KATHMANDU UNIVERSITY

Department of Computer Science and Engineering

Database Management System

COMP 232

Lab 2 Report

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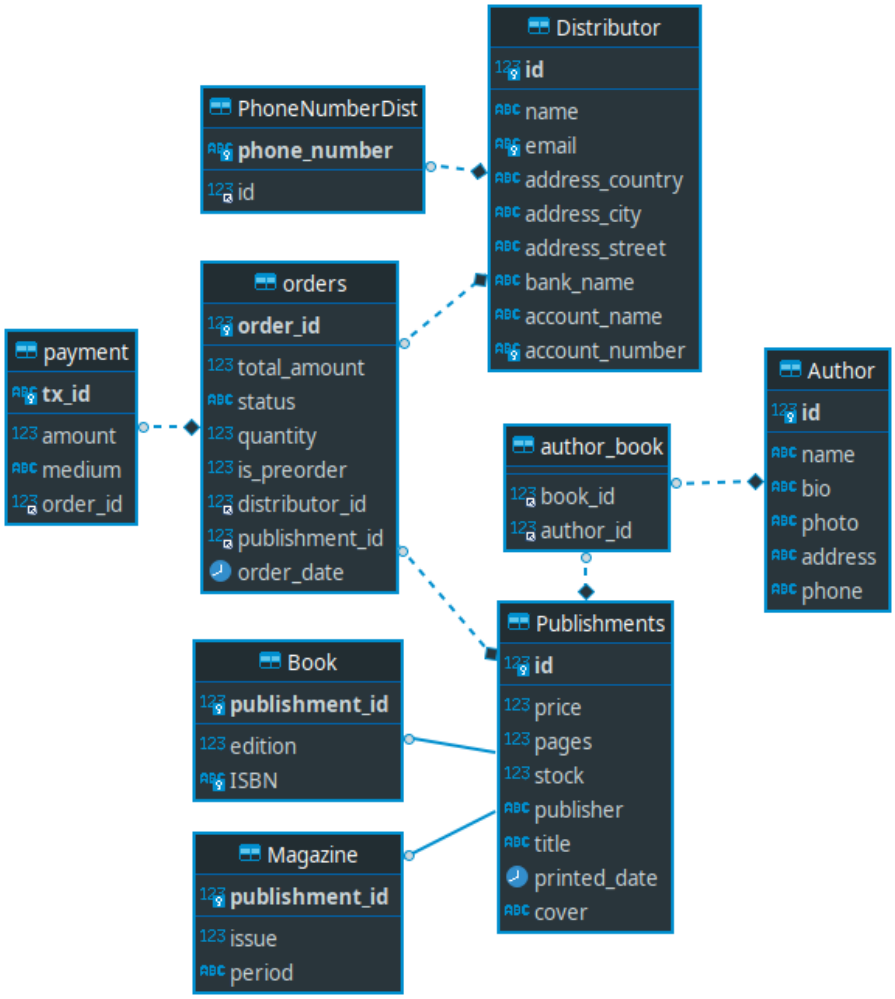

