

INFORMATICS INSTITUTE OF TECHNOLOGY

UNIVERSITY OF WESTMINSTER

Database Systems

5COSC020C.1

Module Leader: Ragu Sivaraman

Coursework: Part A + Part B

Name	Henda Marakkala Tharindu Dilshan Madushanka
UoW Number	20522090
IIT Number	20232113
Group	CS G-16

Table of Contents

Coursework Part A: Conceptual EERD 3

 QUESTION 1: CRITICAL EVALUATION & REFLECTIVE COMMENTARY 3

 1.1 Critical Evaluation 3

 1.2. Reflective Commentary 4

 1.3 Screenshot of the questions provided..... 5

..... 5

..... 5

..... 5

..... 6

..... 6

QUESTION 2: ENTITIES 7

QUESTION 3: SPECIALISATIONS 8

QUESTION 4: RELATIONSHIPS & MULTIPLICITIES 9

QUESTION 5: ATTRIBUTES & PRIMARY KEYS 14

QUESTION 6: CONCEPTUAL EERD QUALITY & NOTATIONS 18

Coursework Part B: Logical ERD 19

Coursework Part A: Conceptual EERD

QUESTION 1: CRITICAL EVALUATION & REFLECTIVE COMMENTARY

1.1 Critical Evaluation

The initial EERD in Document A.2 had several critical semantic and structural flaws that rendered it unsuitable for meeting the project's requirements. Below are the key issues.

1. Limited Representation of Court-Specific Characteristics

- The original model treated courts generically without accounting for specific court types (e.g., tennis, pickleball, or dual-purpose). This omission prevented accurate differentiation in court usage, equipment management, and maintenance.

2. Poorly Defined Relationships

- The relationship between caretakers and parks/courts was overly simplistic. It failed to incorporate dynamic caretaker rotation or mechanisms for maintaining consistent quality standards across parks.

3. Omission of Important Attributes

- Essential attributes, such as maintenance logs, session categories, and equipment-specific details (e.g., fixed vs. movable), were missing or misplaced. This limited the model's ability to represent and manage real-world scenarios effectively.

4. Ambiguity in Multiplicity Constraints

- The cardinalities of key relationships (e.g., courts to equipment or players to sessions) were absent or unclear, leaving critical data relationships undefined and open to misinterpretation.

5. Inadequate Support for Session Types and Bookings

- The initial model failed to distinguish between supervised and unsupervised sessions or block versus single bookings, both of which are crucial for accurately representing Racketminster's operational requirements.

1.2. Reflective Commentary

The revised EERD addresses the shortcomings of the original model by implementing a structured and detailed design approach. Here are the key improvements and design choices made.

1. Entity Specialization

- Introduced specific entities for court types (Tennis, Pickleball) and specialized equipment (Fixed, Movable). This ensures clarity in resource allocation and enables detailed tracking of court characteristics and equipment.

2. Comprehensive Relationships and Multiplicities

Defined clear relationships with appropriate multiplicities, such as:

- A court can host multiple sessions but only one session at a specific time.
- A caretaker can manage multiple parks and courts while maintaining distinct maintenance records.
- Relationships like allocate (for equipment) and recommend (for players) were added to capture real-world interactions.

3. Detailed Attribute Assignment

- Added attributes such as Maintenance Status for equipment, Session Category for session types (e.g., group or personal), and Recommendation Details for tracking player referrals. This ensures each entity comprehensively represents its real-world counterpart.

4. Support for Dynamic Operations

- Integrated entities and relationships to handle caretaker rotation (Caretaker Assignment) and dynamic booking types (e.g., block or single bookings), allowing flexibility in management and reporting.

5. Scalable and Flexible Design

- Designed the EERD to accommodate future expansions, such as adding more session types or integrating additional player-related incentives. The use of hierarchies (e.g., Supervised and Unsupervised sessions) enables scalability without complicating the base structure.

