CS 306 DATABASE SYSTEMS PROJECT PROPOSAL

4.10.2021

SABANCI UNIVERSITY PERSONAL VEHICLE AND PARKING MANAGEMENT SYSTEM

Can Korkmaz 28068
Berfin Özkök 26407
Rebah Özkoç 29207

Updated on 24/10/2024

Sabancı University Vehicle and Parking Management System: SuParkDB - Project Proposal

Finding car parking places in the campus is considered a problem by many people of SU. Our database application solves this issue regarding finding empty parking slots inside the campus, also making it easy to track parking loads of each parking areas for campus personal. Our project aims to create a database application for tracking and keeping record of every personal car in the Uni which are admitted to SU security office. SuParkDB will track whether personal cars are currently inside the campus or not, as well as keeping track of the time and date the car has entered the campus and left the campus. It will also keep track of where the car is currently parked, and what percentage of each parking area in the campus is filled, also keeping track of the car entities inside it. The tracking will be done from the main entrance to campus, with security personal managing the empty slots and guiding entering cars to those empty slots.

The database will have entities such as users and car, and entities will have attributes such as car-model, car-year, car plate number, user-id, user-su-id and relations that relate cars to users, used_by. Cars will also be represented with a normal entity and with an id, not identified by users only as they're required for parking areas to track which cars are inside.

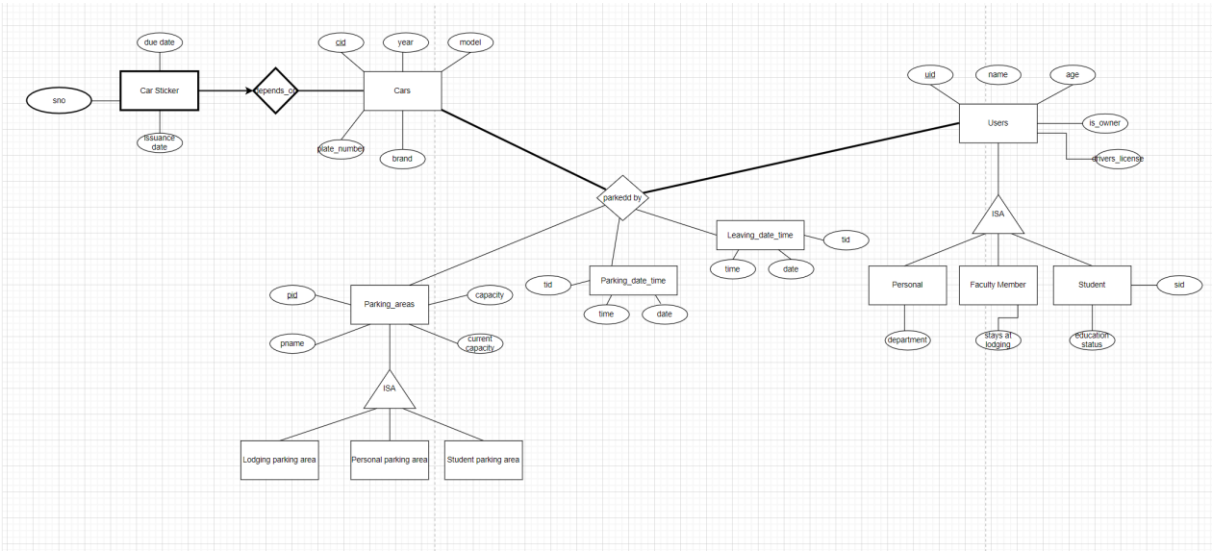
Parking areas in the campus will also be entities. Each parking area will have number of slots allocated, in respect to real data, and keep track of which cars are currently parked in each parking area. Parking slots inside each parking areas aren't going to be individually tracked, as in which car is located at which slot inside that individual parking area isn't going to be kept, just the parking area the car is parked at is going to be kept.

The constraints between cars and users will be that every car can have one or more users, and a user can own multiple cars, constituting many to many relationship. There will also be constraints between cars and parking areas, such as a car can park in only one parking area, and every car inside the campus must be parked. Cars also depend_on a sticker_entity, since cars inside campus can have a car_sticker, and the car_sticker has issuance_date and due_date. The cars entity and car_sticker weak entity is related by a car_depends_on relation. Constraint here is every_car_sticker can point to a single unique car.

