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Experiment -10

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Branch: BE CSE AIML **Section/Group: 21AML12B**
Semester: 03 **Date of Performance: 17-11-2022**
Subject Name: Database management system **Subject Code: 21-CSH-243**

Aim:

XYZ hospital is a multi specialty hospital that includes a number of departments, rooms, doctors, nurses, compounders, and other staff working in the hospital. Patients having different kinds of ailments come to the hospital and get checkup done from the concerned doctors. If required they are admitted in the hospital and discharged after treatment.

The aim of this case study is to design and develop a database for the hospital to maintain the records of various departments, rooms, and doctors in the hospital. It also maintains records of the regular patients, patients admitted in the hospital, the check up of patients done by the doctors, the patients that have been operated, and patients discharged from the hospital.

Description:

In hospital, there are many departments like Orthopedic, Pathology, Emergency, Dental, Gynecology, Anesthetics, I.C.U., Blood Bank, Operation Theater, Laboratory, M.R.I., Neurology, Cardiology, Cancer Department, Corpse, etc. There is an OPD where patients come and get a card (that is, entry card of the patient) for check up from the concerned doctor. After making entry in the card, they go to the concerned doctor's room and the doctor checks up their ailments. According to the ailments, the doctor either prescribes medicine or admits the patient in the concerned department. The patient may choose either private or general room according to his/her need. But before getting admission in the hospital, the patient has to fulfill certain formalities of the hospital like room charges, etc. After the treatment is completed, the doctor discharges the patient. Before discharging from the hospital, the patient again has to complete certain formalities of the hospital like balance charges, test charges, operation charges (if any), blood charges, doctors' charges, etc.

Next we talk about the doctors of the hospital. There are two types of the doctors in the hospital, namely, regular doctors and call on doctors. Regular doctors are those doctors who come to the hospital daily. Calls on doctors are those doctors who are called by the hospital if the concerned doctor is not available.

Table Description:

Following are the tables along with constraints used in Hospital Management database.

1. DEPARTMENT: This table consists of details about the various departments in the hospital. The information stored in this table includes department name, department location, and facilities available in that department. Constraint: Department name will be unique for each department.

2. ALL_DOCTORS: This table stores information about all the doctors working for the hospital and the departments they are associated with. Each doctor is given an identity number starting with DR or DC prefixes only. Constraint: Identity number is unique for each doctor and the corresponding department should exist in DEPARTMENT table.

3. DOC_REG: This table stores details of regular doctors working in the hospital. Doctors are referred to by their doctor number. This table also stores personal details of doctors like name, qualification, address, phone number, salary, date of joining, etc. Constraint: Doctor's number entered should contain DR only as a prefix and must exist in ALL_DOCTORS table.

4. DOC_ON_CALL: This table stores details of doctors called by hospital when additional doctors are required. Doctors are referred to by their doctor number. Other personal details like name, qualification, fees per call, payment due, address, phone number, etc., are also stored. Constraint: Doctor's number entered should contain DC only as a prefix and must exist in ALL_DOCTORS table.

5. PAT_ENTRY: The record in this table is created when any patient arrives in the hospital for a check up. When patient arrives, a patient number is generated which acts as a primary key. Other details like name, age, sex, address, city, phone number, entry date, name of the doctor referred to, diagnosis, and department name are also stored. After storing the necessary details patient is sent to the doctor for check up.
Constraint: Patient number should begin with prefix PT. Sex should be M or F only. Doctor's name and department referred must exist.

6. PAT_CHKUP: This table stores the details about the patients who get treatment from the doctor referred to. Details like patient number from patient entry table, doctor number, date of check up, diagnosis, and treatment are stored. One more field status is used to indicate whether patient is admitted, referred for operation or is a regular patient to the hospital. If patient is admitted, further details are stored in PAT_ADMIT table. If patient is referred for operation, the further details are stored in PAT_OPR table and if patient is a regular patient to the hospital, the further details are stored in PAT_REG table. Constraint: Patient number should exist in PAT_ENTRY table and it should be unique.