Figure 1: Database ER Diagram

Chapter 1

DDL Scripts

1.1 Creating the tables

```
CREATE TABLE Author
(
       id int UNIQUE NOT NULL auto_increment,
       name varchar(30),
       bio varchar(255),
       photo varchar(255),
       address varchar(255),
       phone varchar(255) UNIQUE ,
       primary key (id)
)


-- Create supertype table publishment. Magazine and Book to
     be the weak entity to inherit
-- publishments.
CREATE TABLE Publishments
(
       id int NOT NULL UNIQUE AUTO_INCREMENT,
       price double,
       pages int,
       stock int,
       publisher varchar(255),
       title varchar(255),
       printed_date date,
       cover varchar(255),
       primary key (id)
)


-- Since book and magazine are the weak entiry, they don't
    have primary key
```

```
-- rather they depend on the id or publishment.
CREATE TABLE Book
(
       publishment_id int UNIQUE,
       edition double,
       ISBN varchar(50) NOT NULL UNIQUE,
       foreign key (publishment_id) REFERENCES Publishments
            (id) ON DELETE CASCADE
)

CREATE TABLE Magazine
(
       publishment_id int UNIQUE,
       issue double NOT NULL,
       period varchar(20) default 'Monthly',
       foreign key (publishment_id) references Publishments
            (id) ON DELETE CASCADE
)

-- Creating table for distributor.
-- Since we have one multi valued attribute, ie phone
    number. We have no they than
-- creating a separate table to store phone number.
CREATE TABLE Distributor
(
       id int NOT NULL UNIQUE auto_increment,
       name varchar(50) NOT NULL,
       email varchar(50) NOT NULL UNIQUE,
       address_country varchar(50) NOT NULL,
       address_city varchar(50) NOT NULL,
       address_street varchar(100) NOT NULL,
       bank_name varchar(100),
       account_name varchar(50),
       account_number varchar(50) UNIQUE,
       primary key (id)
)

CREATE TABLE PhoneNumberDist
(
       id int,
       phone_number varchar(10) NOT NULL UNIQUE,
       FOREIGN KEY (id) REFERENCES Distributor(id) ON
           DELETE CASCADE
)

-- now the relation entity
CREATE TABLE orders
(
       order_id int NOT NULL UNIQUE auto_increment,
       total_amount double NOT NULL,
```

```
        status varchar(50) DEFAULT 'Placed',
        quantity int NOT NULL,
        is_preorder bool DEFAULT FALSE,
        distributor_id int NOT NULL,
        publishment_id int NOT NULL,
        PRIMARY KEY(order_id),
        FOREIGN KEY(distributor_id) REFERENCES Distributor(
            id),
        FOREIGN KEY(publishment_id) REFERENCES Publishments(
            id)
)

ALTER TABLE orders ADD order_date date;

-- Spearate table for payment which is a composite
    attribute for order
CREATE TABLE payment
(
        tx_id varchar(50) NOT NULL UNIQUE,
        amount double NOT NULL,
        medium varchar(50) NOT NULL,
        order_id int,
        PRIMARY KEY(tx_id),
        FOREIGN KEY(order_id) REFERENCES orders(order_id)
)


CREATE TABLE author_book
(
        book_id int NOT NULL,
        author_id int NOT NULL,
        FOREIGN KEY(book_id) REFERENCES Publishments(id),
        FOREIGN KEY(author_id) REFERENCES Author(id)
)
```