This real-life database application demo, which we call now SuParkDB, is a comprehensive parking and personal vehicle management system for Sabancı University use, and it manages almost every need of people of Sabancı University and security personal, and it can be further integrated with university digital systems such as mySU website and mySU mobile applications. SuParkDB can also work as a standalone application, as it has its separate set of users, or owners as we call it. It can also provide necessary data to SU security personal, at the same time providing them ease of access to this data.

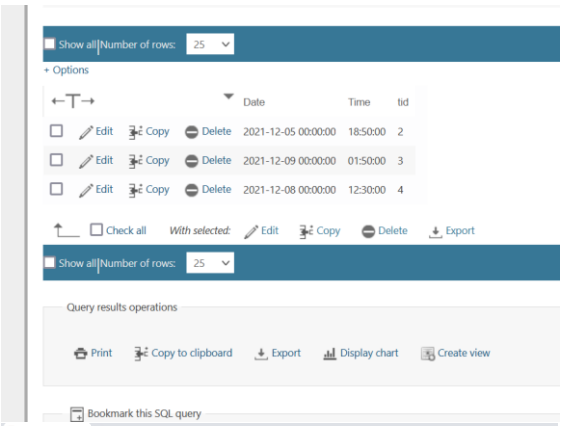
Entity Sets: cars, car_sticker, users, staff, faculty_members, students, parking areas, loding_parking_area, personnel_parking_area, student_parking_area, parking_date_time, leave_date_time

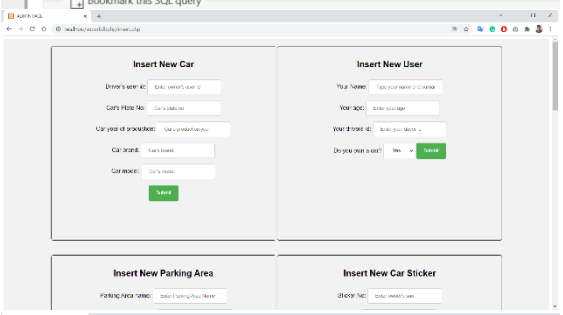
Relations: parked_by, car_depends_on

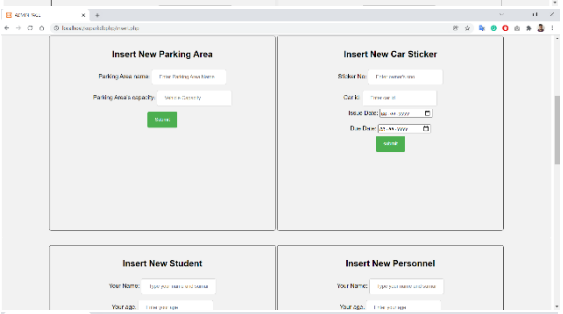

due date
Car Sticker
sno
issuance date
depends_on
cid
year
model
Cars
plate_number
brand
uid
name
age
Users
is_owner
drivers_license
parkedd by
Leaving_date_time
tid
time
date
ISA
Personal
Faculty Member
Student
sid
department
stays at lodging
education status
pid
Parking_areas
capacity
pname
current capacity
tid
Parking_date_time
time
date
ISA
Lodging parking area
Personal parking area
Student parking area

