AITCS

MIPSeR: An Application for Malaysia Island Packages and Services Reservation

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Abstract: Island is part of tourism that contributes to financial development in Malaysia. Island lovers are currently facing problems when they need to find island packages at various platforms like Google Search, Facebook and Twitter to look for island packages and prices. This makes island travelers hard to compare the package prices and package contents. Currently, there is no available system that collects and summarizes all information about island packages in Malaysia. Other than that, people also had difficulty getting information about the islands and the estimation of time taken to reach the island, start planning for an island trip, and customize an island travelling package. In this mobile application, travelers can search for all island travelling packages offered by the west coast islands of Peninsular Malaysia and Borneo Coasts Islands in Malaysia. It aims to assist island travelers by providing a platform for them to search and purchase island travelling packages for all islands on the East Coast and Borneo Coast in Malaysia with using Razor pay as the payment method. The prototyping method is selected to implement the whole application. The proposed application is integrated with Firebase Database to store all information and the backend language used is Java for the application development. At the end of the project development, it is shown that the application has successfully been developed and the objectives have been achieved.

Keywords: Island Packages, Malaysia, Mobile-Based

1. Introduction

An island is a body of land surrounded by water, above water at high tide and smaller than a continent according to the geographer Stephen Royle [1]. According to Malaysia's Department of Survey and Mapping, the nation is made up of 878 islands [2].

Nowadays, people facing pressure in the working environment or pressure in study hence an island trip which is mind relaxing and nature enjoying is preferable. Lots of packages offered by islands in Malaysia, so this is the chance for island travellers to have a visit and gain a great experience of snorkelling and diving in islands on the East Coast of Peninsular Malaysia and islands along the coasts

of Borneo in Malaysia. Islands on the East Coasts of Malaysia are popular with snorkelling and diving due to the colourful coral reefs and crystal-clear waters in the islands. The proposed application provides information on all islands in Kelantan, Pahang, Terengganu, Sabah and Sarawak in Malaysia. It is not only provided with island travelling packages but also provided travellers with customization of island travelling packages.

The proposed application is developed to analyse and design an informative, user-friendly and helpful application for island travellers in Malaysia; also, to develop an Android-based mobile application of the island that promoting and servicing islands travelling packages in Malaysia. Other than that, the objective is to evaluate the application to identify whether all functions work beautifully and comply with all system requirements.

For the methodology, system analysis and design, implementation and testing and last but not least the results and discussions will be organized as follows in Section 2, Section 3, Section 4, Section 5 and Section 6 respectively.

2.   Related Work

2.1   Introduction

Island travelling is considered as part of leisure activity done by a person or a group of people to take a rest and enjoy the beauty of islands. Travelling means to go from one place to another either by car, train, plane or ship for taking [3]. Before the proposed application is being developed, travellers need to find island travelling packages via multiple platforms like Facebook, Instagram and Twitter. They have finished lots of time finding for the island travelling packages. The selection of island travelling packages promoted by island travelling agents are quite limited and there is no customization for the island travelling packages. Some of the island packages promoted by island agents is too expensive and some of the activities included in the island packages are not needed by the travellers. The proposed application and the three other related existing applications are being compared and will show as follow in Section 2.3. This section is mainly discussed to identify the problem statements and finding solutions to overcome the difficulty faced by travellers.

2.2   The Proposed Application

MIPSeR is an application for Malaysia Island Packages and Services Reservation. The proposed application is significantly developed to assist travellers in finding island travelling packages. Instead of taking much time searching for island travelling packages on multiple platforms like Facebook, Instagram and Twitter, the proposed application indeed helps travellers to save more time on searching for island packages more easily and effectively. There are lots of island travelling agents inside the proposed application that promote various selection of island travelling packages for the islands in the East Coast and Borneo Coasts in Malaysia. East Coast islands including Pulau Perhentian, Pulau Tenggol and Pulau Besar while the islands in Borneo Coast of Malaysia are Pulau Penyu, Pulau Tiga and Pulau Mataking.

For the user management module, both users either travellers or agents need to register for an account and log in to the application. All the island information will be inserted by island travelling agents to give sight to travellers on the background of islands and this is discussed in the island information module. For the customize packages module, travellers need to contact the administrator personally to discuss the island packages they want through WhatsApp chat with the admin The fourth module in the proposed application is the payment module which takes place when travellers make orders on the island travelling packages promote by the island agents within the application. Razorpay

is used as the payment method for the proposed application as it is a payments solution which allows businesses to accept, process and disburse payments [4].

2.3   Study on the Similar Existing Applications

Three similar existing applications have been chosen to be compared with the proposed application. These existing applications are Big Island Revealed [5], Travel Planner [6] and TripBucket [7]. Table 1 below shows the comparison table between these three existing applications and the proposed application.

Table 1: Comparison Between Three Existing Applications and The Proposed Application

Item	Applications Features	Big Island Revealed	Travel Planner	TripBucket	Proposed Application
1	Android based	/	/	/	/
2	Available in Malaysia	X	/	/	/
3	Booking available	/	/	X	/
4	Comment and rating	/	X	/	/
5	Current issue updates	/	X	/	/
6	Flight booking	X	/	X	X
7	Free cancellation	/	X	X	/
8	Island description	/	/	X	/
9	Island searching	/	/	/	/
10	Luggage checklist	/	X	X	X
11	Nearby spot recommendation	/	/	/	X
12	Island travelling packages selection	X	X	X	/
13	Review trip experience	/	X	/	/
14	Safety measures	/	X	X	X
15	Suggestion box	/	/	/	/

3.   Methodology

In this section, the software development methodology of the developed application will be explained in detail with a step-by-step explanation in the subtopics below. The prototyping method has been chosen as the method to develop the proposed application. Hence, the whole development of the proposed application starts with the planning phase, followed by the analysis phase, design phase and end with the implementation phase. Users can have a view of every stage of the implementation and can request any additional features or requirements if needed. The development of the proposed application will only proceed to the next part after users are satisfied. 3.1 Prototyping Model

A prototyping model is known as a software development model in which a prototype is built, tested and modified until an acceptable prototype is established which generates a base to construct the final system or software of the proposed application [8]. During the application development, users can have a view on the flow of every stage in the development of the proposed application and elimination will be done to fulfil user requirements before proceeds to the next steps. Figure 1 shows the prototyping model phases which performs the planning phase, analysis phase, design phase and implementation phase. Analysis, design and implementation phases are performed concurrently to quickly develop a simplified version of the proposed application. System prototyping very quickly provides a system for users to evaluate and get feedback on the proposed application.

