CS 353 Term Project Final Report
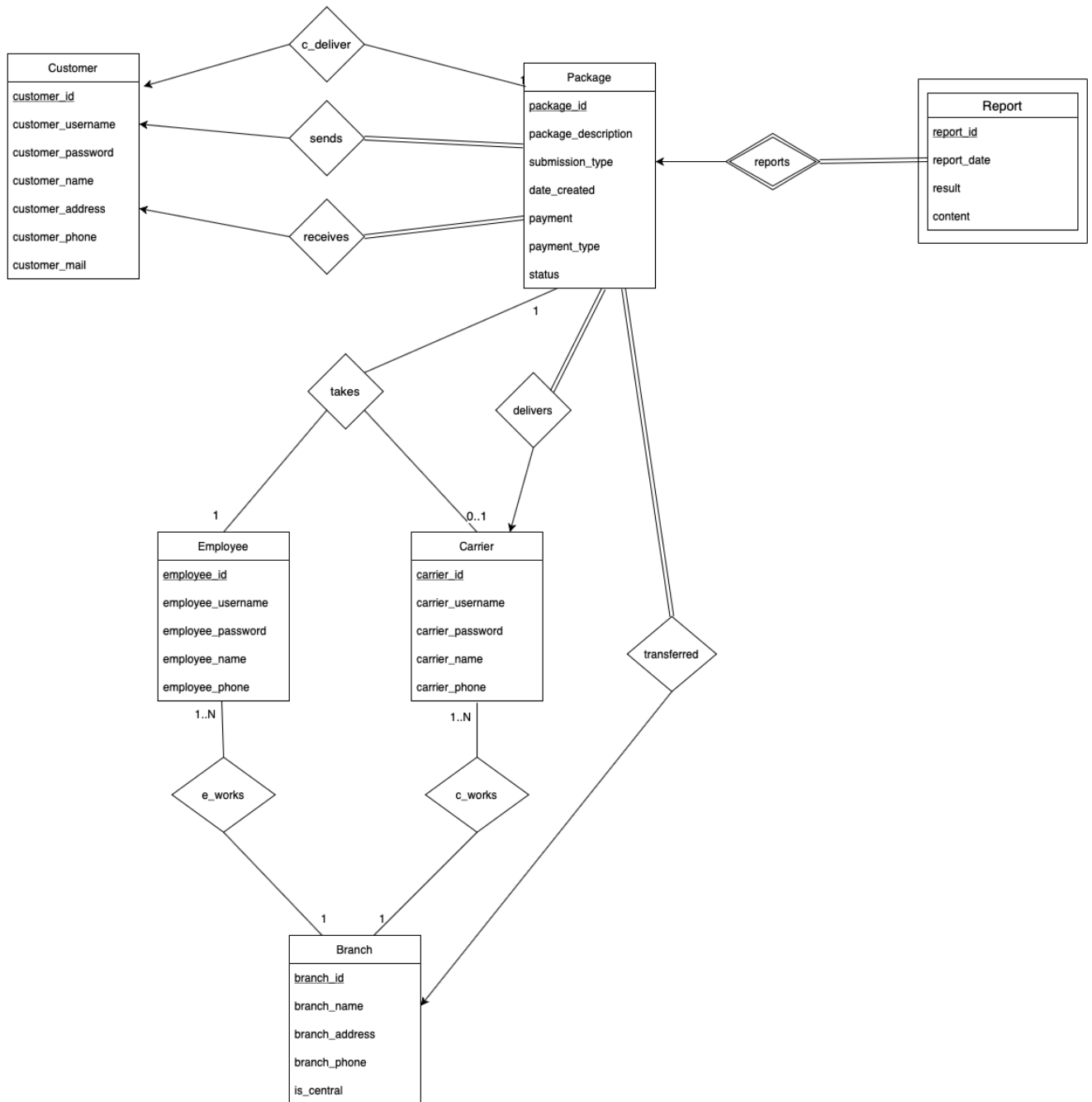**Shipping Company Data Management System**
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Final ER Model

Relational Model

Entity Sets

Customer(<u>customer_id</u>, customer_username, customer_password, customer_name, customer_adress, customer_phone)

Candidate keys -> customer_id
Primary key -> customer_id

FD -> customer_id -> customer_username, customer_password, customer_name, customer_adress, customer_phone