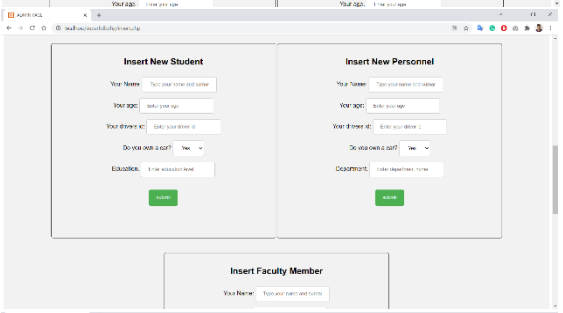
```
CREATE TABLE users(
    uid INTEGER NOT NULL,
    uname VARCHAR(50),
    drivers_license INTEGER NOT NULL,
    age INTEGER,
    is_owner BOOLEAN,
    PRIMARY KEY (uid)
);

CREATE TABLE students(
    uid INTEGER NOT NULL,
    education VARCHAR(50),
    PRIMARY KEY (uid),
    FOREIGN KEY (uid) REFERENCES users (uid)
ON UPDATE CASCADE ON DELETE CASCADE
);
CREATE TABLE personnel (
    uid INTEGER NOT NULL,
    department VARCHAR (50),
    PRIMARY KEY (uid),
    FOREIGN KEY (uid) REFERENCES users (uid)
ON UPDATE CASCADE ON DELETE CASCADE
);
CREATE TABLE faculty_members (
    uid INTEGER NOT NULL,
    stays_in_campus BOOLEAN,
    PRIMARY KEY (uid),
    FOREIGN KEY (uid) REFERENCES users (uid)
ON UPDATE CASCADE ON DELETE CASCADE
);
CREATE TABLE cars(
    cid INTEGER NOT NULL,
    driver_id INTEGER NOT NULL,
    plate_no INTEGER NOT NULL UNIQUE,
    car_year YEAR,
    car_brand VARCHAR(30),
    car_model VARCHAR(30),
    PRIMARY KEY(cid),
    FOREIGN KEY (driver_id) REFERENCES users
(uid),
);

CREATE TABLE parked_by (
    cid INTEGER NOT NULL,
    uid INTEGER NOT NULL,
    pid INTEGER,
    arrival_tid INTEGER NOT NULL,
    departure_tid INTEGER,
    PRIMARY KEY(cid, arrival_tid),
    FOREIGN KEY (cid) REFERENCES cars (cid),
    FOREIGN KEY (uid) REFERENCES users (uid),
    FOREIGN KEY (pid) REFERENCES
parking_areas (pid),
    FOREIGN KEY (arrival_tid) REFERENCES
parking_date_times(tid),
    FOREIGN KEY (departure_tid) REFERENCES
leaving_date_times(tid)
);
```

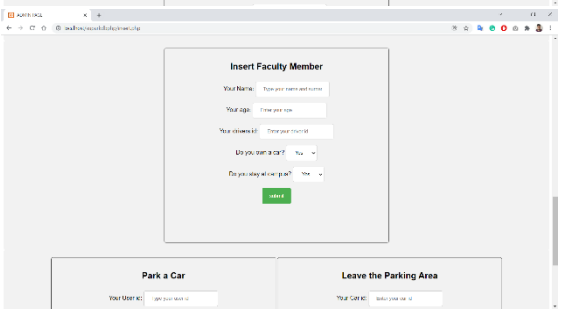
```
CREATE TABLE parking_areas(
   pname VARCHAR(20),
   curr_capacity INTEGER NOT NULL,
   capacity INTEGER NOT NULL,
   pid INTEGER NOT NULL,
   PRIMARY KEY (pid)
);

CREATE TABLE car_Sticker (
   sno INTEGER,
   cid INTEGER,
   issue_date DATE,
   due_date DATE,
   PRIMARY KEY (sno, cid),
   FOREIGN KEY (cid) REFERENCES cars (cid)
ON DELETE CASCADE ON UPDATE CASCADE
);

CREATE TABLE car_depends_on(
   sno INTEGER NOT NULL,
   FOREIGN KEY (sno) REFERENCES car_sticker
(sno) ON DELETE CASCADE ON UPDATE
CASCADE
);

CREATE TABLE parking_date_times(
 Date DATETIME,
 Time TIME,
 tid INTEGER,
 PRIMARY KEY (tid)
);

CREATE TABLE leaving_date_times(
 Date DATETIME,
 Time TIME,
 tid INTEGER,
 PRIMARY KEY (tid)
);

CREATE TABLE student_park_areas(
   pid INTEGER,
   PRIMARY KEY (pid),
   FOREIGN KEY (pid) REFERENCES
parking_areas(pid) ON UPDATE CASCADE ON
DELETE CASCADE
);

CREATE TABLE personnel_park_areas(
        pid INTEGER,
        PRIMARY KEY (pid),
        FOREIGN KEY (pid) REFERENCES
        parking_areas(pid) ON UPDATE
        CASCADE ON DELETE CASCADE
);
CREATE TABLE lodging_park_areas(
         pid INTEGER,
         PRIMARY KEY (pid),
         FOREIGN KEY (pid) REFERENCES
        parking_areas(pid) ON UPDATE
        CASCADE ON DELETE CASCADE
);
```

