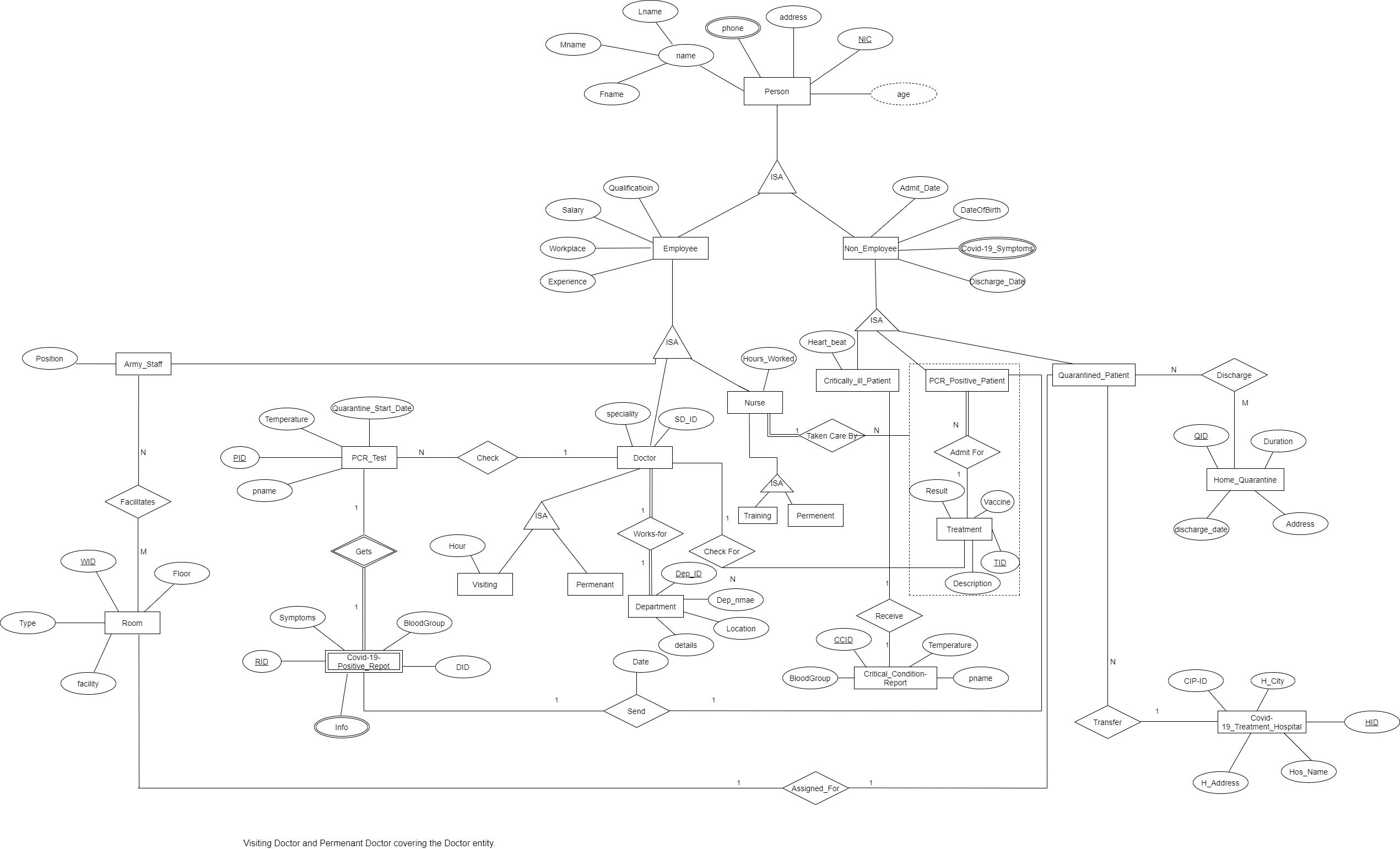
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Dewmini P.W.K

