IF3E Project Report

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Introduction

During this part of the semester (*i.e. A24*) we chose to undertake the first subject which was designing a management system for a travel agency. Thus we decided to create a fictive company called ∼*Martine Travels*[1]∼ as a reference to those books in which the latter goes to different places such as the beach, mountain, and so on...
The goal of this document is to explain every feature, and choice made along the way as precisely as possible. However please keep in mind that this document is not "color-blind friendly" as there are many different colored links between tables on the diagrams.

[1]

Contents

1 Subject Presentation

1.1 Main Objectives

The primary goal of this project is to design a *relational database* in `SQL` in order to manage various daily tasks processed in a travel agency. Staff members have indeed many things to deal with such as clients management, accommodations and transportation bookings (*as packages or not*), payment processing, ... If not organized properly a simple task such as creating a client account could become a hassle and lead to several issues (*e.g efficiency loss, time delays, losing records, upsetting clients, losing contracts with other companies, ...*)

Thus designing a first-rate database system to organize and sort data would allow a company such as *Martine Travels* to be outstandingly fast, efficacious and versatile which would consequently help in gaining customer approval and improve sales.

1.2 Key Features

In order to respect the subject specifications we had to design a database model which **would** allow the developer to implement the following:

- Login & User Authentication
- Client Management
  - Detailed record of clients & their information (*e.g name, email, phone, travel preferences, ...*)
  - Account creation, update or deletion
  - Loyalty points based on client history (*i.e allow to offer discounts and/or personalized package*)
- Travel Package Management
  - Various travel package types (*e.g vacation, business trip, safari, ...*)
  - Details about destination, duration, price and itinerary
  - Ability to assign n transportation and/or accommodation options within a single package
- Transportation Booking
  - Various ways of transportation (*e.g train, car rentals, bus, airplane, ...*)
  - Details about departure and arrival dates, ticket numbers and seat
  - Track transportation providers
- Accommodation Booking
  - Various types of accommodations (*e.g hotels, hostels, resorts, inns, ...*)
  - Details about room types, provided amenities, check-in/out dates
  - Room availability
- Reservation System
  - Ability to book entire packages or individual services (*i.e transportation or accommodation*)
  - Generate booking confirmations

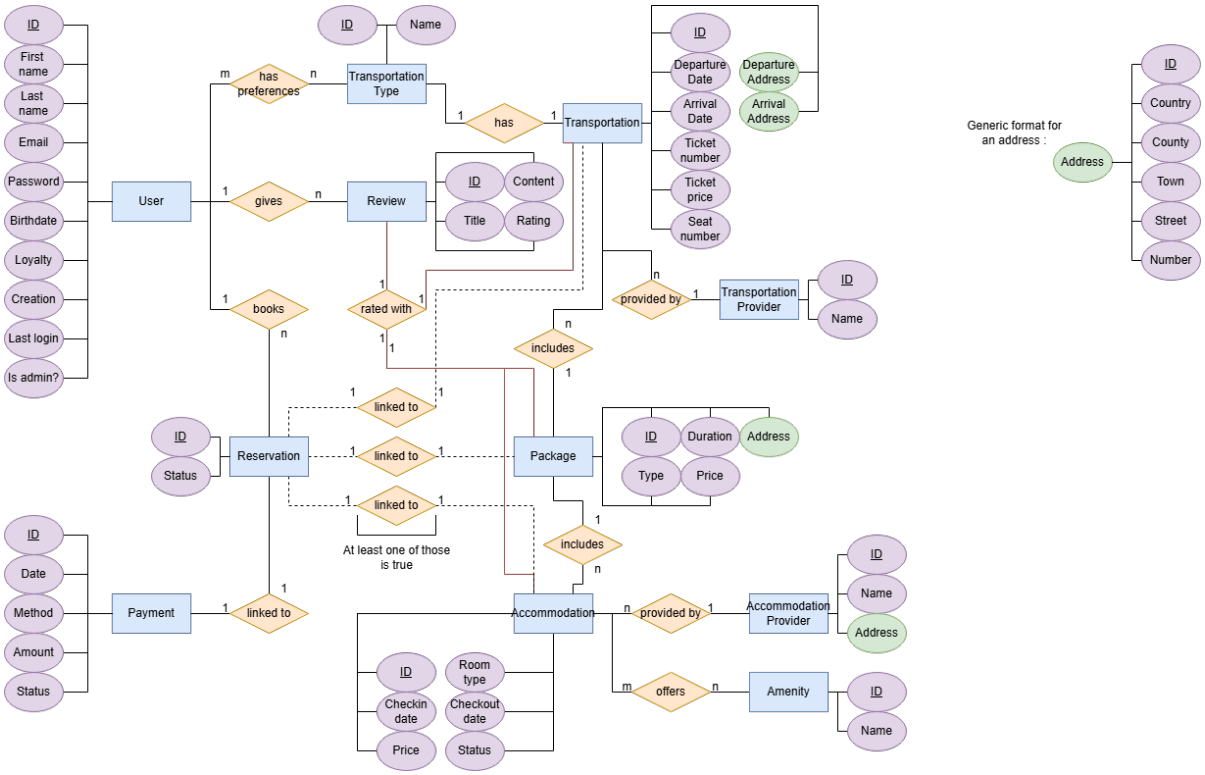
- Allow the user to modify or cancel a reservation

