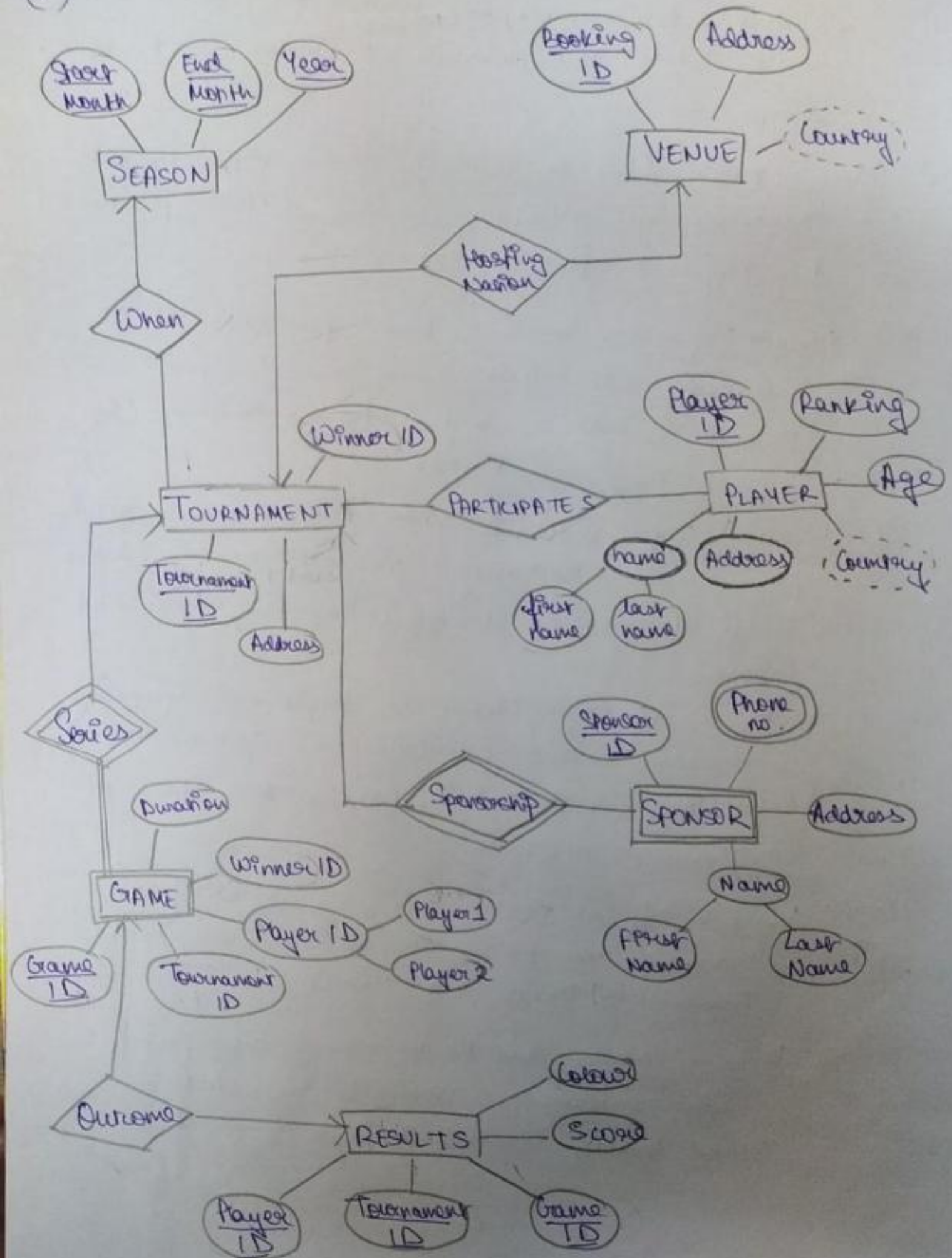


NAME: SUCHETA JHUNSHUNWALA

ROLL No.: MDS202151

(1)



Many players from 'PLAYER' can take part in multiple 'TOURNAMENTS' and give a many to many 'participates' relation. Any 'TOURNAMENT' has a specific 'venue' and the 'VENUE' is booked only for that tournament. Which gives a one to one relation. Also, a 'tournament' occurs at a particular time of the year which is recorded in seasons, but multiple tournaments can take place in the same season so a many to one relation.

