functional and Non-functional requirements that the proposed system supposed to have in order to perform its purpose.

These requirements will describe the scope of the project in a much deeper level. And it will give the developer as well as the user a clear picture of the functionality of the system.

### 2.4.1 Functional Requirements

Functional requirements describe what system should be able to do in order to satisfy the main objective of it. Mainly these describe what the tasks or functions which the system can perform after implementation. Following table will show the functional requirements of the system.

*Table 9:Functional Requirements*

| ID  | Requirement   |
|-----|---|
| 1.  | Shall be able to provide details about diving center  |
| 2.  | Shall be able to show all the diving sites around the center                                |
| 3.  | Shall be able to enter, update, & search all the information about students and instructors |
| 4.  | Shall be able to record all diving courses  |
| 5.  | Shall be able to register students to the system  |
| 6.  | Shall book divers online  |
| 7.  | Shall be able to do online transactions for booking   |
| 8.  | Shall be able to display the prices of all diving courses                                   |
| 9.  | Shall be able to schedule availability time table for instructors                           |
| 10. | Shall be able to manage the diving equipment  |
| 11. | Shall be able to rate the service   |
| 12. | Shall be able to put a comment about the diving   |
| 13. | Shall be able to upload the photos of diving to the students                                |
| 14. | Shall be able to generate reports such as income reports, payment reports etc               |

|     |   |
|-----|---|
| 15. | Shall display special offers to the customers |
|-----|---|

#### 2.4.2 Non-Functional Requirements

Non Functional Requirements are the requirements that are indirectly needed to help the system functionality. Nonfunctional requirements describe the usability, reliability, performance, maintainability and other similar aspects of the system. These sets of requirements may not be directly related to the main function, but they are of extreme importance to the proper functioning of the system. Following are the non-functional requirements for the proposed project.

*Table 10:Non-Functional Requirements*

| ID | Requirements                                  |
|----|---|
| 1. | Should provide an user friendly GUI           |
| 2. | Should ensure validity and secure aspects     |
| 3. | Shall be able to generate reliable document   |
| 4. | Shall have quick response time                |
| 5. | Should be cost effective                      |
| 6. | Should provide Globalization and Localization |

## 2.5 Requirement Specification

This section explains the basic functionalities provided by the system. Main requirements are organized to give a full view of the system.

### Create User profile

1. The system shall allow user (students & Instructors) to create profile with his/her details and set credentials
2. The system shall authenticate user credentials to view the profile
3. The system shall allow the user to update the profile information

Users shall be able to log into the system

1. Users shall provide the username and password when log into the system
2. Users should be able to update information in their accounts whenever they intended
3. Users should be able to logout of the system whenever they intended

The system shall be able to do Online Transactions.

1. A registered student can book divers online after registering to the system
2. They can select instructors by their reference and according to the scheduling calendar.
3. System should be able to provide online secure payment facility.

Provide details about the diving center

1. Students can view the details about the history of the center
2. They can find the diving sites around the center and view previous diving photos
3. Students can get to know about the courses they offer and the equipment they use
4. Registered students can find the prices of the courses and special offers they are willing to offer
5. Students can rate the service and write a review by uploading photos.

## **2.6 Business System Options (BSOs)**

Since this project is implemented to satisfy the specific client's expectations, the business system options should be more focused on satisfying the requirements of the external parties. The features that each BSO is specifically looking at should match the requirement specification of the client and they should be feasible with the developer as well.

### **2.6.1 BSO 1 - Web based solution for users**

One of the business options that is available is to design a System letting Customers to access via Internet. Implementation of web based System. So with the implementation of this System users can access Online to the system. Simply an Online web based System.

### **2.6.2 BSO 2 –Mobile application for users**

This BSO is concerned about introducing a mobile application for the users. This will be an integration of android application with added functionalities. Accessibility is available from anywhere, anytime along with an internet accessibility.

## **2.7 BSO Evaluation**

Evaluation of the BSOs will be done by comparing them with the functional and nonfunctional requirements. Ultimately we can select the best BSO. Looking at the three BSOs, it seems that all of them cover almost all the requirements mentioned in the requirements catalogue. But there are some differences when taking the other constraints.

Following table shows the comparison of the each BSO with the requirements

### **2.7.1 Functional requirement vs. BSOs**

*Table 11:Functional requirement vs. BSOs*

| ID | Requirement   | BSO 1 | BSO 2 |
|----|---|-------|-------|
| 1. | Shall book divers online  | X     | X     |
| 2. | Shall be able to show the information of Instructors and students | X     | X     |
| 3. | Shall be able to schedule availability time table for instructors | X     | X     |
| 4. | Shall be able to generate reports                                 | X     | X     |

|     |  |   |   |
|-----|--|---|---|
| 5.  | Shall be able to provide details about diving centre         | X | X |
| 6.  | Shall be able to show all the diving sites around the centre | X | X |
| 7.  | Shall be able to record all diving courses                   | X | X |
| 8.  | Shall be able to display the prices of all diving courses    | X | X |
| 9.  | Shall be able to manage the diving equipment                 | X | X |
| 10. | Shall display special offers to the customers                | X | X |
| 11. | Shall be able to rate the service                            | X | X |
| 12. | Shall be able to upload the photos of diving to the students | X | X |

Above table illustrates the comparison of the two BSOs with the functional requirements. According the above comparison, all the functional requirements are satisfied by the all BSOs.

### 2.7.2 Non-functional requirement vs. BSOs

*Table 12:Non-functional requirement vs. BSOs*

| ID | Requirement                                 | BSO 1 | BSO 2 |
|----|---|-------|-------|
| 1. | Shall have quick response time              | X     | X     |
| 2. | Shall be able to generate reliable document | X     | X     |
| 3. | Should provide an user friendly GUI         | X     |       |
| 4. | Should ensure validity and secure aspects   | X     |       |
| 5. | Should be cost effective                    | X     |       |

Above table illustrates the comparison of the two BSO with the non-functional requirements. According the above comparison, most of the non-functional requirements are satisfied by the both BSOs. But generate reliable document, quick response time and cost effectiveness are not satisfied by the BSO 2.

## 2.8 Cost Benefit Analysis

### 2.8.1 BSO 1

User can create their profiles, secured login, search diving sites, online registration, online booking, rating and comments, check availability of divers will integrate with this BSO.

#### Benefits

- Can be accessed from anywhere through the internet
- Give more attractive user interfaces compared to the BSO 2
- Efficient decision making - support forecasting
- Comparatively cost effective
- Can support for multiple users.
- Support online transactions.

#### Issues

- Security issues
- Rely highly on good internet connection

#### Cost for BSO 1

Table 13:: Cost for BSO 1

| Description             | Cost (LKR) |
|-------------------------|------------|
| Development Cost        | 100,000.00 |
| Domain name             | 5000.00    |
| For the hosting service | 18,000.00  |
| Total Cost              | 123,000.00 |

### 2.8.2 BSO 2

Users can create their profiles through the mobile application, secured login, search diving sites, online registration, online booking, rating and comments, check availability of divers will integrate with this BSO.

## Benefits

- Can be accessed from anywhere through the internet
- Users can easily access via their smartphone

## Issues

- Security Issues
- User interfaces are not much attractive and responsive to the user
- Not cost effective
- Take time to respond

## Cost for BSO 2

Table 14:: Cost for BSO 2

| Description                 | Cost (LKR) |
|-----------------------------|------------|
| Maintenance cost            | 150,000.00 |
| Publish android application | 3,866.00   |
| For the hosting service     | 46,401.00  |
| Total Cost                  | 200,267.00 |

## 2.9 Selected BSO with a sound justification

The selected BSO is the first one, BSO 1 - Web Based Solution for Students, Instructors and administrator side, since it proves to be the most beneficial and cost effective. When comparing the costs BSO 1 seems more cost effective than 2 since they require additional purchasing and implementation of software etc. BSO 1 could be satisfied using a cost effective manner and also fulfill the most of the Functional and Non-functional requirement. Thus BSO 1 is selected.

# **Development Project-System Requirements Agreement-2018**

Project Title: Web based System for Poseidon Diving Centre

Student No: IM/2014/057

Student Name: G.L.M.Gamini

Supervisor Name: Ms. Samya Dimithrie

## **System Requirements Summary (order on priority, type-mandatory/optional)**

### **Functional Requirements**

1. Shall book divers online - mandatory
  - 1.1 Shall be able to register students to the system
  - 1.2 Shall be able to do online transactions for booking
2. Shall be able to show the information of Instructors and students – mandatory
  - 2.1 Shall be able to enter details
  - 2.2 Shall be able to delete details
  - 2.3 Shall be able to update details
3. Shall be able to schedule availability time table for instructors – mandatory
4. Shall be able to generate reports such as income reports, payment reports etc – mandatory
5. Shall be able to provide details about diving centre - mandatory
6. Shall be able to show all the diving sites around the centre - mandatory
7. Shall be able to record all diving courses - mandatory
8. Shall be able to display the prices of all diving courses – mandatory
9. Shall be able to manage the diving equipment – mandatory
  - 9.1 Shall be able to enter details
  - 9.2 Shall be able to update details
10. Shall display special offers to the customers - mandatory
11. Shall be able to rate the service-optional
  - 11.1 Shall be able to put a comment about the diving
12. Shall be able to upload the photos of diving to the students- optional

#### **Non-Functional Requirements**

- 13. Shall have quick response time
- 14. Shall be able to generate reliable document
- 15. Should provide an user friendly GUI
- 16. Should ensure validity and secure aspects
  - 16.1 Should be able to enter Username and Password
- 17. Should be cost effective

#### **2.10 Summary**

This chapter analyzed the existing features of the process and thus specified the functional requirements. Based on the BSOs were determined and the best option was selected which was to develop a web based system for students, instructors and administrators.

# **CHAPTER 3**

## **SYSTEM DESIGN**

### **Outline of The Chapter**

3.1 Use Case Diagrams for Proposed System

3.2 Use Case Descriptions for Proposed System

3.3 Activity Diagrams

3.4 Sequence Diagrams

3.5 Class Diagrams

3.6 ER Diagram

3.7 Database Design

3.8 GUI Design

### 3.1 Use Case Diagrams for Proposed System

Use cases provide a structured view of the systems functionality. They are used to gather the requirements of a system including internal and external influences. These requirements are mostly design requirements. So when a system is analyzed to gather its functionalities use cases are prepared and actors are identified. This is very important since the next phase of the project is the system designing. Use Case diagrams are consisted of several use cases and the actors of the system. Here the use cases are the different tasks the users will do in order to interact with the system. Actors are the users who interact with the system.

#### 3.1.1 Overall Use Case Diagram for The Proposed System

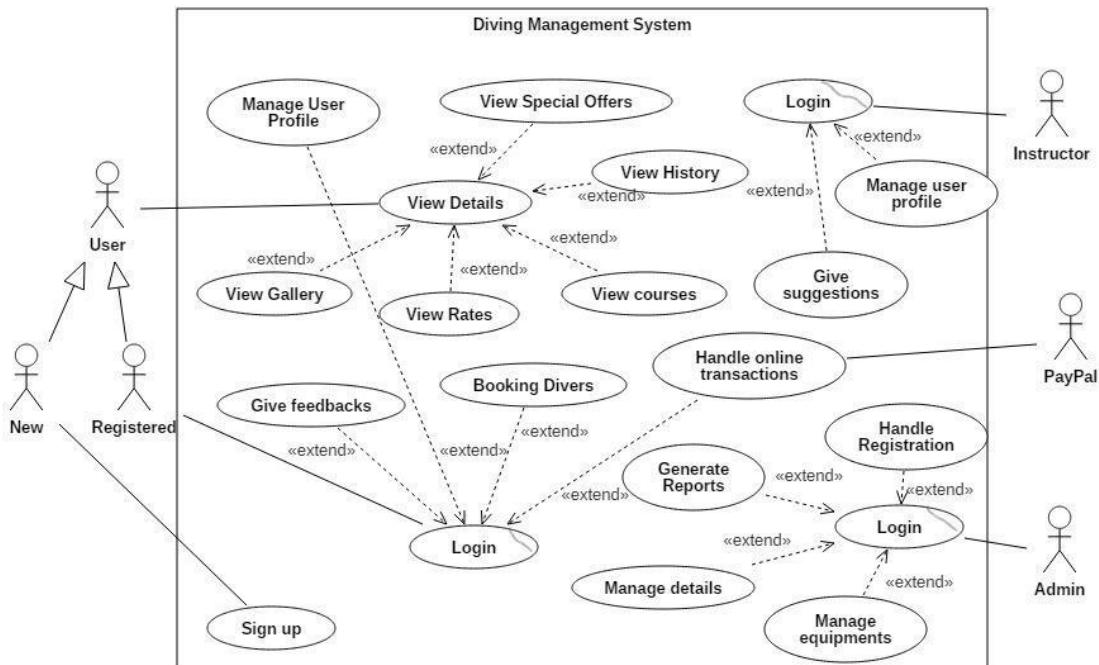


Figure 7:Overall Use Case Diagram for the Proposed System

## 3.2 Use Case Descriptions for The Proposed System

Below Use Case descriptions describe the functionalities of proposed main use cases one by one.

### 3.2.1 Use Case Description for User login

*Table 15:Use Case Description for User Login*

|                                |  |
|--------------------------------|--|
| Use case ID                    | UC 01  |
| Use case Description           | Use case description for user login  |
| Roles                          | Users (Students, Instructors, Admin )  |
| Pre-Conditions                 | User should have created an account in the system.   |
| Basic Course                   | <ol style="list-style-type: none"><li>1. User request to log in</li><li>2. Enters username and password</li><li>3. Validate login details<ul style="list-style-type: none"><li>[if valid] 3.1 Login</li><li>[if invalid] 3.2 Don't allow login</li></ul></li></ol> |
| Alternative course/ Exceptions | <p>2.1 If in the basic course, the actor enters an invalid username and/or password, the system displays an error message. The actor can choose to either return to the beginning of the basic course or cancel the login, at which the use case ends.</p>         |
| Post –Conditions               | Successfully logged in to the system and accesses the allowed level of access  |

### 3.2.2 Use Case Description for Registering Student

*Table 16: Use Case Description for Registering Students*

|                                |   |
|--------------------------------|---|
| Use case ID                    | UC 02   |
| Use case Description           | Use case description for Registering Students   |
| Roles                          | Students  |
| Pre-Conditions                 | Students should have logged in to the system  |
| Basic Course                   | <ol style="list-style-type: none"> <li>1. Students select online registration option and enter details</li> <li>2. Verify details</li> <li>3. Allow to click Submit button</li> <li>4. Send a mail to the user</li> </ol>   |
| Alternative course/ Exceptions | <ol style="list-style-type: none"> <li>2.1 If in the basic course the actor enters an invalid information, the system displays an error message. The user can re-enter the details</li> <li>2.2 If all necessary fields are not filled, system displays an error message</li> </ol> |
| Post –Conditions               | Successfully register into the system   |

### 3.2.3 Use Case Description for Registering Students

*Table 17: Use Case Description for booking divers*

|                      |   |
|----------------------|---|
| Use case ID          | UC 03                                   |
| Use case Description | Use case description for booking divers |
| Roles                | Registered Students                     |

|                                |  |
|--------------------------------|--|
| Pre-Conditions                 | Students should have registered to the system  |
| Basic Course                   | <p>1. Students enter general details about themselves</p> <p>2. Then enter payment details through PayPal</p> <p>3. paypal verify the details</p> <p>[if valid] 3.1 Allow to process</p> <p>[if invalid] 3.2 Show error message</p> <p>4. After entering valid payment details PayPal show message about payment details</p> |
| Alternative course/ Exceptions | <p>2.1 If in the basic course the actor enters an invalid information, the PayPal displays an error message.</p> <p>The user can re-enter the details</p>  |
| Post –Conditions               | Students can do their diving course on the selected date   |

### 3.2.4 Use Case Description for managing user profiles

Table 18: Use Case Description for managing user accounts

|                      |   |
|----------------------|---|
| Use case ID          | UC 04   |
| Use case Description | Use case description for manage user profiles   |
| Roles                | Registered students, Diving instructors   |
| Pre-Conditions       | Students and Instructors should have an account in the system   |
| Basic Course         | <p>1. If users want to update details and profile picture, can select Update option</p> <p>2. If else they want to delete details, can select Delete option</p> <p>3. Else they want to enter new details; they can select Enter option</p> <p>4. Then save changes</p> |

|                                |  |
|--------------------------------|--|
| Alternative course/ Exceptions | If all necessary fields are not filled system display error message. |
| Post –Conditions               | Successfully update account  |

