



Bilkent University
Department of Computer Engineering

CS 353 Term Project Design Report
Shipping Company Data Management System
Group 3

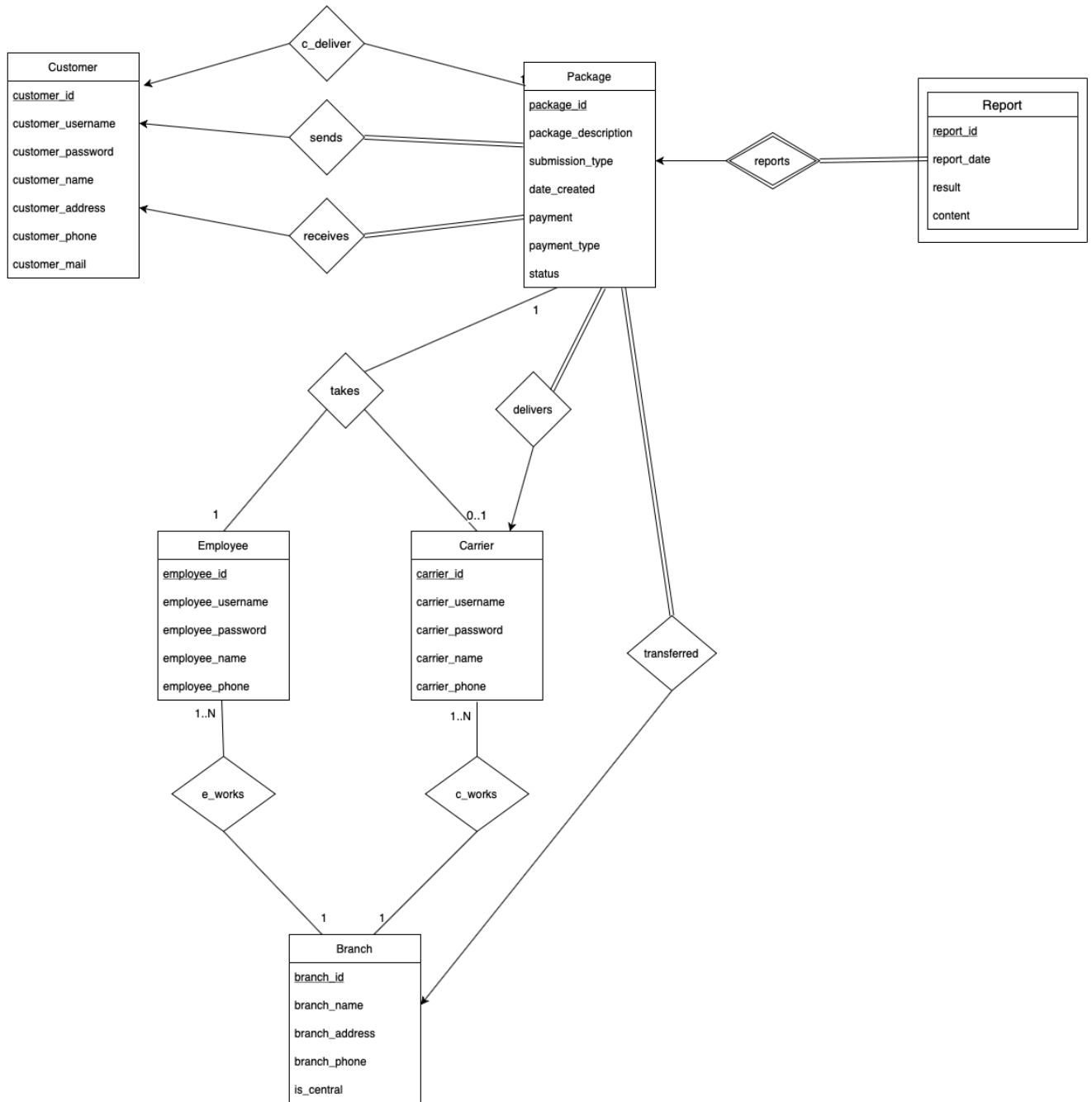
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Revised ER Model



Changes in Revised ER Model

We added an extra functionality that allows customers to deliver packages and work as a carrier in order to gain money. Customers can see undelivered packages of all branches and can demand to deliver the package. If a package will be delivered by a customer instead of a carrier, the package will not participate in 'delivers' relationship and participates in c_deliver relationship instead. 'takes' relationship represents which employee the package is submitted to and which carrier the employee assigns to receive the package. So, 'carrier' entity set participates in the relationship just if the customer demands a carrier to receive the package. 'report' is a weak entity set since it cannot exist without a package to report. 'deliver' relationship represents which carrier will deliver the package to destination.

Relational Model

Entity Sets

Customer(customer_id, 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(employee_id, 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(branch_id, 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(package_id, 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(carrier_id, package_id)

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(package_id, branch_id)

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(package_id, report_id)

