Bilkent University

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CS 353 - Database Systems

Shipping Company Data Management System

Final Report

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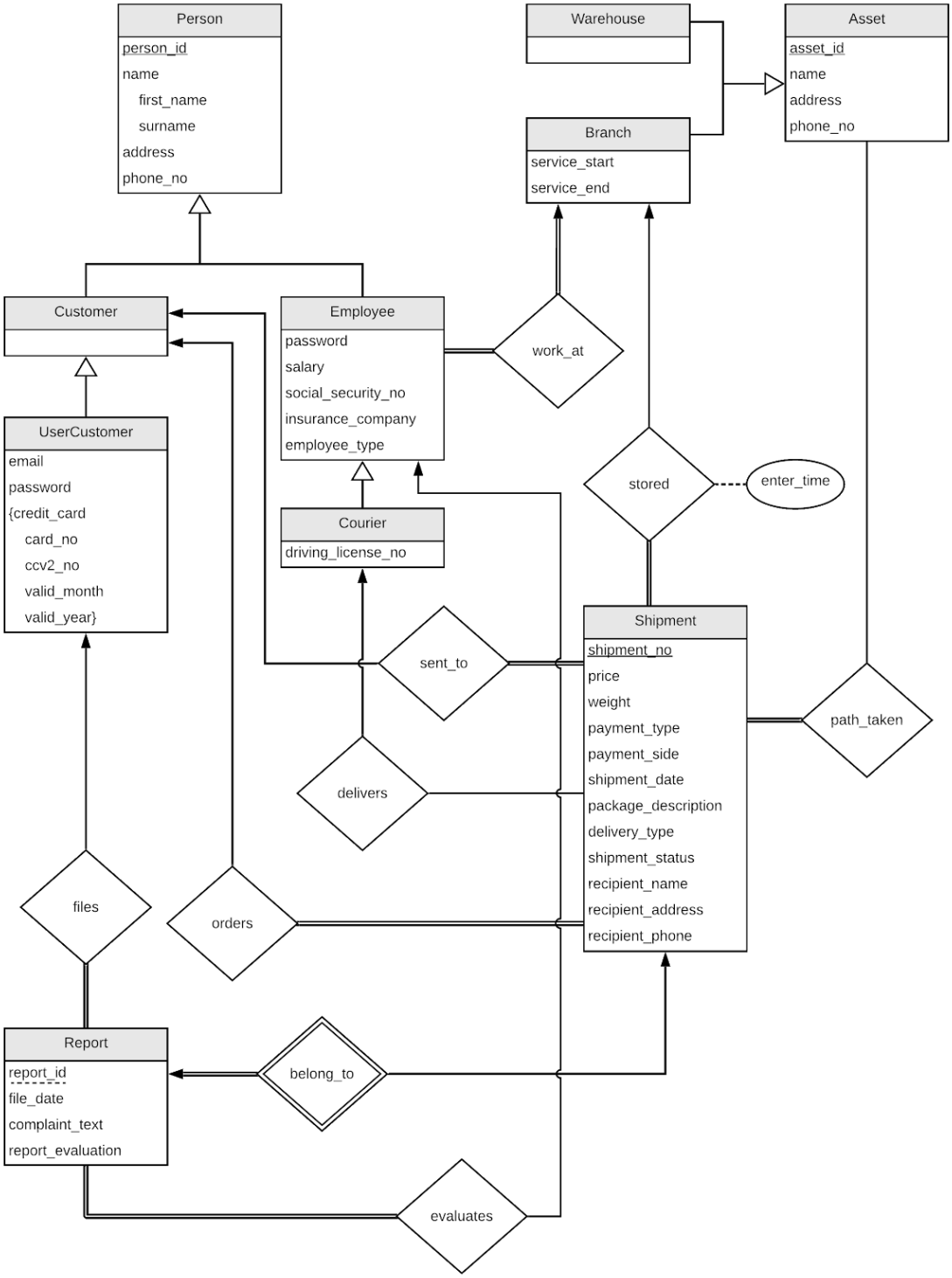
1. Project Description

In shipping companies like UPS, DHL, data storage, retrieval and manipulation is the key factor to the reliable operation of the company. Reliable operation requires reliable database management and it is the foundation of such companies. Companies implementing primitive file-system-like technologies suffer from data redundancy, inconsistency and inefficiency which, in turn, cost a lot of money, if not worse. However, a well-designed database system can provide structure to the company's data management and overcome issues that were stated earlier. In this project, it was our goal to achieve a comprehensive database management system for shipping companies that will both efficient and consistent.

