INDIAN INSTITUTE OF ENGINEERING SCIENCE AND TECHNOLOGY, SHIBPUR

B. TECH 5th SEMESTER MID-TERM EXAMINATION, OCTOBER 2021

DATABASE MANAGEMENT SYSTEMS [CS 3102]

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Q1) given

Students (roll no : integer , sname : string)

Courses (course no : integer , cname : string)

Registration (roll no. : integer , courseno : integer , percent : real) → (rollno, course no) primary key

→ Find distinct names of all students who score more than 90% in course no. 107

a) Relational Algebra

$$\Pi_{sname}\left[\sigma_{courseno=107 \wedge percent>90}\left(Registration \bowtie Students\right)\right]$$

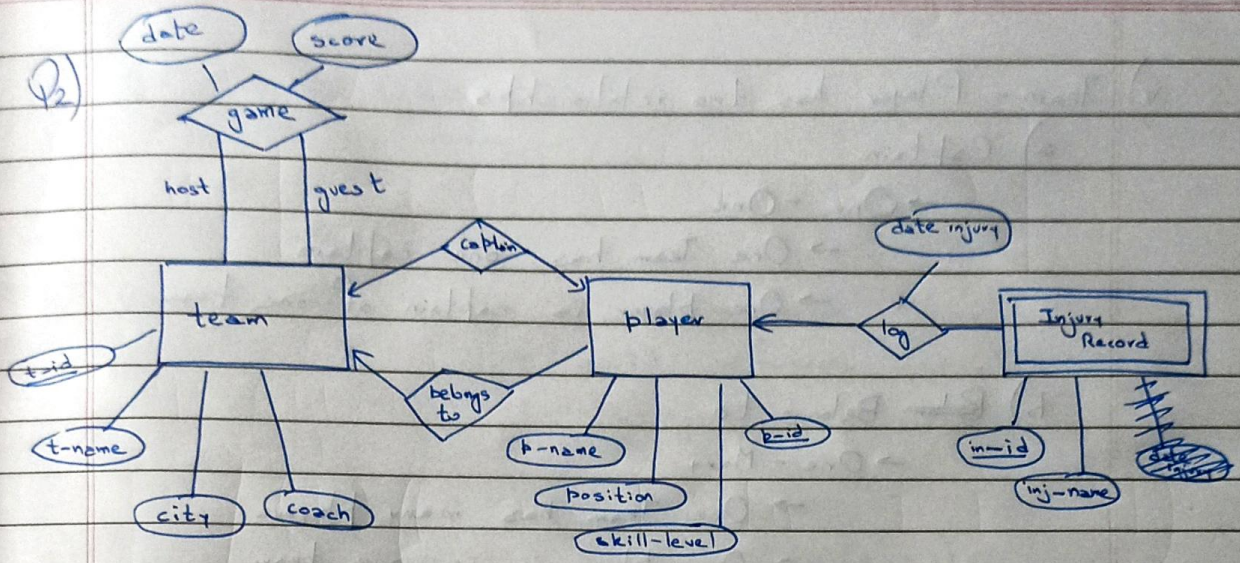
b) Tuple Relational Calculus

$$\left\{ t \mid (\exists s)\left([s \in Students] \wedge [t[sname] = s[sname]]\right) \wedge (\exists r)\left([r \in Registrations] \wedge [s[rollno] = r[roll\ no]] \wedge [r[courseno] = 107] \wedge [r[percent] > 90]\right) \right\}$$

c) SQL

```
SELECT DISTINCT S.sname
FROM
        Students as S,
        Registration as R
WHERE
        S.rollno = R.roll no
    AND R.courseno = 107
    AND R.percent > 90 ;
```

Q2)



Assumption

i) added ~~inj~~ in-id & inj-name in Injury Record to add key & description to the Entity

ii) Added p-id in player & t-id in team for key

iii) Made Injury Record Weak Entity, as it also needs ~~p-name~~ p-id ~~also~~ to determine which player has what Injury

iii) team has a self relationship ~~with~~ game as ~~it uses~~ a game has two Teams, host & guest team

iv) Player - Injury Record Relationship is one-many as
   a) one player can have multiple Injury
   b) one injury record can be linked with one player only

v) Team - Player ~~has~~ two Relationship
   a) ~~Captian~~ Captain → One-One → one team has one captain
      one player captain of one team
   b) Belongs to → One-many

v) Team - Player has two relationships

a) Captain

→ One - One

→ One Team has one captain

→ One player is captain of one team

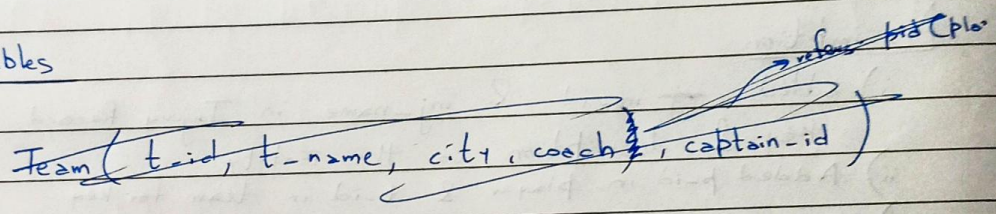
b) ~~Blon~~ Belongs to

→ One - Many

→ One Team has many players

→ One player is in one team

Tables



Team (t_id, t_name, city, coach, captain_id)

1) Team → t_id primary key
- → t_name
- → city
- → coach
- → captain_id references ~~tbl~~ Player (p_id)

2) Player → p_id primary key
- → p_name
- → position
- → skill_level
- → belongs_to references ~~tbl~~ Team (t_id)

3) Injury_Record → in_id primary key
→ inj_name

4) ~~Belongs~~ → log → p_id references Player (p_id)
→ in_id references Injury_Record (in_id)
→ date_injury

5) Game → host_id references Team (t_id)
→ guest_id references Team (t_id)
→ date
→ score