The planning phase is the phase to figure out the problems faced by the travelers during island travelling. The problems such as hard to find island travelling packages and very limited sources to find more island packages. After figuring out the problems, the developer proceeds to the objectives to be achieved to overcome travelers' problems and proceed to the analysis phase. In the analysis phase, developers will analyze the problems faced by travelers from the distributed Google Form and come out with a series of solutions. Next, the design phase starts with designing the user interfaces of the proposed application depends on the topic of island travelling and services reservation. The interface designs will start with wireframe designs to make travelers know the functionalities proposed by the application. The last phase in prototyping methodology is the implementation phase. Developers have to make sure all the user requirements are met and proceed with developing the proposed application.
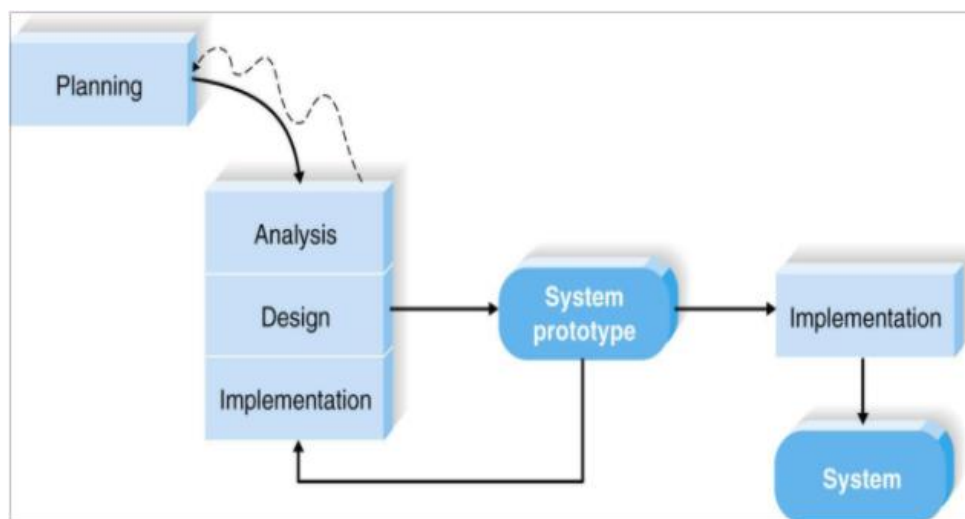

Figure 1: Prototyping Model Phases [9]

3.2   System Development Workflow

There are about five phases involved in application development. These phases are planning, analysis, designing, implement and testing phases. These five phases are tabulated in Table 2 with explanations.

Table 2: System Development Workflow Activities of the Proposed Application

Phases	Activities	Outputs
Planning	Suggest the application name of the application	Project proposal Gantt chart
	Identify the problem statements, objectives, project scopes, expected results and project significance	Literature review Comparison table
Analysis	Define the hardware and software specifications	Hardware and software requirement
	Analyse user requirements	User requirements
	Identify the functional and non-functional requirements	Functional ad non-functional requirements
	Draw and sketch UML diagrams	UML diagrams
Design	Sketch wireframes	Wireframes
	Design user interfaces	User interface designs
	Create design specifications	Database connection
Implementation	Develop and integrate system prototype modules	Malaysia Island Packages and Services Reservation (MIPSeR)
	Perform initial testing	

4.   System Analysis and Design

At the stage of system analysis and design, the proposed application will be developed and improved based on the user requirements in terms of system analysis and system design. Diagrams such as activity diagram and entity-relationship diagram (ERD) will be shown while for the main wireframe design, the user home page will be shown with a clear explanation of the functionalities of the page.

4.1   System Analysis

An activity diagram is drawn and sketch to represent all the processes that take place in the proposed application from start to end. The process will be started at user registration until they successfully purchasing the island travelling packages. Other than that, a class diagram shows all the classes involved in the proposed application.in the proposed application.
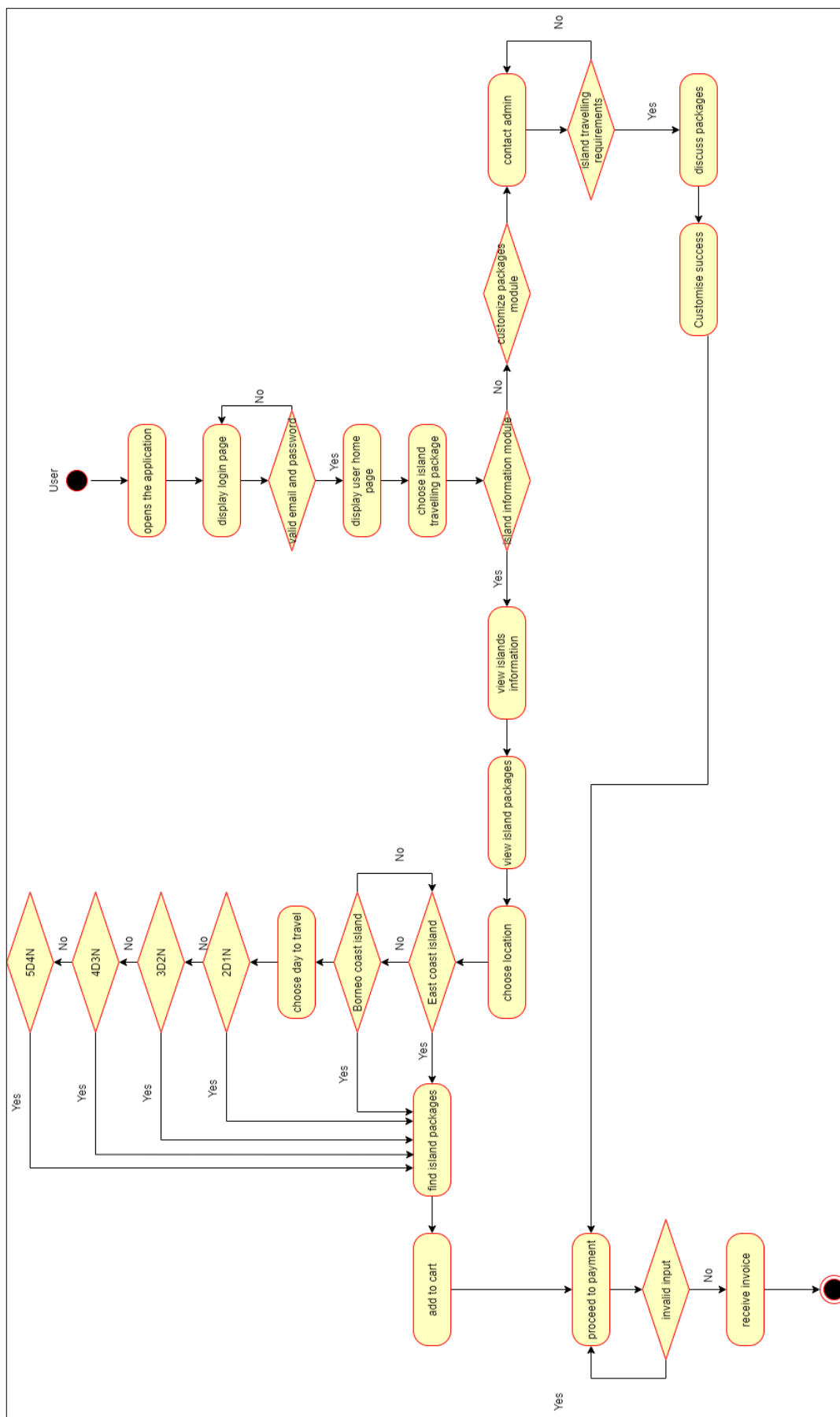
Figure 2: Activity Diagram of the Proposed Application