- Payment Management
  - Track payment status (*i.e pending, completed or refunded*) for reservations
  - Include multiple methods (*e.g credit/debit card, bank transfer, cash*)
  - Track client invoices and generate receipts after payment

- Feedback and Reviews
  - Ability to submit reviews for packages, transportation and accommodations
  - Save feedback

2 Database Design

2.1 Entity-Relationship Diagram



2.2 Database Designer View

3 Front & Back-end Design

TEST

3.1 Login & User Authentication

A user can sign into their account using the corresponding button within the header bar (*which redirects them to main form of* `site/signin.php`). If one does not have an account they can create one by *signing up*. Then all required information are asked via a form. When trying to submit the latter, verification for data format coherence is performed by looking for regular expressions. For instance we make sure that a password is at least 8 characters long and contains at least one number, upper and lowercase letter. Also we make sure that an email address is only used once (*i.e two users cannot have the same email address*). Yet we do not verify if it truly exists. Also for security purposes passwords are not directly saved into the database but rather a hash string ; we indeed use the `PASSWORD_BCRYPT` to encrypt it.

When the user has been successfully log into their account they are either sent to the admin page if they happen to be one, or are redirected to their account page. Moreover the header bar updates itself and allows the user to log out and modify their settings.

3.2 Administrator Access

3.2.1 Overview

At the very beginning, we wanted to make an admin page such that every single table could be modified, be it adding a new record, updating lines with the right datatype, or deleting records. Very soon we discovered that this was not going to be possible for there is quite a number of tables, all of which are joined together. This led to chunks of duplicated code which could not be broken down into `PHP` functions ; this was indeed due to the fact that almost every attribute had a different name whence unalike `SQL` requests.

Thereby we remade the entire page from scratch trying to write functions as it would ease our work. However this soon led to another issue. There are tables in which "secondary" IDs can reference others such as `Package` or `Address`. Thus a request will only return an ID, not the contents it is pointing onto. Hence we wrote a function which would display the latter (*e.g we must show the first and last names of any user, and not just their ID*) and allow the administrator to easily modify any kind of record.

We've also decided to add an extra ID attribute for tables intervening in many-to-many relationships, which we will refer to as "*Join Tables*". This enabled us to perform operations such as *deleting or modifying* on any table without having to take care of every single case.

In order to prevent any staff member to enter invalid data or modify read-only attributes we set some rules down. First administrators are not allowed to directly modify any primary ID. Next forms will prevent anyone from sending data that is either invalid or in the wrong format/datatype (*e.g text, timestamp, integer, ...*). Nevertheless there is no constraint on dates validity and coherence since scheduling is quite the task.

Finally there is "*super-admin*" which can be logged into using the following credentials: `admin@gmail.com, admin`. By the way the reader must keep in mind that the password was so trivial to make testing easier, and to **never** use such weak passwords for any user with higher permissions. Moreover only an administrator can grant a user admin rights.