### 3.2.5 Use Case Description for handling diving equipment

Table 19:Use Case Description for handling diving equipment

|                                |   |
|--------------------------------|---|
| Use case ID                    | UC 05   |
| Use case Description           | Use case description for handling diving equipment  |
| Roles                          | Admin   |
| Pre-Conditions                 | Instructors should have made a request about equipment  |
| Basic Course                   | 1.Instructors provide details about the equipment<br>2.Admin check whether the existing equipment are enough or not<br>[enough] 2.1 provide them to instructors<br>[not enough] 2.2 hire from supplier<br>3.enter the details<br>4.save details |
| Alternative course/ Exceptions | -   |
| Post –Conditions               | Provide equipment to the instructors and when they handover them enter those details also   |

### 3.2.6 Use Case Description for generating reports

Table 20:Use Case Description for generating reports

|                      |   |
|----------------------|---|
| Use case ID          | UC 06                                       |
| Use case Description | Use case description for generating reports |

|                                |  |
|--------------------------------|--|
| Roles                          | Admin  |
| Pre-Conditions                 | The administrator need to be logged in to the system   |
| Basic Course                   | <ol style="list-style-type: none"> <li>1. The system requests actor to enter the required report type</li> <li>2. System imports data</li> </ol> |
|                                | <ol style="list-style-type: none"> <li>3. The actor selects the parameter</li> <li>4. System generates the report.</li> </ol>                    |
| Alternative course/ Exceptions | 3.1 If the required parameters are not available system, The actor can chose to return to the beginning of the basic course                      |
| Post –Conditions               | Report generated successfully  |

### 3.2.7 Use Case Description for generating reports

Table 21:Use Case Description for rate, comments/feedbacks

|                                |  |
|--------------------------------|--|
| Use case ID                    | UC 07  |
| Use case Description           | Use case description for rate, comments/ feedbacks   |
| Roles                          | Students   |
| Pre-Conditions                 | Students need to be logged in to the system  |
| Basic Course                   | <ol style="list-style-type: none"> <li>1. After the diving students can rate the service they offered</li> <li>2. Can write a review about diving and upload photos</li> <li>3. They can share their reviews through facebook or twitter</li> <li>4. Save changes</li> </ol> |
| Alternative course/ Exceptions |  |
| Post –Conditions               | Ratings and comments display on the screen   |

### 3.3 Activity Diagrams for the Proposed System

Activity diagrams are graphical representations of the workflows of stepwise activities and actions with support for choice, iteration and concurrency. Activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control