Figure 2 shows the workflow of the proposed application of travelers purchasing island travelling packages. First, travelers need to open and log in to the application using a valid email address and password. It will redirect travelers to the homepage after the authentication successful. After that, travelers can go through the island information of the islands to read and know the background of the islands. Next, they can start searching for the island travelling packages that they wanted according to the island package categories and proceed to the payment. If there are no island packages that the travelers wanted, they can customize island travelling packages by themselves and end with the payment after customization is done.
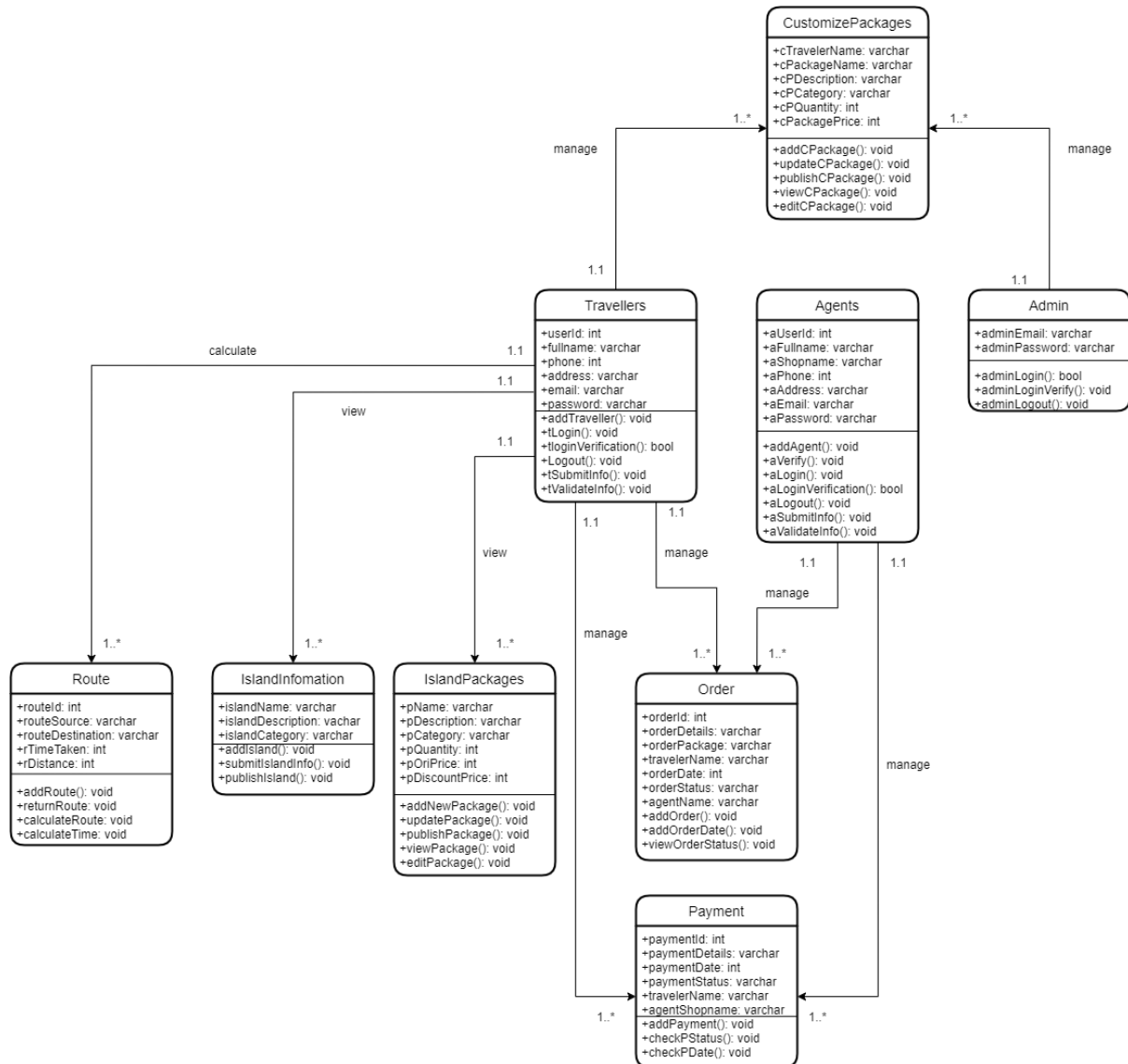

Figure 3: Class Diagram of the Proposed Application

Figure 3 shows the class diagram that will be displayed the different objects in the proposed application with their attributes, operations that occurred and the relationships among these objects. There are 9 classes that take place in the proposed application. The classes here are CutomizePackages, Travellers, Agents, Admin, Route, IslandInformation, IslandPackages, Order and Payment. Inside these classes. All of the above classes show the relationship of one-to-many.

4.2   System Design

The system design is the interface implemented in the proposed application. Figure 4 shows the wireframe of the user home page. This wireframe consists of a navigation drawer button, logout button, purchase packages button, customize packages button and route button.
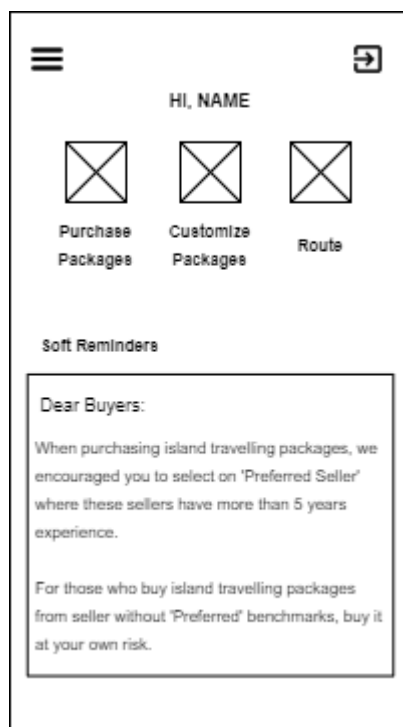

Figure 4: Wireframe of User Homepage

5.   System Implementation and Testing

System implementation and testing is the phase for users to run and check the functionalities implemented in the proposed application to make sure the functions are well-performing.

5.1   System Implementation

System implementation and testing is the phase for users to run and check the functionalities implemented in the proposed application to make sure the functions are System implementation part will be displayed with user interface designs and the code segment part for data connection in the proposed application. The user interface designs shown are traveler registration page, traveler profile page, login page, island packages customization page, shop details page, island information page, add new island packages page, order details page and Razor pay payment page.