Normal Form -> BCNF

Create table **Customer**(customer_id int,
      customer_username varchar(15) not NULL,
      customer_password varchar(10) not NULL,
      customer_name varchar(30) not NULL,
      customer_adress varchar(50) not NULL,
      customer_phone varchar(12) not NULL
      primary key(customer_id)) ;

Employee(<u>employee_id</u>, employee_username, employee_password, employee_name, employee_phone, branch_id)

Candidate keys -> employee_id
Primary key -> employee_id

FD -> employee_id-> employee_username, employee_password, employee_name, employee_phone

Normal Form -> BCNF

branch_id is FK to Branch table

Create table **Employee**(employee_id int,
        employee_username varchar(15) not NULL,
        employee_password varchar(10) not NULL,
        employee_name varchar(30) not NULL,
        employee_phone varchar(12) not NULL,
        branch_id int,
        primary key(employee_id),
        foreign key(branch_id) references Branch) ;

Carrier(carrier_id, carrier_username, carrier_password, carrier_name, carrier_phone, branch_id)

Candidate keys -> carrier_id
Primary key -> carrier_id

FD -> carrier_id-> carrier_username, carrier_password, carrier_name, carrier_phone

Normal Form -> BCNF

branch_id is FK to Branch table

Create table **Carrier**(carrier_id int,

                  carrier_username varchar(15) not NULL,

                  carrier_password varchar(10) not NULL,

                  carrier_name varchar(30) not NULL,

                  carrier_phone varchar(12) not NULL,

                  branch_id int,

                  primary key(carrier_id),

                  foreign key(branch_id) references Branch) ;

Branch(<u>branch_id</u>, branch_name, branch_address, branch_phone, is_central)

Candidate keys -> branch_id

Primary key -> branch_id

FD -> branch_id-> branch_name, branch_address, branch_phone, is_central

Normal Form -> BCNF

Create table **Branch**(　　　　　branch_id int,

branch_name varchar(30) not NULL,

branch_address varchar(30) not NULL,

branch_phone varchar(12) not NULL,

is_central char(1) not NULL,

primary key(branch_id)) ;

Package(<u>package_id</u>, package_description, submission_type, date, payment, status, sender_id, receiver_id, customer_deliver, courier_deliver, transferred_branch)

Candidate keys -> package_id

Primary key -> package_id

FD -> package_id-> package_description, submission_type, date, payment, status, sender_id, receiver_id

Normal Form -> BCNF

sender_id is FK to Customer table

receiver_id is FK to Customer table

customer_deliver is FK to Customer table

courier_deliver is FK to Courier table

transferred_branch is FK to Branch table

Create table **Package**(package_id int,

package_description varchar(30) not NULL,

submission_type varchar(30) not NULL,

date date_created not NULL,

payment varchar(15) not NULL,

status varchar(15) not NULL,

report_id int,

sender_id int,

receiver_id int,

Customer_carrier int,

transferred_branch int,

primary key(package_id),

foreign key(sender_id, receiver_id, customer_carrier) references

Customer)

Foreign key(transferred_branch) references Branch) ;

Report(report_id, package_id, date, result, content)

Candidate keys -> report_id, package_id

Primary key ->report_id, package_id

FD -> report_id, package_id, date, result, content

Normal Form -> BCNF

package_id is FK to Package table

Create table **Report(**   report_id int,

package_id int,

report_date date not NULL,

result varchar(15) not NULL,

content varchar(30) not NULL,

primary key (report_id,package_id),

foreign key (package_id) references Package,

on delete cascade) ;

Relations

Takes(package_id, employee_id, carrier_id)

Candidate keys -> package_id, employee_id, carrier_id

Primary key -> package_id, employee_id, carrier_id

FD -> package_id, employee_id, carrier_id -> package_id, employee_id, carrier_id

Normal Form -> BCNF

package_id is FK to Package table

employee_id is FK to Employee table

carrier_id is FK to Carrier table

Create table **Takes(**   package_id int,

employee_id int,

Courier_id int,

primary key(package_id, employee_id, Courier_id),

foreign key (package_id) references Package,

foreign key (employee_id) references Employee,

foreign key (Courier_id) references Courier)) ;

Sends(customer_id, package_id)

Candidate keys -> customer_id, package_id
Primary key -> customer_id, package_id

FD -> None

Normal Form -> BCNF

package_id is FK to Package table
customer_id is FK to Customer table

Receives(customer_id, package_id)

Candidate keys -> customer_id, package_id
Primary key -> customer_id, package_id

FD -> None

Normal Form -> BCNF

package_id is FK to Package table
customer_id is FK to Customer table

c_delivers(customer_id, package_id)

