2110322: (Database Systems)

CEDT

ปีการศึกษา 2567

โครงงานประจำวิชา

นิสิตแบ่งกลุ่มเพื่อทำโครงงานประจำวิชา กลุ่มละ 6 คน โดยกำหนดโครงงาน และฟังก์ชันของโครงงานให้ดังต่อไปนี้

- **โครงงานที่ 1 ระบบ Hotel Booking**

A hotel wants to have a booking system in the form of a web-based application that, when logging in as an administrator, the administrator can add, update, and delete a hotel's overall information, hotel location, phone numbers, map, hotel's facilities, e.g., valet parking, WI-FI access, pools, the check-in/check-out time, room's information, e.g., room type, extra facilities, room's status (available, occupied), room's price, etc. An administrator can add hotels at different locations, e.g., Bangkok, Chiangmai.

Via the web-based application, without login, a user can browse and search for a hotel and available rooms in the hotel with different facilities, locations, and price ranges. However, if a user wants to book a room, the user must first register and log in. A user can book a room for at most three days, and the user can edit, update, and cancel the booking seven days before the check-in date. Also, the administrator can view all bookings or search for some according to specific conditions, such as within date ranges, and cancel a booking.

ฟังก์ชันของระบบคือ

1. The system shall allow a user to register by specifying the name, telephone number, email, and password.
2. After registration, the user becomes a registered user, and the system shall allow the user to log in to use the system by specifying the email and password. The system shall allow a registered user to log out.

3. After login, the system shall allow the registered user to book up to 3 nights by specifying the date and the preferred hotel. The hotel list is also provided to the user. A hotel information includes the hotel name, address, and telephone number.
4. The system shall allow the registered user to view his hotel bookings.
5. The system shall allow the registered user to edit his hotel bookings.
6. The system shall allow the registered user to delete his hotel bookings.
7. The system shall allow the admin to view any hotel bookings.
8. The system shall allow the admin to edit any hotel bookings.
9. The system shall allow the admin to delete any hotel bookings.

- **โครงงานที่ 2 ระบบ Campground Booking**

A campground wants to have a booking system in the form of a web-based application that, when logging in as an administrator, the administrator can add, update, and delete a campground's overall information, campground location, phone numbers, map, campground's facilities, e.g., toilets, bathrooms, charging station, restaurants, the check-in/check-out time, tent's information, e.g., tent size, tent zone, extra facilities, tent's status (available, occupied), tent's price, etc. An administrator can add campgrounds at different locations, e.g., Loei, Chiangmai.

Via the web-based application, without login, a user can browse and search for a campground and available tents in the campground with different facilities, locations, and price ranges. However, if a user wants to book a tent, the user must first register and log in. A user can book a tent for at most three days, and the user can edit, update, and cancel the booking seven days before the check-in date. Also, the administrator can view all bookings or search for some according to specific conditions, such as within date ranges, and cancel a booking.

ฟังก์ชันของระบบคือ

1. The system shall allow a user to register by specifying the name, telephone number, email, and password.

2. After registration, the user becomes a registered user, and the system shall allow the user to log in to use the system by specifying the email and password. The system shall allow a registered user to log out.
3. After login, the system shall allow the registered user to book up to 3 nights by specifying the date and the preferred campground. The campground list is also provided to the user. A campground information includes the campground name, address, and telephone number.
4. The system shall allow the registered user to view his campground bookings.
5. The system shall allow the registered user to edit his campground bookings.
6. The system shall allow the registered user to delete his campground bookings.
7. The system shall allow the admin to view any campground bookings.
8. The system shall allow the admin to edit any campground bookings.
9. The system shall allow the admin to delete any campground bookings.

- **โครงงานที่ 3 ระบบ Online Job Fair Registration**

An Online Job Fair wants to have an interview booking system in the form of a web-based application that, when logging in as an administrator, the administrator can add, update, and delete the job fair event's overall information, job fair URL, phone numbers, e-mail, description, theme, company's information, e.g., business type, size, address, contact, description, the interview information, e.g., start time, end time, job position, job description, session's status (available, occupied), etc. An administrator can add as many companies as needed.

Via the web-based application, without login, a user can browse and search for a company and available interview sessions in the company with different positions, locations, and time ranges. However, if a user wants to book an interview session, the user must first register and log in. A user can book an interview session for at most three sessions, and the user can edit, update, and cancel the booking seven days before the interview date. Also, the administrator can view all bookings or search for some according to specific conditions, such as within date ranges, and cancel a booking.

