Kathmandu University

department of computer science and engineering

Database management system
COMP232

Lab 2 Report

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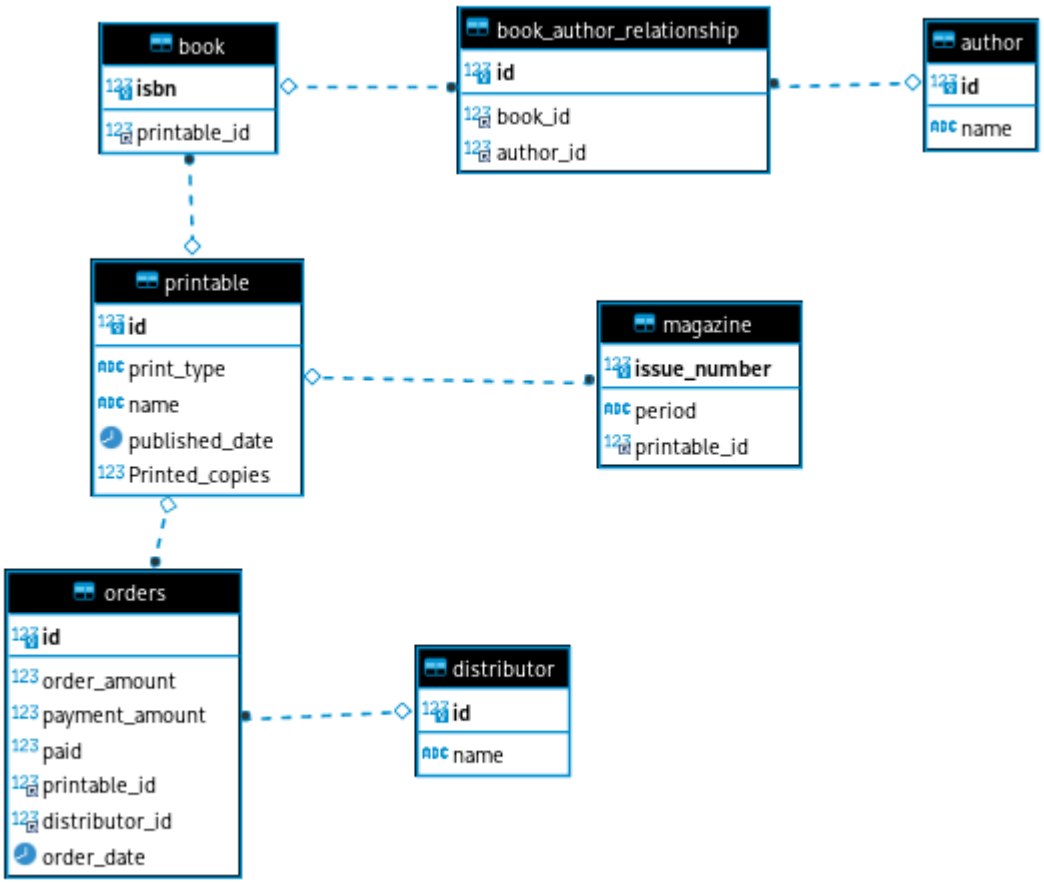
1 Schema For DDL



2 DDL Script for creating tables and populating it

```
CREATE TABLE author(
id INT PRIMARY KEY,
name VARCHAR(255)
);

INSERT INTO author(id,name) VALUES
(1,"Rumi"),
```

```
(2,"Malcom Gladwell"),
(3,"Victor Frankl"),
(4,"Johan Abildskov");


CREATE TABLE IF NOT EXISTS printable (
id INT PRIMARY KEY,
print_type VARCHAR(255),
name VARCHAR (255),
published_date DATE,
Printed_copies INT
);

INSERT INTO printable(id,print_type,name,published_date,printed_copies) VALUES
(1, "book", "A Masnavi", "1992-12-01",1234547),
(2, "book", "A Strangers", "2003-12-01",1245),
(3, "book", "Man Search for Meaning", "2018-12-01",823),
(4, "magazine", "A GCT", "1992-12-01",1234547),
(5, "magazine", "Nature", "2023-01-01",1234547),
(6, "book", "Practical Git", "2013-02-12",1234547);

INSERT INTO printable(id,print_type,name,published_date,printed_copies) VALUES
(7, "book", "Practical Git For Quantum Computers", "2023-02-12",1234547);

CREATE TABLE IF NOT EXISTS book (
isbn INT PRIMARY KEY,
printable_id INT,
FOREIGN KEY(printable_id) REFERENCES printable(id)
);

INSERT INTO book(isbn, printable_id) VALUES
(1,1),
(2,2),
(3,3),
(4,6);
CREATE TABLE IF NOT EXISTS magazine (
issue_number INT PRIMARY KEY,
period VARCHAR(40),
printable_id INT,
FOREIGN KEY(printable_id) REFERENCES printable(id)
);

INSERT INTO magazine(issue_number,period, printable_id) VALUES
(1,"monthly",4),
(2,"weekly",5);
```

```
CREATE TABLE IF NOT EXISTS book_author_relationship (
id SERIAL PRIMARY KEY,
book_id INT,
author_id INT,
FOREIGN KEY(book_id) REFERENCES book(isbn),
FOREIGN KEY(author_id) REFERENCES author(id)
);

INSERT INTO book_author_relationship (id, book_id, author_id) VALUES
(1,1,1),
(2,2,2),
(3,3,3),
(4,4,4);

CREATE TABLE IF NOT EXISTS distributor (
id INT PRIMARY KEY,
name VARCHAR(255)
);

INSERT INTO distributor (id, name) VALUES
(1,"Heritage Publication"),
(2,"Starch Press");

CREATE TABLE IF NOT EXISTS orders (
id INT PRIMARY KEY,
order_amount INT,
payment_amount INT,
paid BOOL,
printable_id INT,
distributor_id INT,
order_date DATE,
FOREIGN KEY(printable_id) REFERENCES printable(id) ON DELETE CASCADE,
FOREIGN KEY(distributor_id) REFERENCES distributor(id) ON DELETE CASCADE
);

INSERT INTO orders (id, order_amount, payment_amount, paid, printable_id, distrib
(1,763,900000,false,1,1,'2013-02-12'),
(6,89002,434534532,true,6,2,'2022-12-10'),
(2,8900,4332,true,6,1,'2022-12-10'),
(4,8900,4332,true,6,2,'2022-12-10');
```