By addressing the deficiencies in the original EERD and focusing on practical, real-world operations, the revised design delivers a robust conceptual model tailored to Racketminster's needs. This approach ensures the model is not only accurate but also adaptable for future requirements.

1.3 Screenshot of the questions provided



Tharindu Madushanka

3 hours ago, at 20:42

...

Name - Tharindu Madushanka

IIT No - 20232113

UoW No - w2052209

Q1. Does every Racketminster caretaker have to manage a maintain record on their own ?

[Reply](#)



Tharindu Madushanka

...

It's not necessary because each court has a separate maintain record. The caretaker who maintain the respective court can update that record.

[Reply](#) • 3 hours ago, at 20:45



Tharindu Madushanka

3 hours ago, at 20:51

...

Name - Tharindu Madushanka

IIT No - 20232113

UoW No - w2052209

Q2. Can the equipment related to one court be used in the other courts in same park?

[Reply](#)



Tharindu Madushanka

...

Each court has its own movable or fixed equipment. Because the quality of those equipment is maintained there is no need to use the movable equipment of one court for another court.

[Reply](#) • 3 hours ago, at 20:56



Tharindu Madushanka

3 hours ago, at 21:04

...

Name - Tharindu Madushanka

IIT No - 20232113

UoW No - w2052209

Q3. Can play both Tennis and Pickleball in the same court?

[Reply](#)



Tharindu Madushanka

...

Yes, there are courts both tennis and pickleball can be played.

[Reply](#) • 3 hours ago, at 21:05



Tharindu Madushanka

3 hours ago, at 21:07

...

Name - Tharindu Madushanka

IIT No - 20232113

UoW No - w2052209

Q4. How is the allocation of equipment managed for each court, especially for courts that support both tennis and pickleball?

[Reply](#)



Tharindu Madushanka

...

Equipment is assigned specifically to each court, which may include both tennis and pickleball items for dual purpose courts. Records need to be kept to ensure that each piece of equipment, whether fixed or movable, is correctly allocated and available for players based on the type of session.

[Reply](#) • 2 hours ago, at 21:20



Tharindu Madushanka

9 minutes ago, at 23:39

...

Name - Tharindu Madushanka

IIT No - 20232113

UoW No - w2052209

Q5. How are caretakers assigned to different parks and courts, and is there a system to rotate caretakers to maintain quality?

[Reply](#)



Tharindu Madushanka

...

Caretakers are allocated to specific parks and courts and also there are specific maintain record for each court and equipment would be helpful to ensure consistency in maintenance quality and avoid over-reliance on individual caretakers for specific areas.

[Reply](#) • a few seconds ago, at 23:48

QUESTION 2: ENTITIES

Entity Name	Brief Explanation
w2052209_Park	This General w2052209_Park entity describes all the parks contain in the small town called Ovestminster in UK.
w2052209_Court	This General w2052209_Court entity describe all the Courts contain in a dedicate park for racket sport.
w2052209_Caretacker	This General w2052209_Caretacker entity describes all Racketminster caretakers who are responsible for their preservation.
w2052209_Equipment	This General w2052209_Equipment entity describes all the movable or fixed equipment allocated to respective court
w2052209_Maintaince_Record	This General w2052209_Maintaince_Record entity describes all the maintenance records of each court and equipment
w2052209_Player	This General w2052209_Player entity represents all player who participate in racket-based sports
w2052209_Session	This General w2052209_Session entity describes all the sessions like Supervised and Unsupervised to run on specific court
w2052209_Instructor	This General w2052209_Instructor entity describes all Instructors who assign in to Supervised sessions.
w2052209_Booking	This General w2052209_Booking entity describes all the Booking sessions who book by a specific player. It can be either Block booking or Single booking.