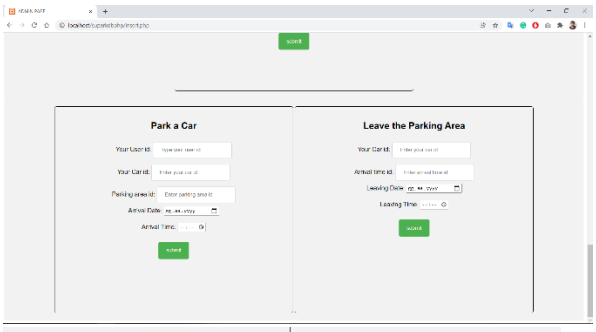

Show all Number of rows: 25
+ Options
Date Time tid
Edit Copy Delete 2021-12-05 00:00:00 18:50:00 2
Edit Copy Delete 2021-12-09 00:00:00 01:50:00 3
Edit Copy Delete 2021-12-08 00:00:00 12:30:00 4
Check all With selected: Edit Copy Delete Export
Show all Number of rows: 25
Query results operations
Print Copy to clipboard Export Display chart Create view
Bookmark this SQL query

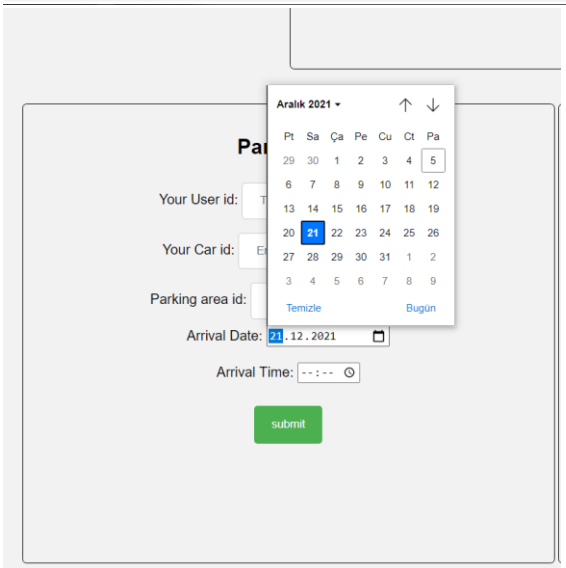

Insert New Car
Insert New User
Insert New Parking Area
Insert New Car Sticker

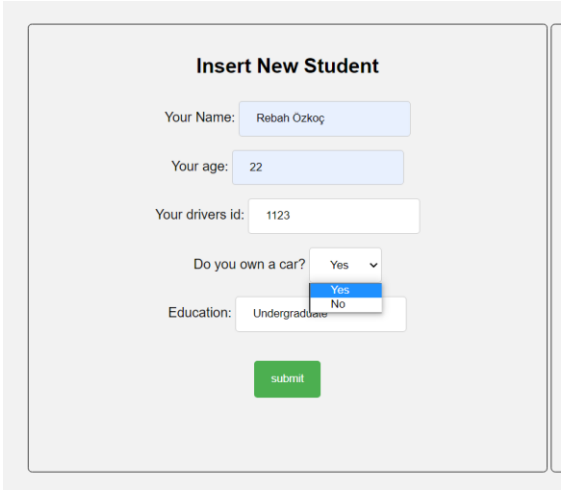

Insert New Parking Area
Insert New Car Sticker
Insert New Student
Insert New Personnel

