Bilkent University

Department of Computer Engineering

CS 353 - Database Systems

Tour Reservation Management System

Project Proposal

- Group 4 -

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1. Introduction

1.1. Webpage

Throughout the project, our reports will be hosted on the following website:

https://cs353-01.firebaseapp.com

1.2. System Definition

In this project, we are going to propose, design and implement an application system for tour reservation management. The application will provide a functional interface for a basic tour reservation business and its customers.

1.3. Why do we need a database?

A reservation system has to be able to access and manipulating the information that are associated with the related components (tours, customers, routes etc.). The complexity and size of this total information is relatively large, so it cannot be handled through a basic file system. Thus, a database system will help manipulating the reservation system's information effectively and efficiently, in our application.

1.4. How the database will be used?

The database system will be used to store the data of customers, travel agencies and their representative employees, tours and the information associated with them. It will help us in accessing and manipulating the data through necessary queries.

2. Functional Requirements

The tour reservation management system will have different functionalities for customers and travel agency employees.

2.1. Customer Requirements

- A customer can create a customer account with a valid e-mail address.
- A customer can edit their profile data.
- A customer can see the list of past tours that they have attended.
- A customer can see the list of available tours.
- A customer can filter the list of available tours according to some tags and parameters.
- A customer can see the tours with full quota as well. They can follow those tours to get a notification when there is available quota (due to another customer's cancellation or extension in quotas) in the tour.

- A customer can make a reservation to a tour for one or more people, including or excluding himself.
- A customer can cancel a tour that has not past its cancellation deadline yet.
- A customer can see the details of their current tours.
    - A tour can have sub-tours that are in the system as well.
    - A tour can list all the accommodation places, travelling routes and trip events in chronological order. It should also display properties about these listed elements (date, time, place etc.)
- A customer can change their account password through the email they have provided.
- A customer can delete their account whenever they can, with authorization steps.

2.2. System Admin Requirements

- A system admin can register a travel agency to the system, with providing their name and business email domain.

2.3. Travel Agency Employee Requirements

- A travel agency employee can create an agency account with a valid e-mail address that belongs to a registered travel agency email domain.
- A travel agency employee can add a tour to the system, registered to the travel agency that they are working for.
    - They can choose sub-tours that the parent tour have.
    - They can set the quota for the tour.
    - They can add accommodation places, travelling routes and trip events to the tour by specifying their properties (date, time, place etc.).
- A travel agency employee can cancel a whole tour.
- A travel agency employee can see the list of the customers that have made reservation to a particular tour.
- A travel agency can extend the quota of a tour.

2.4. Other Functional Requirements

- A customer should be warned when they attempt to make reservation to conflicting tours.
- When a tour is cancelled by a travel agency employee, all the participants should get a notification and receive their refund.

3. Nonfunctional Requirements

3.1. Response Time

The database should handle the queries as fast as possible, in order to address this case the queries should be written in the most efficient manner. In addition to that, the server that communicates the database will have fast transfer speeds for reducing the response time.

3.2. Security

The database will be designed in a way that it follows the CIA triad model consisting of confidentiality, integrity and availability. Confidentiality will be established by storing sensitive data either encrypted or hashed depending on the data type. Integrity will be established by authenticating accounts in a way that only the accounts that has certain privileges can alter data. Availability will be established by using a reliable reliable server.

3.3. User-friendly Interface

The database user interface will be designed so that the reservation process is not a burden on the user. The user will be provided with step by step instructions for which type of data to enter. The sequence of these instructions will be ordered in a way that it is natural as if the user is making a reservation by doing a face to face conversation with a reservation employee.

3.4. Non-redundant Data

The database will be designed in a way that the redundancy is as low as possible. This will be done by starting with a robust design in the beginning, meaning that the tables that has common values can be considered as a single table or they can be connected via an additional relation that will make the duplicate data unnecessary.

4. Limitations

- A customer account cannot be opened without a valid email.
- An agency account cannot be opened without a valid mail in domain of a registered agency account.
- A traveler cannot cancel a reservation, they need to have access to the customer account that the reservation that is made.
- A customer cannot make a reservation to a tour with full quota.
- A tour has to have at least one element (route, accommodation or trip event) in it in order to be added to the system.

- A customer account can not use bonus points if they do not correspond to a payment amount.
- Two tours with intersecting time slots can not be reserved for a traveler.
- The payment can not be issued if the reservation due date has been passed.

5. Conceptual Design of the Database System

5.1. Description

The following list describes the conceptual design of the database system that will be used in the application.

- In order to make a reservation to a tour, the user creates a **customer account.** The customer accounts have ID, username, password, email, name, gender, date of birth, payment methods and booking points. The ID would uniquely distinguish an account from the others. The email and password will handle the login process of the system. The user will have one or more payment methods in their accounts. An account will gain some amount of booking points with each purchase which can be spent on other purchases.

- The users will be able to make **reservation** through their account. The reservations have ID, issue date, cancelling deadline, reservation status and payment status.

- Each reservation will have associated **traveler**s with them. The travelers have national ID, nationality, name, gender, date of birth. National ID and nationality is sufficient to identify any traveler. Travelers will be able to access their seat numbers for a travel and room numbers for a room they have been assigned. Travelers might have dependency to each other, such as child travelers being dependent to their parents.