ฟังก์ชันของระบบคือ

1. The system shall allow a user to register by specifying the name, telephone number, email, and password.
2. After registration, the user becomes a registered user, and the system shall allow the user to log in to use the system by specifying the email and password. The system shall allow a registered user to log out.
3. After login, the system shall allow the registered user to book up to 3 interview sessions by specifying the date (during May 10^{th} -13^{th}, 2022) and the preferred companies. The company list is also provided to the user. A company information includes the company name, address, website, description, and telephone number.
4. The system shall allow the registered user to view his interview session bookings.
5. The system shall allow the registered user to edit his interview session bookings.
6. The system shall allow the registered user to delete his interview session bookings.
7. The system shall allow the admin to view any interview session bookings.
8. The system shall allow the admin to edit any interview session bookings.
9. The system shall allow the admin to delete any interview session bookings.

- **โครงงานที่ 4 ระบบ Dentist Booking**

A dentist shop wants to have a booking system in the form of a web-based application that, when logging in as an administrator, the administrator can add, update, and delete a dentist shop's overall information, shop location, available services, phone numbers, map, shop's facilities, e.g., parking, price range, dentist's information, e.g., name, years of experience, area of expertise, available time slots, etc. An administrator can add dentists as many as needed.

Via the web-based application, without login, a user can browse and search for a dentist and available time slot in the shop with the dentist's name, different area of expertise, years of experience. However, if a user wants to book a dentist, the user must first register and log in. A user can book an appointment for at most one time slot, and the user can edit, update, and cancel the booking seven days before the booking date.

Also, the administrator can view all bookings or search for some according to specific conditions, such as within date ranges, and cancel a booking.

- **ฟังก์ชันของระบบคือ**

1. The system shall allow a user to register by specifying the name, telephone number, email, and password.
2. After registration, the user becomes a registered user, and the system shall allow the user to log in to use the system by specifying the email and password. The system shall allow a registered user to log out.
3. After login, the system shall allow the registered user to book only ONE session by specifying the date and the preferred dentist. The dentist list is also provided to the user. A dentist information includes the dentist's name, years of experience, and area of expertise.
4. The system shall allow the registered user to view his booking.
5. The system shall allow the registered user to edit his booking.
6. The system shall allow the registered user to delete his booking.
7. The system shall allow the admin to view any bookings.
8. The system shall allow the admin to edit any bookings.
9. The system shall allow the admin to delete any bookings.

- **โครงงานที่ 5 ระบบ Restaurant Reservation**

A restaurant network wants to have a booking system in the form of a web-based application that, when logging in as an administrator, the administrator can add, update, and delete the restaurant's overall information, restaurant name, location, address, type of food, rating, phone numbers, map, restaurant's facilities, e.g., parking, price range, open-close time, table's information, e.g., capacity, zone, time slots, etc. An administrator can add as many restaurants as needed.

Via the web-based application, without login, a user can browse and search for a restaurant with the restaurant 's name, area, rating, and type of food. However, if a user wants to book a table, the user must first register and log in. A user can book a table for

at most three tables, and the user can edit, update, and cancel the booking an hour before the booked time. Also, the administrator can view all bookings or search for some according to specific conditions, such as within date ranges, and cancel a booking.

- **ฟังก์ชันของระบบคือ**

1. The system shall allow a user to register by specifying the name, telephone number, email, and password.
2. After registration, the user becomes a registered user, and the system shall allow the user to log in to use the system by specifying the email and password. The system shall allow a registered user to log out.
3. After login, the system shall allow the registered user to reserve up to 3 tables by specifying the date and the preferred restaurant. The restaurant list is also provided to the user. A restaurant information includes the name, address, telephone number, and open-close time.
4. The system shall allow the registered user to view his/her restaurant reservation.
5. The system shall allow the registered user to edit his/her restaurant reservation.
6. The system shall allow the registered user to delete his/her restaurant reservation.
7. The system shall allow the admin to view any restaurant reservation.
8. The system shall allow the admin to edit any restaurant reservation.
9. The system shall allow the admin to delete any restaurant reservation.