**Information System for Covid-19 Quarantine Centers**

**(1)**

* A person has a NIC (unique), age, name, phone and an address. Name can be divided in to Fname, Mname and Lname.
* One person can have many phone numbers.
* Age is derived from date of birth and current date. Address can be divided into country, city and village.
* An employee is a person with the following attributes: Qualification, experience, salary and workplace.
* Doctor, Army Staff and Nurse are not only employees but also persons.
* Doctor has attributes named speciality and SD\_ID. Visiting doctor overlaps permanent doctor and visiting doctor has one attribute named Hour.
* Army Staff also has an attribute “position” and Nurse has an attribute “Hours-worked”.
* Non-Employees are also persons with following attributes: Admit-date, DateOfBirth, Covid-19\_Symptoms and Discharge date.
* There can be multiple covid-19 symptoms in one Non-Employee.
* Non-Employees are also persons and can be divided into three categories. They are Critically\_ill\_Patients, PCR\_Positive\_Patients and Quarantined Patients.
* Critically patients have an attribute Heart\_beat.
* Doctor checks PCR Tests.
* The PCR Test has following attributes: PID, quarantine\_start\_date, pname and Temperature. Each test is done by one doctor for many patients.
* If PCR Test result become it gets covid-19 Positive Report.
* It will send to the PCR Test positive patients.
* One PCR Test can be gets one covid-19 Positive Report and Covid-19 Positive Report has following attributes: BloodGroup, Info symptoms, DID and RID (unique).
* There can be multiple information in one covid-19 Positive\_Report of a PCR\_Test\_Positive\_Patient.
* Covid-19 Positive Report is depend on PCR Test (weak entity). Covid-19 positive report can’t exist on its own.
* One Covid-19 Positive Report sent to a one PCR Test Positive Patient and system recorded the date that sent the Covid-19 Positive Report.
* And also doctors must check PCR Test Positive Patients for the treatments. Treatment entity has following attributes: Description, Result, Vaccine and PID (unique).
* One doctor is checking for PCR positive patients for many treatments.
* PCR positive patients must admit for the treatments and many patients admitted for one treatment.
* Doctors must work for one department. One doctor works for only one department.
* Department has Dep\_ID, Dep\_name, details and Location attributes.
* The Army\_Staff facilitates rooms. Rooms have Floor, WID (unique), Type and Facility attributes.
* Many army staff facilitate many rooms assigned for the quarantined patients.
* There are two types of nurses. They are training and permanent.
* When PCR positive patient admitted for treatments, they must take care by nurses. In There many patients are taken care by one nurse.
* When patients are in critical condition doctors check them and give a critical condition report. One critical ill patient can receive only one critical condition report.
* Critical condition report has following attributes: CCID (unique), BloodGroup, Temperature and pname.
* When critical condition report received to a patient, he will transfer to a covid-19 treatment Hospital. Covid-19 treatment Hospital has Hcity, HID (unique), Hospital\_name, Critically ill patient ID(CIP\_ID) and H\_Adress attributes.
* Many critical ill patients are transferred to one covid-19 treatment Hospital.
* When a patient’s PCR Test become positive, he will be known as PCR Test Positive patient. If test become positive the patient must admits for treatments. (Total participation)
* Many PCR Test Positive patients are admitted for one or many treatments.
* A quarantined patient not only a non-employee but also a person. He will quarantine in the quarantine center for 14 days.
* Even after the 14th day if he is not show any symptom of covid-19, he will discharge from the quarantine center for the Home\_quarantine.
* Home\_quarantine has Address, Duration, Pname, discharge\_date and QID (unique) attributes.
* Many quarantined patients discharge to many home quarantines.
* All the data will be recorded in the system in covid-19 quarantine center.

**(2)** 

**(3)**

Person Person.phone

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NIC | Fname | Mname | Lname | age | address |

|  |  |
| --- | --- |
| NIC | phone |

Employee

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| E\_NIC | Qualification | Experience | Salary | Workplace |

Non-Employee Non-Employee.Covid-19\_Symptoms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NE\_NIC | Discharge\_date | Admit\_date | DateOfBirth | Heartbeat | type |

|  |  |
| --- | --- |
| NE\_NIC | Covid-19\_Symptoms |

Nurse

|  |  |
| --- | --- |
| N\_NIC | Hours\_Worked |

Doctor

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| DOC\_NIC | Speciality | Hour | SD\_ID | Permanent | Visiting |

Army\_Staff

|  |  |
| --- | --- |
| AR\_NIC | position |

PCR\_Positive\_Patient

|  |  |  |  |
| --- | --- | --- | --- |
| P\_NIC | DOC\_NIC | TID | N\_NIC |

FOREIGN KEY (TID) REFERENCES Treatment(TID)