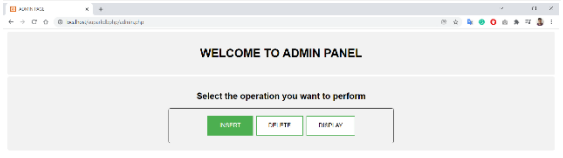

Insert New Student
Insert New Personnel
Insert Faculty Member

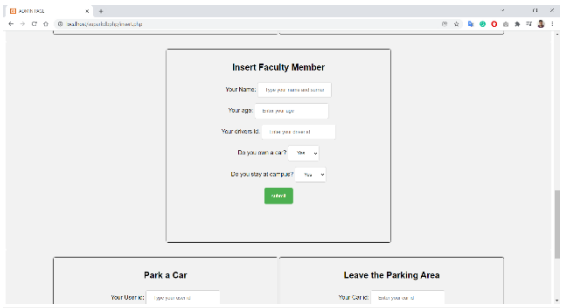

Insert Faculty Member
Park a Car
Leave the Parking Area

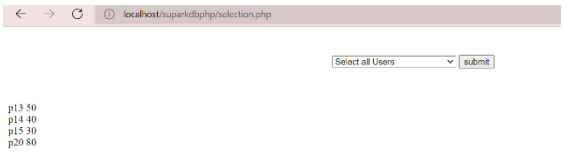

Park a Car
Leave the Parking Area

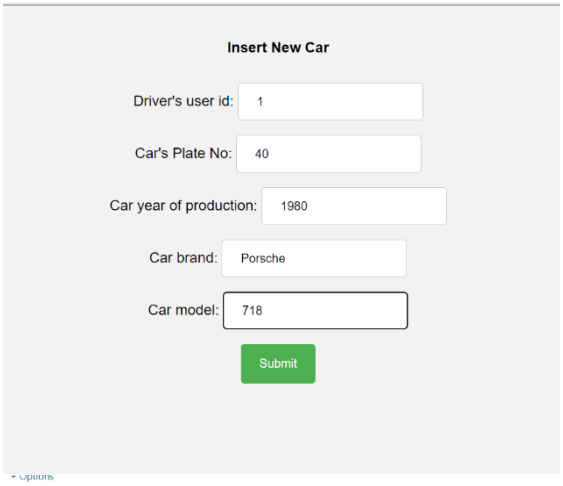

Aralık 2021
Pt Sa Ça Pe Cu Ct Pa
Your User id:
Your Car id:
Parking area id:
Arrival Date: 21.12.2021
Arrival Time:
submit
Temizle
Bugün


Insert New Student
Your Name: Rebah Özkoç
Your age: 22
Your drivers id: 1123
Do you own a car? Yes
Yes
No
Education:
submit

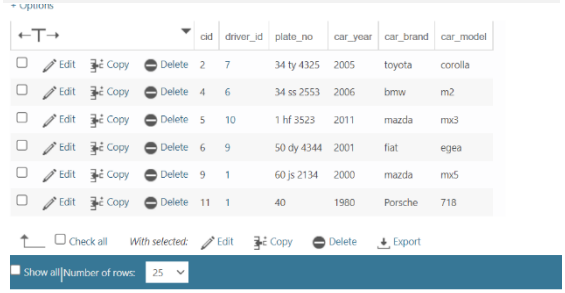

WELCOME TO ADMIN PANEL
Select the operation you want to perform

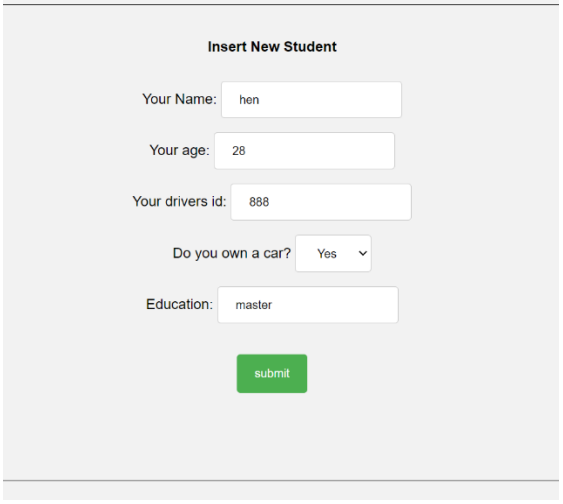

Insert Faculty Member
Park a Car
Leave the Parking Area

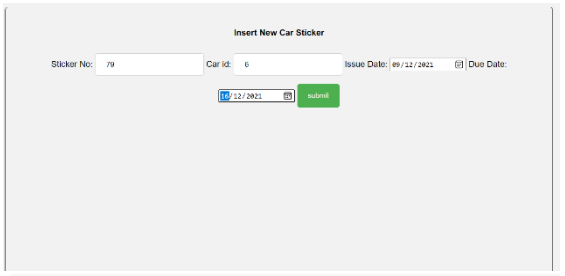

localhost/suparkdbphp/selection.php
Select all Users
submit
p13 50
p14 40
p15 30
p20 80