QUESTION 3: SPECIALISATIONS

General Entity	Specialized Entity	Brief Explanation
w2052209_Court	w2052209_Tennis	Courts dedicated to tennis, used exclusively for tennis matches and sessions.
	w2052209_Pickleballo	Courts dedicated to pickleball, used exclusively for pickleball matches and sessions.
w2052209_Maintaince_Record	w2052209_Court_Record	Maintenance records specifically for courts to track upkeep and ensure courts are in proper condition.
	w2052209_Equipment_Record	Maintenance records specifically for equipment to ensure all items are well-maintained and functional.
w2052209_Equipment	w2052209_Fixed	Fixed equipment such as nets, which are permanently installed and allocated to specific courts.
	w2052209_Moveble	Movable equipment such as rackets and balls, which can be used across different courts as needed.
w2052209_Booking	w2052209_BlockBooking	Bookings that allow players to reserve multiple unsupervised sessions in advance, often with follow-up sessions.
	w2052209_SingleBooking	Standard bookings for individual sessions, allowing players to reserve a single session for their chosen activity.
w2052209_Session	w2052209_Supervised	Sessions supervised by qualified instructors, either for individual or group guidance.
	w2052209_Unsupervised	Sessions where players participate independently, without instructor oversight.
w2052209_Unsupervised	w2052209_Single	Unsupervised sessions for two players, typically organized for single player matches.
	w2052209_Double	Unsupervised sessions for four players, allowing for doubles matches.
w2052209_Supervised	w2052209_Personal	One-on-one supervised sessions with an instructor, allowing personalized guidance and training.

	w2052209_Group	Supervised group sessions where multiple players participate under the supervision of up to two instructors.
w2052209_Group	w2052209_Fitness	Group sessions focused on fitness, combining exercise and racket sports practice under instructor supervision.
	w2052209_GroupCoaching	Structured group coaching sessions aimed at improving skills at various levels under the guidance of an instructor.
	w2052209_SocialFun	Relaxed, social group sessions for players to socialize and enjoy playing sports, with an instructor providing oversight.

QUESTION 4: RELATIONSHIPS & MULTIPLICITIES

Entity Name	Multiplicity	Relationship	Multiplicity	Entity Name	Brief justifications for the multiplicity
w2052209_Park	1..1	contain	1..*	w2052209_Court	Each park must contain at least one court for players
					A park can contain multiple courts for different racket sports
					A court cannot exist without being part of a park
					One specific court can be only that one park

w2052209_Court	1..1	allocate	1..*	w2052209_Equipment	Each court is allocated equipment necessary for racket sports
					A court may have multiple equipment items, like nets and balls
					Equipment is designated to a specific court to ensure availability and maintenance
					Courts must have at least one piece of equipment allocated to them
w2052209_Court	0..1	maintain	1..*	w2052209_Caretacker	Courts are maintained by caretakers assigned specifically to them.
					A court can be without a caretaker, but typically at least one caretaker is responsible for its upkeep
					Multiple caretakers may be involved to handle different aspects of court maintenance
w2052209_Caretacker	1..*	maintain	0..*	w2052209_Equipment	Caretakers are dedicated to ensuring courts are playable and safe
					Caretakers are responsible for maintaining all assigned equipment
					Each piece of equipment may have one or more caretakers responsible for its condition

					<p>Some equipment might not need immediate maintenance, hence the 0 multiplicity</p> <p>Maintenance involves regular checks, repairs, and replacement if necessary</p>
w2052209_Caretacker	1..1	manage	0..*	w2052209_Maintaince_Record	Each maintenance record is managed by a caretaker for tracking purposes
					There can be multiple records managed by a caretaker, based on maintenance needs.
					A record might not always exist if no maintenance is required at that time
					Records ensure accountability and proper upkeep of equipment and courts
w2052209_Session	0..1	book	1..1	w2052209_Court	Each session is held on a specific court booked for that purpose
					A court must be booked for a session to occur
					Sessions may sometimes not be booked, allowing flexibility in court use
					Booked courts allow players to have dedicated time for their activities