#### 3.3.1 Activity Diagram for User Login

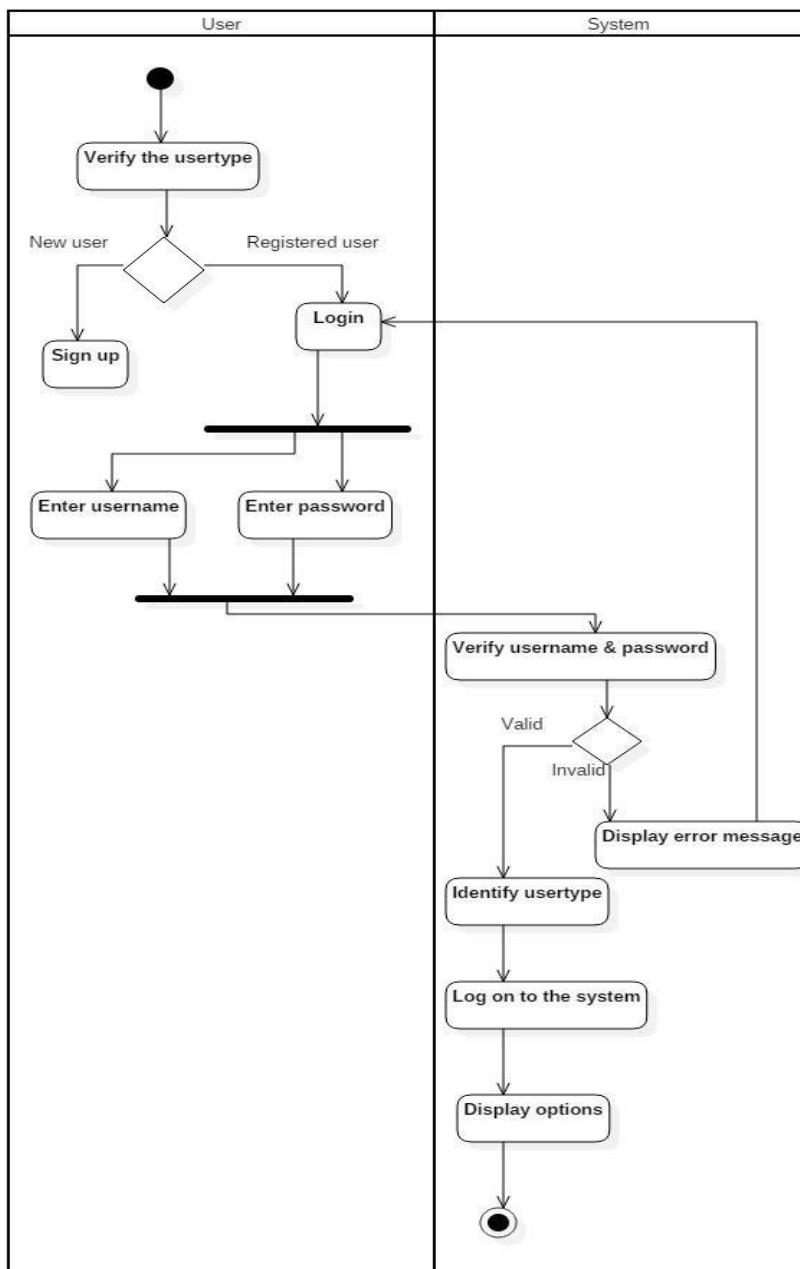


Figure 8:Activity Diagram for User Login

### 3.3.2 Activity Diagram for Registering Students

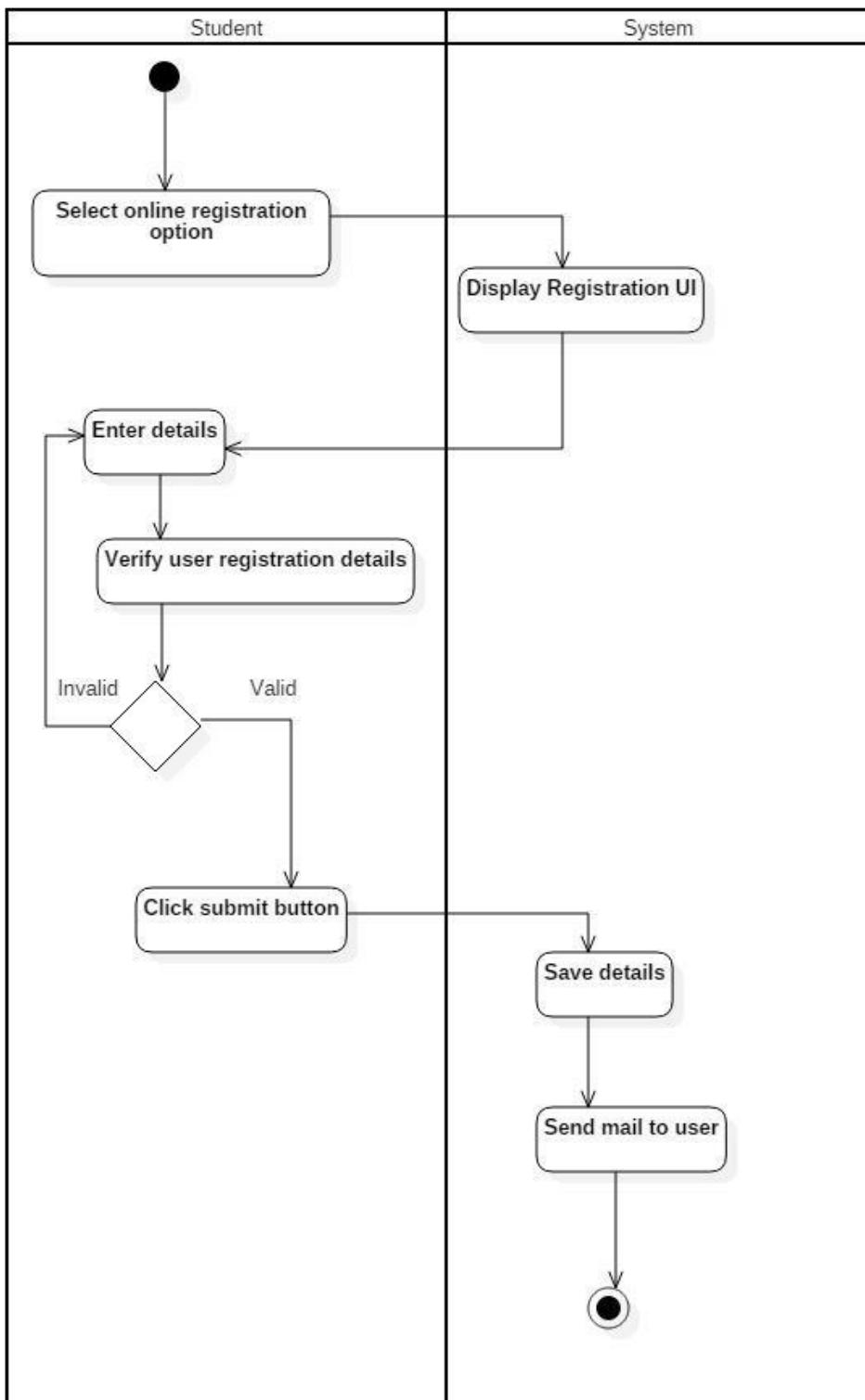


Figure 9:Activity Diagram for registering students

### 3.3.3 Activity Diagram for booking divers

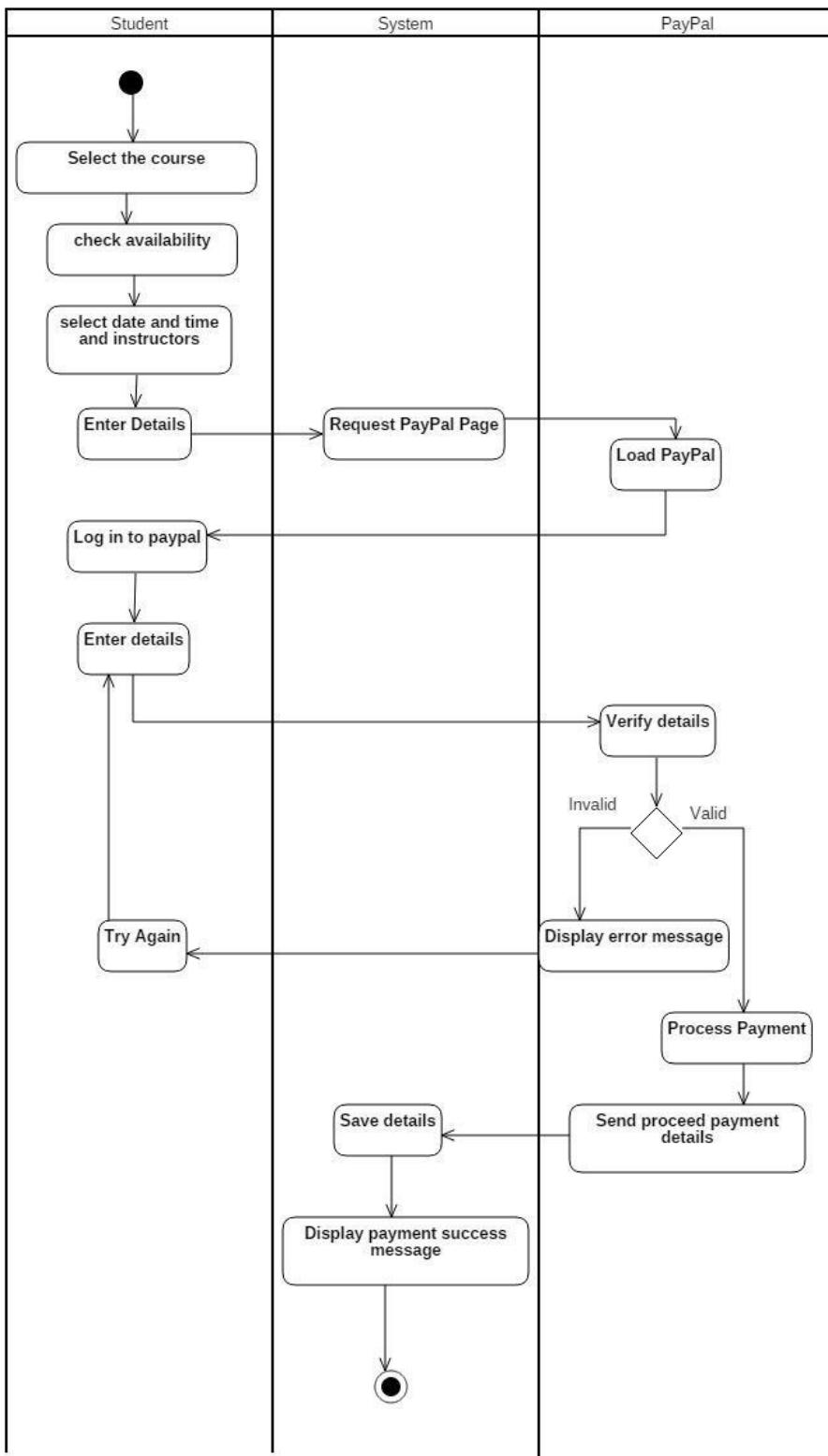


Figure 10:: Activity Diagram for booking divers

### 3.3.4 Activity Diagram for Managing user profiles

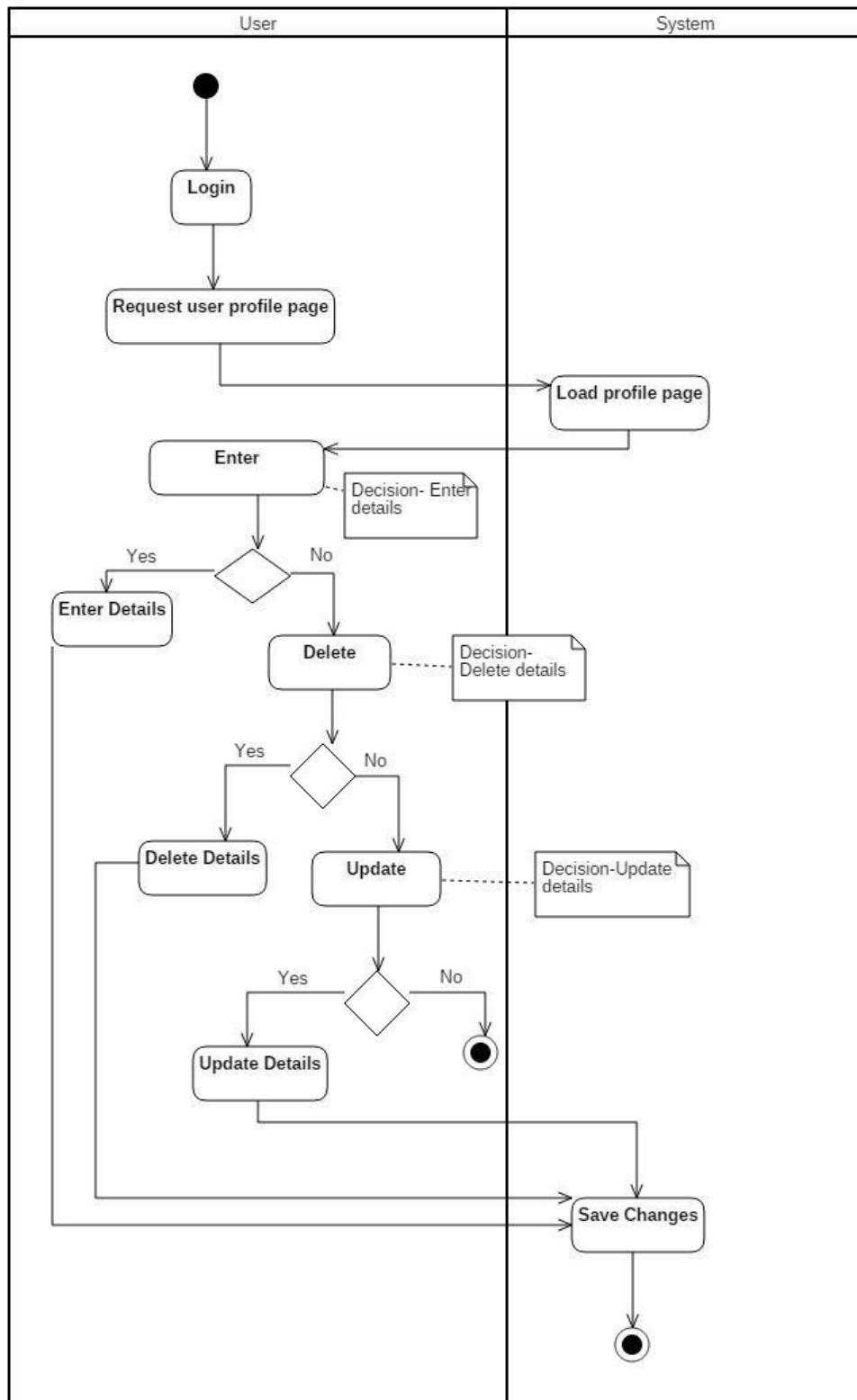


Figure 11:: Activity Diagram for managing user profiles

### 3.3.5 Handling Diving Equipment

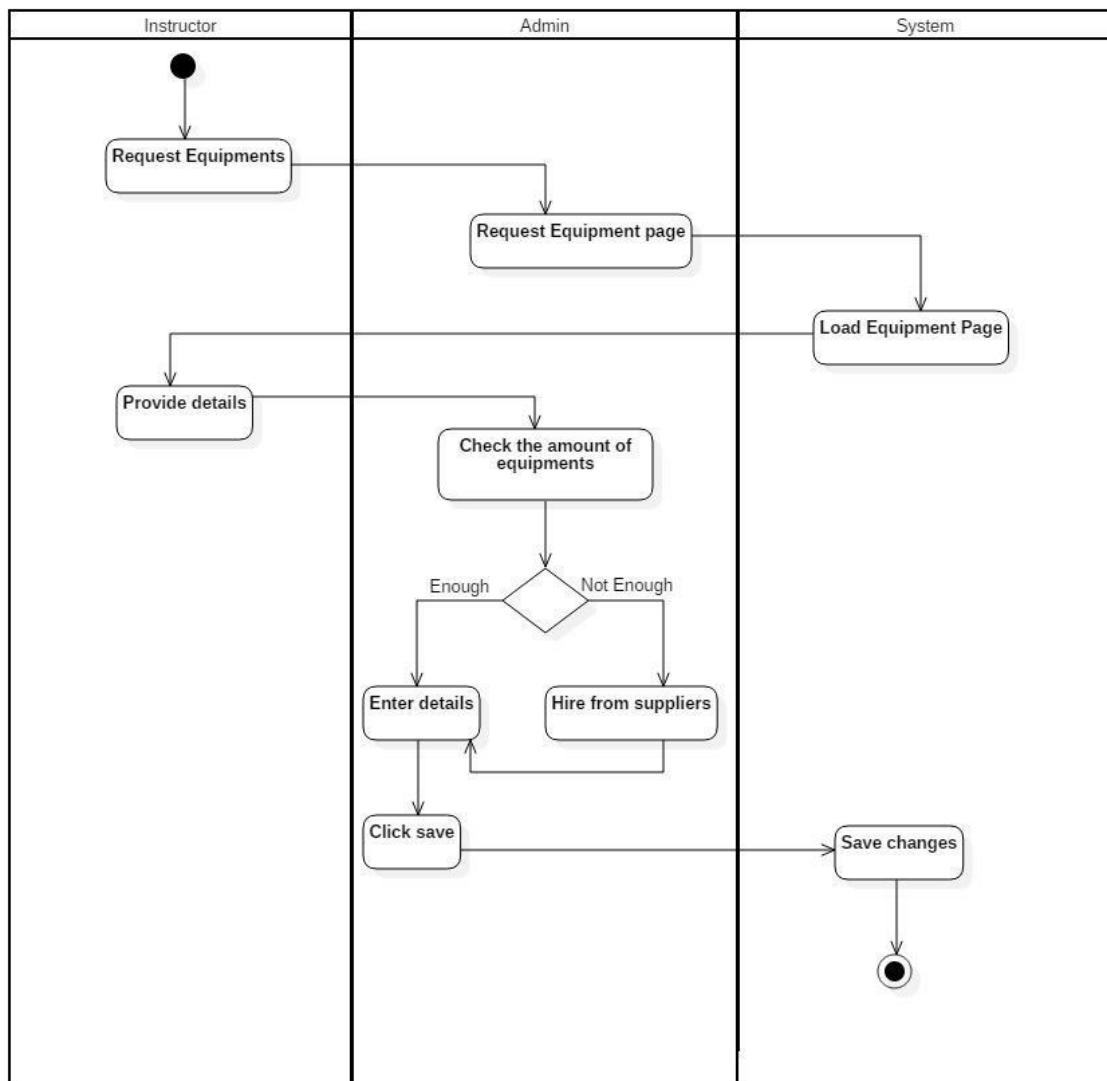


Figure 12: Activity Diagram for handling diving equipment

### 3.3.6 Activity Diagram for Generating Reports

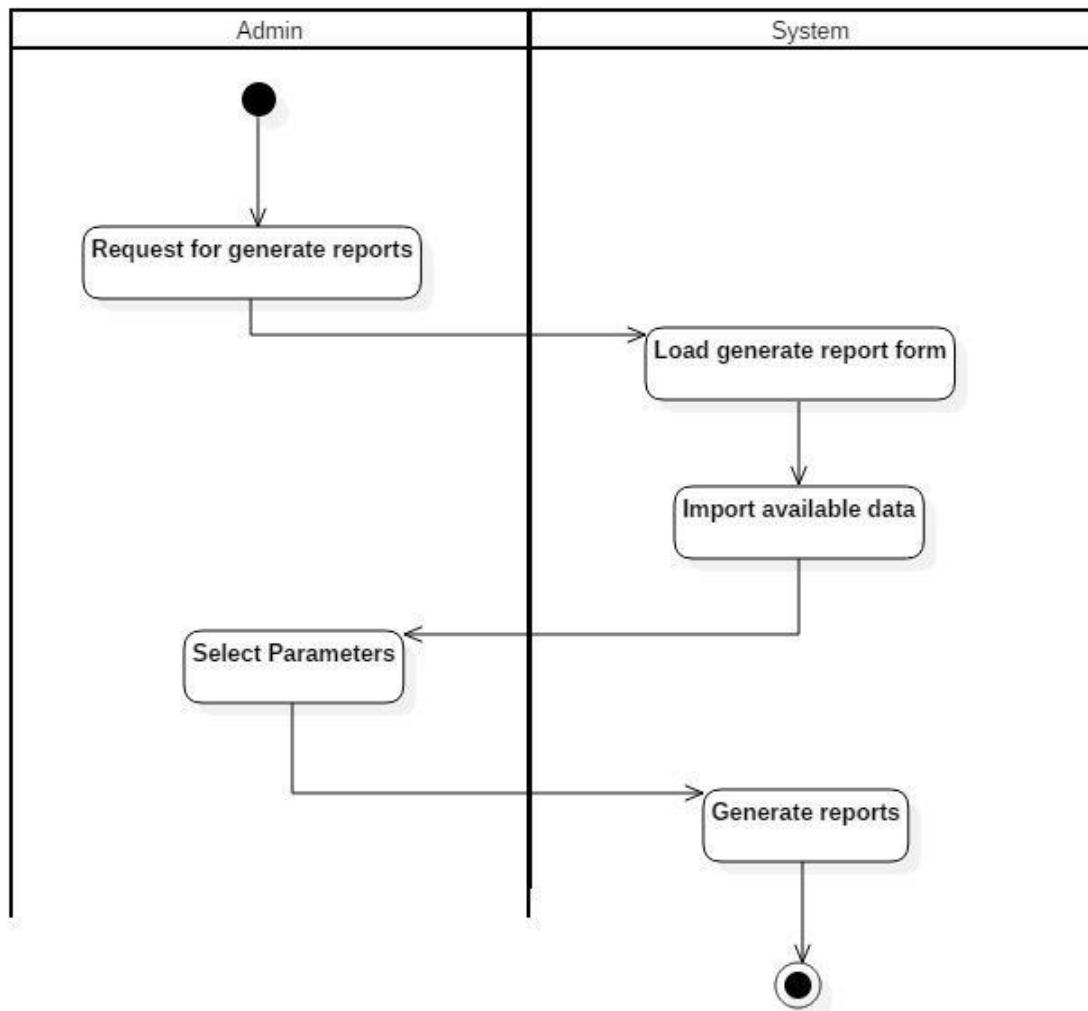


Figure 13:: Activity Diagram for generating reports

### 3.3.7 Activity Diagram for rating, comments/ feedbacks

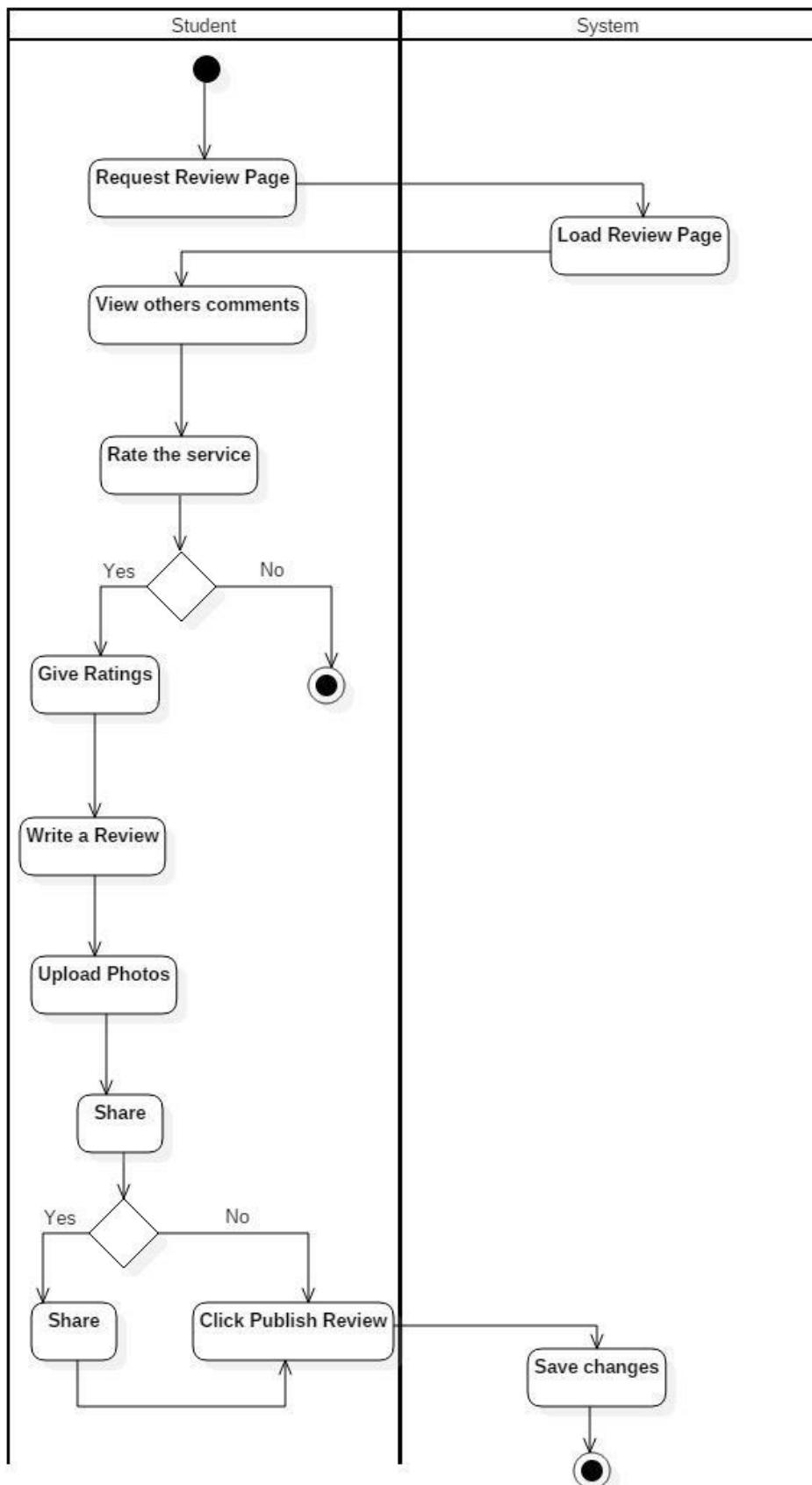


Figure 14:Activity diagram for rating. Comments/ feedbacks

### 3.4 Sequence Diagrams for the Proposed System

Sequence diagrams show how the system interacts with the actors in a use case functionality. Each actor is represented with a horizontal lifeline and the data transactions are drawn from one life line to another or within one lifeline. Following sequence diagrams describe some of the main use cases which are a bit difficult to understand with only having use case descriptions.

#### 3.4.1 Sequence diagram for user login

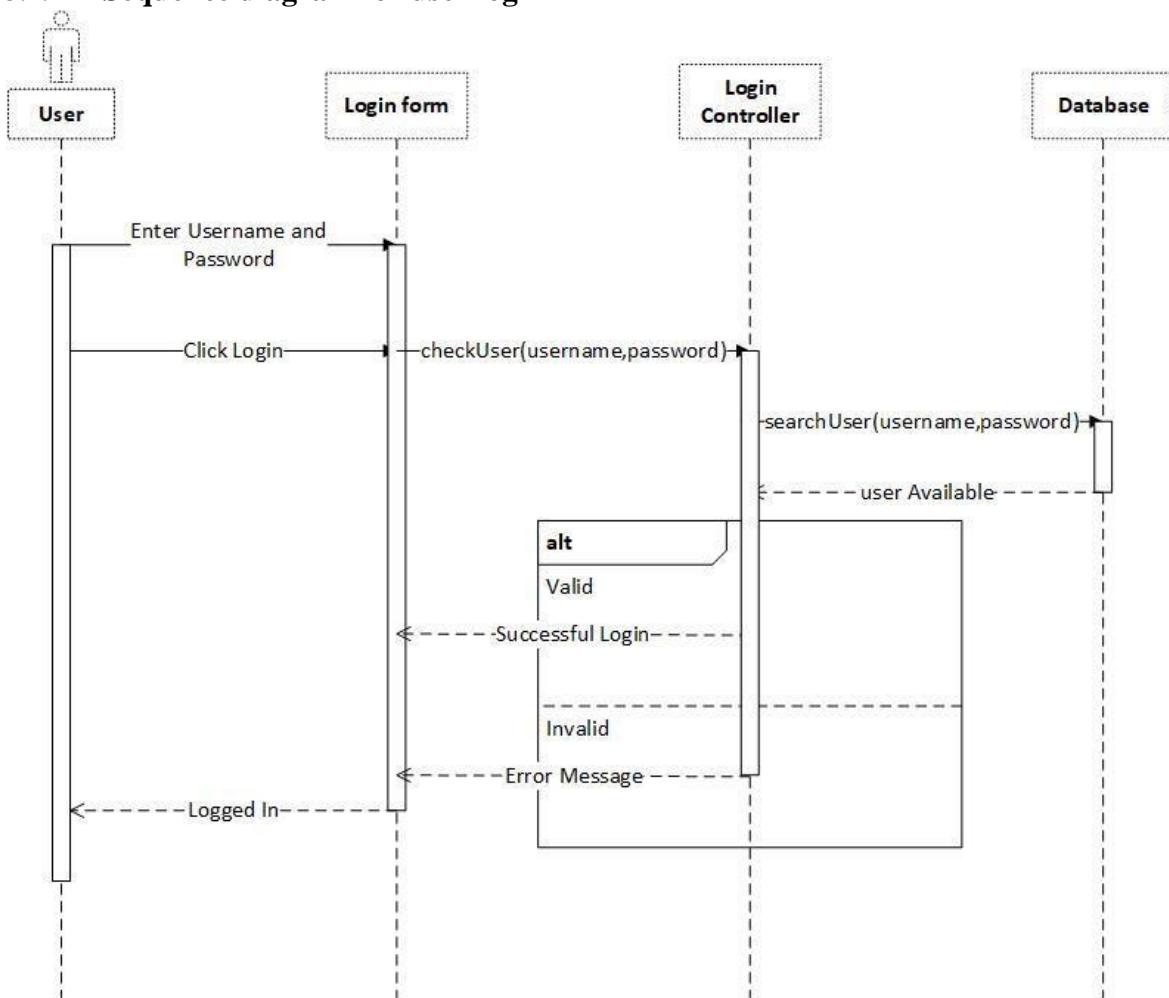


Figure 15:Sequence diagram for user login

The sequence diagram for user login illustrated in figure 3.8 describes the objects and classes involved in the user login scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

