SQL

Structured Query Language

01

Introduction

Structured Query Language

what is SQL

Structured query language (SQL) is a programming language for storing and processing information in a relational database. A relational database stores information in tabular form, with rows and columns representing different data attributes and the various relationships between the data values. You can use SQL statements to store, update, remove, search, and retrieve information from the database. You can also use SQL to maintain and optimize database performance.

What Can SQL do?

1. SQL can execute queries against a database
2. SQL can retrieve data from a database
3. SQL can insert records in a database
4. SQL can update records in a database
5. SQL can delete records from a database
6. SQL can create new databases
7. SQL can create new tables in a database
8. SQL can create stored procedures in a database
9. SQL can create views in a database
10. SQL can set permissions on tables, procedures, and views

02

Project

Blood Bank Management

BLOOD BANK MANAGEMENT

Aim of the Project

- This project focuses on managing a blood bank dataset through SQL, overseeing blood types, donors, recipients, and units.
- It demonstrates expertise in healthcare data handling, optimizing blood supply, and ensuring timely availability.
- The project showcases skills in data management and analysis within the sensitive environment of a blood bank.
- Aggregate functions to summarize and analyze blood bank data. Optimizing SQL queries for efficiency and performance in managing large datasets.

INFORMATION OF ENTITIES

In total, we have eight entities, and information on each entity is mentioned below:-

1. Blood_Donor: (Attributes – bd_ID, bd_name, bd_sex, bd_age, bd_Bgroup, bd_reg_date, bd_phNo)

2. Recipient: (Attributes – reci_ID, reci_name, reci_age, reci_Bgrp, reci_Bqnty , reci_sex, reci_reg_date, reci_phNo)

3. BB_Manager: (Attributes – m_ID, m_Name, m_phNo)

4.Recording_Staff : (Attributes ⁻ reco_ID, reco_Name, reco_phNo)

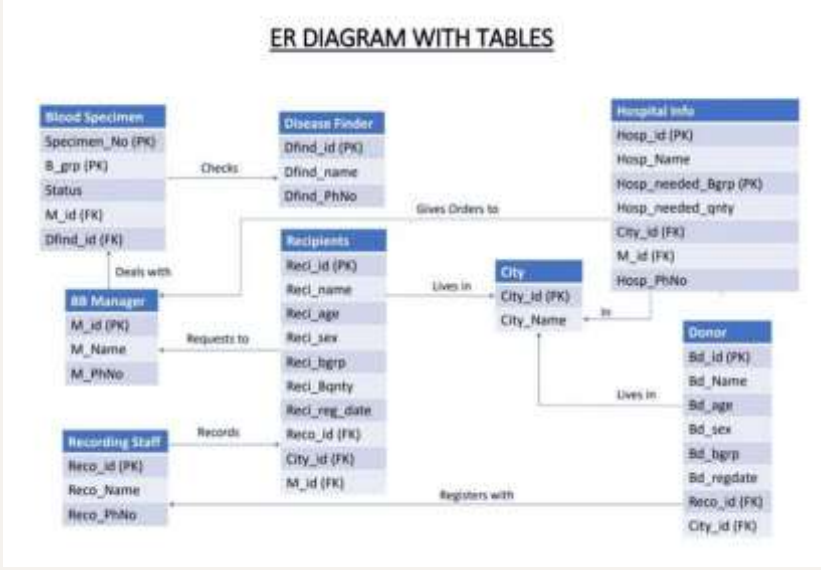
5. BloodSpecimen : (Attributes ⁻ specimen_number, b_group, status)

6. DiseaseFinder: (Attributes - dfind_ID, dfind_name, dfind_PhNo)

7.Hospital_Info : (Attributes ⁻ hosp_ID, hosp_name, hosp_needed_Bgr, hosp_needed_Bqnty)

8. city: (Attributes- city_ID, city_name)

ER diagram


ER DIAGRAM WITH TABLES
Blood Specimen
Specimen_No (PK)
B_grp (PK)
Status
M_id (FK)
Dfind_id (FK)
Checks
Disease Finder
Dfind_id (PK)
Dfind_name
Dfind_PhNo
Hospital Info
Hosp_id (PK)
Hosp_Name
Hosp_needed_Bgrp (PK)
Hosp_needed_qnty
City_id (FK)
M_id (FK)
Hosp_PhNo
Gives Orders to
Deals with
BB Manager
M_id (PK)
M_Name
M_PhNo
Requests to
Recipients
Reci_id (PK)
Reci_name
Reci_age
Reci_sex
Reci_bgrp
Reci_Bqnty
Reci_reg_date
Reco_id (FK)
City_id (FK)
M_id (FK)
Lives in
City
City_id (PK)
City_Name
In
Donor
Bd_id (PK)
Bd_Name
Bd_age
Bd_sex
Bd_bgrp
Bd_regdate
Reco_id (FK)
City_id (FK)
Lives in
Recording Staff
Reco_id (PK)
Reco_Name
Reco_PhNo
Records
Registers with

TABLES AFTER NORMALIZATION

BB_Manager:

Results | Messages

	M_id	mName	m_phNo
1	101	Jack	4693951392
2	102	Mark	4693804553
3	103	Dan	4693804552
4	104	Stacy	4693804551
5	105	Henry	4693804550
6	106	Steve	4694959671
7	107	Jason	4695959671
8	108	Stella	4663959671
9	109	Monika	4673959671
10	110	John	4693859671

BloodSpecimen:

Results | Messages

	specimen_number	b_group	status	dfind_ID	M_id
1	1001	B+	1	11	101
2	1002	O+	1	12	102
3	1003	AB+	1	11	102
4	1004	O-	1	13	103
5	1005	A+	0	14	101
6	1006	A-	1	13	104
7	1007	AB-	1	15	104
8	1008	AB-	0	11	105
9	1009	B+	1	13	105
10	1010	O+	0	12	105
11	1011	O+	1	13	103
12	1012	O-	1	14	102
13	1013	B-	1	14	102
14	1014	AB+	0	15	101

Blood_Donor:

Results | Messages

	bd_ID	bd_name	bd_age	bd_sex	bd_Bgroup	bd_reg_date	reco_ID	City_ID	bd_phNo
1	150011	Pat	29	M	O+	2015-07-19	101412	1300	4693951232
2	150021	Shyam	42	F	A-	2015-12-24	101412	1300	4600001232
3	150121	Dan	44	M	AB+	2015-08-28	101212	1200	4611111232
4	150221	Mark	25	M	B+	2015-12-17	101212	1100	4622221232
5	160011	Abdul	35	F	A+	2016-11-22	101212	1100	4633331232
6	160031	Mike	33	F	AB-	2016-02-06	101212	1400	4644441232
7	160091	Carrol	24	M	B-	2016-10-15	101312	1500	4655551232
8	160101	Smith	22	M	O+	2016-01-04	101312	1200	4666661232
9	160301	Elisa	31	F	AB+	2016-09-10	101312	1200	4677771232
10	160401	Mark	29	M	O-	2016-12-17	101212	1200	4688881232

City:

Results | Messages

	City_ID	City_name
1	1100	Dallas
2	1200	Austin
3	1300	Irving
4	1400	Houston
5	1500	Richardson
6	1600	Plano
7	1700	Frisco
8	1800	Arlington
9	1900	San Antonio
10	2000	Allen

Hospital_Info_1:

Results | Messages

	hosp_ID	hosp_name	City_ID	M_id	hosp_phNo
1	1	MayoClinic	1100	101	4611001232
2	2	CleavelandClinic	1200	103	4622001232
3	3	NYU	1300	103	4633001232
4	4	Baylor	1400	104	4644001232
5	5	Charlton	1800	103	4655001232
6	6	Greenoaks	1300	106	4666001232
7	7	Forestpark	1300	102	4677001232
8	8	Parkland	1200	106	4688001232
9	9	Pinecreek	1500	109	4699001232
10	10	WalnutHill	1700	105	4691001232

Hospital_Info_2:

Results | Messages

	hosp_ID	hosp_name	hosp_needed_Bgrp	hosp_needed_qnty
1	1	MayoClinic	A+	20
2	1	MayoClinic	A-	40
3	1	MayoClinic	AB+	0
4	1	MayoClinic	AB-	20
5	1	MayoClinic	B-	10
6	2	CleavelandClinic	A+	40
7	2	CleavelandClinic	A-	10
8	2	CleavelandClinic	AB+	20
9	2	CleavelandClinic	AB-	10
10	2	CleavelandClinic	B+	0
11	2	CleavelandClinic	B-	30
12	3	NYU	A+	0
13	3	NYU	A-	0
14	3	NYU	AB+	0
15	3	NYU	AB-	0
16	3	NYU	B+	10
17	3	NYU	B-	20
18	4	Baylor	A+	10
19	4	Baylor	A-	40
20	7	Forestpark	B-	40
21	8	Parkland	B+	10
22	9	Pinecreek	AB-	20

Recording_Staff:

Results | Messages

	reco_ID	reco_Name	reco_phNo
1	101012	Lekha	4044846553
2	101112	Mark	4045856553
3	101212	Walcot	4045806553
4	101312	Henry	4045806553
5	101412	Silva	4045806553
6	101512	Adrian	4045806553
7	101612	Mark	4045806553
8	101712	Abdul	4045816553
9	101812	Jerry	4045826553
10	101912	Tim	4045836553

DiseaseFinder:

Results | Messages

	dfind_ID	dfind_name	dfind_PhNo
1	11	Peter	4693804223
2	12	Park	4693804223
3	13	Jerry	4693804223
4	14	Mark	4693804223
5	15	Monika	4693804223
6	16	Ram	4693804123
7	17	Swathi	4693804223
8	18	Gautham	4693804323
9	19	Ashwin	4693804423
10	20	Yash	4693804523

Recipient:

Results | Messages

	reci_ID	reci_name	reci_age	reci_Bgp	reci_Bonty	reco_ID	City_ID	M_id	reci_sex	reci_reg_date
1	10001	Peter	25	B+	1.5	101212	1100	101	M	2015-12-17
2	10002	Dan	60	A+	1	101312	1100	102	M	2015-12-16
3	10003	Steve	35	AB+	0.5	101312	1200	102	M	2015-10-17
4	10004	Parker	66	B+	1	101212	1300	104	M	2016-11-17
5	10005	Jason	53	B-	1	101412	1400	105	M	2015-04-17
6	10006	Preetham	45	O+	1.5	101512	1500	105	M	2015-12-17
7	10007	Swetha	22	AB-	1	101212	1500	101	F	2015-05-17
8	10008	Swathi	25	B+	2	101412	1300	103	F	2015-12-14
9	10009	Lance	30	A+	1.5	101312	1100	104	M	2015-02-16
10	10010	Marsh	25	AB+	3.5	101212	1200	107	M	2016-10-17

Queries

1. Retrieve the names of 10 blood donors ordered by their registration dates ?

```
SELECT bd_name
FROM Blood_Donor
ORDER BY bd_reg_date limit 10;
```

bd_name
Pat
Pat
Dan
Dan
Mark
Mark
Shyam
Shyam
Smith
Smith

2. Retrieve the names of recipients who are male, aged between 20 and 80, and need blood of type 'B+' or 'AB+' ?

```
SELECT reci_name
FROM Recipient
WHERE reci_sex = 'M' AND reci_age
BETWEEN 20 AND 80 AND (reci_Brgp = 'B+'
OR reci_Brgp = 'AB+');
```

reci_name
Mark
Steve
Parker
Marsh

3. Retrieve the names of recipients who have a blood quantity greater than 1 and are from cities other than 'Irving'?

```
SELECT reci_name FROM Recipient WHERE
reci_Bqnty > 1 AND City_ID NOT IN (SELECT
City_ID FROM City WHERE City_name =
'Irving');
```

reci_name
Mark
Preetham
Swathi
Lance

4. Find the names and ages of all recipients who are registered in hospitals located in cities other than Houston.

```
SELECT distinct r.reci_name, r.reci_ageFROM
Recipient rJOIN Hospital_Info_1 hi ON r.M_id =
hi.M_idJOIN City c ON hi.City_ID =
c.City_IDWHERE c.City_name <> 'Houston' limit
8;
```

reci_name	reci_age
Mark	25
Swetha	22
Swathi	25
Parker	66
Lance	30
Jason	53
Preetham	45

5. Find Recipients with Blood Quantity Greater Than a Specified BLOOD Quantity > 2 ?

```
SELECT reci_name, reci_Bqnty
FROM Recipient
WHERE reci_Bqnty > 1.5
```

	reci_name	reci_Bqnty
▶	Swathi	2
	Marsh	3.5

6. Find Blood Donors Who are Female and Aged Between 30 and 40 ?

```
SELECT bd_name, bd_age, bd_sex
FROM Blood_Donor
WHERE bd_sex = 'F' AND bd_age
BETWEEN 30 AND 40;
```

	bd_name	bd_age	bd_sex
▶	Abdul	35	F
	Mike	33	F
	Elisa	31	F

7. List the hospitals along with their names and the corresponding city they are located in ?

```
SELECT h.hosp_name, c.City_name
FROM Hospital_Info_1 h
JOIN City c ON h.City_ID = c.City_ID;
```

hosp_name	City_name
MayoClinic	Austin
CleavelandClinic	Irving
NYU	Houston
Baylor	Richardson
Charlton	San Antonio
Greenoaks	Houston
Forestpark	Houston
Parkland	Irving
Pinecreek	Plano
WalnutHill	Arlington

8. List the blood groups along with the total quantity needed in each hospital ?

```
SELECT hosp_name, hosp_needed_Bgrp,
SUM(hosp_needed_qnty) AS Total_Quantity
FROM Hospital_Info_2
GROUP BY hosp_name, hosp_needed_Bgrp;
```

hosp_name	hosp_needed_Bgrp	Total_Quantity
MayoClinic	A-	40
MayoClinic	A+	20
MayoClinic	AB-	20
MayoClinic	AB+	0
MayoClinic	B-	10
CleavelandClinic	A-	10
CleavelandClinic	A+	40
CleavelandClinic	AB-	10
CleavelandClinic	AB+	20
CleavelandClinic	B-	30

9. Retrieve the 10 names of recipients along with the hospitals they are associated with, ordered by the quantity of blood needed in descending order.

Query to Retrieve Data :

```
SELECT distinct r.reci_name, hi.hosp_name,
r.reci_Bqnty FROM Recipient r
JOIN Hospital_Info_1 hi ON r.City_ID =
hi.City_ID
ORDER BY r.reci_Bqnty DESC limit 10;
```

reci_name	hosp_name	reci_Bqnty
Marsh	CleavelandClinic	3.5
Marsh	Parkland	3.5
Swathi	NYU	2
Swathi	Greenoaks	2
Swathi	Forestpark	2
Lance	MayoClinic	1.5
Mark	MayoClinic	1.5
Preetham	Pinecreek	1.5
Dan	MayoClinic	1
Parker	NYU	1


THANK YOU