- **โครงงานที่ 6 ระบบ Co-working Space Reservation**

A co-working space franchise wants to have a booking system in the form of a web-based application that, when logging in as an administrator, the administrator can add, update, and delete a co-working space's overall information, co-working space name, location, address, rating, phone numbers, map, co-working space's facilities, e.g., parking, food and beverage, printer, price range, open-close time, room's information, e.g., capacity, personal printer, projector, microphone and sound system, price, available time slots, etc. An administrator can add as many co-working space locations as needed.

Via the web-based application, without login, a user can browse and search for a co-working space with the co-working space ’s name, area, rating, and facilities. However, if a user wants to book a time slot of a room, the user must first register and log in. A user can book a room’s time slot for at most three time slots, and the user can edit, update, and cancel the booking an hour before the booked time. Also, the administrator can view all bookings or search for some according to specific conditions, such as within date ranges, and cancel a booking.

- **ฟังก์ชันของระบบคือ**

1. The system shall allow a user to register by specifying the name, telephone number, email, and password.
2. After registration, the user becomes a registered user, and the system shall allow the user to log in to use the system by specifying the email and password. The system shall allow a registered user to log out.
3. After login, the system shall allow the registered user to reserve up to 3 rooms by specifying the date and the preferred co-working space. The co-working space list is also provided to the user. A co-working space information includes the name, address, and telephone number, and open-close time.
4. The system shall allow the registered user to view his/her co-working space reservation.
5. The system shall allow the registered user to edit his/her co-working space reservation.
6. The system shall allow the registered user to delete his/her co-working space reservation.
7. The system shall allow the admin to view any co-working space reservation.
8. The system shall allow the admin to edit any co-working space reservation.
9. The system shall allow the admin to delete any co-working space reservation.

- **โครงงานที่ 7 ระบบ Rental Car Booking**

A rental car franchise wants to have a booking system in the form of a web-based application that, when logging in as an administrator, the administrator can add, update, and delete a shop’ overall information, name, location, address, phone

numbers, map, price range, open-close time, car's information, e.g., capacity, model, options, price per day, etc. An administrator can add as many cars as needed.

Via the web-based application, without login, a user can browse and search for a car with capacity, model, pickup and return dates, shop location, and price ranges. However, if a user wants to book a car, the user must first register and log in. A user can book a car for at most three cars, and the user can edit, update, and cancel the booking a day before the pick-up date. Also, the administrator can view all bookings or search for some according to specific conditions, such as within date ranges, and cancel a booking.

- **ฟังก์ชันของระบบคือ**

1. The system shall allow a user to register by specifying the name, telephone number, email, and password.
2. After registration, the user becomes a registered user, and the system shall allow the user to log in to use the system by specifying the email and password. The system shall allow a registered user to log out.
3. After login, the system shall allow the registered user to book up to 3 cars by specifying the date and the preferred rental car provider. The rental car provider list is also provided to the user. A rental car provider information includes the name, address, and telephone number.
4. The system shall allow the registered user to view his/her rental car bookings.
5. The system shall allow the registered user to edit his/her rental car bookings.
6. The system shall allow the registered user to delete his/her rental car bookings.
7. The system shall allow the admin to view any rental car bookings.
8. The system shall allow the admin to edit any rental car bookings.
9. The system shall allow the admin to delete any rental car bookings.

- **โครงงานที่ 8 ระบบ Massage Reservation**

A massage shop franchise wants to have a booking system in the form of a web-based application that, when logging in as an administrator, the administrator can add, update, and delete shops' overall information, name, location, address, phone numbers,

map, price range, open-close time, massage's information, e.g., duration, oil, area, price, sessions, etc. An administrator can add as many shops as needed.

Via the web-based application, without login, a user can browse and search for a massage with massage area, duration, oil, shop location, and price ranges. However, if a user wants to book a massage session, the user must first register and log in. A user can book a session for at most three reservations, and the user can edit, update, and cancel the reservation a day before the reservation date. Also, the administrator can view all reservations or search for some according to specific conditions, such as within date ranges, and cancel a booking.

- **ฟังก์ชันของระบบคือ**

1. The system shall allow a user to register by specifying the name, telephone number, email, and password.
2. After registration, the user becomes a registered user, and the system shall allow the user to log in to use the system by specifying the email and password. The system shall allow a registered user to log out.
3. After login, the system shall allow the registered user to reserve up to 3 queues by specifying the date and the preferred massage shop. The massage shop list is also provided to the user. A massage shop information includes the name, address, telephone number, and open-close time.
4. The system shall allow the registered user to view his/her massage reservation.
5. The system shall allow the registered user to edit his/her massage reservation.
6. The system shall allow the registered user to delete his/her massage reservation.
7. The system shall allow the admin to view any massage reservation.
8. The system shall allow the admin to edit any massage reservation.
9. The system shall allow the admin to delete any massage reservation.