Candidate keys -> customer_id, package_id
Primary key -> customer_id, package_id

FD -> None

Normal Form -> BCNF

package_id is FK to Package table
customer_id is FK to Customer table

delivers(<u>carrier_id, package_id</u>)

Candidate keys -> carrier_id, package_id
Primary key -> carrier_id, package_id

FD -> None

Normal Form -> BCNF

package_id is FK to Package table
carrier_id is FK to Carrier table

transferred(<u>package_id, branch_id</u>)

Candidate keys -> package_id, branch_id
Primary key -> package_id, branch_id

FD -> None

Normal Form -> BCNF

package_id is FK to Package table

branch_id is FK to Branch table

reports(<u>package_id, report_id</u>)

Candidate keys -> package_id, report_id
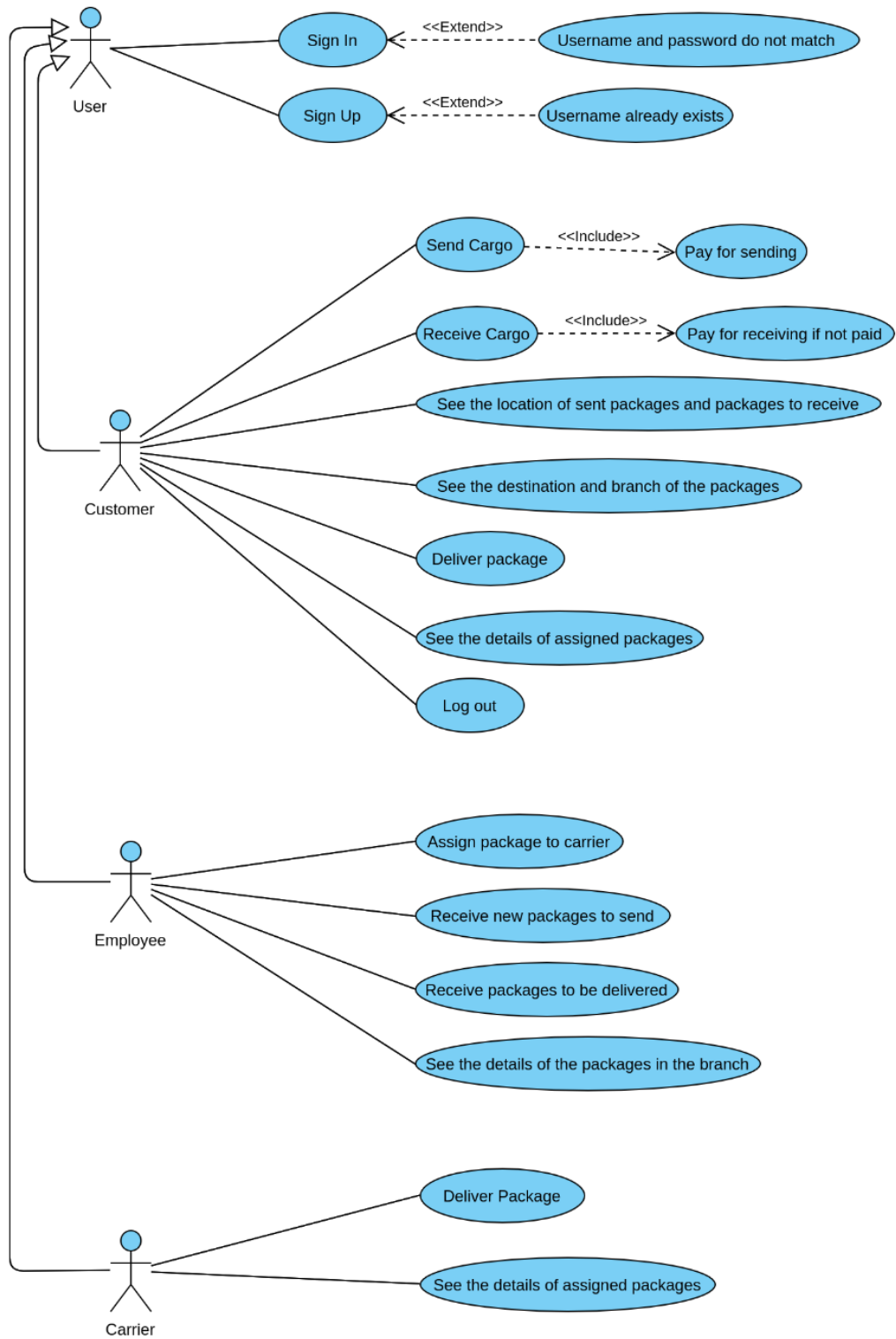
Primary key ->package_id, report_id