Any 'tournament' has a series of 'games' so it is a many to one relation but the games exist iff the tournament takes place. Thus, 'game' is a weak entity. Now, each game has an outcome which is stored in the results entity & the outcome is unique to the game, this is a one to one relation.

There are many 'sponsors' who provide sponsorship for various tournaments. This is a many to many relation. But, the sponsors can provide funding only if the tournament is organised so 'sponsors' is a weak entity.

∴ We get 7 entities, 6 relationships and 25 attributes in our ER diagram.

(2) Relational Schema:

tournament (tournament ID, Address, WinnerID)
 season (year, start month, end month) tournament ID)
 venue (booking ID, Address, Tournament ID)
 player (player ID, Ranking, Age, Address, First Name, Last Name)
 Sponsor (sponsor ID, Tournament ID, Address, First Name, Last Name)
 Sponsor - Phone (Sponsor ID, Phone no.)
 Game (Game ID, Tournament ID, Player ID's, WinnerID, Duration)
 result (Game ID, Tournament ID, Player ID, Score, Labour)
 participates (tournament ID, Player ID)

SEASON

Year	Start Month	End Month	T-ID
2019	January	February	1567
2019	April	May	2341
2020	June	July	1478

VENUE

BookingID	Address	T-ID
112356	Hogwarts, England	1567
578221	Shel, Canada	1478
171131	Rohini, India	2341

TOURNAMENT

T-ID	Address	Winner ID
1567	Hogwarts, England	2
1478	Shel, Canada	15
2341	Rohini, India	4

PARTICIPATES

Player ID	Tournament ID
2	1567
3	1478
4	2341
15	1478
6	1567
3	2341

PLAYER

P-ID	Ranking	Age	Address	First Name	Last Name
2	962	23	Piver Drive, England	Harry	Potter
3	812	24	Burrow, UK	Ron	Weasley
4	1531	29	Hampstead, UK	Hermione	Granger
6	478	31	Kolkata, India	Luna	
15	1400	27	Chennai, India	Pooja	Patil

SPONSOR

S-ID	T-ID	Address	First Name	Last Name
1	1478	Mera, UK	Mark	Zuck
2	1567	Oracle, USA	Larry	Ellison
3	2341	Mumbai, India	Ratan	Tata

GAME

G-ID	T-ID	P1-ID	P2-ID	W-ID
1567-1	1567	2	6	2
1567-2	1567	3	2	2
1478-14	1478	15	3	15
2341-A	2341	4	6	4
2341-B	2341	4	3	4

SPONSOR PHONE

S-ID	Phone no.
1	(1152, 2212, 14315)
2	91235
3	(15678, 1112)

RESULTS

P-ID	G-ID	T-ID	Color	Score
2	1567-1	1567	Black	2
3	1478-14	1478	Black	0
4	2341-B	2341	White	2
6	1567-1	1567	White	0
15	1478-14	1478	Black	3

(3) The result attribute has 3 values, 0 for loss, 1 for win and 2 for draw. The color attribute has 2 values, 0 for black and 1 for white.

(a) Player who at least one win = $\Pi_{\text{playerID}} (\sigma_{\text{result}=1}(\text{results}))$

\therefore Player with no wins = $\Pi_{\text{playerID}}(\text{results}) - \Pi_{\text{playerID}} (\sigma_{\text{result}=1}(\text{results}))$

(b) The tournament with maximum wins shall have maximum number of 1's in the result column.

Sum of the result for each tournament = $\left\{ \begin{array}{l} \text{tournamentID} \\ \text{sum(result)} \end{array} \right\} (\text{results})$

Tournaments with max wins shall have this sum maximum.

\therefore Tournaments with maximum wins =

$\left\{ \begin{array}{l} \text{max(result)} \\ \text{tournamentID} \end{array} \right\} \left(\left\{ \begin{array}{l} \text{sum(result)} \\ \text{results} \end{array} \right\} \right)$

c) Games that were a draw = $\Pi_{\text{gameID}} (\sigma_{\text{result}=2}(\text{results}))$

\therefore Games that were not a draw = $\Pi_{\text{gameID}}(\text{results}) - \Pi_{\text{gameID}} (\sigma_{\text{result}=2}(\text{results}))$

d) Tournament ID and game ID where player with white piece won =

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