RDBMS Assignment 1

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M.Sc. in Data Science

Date : 28.02.2021

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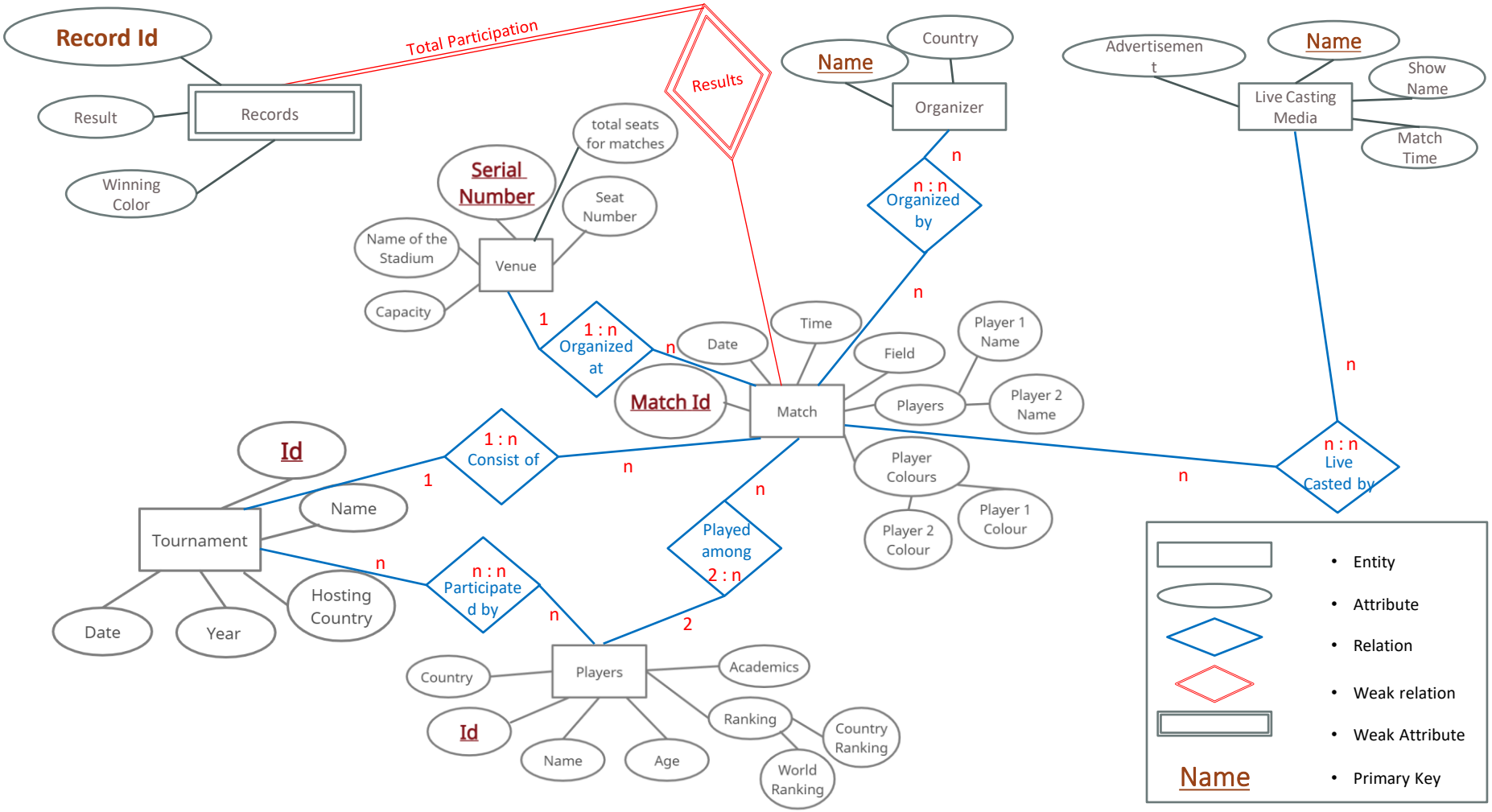
1. Draw an ER diagram to model a part of the chess tournaments domain. Your ER diagram should have at least 5 entities, 5 relationships and 10 attributes in total. Identify at least one weak entity. Enrich your diagram with mapping cardinalities. Explain your design choices in your ER model.