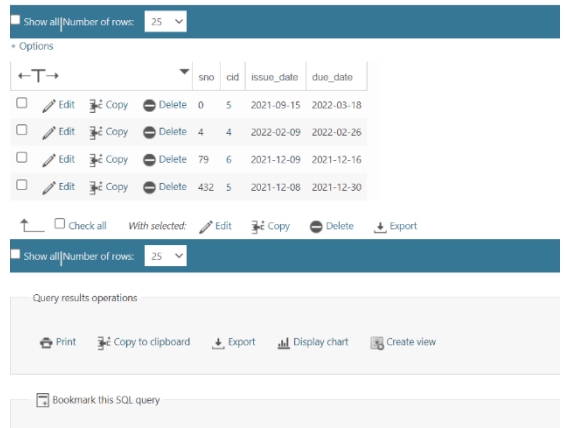

Insert New Car
Driver's user id: 1
Car's Plate No: 40
Car year of production: 1980
Car brand: Porsche
Car model: 718
Submit

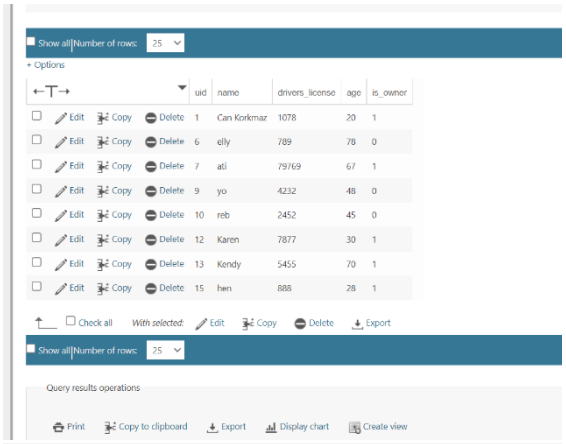

Insert New Parking Area
Parking Area name: p20
Parking Area's capacity: 80
Submit

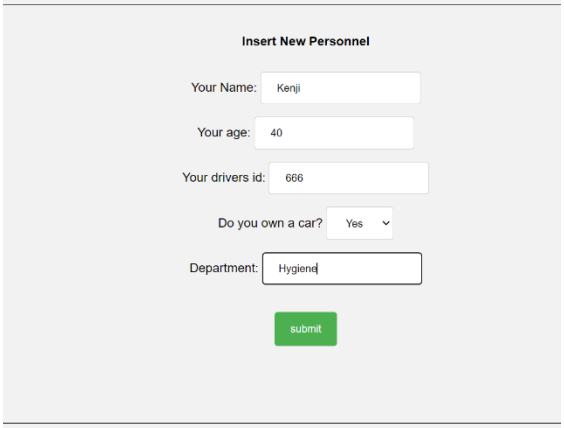

cid driver_id plate_no car_year car_brand car_model
2 7 34 ty 4325 2005 toyota corolla
4 6 34 ss 2553 2006 bmw m2
5 10 1 hf 3523 2011 mazda mx3
6 9 50 dy 4344 2001 fiat egea
9 1 60 js 2134 2000 mazda mx5
11 1 40 1980 Porsche 718
Check all With selected: Edit Copy Delete Export
Show all Number of rows: 25

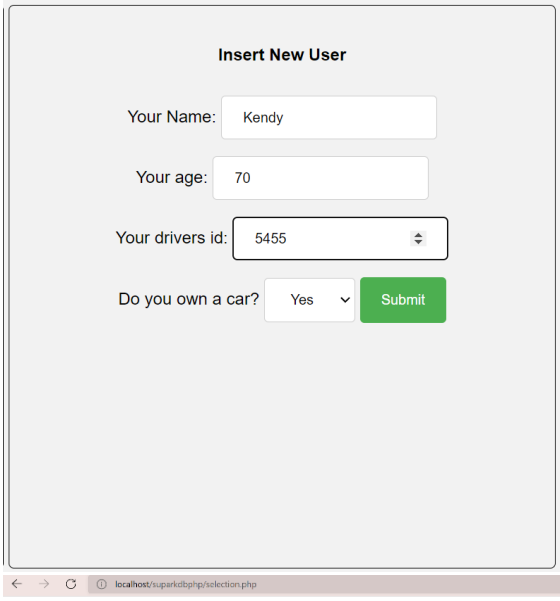

Insert New Student
Your Name: hen
Your age: 28
Your drivers id: 888
Do you own a car? Yes
Education: master
submit
Show all Number of rows: 25
Options
uid education
1 university
15 master
Check all With selected: Edit Copy Delete Export
Show all Number of rows: 25
Query results operations