Database is used in order to manage all the data for the Shipping Company Data Management System. We used database to login information, data entries and to perform queries. Using a database is a powerful way to store and analyse large amounts of data. The system for our project is designed to hold various amounts of information. A shipping company can have entities like employees, customers, couriers, transportation events, retail center, shipped items and so on

2. Final E/R Model



3. Final List of Tables

person

person(person_id, first_name, surname, address, phone_no)

usercustomer

usercustomer(person_id, email, password)

FOREIGN KEY person_id REFERENCES person(person_id)

employee

employee(person_id, password, salary, social_security_no,

insurance_company, employee_type)

FOREIGN KEY person_id REFERENCES person(person_id)

courier

courier(person_id, driving_license_no)

FOREIGN KEY person_id REFERENCES employee(person_id)

asset

asset(asset_id, name, address, phone_no)

warehouse

warehouse(asset_id)

FOREIGN KEY asset_id REFERENCES asset(asset_id)

branch

branch(asset_id, service_start, service_end)

FOREIGN KEY asset_id REFERENCES warehouse(asset_id)

shipment

shipment(shipment_no, price, weight, payment_type, payment_side,
shipment_date, package_description, shipment_status, delivery_type,
recipient_name, recipient_address, recipient_phone)

report

report(shipment_no, report_id, file_date, content_text, report_evaluation)

FOREIGN KEY shipment_no REFERENCES shipment(shipment_no)

work_at

work_at(person_id, asset_id)

FOREIGN KEY person_id REFERENCES employee(person_id)

stored

stored(shipment_no, asset_id, enter_time)

FOREIGN KEY shipment_no REFERENCES shipment(shipment_no)

path_taken

path_taken(shipment_no, asset_id)

FOREIGN KEY shipment_no REFERENCES shipment(shipment_no)

FOREIGN KEY asset_id REFERENCES asset(asset_id)

sent_to

sent_to(shipment_no, person_id)

FOREIGN KEY shipment_no REFERENCES shipment(shipment_no)

delivers

delivers(shipment_no, person_id)

FOREIGN KEY shipment_no REFERENCES shipment(shipment_no)

orders

orders(shipment_no, person_id)

FOREIGN KEY shipment_no REFERENCES shipment(shipment_no)

4. Implementation Details

Our Shipment Company Data Management System consists of two main parts, namely database component and website component. We have used MariaDB database implementation, which is almost identical to MySQL. In order to have a consistency between our coding, we have used GitHub.

For the user interface and application functionalities of our Shipment Company Data Management System, we used HTML, CSS and Javascript. We also used Bootstrap 4 UI Kit. HTML is used to design the user interface and the styles of the pages are implemented using CSS. We used JavaScript to provide pop-ups and other error types situationally.

NodeJS open source environment is used throughout the entire system to provide system operations and backend development. We also used Nodemon utility to monitor for any changes in our source and automatically restart our server when necessary. This eased our development. As part of JavaScript, jQuery library is used to have access to jQuery methods. Finally, Embedded JavaScript is used to dynamically add certain elements to the page.

5. Advanced Database Features

```
CREATE VIEW awaiting_reports AS
SELECT * FROM files NATURAL JOIN usercustomer
WHERE  report_evaluation = 0;
```

The view above is the usercustomers view of his/her ongoing reports that are still under investigation.

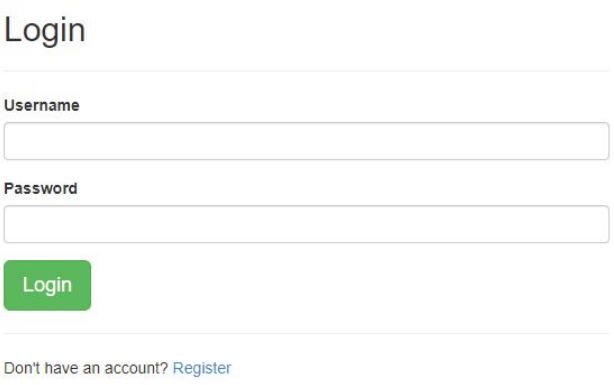
```
CREATE TRIGGER decline_shipment AFTER INSERT, UPDATE ON shipment
FOR EACH ROW
    IF EXISTS(SELECT * FROM report NATURAL JOIN files
                    WHERE person_id = @currentID AND shipment_no = NEW.shipment_no)
      SET shipment_status = 'DECLINED';
```

The trigger above sets the status of the shipment to DECLINED whenever usercustomer files a complaint(report) about the shipment.