### 3.4.2 Sequence diagram for Registering Students

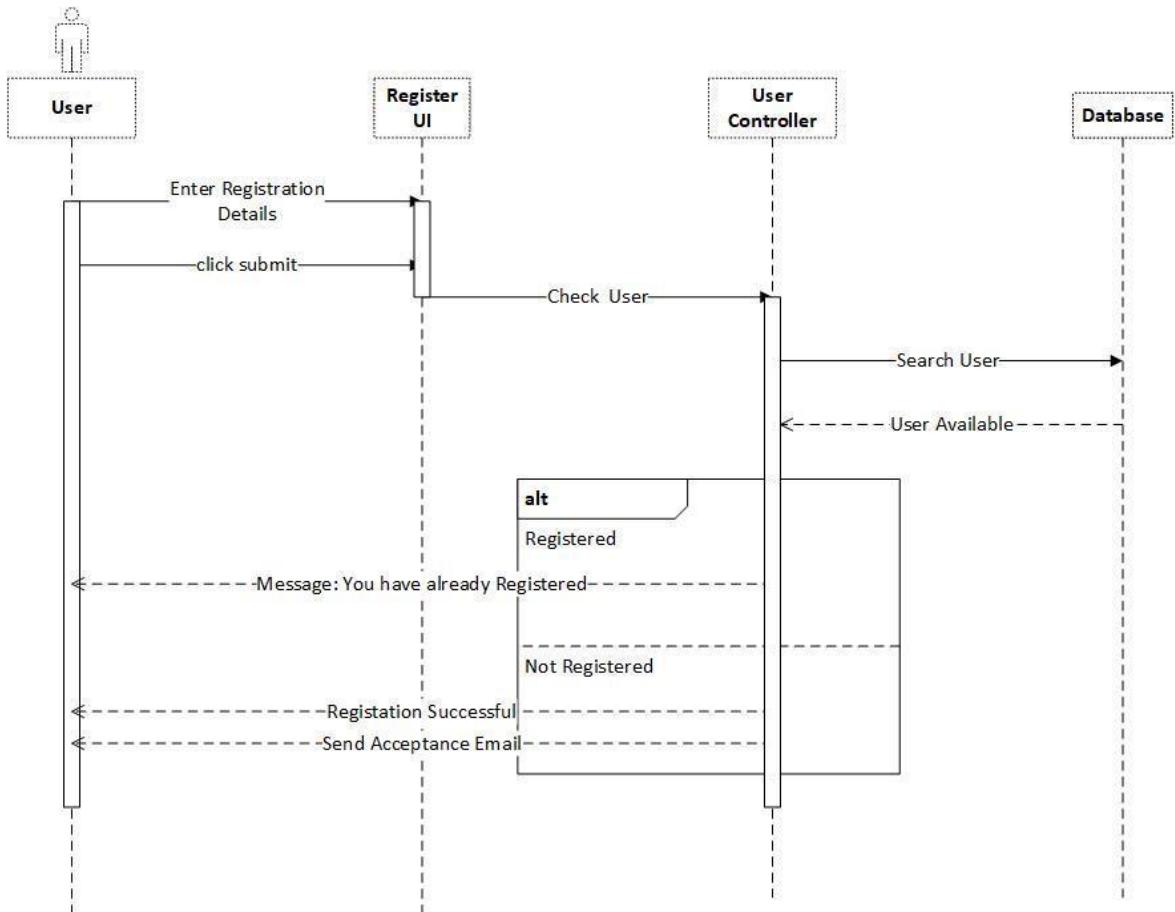


Figure 16: Sequence diagram for Registering Students

The sequence diagram for registering students illustrated in figure 3.09 describes the objects and classes involved in the registering scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

### 3.4.3 Sequence diagram for booking divers

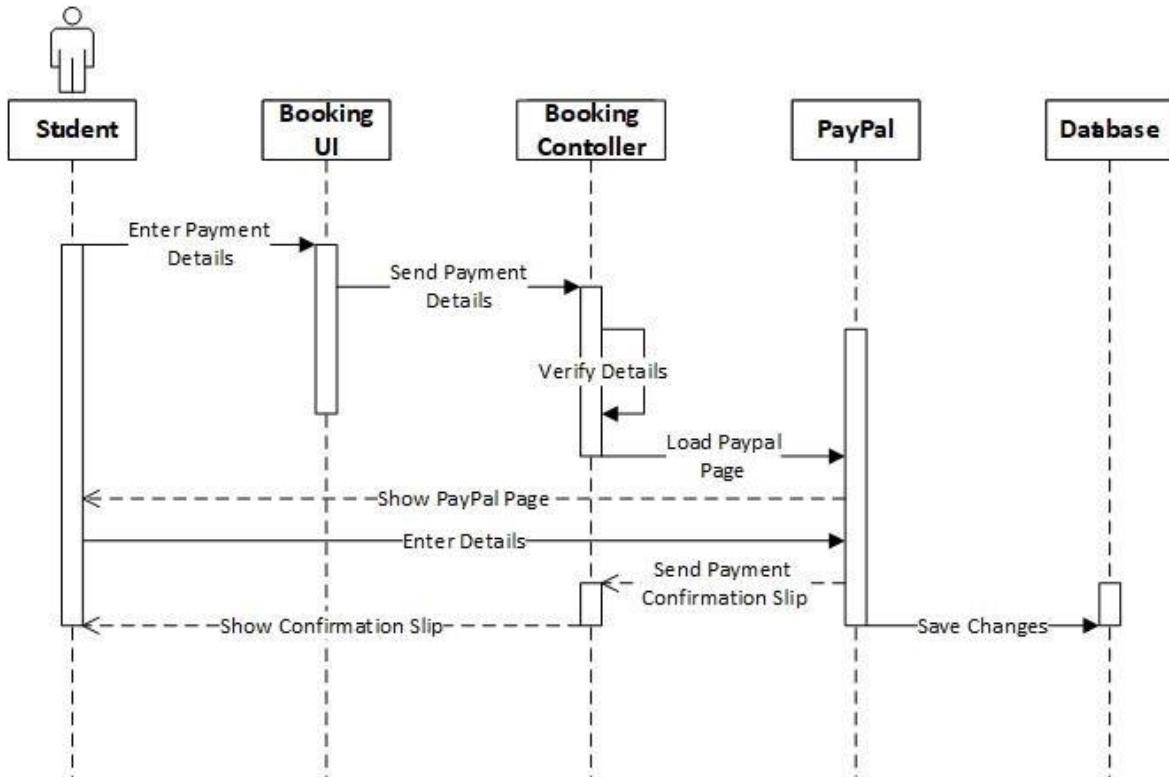


Figure 17:: Sequence diagram for Booking Divers

The sequence diagram for booking divers illustrated in figure 3.11 describes the objects and classes involved in the booking scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

### 3.4.4 Sequence diagram for Managing User Profiles

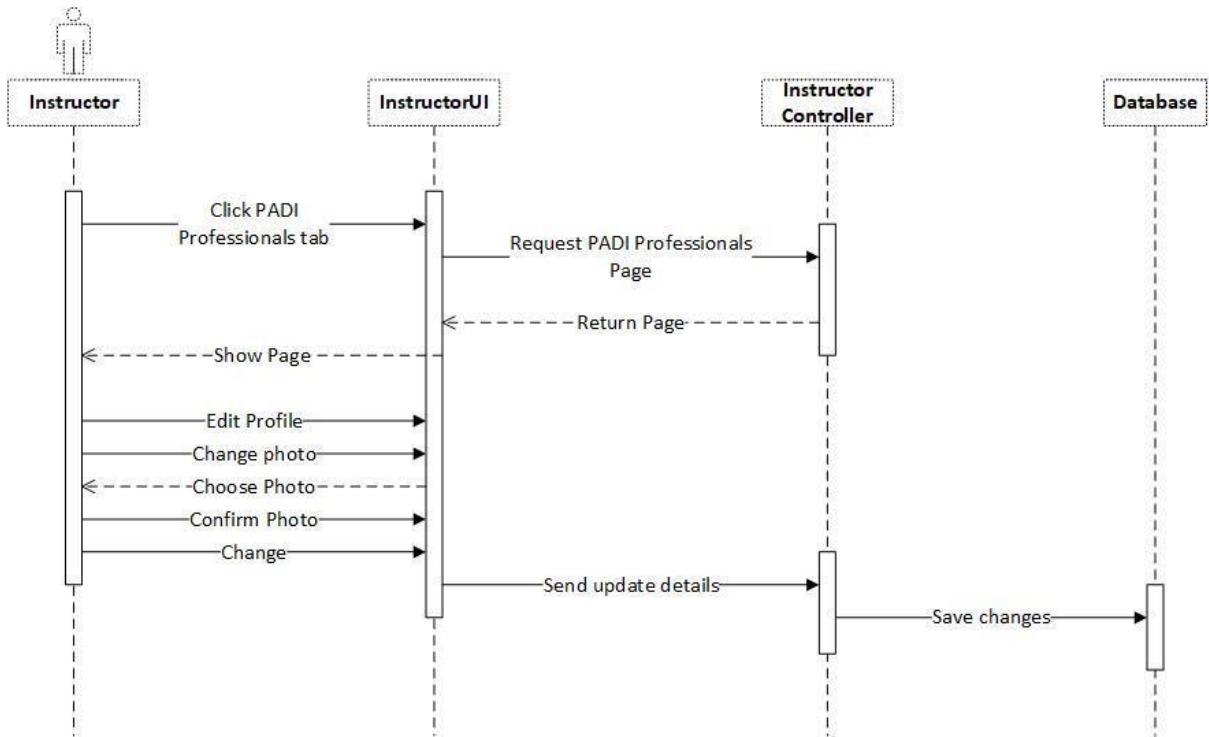


Figure 18: Sequence diagram for Managing User Profiles

The sequence diagram for managing user profiles illustrated in figure 3.12 describes the objects and classes involved in the user profile scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

### 3.4.5 Sequence diagram for Handling Diving Equipment

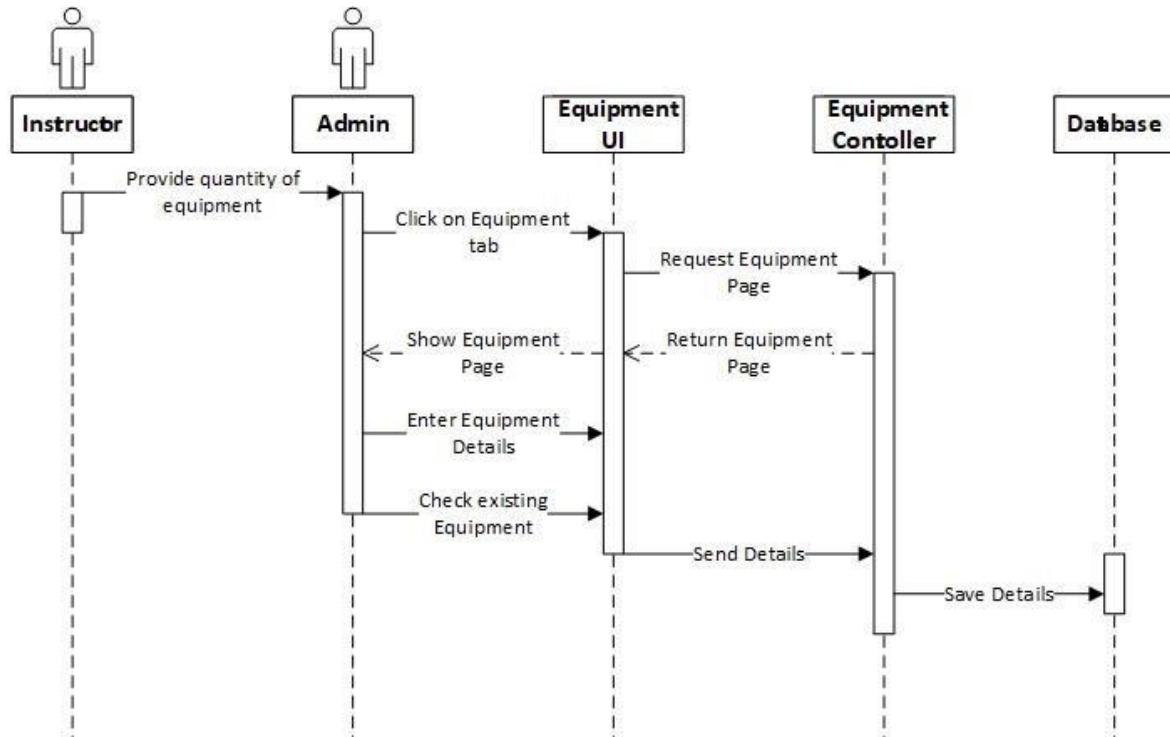


Figure 19: Sequence diagram for Handling Diving Equipment

The sequence diagram for handling diving equipment illustrated in figure 3.12 describes the objects and classes involved in the handling equipment scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

### 3.4.6 Sequence diagram for Rating, Comments/ Feedbacks

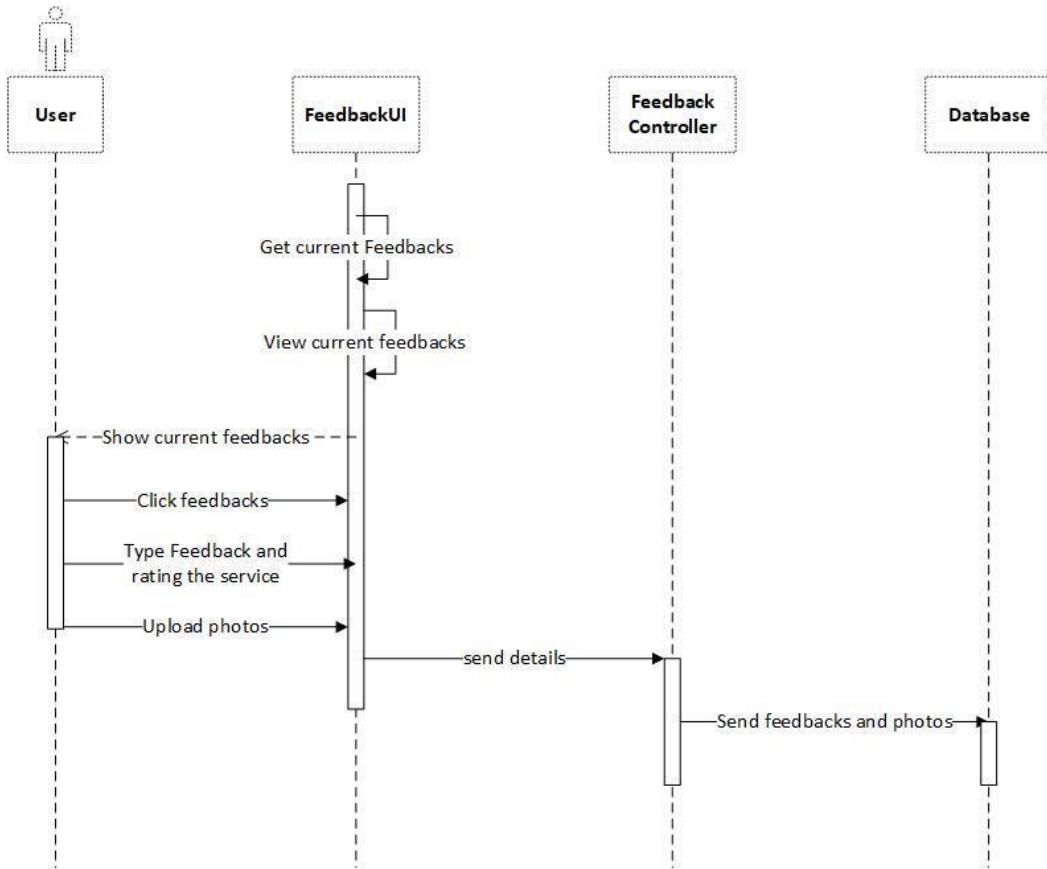


Figure 20: Sequence diagram for Rating, Comments/ Feedbacks

The sequence diagram for user login illustrated in figure 3.16 describes the objects and classes involved in the user login scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

### 3.5 Class Diagram for Proposed System

Class diagram in figure 3.15 describes the structure of a proposed system by showing the system's classes their attributes, operations and the relationships among the classes.