1.2 Populating data

```
-- Adding Random Author Data

INSERT INTO Author (name,bio,photo,address,phone) VALUES
(
        'Aayush Paudel',
        'Good Writer.',
        'https://hatrabbits.com/wp-content/uploads/2017/01/
            random.jpg',
        'Kathmandu',
        '9876543210'
),
```

```
(
        'Aayush Aryal',
        'Hero Writer',
        'https://hatrabbits.com/wp-content/uploads/2017/01/
            random.jpg',
        'Footpath',
        '0123456789'
),
(
        'Sushant Adhikari',
        'Chill Writer',
        'https://hatrabbits.com/wp-content/uploads/2017/01/
            random.jpg',
        'Pokhara',
        '0123498765'
),
(
        'Aayush Marasini',
        'Hot Writer',
        'https://hatrabbits.com/wp-content/uploads/2017/01/
            random.jpg',
        'Kathmandu',
        '0912345678'
)


-- Insert random book data

INSERT INTO Publishments (price,pages,stock,publisher,title
    ,printed_date,cover) VALUES
(
        600.00,
        100,
        1000,
        'Manjari Publications',
        'Bagwat Gita',
         NOW(),
        'https://pbs.twimg.com/profile_images
            /1202979137184354305/yKvAZsT3_400x400.jpg'
),

INSERT INTO Book (publishment_id,edition,ISBN) VALUES
(
        LAST_INSERT_ID(),
        1,
        '1234567'
)

INSERT INTO Publishments (price,pages,stock,publisher,title
    ,printed_date,cover) VALUES
```

```
(
        12050.00,
        100,
        1000,
        'Manjari Publications',
        'University Physics',
         NOW(),
        'https://pbs.twimg.com/profile_images
            /1202979137184354305/yKvAZsT3_400x400.jpg'
)

INSERT INTO Book (publishment_id,edition,ISBN) VALUES
(
        LAST_INSERT_ID(),
        3,
        '6585645'
)


-- Insert Magazine Data

-- Insert random book data

INSERT INTO Publishments (price,pages,stock,publisher,title
    ,printed_date,cover) VALUES
(
        100.00,
        10,
        1000,
        'Manjari Publications',
        'Time Magazine',
         NOW(),
        'https://pbs.twimg.com/profile_images
            /1202979137184354305/yKvAZsT3_400x400.jpg'
)

INSERT INTO Magazine (publishment_id,issue) VALUES
(
        LAST_INSERT_ID(),
        2
)

INSERT INTO Publishments (price,pages,stock,publisher,title
    ,printed_date,cover) VALUES
(
        120.00,
        20,
        5000,
        'Manjari Publications',
        'Times India Magazine',
```

```
        NOW(),
        'https://pbs.twimg.com/profile_images
            /1202979137184354305/yKvAZsT3_400x400.jpg'
)

INSERT INTO Magazine (publishment_id,issue,period) VALUES
(
        LAST_INSERT_ID(),
        2,
        'Annual'
)


-- Adding Data in Distributor Tables

INSERT INTO Distributor (name,email,address_country,
    address_city,address_street,bank_name,account_name,
    account_number) VALUES
(
        'Mero Link Pvt Ltd',
        'merolink@gmail.com',
        'Nepal',
        'Dhulikhel',
        'Vandol',
        'NIC Asia Bank',
        'Mero Link Pvt Ltd',
        '110020094023403'
)

INSERT INTO Distributor (name,email,address_country,
    address_city,address_street,bank_name,account_name,
    account_number) VALUES
(
        'Tech Himalaya Pvt Ltd',
        'techhimalaya28@gmail.com',
        'Nepal',
        'Bharatpur',
        'Shamichowk',
        'Everest Asia Bank',
        'Tech Himalaya Software Solutions Pvt Ltd',
        '110020094023567'
)

-- Inserting Distributor Phone Numbers in PhoneNumberDist
    Tables

INSERT INTO PhoneNumberDist VALUES
(
        2,
        '9869698962'
```

```
),
(
       2,
       '9865383233'
),
(
       1,
       '9845144428'
),
(
       1,
       '9865383246'
)

-- Assignning Authors to a book
INSERT INTO author_book VALUES (1,1)
INSERT INTO author_book VALUES (1,2)
INSERT INTO author_book VALUES (2,3)
INSERT INTO author_book VALUES (2,4)

-- Creating Orders

order_id int NOT NULL UNIQUE auto_increment,
       total_amount double NOT NULL,
       status varchar(50) DEFAULT 'Placed',
       quantity int NOT NULL,
       is_preorder bool DEFAULT FALSE,
       distributor_id int NOT NULL,
       publishment_id

INSERT INTO orders(total_amount,status,quantity,is_preorder
    ,distributor_id,publishment_id,order_date) VALUES
(
       2000,
       'Paid',
       4,
       TRUE,
       1,
       1,
       '1980-12-17'
)

INSERT INTO orders(total_amount,status,quantity,is_preorder
    ,distributor_id,publishment_id,order_date) VALUES
(
       12050,
       'Unpaid',
       1,
       FALSE,
       2,
```

```
        2,
        NOW()
)

-- Doing Payments
tx_id varchar(50) NOT NULL UNIQUE,
        amount double NOT NULL,
        medium varchar(50) NOT NULL,
        order_id int,

INSERT INTO payment VALUES
(
        'ds656uhajdh',
        2000.00,
        'Bank Transfer',
        1
)
```

Chapter 2

Queries

2.1 Find the name of all published books.

```
SELECT * from Book b INNER JOIN Publishments p ON b.publishment_id =
    p.id
```

Relational Algebra :

$$\rho_p(Publishments) \bowtie_{b.publishment\_id=p.id} \rho_b(Book)$$

Description: Creates innter join of table Publishments and Book.