7. PAT_ADMIT: When patient is admitted, his/her related details are stored in this table. Information stored includes patient number, advance payment, mode of payment, room number, department, date of admission, initial condition, diagnosis, treatment, number of the doctor under whom treatment is done, attendant name, etc. Constraint: Patient number should exist in PAT_ENTRY table. Department, doctor number, room number must be valid.

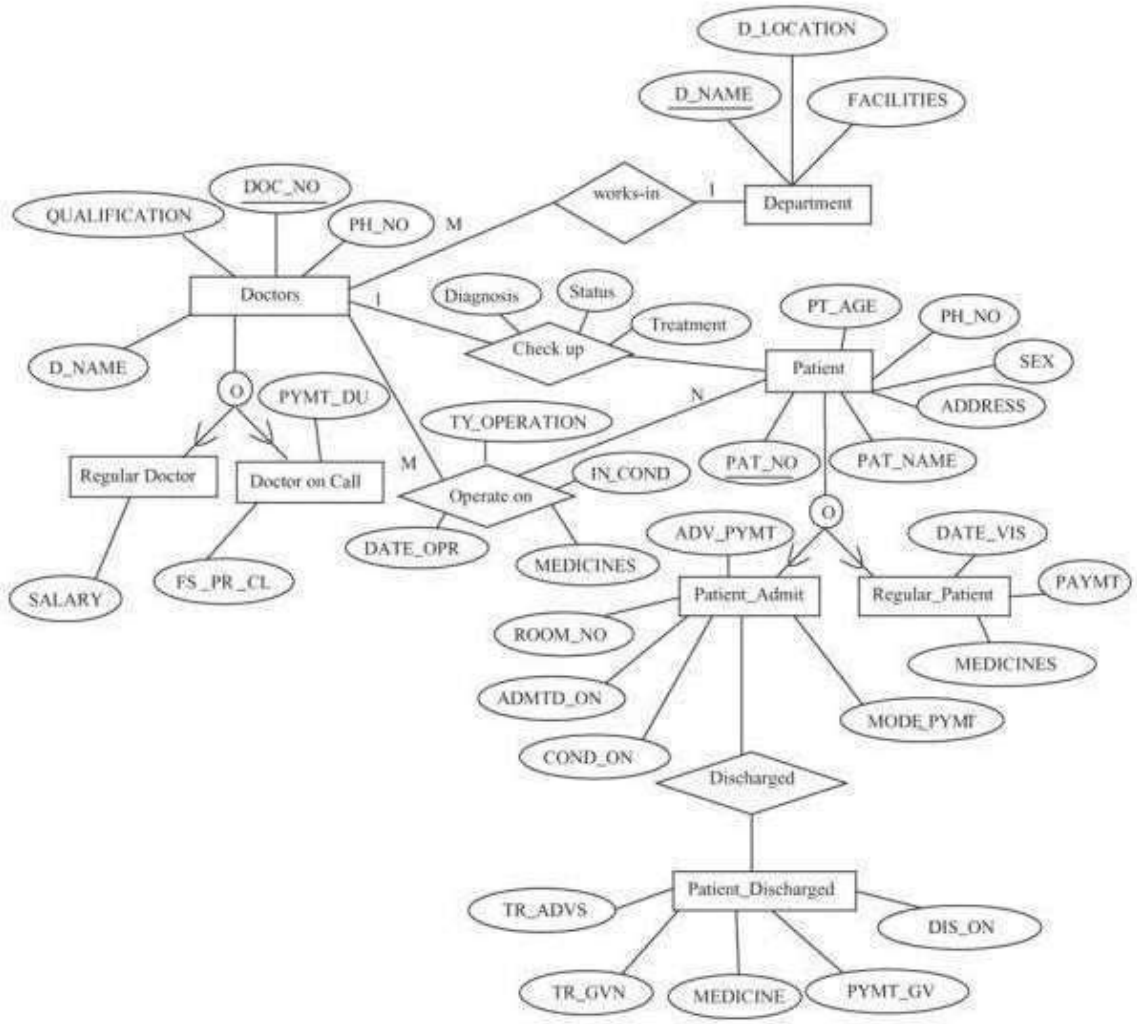
8. PAT_DIS: An entry is made in this table whenever a patient gets discharged from the hospital. Each entry includes details like patient number, treatment given, treatment advice, payment made, mode of payment, date of discharge, etc. Constraint: Patient number should exist in PAT_ENTRY table.