นิสิตจะต้องส่ง Final report ที่ประกอบไปด้วยเนื้อหาดังต่อไปนี้ (กำหนดส่ง 10-ก.พ.-2568)

1) ชื่อโครงการ
2) ER Diagram (Chen's notation) **(4 คะแนน)**
3) Schema diagram แสดง referential integrity **(2 คะแนน)**
4) SQL commands ให้เป็นไปตาม functional requirements ของ project **(5 คะแนน)**
5) 1 SQL complex query ที่ทำงานกับฐานข้อมูล โดยตัวอย่างของ complex queries
   (ตัวอย่างแสดงในภาคผนวก ก ของเอกสารนี้) **(2 คะแนน)**
6) สร้าง Document-based design schema 1 collection
   (ตัวอย่างแสดงในภาคผนวก ข ของเอกสารนี้) **(2 คะแนน)**

ภาคผนวก ก

ตัวอย่าง complex queries ที่ใช้ได้

<u>ตัวอย่างที่ 1 ที่ใช้ได้</u>

Riders with their manager and special conditions

Query แสดงข้อมูล Rider ที่มี Rating มากกว่า 1 และมีจำนวนการให้บริการมากกว่า 1 ครั้งโดยจะแสดง Attributes คือ

- Rider full name (firstname and lastname)
- Station name
- rating
- จำนวนการให้บริการ (ในชื่อ Number of Ride)
- Manager full name (firstname and lastname)

```
SELECT
        U.first_name as "Rider First Name",
        U.last_name as "Rider Last Name",
        S.name as "Station name",
        rating,
        count(ride_ID) as "Number of Ride",
        M.first_name as "Manager First Name",
        M.last_name as "Manager Last Name"

FROM
        rider left join ride on rider.user_ID = ride.rider_ID
        natural join station S natural join user U,
        manager M

WHERE
        rating > 1 and M.manager_ID =  "MN000001"
        and S.manager_ID = M.manager_ID

GROUP BY user_ID
HAVING count(ride_ID)>1;
```

ตัวอย่างที่ 2 ที่ใช้ได้

Scenario:

Pump admin wants to know the total income of each shop in the system.

Query:

```
SELECT shop_name, SUM(total_profit) AS total_profit
FROM (
    SELECT shop.name AS shop_name,
    product.name AS product_name,
    product.price * product_order_line.product_amount AS total_profit
    FROM partnershop shop
    JOIN product product
    ON shop.id = product.partnershop_id
    JOIN product_order product_order
    ON shop.id = product_order.deliver_by_partnershop
    JOIN product_order_line product_order_line
    ON product_order_line.product_order_id  = product_order.id
    AND product_order_line.product_id = product.id
) AS summary_table
GROUP BY shop_name
ORDER BY total_profit DESC
```

ตัวอย่างที่ 3 ที่ใช้ได้

Query#2: Given Chatroom_id, we have to query all of the chat history in the room with owner's Firstname, Lastname, and profile picture. The results should also be sorted by Send_time (Descending as in the typical chat app).

```
SELECT ch.*, ct.Firstname, ct.Lastname, ct.Img_path
FROM (
    SELECT Chat_id, Send_time, Message Body, 'TEXT' Type, Sender
    FROM TEXT t
    WHERE Chatroom_id = 'chatroom001'
    UNION
    SELECT Chat_id, Send_time, Image_path Body, 'IMAGE' Type, Sender
    FROM IMAGE i
    WHERE Chatroom_id = 'chatroom001'
) ch
JOIN CUSTOMER ct ON ch.Sender = ct.Username;
```

ตัวอย่างที่ 4 ที่ใช้ได้

ระบบต้องการ 10 อันดับ courseID ที่กำลังเป็นที่นิยม ในหมู่เด็กมัธยม(อายุตั้งแต่ 12 ถึง 18 ปี) โดยการที่ course ใดๆกำลังเป็นที่นิยม จะมีเงื่อนไขดังนี้ คือ