w2052209_Booking	1..1	book	1..1	w2052209_Session	Each booking is tied to a specific session
					Both booking and session must exist for players to attend
					Bookings ensure organization and that sessions are scheduled appropriately
					Players must book to reserve their spot in a session
w2052209_Player	1..*	recommend	0..*	w2052209_Player	A player may not recommend another player
					A player can recommend many players
					One player is no player May not be recommended
					One player can be recommended by many players
w2052209_Player	1..*	book	0..*	w2052209_Booking	A player can be without make a booking
					A player can have multiple bookings based on their preferences
					A booking must have at least one player
					A booking can have multiple players
					A Block booking must have a one Unsupervised session

w2052209_BlockBooking	0..1	book	1..1	w2052209_Unsupervised	In specific time duration a block booking has only one Unsupervised session
					Unsupervised session can be without making a booking
w2052209_Instructor	1..2	coach	0..*	w2052209_Supervised	Each supervised session must guide by at least one instructor
					Each supervised session can have maximum two instructors
					Instructor can exist without any Supervised sessions
					Instructor can have many Supervised sessions

QUESTION 5: ATTRIBUTES & PRIMARY KEYS

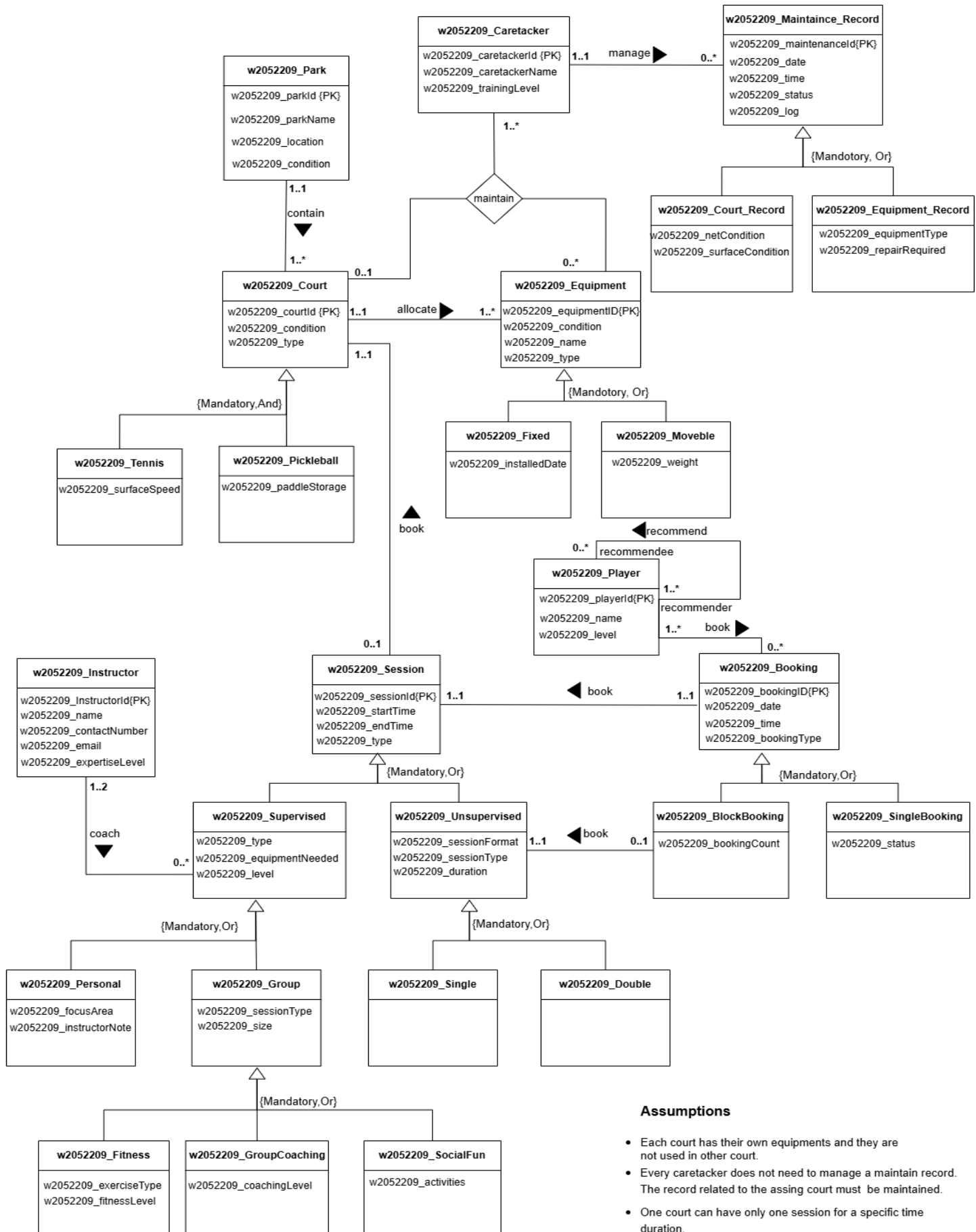
Entity Name	Attributes for each entity (include PK)	Brief explanation
w2052209_Park	w2052209_parkId {PK}	Unique identifier for each park in Ovestminster.
	w2052209_parkName	Name of the park (e.g., Green Park, Riverside Park).
	w2052209_location	Physical location of the park, including address or description.
	w2052209_condition	Current state or quality of the park (e.g., excellent, good, fair).
w2052209_Caretaker	w2052209_caretakerId {PK}	Unique identifier for each caretaker responsible for park maintenance.
	w2052209_caretakerName	Name of the caretaker.
	w2052209_trainingLevel	Level of training the caretaker has received (e.g., basic, advanced)
w2052209_Maintaince_Record	w2052209_maintenanceId {PK}	Unique identifier for each maintenance record associated with parks or courts.
	w2052209_date	Date when the maintenance was conducted
	w2052209_time	Time of day the maintenance took place
	w2052209_status	Status of the maintenance (e.g., completed, in-progress)
	w2052209_log	Detailed notes or log about the maintenance performed
w2052209_Court_Record	w2052209_netCondition	Current condition of the net on the court
	w2052209_surfaceCondition	Description of the court's surface condition
w2052209_Equipment_Record	w2052209_equipmentType	Type of equipment associated with a court (e.g., rackets, balls)
	w2052209_repairRequired	Indicates if repair is needed for the equipment (yes/no)