9. PAT_REG: Details of regular patients are stored in this table. Information stored includes date of visit, diagnosis, treatment, medicine recommended, status of treatment, etc. Constraint: Patient number should exist in patient entry table. There can be multiple entries of one patient as patient might be visiting hospital repeatedly for check up and there will be entry for patient's each visit.

10. PAT_OPR: If patient is operated in the hospital, his/her details are stored in this table. Information stored includes patient number, date of admission, date of operation, number of the doctor who conducted the operation, number of the operation theater in which operation was carried out, type of operation, patient's condition before and after operation, treatment advice, etc. Constraint: Patient number should exist in PAT_ENTRY table. Department, doctor number should exist or should be valid.

11. ROOM_DETAILS: It contains details of all rooms in the hospital. The details stored in this table include room number, room type (general or private), status (whether occupied or not), if occupied, then patient number, patient name, charges per day, etc. Constraint: Room number should be unique. Room type can only be G or P and status can only be Y or N

E-R Diagram



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Relational Database Schema for Case Study The relational database schema for Hospital Management database is as follows:

1. DEPARTMENT (D_NAME, D_LOCATION, FACILITIES)

2. ALL_DOCTORS (DOC_NO, DEPARTMENT)

3. DOC_REG(DOC_NO, D_NAME, QUALIFICATION, SALARY, EN_TIME, EX_TIME, ADDRESS, PH_NO, DOJ)

4. DOC_ON_CALL (DOC_NO, D_NAME, QUALIFICATION, FS_PR_CL, PYMT_DU, ADDRESS, PH_NO)

5. PAT_ENTRY (PAT_NO, PAT_NAME, CHKUP_DT, PT_AGE, SEX, RFRG_CSTNT, DIAGNOSIS, RFD, ADDRESS, CITY, PH_NO, DEPARTMENT)

6. PAT_CHKUP (PAT_NO, DOC_NO, DIAGNOSIS, STATUS, TREATMENT)

7. PAT_ADMIT (PAT_NO, ADV_PYMT, MODE_PYMT, ROOM_NO, DEPTNAME, ADMTD_ON, COND_ON, INVSTGTN_DN, TRMT_SDT, ATTDNT_NM)

8. PAT_DIS (PAT_NO, TR_ADVS, TR_GVN, MEDICINES, PYMT_GV, DIS_ON)

9. PAT_REG (PAT_NO, DATE_VIS, CONDITION, TREATMENT, MEDICINES, DOC_NO, PAYMT)

10. PAT_OPR (PAT_NO, DATE_OPR, IN_COND, AFOP_COND, TY_OPERATION, MEDICINES, DOC_NO, OPTH_NO, OTHER_SUG)

11. ROOM_DETAILS (ROOM_NO, TYPE, STATUS, RM_DL_CRG, OTHER_CRG)

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Creating the table in Microsoft Azure:

```
create database Hospital_Managment_System

use Hospital_Managment_System

create table All_Doctor(Doc_No nvarchar(50) primary key,Department varchar(50))

create table Department(D_Name nvarchar(50) primary key,D_Location varchar(250),Facilities
nvarchar(50))

create table DOC_REG(DOC_NO nvarchar(50) Foreign key REFERENCES
All_Doctor(Doc_no),DOC_NAME nvarchar(50) , D_NAME nvarchar(50) Foreign key
REFERENCES Department(D_Name) , QUALIFICATION nvarchar(50), SALARY int, EN_TIME
nvarchar(50), EX_TIME nvarchar(50), ADDRESS varchar(250),PH_NO nvarchar(13), DOJ
nvarchar(50))

create table DOC_ON_CALL (DOC_NO nvarchar(50) Foreign key REFERENCES
