***Database System***

***Final Report***

***Project***

***IVOR Hospital Management System***



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Report:

In order to achieve our goal i.e. IVOR hospital management system. We analyzed all the given requirements mention in the given pdf. And develop a set of concepts for hospital management system. In order to become more familiar with hospital management systems we take a visit towards shifa hospital. And draw a sketch of whole hospital management system. Apart from requirements we also implement some real world terminologies and also fulfill the given requirements. After analyzing the requirements we give it the shape of ERD. And after we move towards creating tables for storing some dummy record.

ERD describes the main logical structure of hospital management system and ERD is given along with a file name as ERD.

After ERD we create tables with the help of SQL. By using this language we were enable to interact more towards DDL. Tables creation file is attached name as Tables.sql

**Tables Description:**

1. S*pecialty*

**CREATE TABLE Speciality**

**(**

**Spec\_Code char(5),**

**Name varchar(35) unique,**

**levelof int,**

**constraint S\_PK1 PRIMARY KEY (Spec\_Code)**

**);**

This tables is defined by its primary key that is char fixed length. And an attribute defining its name. Level means at which level does this specialty belongs. Unique constraint is applied for only name cause each Specialty has unique name according to given requirements.

1. *Consultant*

**CREATE TABLE Consultant**

**(**

**Const\_ID char(8),**

**Name varchar(35) not null,**

**Address varchar(60),**

**Billing\_Rate number(4),**

**Salary number(8,2),**

**Phone varchar(20) unique,**

**DOB varchar(25) not Null,**

**Spec\_Code char(5),**

**position varchar(20),**

**constraint c\_pk1 PRIMARY KEY (Const\_ID),**

**constraint fcpk1 FOREIGN KEY (Spec\_Code)**

**references Speciality(Spec\_Code)**

**);**

As many doctor could be consultant so as consultant super type is doctor so after

Mapping we choose option 2 for mapping and make consultant apart. And its

Primary key is Const Id that is actually doctor id which came as foreign key but play

the role of primary key. Other attributes like address, DOB are same that each doctor has. Each consultant has specialty so spec\_code works as foreign key in this table.

1. *Ward*

**CREATE TABLE WARD**

**(**

**Ward\_ID char(5),**

**Name varchar(35) unique,**

**Floor\_no number(2),**

**Capacity number(3),**

**Spec\_Code char(5),**

**constraint wpk1 PRIMARY KEY (Ward\_ID),**

**constraint fkp1 FOREIGN KEY (Spec\_Code)**

**references Speciality(Spec\_Code)**

**);**

Ward id is its primary key and name defines which ward is it. Each ward caters certain specialty so one ward has many specialty so spec code become as foreign key in this table other attribute defines its name , capacity etc. Ward name is unique because each ward has its own name and differentiate by its name so constraints is applied on name.

1. *Complaint*

**CREATE TABLE Complaint**

**(**

**COM\_CODE NUMBER(5),**

**TITLE VARCHAR(20) NOT NULL,**

**DESCR VARCHAR(40),**

**CONSTRAINT COM\_PK PRIMARY KEY(COM\_CODE)**

**);**

Code is primary key that uniquely identifies its each record. While title is name of complain that is should not be null constraint is applied on title is null. Description is defined by as details of complain.

1. Treatment

**CREATE TABLE TREATMENT**

**(**

**TRT\_CODE char(5),**

**NAME VARCHAR(35) NOT NULL,**

**DESCR VARCHAR(40),**

**CONSTRAINT TRT\_PK PRIMARY KEY(TRT\_CODE)**

**);**

code is its primary key that uniquely identifies its all rows. Name defined treatment name.Not null constraint is applied cause treatment name should not be null.

Description consists of details that could be null.

1. *Patient:*

**CREATE TABLE PATIENT**

**(**

**PAT\_ID char(8),**

**NAME VARCHAR(35) NOT NULL,**

**ADDRESS VARCHAR(60),**

**Phone VARCHAR(25) unique,**

**City varchar(25),**

**DOB varchar(25) not Null,**

**CONSTRAINT pat\_PK PRIMARY KEY(PAT\_ID)**

**);**

id is its primary key. And Date of birth should not be null on the other hand name of patient should not be null. Id determines its each tuple.

