ALLIANCE UNIVERSITY

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Project Report
Master of Computer Application
Semester – II
Database Design and Implementation

# Neo4j Movie Ticket Booking System

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# Neo4j Movie Ticket Booking System

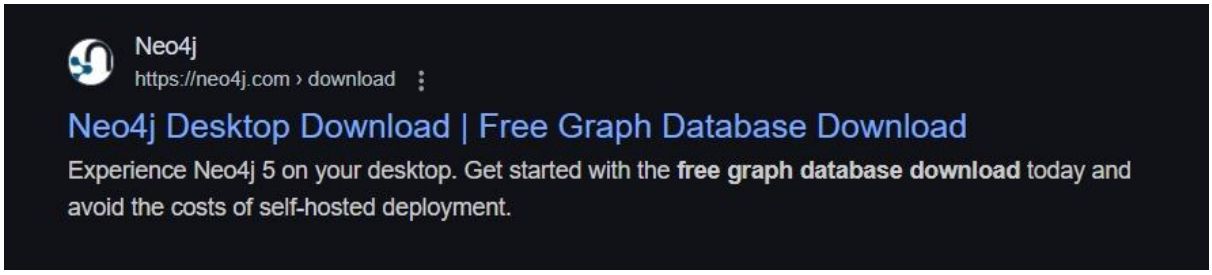
## Why Neo4j?

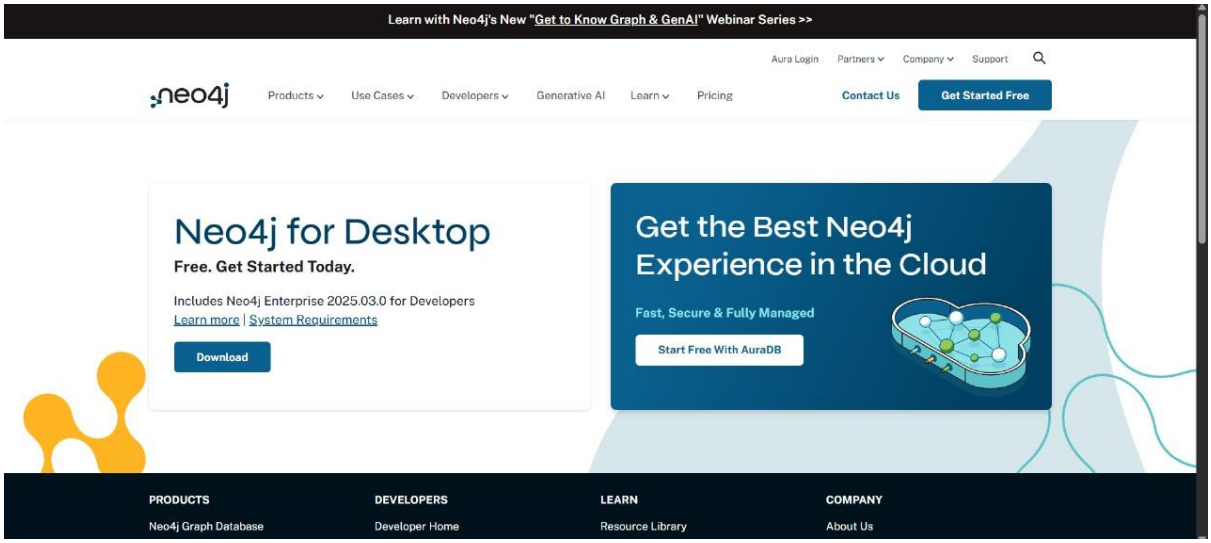
- Neo4j is a graph database ideal for highly connected data.
- Movie ticket booking involves users, theaters, movies, showtimes, and relationships.
- Graph databases make it easier to traverse relationships (e.g., "Which user booked which movie in which theater?")