All_Doctor(Doc_no),DOC_NAME nvarchar(50), D_NAME nvarchar(50) Foreign key
REFERENCES Department(D_Name) , QUALIFICATION nvarchar(50), FS_PR_CL int, PYMT_DU
int , ADDRESS varchar(250),PH_NO nvarchar(13))

create table PAT_ENTRY (PAT_NO nvarchar(50) primary key, PAT_NAME nvarchar(50), PT_AGE
int, SEX char,CHKUP_DT varchar(250), DIAGNOSIS varchar(250),RFD nvarchar(50) Foreign key
REFERENCES All_Doctor(Doc_no),DEPARTMENT nvarchar(50) Foreign key REFERENCES
Department(D_Name) , ADDRESS varchar(250), CITY varchar(250), PH_NO nvarchar(13) )

create table PAT_CHKUP (PAT_NO nvarchar(50) foreign key references PAT_ENTRY(PAT_NO),
DOC_NO nvarchar(50) Foreign key REFERENCES All_Doctor(Doc_no), DIAGNOSIS
varchar(250), STATUS varchar(250), TREATMENT varchar(250))

create table ROOM_DETAILS (ROOM_NO nvarchar(50) primary key, TYPE Char, STATUS char,
RM_DL_CRG int, OTHER_CRG int)

create table PAT_ADMIT (PAT_NO nvarchar(50) foreign key references PAT_ENTRY(PAT_NO),
ADV_PYMT int, MODE_PYMT nvarchar(50), ROOM_NO nvarchar(50) foreign key references
ROOM_DETAILS(ROOM_NO) , DEPTNAME nvarchar(50) Foreign key REFERENCES
Department(D_Name) , ADMTD_ON date,INT_COND varchar(250), TREATMT_DT varchar(250) ,
TRMT_ST varchar(50) , ATTDT_NM nvarchar(50) Foreign key REFERENCES
All_Doctor(Doc_no))

create table PAT_DIS (PAT_NO nvarchar(50) foreign key references PAT_ENTRY(PAT_NO),
TR_ADVS varchar(250), TR_GVN varchar(250) , MEDICINES varchar(250) , PYMT_GV int ,
DIS_ON date)
```

create table PAT_REG (PAT_NO nvarchar(50) foreign key references PAT_ENTRY(PAT_NO), DATE_VIS date, CONDITION varchar(250), TREATMENT varchar(250), MEDICINES varchar(250), DOC_NO nvarchar(50) Foreign key REFERENCES All_Doctor(Doc_no), PAYMT int)

create table PAT_OPR (PAT_NO nvarchar(50) foreign key references PAT_ENTRY(PAT_NO), DATE_OPR date, IN_COND varchar(250) , AFOP_COND varchar(250), TY_OPERATION varchar(250), MEDICINES varchar(250),DOC_NO nvarchar(50) Foreign key REFERENCES All_Doctor(Doc_no), OPTH_NO nvarchar(50), OTHER_SUG varchar(250))

Displaying the database

Department Table

	D_Name	D_Location	Facilities
1	Dietary_Department	e_health_teaching_in_regard_to_proper_diet_of_the_cl...	Location_can_be_flexible
2	Medical_Department	_medicine,_surgery,_gynaecology,_obstetrics,_paediatri...	Spread_throughout_the_hospital
3	Operation_Theatre_(OT)	These_should_be_four_zone_-_outer_zone,_clean_zo...	physiotherapy,_occupational_therapy
4	Outpatient_department_(OPD)	Consultation,_investigation,_procedures,_specialty_servi...	at_the_entrance_of_the_hospital
5	Paramedical_Department	Labs_like_Bacteriology_laboratory	At_hygenic_and_usually_protected_places
6	Pharmacy_Department	purchasing,_compounding,_storing_and_dispensing_al...	These_should_be_four_zone_-_outer_zone
7	Physical_Medicine_and_Rehabilitation_Department	physiotherapy,_occupational_therapy,_speech_therapy_...	With_an_open_space_to_allow_ppl_to_rehab
8	Radiology_Department_(X-ray)	X-ray_rooms_25,Film_processing10,Administration30,...	easy_accessibility_for_OP_and_IP_clients

