

Normalization

The system contains seven tables. Each table has been individually normalized.

1.users table:

user(user_id, name, phone, email, password, is_approved)

primary key is user_id.

user_id	name	phone	email	password	is_approved
1	Farhan Rafid	017117878458	farhan@gmail.com	asfrwew	1
2	Joy Hasan	014854888888	joy@yahoo.com	sdfasdfs	0
3	Abir Ahmed	012245478888	abir@gmail.com	Hjhj5555	0
4	Rafsan Hossain	016598999999	rafsan@gmail.com	Uyff7777	1
5	Abed Ali	015487855555	abed@yahoo.com	54f45hfhf	1

1NF:

All attributes hold a single value per cell. No repeating columns. Table is in 1NF.

2NF:

Primary key is a single attribute, so partial dependency cannot occur. Table is in 2NF.

3NF:

We check if any non-key attribute determines another non-key attribute.

- email does not determine name, phone, password, or approval flag.
- name does not determine email.
- No transitive dependencies.

Table is in 3NF.

BCNF:

Every determinant must be a candidate key.

- user_id is the only determinant.
- email is unique but does not violate BCNF.

Table is in BCNF.

2.managers table:

managers(manager_id, name, email, password)

Primary key is manager_id.

manager_id	name	email	password
1	Faruk Hossain	faruk@gmail.com	sadfawert
2	Zayed Kabir	zayed@gmail.com	5654tyhtr
3	Khaled Noor	khaled@gmail.com	787r5hjh
4	Mubin Haq	mubin@gmail.com	Dfdtrfhdr
5	Arham Ahmed	arham@gmail.com	343tsf@!

1NF:

Attributes are atomic. So it is 1NF.

2NF:

Single-column primary key, so no partial dependency. It is 2NF.

3NF:

No non-key attribute determines another non-key attribute. Therefore it is 3NF.

BCNF:

Determinant = manager_id only, which is the primary key. Therefore it is BCNF form.

3.theater table:

Theater(theater_id, theater_number, location)

The primary key here is theater_id.

theater_id	theater_number	location
1	Star Cineplex	Panthapath,Bashundhara City,Dhaka
2	Blockbuster	Jamuna,Bashundhara RA, Dhaka
3	Rupali	Notun Bazar,Katpotti,Barisal
4	SilverScreen	Finlay Square, Chittagong
5	Kakoli	Nilphamari,Rangpur.

1NF:

No repeating groups. It follows 1NF.

2NF:

PK has one attribute. No partial dependency. It is in 2NF.

3NF:

theater_number does not determine location, and vice-versa. It fulfills 3NF.

BCNF:

Only determinant is the primary key. So it is BCNF.

4.movies table:

movies (movie_id, title, showtime, release_date, price_per_seat, total_seats, theater_id, genre, duration)

Primary Key is movie_id. Foreign key is theater_id.

Movie_id	title	showtime	release_date	Price_per_seat	Total_seats	Theater_id	genre	duration
1	Logan	2025-12-12 18:00:00	2017-17-02	180	120	1	Action	1h45m
2	Star Wars	2025-12-22 18:30:00	2011-05-05	147	80	3	Scifi	1h38m
3	Heat	2025-12-17 11:00:00	1995-09-26	450	135	5	Drama	2h8m
4	Interstellar	2025-12-10 13:50:00	2012-08-14	500	100	4	Scifi	2h25m
5	Inception	2025-12-28 13:00:00	2002-07-19	185	95	2	Drama	2h9m

1NF:

All values atomic. Therefore it is in 1NF.

2NF:

Primary key is not composite for which it is 2NF.

3NF:

We check for transitive dependencies:

- theater_id determines theater attributes, but these are not stored here.
- title does not determine genre or duration in a strict dependency sense.

No non-key determines another non-key. So it fulfills conditions for 3NF.

BCNF:

movie_id is the only determinant. Easily BCNF.

5. bookings table:

bookings(booking_id, user_id, movie_id, seats_booked, booking_date)

Primary Key is booking_id while foreign keys are user_id and movie_id.

Booking_id	User_id	Movie_id	Seats_booked	Booking_date
1	1	1	1	2025-12-11
2	3	1	1	2025-12-17
3	5	2	10	2025-12-25
4	2	2	25	2025-12-25
5	4	3	12	2025-12-30

1NF:

No exact repeating values in 2 or more rows. Each row unique. 1NF.

2NF:

Primary key has one column, foreign keys do not form composite key. 2NF.

3NF:

user_id and movie_id refer outward to other tables, but within Booking no non-key attribute determines another. 3NF.

BCNF:

booking_id is the only determinant. BCNF.

6. scores table:

score(score_id, user_id, movie_id, score, score_date)

Unique(user_id, movie_id).

Primary Key is score_id, the foreign keys are user_id, movie_id.

Score_id	User_id	Movie_id	score	Score_date
1	2	2	75	2025-12-20
2	3	2	70	2025-12-12
3	4	1	98	2025-12-30
4	5	3	22	2025-12-07
5	1	4	50	2025-12-15

1NF:

All values atomic. 1NF.

2NF:

Primary key is a single attribute. No partial dependency. 2NF.

3NF:

Check internal dependencies:

- (user_id, movie_id) is unique, but score_id remains the official PK.
- score does not determine date, and date does not determine score.

3NF.

BCNF:

Both score_id and the pair (user_id, movie_id) function as candidate keys. A table where all determinants are candidate keys satisfies BCNF.

7. pending_registration table:

pending_registration(pending_id, name, phone, email, password, reg_date)

Primary key is pending_id.

Pending_id	name	phone	email	password	Reg_date
1	Farhan Rafid	017117878458	farhan@gmail.com	asfrwew	2025-12-11
2	Joy Hasan	014854888888	joy@yahoo.com	sdfasdfs	2025-12-17
3	Abir Ahmed	012245478888	abir@gmail.com	Hjhj5555	2025-12-25
4	Rafsan Hossain	016598999999	rafsan@gmail.com	Uyff7777	2025-12-25
5	Abed Ali	015487855555	abed@yahoo.com	54f45hfhf	2025-12-30

1NF:

Attributes are single-valued.1NF.

2NF:

No composite key.2NF.

3NF:

No attribute determines another.3NF.

BCNF:

Primary key is the only determinant.BCNF.

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All seven relations satisfy the requirements of:1NF → 2NF → 3NF → BCNF