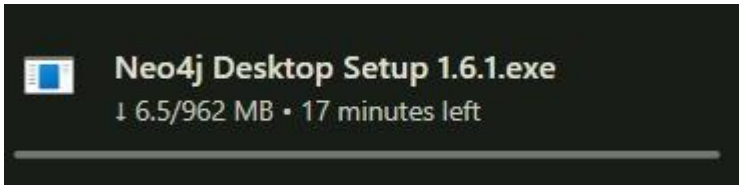
## Project Setup

### Step 1: Installation

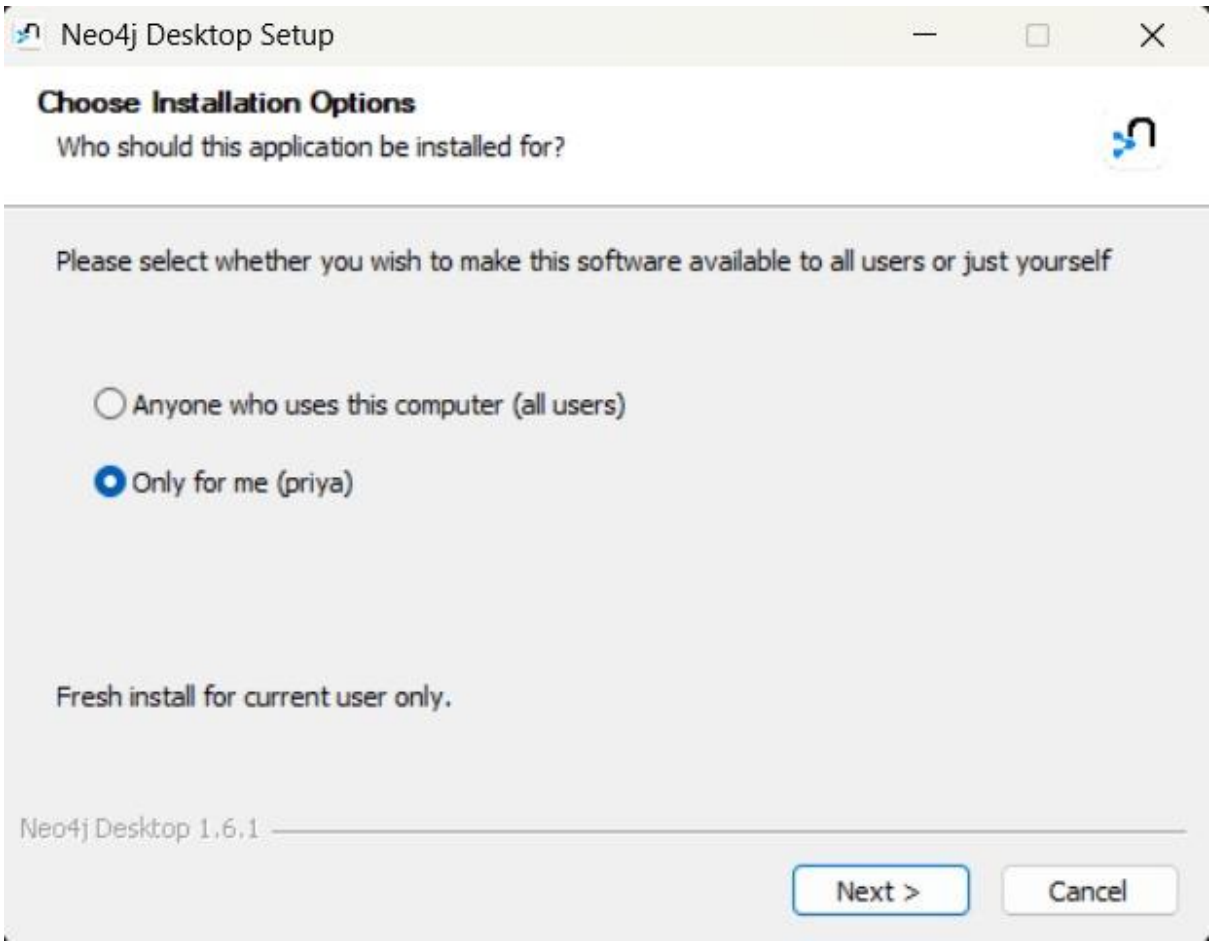
- Download Neo4j Desktop from neo4j.com

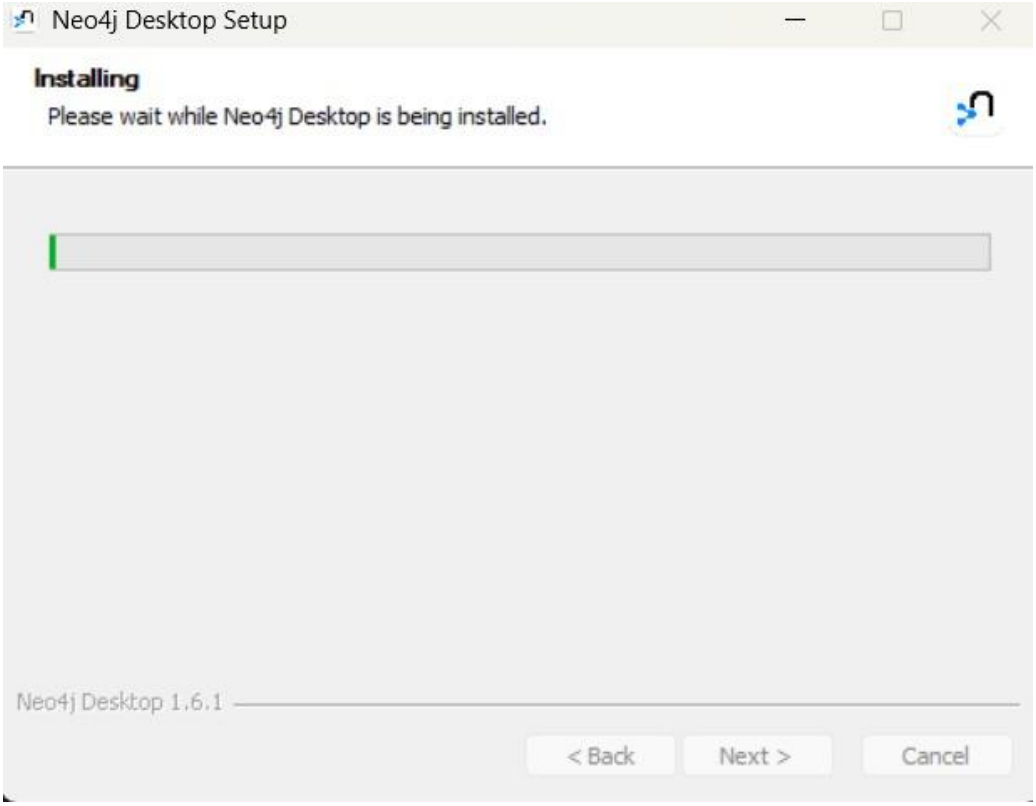


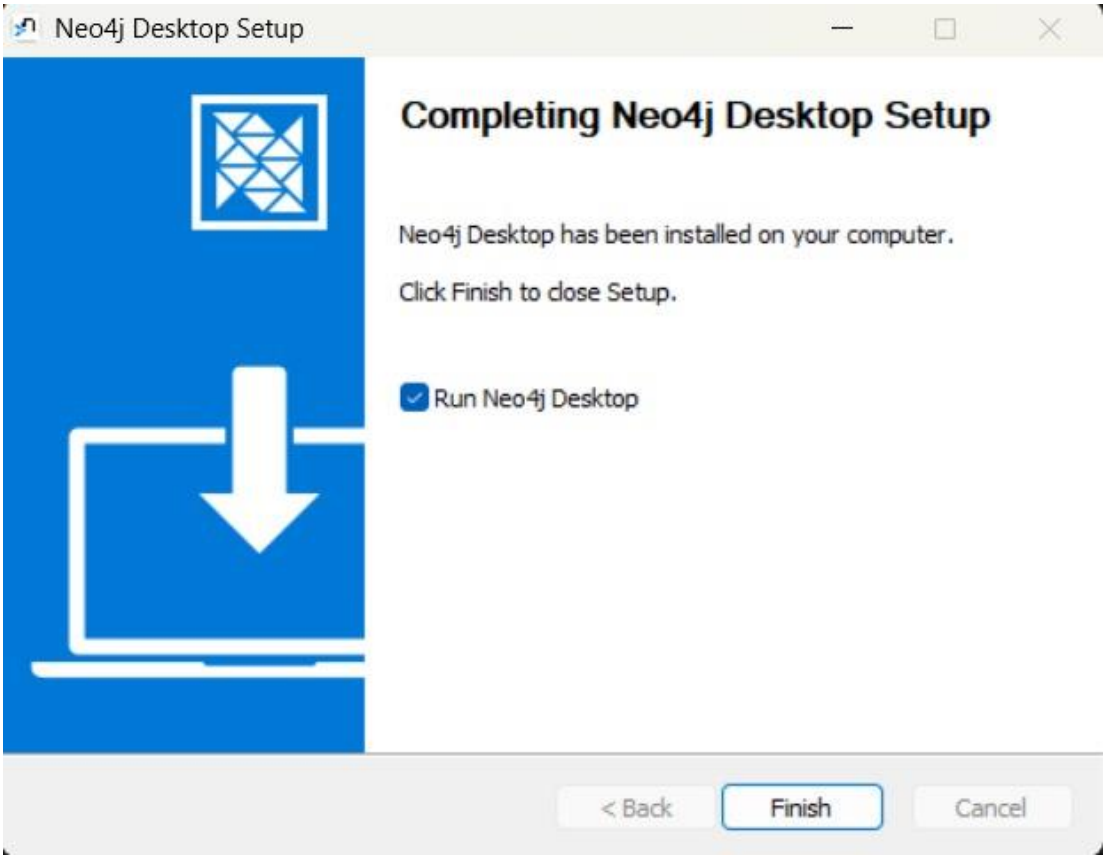





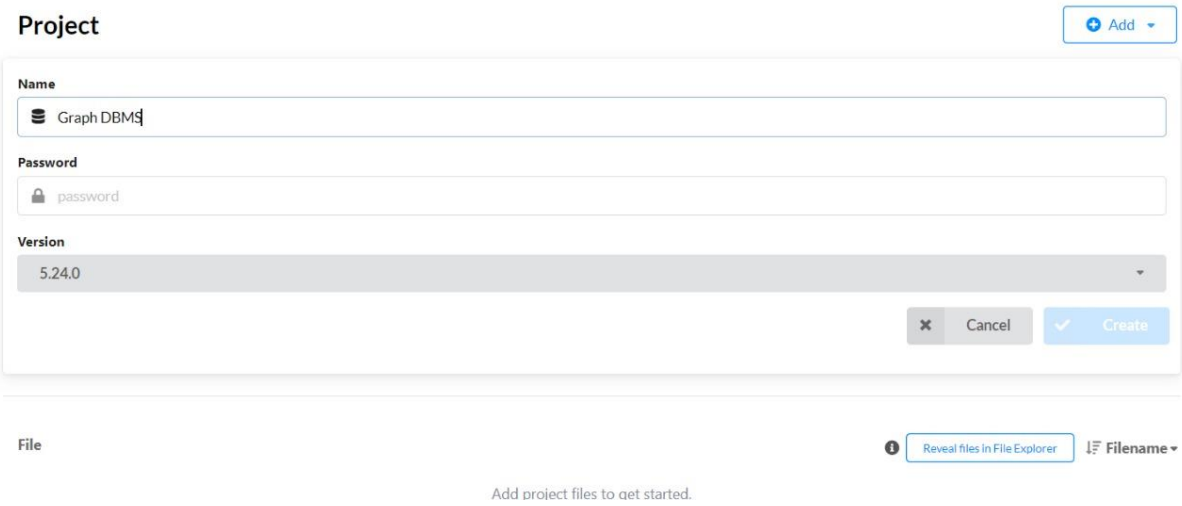

- Install Neo4j Desktop



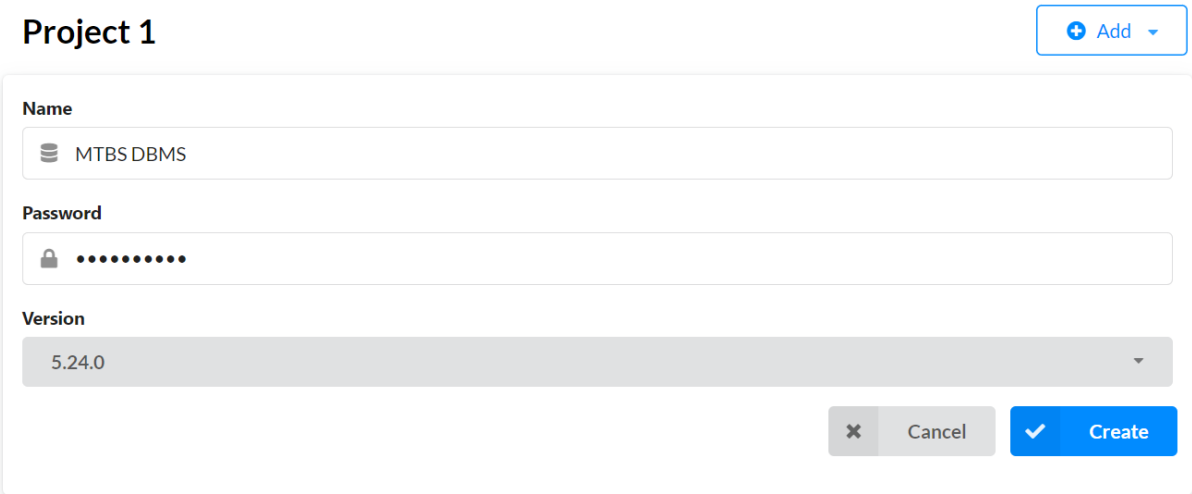

Neo4j Desktop Setup
Installing
Please wait while Neo4j Desktop is being installed.
Neo4j Desktop 1.6.1
< Back
Next >
Cancel


Neo4j Desktop Setup
Completing Neo4j Desktop Setup
Neo4j Desktop has been installed on your computer.