All_Doctors table

	Doc_No	Department
1	DC101	Outpatient_department_(OPD)
2	DC102	Outpatient_department_(OPD)
3	DC103	Outpatient_department_(OPD)
4	DC1101	Outpatient_department_(OPD)
5	DC201	Paramedical_Department
6	DC202	Paramedical_Department
7	DC203	Paramedical_Department
8	DC204	Paramedical_Department
9	DC205	Paramedical_Department
10	DC2201	Paramedical_Department
11	DC2202	Paramedical_Department
12	DC301	Physical_Medicine_and_Rehabilitation_Department
13	DC302	Physical_Medicine_and_Rehabilitation_Department
14	DC303	Physical_Medicine_and_Rehabilitation_Department
15	DC304	Physical_Medicine_and_Rehabilitation_Department
16	DC305	Physical_Medicine_and_Rehabilitation_Department
17	DC401	Operation_Theatre_Complex_(OT)
18	DC402	Operation_Theatre_Complex_(OT)
19	DC403	Operation_Theatre_Complex_(OT)
20	DC4401	Operation_Theatre_Complex_(OT)
21	DC4402	Operation_Theatre_Complex_(OT)
22	DC501	Pharmacy_Department
23	DC502	Pharmacy_Department
24	DC503	Pharmacy_Department
25	DC601	Radiology_Department_(X-ray)
26	DC602	Radiology_Department_(X-ray)
27	DC603	Radiology_Department_(X-ray)
28	DC6601	Radiology_Department_(X-ray)
29	DC6602	Radiology_Department_(X-ray)
30	DC701	Dietary_Department
31	DC702	Dietary_Department

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Doc_REG Table

	DOC_NO	DOC_NAME	D_NAME	QUALIFICATION	SALARY	EN_TIME	EX_TIME	ADDRESS	PH_NO	DOJ
1	DC101	Pearlie Gallegos	Outpatient_department_(OPD)	MBBS	4347887	09:26:43	17:07:11	San Diego	96586	28/02/2020
2	DC102	Deshawn Hanna	Outpatient_department_(OPD)	MBBS	6273177	09:39:41	17:07:11		82153	26/06/2021
3	DC103	Glenda Whitehead	Outpatient_department_(OPD)	MBBS	7853096	09:47:06	17:07:11	New York	83619	23/02/2022
4	DC201	Dorsey Johns	Paramedical_Department	MBBS	4239748	09:44:32	17:07:11		91405	29/02/2020
5	DC202	Bridgette Ponce	Paramedical_Department	MBBS	1709609	09:08:12	17:07:11	Chicago	99339	09/03/2021
6	DC203	Harold Gibbs	Paramedical_Department	MBBS	7904068	09:05:50	17:07:11	Chicago	99588	25/12/2021
7	DC204	Cyril Fuentes	Paramedical_Department	MBBS	8229472	09:37:59	17:07:11	Houston	98119	01/09/2021
8	DC205	Deangelo Navarro	Paramedical_Department	MBBS	1756303	09:21:48	17:07:11	Chicago	90046	12/12/2019
9	DC301	Lindsay Cross	Physical_Medicine_and_Re...	BBS	4665092	09:08:49	17:07:11	Houston	91389	09/03/2021
10	DC302	Ida Goodman	Physical_Medicine_and_Re...	BBS	4137560	09:02:01	17:07:11	Philadel...	98560	13/02/2022
11	DC303	Elden Luna	Physical_Medicine_and_Re...	BBS	4392062	09:40:58	17:07:11	San Diego	82835	28/02/2020
12	DC304	Ken Montgomery	Physical_Medicine_and_Re...	BBS	5440043	09:41:23	17:07:11		90115	29/02/2020
13	DC305	Irma Gray	Physical_Medicine_and_Re...	BBS	7139443	09:27:57	17:07:11	Philadel...	93439	24/01/2021
14	DC501	Juanita Conrad	Pharmacy_Department	B.Pharm	2361992	09:40:35	17:07:11	New York	80576	25/12/2021
15	DC502	Celeste Leonard	Pharmacy_Department	B.Pharm	4872107	09:06:43	17:07:11	San Diego	89003	26/11/2021
16	DC503	Anderson Velez	Pharmacy_Department	B.Pharm	9291593	09:00:07	17:07:11	Los Ang...	89839	31/01/2020
17	DC601	Hans Michael	Radiology_Department_(X-r...	MBBS	3098723	09:02:59	17:07:11	Los Ang...	82420	01/09/2021
18	DC602	Burl Mitchell	Radiology_Department_(X-r...	MBBS	9761868	09:23:51	17:07:11	Houston	81681	
19	DC603	Harriet Bradshaw	Radiology_Department_(X-r...	MBBS	1190522	09:50:30	17:07:11	San Diego	82946	13/02/2022
20	DC701	Jimmy Barry	Dietary_Department	BBS	4538924	09:24:47	17:07:11	Houston	98707	03/08/2021
21	DC702	Arlen Yates	Dietary_Department	BBS	4804307	09:00:49	17:07:11	New York	90490	17/09/2021
22	DC703	Elena Petersen	Dietary_Department	BBS	3338938	09:37:23	17:07:11		84137	01/10/2019
23	DC401	Tobias Leon	Operation_Theatre_(OT)	MBBS	9402844	09:19:01	17:07:11	Los Ang...	81272	01/06/2022
24	DC402	Haley Gordon	Operation_Theatre_(OT)	MBBS	7392673	09:17:22	17:07:11	Phoenix	95986	17/01/2020
25	DC403	Weldon Fox	Operation_Theatre_(OT)	MBBS	8866826	09:19:17	17:07:11	Los Ang...	93820	26/02/2022