The application enables travelers to purchase island travelling packages for all islands available in East Coast and Borneo Coast Malaysia like Pulau Perhentian and Pulau Semporna using the payment method of Razor pay. Other than that, if the travelers do not find any island travelling packages that they wanted, they can go and contact the administrator for customizing the island travelling packages based on their requirements like days to stay and budget limit via WhatsApp chat. Travellers can also know some details or background of the islands based on the island information which is updated by the administrator into the application. Travellers can also determine whether the island agents are preferred agents or not by looking at the benchmark of preferred to avoid themselves from getting

cheated. Next, they can also identify whether the agents are currently online by looking at the online status of the gents. Travellers can understand more about the island agents by looking at the shop details like location, email address and phone number. well-performing.
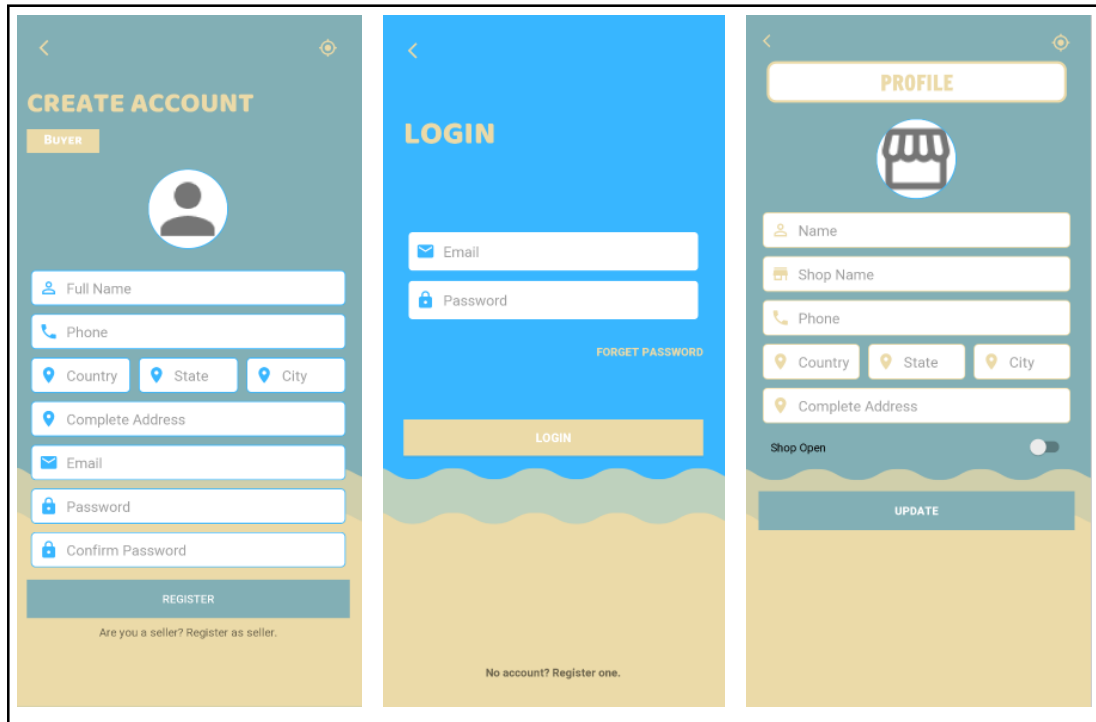
Figure 5: Example interfaces of user management module

Figure 5 shows a user management module that explains the registration, login and profile editing for users in the proposed application. During registration, travelers need to input their information line full name, phone, complete address, email address, password and confirm password. Once the registration is a success, travelers need to log in to the application using a valid email address and password. Travellers will redirect to the user home page after the authentication during login is done and they can proceed to manage their profile information.
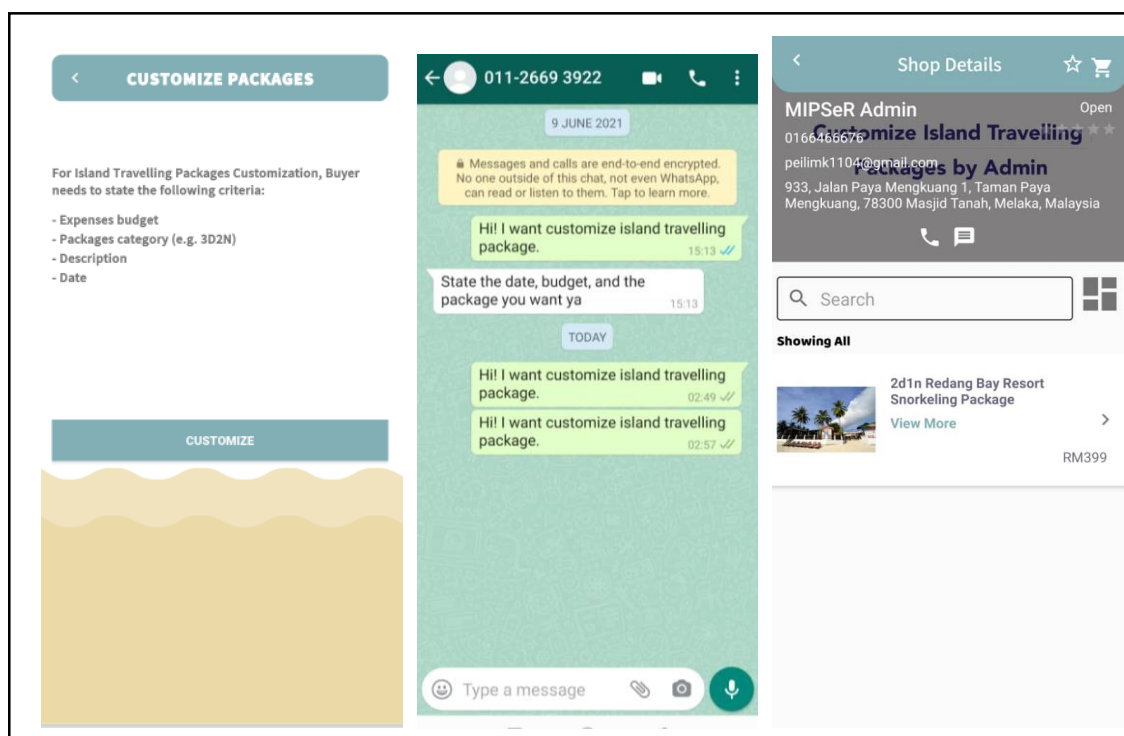
Figure 6: Example interfaces for customize packages module

Figure 6 shows customize packages module which is the special feature of the proposed application where travelers can contact the administrator to customize the island travelling packages expenses budget limit, package category and state their requirements. MIPSeR administrator is the only shop name that allows island travelling packages in the proposed application and is handling is the administrator.