Click Finish to close Setup.
Run Neo4j Desktop
< Back
Finish
Cancel

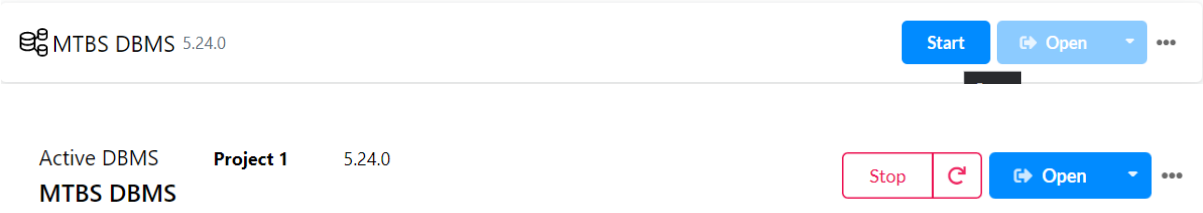
- Create a new project and database




- Set username/password (default: neo4j/neo4j)




- Start the database



## Step 2: Database Schema Design

We will be having  5 types of nodes and their relationships:

**Nodes (5 types):**

1. **User**
   Attributes:
   id, name, email, phone, registered_date
2. **Movie**
   Attributes:
   id, title, genre, rating, language
3. **Theater**
   Attributes:
   id, name, location, capacity, opened_date
4. **Show**
   Attributes:
   id, time, date, price, screen
5. **Booking**
   Attributes:
   id, ticket_count, total_amount, status, booking_time

**Relationships:**

- **(User) -[:BOOKED]-> (Booking)**
  A user makes a booking.
- **(Booking) -[:FOR_SHOW]-> (Show)**
  Each booking is for a particular show.
- **(Show) -[:PLAYS]-> (Movie)**
  The show plays a specific movie.
- **(Show) -[:IN_THEATER]-> (Theater)**
  The show is conducted in a specific theater.
- **(Booking) -[:BOOKED_BY]-> (User)**
  Extra link back from booking to user (redundancy for flexibility).
- **(User) -[:WATCHED]-> (Movie)**
  To show user has watched a movie (optional but adds connection).