3.2.2 Code explanation

Only administrators can enter the `site/admin/admin.php` page. When one first arrive on that page they are asked to choose a table to modify. This can be done by clicking on the corresponding link. Then they are redirected to a page which displays all records from a table. This is because of a `PHP` page of which two arguments are passed: the name of the table and the action to perform. The first one is used in `DisplayTableData` which as its name suggests, displays the table. Then the second one is used in `DisplayForm` which allows the admin to modify a record and checks for data format coherence.

3.3 Reservation System

3.4 Other features

3.4.1 Inactive users deletion

We have added a small scheduled event (*every five minutes*) which looks for users who have not used the website in two years, then deletes the latter.

3.4.2 Downloading reservation receipts

4 Organization

In order to successfully complete our project and to be more efficient we adopted a simple rule: we made sure that everyone could work on the same file while being at home and without relying on a single person.

4.1 Version Control System

Using a version control system such as *Git* was quite useful in our project as it enabled us to track and manage changes to the source code easily. It also allowed us to keep backups of the codebase in case something bad happened (*e.g data corruption or loss, hardware malfunction*) or in case we wanted to try out new features without the fear of breaking something. Besides it made collaboration easier by allowing every member of the group to work on different aspects simultaneously.

We chose to host our code base on *GitHub* as it is free and easier to set up in *PhpStorm*. To access our project repository go here.

4.2 Connection to the Database

The connection to the database has also been an important problem. Working separately on the database could indeed yield some interesting results to say the least. That is especially true when testing the front-end part ; one might have had a newer database model while another might not and thus would have had to update it (*all records would have been lost*) to test the website. Therefore we chose to host the database on an UNIX Apache server run from a personal Raspberry PI card.

This solved a huge issue as now everyone could work on the project when they wanted to. Yet that simple action led to two sub-issues:

Security We opened a port in our firewall to grant us a remote access to both the PhpMyAdmin page and the database. Yet anyone could also go through that port to steal information which is a great flaw. Thus, we first tried to enable SSL encryption, still it was too difficult to set up. So we set rules down in order to lower permissions for remote access. Moreover "suspicious" requests are denied by the Internet box. All in all this is okay for such a small project however keep in mind that those layers of security are not enough by today's standards.

Static IP Address Another problem laid in the fact that we did not own a website domain, nor a **static** address as it cost money. Thus we had to use the IP address of the card every single time. Moreover most of the time an IP address will change about every two weeks. Thus someone had to monitor the latter and change it in `connection.php` so as to ensure the connection to the database.

For more information on how to connect to the database, please see Appendix B

5 Conclusion

In conclusion,

Difficulties

Suggestions

A Software used

- MariaDB
  - Server: Localhost via UNIX socket
  - Server connection: SSL not set up
  - Server version: 10.11.8-MariaDB-0ubuntu0.24.04.1 - Ubuntu 24.04
  - Protocol version: 10
  - Server character set: UTF-8 Unicode (utf8mb4)
- Apache/2.4.58 (Ubuntu)
  - Database client version: libmysql - mysqlnd 8.3.6
- PHP 8.3.6 [2]
  - mysqli
  - curl
  - mbstring
  - sodium
- phpMyAdmin 5.2.1deb3
- PhpStorm 2024 [1]

B How to connect to the database?

As of November 17, 2024, the IP address of the server is `90.100.91.219`. Also the server will be unplugged on December 1, 2024 at noon. Therefore you may try to access it remotely. However if you may prefer to upload the database on your localhost, there are some variables that need to be updated.

First start your Apache Server and import `martine_travels.sql` into your PhpMyAdmin. Then open the file `site/connection.php` and change its content to:

```
<?php
function get_dbhandle(): PDO
{
 $host = "localhost";
 $dbname = "martine_travels";
 $dbuser = "root";
 $dbpasswd = "";
 return new PDO("mysql:host=$host;dbname=$dbname", $dbuser, $dbpasswd);
}
?>
```

C PHP Configuration on Windows

References

[1] JetBrains. Phpstorm, 2024.1.1.

[2] Rasmus Lerdorf. Php, 2024.