Figure 7: Example interfaces of island information module

Figure 7 shows the island information module which is the explanation of islands information and background begins. Other than that, it also consists of add new island travelling packages included the description of the packages about the activities, accommodation and meals.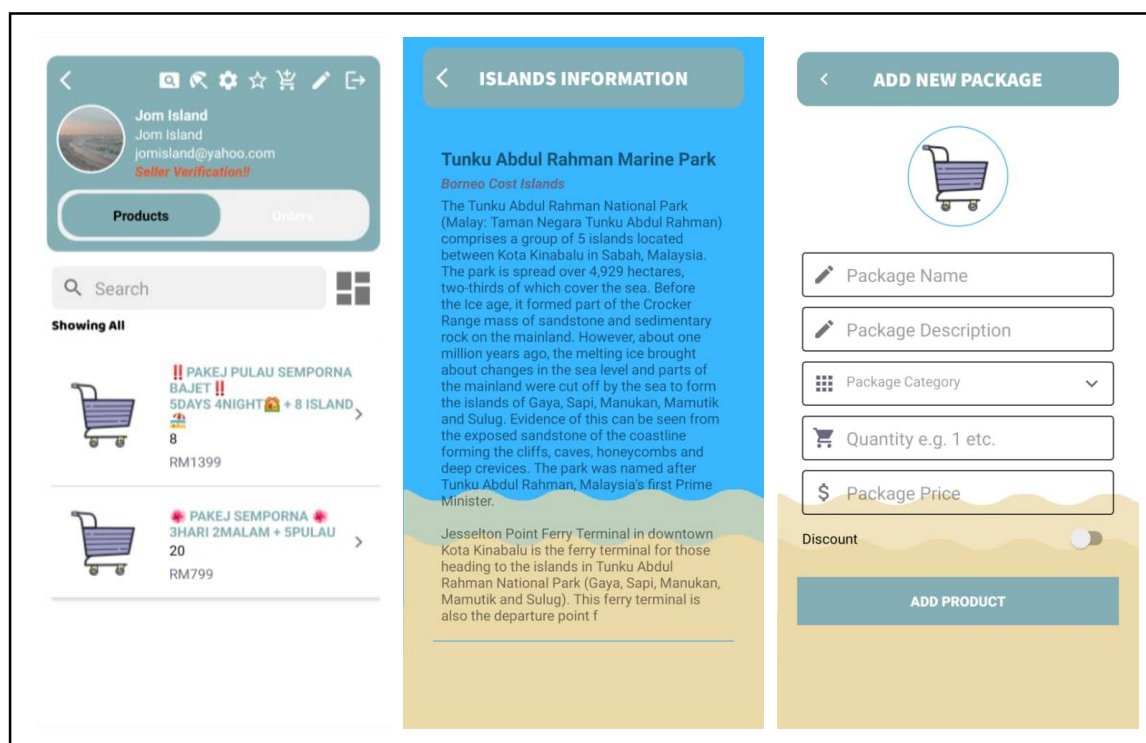 The module is handled by the island agents for adding, editing and deleting. Travellers can only view, add to cart and purchase.
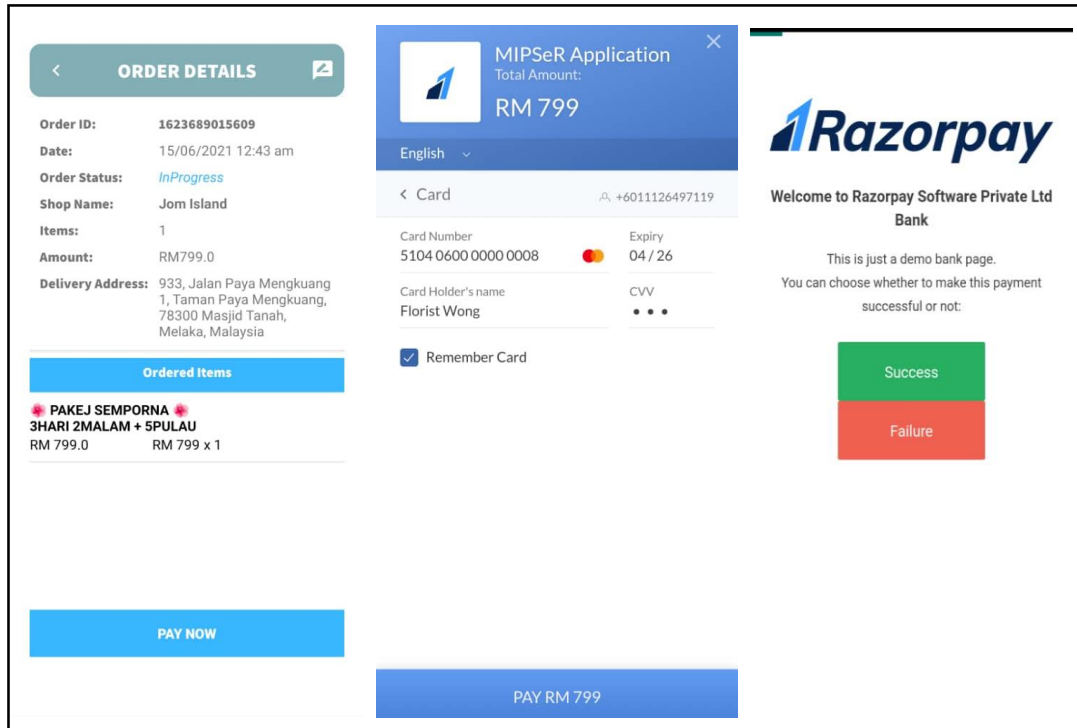
Figure 8: Example interfaces of payment module

Figure 8 shows the workflow of payment in the proposed application. Travellers view and pay for the island travelling packages they wanted using the Razor pay. They will start entering the total amount of the island travelling packages of their purchase, then insert the card number for test payment and lastly Razor pay demo page with success or failure page will appear at the last step of payment.

```
DatabaseReference databaseReference = FirebaseDatabase.getInstance().getReference( path: "Users");
databaseReference.child(firebaseAuth.getUid()).setValue(hashMap)
```

Figure 9: Code Segment for Database Connection

Figure 9 shows the "Users" in the folder that stores all the information of users upon registration like the profile image, address, full name, email and phone number and the database connection used is Firebase Database.

```java
private String email, password;
private void loginUser() {
    email = loginEmail.getText().toString().trim();
    password = loginPassword.getText().toString().trim();
    if (!Patterns.EMAIL_ADDRESS.matcher(email).matches()) {
        Toast.makeText( context: this, text: "Invalid email address!", Toast.LENGTH_SHORT).show();
        return;
    }
    if (TextUtils.isEmpty(password)) {
        Toast.makeText( context: this, text: "Please enter password", Toast.LENGTH_SHORT).show();
        return;
    }
    progressDialog.setMessage("Logging in...");
    progressDialog.show();

    firebaseAuth.signInWithEmailAndPassword(email, password)
            .addOnSuccessListener(new OnSuccessListener<AuthResult>() {
                @Override
                public void onSuccess(AuthResult authResult) {
                    //logged in successfully
                    makeMeOnline();
                }
            })
            .addOnFailureListener(new OnFailureListener() {
                @Override
                public void onFailure(@NonNull Exception e) {
                    //log in failed
                    progressDialog.dismiss();
                    Toast.makeText( context: LoginActvity.this, text: ""+e.getMessage(), Toast.LENGTH_SHORT).show();
                }
            });
}
```