**Step 3: Sample Data**

- CREATE OPERATION AND SAMPLE DATA :

1. USER Table (Label: User)

CREATE

(:User {id: 1, name: 'Aditi', email: 'aditi@example.com', phone: '9991110001', registered_date: '2024-06-01'}),

(:User {id: 2, name: 'Ravi', email: 'ravi@example.com', phone: '9991110002', registered_date: '2024-06-02'}),

(:User {id: 3, name: 'Priya', email: 'priya@example.com', phone: '9991110003', registered_date: '2024-06-03'}),

(:User {id: 4, name: 'Arjun', email: 'arjun@example.com', phone: '9991110004', registered_date: '2024-06-04'}),

(:User {id: 5, name: 'Neha', email: 'neha@example.com', phone: '9991110005', registered_date: '2024-06-05'}),

(:User {id: 6, name: 'Kiran', email: 'kiran@example.com', phone: '9991110006', registered_date: '2024-06-06'}),

(:User {id: 7, name: 'Rahul', email: 'rahul@example.com', phone: '9991110007', registered_date: '2024-06-07'}),

(:User {id: 8, name: 'Meena', email: 'meena@example.com', phone: '9991110008', registered_date: '2024-06-08'}),

(:User {id: 9, name: 'Aarav', email: 'aarav@example.com', phone: '9991110009', registered_date: '2024-06-09'}),

(:User {id: 10, name: 'Sneha', email: 'sneha@example.com', phone: '9991110010', registered_date: '2024-06-10'});

2. MOVIE Table (Label: Movie)

CREATE

(:Movie {id: 1, title: 'Inception', genre: 'Sci-Fi', rating: 8.8, language: 'English'}),

(:Movie {id: 2, title: '3 Idiots', genre: 'Comedy/Drama', rating: 8.4, language: 'Hindi'}),

(:Movie {id: 3, title: 'Interstellar', genre: 'Sci-Fi', rating: 8.6, language: 'English'}),

(:Movie {id: 4, title: 'Dangal', genre: 'Biography', rating: 8.3, language: 'Hindi'}),

(:Movie {id: 5, title: 'The Dark Knight', genre: 'Action', rating: 9.0, language: 'English'}),

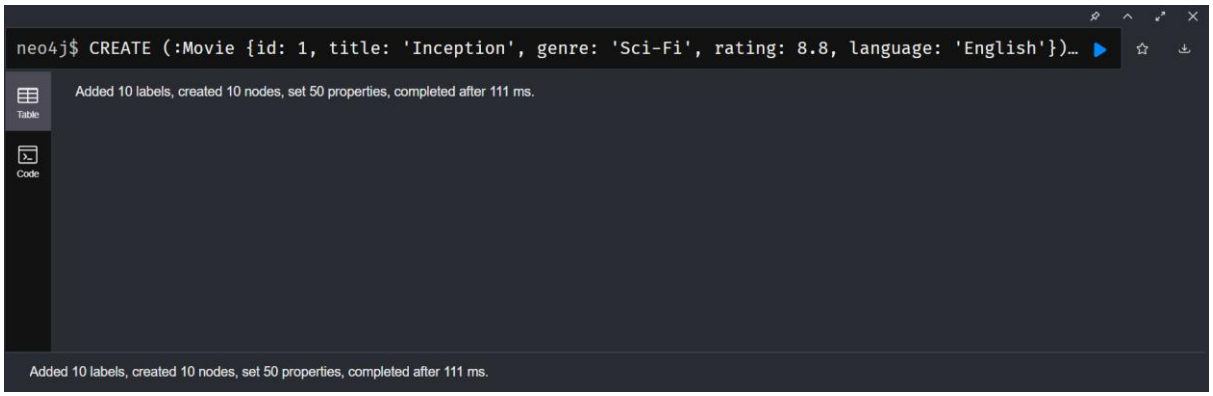
(:Movie {id: 6, title: 'Parasite', genre: 'Thriller', rating: 8.6, language: 'Korean'}),

(:Movie {id: 7, title: 'Drishyam', genre: 'Thriller', rating: 8.2, language: 'Hindi'}),

(:Movie {id: 8, title: 'Avatar', genre: 'Fantasy', rating: 7.8, language: 'English'}),

(:Movie {id: 9, title: 'Jawan', genre: 'Action', rating: 7.0, language: 'Hindi'}),

(:Movie {id: 10, title: 'The Pursuit of Happyness', genre: 'Drama', rating: 8.0, language: 'English'});



3. THEATER Table (Label: Theater)

CREATE

(:Theater {id: 1, name: 'PVR Phoenix', location: 'Bangalore', capacity: 300, opened_date: '2015-06-01'}),

(:Theater {id: 2, name: 'INOX Garuda', location: 'Bangalore', capacity: 250, opened_date: '2016-08-15'}),

(:Theater {id: 3, name: 'Cinepolis Nexus', location: 'Mumbai', capacity: 400, opened_date: '2017-03-20'}),

(:Theater {id: 4, name: 'Carnival Kolkata', location: 'Kolkata', capacity: 350, opened_date: '2014-11-11'}),

(:Theater {id: 5, name: 'INOX South City', location: 'Kolkata', capacity: 320, opened_date: '2018-09-30'}),