FOREIGN KEY (N\_NIC) REFERENCES Nurse(N\_NIC)

Critically\_ill\_Patient

|  |  |  |
| --- | --- | --- |
| C\_NIC | Heartbeat | HID |

FOREIGN KEY (HID) REFERENCES Covid-19\_Treatment\_Hospital(HID)

Quarantined\_Patient

|  |
| --- |
| Q\_NIC |

PCR\_Test

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PID | Quarantine\_start\_date | Temperature | pname | DOC\_NIC |

FOREIGN KEY (DOC\_NIC) REFERENCES Doctor(DOC\_NIC)

Covid\_19\_Positive\_Report Covid\_19\_Positive\_Report.Info

|  |  |
| --- | --- |
| RID | Info |

|  |  |  |  |
| --- | --- | --- | --- |
| RID | BloodGroup | Symptoms | DID |

Check

|  |  |
| --- | --- |
| DOC\_NIC | PID |

FOREIGN KEY (DOC\_NIC) REFERENCES Doctor(DOC\_NIC)

FOREIGN KEY (PID) REFERENCES PCR\_Test(PID)

Department

|  |  |  |  |
| --- | --- | --- | --- |
| Dep-ID | Dep\_name | details | Location |

Works-for

|  |  |
| --- | --- |
| Doc\_NIC | Dep\_ID |

FOREIGN KEY (DOC\_NIC) REFERENCES Doctor(DOC\_NIC)

FOREIGN KEY (Dep\_ID) REFERENCES Department(Dep\_ID)

Send

|  |  |  |
| --- | --- | --- |
| RID | P\_NIC | Date |

FOREIGN KEY (RID) REFERENCES Covid\_19\_Positive\_Report (RID)

FOREIGN KEY (P\_NIC) REFERENCES PCR\_Positive\_Patient(P\_NIC)

Critical\_Condition\_Report

|  |  |  |  |
| --- | --- | --- | --- |
| CCID | BloodGroup | pname | Temperature |

Receive

|  |  |
| --- | --- |
| C\_NIC | CCID |

FOREIGN KEY (C\_NIC) REFERENCES Critically\_ill\_Patient(C\_NIC)

FOREIGN KEY (CCID) REFERENCES Critical\_Condition\_Report(CCID)

Covid-19\_Treatment\_Hospital

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HID | H\_City | Hos\_Name | H\_Address | CIP\_ID |

Transfer

|  |  |
| --- | --- |
| C\_NIC | HID |

FOREIGN KEY (C\_NIC) REFERENCES Critically\_ill\_Patient(C\_NIC)

FOREIGN KEY (HID) REFERENCES Covid-19\_Treatment\_Hospital(HID)

Treatment

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TID | Vaccine | Result | Description | DOC\_NIC |

FOREIGN KEY (DOC\_NIC) REFERENCES Doctor(DOC\_NIC)

Checks-For

|  |  |
| --- | --- |
| DOC\_NIC | TID |

FOREIGN KEY (DOC\_NIC) REFERENCES Doctor(DOC\_NIC)

FOREIGN KEY (TID) REFERENCES Treatment(TID)

Admit-For

|  |  |
| --- | --- |
| P\_NIC | TID |

FOREIGN KEY (P\_NIC) REFERENCES PCR\_Positive\_Patient (P\_NIC)

FOREIGN KEY (TID) REFERENCES Treatment(TID)

Room

|  |  |  |  |
| --- | --- | --- | --- |
| WID | Type | Floor | Facility |

Facilitate

|  |  |
| --- | --- |
| Ar\_NIC | WID |

FOREIGN KEY (Ar\_NIC) REFERENCES Army\_Staff(Ar\_NIC)

FOREIGN KEY (WID) REFERENCES Room(WID)

Home\_Quarantine

|  |  |  |  |
| --- | --- | --- | --- |
| QID | Address | Duration | discharge\_date |

Discharge

|  |  |
| --- | --- |
| Q\_NIC | QID |

FOREIGN KEY (Q\_NIC) REFERENCES Quarantined\_Patient(Q\_NIC)

FOREIGN KEY (QID) REFERENCES Home\_Quarantine (QID)