FD -> None

Normal Form -> BCNF
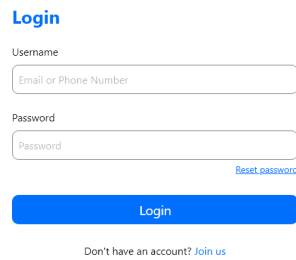
package_id is FK to Package table

report_id is FK to Report table

Use Case Diagram

User
- Sign In
  - <<Extend>> Username and password do not match
- Sign Up
  - <<Extend>> Username already exists

Customer
- Send Cargo
  - <<Include>> Pay for sending
- Receive Cargo
  - <<Include>> Pay for receiving if not paid
- See the location of sent packages and packages to receive
- See the destination and branch of the packages
- Deliver package
- See the details of assigned packages
- Log out

Employee
- Assign package to carrier
- Receive new packages to send
- Receive packages to be delivered
- See the details of the packages in the branch

Carrier
- Deliver Package
- See the details of assigned packages

User Interface Design & Corresponding SQL Statements

Login

SELECT * FROM Customer WHERE (@username = customer_username AND sha(@password) = customer_password)

SELECT * FROM Employee WHERE (@username = employee_username AND sha(@password) = employee_password)

SELECT * FROM Courier WHERE (@username = courier_username AND sha(@password) = courier_password)

Sign Up

Register

First Name   Last Name

Phone Number   Email

Password   Confirm Password

Sign Up

Already have an account? Login.

INSERT INTO customers(username, password, name, mail) VALUES (@username, @sha(password), @name, @mail)

Customer - Send a package

Recipient

15516548 - Saidcan Alemdaroğlu ▼

Recipient

○ Submit to Branch   ○ Call Courier

Branch

5198156 - Etlik Branch ▼

4165166 - Ella Fisher ▼

Courier

5198156 - Etlik Branch ▼

4165166 - Michael Graham ▼

Package Info

Width - cm	Length - cm	Height - cm	Weight - kg
102	25	33	2,5

Payment

○ Online   ○ Cash - Recipient   ○ Cash - Sender

Name on card

Riley Birch

Card Number

4304 9786 3317 0156

Expiration Date   CCV

10	22		584		Save

SELECT customer_id, customer_name FROM Customer

SELECT branch_id, branch_name FROM Branch

SELECT employee_id, employee_name FROM Employee WHERE branch_id = @branch_id

SELECT Carrier_id, carrier_name FROM Carrier WHERE branch_id = @branch_id

Customer - Package History

Package History

Package ID	Date	Carrier	From	To	Status
1189451654	27.11.2021	John Doe	22 Pawnee Drive Cary, NC 27511	90 Warren Street Forney, TX 75126	Declined
1189451478	26.11.2021	Lauren Armstrong	22 Pawnee Drive Cary, NC 27511	725 West Sutor St. Redondo Beach, CA	Delivered
1189451355	25.11.2021	Owen Sanders	22 Pawnee Drive Cary, NC 27511	7672 Kirkland Lane Hicksville, NY 11801	Delivered
1189451125	22.11.2021	Lauren Armstrong	22 Pawnee Drive Cary, NC 27511	725 West Sutor St. Redondo Beach, CA	Delivered
1189451014	21.11.2021	Owen Sanders	22 Pawnee Drive Cary, NC 27511	7672 Kirkland Lane Hicksville, NY 11801	Delivered

SELECT   p.package_id, p.date_created, carrier.carrier_name, deliverer.customer_name, sender.address, receiver.address, p.status

FROM   Package p, Carrier carrier, Customer deliverer, Customer sender, Customer receiver

WHERE   p.sender_id = sender.customer_id AND p.receiver_id = receiver.customer_id AND (p.carrier_deliver = carrier.carrier_id OR p.customer_deliver = deliverer.customer_id) and (p.sender_id = @my_id OR p.receiver_id = @my_id)

Customer - Current packages (Home)

Welcome, Etophiana.