Figure 10: Code Segment for Login Activity

Figure 10 shows the method used for login is signInWithEmailandPassword with the implementation of Authentication in Firebase Database.

```java
try {
    JSONObject options = new JSONObject();
    options.put( name: "name", value: "MIPSeR Application");
    options.put( name: "description", value: "Total Amount: ");
    options.put( name: "image", value: "https://s3.amazonaws.com/rzp-mobile/images/rzp.png");
    options.put( name: "currency", value: "MYR");
    options.put( name: "amount", amountT);

    JSONObject preFill = new JSONObject();
    preFill.put( name: "email", value: "test@razorpay.com");
    preFill.put( name: "contact", value: "+6011126497119");

    options.put( name: "prefill", preFill);

    co.open(activity, options);
} catch (Exception e) {
    Toast.makeText(activity, text: "Error in payment: " + e.getMessage(), Toast.LENGTH_SHORT)
            .show();
    e.printStackTrace();
}
```

Figure 11: Code Segment for the Razor pay

Upon the payment confirmation page, it will show all the details like name, description, currency and amount and these code segments of payment is shown in Figure 11. The name displayed on the payment confirmation page is the MIPSeR application and the total amount is the total amount of the island packages selected by the traveler. The currency shown will be MYR which is Ringgit Malaysia.

Next, the traveler needs to enter their card number, expiry date of the card and the card CVV to succeed in the payment.

5.2   System Testing

System testing is conducted to make sure the MIPSeR application works perfectly and to make sure the problems faced by travelers are solved. This section includes functional testing and user acceptance testing which show as follows.

5.2.1   Functional Testing

The project test plan is a documentation part that outlines the proposed application functions to be tested, the specific tests that will be performed, how the tests will be performed, who will be responsible for each test and expected results from the proposed application.

Table 3: Testing Results of Register Function

No	Test Case	Expected Output	Actual Output
1	Incomplete fields	An error toast message popped out asking users to input data during registration	As expected
2	Complete fields with no current location	An error toast message popped out showing turn on GPS button to detect current location and registration failed	As expected
3	Complete fields with invalid input of full name, phone, complete address, email address, password and confirm password	An error toast message popped out and registration failed	As expected
4	Complete all fields with duplicate email address	An error toast message popped out saying that the email address has been registered by other users and registration failed	As expected
5	Complete all fields with valid information	Registration succeed, user information saved into firebase database and redirect users to homepage	As expected

Table 4: Testing Results of Payment Function

No	Test Case	Expected Output	Actual Output
1	Travelers browse and select island travelling packages and add them into cart	After adding the island packages into the cart, then it will proceed to payment	As expected
2	Travelers shopping cart is empty	Only when there is an item in the shopping cart then the traveler can proceed to payment	As expected

Table 3 and Table 4 above show two of the test plans carried out to test functionalities of the proposed application and the result of every test is recorded in the expected outputs. Test plans for the register function and payment function are highlighted here. The register function is considered the

most important part as the users need to create an account first before they can log in to the proposed application. Users need to register for creating an account before using the application. They need to fill in all fields which are full name, phone, address, email address, password and confirm password to complete and succeed their registration. The payment function highlighted here is to explain the flow of order and the order is successful with the implementation of Razor pay. After travelers adding the island packages into the cart, they will proceed with the Razor pay payment method. Next, it will redirect travelers to the Razor pay gateway. Travellers need to fill in their card number, expiry date of the card and the card CVV to succeed the payment else if the shopping cart is empty, payment cannot be completed.

5.2.2 User Acceptance Testing

User acceptance testing is conducted via the distribution of Google Form to provide users with the opportunities to interact with the application and to determine if the functions are as expected. This test is also to assist developer to figure out some functions that may be ignored by them during application development.
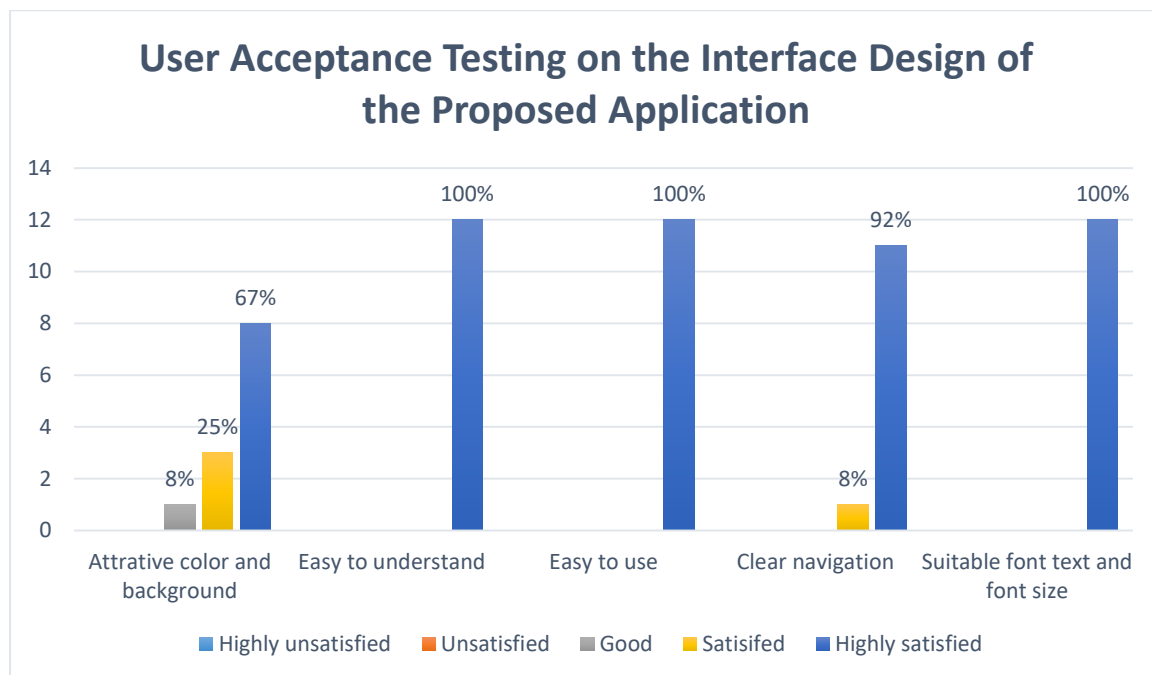
Figure 12: Chart results for testing of interface design

Based on the results from the user acceptance testing carried out on the interface design displayed in Figure 12, users are somehow feeling good about the colour and background. However, they request to make the background and colour more attractive. All of the respondents are highly satisfied with the interfaces which are easy to use and easy to understand. Clear navigation is considered as satisfied with the respondents and they are totally satisfied with the font text and font size used in the proposed application.