1. *Nurse*

**CREATE TABLE Nurse**

**(**

**Nurse\_ID char(8),**

**NAME VARCHAR(30) NOT NULL,**

**ADDRESS VARCHAR(60),**

**TELNO VARCHAR(20) UNIQUE,**

**DOB Date not Null,**

**NurseType varchar(5),**

**HireDate Date not NULL,**

**position varchar(20),**

**constraint nnnpk1 PRIMARY KEY(Nurse\_ID)**

**);**

Nurse is super type of register nurse and non-register nurse. So the comman attributes that belong to both reg nurse and non reg nure came in here. Hire date should not null not null constraint is applied. Each nurse has unique telephone #. And name of nurse should not be null.id is its primary key.

1. *Nurse Shift*

**CREATE table NurseShift**

**(**

**Ser\_NS number(10),**

**Sis\_ID char(8),**

**Shift varchar(10) not Null,**

**Incharge\_ward char(5),**

**constraint nspk2 PRIMARY KEY (Ser\_NS,Sis\_ID,incharge\_ward),**

**constraint a1 FOREIGN KEY (Sis\_ID)**

**references Nurse(Nurse\_ID),**

**constraint a2 FOREIGN KEY (Incharge\_ward)**

**references Ward(Ward\_ID)**

**);**

This table hold the record of each nurse that works as sister in any ward it also maintain the previous history of nurse that in which ward nurse work as sister before and nurse id is primary key that came from nurse. While incharge ward is foreign key that came form ward. It explains that which nurse works as sister in which ward. Shift defines their shifts like day or night.

1. *Register Nurses*

**CREATE TABLE RegNurse**

**(**

**RNurse\_Id char(8),**

**SAL number(8,2) not null,**

**bonus number(6,2),**

**pension number(6,2),**

**constraint regNqq\_pk1 PRIMARY KEY (RNurse\_ID),**

**constraint regN\_pk1 FOREIGN KEY (RNurse\_ID)**

**references Nurse(Nurse\_ID)**

**);**

Rnurse Id determines its primary key that came from nurse as foreign key. It inherit all attributes of nurse by making a join with nurse using id. It has its own salary and bonus and pension because they are permanent and works for particular time.

1. *Non-Register Nurse*

**CREATE TABLE NonRegNurse**

**(**

**NRNurse\_ID char(8),**

**rate int not null,**

**workHrs int,**

**constraint nonregN\_asapk1 PRIMARY KEY (NRNurse\_ID),**

**constraint regNaa\_pk1 FOREIGN KEY (NRNurse\_ID)**

**references Nurse(Nurse\_ID)**

**);**

Id is its primary key that came from nurse id and works as foreign key in this table .this table hold the data for non reg nurses and also holds their extra attributes like rate, working hours, etc. Not null constraint is applied on rate.

1. *CareUnit*

**CREATE TABLE CAREUNIT**

**(**

**CU\_code char(8),**

**ward\_ID char(5),**

**name varchar(30) not null,**

**capacity int,**

**Head\_Nurse char(8),**

**constraint cu\_pk PRIMARY KEY(CU\_CODE),**

**CONSTRAINT cu\_fk1 FOREIGN KEY(ward\_ID) REFERENCES WARD(WARD\_ID),**

**CONSTRAINT cu\_fk2 FOREIGN KEY(Head\_Nurse) REFERENCES RegNurse(RNURSE\_ID)**

**);**

Each careunit has its own code and its uniquely identifies all record from this table. As 1 ward has many careunits . ward id works as foreign key in this table and name of care should not be null means not null constraint is applied. Each care unit has head nurse that is register nurse so register nurse id works as foreign key in ths table.