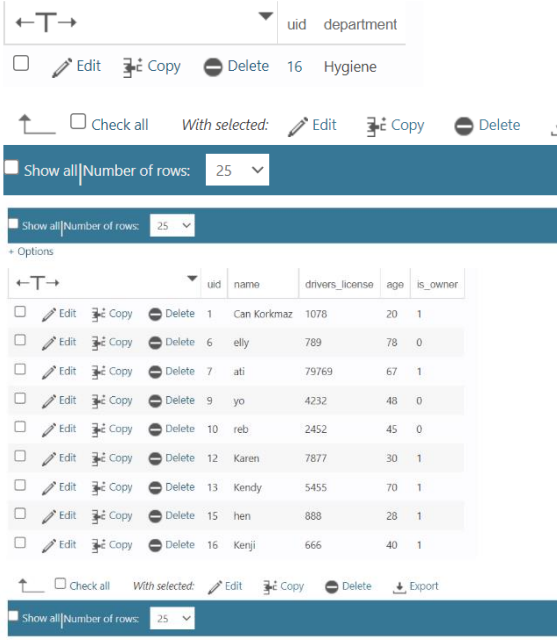

Insert New Car Sticker
Sticker No: 79
Car id: 6
Issue Date: 09/12/2021
Due Date:
submit


Show all Number of rows: 25
Options
sno cid issue_date due_date
0 5 2021-09-15 2022-03-18
4 4 2022-02-09 2022-02-26
79 6 2021-12-09 2021-12-16
432 5 2021-12-08 2021-12-30
Check all With selected: Edit Copy Delete Export
Show all Number of rows: 25
Query results operations
Print Copy to clipboard Export Display chart Create view
Bookmark this SQL query

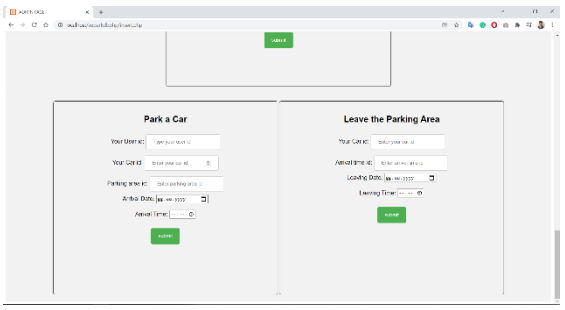


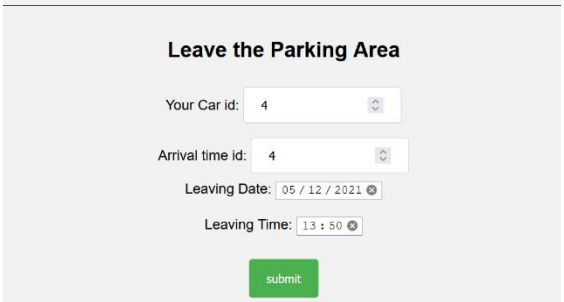


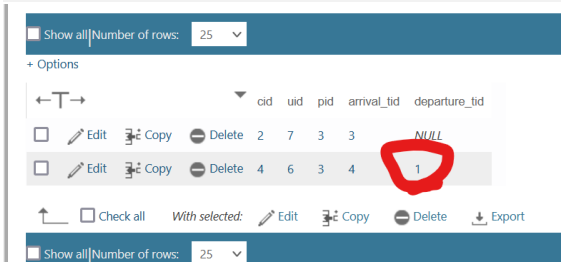




1 Can Korkmaz 1078 20 1
6 elly 789 78 0
7 ati 79769 67 1
9 yo 4232 48 0
10 reb 2452 45 0
12 Karen 7877 30 1
13 Kendy 5455 70 1







Park a Car

Your User id: 6

Your Car id: 4

Parking area id: 3

Arrival Date: 08 / 12 / 2021

Arrival Time: 12 : 30

submit