Assigned

|  |  |
| --- | --- |
| Q\_NIC | WID |

FOREIGN KEY (Q\_NIC) REFERENCES Quarantined\_Patient(Q\_NIC)

FOREIGN KEY (WID) REFERENCES Room(WID)

c) Justification of ISA hierarchy mapping

* Option 4 is used to map Doctor and its sub-entities. A doctor who is not a visiting or a permanent (partial). Primary key of Doctor (superclass) becomes primary key of the relation. And also this has overlapping constraint. So, the best option to map this ISA hierarchy is option 4.
* Option 3 is used to map Non-Employee and its sub entities. It’s created a single relation including attributes of the Non-Employee (super class) as well as attributes of all sub classes. (Critically ill patient, PCR Positive Patient, Quarantined patient). And also these sub classes have few attributes and the relationship is disjoint. So the best option to map this ISA hierarchy is option 3.
* Option 2 is used to map Nurse and its sub entities. Permanent nurse entity has specific different relationship with PCR\_Positive\_Patient. So, the best option to map this ISA hierarchy is option 2.

**4) QUERIES**

a) Query 1:

1. Write a query to find Treatment ID and PCR TEST Count of each is done where the Doctor NIC is start in letter “M” and PCR TEST count is greater than 15.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| DOC\_NIC | Speciality | Hour | SD\_ID | Permanent | Visiting |

Doctor

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TID | Vaccine | Result | Discription | DOC\_NIC |

Treatment

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PID | Quarantine\_Start\_Date | Temperature | Pname | DOC\_NIC |

PCR\_TEST

SELECT t.TID, Count (p.PID) AS ‘PCR Test Count’

FROM Doctor d, Treatment t, PCR\_Test P

Where d.name LIKE (‘%M’) AND t.TID=d.SD\_ID AND p.PID=d.DOC\_NIC

Group By p.PID

Having COUNT (p.PID)>15.

1. Find the IDS of PCR Test and count of the covid-19 positive reports checks by the doctor (DOC\_NIC=100520100V) which marked the the Temperature is above 38 0C

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| DOC\_NIC | Speciality | Hours | SD\_ID | Permanent | Visiting |

Doctor

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PID | Quarantine\_Start\_Date | Temperature | pname | DOC\_NIC |

PCR\_Test

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RID | BloodGroup | Symptoms | DID | Body\_Heat | Info |

Covid-19\_Positive\_Report

SELECT P.PID, Count (r.RID)

FROM PCR\_TEST p

JOIN PCR\_TEST p ON P.PID=r.RID

JOIN Covid-19\_Positive\_Report r ON r. Body\_Heat=p.Temperature

JOIN Doctor d ON d.DOC\_NIC=r.DID

Where d.DOC\_NIC= ‘100520100V’

Group by r.RID

Having p. Temperature >38

b) Query 2: Write a query to find the NIC and patient name in critically ill patient who was transferred to “IDH Hospital”

|  |  |  |
| --- | --- | --- |
| C\_NIC | Heartbeat | HID |

Criticallly\_ ill\_ patient

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HID | H\_City | Hos\_Name | H\_Adress | CIP\_ID |

Covid-19\_Treatment\_Hospital

SELECT c.name, c.C\_NIC

FROM Critically\_ill\_Patient c, Covid-19 \_Treatment\_Hospital h

Where c.C\_NIC=h.CIP\_ID AND c.HID IN

(SELECT h.HID

FROM Covid-19 \_Treatment\_Hospital

WHERE h.HOS\_name= ‘IDH’)

**5) Procedure**

Create a procedure that give output specialist doctor name and salary in given department.

CREATE PROCEDIURE ds\_getnameSalary (@Dep\_ID char(7), @name varchar(20) output, @salary real output)

AS

begin

Select @name=d.name, @salary= d.salary

From Doctor d, Department e

Where d.SD-ID =e.Dep\_ID and d.Dep\_ID=@Dep\_ID

End

**6)Trigger**

Create a trigger to ensure that one doctor doesn’t works in more than 1 department.

CREATE TRIGGER CheckNumDepts

ON works\_for

FOR INSERT,UPDATE

AS

Begin

declare @SD\_ID int

declare @total int

select @SD\_ID=SD\_ID

from inserted

select@total=count(\*)

from works\_for

where SD\_ID=@SD-ID

if @total>1

begin

print’Cannot work in more than 1 department’

rollback transaction

end

end