1. *Bed*

**CREATE TABLE BED**

**(**

**BedNo int not null,**

**bedtype varchar(30),**

**sizeOfBed varchar(15),**

**CU\_Code char(8),**

**Ward\_No char(5),**

**constraint bd\_pk PRIMARY KEY(BedNo),**

**CONSTRAINT bd\_fk1 FOREIGN KEY(CU\_Code) REFERENCES CAREUNIT(cu\_code),**

**CONSTRAINT bd\_fk12 FOREIGN KEY(Ward\_No) REFERENCES Ward(Ward\_ID)**

**);**

Each bed has its unique number and also its type and size. Bed no is primary key cause in whole hospital all beds have their own unique number. Bed belongs ward and many beds belong to care unit that have ben assign to admit patient.

So ward id and care unit code works as foreign key in this table.bed no should not be null. Not null constraint is applied on table bed no.

1. *Team*

**CREATE TABLE TEAM**

**(**

**Team\_Code char(8),**

**Name varchar(30) unique,**

**Const\_ID char(8),**

**constraint tm\_pk PRIMARY KEY(Team\_code),**

**CONSTRAINT tm\_fk1 FOREIGN KEY(Const\_ID) REFERENCES Consultant(Const\_ID)**

**);**

Each consultant has team of doctor. And each consultant has 1 team. So team number is primary key of team table and also const id who head the team. On the other hand const id works as foreign key in this table cause consultant has team so due to total participation it came in this table. Each team has unique name and unique constraint is applied on team name.

1. *Junior Doctor*

**CREATE Table JuniorDR**

**(**

**Doc\_ID char(8),**

**Name varchar(35) not null,**

**ADDRESS varchar(60),**

**Salary Number(8,2),**

**Phone varchar(15) unique,**

**Positon varchar(20) not null,**

**DOB varchar(25) Not NUll,**

**constraint jd\_pk1 PRIMARY KEY (Doc\_ID)**

**);**

Id is primary key that uniquely identifies its each tuple. Each doctor has name should not be null. Phone of each doctor should be unique means unique constraint is applied on phone. Dob should not be null and not null constraint is applied on name, position.

1. *Nurse previous History*

**CREATE Table NursePreHistory**

**(**

**Ser\_NPH number(10),**

**Nurse\_ID char(8),**

**JoinDate date not Null,**

**CU\_Code char(8),**

**Ward\_id char(5),**

**constraint NPH PRIMARY KEY (Ser\_NPH,Nurse\_ID,CU­\_Code),**

**constraint NPH\_Fk1 FOREIGN KEY (CU\_CODE)**

**references CAREUNIT(CU\_CODE)**

**constraint NPH\_Fk12 FOREIGN KEY (Nurse\_ID)**

**references NURSE(Nurse\_ID)**

**);**

This table hold the record of nurse wether reg or non reg nurse. Its hold in which ward current nurse works and its previous ward. Ward id came from ward and works as foreign key in this table. On the other hand cu id works as foreign key in this table and refers to careunit. Serial no refers to auto increment number to hold all records.

1. *Care unit Admit*

**CREATE TABLE CU\_Admit**

**(**

**Ser\_CU number(10),**

**pat\_id char(8),**

**Cu\_code char(8),**

**admit\_date date not Null,**

**bedNo int,**

**constraint CuA\_pk PRIMARY KEY(Ser\_CU,pat\_id,CU\_CODE),**

**CONSTRAINT CuA\_fk1 FOREIGN KEY(pat\_id) REFERENCES PATIENT(pat\_id),**

**CONSTRAINT CuA\_fk2 FOREIGN KEY(Cu\_code) REFERENCES CAREUNIT(Cu\_code),**

**CONSTRAINT CuA\_fk4 FOREIGN KEY(BedNo) REFERENCES BED(bedNo)**

**);**

This table hold record of patient admission in which care unit patient has been admitted. Careunit code works as foreign key in this table. Bed no specifies that on which bed patient had been admitted. Serial no is auto increment no to hold duplicate records. Patient id woks as foreign key in this table. Not null constraint is applied on admit date.