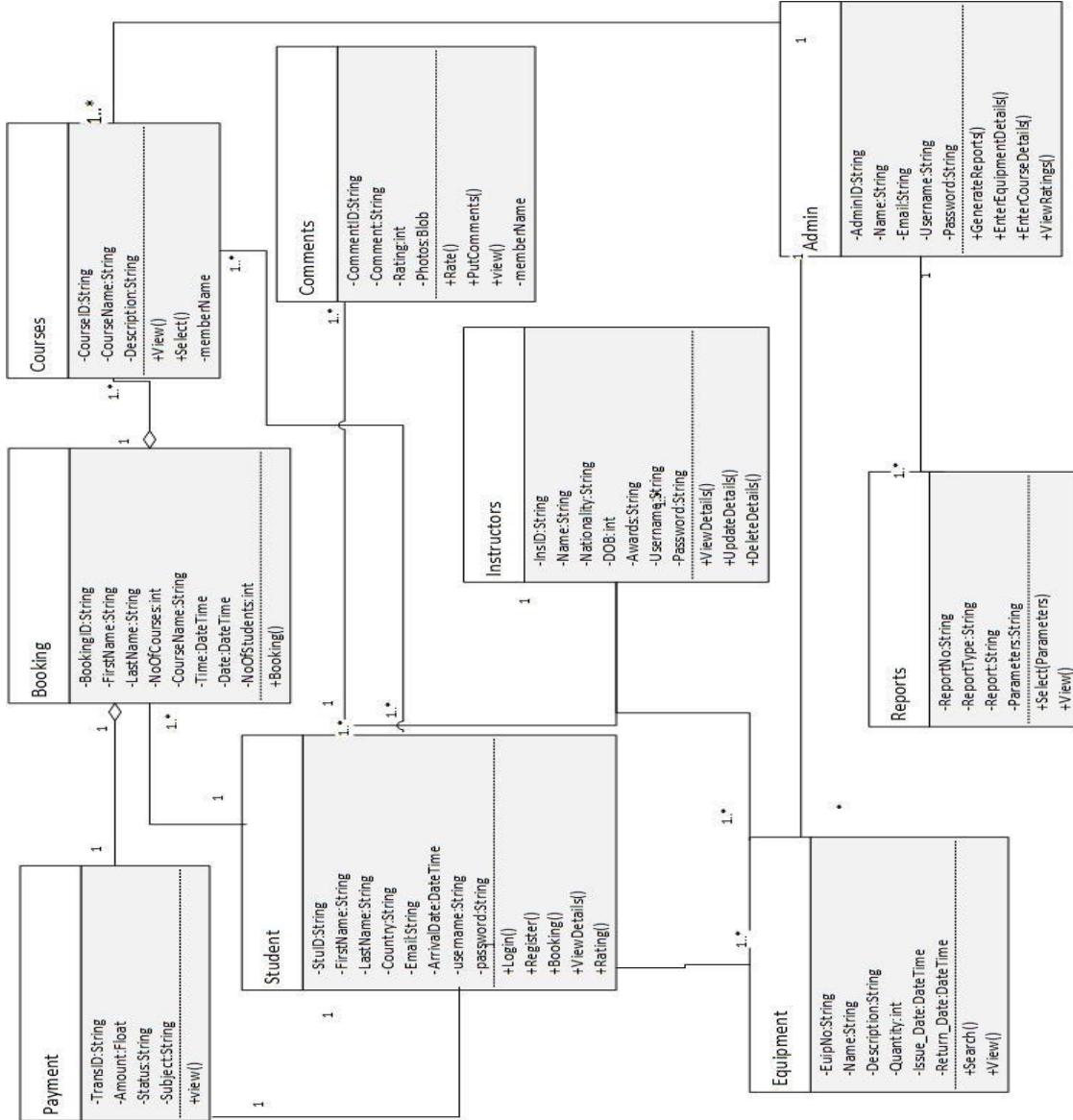


Figure 21:Class diagram for the proposed system

### 3.6 ER Diagram

The entity relationship diagram shown below in figure 3.15 describe the relationship between entities.

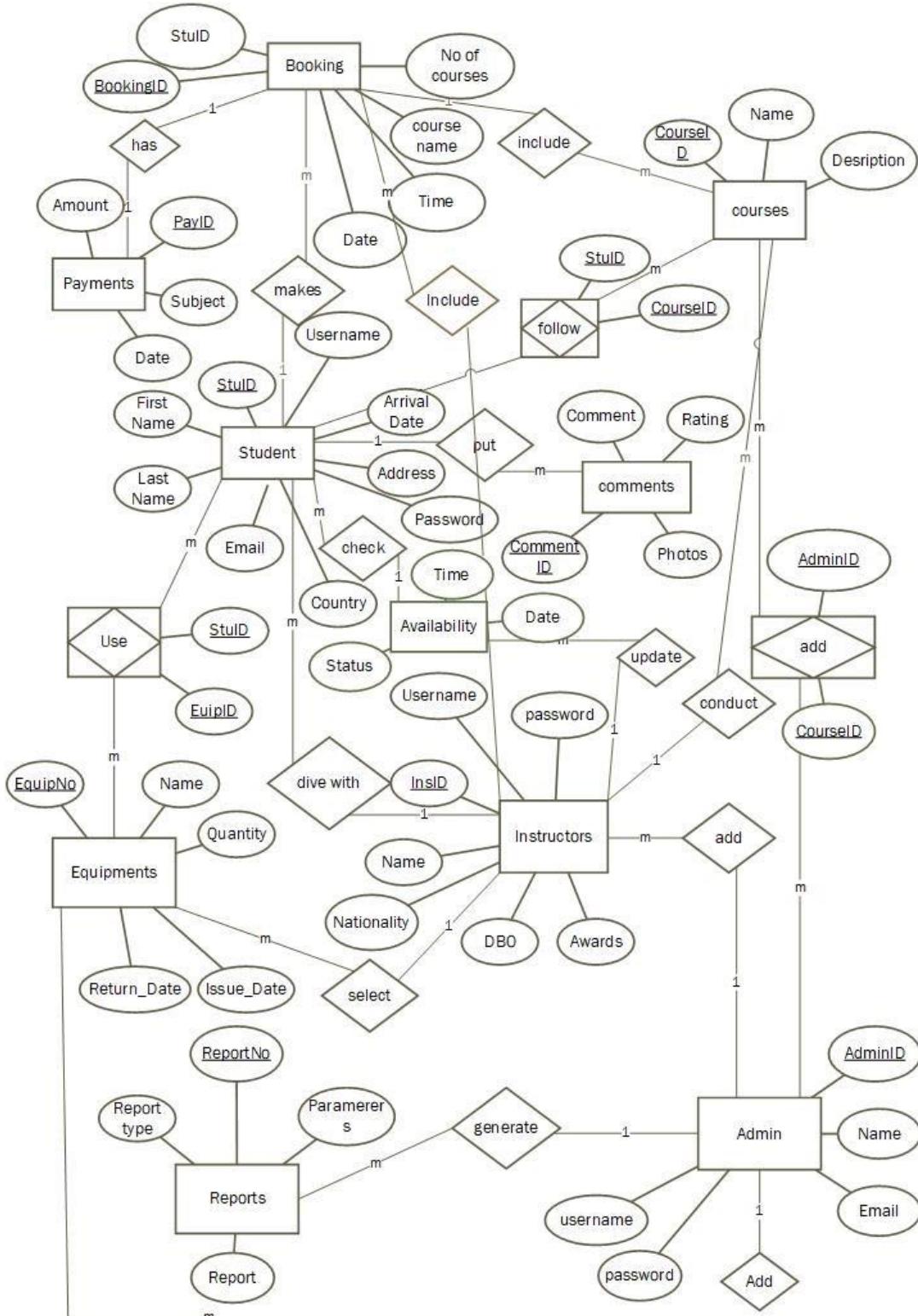


Figure 22:ER diagram for the proposed system

### 3.7 Normalized database design

Database relationship diagram shown in figure 3.16 illustrates the relationship between the data tables in the database.

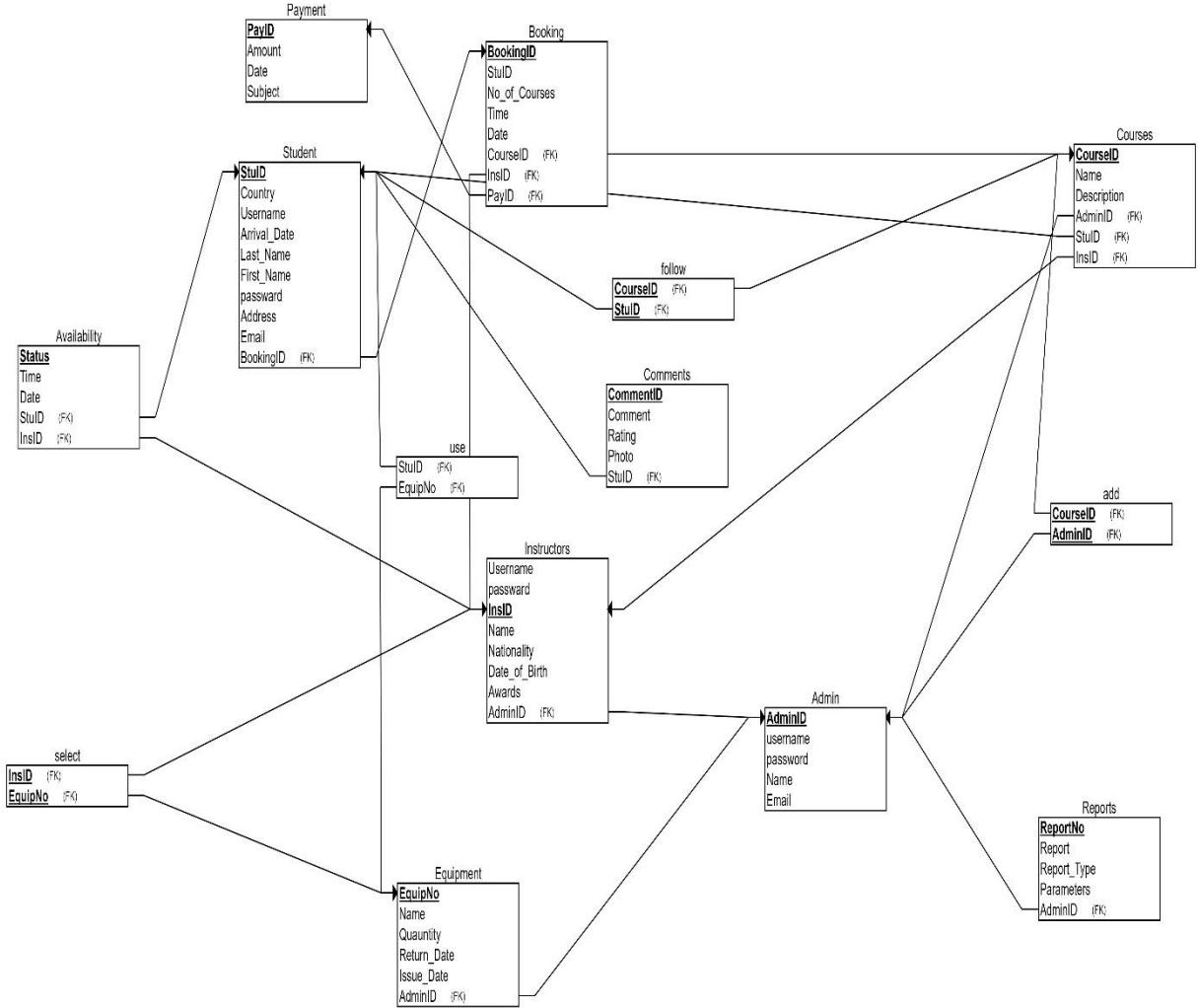


Figure 23:: Normalized database design for the proposed system

### 3.8 GUI Design

Graphical User Interface (GUI) is one of the key component in a web application that communicates with the users of the system. User friendly GUI is the one of the major nonfunctional requirement of this system.

The main design consideration related with GUI's (Graphical User Interface) are listed below where these factors are considered in the system GUI designs.

Attractive user interfaces

- User friendly interfaces, easy to use and easily learnable user interfaces
- Easy to navigate forward and backward and keeping the process flow of the actions
- Give good error messages with information to recover from the error occurred
- Prevent errors as much as possible and use client side validations to give immediate feedback
- Provide feedback of all the actions if succeeded or not

#### 3.8.1 Welcome Page GUI



Figure 24:GUI for Welcome Page

### 3.8.2 About Us GUI

The screenshot shows the 'About Us' page of the Poseidon Diving Station Sri Lanka website. At the top, there is a logo for 'POSEIDON DIVING STATION SRI LANKA' and a 'dive' logo. To the right, there is a banner for 'PADI 5STAR INSTRUCTOR DEVELOPMENT CENTRE'. Below the header, a navigation bar includes 'Home', 'About Us' (which is currently selected), 'Diving Professionals', 'PADI Courses', 'Book Online', 'Equipment', and 'Write a Review'. Under 'About Us', there is a dropdown menu with options: 'History', 'Diving Sites', and 'Gallery'. The main content area contains text about the center's history and services, followed by a series of small images showing various diving and beach scenes.

39:

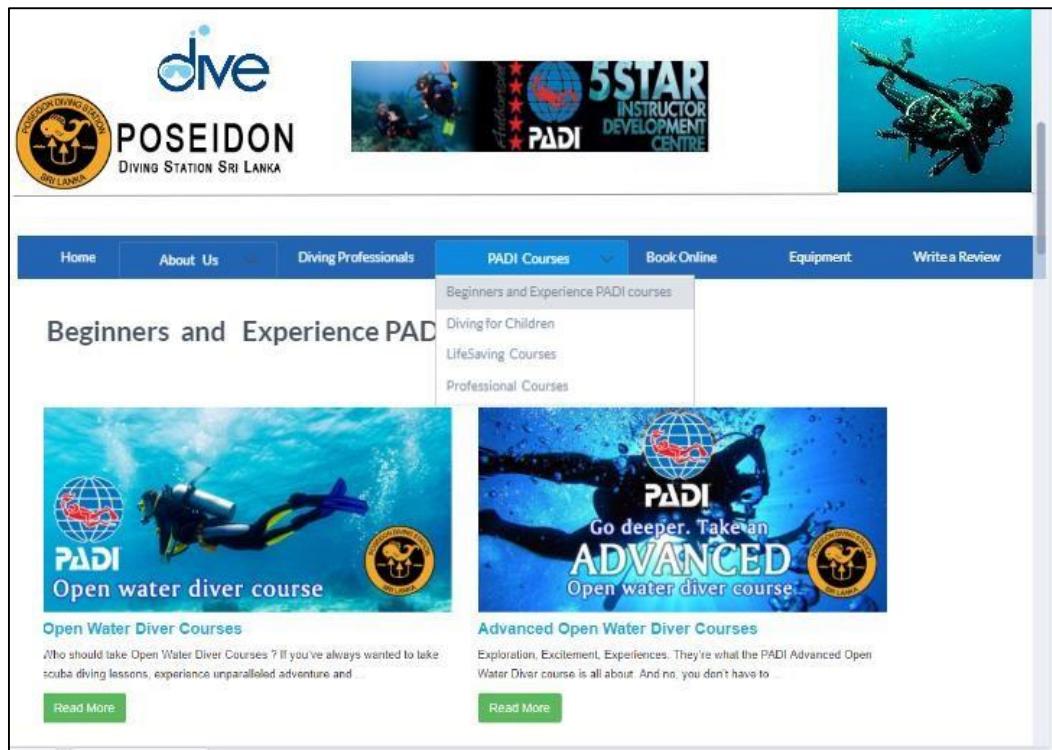
Figure 25:GUI for About Us

### 3.8.3 Diving Professionals GUI

The screenshot shows the 'Diving Professionals' page of the Poseidon Diving Station Sri Lanka website. The layout is similar to the 'About Us' page, with the 'dive' logo, 'POSEIDON DIVING STATION SRI LANKA' logo, and 'PADI 5STAR INSTRUCTOR DEVELOPMENT CENTRE' banner at the top. The navigation bar includes 'Home', 'About Us', 'Diving Professionals' (selected), 'PADI Courses', 'Book Online', 'Equipment', and 'Write a Review'. The main content area features input fields for 'Instructor ID', 'Name', 'Nationality', 'Date of Birth', and 'Awards', each with a corresponding empty text box. To the right of these fields is a 'Availability' section containing a calendar for October 2017. The calendar highlights the 23rd of October. There are also three small profile pictures of instructors.

