Ex.No 24

Database Design using ER modeling, normalization and Implementation for any application

Aim:

To design a database using ER modeling and Normalization for student portal and sports meet Application

Problem Statement: ER Diagram

- A College is conducting a sports meet.
- Teams from recognized colleges are allowed.
- A team should have the players of same college.
- A player can play for more than one team.
- Events occurs in various grounds in the college.
- Winning teams receive awards.
- A captain is a player of a team.
- A player is a student of a college.
- Many teams can play a game.
- A game takes place in a ground.
- A college can have many teams.
- Only first two teams are awarded.

IDENTIFICATION OF ENTITY:

- ✔ COLLEGE
- ✔ PLAYERS
- ✔ TEAMS
- ✔ GAMES
- ✔ GROUND
- ✔ AWARDS

DESCRIPTION ABOUT ENTITY:

ENTITYNAME	TYPE	NOTATION
COLLEGE	Strong	
PLAYERS	Strong	
TEAMS	Strong	
GAMES	Strong	
GROUND	Strong	
AWARDS	Weak	

ATTRIBUTES:

- ✔ COLLEGE – CID, Name, Address line1, Address line2
- ✔ PLAYERS – FN, LN, POS, DOB, GENDER, PID
- ✔ TEAM - TID, Name, NOP, Rank, Team
- ✔ GAMES - GID, Name
- ✔ GROUND - ID, Name, Area
- ✔ AWARDS – Name, Position, Prize, Team

DESCRIPTION ABOUT ATTRIBUTES:

COLLEGE

ATTRIBUTE NAME	TYPE	NOTATION
CID	Single	
Name	Single	
Address line 1	Composite	
Address line2	Composite	

PLAYERS

ATTRIBUTE NAME	TYPE	NOTATION
PID	Single	
FN	Single	
LN	Single	
Position	Single	
Age	Derived	
Gender	single	

AWARDS

ATTRIBUTE NAME	TYPE	NOTATION
Name	Single	
Position	Single	
Prize	Single	
Team	Single	

GROUND

ATTRIBUTE NAME	TYPE	NOTATION
ID	Single	
Name	Single	
Area	single	

TEAMS

ATTRIBUTE NAME	TYPE	NOTATION
TID	Single	
Name	Single	
Team	Single	
No.of players	Single	
Ranking	Single	

GAME

S ATTRIBUTE NAME	TYPE	NOTATION
GID	Single	
Name	Single	

RELATIONSHIP:

BINARY:

- Plays
- Has
- Student of
- Receives
- Takes place

ATTRIBUTES IN THE RELATIONSHIP:

- ✔ Student of – CID, PID
- ✔ Has – TID, CID
- ✔ Plays – TID, GID
- ✔ Takes place – GID, ID
- ✔ Receives – TID, Position

CARDINALITY AND RELATIONSHIP:

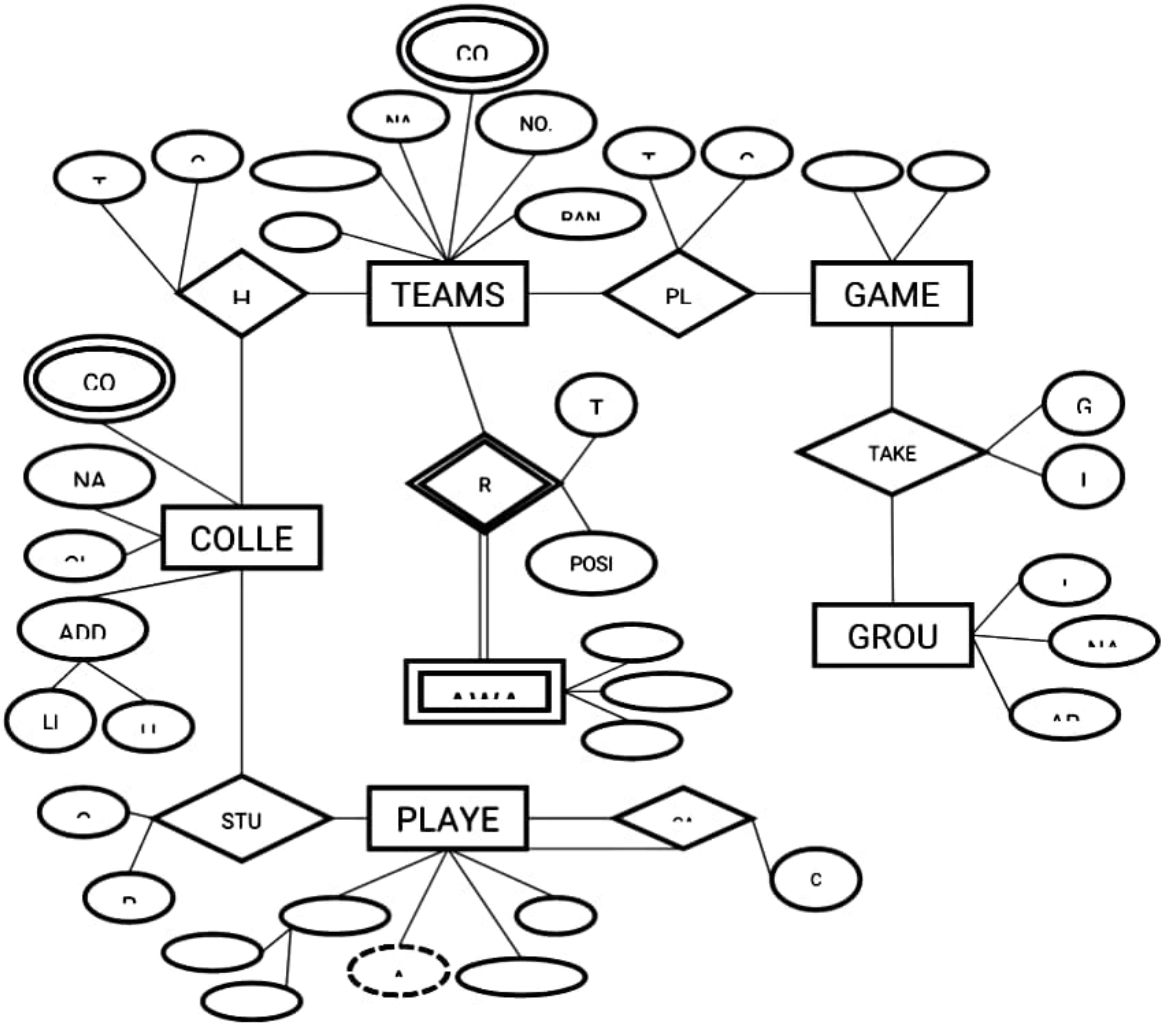
- ➤ ONE TO ONE:Plays, Takes place
- ➤ MANY TO ONE:Student of
- ➤ ONE TO MANY:has

CARDINALITY ABOUT RELATIONSHIP:

- ✔ PLAYERS STUDENT OF COLLEGE.

- ✔ MANY TEAMS PLAY A GAME.
- ✔ A GAME TAKES PLACE IN A GROUND.
- ✔ A COLLEGE HAS MANY TEAMS.

ER DIAGRAM:



Problem Statement: Normalization

Createacollegedatabasethatcontainsstudentid,studentname,studentcity,dateofbirth,course id, course name, duration of the course, marks and grade and their relationships. The requirements are listedbelow:

- A college can offer one or morecourses.

- A student can enroll in one or morecourses.
- Courses can be taken by one or morestudents.
- A student can have student_id, student_name, date _of _birth andstudent_city.
- A student belongs to onecity.
- A city can have one or morestudents.
- A course can have course_id, course_name andduration.
- When a student finishes the course, a grade and marks areawarded.
- Grades are calculated based on themarks

Below 45 – U, 45-50 – E, 50-60– D, 60-70 – C, 70-80 – B, 80-90 – A, 90-100 –S

STUDENT ID	STUDENT NAME	STUDENT CITY	DOB	COURSE ID	COURSE NAME	DURATION	MARKS	GRADE

FIRST NORMAL FORM

A relation is said to be in first normal form if and only if

*All the attributes in the relation must be atomic in nature.

*No multivalued and composite attributes in the table

In a given table there is no multivalued and composite attributes, so it is satisfying normal form1

SECOND NORMAL FORM

A relation is said to be in second normal form if and only if
*It is in the first normal form and
***No partial dependencies** exist between non-key attributes and key attributes.

From Requirements: (studentid, courseid is Composite Primarykey)

studentid,courseid → studentname
studentid,courseid → studentcity
studentid,courseid → dob PartialFunctional dependencies.
→
→
→

studentid,**courseid** coursename
studentid,**courseid** duration
studentid,courseid marks
studentid,coursed grade Full Functionaldependencies

After removing partial functional dependencies from above table

STUDENT

STUDENTID	STUDENTNAME	STUDENTCITY	DOB

COURSE

COURSEID	COURSENAME	DURATION

RESULT

STUDENTID	COURSEID	MARKS	GRADE

THIRD NORMAL FORM

A relation is said to be in the third normal form if and only if

*it is in Second Normal Form

***No transitive dependency** exists between non-key attributes and key attribute

studentid,coursed → marks

marks → grade Transitivedependency

studentid,courseid grade

After removing transitive dependency from above table

STUDENT

STUDENTID	STUDENTNAME	STUDENTCITY	DOB

COURSE

COURSEID	COURSENAME	DURATION

MARKS

MARKID	RANGE 1	RANGE 2

RESULT

STUDENTID	COURSEID	MARKID

Result:

Thus the database is designed and normalized