1. *Patient Inchagre*

**CREATE Table Pataint\_Incharge**

**(**

**Ser\_PatINC number(10),**

**pat\_Id char(8),**

**Doc\_ID char(8),**

**Inc\_Date Date not Null,**

**constraint pi\_pk1 PRIMARY KEY (pat\_Id,Ser\_PatINC,Doc\_ID),**

**constraint pi\_fk1 FOREIGN KEY (pat\_id)**

**references Patient(pat\_id),**

**constraint pi\_fk2 FOREIGN KEY (Doc\_id)**

**references juniorDr(Doc\_id)**

**);**

This tables holds the record of patient that which patient had which in charge doctor.

Patient I came as foreign key from table patient. On the other hand doctor id camas form juniordr and works as foreign key in this table.

1. *Medical History*

**CREATE Table Medical\_Histroy**

**(**

**Serial\_no number(10),**

**pat\_Id char(8),**

**Doc\_ID char(8),**

**TRT\_Code char(5),**

**Com\_Code number(5),**

**Start\_Date Date not Null,**

**End\_Date Date not Null,**

**constraint pi\_pk15 PRIMARY KEY (Serial\_no,pat\_Id,Doc\_ID,Com\_Code,TRT\_Code),**

**constraint pi\_fk15 FOREIGN KEY (pat\_id)**

**references Patient(pat\_id),**

**constraint pi\_fk25 FOREIGN KEY (Doc\_id)**

**references juniorDr(Doc\_id),**

**constraint pi\_fk254 FOREIGN KEY (Com\_code)**

**references complaint(COm\_code),**

**constraint pi\_fk255 FOREIGN KEY (trt\_code)**

**references Treatment(TRT\_Code)**

**);**

This table hold the data of each patient treatment cross ponding to complaints. And a treatment # also which is surrogate key. Along with this doc id who perform treatment and treat code and complain code are composite primary key. Extra attributes are start date and end date. Doc id works as foreign key in this table and treatment code also and complain code also.

1. *Doctor Team*

**CREATE TABLE DOCTEAM\_REC**

**(**

**Team\_Code char(8),**

**Doc\_ID char(8),**

**joinDate date,**

**endDate date,**

**constraint DTREC\_pk PRIMARY KEY(Team\_code,Doc\_ID),**

**CONSTRAINT DTREC\_fk1 FOREIGN KEY(Team\_Code) REFERENCES TEAM(Team\_Code),**

**CONSTRAINT DTREC\_fk2 FOREIGN KEY(Doc\_ID) REFERENCES JuniorDR(Doc\_ID)**

**);**

This table hold record that which doctor belongs to which team and doctor may belong to more then team at different times. Doctor id works as foreign key and composite primary key in this table. And team code also.

1. *Performance*

**CREATE TABLE PERFORMANCE**

**(**

**SerPerf\_NO number(10),**

**Doc\_ID char(8),**

**Team\_Code char(8),**

**DATE\_GRADE varchar(3),**

**perf\_description varchar(60),**

**fromDate date,**

**toDate date,**

**estab varchar(60),**

**newPosition varchar(30),**

**constraint perf\_pk PRIMARY KEY(SerPerf\_No,Doc\_ID,Team\_code),**

**CONSTRAINT perf\_fk1 FOREIGN KEY(Doc\_ID) REFERENCES JuniorDR(Doc\_ID),**

**CONSTRAINT perf\_fk2 FOREIGN KEY(Team\_Code) REFERENCES TEAM(Team\_Code)**

**);**

This table hold the record of performance history of doctor that a consultant assign to them. doc id woks as foreign key in this table and also primary key on the other hand team code is also foreign key and primary key also. Performance # is surrogate key which is also primary key in this table.

**Assumptions:**

* Nurses works only in care units for caring the patients.
* Patients can also enter into wards without any treatment.
* For caring of patients in ward each ward has a day and night sister.
* Set of Treatments are predefined.
* A Doctor can also change team of one consultant.
* Nurses can also change their shifts.
* Sisters can switch from one ward to another ward.
* Patient can also admit again into same or different ward.
* Patient can also admit again into same or different care unit.
* Bed is Assign to Admit Patient.
* Ward and care units both have beds.
* A consultant can have only one specialty.