The diagram is Entity Relationship diagram of a chess tournament. So, some entities are chosen along with their several attributes.The entities are, **Players, Match, Tournament, Venue, Organizer and Live Casting Media**.There is one weak entity called, Records, which is totally dependent on the results of the Match. If there is no match, records will not be present. This weak entity is having **Full Participation** with the Match Entity. The attributes are easily identifiable from the diagram which is distinguished by the oval shapes.

The relationship among the entities are also shown. In this paragraph the relationships will be discussed in detail. Player entity is related to Match with the relation **Played among**. This is two to many relationship as two players can play more than one matches but more than two players cannot play a single match. Chess is not a group game.

Likely, a tournament can consist of several matches, but there may be some single matches which are not included in a tournament. Also, multiple tournament can't have same matches. That is why Tournament **Consist of** Matches is Many to one relationship. The Tournament entity is related to Players using **Participated by** relation, which is many to many relationship. Because more than one player can participate to more than one tournament. Likewise, **Organised by and Live Casted by** these 2 relations are many to many where **Organised at** relation is one to many.

We have also shown the Primary Key in the ER Diagram and highlighted them using underlined red font.

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2. Convert the ER diagram into a relational form. Draw the tables, and fill them with two sample records.

- **Players**(Id, Name, Country, Age, World Ranking, Country Ranking, Academics)

Id	Name	Country	Age	Ranking		Academics
				World Ranking	Country Ranking	
S11	V. Anand	India	51	16	3	Graduate
S12	A. Giri	Netherlands	26	11	1	Graduate

- **Match**(Match Id, Date, Time, Field, Player 1 Id, Player 2 Id, Player 1 Name, Player 2 Name, Player 1 Colour, Player 2 Colour)

Match Id	Date	Time	Field	Player Id		Player Name		Player Colour	
				Player 1	Player 2	Player 1	Player 2	Player 1	Player 2
M17	12.02.21	11:30	CC	S11	S12	V.Anand	A.Giri	Black	White
M20	20.02.21	17:45	JNH	S12	S11	A.Giri	V.Anand	White	Black

- **Tournament**(Id, Name, Hosting Country, Year, Date, Match Id)

Id	Name	Year	Hosting Country	Date	Match Id
CMM2021EN08	FIDE World Cup	2021	Russia	Feb 01 - Feb 10	M17
CMI2021IN05	Chess India	2021	India	Feb 15 - Feb 28	M20

- **Organizer**(Name, Country, Match Id)

Name	Country	Match Id
Tata Steel	India	M20
FIDE	Russia	M17

- **Live Casting Media**(Name,Advertisement, Show Name, Match Time, Match Id)

Name	Advertisement	Show Name	Match Time	Match Id
ESPN	Pepsico	Grand Master Challenge	11:30	M17
Ten Sports	Adidas	India GrandTour	17:45	M20

- **Venue**(Serial Number, Name of the Stadium, Capacity, Total Seats for Matches, Seat Number, Match Id)

Serial Number	Name of the Stadium	Capacity	Total Seats for Matches	Seat Number	Match Id
ES110	CC	1500	5	1	M17
ES220	JNH	5000	4	3	M20

- **Record**(Record Id, Result, Winning Color,Match Id)

Record Id	Result	Winning Color	Match Id
SL2021FEB001	1-0	Black	M17
SL2021FEB003	1-0	White	M20

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3. There is a **results** relation with attributes (playerID, tournamentID, gameID, color, result). Let us assume for the attribute result

- win = 1
- loose = -1
- draw = 0

and there will be at least one win for each player.

for the attribute color,

- white = 1
- black = 2

G is group by function.

(a) $H_1 \leftarrow \rho_{H_1(P,W)}({}_{playerID}\ G_{count(result)}\ (\sigma_{result\ =\ 1}(results)))$

$H_2 \leftarrow \rho_{H_2(M)}(G_{min(W)}\ (H_1))$

$\prod_P (H_1\ \bowtie_{W=M}\ H_2)$

(b) $H_1 \leftarrow \rho_{H_1(T,D)}(_{tournamentID}\ G_{count(result)}\ (\sigma_{result\ =\ 0}(results)))$

$H_2 \leftarrow \rho_{X_2(M)}(G_{max(D)}\ (H_1))$

$\prod_T (H_1\ \bowtie_{D=M}\ H_2)$

(c) $\pi_{gameID}(\sigma_{result\ =\ 1\ \vee\ result\ =\ -1}(results))$

(d) $\pi_{tournamentID\ ,\ gameID}\ (\sigma_{result\ =\ 1\ \wedge\ color\ =\ 1}(results))$