- มีจำนวนสมาชิกเยอะ(มากกว่า 50 คน) และมีคะแนน review เฉลี่ยไม่ได้แย่ (ไม่ต่ำกว่า 3) หรือ
- อาจจะมีจำนวนสมาชิกไม่มาก (น้อยกว่า 50 คนแต่ไม่ต่ำกว่า 20คน) แต่มีคะแนน review เฉลี่ยที่สูง (ไม่ต่ำกว่า 4.5)

โดยให้เรียงลำดับจากมากไปน้อยตาม จำนวนสมาชิกที่เป็นเด็กมัธยมของ course นั้นๆ

```
select m.Cid
from member m, student s, user u
where s.username = m.Susername
        and  s.username = u.Username
        and  m.Cid in
        (
                (select m.Cid
                from member m
                where
                 m.Cid in (select m.Cid from member m group by m.Cid having
        count(*) >= 20)
                and m.Cid in (select r.Cid from review r group by r.Cid having
                avg(r.rating) >= 4.5))
        union
                (select m.Cid
                from member m
                where
                m.Cid in (select m.Cid from member m group by m.Cid having
                count(*) >= 50)
                and m.Cid in(select r.Cid from review r group by r.Cid having
        avg(r.rating) >= 3))
        )
group by m.Cid
order by count(datediff(curDate(), u.birthday) between 4380 and 6935) desc
limit 10 ;
```

ตัวอย่าง complex queries ที่ใช้ไม่ได้

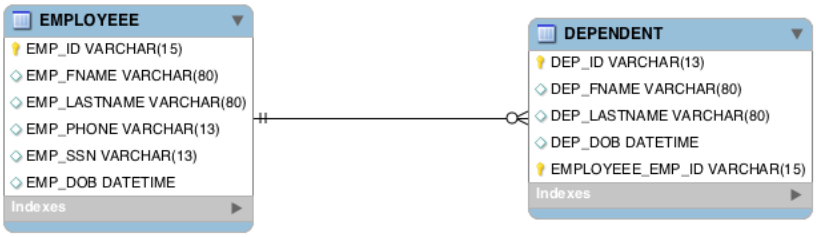
View Guest's Order List & View Order Status	**SELECT** "order"."orderID", "order"."roomNumber", food."foodName","orderFood"."amount", "order".timestamp, "order".status **FROM** "order","orderFood",food **WHERE** "orderFood"."orderID" = "order"."orderID" **AND** "orderFood"."foodID" = "food"."foodID" **AND** ("order".status ='pending' **OR** "order".status= 'approved' **OR** "order".status ='on the way' **OR** "order".status= 'arrived')	Query current ongoing order for kitchen department.
	SELECT "order"."roomNumber", "order"."orderID", amenity."amenityName", "orderAmenity".amount, "order".timestamp **FROM** "order","orderAmenity",amenity **WHERE** "order"."orderID"="orderAmenity"."orderID" **AND** "orderAmenity"."amenityID" = "amenity"."amenityID" **AND** ("order".status ='pending' OR "order".status ='approved' **OR** "order".status = 'on the way')	Query current ongoing order for housekeeping department.

ภาคผนวก ข

ตัวอย่าง Document-based design schema

ให้แสดง design schema ในรูปแบบ JSON ดังตัวอย่างการแปลงจาก ER diagram ไปเป็น document-based design schema ต่อไปนี้

ER diagram



สามารถแปลงเป็น **document-based design schema** ต่อไปนี้

```
{
   "title": "employee",
   "required": ["_id", "emp_fname", "emp_lastname", "emp_phone", "emp_ssn", "emp_dob",
    ],
   "properties": {
      "_id": { "bsonType": "objectId" },
      "emp_fname": { "bsonType": "string" },
      "emp_lastname": { "bsonType": "string" },
       "emp_phone": {
          "bsonType": "string",
          "pattern": "/^[0-9]{3}-[0-9]{7}$"
       },
       "emp_ssn": {
          "bsonType": "string",
          "pattern": "/^[0-9]{3}-[0-9]{2}-[0-9]{3}$"
       },
       "emp_dob": { "bsonType": "date" },
       "emp_dependents": {
          "bsonType": "array",
          "items": {
             "bsonType": "object",
             "properties": {
                "dep_id": { "bsonType": "string" },
                "dep_fname": { "bsonType": "string" },
                "dep_lastname": { "bsonType": "string" },
                "dep_dob": { "bsonType": "date" }
             }
          }
       }
    }
}
```