Send New Package **See Package History** **Be a Courier**

Current Package Status

Package ID	Date	Courier	From	To	Status
1189451654	27.11.2021	John Doe	22 Pawnee Drive Cary, NC 27511	90 Warren Street Forney, TX 75126	**Approve**
1189451478	26.11.2021	Lauren Armstrong	22 Pawnee Drive Cary, NC 27511	725 West Sutor St. Redondo Beach, CA	On transfer
1189451355	25.11.2021	Owen Sanders	22 Pawnee Drive Cary, NC 27511	7672 Kirkland Lane Hicksville, NY 11801	On transfer

SELECT   p.package_id, p.date_created, carrier.carrier_name, deliverer.customer_name, sender.address, receiver.address, p.status

FROM   Package p, Carrier carrier, Customer deliverer, Customer sender, Customer receiver

WHERE   p.sender_id = sender.customer_id AND p.receiver_id = receiver.customer_id

AND (p.carrier_deliver = carrier.carrier_id OR p.customer_deliver = deliverer.customer_id)

AND (p.sender_id = @my_id OR p.receiver_id = @my_id) AND p.status <> "Delivered"

Customer - Be a Courier

Branch

| 5198156 - Etlik Branch | ▼ |

Current Available Packages

Package ID	From	To	Action
1189451654	22 Pawnee Drive Cary, NC 27511	90 Warren Street Forney, TX 75126	**Apply**
1189451478	22 Pawnee Drive Cary, NC 27511	725 West Sutor St. Redondo Beach, CA	**Apply**
1189451355	22 Pawnee Drive Cary, NC 27511	7672 Kirkland Lane Hicksville, NY 11801	**Apply**

Get all the branches

SELECT   branch_id, branch_name

FROM   Branch

Get all the packages that are waiting for delivery

SELECT   p.package_id, sender.address, receiver.address, p.status

FROM   Package p, Customer sender, Customer receiver

WHERE   p.sender_id = sender.customer_id AND p.receiver_id = receiver.customer_id

AND p.transferred_branch = @branch_id AND p.status = "Waiting for Delivery"

Update status and customer_delivery fields of the package

UPDATE Package SET status = "On Delivery" and customer_deliver = @my_id WHERE

package_id = @package_id

Customer - Report

Package ID	Date	Courier	From	To	Status
1189451654	27.11.2021	John Doe	22 Pawnee Drive Cary, NC 27511	90 Warren Street Forney, TX 75126	

Report

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Vivamus hendrerit aliquam est vel pharetra. In eleifend urna ac odio feugiat, sed faucibus eros pharetra. Duis ac turpis sollicitudin, facilisis felis id, tincidunt justo. Morbi iaculis felis eget arcu eleifend, non finibus quam consequat. Fusce lacinia sodales volutpat. Nullam euismod dapibus sapien vel consequat. Morbi odio tortor, faucibus ac augue eu, condimentum consequat nisl. Aenean commodo dictum sagittis. Cras eros nulla, facilisis quis imperdiet vel, dapibus eu dui. Fusce feugiat, neque quis dignissim laoreet, est velit bibendum augue, in pellentesque enim metus ut magna. Interdum et malesuada fames ac ante ipsum primis in faucibus. Etiam rutrum sapien id ipsum sagittis auctor. Quisque tellus mauris, rutrum et tortor quis, placerat fermentum urna.

Send

INSERT INTO   Report (content, package_id, curdate())
VALUES   (@content, @package_id)

Courier & Employee - Current packages (Home)

Welcome, Employee #11412. Branch - Etlik

Package ID	Date	Courier	From	To	Action
1189451654	27.11.2021	John Doe	Yenimahalle Branch	Etlik Branch	**Action**
-	26.11.2021	-	21 Ivy Rd. Decatur, GA 30030	725 West Sutor St. Redondo Beach, CA	**Action**
1189451355	25.11.2021	-	7696 Birch Hill Avenue Centereach, NY 11720	7672 Kirkland Lane Hicksville, NY 11801	**Action**

Get packages for Employee

SELECT   p.package_id, p.date_created, carrier.carrier_name, deliverer.customer_name, sender.address, receiver.address

FROM   Package p, Carrier carrier, Customer deliverer, Customer sender, Customer receiver, Employee employee

WHERE   p.sender_id = sender.customer_id AND p.receiver_id = receiver.customer_id

AND (p.carrier_deliver = carrier.carrier_id OR p.customer_deliver = deliverer.customer_id)

AND p.employee_id = @my_id AND p.status <> "Delivered" AND p.status <> "Declined"

Get packages for Carrier

SELECT   p.package_id, p.date_created, carrier.carrier_name, deliverer.customer_name, sender.address, receiver.address