Figure 13: Chart results for testing on the functions

Based on the testing results from the functions of the proposed application displayed in Figure 13, users are fully satisfied with the registration part where they can understand well what they should do to register an account like input email address. The login function is also quite easy for them as all of the respondents are highly satisfied. Feedbacks on the island information function and the route function is so far so good for the respondents as some think the function is good and some are not. Order fu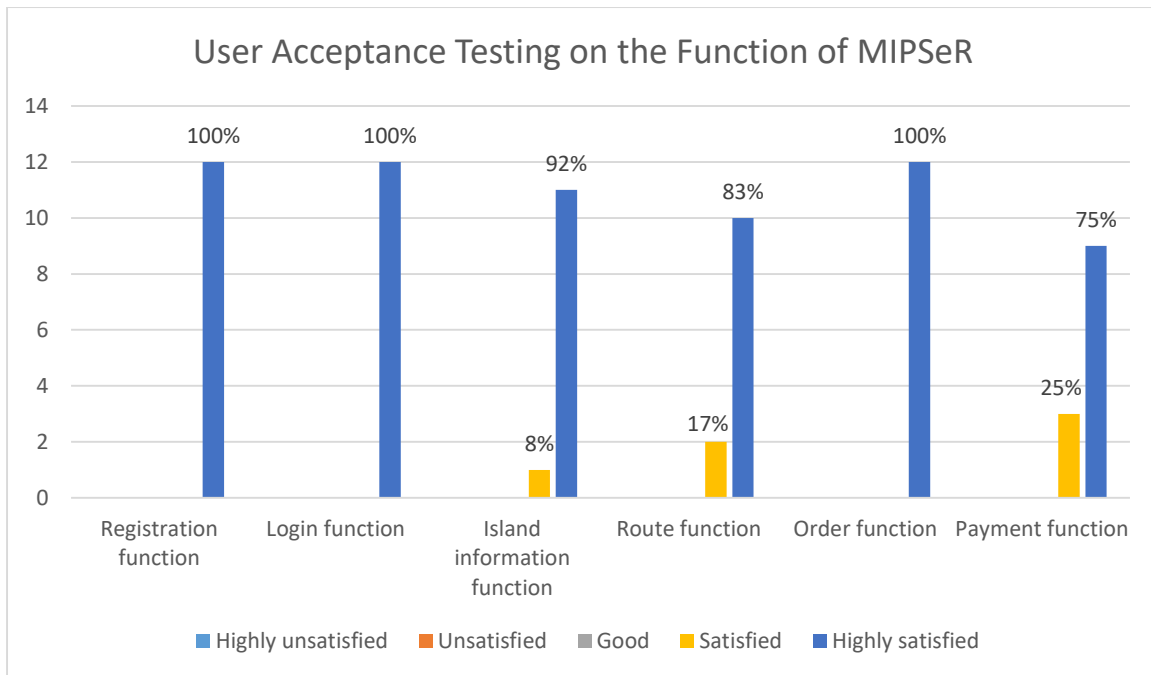nction is easy to apply but for the payment function, some of the users are still new to Razor pay which will lead them to worry about the security of the payment and they prefer online banking more on Maybank2u which is well-known and secure for all Malaysians to use.

6. Discussion and Conclusion

This paper consists of the table of comparison between three existing applications and the proposed application, activity diagram, class diagram, wireframe design, examples of interfaces in each module of the proposed application, functional testing of the proposed application along with the results of user acceptance testing. The application is built to enable travelers to purchase the island travelling packages from MIPSeR using the Razor pay payment method. Furthermore, travelers can also customize their island travelling packages by stating their requirements like budget limit and activities included in the package to the administrator for customization and travelers can give a rating to the agents after done purchasing island travelling packages so that other travelers can review the rating of agents before they want to purchase island travelling package from agents. The application is successfully developed, problems faced by travelers are solved and also gets good feedback from the users but somehow there is still some functionalities that need to be improved like the number of seats left for each of the island travelling package will automatically decrement without manually decrement. Other than that, the limitation also includes the payment method which is only supported by Razor pay.

Acknowledgement

Appendix A

My Team | MIPSeR Application

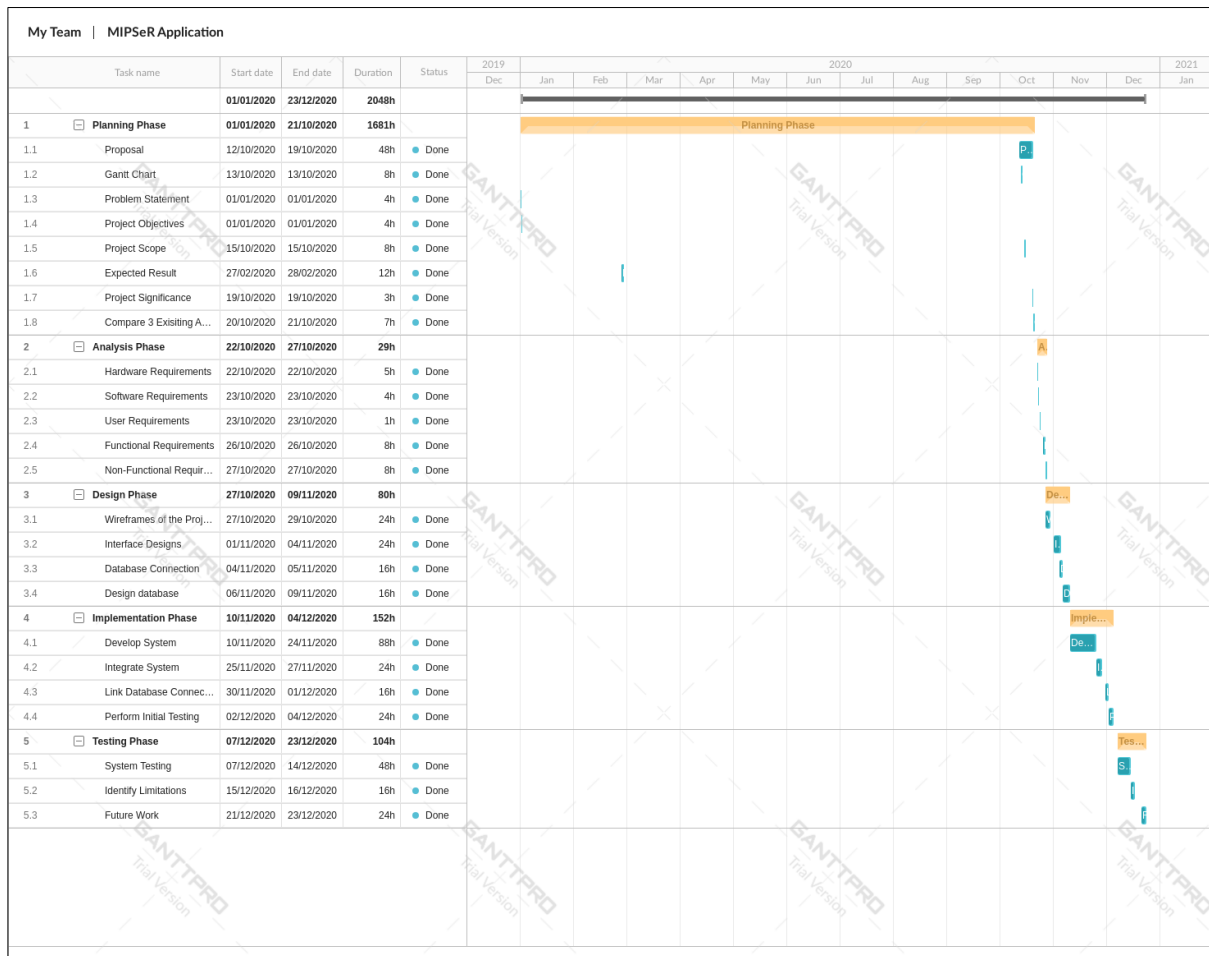|	Task name	Start date	End date	Duration	Status	2019 Dec	2020	2021 Jan
		01/01/2020	23/12/2020	2048h				
1	Planning Phase	01/01/2020	21/10/2020	1681h			Planning Phase	
1.1	Proposal	12/10/2020	19/10/2020	48h	● Done			
1.2	Gantt Chart	13/10/2020	13/10/2020	8h	● Done			
1.3	Problem Statement	01/01/2020	01/01/2020	4h	● Done			
1.4	Project Objectives	01/01/2020	01/01/2020	4h	● Done			
1.5	Project Scope	15/10/2020	15/10/2020	8h	● Done			
1.6	Expected Result	27/02/2020	28/02/2020	12h	● Done			
1.7	Project Significance	19/10/2020	19/10/2020	3h	● Done			
1.8	Compare 3 Exisiting A…	20/10/2020	21/10/2020	7h	● Done			
2	Analysis Phase	22/10/2020	27/10/2020	29h				
2.1	Hardware Requirements	22/10/2020	22/10/2020	5h	● Done			
2.2	Software Requirements	23/10/2020	23/10/2020	4h	● Done			
2.3	User Requirements	23/10/2020	23/10/2020	1h	● Done			
2.4	Functional Requirements	26/10/2020	26/10/2020	8h	● Done			
2.5	Non-Functional Requir…	27/10/2020	27/10/2020	8h	● Done			
3	Design Phase	27/10/2020	09/11/2020	80h				
3.1	Wireframes of the Proj…	27/10/2020	29/10/2020	24h	● Done			
3.2	Interface Designs	01/11/2020	04/11/2020	24h	● Done			
3.3	Database Connection	04/11/2020	05/11/2020	16h	● Done			
3.4	Design database	06/11/2020	09/11/2020	16h	● Done			
4	Implementation Phase	10/11/2020	04/12/2020	152h				
4.1	Develop System	10/11/2020	24/11/2020	88h	● Done			
4.2	Integrate System	25/11/2020	27/11/2020	24h	● Done			
4.3	Link Database Connec…	30/11/2020	01/12/2020	16h	● Done			
4.4	Perform Initial Testing	02/12/2020	04/12/2020	24h	● Done			
5	Testing Phase	07/12/2020	23/12/2020	104h				
5.1	System Testing	07/12/2020	14/12/2020	48h	● Done			
5.2	Identify Limitations	15/12/2020	16/12/2020	16h	● Done			
5.3	Future Work	21/12/2020	23/12/2020	24h	● Done			