Output:

publishment_id	edition	ISBN	id	price	pages	stock	publisher	title
1	1.0	1234567	1	500.0	800	0	Manjari Publications	Auna Ratnamala
2	3.0	6585645	2	12050.0	100	1000	Manjari Publications	University Physic

2.2 Find the name of all books published before 2000.

```
SELECT title from Book b INNER JOIN Publishments p ON b.publishment_id
    =p.id WHERE printed_date < '2000-01-01'
```

Relational Algebra :

$$\prod_{title}(\sigma_{printed\_date<'2000-01-01'}(\rho_p(Publishments) \bowtie_{b.publishment\_id=p.id} \rho_b(Book)))$$

Description: Selects title from the inner join of Book and Publiushments where the printed_date is before 2020.

Output:

title
Auna Ratnamala

2.3 Get the details of the books written by a particular author.

```
SELECT * from author_book ab INNER JOIN Author a ON ab.author_id = a.
    id INNER JOIN Book b ON ab.book_id = b.publishment_id INNER JOIN
    Publishments p ON b.publishment_id =p.id WHERE name="Aadarsha
    Dhakal"
```

Relational Algebra :

$$\sigma_{name="AadarshaDhakal"}(\rho_{ab}(author\_book) \bowtie_{ab.author\_id=a.id} \rho_a(Author)$$

$$\bowtie_{ab.book\_id=b.publishment_id} \rho_b(Book) \bowtie_{b.publishment\_id=p.id} \rho_p(Publishments))$$

Description: Creates Join of author_book table, Author table and Book table and Publiushments table and find the tuples where name is the 'Aadarsha Dhakal'.

Output:

book_id	author_id	id	name	bio	photo
1	1	1	Aadarsha Dhakal	Torilaure Writer tori tori publications.	https://pbs.twimg.co

2.4 Find the name of all weekly publications.

```
SELECT title from Publishments p INNER JOIN Magazine m ON p.id = m.
    publishment_id WHERE period='Weekly'
```

Relational Algebra :

$$\prod_{title}(\sigma_{period='Weekly'}(\rho_p(Publishments) \bowtie_{p.id=m.publishment_id} \rho_m(Magazine)))$$

Description: Selects title from innter join of table Publishments and Magazine where period = 'Weekly'.

Output:

title
Times India Magazine

2.5 Find the name of pre-ordered books.

```
SELECT title FROM orders o INNER JOIN Publishments p ON o.
    publishment_id =p.id WHERE is_preorder = True
```

Relational Algebra :

$$\prod_{title}(\sigma_{is\_preorder=True}(\rho_o(orders) \bowtie_{o.publishment\_id=p.id} \rho_p(Publishments)))$$

Description: Selects title from inner join of table Publishments and orders where order's publishment_id is equal to publishment's id.

Output:

title
Auna Ratnamala

2.6 Get the details of all publications with the name starting with an 'A'.

```
SELECT * FROM Publishments p WHERE title LIKE 'A%'
```

Relational Algebra :

$$\sigma_{title\ LIKE\ 'A\%'}\rho_p(Publishments)$$

Description: Retrives tuples from Publishments table where title starts with letter 'A'.

Output:

id	price	pages	stock	publisher	title	printed_date	cover
1	500.0	800	0	Manjari Publications	Auna Ratnamala	1922-02-15	https://pbs.twimg.com

2.7 Find all the orders for a particular book. The result must be sorted based on the order date.

```
SELECT * FROM orders o INNER JOIN Publishments p ON o.publishment_id
    = p.id INNER JOIN Book b ON p.id = b.publishment_id ORDER BY
    order_date DESC
```

Relational Algebra :

$\tau_{order\_date\ \downarrow}(\rho_p(Publishments) \bowtie_{o.publishment\_id=p.id} \rho_o(orders) \bowtie_{p.id=b.publishment\_id} \rho_b(Book))$

Description: Retrives tuples from INNER JOIN of orders table, Publishments table and Book table and are ordered descendingly by order_date.

Output:

order_id	total_amount	status	quantity	is_preorder	distributor_id	publishment_id	order_date	id
2	12050.0	Unpaid	1	0	2	2	2022-02-15	2
1	2000.0	Paid	4	1	1	1	1980-12-17	1