FROM   Package p, Carrier carrier, Customer deliverer, Customer sender, Customer receiver, Employee employee

WHERE   p.sender_id = sender.customer_id AND p.receiver_id = receiver.customer_id
AND (p.carrier_deliver = carrier.carrier_id OR p.customer_deliver = deliverer.customer_id)
AND p.carrier_id = @my_id AND p.status <> "Delivered" AND p.status <> "Declined"

Courier & Employee - Package Actions

Welcome, Employee #11412. Branch - Etlik

Package ID	Date	Courier	From	To
1189451654	27.11.2021	-	281 Manhattan Drive Owings Mills, MD	90 Warren Street Forney, TX 75126

Accept

Branch

5198156 - Etlik Branch ▼

4165166 - Ella Fisher ▼

Transfer

Courier

5198156 - Etlik Branch ▼

4165166 - Michael Graham ▼

Assign

Transfer package to another branch

UPDATE Package SET transferred_branch = @branch_id WHERE package_id = @package_id

Assign carrier to a package

UPDATE Package SET carrier_deliver = @carrier_id WHERE package_id = @package_id

Update package status to "On Transfer"

UPDATE Package SET status = "On Transfer" WHERE package_id = @package_id

Reports

Current Reports

Package ID	Date	Courier	From	To	Status
1189451654	27.11.2021	John Doe	22 Pawnee Drive Cary, NC 27511	90 Warren Street Forney, TX 75126	**Action**
1189451478	26.11.2021	Lauren Armstrong	22 Pawnee Drive Cary, NC 27511	725 West Sutor St. Redondo Beach, CA	**Action**
1189451355	25.11.2021	Owen Sanders	22 Pawnee Drive Cary, NC 27511	7672 Kirkland Lane Hicksville, NY 11801	**Action**
1189451478	26.11.2021	Lauren Armstrong	22 Pawnee Drive Cary, NC 27511	725 West Sutor St. Redondo Beach, CA	Approved
1189451355	25.11.2021	Owen Sanders	22 Pawnee Drive Cary, NC 27511	7672 Kirkland Lane Hicksville, NY 11801	Declined

SELECT   p.package_id, p.date_created, carrier.carrier_name, deliverer.customer_name, sender.address, receiver.address, p.status

FROM   Package p, Carrier carrier, Customer deliverer, Customer sender, Customer receiver, Report report

WHERE   p.sender_id = sender.customer_id AND p.receiver_id = receiver.customer_id AND (p.carrier_deliver = carrier.carrier_id OR p.customer_deliver = deliverer.customer_id) and report.package_id = p.package_id

Reports - Actions

UPDATE Report SET status = @status WHERE report_id = @report_id

Implementation Details

We have implemented the backend server using PHP and will use MySQL as our database. The frontend will be coded with HTML, CSS, and JavaScript.

User Manual

Sign up

Just the customers can sign up using the application. The employees and the carriers will be signed up by the administration of the application so that they are verified accounts. Although employees and carriers don't sign up in the application, the usernames and the phone numbers will be unique among all the users (customers, employees, carriers).

Sign in

All the users can sign in from the sign-in page of the application. The home page will be rendered according to their user type. If the user is a customer, he/she will see the current (active) packages. There will be three buttons: send a new package, see package history, and be a carrier.

Customer

Send a new package

Customers can add a package delivery request by giving details about the package (dimensions, weight), by selecting the branch, the employee in the branch, and optionally the carrier who the customer wants the package taken by from home. Additionally, the customer selects the payment method and submits the request.

See package history

Customers can view the delivered packages on this page. The data on this page will be the package id, date, carrier, from, and to addresses.

Be a carrier

Customers can also be carriers of the packages that have to be delivered to users. On this page, the customer can select a branch and see the packages and details of them. After selecting the package he/she will request the delivery. After the approval is gotten from the employee in the branch, the package will be assigned to the customer.

Employee

Employees sign in indicating that it will be an employee account and the branch the employee works in. When logged in, the employee is directed to the home page. On the home page, the user sees the packages that are associated with the user's branch he/she works in. The employee can assign a courier and send the package to another branch by clicking on the package on the home page.

Carrier

The courier logs in and the system understand that it is a courier. The courier who logs in sees the cargoes assigned to him on the homepage. Couriers can change the status of the couriers by clicking the edit button on the right of the packages on the main page. Couriers only see the cargo assigned to them and can make changes within their authority.

Website

https://github.com/SMRSLYMNL/CS_353