Figure 12: Gantt Chart of the Proposed Application
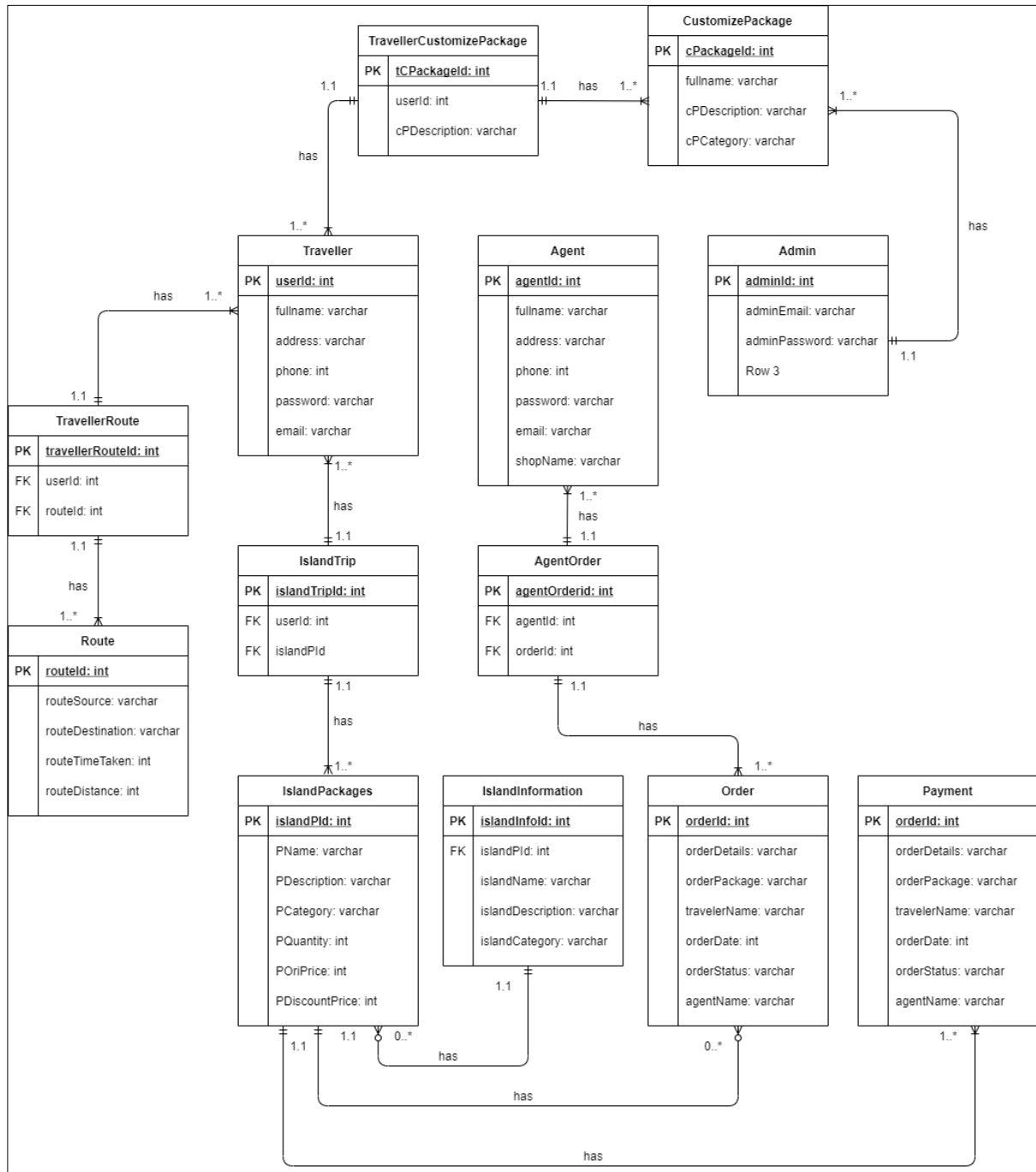
Appendix B

Figure 13: ERD Diagram of the Proposed Application

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