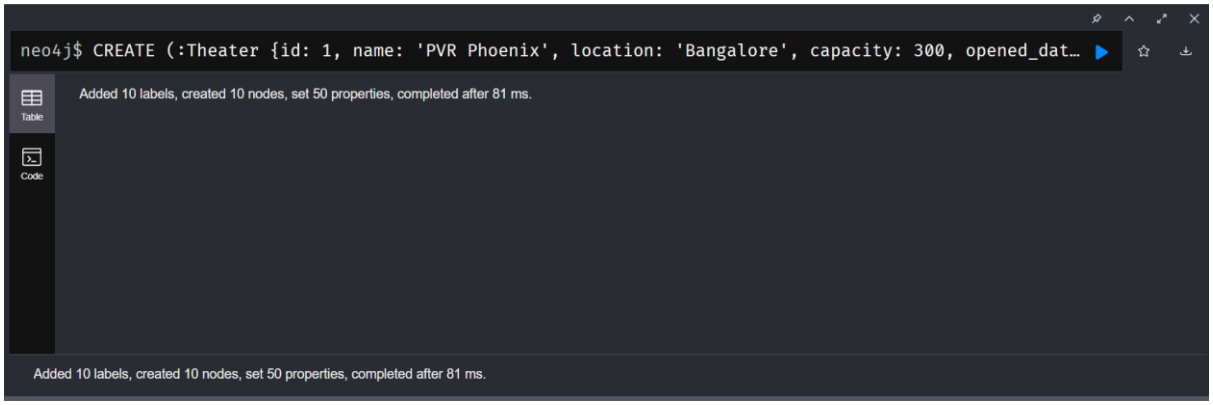
(:Theater {id: 6, name: 'Miraj Cinemas', location: 'Delhi', capacity: 280, opened_date: '2019-01-05'}),

(:Theater {id: 7, name: 'PVR Elante', location: 'Chandigarh', capacity: 300, opened_date: '2016-07-12'}),

(:Theater {id: 8, name: 'PVR Lulu', location: 'Kochi', capacity: 270, opened_date: '2017-10-21'}),

(:Theater {id: 9, name: 'INOX Quest', location: 'Kolkata', capacity: 260, opened_date: '2013-12-12'}),

(:Theater {id: 10, name: 'PVR Ambience', location: 'Gurgaon', capacity: 350, opened_date: '2020-02-01'});



4. SHOW Table (Label: Show)

```
CREATE
(:Show {id: 1, time: '10:00', date: '2024-06-15', price: 200, screen: 'Screen 1'}),
(:Show {id: 2, time: '13:00', date: '2024-06-15', price: 250, screen: 'Screen 2'}),
(:Show {id: 3, time: '16:00', date: '2024-06-15', price: 200, screen: 'Screen 3'}),
(:Show {id: 4, time: '19:00', date: '2024-06-15', price: 300, screen: 'Screen 1'}),
(:Show {id: 5, time: '22:00', date: '2024-06-15', price: 350, screen: 'Screen 2'}),
(:Show {id: 6, time: '10:00', date: '2024-06-16', price: 200, screen: 'Screen 1'}),
(:Show {id: 7, time: '13:00', date: '2024-06-16', price: 250, screen: 'Screen 2'}),
(:Show {id: 8, time: '16:00', date: '2024-06-16', price: 300, screen: 'Screen 3'}),
(:Show {id: 9, time: '19:00', date: '2024-06-16', price: 350, screen: 'Screen 1'}),
(:Show {id: 10, time: '22:00', date: '2024-06-16', price: 400, screen: 'Screen 2'});
```

5. BOOKING Table (Label: Booking)

CREATE

(:Booking {id: 1, ticket_count: 2, total_amount: 400, status: 'Confirmed', booking_time: '2024-06-10T10:30:00'}),

(:Booking {id: 2, ticket_count: 3, total_amount: 750, status: 'Confirmed', booking_time: '2024-06-10T11:00:00'}),

(:Booking {id: 3, ticket_count: 1, total_amount: 250, status: 'Confirmed', booking_time: '2024-06-10T11:30:00'}),

(:Booking {id: 4, ticket_count: 4, total_amount: 1200, status: 'Confirmed', booking_time: '2024-06-10T12:00:00'}),

(:Booking {id: 5, ticket_count: 2, total_amount: 600, status: 'Cancelled', booking_time: '2024-06-10T12:30:00'}),

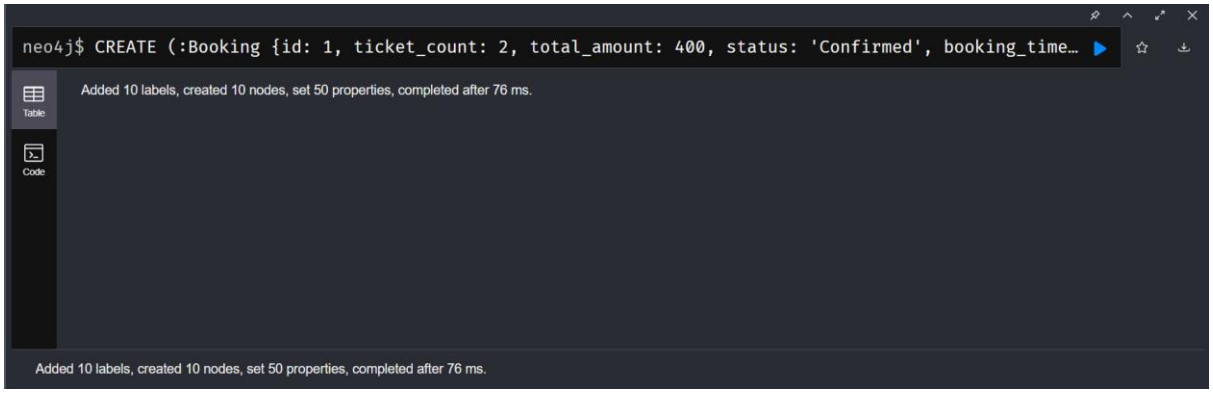
(:Booking {id: 6, ticket_count: 1, total_amount: 200, status: 'Confirmed', booking_time: '2024-06-10T13:00:00'}),