3 Queries in Relational Algebra and SQL with their output table

3.1 Find the name of all published books

From printable table we select all the entries that are already published and the type is book.

```
SELECT * FROM printable p WHERE p.print_type LIKE 'book'
AND p.published_date <= NOW();
```

$$\sigma_{p.print\_type\ LIKE\ 'book'\ AND\ p.published\_date \leq NOW()}(\rho_p(printable)).$$

id	print_type	name	published_date	Printed_copies
1	book	A Masnavi	1992-12-01	1234547
2	book	A Strangers	2003-12-01	1245
3	book	Man Search for Meaning	2018-12-01	823
6	book	Practical Git	2013-02-12	1234547

3.2 Find the name of all books published before 2000

The constraint here is published date for the entries on printable table must be less than Jan of 2001.

```
SELECT * FROM printable p
WHERE p.published_date < '2000-01-01';
```

$$\sigma_{p.published\_date \leq '2000-01-01'}(\rho_p(printable)).$$

id	print_type	name	published_date	Printed_copies
1	book	A Masnavi	1992-12-01	1234547
4	magazine	A GCT	1992-12-01	1234547

3.3 Get the details of the books written by particular author

Tables **printable**, **book**, **book_author_relationship** and **author** are joined together and then we get the name of the book by particular author if we add constraint author.name LIKE 'author_name'

$\Pi_{p.*,a.name}(\rho_p(printable) \bowtie_{b.printable\_id=p.id}$
$\rho_b(book) \bowtie_{bar.book\_id=b.isbn}$
$\rho_bar(book\_author\_relationship) \bowtie_{a.id=bar.author\_id} \rho_a(author))$.

```
SELECT p.*, b.*  FROM printable p
INNER JOIN book b on b.printable_id  = p.id
INNER JOIN book_author_relationship bar
ON bar.book_id = b.isbn
INNER JOIN author a
ON a.id = bar.author_id;
```

id	print_type	name	published_date	Printed_copies	name
1	book	A Masnavi	1992-12-01	1234547	Rumi
2	book	A Strangers	2003-12-01	1245	Malcom Gladwell
3	book	Man Search for Meaning	2018-12-01	823	Victor Frankl
6	book	Practical Git	2013-02-12	1234547	Johan Abildskov

3.4 Find the name of all weekly publications

$\Pi_{p.name,m.period}(\rho_{periodLIKE"weekly"}$
$(\rho_p(printable) \bowtie_{m.printable\_id=p.id} \rho_m(magazine)))$
.

```
SELECT p.*,m.* FROM printable p
INNER JOIN magazine m
ON m.printable_id = p.id WHERE period LIKE 'weekly';
```

id	print_type	name	published_date	Printed_copies	issue_number	period
5	magazine	Nature	2018-01-01	1234547	2	weekly

3.5 Find the name of pre-ordered books

$\Pi_{p.*,o.order\_date,o.order\_amount}($
$\sigma_{p.printed_copies<o.order\_amountANDp.print\_typeLIKE"book"}$
$(\rho_p(printable) \bowtie_{o.printable\_id=p.id} \rho_o orders))$.

```
SELECT p.*,o.order_date,o.order_amount  FROM printable p
INNER JOIN orders o ON o.printable_id = p.id
WHERE p.Printed_copies < o.order_amount
AND p.print_type like 'book';
```

id	print_type	name	published_date	Printed_copies	order_date	order_amount
2	book	A Strangers	2003-12-01	1245	2022-12-10	8900

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

$\sigma_{p.nameLIKE'a\%'}(\rho_p printable)$

.

```
SELECT * FROM printable p WHERE p.name LIKE 'a%';
```

id	print_type	name	published_date	Printed_copies
1	book	A Masnavi	1992-12-01	1234547
2	book	A Strangers	2003-12-01	1245
4	magazine	A GCT	1992-12-01	1234547

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

$\Pi_{p.name,p.printed\_copies,o.order\_amount,o.order\_date}($
$\sigma_{p.print\_typeLIKE"book"}(\rho_p(printable) \bowtie_{p.id=o.printable\_id} \rho_o orders)$
.

```
SELECT * from printable p
INNER JOIN orders o ON
p.id = o.printable_id
WHERE p.print_type LIKE 'book'
ORDER BY p.name, o.order_date;
```

name	Printed_copies	order_amount	order_date
A Masnavi	1234547	763	2013-02-12
A Masnavi	1234547	763	2013-02-12
A Masnavi	1234547	763	2013-02-12
A Strangers	1245	8900	2022-12-10
Practical Git	1234547	8900	2022-12-10
Practical Git	1234547	8900	2022-12-10
Practical Git	1234547	8900	2022-12-10
Practical Git	1234547	89002	2022-12-10
Practical Git	1234547	89002	2022-12-10