

NORMALIZATION ON THE DATABASE

1. BLOODBANK Table

Before Normalization

bloodb ank_id	name	contact_number	email	adress	city	state	zip_ code
1	Dhaka Blood Bank	01811123456	dhaka.blood bank@gmail .com	House 15, Road 5, Dhanmondi	Dhaka	Dhaka	1209
2	Chittagong Blood Bank	01822223456	chattogram. bloodbank@ gmail.com	House 8, Road 12, Panchlaish	Chattogram	Chattogram	4000

1NF (Eliminate repeating groups, ensure atomic values)

Issue: The address column contains multiple pieces of information (house number, road, city).

Solution: Split into separate columns.

blood bank_ id	name	contact_number	email	house _no	road _no	city	state	zip_ c ode
1	Dhaka Blood Bank	01811123456	dhaka.blood bank@gmail .com	15	5	Dhanmondi	Dhaka	1209
2	Chittagong Blood Bank	01822223456	chattogram. bloodbank@ gmail.com	8	12	Panchlaish	Chattogram	4000

2NF (Remove Partial Dependencies)

No partial dependency exists since the primary key is bloodbank_id, and all columns depend entirely on it.

3NF (Remove Transitive Dependencies)

Issue: City, State, and Zip Code depend on each other.

Solution: Create a separate Location Table.

Updated BLOODBANK Table

blood bank_id	name	contact_number	email	house_no	road_no	location_id
1	Dhaka Blood Bank	01811123456	dhaka.bloodbank@gmail.com	15	5	101
2	Chittagong Blood Bank	01822223456	chattogram.bloodbank@gmail.com	8	12	102

New LOCATION Table

Location_id	city	state	zip_code
101	Dhanmondi	Dhaka	1209
102	Panchlaish	Chattogram	4000

2. EMPLOYEE Table

Before Normalization

employee_id	name	contact_number	email	nid	bloodbank_id
1	Shakil Ahmed	01712345678	shakil000@gmail.com	123456789	5
2	Rima Sultana	01722345678	rima111@gmail.com	223456789	12

1NF (Atomic Values)

Already in 1NF (No repeating groups, all values atomic).

2NF (Remove Partial Dependencies)

Already in 2NF (All non-key columns fully depend on the composite key (employee_id, bloodbank_id)).

3NF (Remove Transitive Dependencies)

Issue: Employee personal details (name, email, nid, contact_number) should be in a separate PERSON Table.

Updated EMPLOYEE Table

employee_id	bloodbank_id
1	5
2	12

New PERSON Table

employee_id	name	contact_number	email	nid
1	Shakil Ahmed	01712345678	shakil000@gmail.com	123456789
2	Rima Sultana	01722345678	rima111@gmail.com	223456789

3. BLOOD Table

Before Normalization

blood_id	blood_type
1	O+
2	A+

Already in 3NF (No redundancy or dependencies).

4. DONOR Table

Before Normalization

donor_id	full_name	gender	age	blood_type	contact_number	email	nid	street_address	city	state	zip_code
1	Rashedul Islam	Male	25	O+	01811123456	rashed101@gmail.com	111223344	House 5, Road 10	Mirpur	Dhaka	1209

1NF (Atomic Values)

Address split into separate columns (house_no, road_no, city, state, zip_code).

2NF (Remove Partial Dependencies)

No partial dependency exists because donor_id is the primary key.

3NF (Remove Transitive Dependencies)

Issue: City, State, and Zip Code are dependent.

Solution: Create a separate Location Table (reusing the one from BloodBank).

donor_id	full_name	gender	age	blood_type	contact_number	email	nid	house_no	road_no	location_id
1	Rashedul Islam	Male	25	O+	01811123456	rashed101@gmail.com	111223344	5	10	103

5. PATIENT Table

Before Normalization

patient_id	name	gender	age	blood_type	contact_number	hospital_id	Street_address	city	state	zip_code
1	Jahidul Hasan	Male	45	A+	01711234567	1	House 12, Road 5	Dhanmondi	Dhaka	1209

1NF (Atomic Values)

Address split into separate columns (house_no, road_no, city, state, zip_code).

2NF (Remove Partial Dependencies)

No partial dependency exists because patient_id is the primary key.

3NF (Remove Transitive Dependencies)

Issue: City, State, and Zip Code are dependent.

Solution: Link to the Location Table.

Updated PATIENT Table

patient_id	name	gender	age	blood_type	contact_number	hospital_id	house_no	road_no	location_id
1	Jahidul Hasan	Male	45	A+	01711234567		12	5	104

6. BLOODDONATION Table

Before Normalization

donation_id	donor_id	donation_date	donation_quantity_ml	bloodbank_id
1	1	2024-12-01	500	1
2	2	2024-12-02	450	2

1NF (Atomic Values)

Already in 1NF (All values are atomic).

2NF (Remove Partial Dependencies)

No partial dependency exists because donation_id is the primary key and all columns depend fully on it.

3NF (Remove Transitive Dependencies)

Issue: Bloodbank and Donor information are repeated multiple times.

Solution: Use Bloodbank and Donor tables for reference. Keep only the essential attributes here.

Updated BLOODDONATION Table

donation_id	donor_id	donation_date	donation_quantity_ml	bloodbank_id
1	1	2024-12-01	500	1
2	2	2024-12-02	450	2

7. BLOODREQUEST Table

Before Normalization

request_id	patient_id	blood_type	request_date	required_quantity_ml	status	bloodbank_id	Employee_id
1	1	A+	2024-12-02	500	pending	1	1
2	2	O+	2024-12-03	450	fulfilled	2	2

1NF (Atomic Values)

Already in 1NF (All values atomic).

2NF (Remove Partial Dependencies)

No partial dependency because the primary key is request_id.

3NF (Remove Transitive Dependencies)

Issue: Blood Type and Patient Information should not be stored here redundantly. **Solution:** Use Patient Table and Blood Type reference.

Updated BLOODREQUEST Table

request_id	patient_id	request_date	required_quantity_ml	status	bloodbank_id	Employee_id
1	1	2024-12-02	500	pending	1	1
2	2	2024-12-03	450	fulfilled	2	2

8. BLOODINVENTORY Table

Before Normalization

inventory_id	bloodbank_id	blood_type	available_quantity_ml	employee_id
1	1	O+	500	1
2	2	A+	450	2

1NF (Atomic Values)

Already in 1NF (All values atomic).

2NF (Remove Partial Dependencies)

No partial dependency because inventory_id is the primary key.

3NF (Remove Transitive Dependencies)

Issue: Blood Type and Bloodbank Info should not be redundantly stored.

Solution: Link Blood Type and Bloodbank to their respective tables.

Updated BLOODINVENTORY Table

inventory_id	bloodbank_id	blood_type	available_quantity_ml	employee_id
1	1	O+	500	1
2	2	A+	450	2