Figure 26:Diving Professionals GUI

### 3.8.4 PADI Courses GUI



igure 3-21

Figure 27:GUI for PADI Courses

### 3.8.5 Book Online GUI

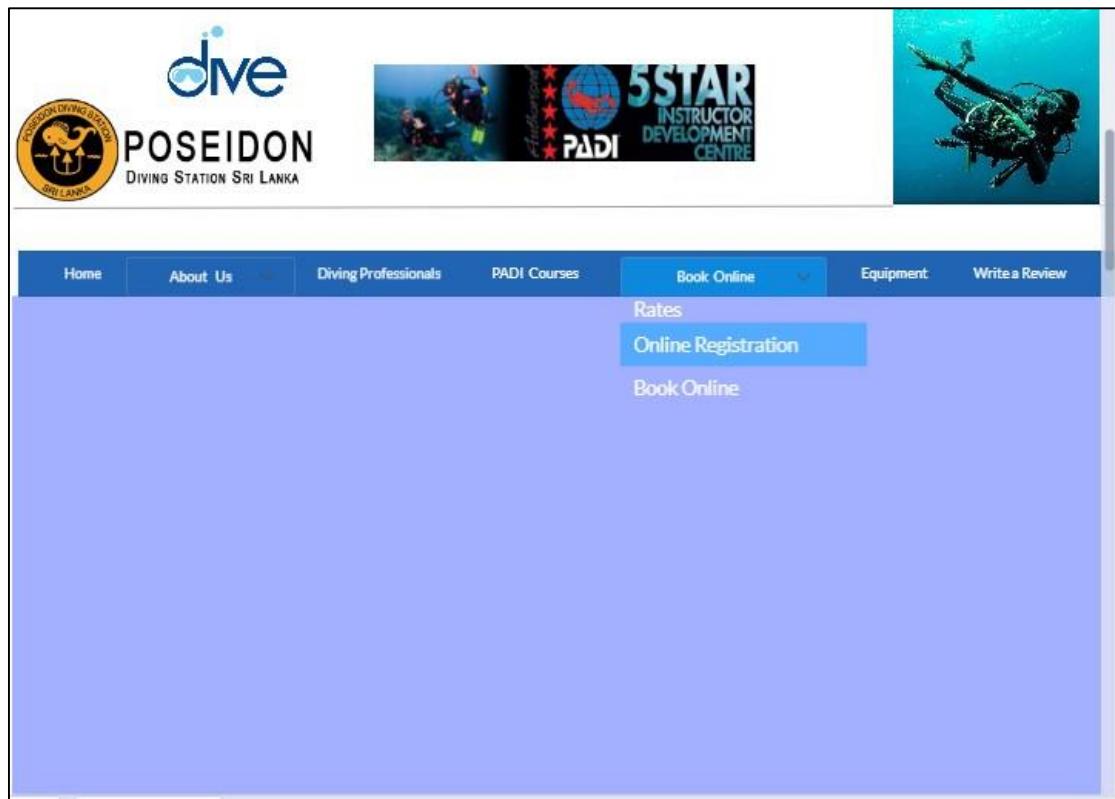


Figure 28:GUI for Book Online

### 3.8.6 Book Online | Rates GUI

The screenshot shows the Poseidon Diving Station Sri Lanka website. At the top, there is a logo for 'POSEIDON DIVING STATION SRI LANKA' and a 'dive' logo. To the right, there is a banner for '5STAR INSTRUCTOR DEVELOPMENT CENTRE PADI'. Below the header, there is a navigation bar with links: Home, About Us, Diving Professionals, PADI Courses, Book Online (highlighted in blue), Equipment, and Write a Review.

**Experience Programmes (Try Dives)**

|   |         |
|---|---------|
| Bubblemaker   | 45      |
| Discover Scuba (in the reef)                        | 50      |
| Discover Scuba Diving (1 shallow and 1 deeper dive) | From 85 |

**PADI Courses**

|   |                            |
|---|----------------------------|
| Scuba Diver                                 | 280                        |
| Open Water Diver                            | 375                        |
| Open water referral (open water dives only) | 265                        |
| Open Water completion after online theory   | 290                        |
| Advanced Open Water                         | 330 (345 with Nitrox dive) |
| Emergency First Response                    | 195                        |
| Rescue Diver                                | 405                        |
| Scuba Review (refresher + 1 dive)           | 90                         |

**Speciality Courses**

|  |     |
|--|-----|
| Enriched air diver (2 dives)                           | 245 |
| Deep/Wreck (4 dives each) Night diver (3 dives)        | 255 |
| Underwater photographer/underwater navigator (2 dives) | 235 |

Figure 3-23:

Figure 29:GUI for view rates

### 3.8.7 Book Online | Student Registration GUI

The screenshot shows the Poseidon Diving Station Sri Lanka website. At the top, there is a logo for 'POSEIDON DIVING STATION SRI LANKA' and a 'dive' logo. To the right, there is a banner for '5STAR INSTRUCTOR DEVELOPMENT CENTRE PADI'. Below the header, there is a navigation bar with links: Home, About Us, Diving Professionals, PADI Courses, Book Online (highlighted in blue), Equipment, and Write a Review.

The main area is a form for student registration:

- Text input field: Your name
- Text input field: Country (Sri Lanka selected)
- Text input field: Address
- Text input field: Email Address
- Image placeholder: A portrait photo of a man.
- Text button: Upload Photo
- Buttons at the bottom: Save and Cancel.

Figure 30:GUI for Book Online | Student Registration

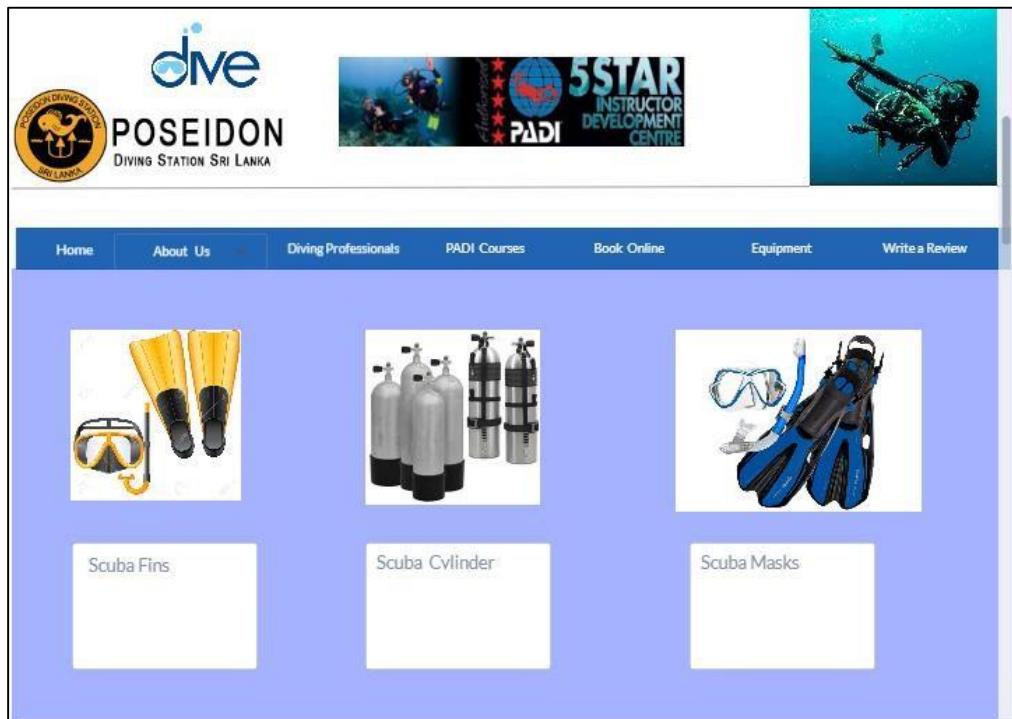
-25

Figure 31: Book Online / Update Details

### 3.8.8 Book Online | Booking GUI

Figure 32:: Book Online | Student Registration GUI

### 3.8.9 Equipment GUI



3-27:

Figure 33:GUI for Equipment

### 3.8.10 Login GUI

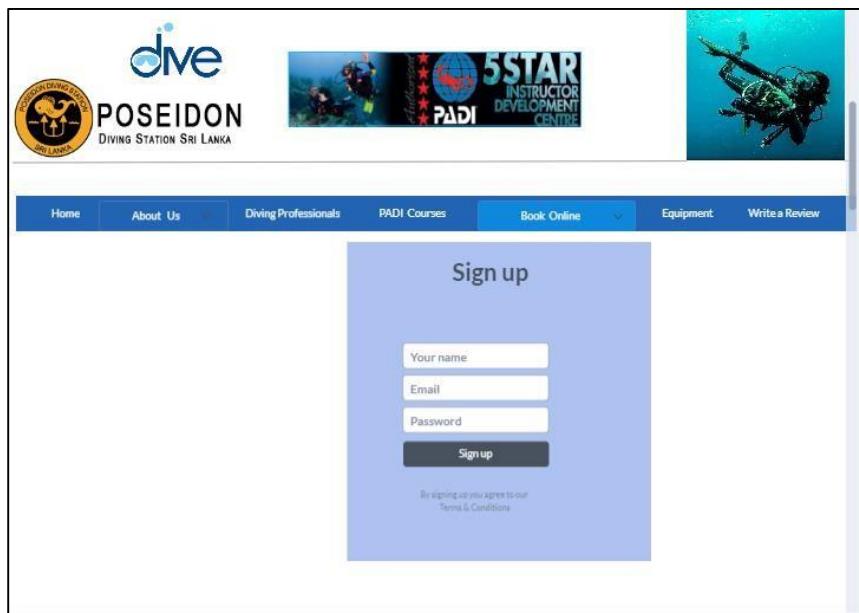


Figure 34:Login GUI

### **3.9 Summary**

This chapter depicted the system design where it showed how the functionality is achieved. This was depicted through Objected Oriented Approach. Furthermore, the Database Design and the Graphical User Interfaces were elaborated.

# **CHAPTER 4**

# **DEVELOPMENT**

## **Outline of The Chapter**

4.1.Programming Languages and Development Tools

5.2.Summary

## **4.1. Programming Languages and Development Tools**

Diving Management System for “Poseidon Diving Centre” is a web based development for Poseidon Diving Station. When selecting the programming languages and development technologies, compatibility with existing resources such as software, hardware, human and organizational capabilities have been more focused on. In addition, support for attractive Graphical User Interface design was considered.

### **4.1.1. HyperText Markup Language (HTML)**

HyperText Markup Language (HTML) is the standard markup language for creating web pages and web applications. With Cascading Style Sheets (CSS), and JavaScript, it forms a triad of keystone technologies for the World Wide Web. Web browsers receive HTML documents from a webserver or from local storage and render them into multimedia web pages. HTML describes the structure of a web page semantically and originally included signs for the appearance of the document. HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects, such as interactive forms may be embedded into the rendered page. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. The World Wide Web Consortium (W3C), maintainer of both the HTML and the CSS standards, has encouraged the use of CSS over explicit presentational HTML since 1997.

### **4.1.2. Cascading Style Sheets (CSS)**

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language. Although most often used to set the visual style of web pages and user interfaces written in HTML and XHTML, the language can be applied to any XML document, including plain XML, SVG and XUL, and is applicable to rendering in speech, or on other media. Along with HTML and JavaScript, CSS is a cornerstone technology used by most websites to create visually engaging webpages, user interfaces for web applications, and user interfaces for many mobile applications. The CSS specifications are maintained by the World Wide Web Consortium (W3C). The W3C operates a free CSS validation service for CSS documents

#### **4.1.3.Php**

PHP is a server-side scripting language designed primarily for web development but also used as a general-purpose programming language. PHP originally stood for Personal Home Page, but it now stands for the recursive acronym PHP: Hypertext Preprocessor. PHP code may be embedded into HTML code, or it can be used in combination with various web template systems, web content management systems and web frameworks. PHP code is usually processed by a PHP interpreter implemented as a module in the web server or as a Common Gateway Interface (CGI) executable. The web server combines the results of the interpreted and executed PHP code, which may be any type of data, including images, with the generated web page. PHP code may also be executed with a command-line interface (CLI) and can be used to implement standalone graphical applications.

#### **4.1.4.Javascript**

JavaScript is a high-level, dynamic, un-typed, and interpreted programming language. It has been standardized in the ECMAScript language specification. Alongside HTML and CSS, JavaScript is one of the three core technologies of World Wide Web content production; the majority of websites employ it, and all modern Web browsers support it without the need for plug-ins. JavaScript is prototype-based with first-class functions, making it a multi-paradigm language, supporting object-oriented, imperative, and functional programming styles. It has an API for working with text, arrays, dates and regular expressions, but does not include any I/O, such as networking, storage, or graphics facilities, relying for these upon the host environment in which it is embedded. Although there are strong outward similarities between JavaScript and Java, including language name, syntax, and respective standard libraries, the two are distinct languages and differ greatly in their design. JavaScript was influenced by programming languages such as Self and Scheme.

#### **4.1.5 WAMP Server**

The acronym WAMP refers to a set of free (open source) applications, combined with Microsoft Windows, which are commonly used in Web server environments. The WAMP stack provides developers with the four key elements of a Web server: an operating system, database, Web server and Web scripting software. The combined usage of these programs is called a server stack. In this stack, Microsoft Windows is the operating system (OS), Apache is the Web server, MySQL handles the database components, while PHP, Python, or PERL represents the dynamic scripting languages.

#### **4.1.6 PhpMyAdmin**

PhpMyAdmin is a free web application that provides a convenient GUI for working with the MySQL database management system. It is the most popular MySQL administration tool that is used by millions of users worldwide and has won numerous awards and honors. Written in PHP, it has all common functions that you may need when developing a MySQL-based application or website. It also gave birth to several similar products, for example phpPgAdmin which provides similar functionality for the PostgreSQL DBMS.

## **5.2. Summary**

In this chapter, the development aspects of the system has been described. Under that initially the technologies used have been explained and justified and finally the constraints faced during the development process have been described.

In this chapter, the development aspects of the system has been described. Under that initially the technologies used have been explained and justified and finally the constraints faced during the development process have been described.

## **CHAPTER 5**

# **TESTING**

### **Outline of The Chapter**

5.1.Test Plan and Test Strategy

5.2.Sample Test Cases

5.3 Test Report

5.4 Severity of the error / bug identified and possible solutions

7.5 Summary

## **5.1.Test Plan and Test Strategy**

Testing is carried out to ensure the system is aligned with the user expectation. The functionalities and functions are tested in order to improve the quality of the product and improve the functionalities of the product too. The testing plan defines the items to be tested and the functions are selected bases on the importance of the functions, and the risk of the functions on the users view point. Then the test cases were designed corresponding with the use case descriptions. They were executed manually and the results were recorded. The bugs identified were corrected and tested again. In the testing process of this system both black box testing and white box testing has used.

### **5.1.1 Black box testing**

Black-box testing is a testing strategy that ignores the internal mechanism of a system or component and focuses solely on outputs generated in response to selected inputs and execution conditions.

Under these testing approaches four main test types has used to test this system

- In black box testing, the structure of the program is not taken into consideration. It takes into account functionality of the application only. It is also called functional testing.
- Tester is mainly concerned with the validation of the output rather than how the output is produced. Knowledge of programming or implementation logic ( of internal structure and working) is not required for testers. It is applicable mainly at higher levels of testing - Acceptance Testing and System Testing.

### **5.1.1 White box testing**

WHITE BOX TESTING (also known as Clear Box Testing, Open Box Testing, Glass Box Testing, Transparent Box Testing, Code-Based Testing or Structural Testing) is a software testing method in which the internal structure/design/implementation of the item being tested is known to the tester. The tester chooses inputs to exercise paths through the code and determines the appropriate outputs. Programming know-how and the implementation knowledge is essential. White box testing is testing beyond the user interface and into the nitty-gritty of a system.

This method is named so because the software program, in the eyes of the tester, is like a white/transparent box; inside which one clearly sees.

White Box Testing method is applicable to the following levels of software testing:

- Unit Testing: For testing paths within a unit.
- Integration Testing: For testing paths between units.
- System Testing: For testing paths between subsystems.

However, it is mainly applied to Unit Testing.

## 5.2. Sample Test Cases

A test case is a set of test inputs, execution conditions, and expected results developed for a particular objective, such as to exercise a particular program path or to verify compliance with a specific requirement.

