



KATHMANDU UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DATABASE MANAGEMENT SYSTEM
COMP 232

Lab 2 Report

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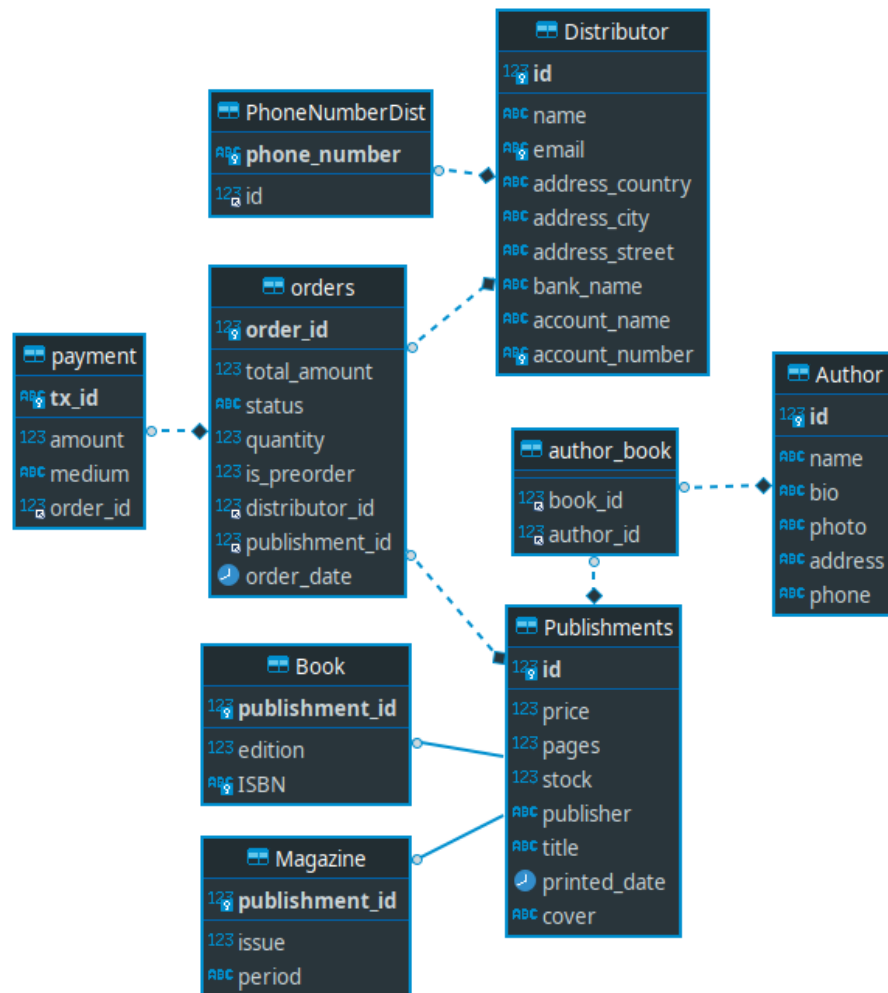


Figure 1: Database ER Diagram

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,
        publication_id int NOT NULL,
        PRIMARY KEY(order_id),
        FOREIGN KEY(distributor_id) REFERENCES Distributor(
            id),
        FOREIGN KEY(publication_id) REFERENCES Publications(
            id)
    )

ALTER TABLE orders ADD order_date date;

-- Separate 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 Publications(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 inner join of table Publishments and Book.

Output:

publishment_id	edition	ISBN	id	price	pages
1	1.0	1234567	1	500.0	800
2	3.0	6585645	2	12050.0	100

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	name	phone	ISBN	price
1	1	Aadarsha Dhakal	9869698962	1234567	500.0

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 inner 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.
    publication_id =p.id WHERE is_preorder = True
```

Relational Algebra :

$$\prod_{title} (\sigma_{is_preorder=True}(\rho_o(orders) \bowtie_{o.publication_id=p.id} \rho_p(Publishments)))$$

Description: Selects title from inner join of table Publishments and orders where order's publication_id is equal to publication'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 :

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

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

Output:

id	price	publisher	title	printed_date
1	500.0	Manjari Publications	Auna Ratnamala	1922-02-15

**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	quantity	order_date	title	ISBN
2	12050.0	1	2022-02-15	University Physics	6585645
1	2000.0	4	1980-12-17	Auna Ratnamala	1234567