Candidate keys -> package_id, report_id

Primary key -> package_id, report_id

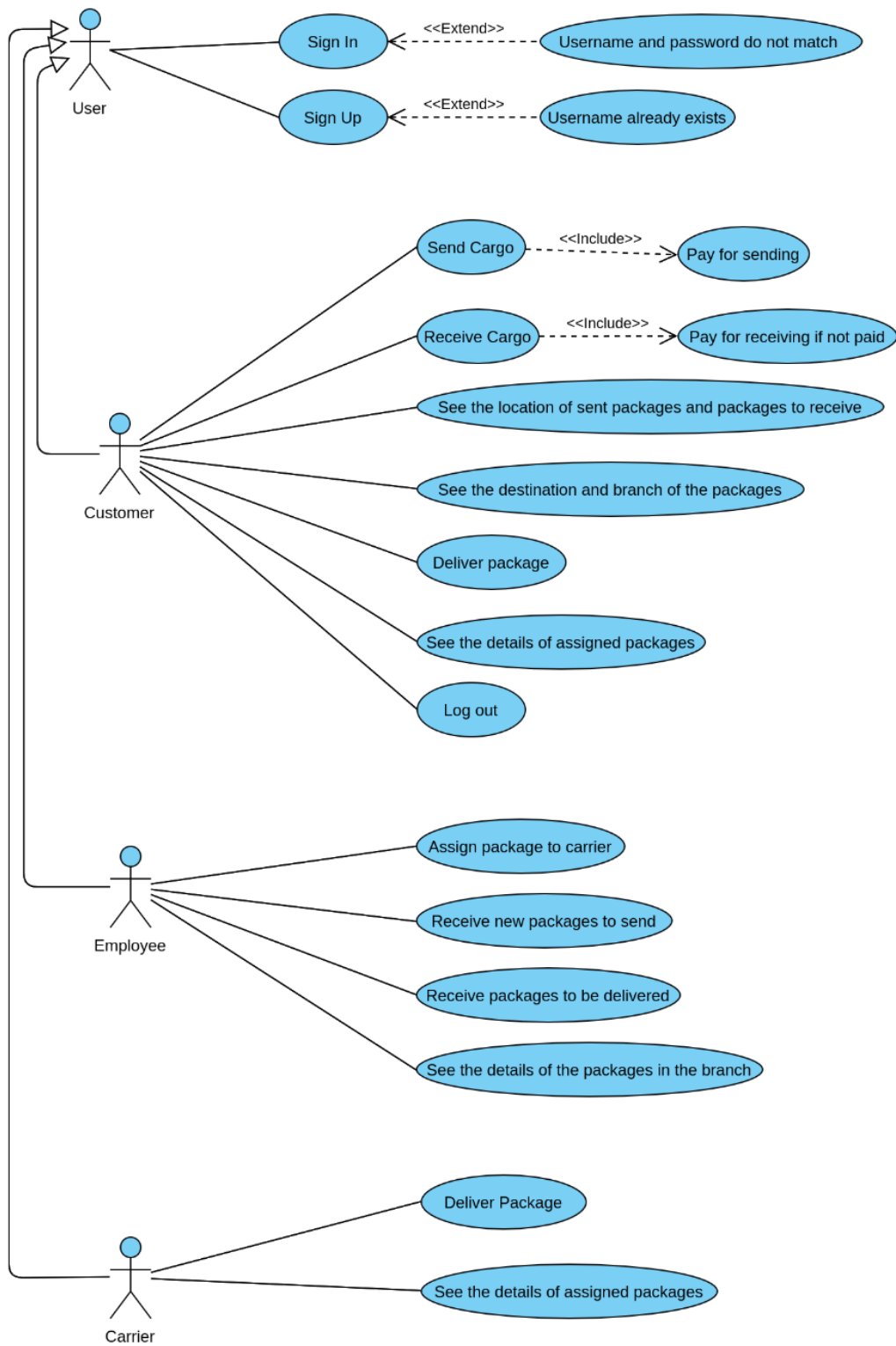
FD -> None

Normal Form -> BCNF

package_id is FK to Package table

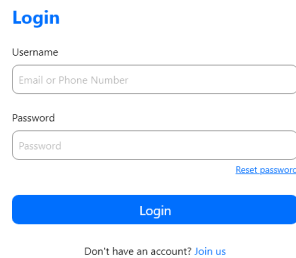
report_id is FK to Report table

Use Case Diagram



User Interface Design & Corresponding SQL Statements

Login



The login form is centered on the page. It features a blue 'Login' title at the top. Below the title are two input fields: 'Username' with a placeholder 'Email or Phone Number' and 'Password' with a placeholder 'Password'. A blue link 'Reset password' is positioned to the right of the password field. A solid blue 'Login' button is located below the input fields. At the bottom, a link 'Don't have an account? Join us' is displayed.

```
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
<input type="text"/>	<input type="text"/>
Phone Number	Email
<input type="text"/>	<input type="text"/>
Password	Confirm Password
<input type="text"/>	<input type="text"/>

Sign Up

Already have an account? [Login](#).

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

Customer - Send a package

Welcome, Etophiana.[Home](#)

Recipient

15516548 - Saidcan Alemdaroglu ▼

Branch

5198156 - Etlik Branch ▼

4165166 - Ella Fisher ▼

Package Info

Width - cm

102

Length - cm

25

Height - cm

33

Weight - kg

2.5

Payment

☒ Online ☐ Cash - Recipient ☐ Cash - Sender

Name on card

Riley Birch

Card Number

4304 9786 3317 0156

Expiration Date

10

22

CCV

584

Save

Recipient

☒ Submit to Branch ☐ Call Courier

Courier

5198156 - Etlik Branch ▼

4165166 - Michael Graham ▼

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

Welcome, Etophiana.

[Home](#)

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, Etoghiana.

[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

Welcome, Etophilia.

Home

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

Welcome, Etophiana.

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

VALUES

Report (content, package_id, curdate())

((@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

Welcome

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

Welcome

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

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.

Status

☒ Approved ☐ Declined

[Save](#)

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

Implementation Plan

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

Website

https://github.com/SMRSLYMNL/CS_353