### 5.2.1. Test Case 01 – Registration

| 1. Registration |                |   |   |                                   |        |
|-----------------|----------------|---|---|-----------------------------------|--------|
| ID              | Test Case Name | Test Case Description   | Input Data  | Expected Output                   | Status |
| 1.1             | Add user       | Steps:<br>1.Go to Registration form<br>2.Input user details<br>3.Click on register button | User name<br><br>Password<br><br>First name<br><br>Last name<br><br>Email<br><br>Home Address<br><br>T.P number | Message to indicate Data Inserted | Pass   |

Table 22:Registration Test Case

### 5.2.2. Test Case 02 – User Login

| 2. User Login |                               |   |                                   |   |        |
|---------------|-------------------------------|---|-----------------------------------|---|--------|
| ID            | Test Case Name                | Test Case Description   | Input Data                        | Expected Output   | Status |
| 2.1           | User Login                    | Steps:<br>1.Input user name<br>2.Input password<br>3.Press login  | Username<br>Password              | Accept the correct user name and password.<br><br>Display the home page based on the access level.    | Pass   |
| 2.2           | Password/User name Validation | Steps :<br>1.Input user name<br>2.Input password<br>3.Press login | Mismatching Username and password | Display a message informing the mismatch of username and password<br><br>Allows the user to try again | Pass   |

Table 23:User Login Test Case

### 5.2.3. Test Case 03 – Add Instructor Details

| 3. Add Instructors Details |                        |  |  |                              |        |
|----------------------------|------------------------|--|--|------------------------------|--------|
| ID                         | Test Case Name         | Test Case Description  | Input Data   | Expected Output              | Status |
| 3.1                        | Add Instructor Details | Steps:<br>1.Input Instructor details<br>2.Upload a photo<br>3.Press save | Instructor Name<br>Instructor ID<br>Nationality<br>Awards<br>Image | Message to indicate success. | Pass   |

Table 24:Add Instructor Details Test Case

#### 5.2.4. Test Case 04 – Find Instructor Details

| 4.Finding Instructors Details |                         |  |                                 |  |        |
|-------------------------------|-------------------------|--|---------------------------------|--|--------|
| ID                            | Test Case Name          | Test Case Description  | Input Data                      | Expected Output  | Status |
| 4.1                           | Find Instructor Details | Steps:<br>1.Select any instructor<br>2.Click Find<br>3.Then show the details | Select Name & Click Find button | Display the Nationality, Instructor ID and .Awards he/she achieved | Pass   |

Table 25:Find Instructors Details Test Case

#### 5.2.5. Test Case 05 – Booking

| 5.Booking |                |   |   |  |        |
|-----------|----------------|---|---|--|--------|
| ID        | Test Case Name | Test Case Description   | Input Data  | Expected Output  | Status |
| 5.1       | Booking        | Steps:<br>1.Input User Details<br>2.Check availability<br>3.Click Save<br>4.Connect to the PayPal | First Name<br>Last Name<br>Instructor Name<br>Diving Course<br>Booking Date<br>Booking Time<br>Number of students | Display entered details in the table & show a button to continue with PayPal | Pass   |

Table 26:Booking Test Case

### 5.2.6. Test Case 06 – Add New Equipment

| <b>6.Add New Equipment</b> |                       |   |                              |                          |               |
|----------------------------|-----------------------|---|------------------------------|--------------------------|---------------|
| <b>ID</b>                  | <b>Test Case Name</b> | <b>Test Case Description</b>  | <b>Input Data</b>            | <b>Expected Output</b>   | <b>Status</b> |
| 6.1                        | Add New Item          | Steps:<br>1. Enter Equipment name<br>2. Input description<br>3. Upload Image<br>4. Click Save | Name<br>Description<br>Image | Display Success message. | Pass          |

Table 27: Add New Equipment Test Case

### 5.2.7. Test Case 07 – Generate Reports

| <b>8. Generate Reports</b> |                       |                                    |                   |   |               |
|----------------------------|-----------------------|------------------------------------|-------------------|---|---------------|
| <b>ID</b>                  | <b>Test Case Name</b> | <b>Test Case Description</b>       | <b>Input Data</b> | <b>Expected Output</b>                              | <b>Status</b> |
| 8.1                        | Generate reports      | Generate reports about instructors | Time Duration     | Instructor name & the number of booking of each one | Pass          |

Table 28:- Generate Reports Test Case

### **5.3 Test Report**

Testing is done as part of the development process, and not at the end of the whole process. If it is not done throughout the development process then the testing is done at the end, if so the system will take many changes even in the interface design and process of interface navigations too. Thus changing these at the end is costly and time consuming.

Tests were performed iteratively. Number of bugs detected by test cases and test data was reduced with each iteration. Some bugs took more time than expected to fix. But fixing those bugs was important to system to work properly. Bugs which were found during the tests were fixed immediately. If it could not be fixed then and there, it was written down and retried later.

Unit testing, Integrated Testing, Functional Testing were done by the developer with the help of peers. Peer and client evaluation aided in achieving test goals and functional requirements of the system immensely

Peer – Githmi Tharika ( MIT, Undergraduate)

Client –Mr. Imantha Chanuka – Diving Instructor , Poseidon Diving Centre, Hikkaduwa.

- Concept Testing: Acceptable
- All Units testing: Passed
- All Integrated testing: Passed
- UI testing: Average, Acceptable
- All Functional Testing: Partially Completed
- System Testing: Partially Completed

### **5.4 Severity of the error / bug identified and possible solutions**

Concept testing, Unit Testing, Integrated testing, Functional testing tests the functionality of the system and compares with the requirements of the system which increases the reliability and quality of the system. UI testing increases the usability of the system, which then increases the quality of the system. Errors were found in Unit, Integrated and Functional Testing, but they were not catastrophic or serious errors and were tolerable. Developer was able to handle the exceptions caught when debugging the system. Errors found in UI and

Concept testing were taken in to consideration and were re-modified according to their existence in the design phase and development phase

## **7.5 Summary**

In this chapter, the developer has mentioned the test types, which the developer has followed when implementing the testing procedure and test cases of the system. The developer has further described test strategies used, test plan, sample test cases and presents the report of the overall test phase.

# **CHAPTER 6**

# **IMPLEMENTATION**

## **Outline of The Chapter**

6.1 Installation guide

6.2 User guide

6.3 Summary

## **6.1 Installation guide**

The minimum hardware and software requirement for the installation of the system as follows,

### **6.1.1.Hardware Requirements**

Hardware Requirements of the client machine. Client's machine should be in the following configuration

- Dual Core or above Processor Speed
- GB or above RAM
- 60 GB or above Hard Disk
- 256MB or above VGA Card
- Mouse / Keyboard
- Internet Connection

### **6.1.2.Software Requirements**

- Operating system – Windows 7/8/8.1/10
- Backend software – WAMP SERVER

### **6.1.3.Web Server Requirements**

Web server with internet connection. Hardware configuration,

- Core i3 processor above Processor Speed
- 4 GB or above RAM
- 200 GB Hard Drive

## **6.2 User guide**

User manual will help you throughout the system functionality enabling you, easily manage the Diving Management System. This software is implemented by G.L.M.Gamini with special customized features to satisfy the requirements of Poseidon Diving Center, Hikkaduwa. In this system, there are three authorized users. They are,

- I. Students
- II. Administrator
- III. Diving Instructors

### **6.2.1. Student side web application**

- Login
- View Diving sites details
- View Diving courses
- View Equipment details
- Search Diving instructors details
- View rates of courses
- Registration
- Online Booking
- Rating & Comments

#### **1. Home Page**

Home page has eight tabs on the top horizontal navigation bar, which could be selected as required. The menus are,

- Home
- About Us
- PADI Courses
- Equipment
- Diving Professionals
- Book Online
- Write a Review
- Login



*Figure 35:Navigation Bar*

In the Home page, students can view Special courses that they have offered for their students and the popular courses available in the diving center.

## 1. Home Page

Figure 36:Home Page Interface



### Welcome To Poseidon Diving Centre

#### Special Offers



2018 Oct 28 - Nov 12

Complete The PADI Open Water Diver And Advanced Open Water Diver Courses And Get Nitrox Course Free.



2018 Oct 28 - Nov 12

Do 4 Specialty Courses, Get 5th Free. (Cheapest Course Will Be Free).



2018 Oct 28 - Nov 12

If Two People Get A 10 Dive Package Each, Get 15% Off Room Charge (Based On 2 People Sharing And Not Available During Christmas And New Year)

#### Popular PADI Courses



##### Discover Scuba Diving

Fusce Euismod Consequat Ante. Lorem  
Ipsum Dolor Sit Amet, Cosectetuer  
Adipiscing Elit. Pellentesque Sed Dolor.  
Aliquam Congue Fermentum Nisl.



##### Emergency First Responsive Provider

Fusce Euismod Consequat Ante. Lorem  
Ipsum Dolor Sit Amet, Cosectetuer  
Adipiscing Elit. Pellentesque Sed Dolor.  
Aliquam Congue Fermentum Nisl.



##### Advance Open Water Diver Courses

Fusce Euismod Consequat Ante. Lorem  
Ipsum Dolor Sit Amet, Cosectetuer  
Adipiscing Elit. Pellentesque Sed Dolor.  
Aliquam Congue Fermentum Nisl.



##### Open Water Diver Courses

Fusce Euismod Consequat Ante. Lorem  
Ipsum Dolor Sit Amet, Cosectetuer  
Adipiscing Elit. Pellentesque Sed Dolor.  
Aliquam Congue Fermentum Nisl.

## 2. About Us

In This interface students can

- get details about the diving centre

Figure 37:About Us Interface



### Sri Lanka's First Five Star PADI Dive Centre And PADI Five Star Instructor Development Centre

Since 1973 Poseidon has been diving and teaching in the waters around Sri Lanka. With over 40 years experience we have built up the best reputation for safety in diving, professionalism and friendliness. Our five star dive center offers a range of diving experiences, from try dives and the beginner's PADI Open Water Diver course up to instructor development courses.

The center has 4 instructors, 3 PADI Master Scuba Diver Trainers and one Master Instructor with a Course Director for the IDC. PADI open water diver courses start every day and advanced open water diver, rescue diver, emergency first response and divemaster courses run on demand. Divers who wish to expand their skills can attend any of a full range of PADI specialty courses.

For qualified divers we run daily diving trips with a team of 5 highly experienced and qualified Divemasters to lead and assist the divers and visit a wide variety of beautiful wreck, reef and rock formation sites. Now we have 4 dive centres around the island, click on each one to learn more about what each center has to offer Hikkaduwa Dive Centre , Unawatuna Dive Centre , Mirissa Dive Centre and Trincomalee Dive Centre.

- get details about diving sites

Figure 38:View details about diving sites

This screenshot shows a section titled "Our Instructors" on the left and "Diving Sites" on the right. Under "Our Instructors", there are four photographs of divers with their names below them: Imantha Sembakutti, Erin Murdoch, Lal Sembakutti, and Praveen Wijesooriya. Under "Diving Sites", there is a numbered list from 1 to 4, each corresponding to a diving center: 1. Hikkaduwa Diving Centre, 2. Mirissa Diving Centre, 3. Trincomalee Diving Centre, and 4. Unawatuna Diving Centre.

| 1. | Hikkaduwa Diving Centre   |
|----|---------------------------|
| 2. | Mirissa Diving Centre     |
| 3. | Trincomalee Diving Centre |
| 4. | Unawatuna Diving Centre   |

When a student needs to know about the available diving sites in each diving center, he/she can click any diving center and view details

Figure 39:Hikkaduwa Diving sites



## Reef and Rock Formations in Hikkaduwa

### Waliduwa (Coral Garden Rocks) (Depth: 3-10m)

Ideal for beginners and SCUBA reviews. A nearby spot just in front of Coral Garden Hotel, good for small reef fishes and turtles.

### Cave (Depth 8-16m)>

A small but beautiful cave, near Waliduwa, again great for turtles and nudibranches. Next to a reef with lots of soft corals

### Hikkaduwa Gala (Depth 5-18m)

Beautiful rock formation with many reef fishes, ideal for beginners and experienced alike.

### Sunil Gala (Depth 6-18m)

Dive starts with a large rock near the surface, following this down to the rocky bottom where you can see reef fishes, groupers and moray.

### Kadavara Gala (Depth 5-18m)

A pretty rock formation similar to Sunil Gala.

### Goda Gala (Depth 8-26m)

Stunning large rocky area with lots of friendly moray to be found. Also good for big groupers, rigger fish and schools of small fish

- view gallery

Figure 40:Gallery

## Gallery



### 3.PADI Courses

Students can get details about all the diving courses they offer in their diving centre.

Figure 41:View Diving courses details



Poseidon Diving Station is the most experienced diving school in Sri Lanka in our PADI five star diving school we have 4 expert local and foreign instructors teaching all PADI dive courses up to instructor.

We have learning materials in most major languages. The reef of Hikkaduwa Marine Reserve is a few meters from the centre and we are fortunate to be able to do our shallow water training in the shelter of the reef where you can experience sea conditions and see some marine life whilst training.

An easy boat ride away we have plentiful wrecks, reef and rock formations where it is possible to see large marine life including dolphins, whale sharks and mantaray. Our dives in the Indian Ocean have visibility up to 25m in safe, warm water.



#### PADI Scuba Diver Course

Who Should Take The PADI Scuba Diver Courses ? The PADI Scuba Diver Course Is A Subset Of The PADI Open ...

[Read More](#)



#### Open Water Diver Course

Who Should Take Open Water Diver Courses ? If You've Always Wanted To Take Scuba Diving Lessons, Experience Unparalleled Adventure And ...

[Read More](#)



#### Advanced Open Water Diver Courses

Exploration, Excitement, Experiences. They're What The PADI Advanced Open Water Diver Course Is All About. And No, You Don't Have To ...

[Read More](#)



#### Master Scuba Diver Courses

Master Scuba Diver Course Is The Highest Rank You Can Achieve Before Turning Pro. To Complete This You Must Be Over ...

[Read More](#)

By clicking 'Read More' button, student can gets more details

Figure 42:View more details about courses

### Discover Scuba Diving



Discover Scuba Diving program consists of a briefing and 2 try-dives. The first dive is in shallow water within our home reef where you will be trained in basic underwater skills. On the second dive we take you to Coral Garden Rocks where you can dive up to 12m deep, all with a trained PADI instructor. With this programme you can begin on the path to the Open water course.

Have you always wondered what it's like to breathe underwater? If you want to try scuba diving, but aren't quite ready to take the plunge into a certification course, Discover Scuba Diving is for you

Poseidon Diving Centre offers this program from the beach and from a dive boat. You can try while you are on vacation in Sri Lanka. While not a scuba certification course, Discover Scuba Diving is a quick and easy introduction to the underwater world.

To join the PADI Discover Scuba Diving Program, you must be at least 10 years old. No prior experience with scuba diving is necessary, but you need to be in reasonable physical health

## 4.Equipment

Students can get details about equipment that are used during the diving

Figure 43:View Equipment details



### Scuba BCD

A Buoyancy Compensator, Also Called A Buoyancy Control Device, BC, BCD, Stabilizer, Stabilisor, Stab Jacket, Wing Or ABLJ Depending On Design, Is A Piece Of Diving Equipment With An Inflatable Bladder Which Is Worn By Divers To Establish Neutral Buoyancy Underwater And Positive Buoyancy On The Surface,



### Scuba Regulator

A Diving Regulator Is A Pressure Regulator That Reduces Pressurized Breathing Gas To Ambient Pressure And Delivers It To The Diver. The Gas May Be Air Or One Of A Variety Of Specially Blended Breathing Gases.

[Read More](#)



### Scuba Mask

A Diving Mask (Also Half Mask, Dive Mask Or Scuba Mask) Is An Item Of Diving Equipment That Allows Underwater Divers, Including, Scuba Divers, Free-Divers, And Snorkelers To See Clearly Underwater.

[Read More](#)

By clicking 'Read More' students can view more details about relevant equipment

Figure 44:View more details about equipment

## Scuba BCD



### Description

Imagine scuba diving while hovering, weightless underwater – eye to eye with a fish. How is it possible? It starts with your buoyancy control device (BCD).

A BCD does exactly what its name describes – it gives you control in the water. Sometimes you want to float on the surface comfortably. Occasionally, you want to kneel or stand on the bottom, sometimes during a training course. Most of the time, you want to drift along effortlessly mid-water, observing the scenery. To do this efficiently, you need a BCD that fits you well, along with a weight system to fine-tune your buoyancy. The BCD also holds your tank.

### Standard Features

- Expandable bladder
- Low-pressure inflator and oral inflation mechanism
- Deflator mechanism and overpressure valve
- Adjustable straps, buckles, bands or releases
- Adjustable tank band and sturdy back plate

## 5.PADI Professionals

In this interface you can select any instructor and click ‘Find’ button. Then the details of relevant instructor are displayed in the window.