(:Booking {id: 7, ticket_count: 3, total_amount: 900, status: 'Confirmed', booking_time: '2024-06-10T13:30:00'}),

(:Booking {id: 8, ticket_count: 2, total_amount: 700, status: 'Confirmed', booking_time: '2024-06-10T14:00:00'}),

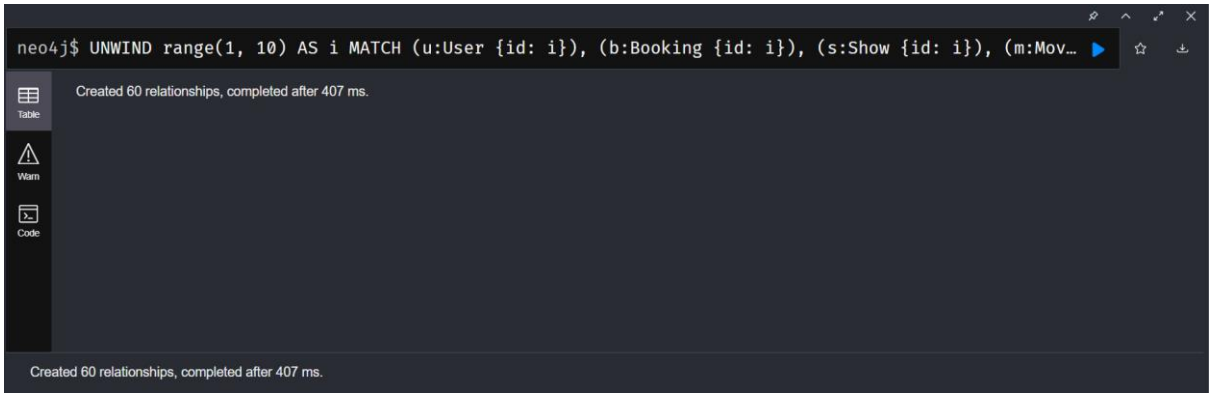
(:Booking {id: 9, ticket_count: 1, total_amount: 350, status: 'Cancelled', booking_time: '2024-06-10T14:30:00'}),

(:Booking {id: 10, ticket_count: 2, total_amount: 800, status: 'Confirmed', booking_time: '2024-06-10T15:00:00'});



## CREATE RELATIONSHIP BETWEEN TABLES

```
UNWIND range(1, 10) AS i
MATCH (u:User {id: i}), (b:Booking {id: i}), (s:Show {id: i}), (m:Movie {id: i}), (t:Theater {id: i})
CREATE
  (u)-[:BOOKED]->(b),
  (b)-[:FOR_SHOW]->(s),
  (s)-[:PLAYS]->(m),
  (s)-[:IN_THEATER]->(t),
  (b)-[:BOOKED_BY]->(u),
  (u)-[:WATCHED]->(m);
```



## READ Operations (R)

1. View All Users and Their Booked Movies:

MATCH (u:User)-[:BOOKED]->(:Booking)-[:FOR_SHOW]->(:Show)-[:PLAYS]->(m:Movie)

RETURN u.name AS UserName, m.title AS MovieTitle;

```
neo4j$ MATCH (u:User)-[:BOOKED]→(:Booking)-[:FOR_SHOW]→(:Show)-[:PLAYS]→(m:Movie) RETURN u.name A…
```

| | UserName | MovieTitle |
|---|---|---|
| 1 | "Aditi" | "Inception" |
| 2 | "Ravi" | "3 Idiots" |
| 3 | "Priya" | "Interstellar" |
| 4 | "Arjun" | "Dangal" |
| 5 | "Neha" | "The Dark Knight" |
| 6 | "Kiran" | "Parasite" |

Started streaming 10 records after 27 ms and completed after 37 ms.

2. See Which Movie is Played in Which Theater:

MATCH (s:Show)-[:PLAYS]->(m:Movie), (s)-[:IN_THEATER]->(t:Theater)

RETURN m.title AS MovieTitle, t.name AS TheaterName;

```
neo4j$ MATCH (s:Show)-[:PLAYS]→(m:Movie), (s)-[:IN_THEATER]→(t:Theater) RETURN m.title AS MovieTit…
```