6. User's Manual

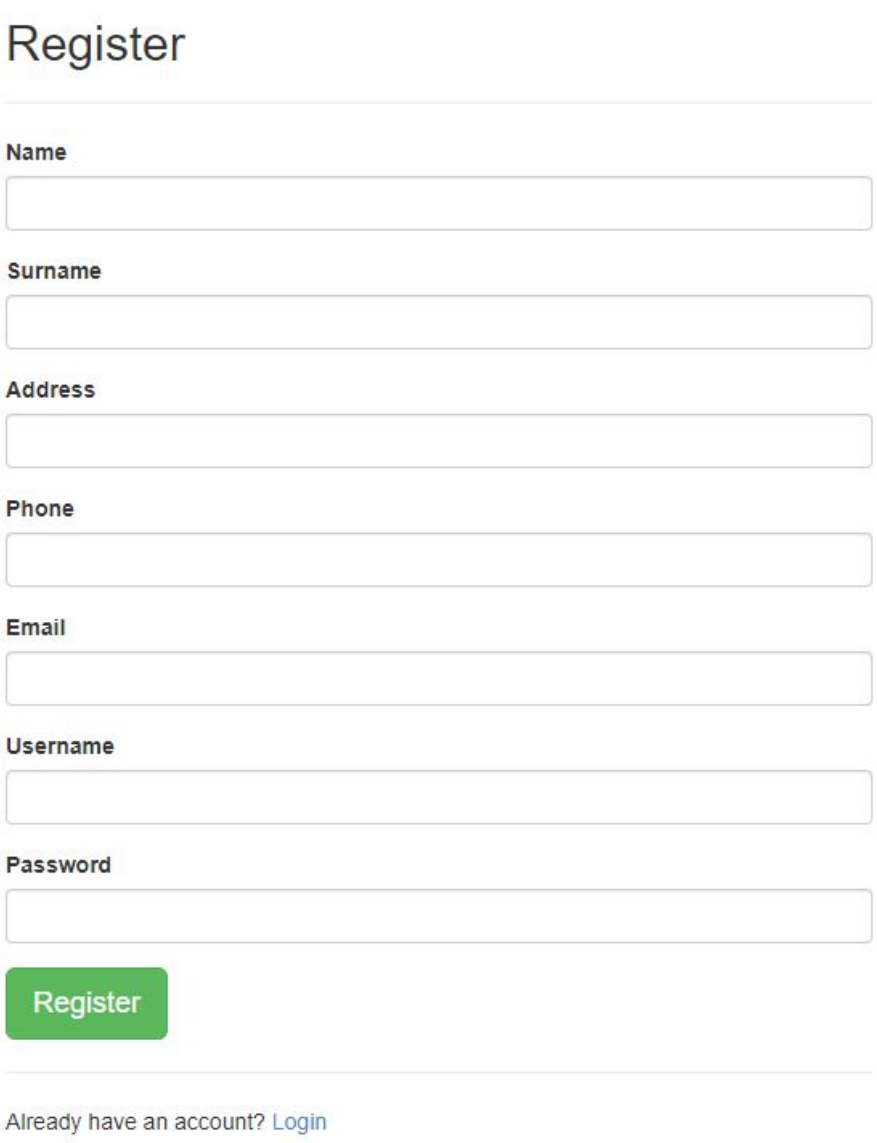
6.1. Login and Registration System

User Login and Registration page is the very first page that welcomes the newly entering user into system.