Figure 45:Find information about instructors



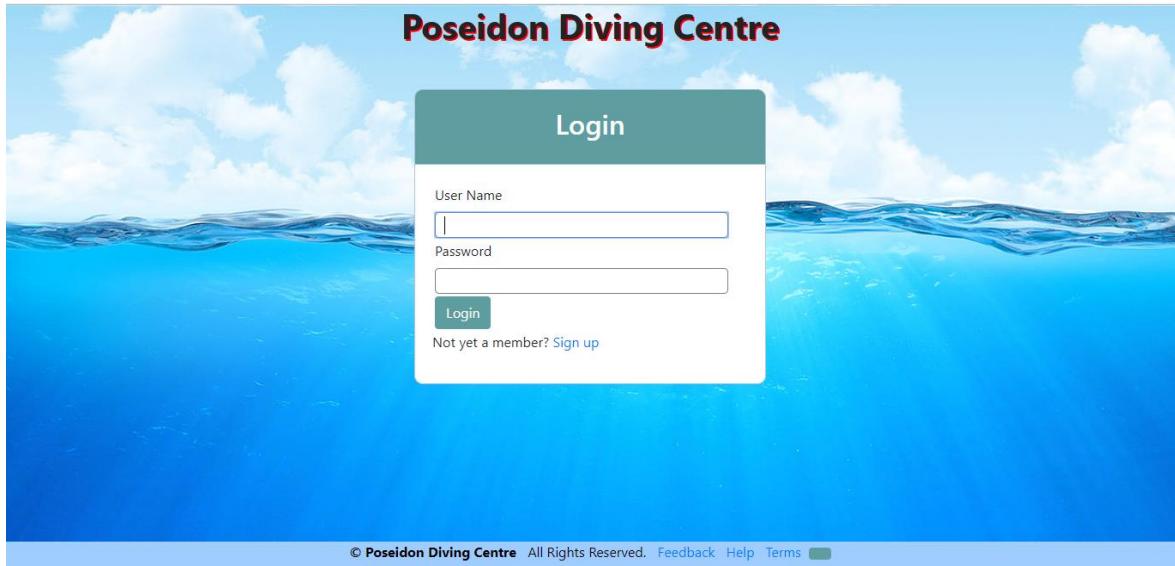
Figure 46:Display Instructor Details

A screenshot of the "Display Instructor Details" page. At the top left, there is a label "Instructor Name" followed by a search input field containing "Praveen Wijesooriya" and a "find" button. Below this, there is a label "Instructor ID" followed by an input field containing the number "4". Further down, there is a label "Nationality" followed by an input field containing "Sri Lankan". On the far left, there is a label "Awards" followed by a large text area containing the text "PADI Eliteinstructor 100+ in 2016, 2017". To the right of the search results area is a large, light gray placeholder image of a person's head and shoulders.

## 6.Booking

In the booking window, there are 3 sub menus called Rates, Registration and Booking. Firstly students have to login or sign up to the system to view prices of the courses.

Figure 47:Login form



The login form is titled "Login" and is set against a background of a clear blue sky and ocean water. It features two input fields for "User Name" and "Password", a "Login" button, and a link for new members to "Sign up". The footer contains copyright information and links for Feedback, Help, and Terms.

**Poseidon Diving Centre**

**Login**

User Name

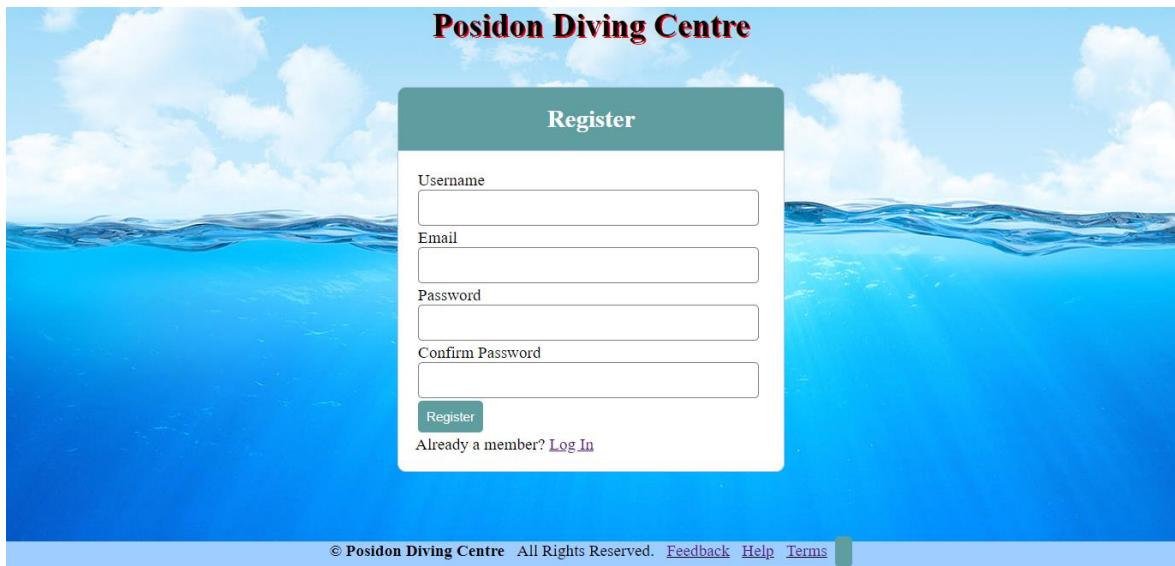
Password

**Login**

Not yet a member? [Sign up](#)

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Figure 48:Sign up form



The register form is titled "Register" and is set against a background of a clear blue sky and ocean water. It includes four input fields for "Username", "Email", "Password", and "Confirm Password", a "Register" button, and a link for existing members to "Log In". The footer contains copyright information and links for Feedback, Help, and Terms.

**Posidon Diving Centre**

**Register**

Username

Email

Password

Confirm Password

**Register**

Already a member? [Log In](#)

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## 6.1 Rates

Figure 49:-View Rates



| Course Name                                    | Price in US dollars |
|--|---------------------|
| Price in US dollars                            | 40                  |
| Single dive with tank and weights only         | 35                  |
| 2 dives in one trip with equipment             | 75                  |
| 2 dives in one trip with tank and weights only | 65                  |
| 10 dives package with equipment                | 355                 |
| 10 dives package with tank and weights only    | 305                 |
| Night dives as above plus                      | 12                  |

All dives are accompanied by PADI Divemasters. All our dives are boat dives and this is included in the cost.

## PADI Courses

| Course Name                                 | Price in US dollars        |
|---|----------------------------|
| Scuba Diver                                 | 280                        |
| Open Water Diver                            | 375                        |
| Open water referral (open water dives only) | 265                        |
| Open Water completion after online theory   | 290                        |
| Advanced Open Water                         | 330 (345 with Nitrox dive) |
| Emergency First Response                    | 195                        |
| Rescue Diver                                | 405                        |
| Scuba Review (refresher + 1 dive)           | 90                         |

Students can view all the prices of diving courses in this window

## 6.2 Online Registration

Figure 50:Online Registration

A screenshot of an online registration form titled "Online Registration". The form includes fields for First Name, Last Name, Country (set to Sri Lanka), Address, and E-mail Address. At the bottom are "Save" and "Clear" buttons.

By filling above form, students can register to the system. Then they can book their diving.

## 6.3 Online Booking

Figure 51:-Online Booking form



The screenshot shows a web-based booking form titled "Online Booking". The form includes fields for First Name, Last Name, Instructor Name (set to "Imantha Sembakutti"), Course Name (set to "PADI Scuba Diver Course"), Booking Date (set to "mm/dd/yyyy"), Booking Time (set to "--:-- --"), Number of Students (set to "No of Students"), and Course Fee. A "Check Availability" button is located next to the Instructor Name field. At the bottom are "Submit" and "Clear" buttons.

|                    |                         |
|--------------------|-------------------------|
| First Name         | first name              |
| Last Name          | last name               |
| Instructor Name    | Imantha Sembakutti      |
| Course Name        | PADI Scuba Diver Course |
| Booking Date       | mm/dd/yyyy              |
| Booking Time       | --:-- --                |
| Number of Students | No of Students          |
| Course Fee         |                         |

**Submit** **Clear**

After filling this form, then students can do their transactions through PayPal gateway.

Figure 52:-Booking Result



The screenshot shows a booking result page with a summary table and a PayPal payment button. The table lists the booking details: First Name (Githmi), Last Name (Sandeepani), Instructor Name (Imantha), Booking Date (PADI Scuba Diver Course), Booking Time (2018-10-31, 23:00:00), Course Name (3), and Course Fee (300). Below the table is a "Pay with PayPal" button.

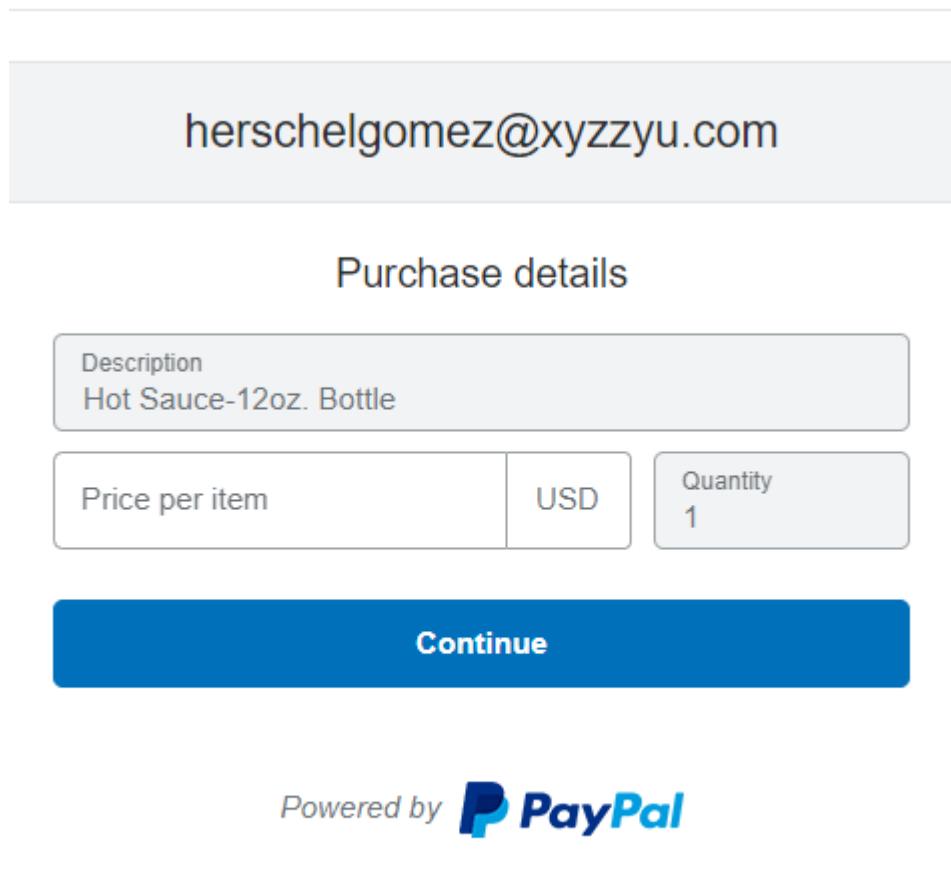
| First Name | Last Name  | Instructor Name | Booking Date            | Booking Time | Course Name | No of stu | Course Fee |
|------------|------------|-----------------|-------------------------|--------------|-------------|-----------|------------|
| Githmi     | Sandeepani | Imantha         | PADI Scuba Diver Course | 2018-10-31   | 23:00:00    | 3         | 300        |

Pay with PayPal

PayPal calculates tax and shipping based on rates that you set up in your PayPal account.

**Buy Now**

Figure 53:-Connect to PayPal



Policies Terms Privacy Feedback

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### 6.2.2. Admin side web application

- Login
- Add new equipment
- Generate reports

#### 1. Add New Equipment

Figure 54: Add New Equipment

Equipment Name

Description

Click the image to upload

Add    Clear

#### 2. Generate Reports

In here Admin can select time duration and then select ‘View Report’.

Figure 55:-select time duration

Instructor Report

From Date                          To Date

mm/dd/yyyy                         mm/dd/yyyy

View Report

Our Partners

Then it displays the number of booking that each instructor had gained during that time period

Figure 56:Display results

The screenshot shows a website for 'POSEIDON DIVING STATION SRI LANKA'. The header includes the logo, the name 'POSEIDON' in large letters, and 'DIVING STATION SRI LANKA' below it. The top navigation bar has links for Home, About Us, PADI Courses, Equipment, Reports, and Write A Review. Below the header, a dark banner features the text 'Instructor Report' in white. The main content area contains a table with three rows. The columns are 'Instructor Name' and 'Count'. The data is as follows:

| Instructor Name | Count |
|-----------------|-------|
| Erin Murdoch    | 1     |
| Imantha         | 9     |
| Lal Sembakutti  | 1     |

### 6.2.3. Instructor side web application

- Login
- Enter Instructor Details

## 1.Enter Instructor Details

Figure 57: Add Instructor Details

The screenshot shows a web-based form titled "PADI Professionals". The background features a dark, underwater-themed image of coral reefs. The form includes fields for "Instructor Name" (with an empty input box), "Nationality" (with an empty input box), "Awards" (with an empty input box), and a placeholder for a profile picture labeled "Click the image to upload". A "Submit" button is located at the bottom right.

|                                       |                      |
|---------------------------------------|----------------------|
| Instructor Name                       | <input type="text"/> |
| Nationality                           | <input type="text"/> |
| Awards                                | <input type="text"/> |
| Click the image to upload             |                      |
| <input type="button" value="Submit"/> |                      |

## 6.3 Summary

This chapter the developer has discussed about the implementation of the Diving Management System. It includes the implementation specifications such as software requirements and hardware requirements installation guide, User Manual, which guides the user to how to use the system.

# **CHAPTER 7**

# **CONCLUSION**

## **Outline of The Chapter**

- 7.1 Degree of objectives met
- 7.2 Usability, accessibility, reliability and friendliness
- 7.3 User's response
- 7.4 Limitations and drawbacks
- 7.5 Future modifications, improvements and extensions possible
- 7.6 Summary

## **7.1 Degree of objectives met**

The main objective of “dive” diving management system is providing quality service to the customers and as well as ease the business processes effectively and efficiently. The system enables the students to register and book their divers online. It reduces the difficulties of most business activities such as security, handle multiple callers, call charges etc

### **1. Improve efficiency and accuracy**

Most of the activities which are done by manually move in to automated system. Therefore, administrator's activities are reduced and then the security issues are minimized.

### **2. Minimize cancellation cost**

Students can view the details of instructors and their time table. Therefore, they can select their instructors with date and time according to their preference. Because of that reduce the cancellation cost which have to pay by students due to inconveniences.

### **3. Provide help to instructors and admin**

Students can view all the details about diving center and diving before they are going to the diving. Therefore, instructors can reduce their time to explain about equipment and courses. As well as it is easy to admin to provide details about diving center.

### **4. Improve decision making**

The management decision making process is provided by the new system to develop strategic plans to increase the revenue from the diving

## **7.2 Usability, accessibility, reliability and friendliness**

System design was done considering the qualitative approach and constraints presented. So when considering usability, Graphical User Interfaces were designed considering the usability engineering concepts learned. So that the users are satisfied and their resources are utilized in a satisfactory level at the design phase.

And when considering accessibility; the functionalities used in the system have been designed so that only the necessary privileges are designed for the relevant user type giving appropriate access levels.

When considering reliability encryption will be used for secured data such as passwords to protect them and only the personnel with accurate user credentials will be allowed to access the system.

User friendliness will be provided from the features like easily understandable GUIs and functionalities and the real-time responsiveness of the system.

## **7.3 User's response**

Users can get quick response time when they are using some features such as login, online registration, online booking etc. As well as provide reliable reports to the administrators. Therefore, they can save their time and cost.

## **7.4 Limitations and drawbacks**

With the time and resource limitations, “dive” – Diving management System has its limitations and drawbacks with the current completion state.

Mainly there are two limitations in this stage. First one is with the security issues it is hard to cover salary payments. Next one is the accommodation facility. This is a vast area and with the time limitations this is not covered in this stage.

Due to expertise gathered to continue the process was limited it is not feasible to design a perfectly suitable solution for the problems identified. And since time is limited the iterative approach has been limited so some mistakes may not have been able to identify during the process.

## **7.5 Future modifications, improvements and extensions possible**

There are several further modifications to the system, which will enhance the quality of the system in terms of usability, reliability and accessibility.

- Improve the system to be used in other platforms
- Develop a mobile application which can use for all users
- Increase the types of reports which give more accurate data about the diving

## **7.6 Summary**

In this chapter, the author has described about the degree of objectives met after implementing the project, limitations and drawbacks, and further development of the project.