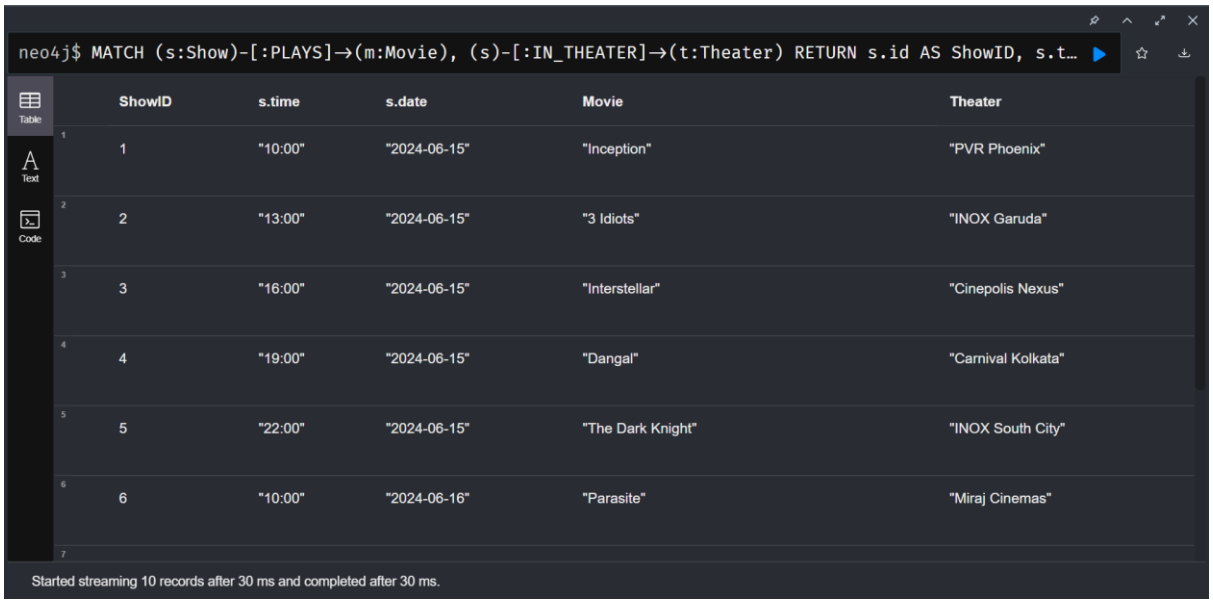
| | MovieTitle | TheaterName |
|---|---|---|
| 1 | "Inception" | "PVR Phoenix" |
| 2 | "3 Idiots" | "INOX Garuda" |
| 3 | "Interstellar" | "Cinepolis Nexus" |
| 4 | "Dangal" | "Carnival Kolkata" |
| 5 | "The Dark Knight" | "INOX South City" |
| 6 | "Parasite" | "Miraj Cinemas" |

Started streaming 10 records after 45 ms and completed after 54 ms.

3. Get All Shows and Their Time, Date, Theater, and Movie:

MATCH (s:Show)-[:PLAYS]->(m:Movie), (s)-[:IN_THEATER]->(t:Theater)

RETURN s.id AS ShowID, s.time, s.date, m.title AS Movie, t.name AS Theater;




| | ShowID | s.time | s.date | Movie | Theater |
|---|---|---|---|---|---|
| 1 | 1 | "10:00" | "2024-06-15" | "Inception" | "PVR Phoenix" |
| 2 | 2 | "13:00" | "2024-06-15" | "3 Idiots" | "INOX Garuda" |
| 3 | 3 | "16:00" | "2024-06-15" | "Interstellar" | "Cinepolis Nexus" |
| 4 | 4 | "19:00" | "2024-06-15" | "Dangal" | "Carnival Kolkata" |
| 5 | 5 | "22:00" | "2024-06-15" | "The Dark Knight" | "INOX South City" |
| 6 | 6 | "10:00" | "2024-06-16" | "Parasite" | "Miraj Cinemas" |
| 7 | | | | | |

## UPDATE operations (U):

### 1. Update a User's Email:

MATCH (u:User {id: 1})

SET u.email = "newemail1@example.com"

RETURN u;


### 2. Update Booking Ticket Count and Recalculate Amount:

MATCH (b:Booking {id: 1})

SET b.ticket_count = 4,

b.total_amount = 4 * 200

RETURN b;

## DELETE operations (D):

**1. Delete a Specific User and Their Relationships:**

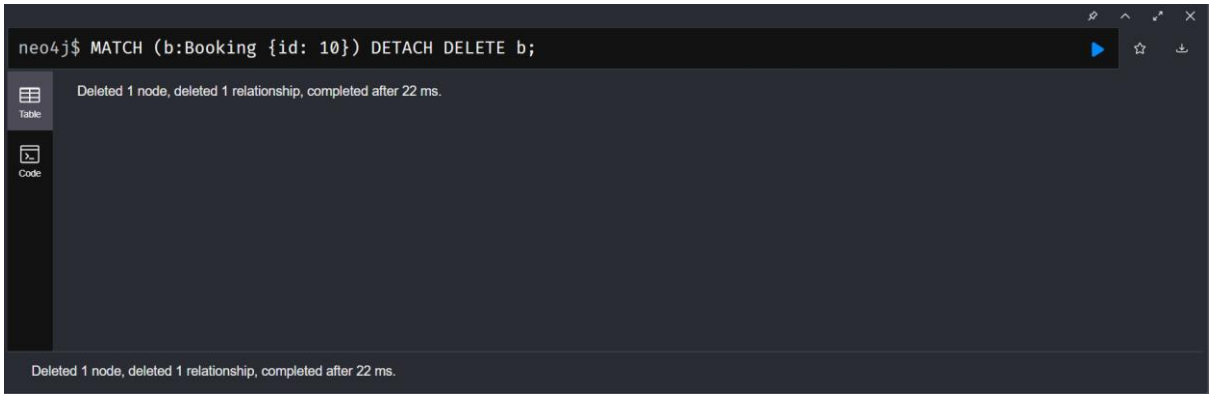
MATCH (u:User {id: 10})

DETACH DELETE u;


**2. Delete a Booking Record:**

MATCH (b:Booking {id: 10})

DETACH DELETE b;



# FINAL GRAPH REPRESENTATION