Doc_ON_CALL Table:

	DOC_NO	DOC_NAME	D_NAME	QUALIFICATION	FS_PR_CL	PYMT_DU	ADDRESS	PH_NO
1	DC1101	Essie Maynard	Outpatient_department_(OPD)	MBBS	811486	556219	New York	96385
2	DC2201	Ruthie Gross	Paramedical_Department	MBBS	554441	718647	Houston	96485
3	DC2202	Lavern Ballard	Paramedical_Department	MBBS	608838	975215	New York	82018
4	DC6601	Pauline Roach	Radiology_Department_(X-ray)	MBBS	467080	849486	San Diego	80248
5	DC6602	Colin Taylor	Radiology_Department_(X-ray)	MBBS	470589	544623	Phoenix	99954
6	DC8801	Michele Goodman	Medical_Department	MBBS	473247	888994	New York	81717
7	DC8802	Marc Park	Medical_Department	MBBS	738790	832086	Phoenix	92907
8	DC8803	Daisy Stanton	Medical_Department	MBBS	174088	786924	Philadelphia	86279
9	DC4401	Marina King	Operation_Theatre_(OT)	MBBS	168030	605379	San Diego	89657
10	DC4402	Dario Richard	Operation_Theatre_(OT)	MBBS	497022	499113		87934

Pat_Entry Table

	PAT_NO	PAT_NAME	PT_AGE	SEX	CHKUP_DT	DIAGNOSIS	RFD	DEPARTMENT	ADDRESS	CITY	PH_NO
1	PT101	Rodney East	61	M	Tuberclosis	MEdication	DC101	Outpatient_department_(OPD)	New York	New York	95722
2	PT102	Blaine Arroyo	3	M	Comon Cold	Medication	DC102	Outpatient_department_(OPD)	New York	San Diego	83700
3	PT301	Jena Bowden	77	F	Spinal Chord Injury	Rehab	DC301	Physical_Medicine_and_Rehabilitation_Department	Philadelphia	Philadelphia	80605
4	PT302	Korben Mahoney	80	F	Hand Nerve damaged	Rehab	DC302	Physical_Medicine_and_Rehabilitation_Department	New York	Houston	84707
5	PT401	Clive Burton	23	F	Heart Attack	Surgery	DC401	Operation_Theatre_(OT)	Houston	Houston	94849
6	PT402	Crystal Robins	80	F	Liver Faliure	Surgery	DC402	Operation_Theatre_(OT)	San Antonio	San Diego	94385
7	PT403	Stacie Summers	18	F	Kidney Faliure	Surgery	DC403	Operation_Theatre_(OT)	Los Angeles	Houston	88016
8	PT601	Digby Dupont	47	F	Brain tumor	Radio Logy	DC601	Radiology_Department_(X-ray)	New York	Phoenix	88393
9	PT602	Naeem Samuels	7	M	Kidney Tumor	Radio Logy	DC602	Radiology_Department_(X-ray)	Los Angeles	Los Angeles	89576
10	PT801	Etienne Alfaro	5	M	Digestion Problem	Medication	DC801	Medical_Department	San Antonio	New York	86114