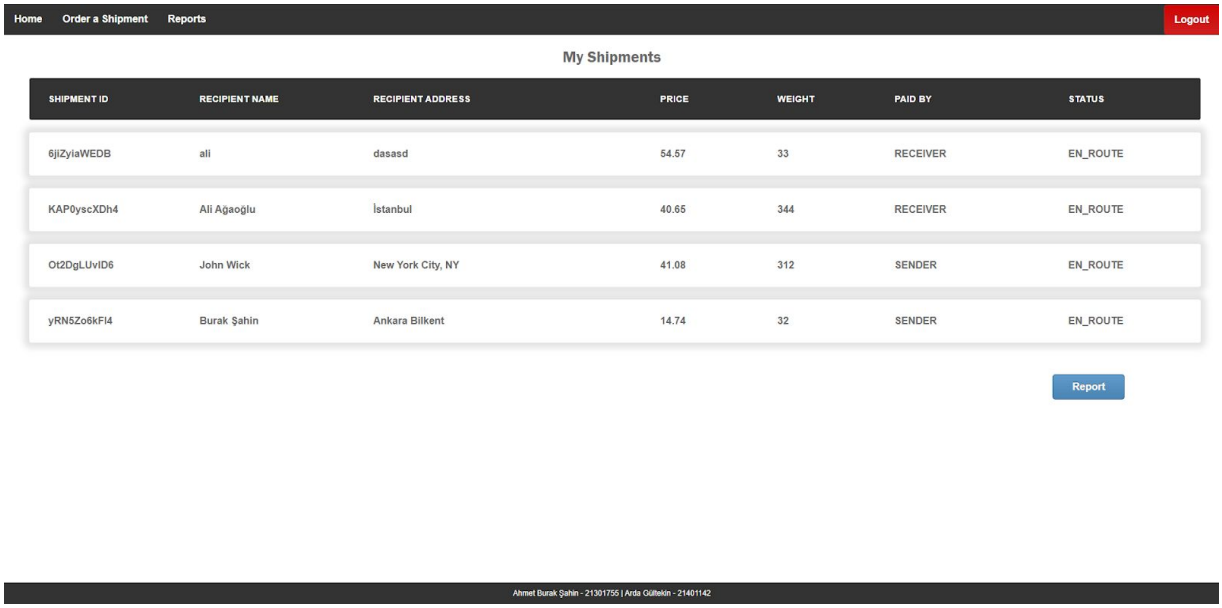
User, if he/she has an account can type his/her username and password to enter into the system. If not, Register link, can be used to forward to the Register page and complete the registration process. For the minimal registration, the potential user needs to provide his/her full name, address, phone number, email address, a unique username and password.

The Register page looks like as follows:



6.2. Main Page

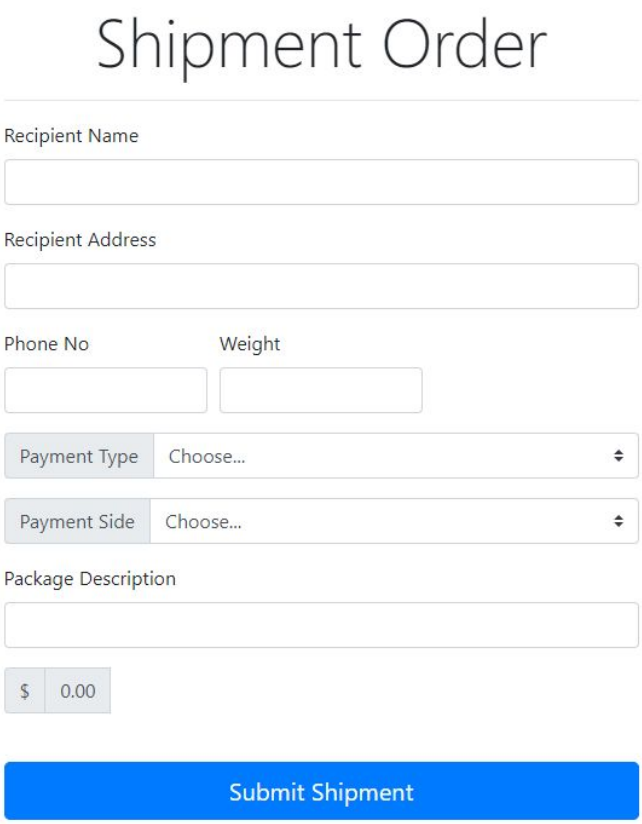
Main Page looks like as following:



The shipment history so far is immediately shown on the initial page. The table columns provide information about the various aspects of the shipment that the user has sent so far. In order to place a new shipment order user needs to proceed to the Order a Shipment page from the navigation bar.