- An **accommodation place** defines locations assigned to tours like hotels, motels, hostels etc. The accommodation places have ID, name, address, departure date/time and arrival date/time. A **hotel** also has a rating, which other accomodation places does not have.

- A **travel route** defines all the travel routes and attributes of travelers in a tour. The travel route have ID, company name, departure place, departure date/time, arrival place, arrival date/time and vehicle type.

- A **trip event** can be multiple different things such as dinner at a restaurant, museum visit, concert etc.

- A **travel agency** offers multiple tours on the system. The travel agencies have agency ID, name, email domain and rating.

- Reservations are made for **tour**s. The tours have ID, quota and prices according to each season. The tours have a sequence of travel routes, accomodation places and trip events. The tours can consist of multiple subtours which has the same attributes. Tours can have special tags like having sea/flight trips and having vegan/halal/kosher menus.

- In order to add a new tour, an employee from a travel agency should create and use a **agency account.** The agency accounts have username, password and email. An agency account is authorized to add a new tour to the system with the properties that they can choose.

- For adding a travel agency to the system, a **system admin account** is required. The system admin accounts have username, password and email.

5.2. E/R Diagram

The E/R diagram that corresponds to the design can be found below in Figure 1.

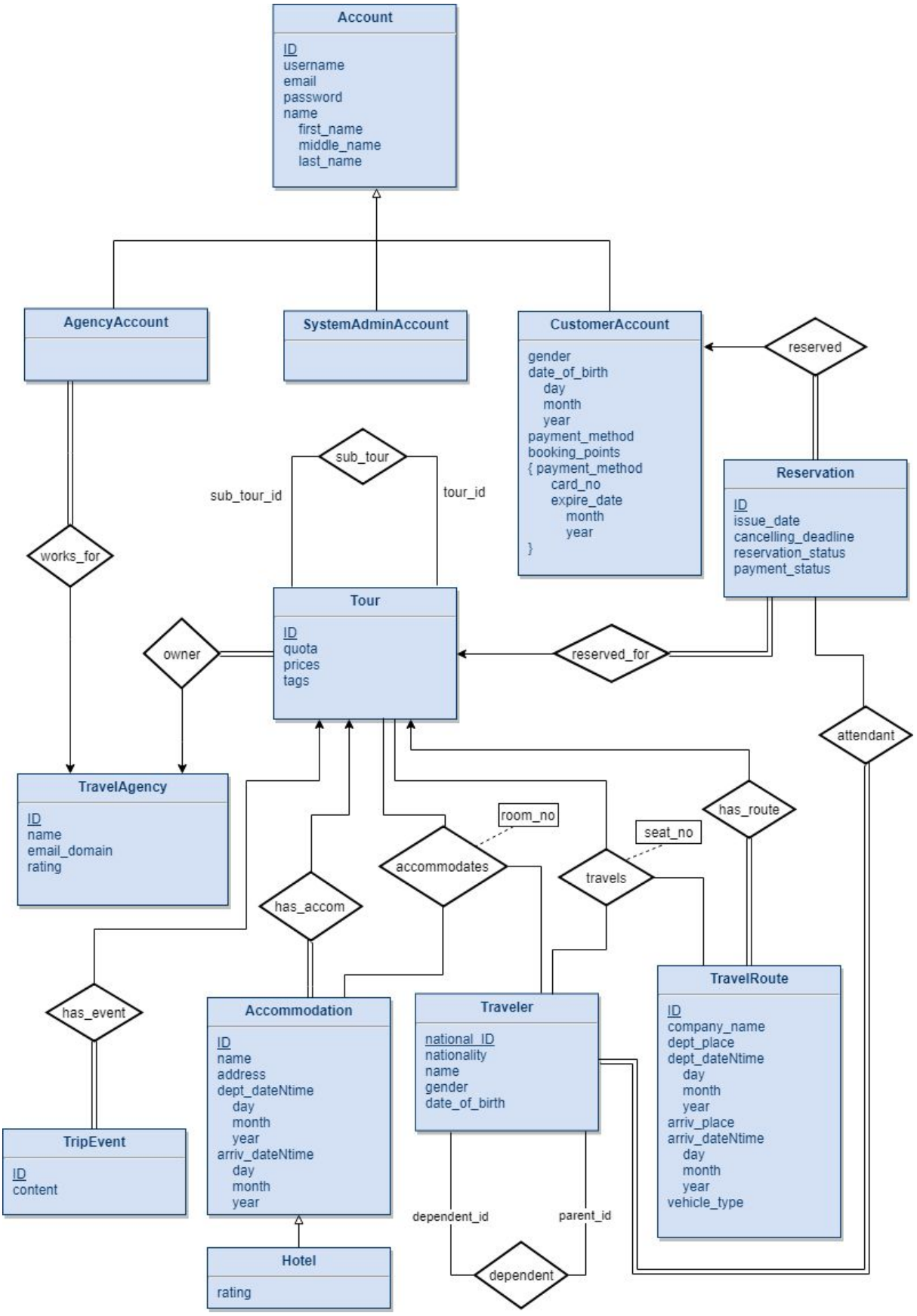

Figure 1: E/R Diagram of the Database System