PAT_Admit Table

	PAT_NO	ADV_PYMT	MODE_PYMT	ROOM_NO	DEPTNAME	ADMTD_ON	INT_COND	TREATMT_DT	TRMT_ST	ATTDT_NM
1	PT301	848	Online	RO000	Physical_Medicine_and_Rehabilitation_Department	2022-05-04	Good	Rehab	Good	DC302
2	PT302	911	Offline	RO002	Physical_Medicine_and_Rehabilitation_Department	2022-06-04	Not Good	Rehab	Better	DC301
3	PT401	858	Online	RO101	Operation_Theatre_(OT)	2022-03-01	Average	Surgery	Better	DC401
4	PT402	118	Offline	RO201	Operation_Theatre_(OT)	2022-09-24	Worst	Surgery	Improved	DC402
5	PT403	593	Online	RO302	Operation_Theatre_(OT)	2022-05-28	Bad	Surgery	Fine	DC403

Pat_CHKUP Table

	PAT_NO	DOC_NO	DIAGNOSIS	STATUS	TREATMENT
1	PT101	DC101	MEdication	In Progress	giving medicine
2	PT102	DC102	Medication	Completed	giving medicine
3	PT801	DC801	Rehab	Completed	observing

Pat_OPR Table

	PAT_NO	DATE_OPR	IN_COND	AFOP_COND	TY_OPERATION	MEDICINES	DOC_NO	OPTH_NO	OTHER_SUG
1	PT401	2022-03-01	Critical	Under_Observation	Heart_Transplant	Glucose&Pain_Killers	DC401	OP22001	NA
2	PT402	2022-10-24	Critical	Under_Observation	Liver_Transplant	Glucose&Pain_Killers	DC402	OP22002	NA
3	PT403	2022-07-28	Critical	Under_Observation	Kidney_Transplant	Glucose&Pain_Killers	DC401	OP22001	NA

Pat_REG Table

	PAT_NO	DATE_VIS	CONDITION	TREATMENT	MEDICINES	DOC_NO	PAYMT
1	PT301	2022-10-03	Average	Rehab	Vitamins	DC301	6000
2	PT302	2022-11-05	Average	Rehab	Vitamins	DC302	10000

Pat_DIS Table

	PAT_NO	TR_ADVS	TR_GVN	MEDICINES	PYMT_GV	DIS_ON
1	PT601	To_take_rest	Radiology	Vitamins	500	2022-10-04
2	PT602	To_take_rest	Radiology	Vitamins	250	2022-10-04

Room Details Table

	ROOM_NO	TYPE	STATUS	RM_DL_CRG	OTHER_CRG
1	RO000	P	Y	9536	623
2	RO001	G	N	9613	212
3	RO002	G	Y	4394	945
4	RO100	G	N	6392	21
5	RO101	P	Y	9567	49
6	RO102	P	N	9310	798
7	RO200	G	N	799	825
8	RO201	P	Y	1143	90
9	RO202	P	N	5412	958
10	RO300	P	N	3542	861
11	RO301	G	N	4011	400
12	RO302	G	Y	3524	722
13	RO400	P	N	128	524
14	RO401	P	N	5852	78
15	RO402	P	Y	6542	230

Conclusion:

We successfully implement the relational model of hospital system in SQL server using Microsoft Azure SQL Management Studio.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			