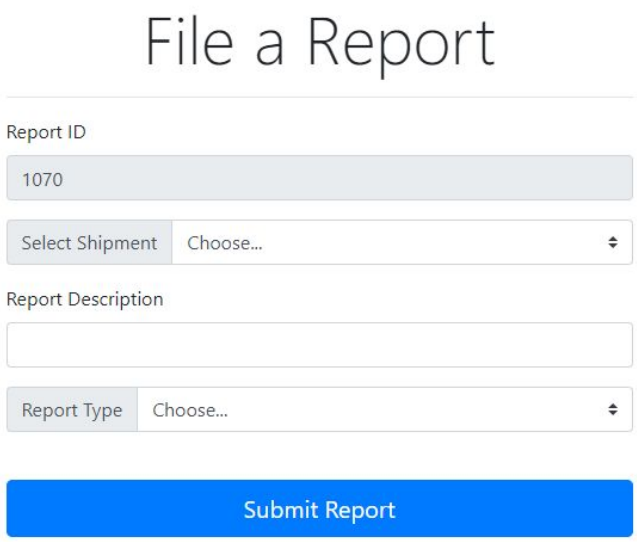
6.3. Order a Shipment Page

The shipment history so far is immediately shown on the initial page.



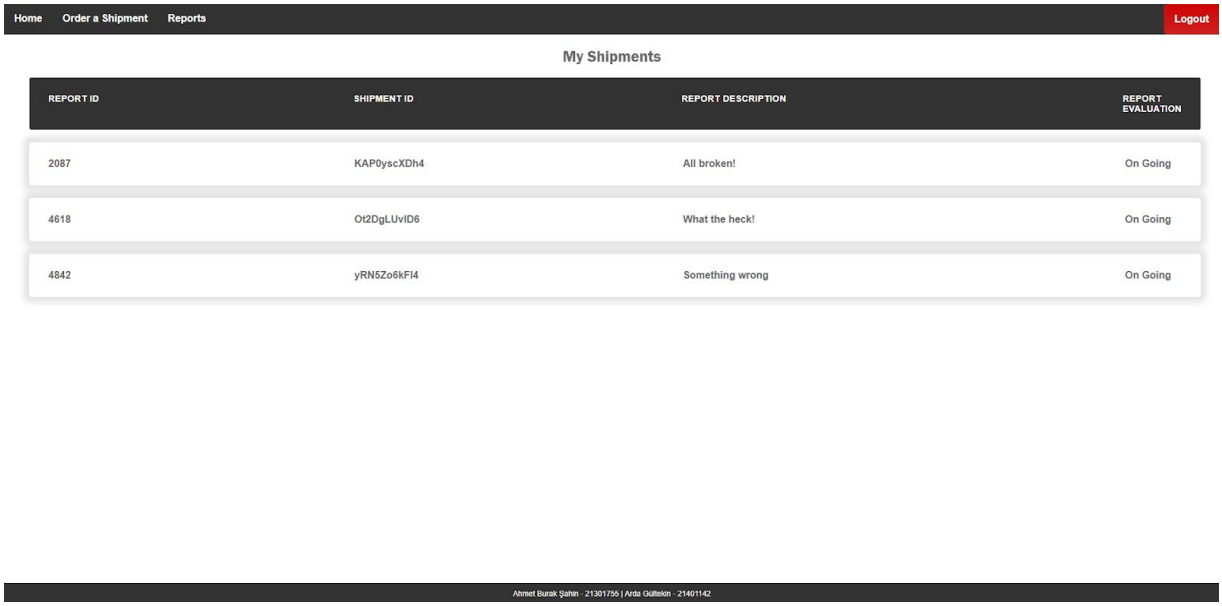
In this page user should specify the name of the recipient, address of the recipient, phone number of the recipient, weight of the cargo, payment type (either CASH or CREDIT CARD) and payment side (SENDER or RECEIVER), finally a short description about the package content is required to place the order. After specifying the package weight, the system assigns a price to the shipment order.

6.4. File a Report Page



To access to this page user must click the report button on the Main Page. This page provides the means of filing a report about a possibly malformed or mistaken package. A random Report ID will be assigned to each report. Each report should be associated with a single shipment, therefore we need to select the corresponding shipment ID number from the Selec Shipment dropdown menu. A short explanation of the report is provided at Report Description section and finally Report Type specified to be either Cancellation or Complaint.

6.5. Report Listing Page



In this page user can see the various information about the report she/he has filed previously. More importantly he/she can track the status/ progress of the Reports, which is specified at the Report Evaluation column.