w2052209_Court	w2052209_courtId {PK}	Unique identifier for each court
	w2052209_condition	Overall condition of the court (e.g., playable, under repair)
	w2052209_type	Specifies the type of court (e.g., tennis, pickleball, multi-purpose)
w2052209_Tennis	w2052209_surfaceSpeed	Speed rating of the court surface, affecting tennis play
w2052209_Pickleball	w2052209_paddleStorage	Availability of storage specifically for pickleball paddles
w2052209_Equipment	w2052209_equipmentID {PK}	Unique identifier for each piece of equipment
	w2052209_condition	Current condition of the equipment (e.g., good, needs repair)
	w2052209_name	Name or label of the equipment (e.g., tennis racket, net)
	w2052209_type	Specifies whether the equipment is fixed or movable
w2052209_Fixed	w2052209_installedDate	Date when the fixed equipment was installed
w2052209_Moveble	w2052209_weight	Weight of the movable equipment, important for portability
w2052209_Player	w2052209_playerId {PK}	Unique identifier for each player registered in the scheme
	w2052209_name	Name of the player
	w2052209_level	Player's skill level (e.g., beginner, intermediate, advanced)
w2052209_Booking	w2052209_bookingID {PK}	Unique identifier for each booking made for a session
	w2052209_date	Date of the booked session.
	w2052209_time	Time of the booked session
	w2052209_bookingType	Type of booking (e.g., single session, block booking)
w2052209_BlockBooking	w2052209_bookingCount	Number of sessions included in a block booking.

w2052209_SingleBooking	w2052209_status	Status of the single booking (e.g., confirmed, canceled)
w2052209_Instructor	w2052209_InstructorId{PK}	Unique identifier for each instructor
	w2052209_name	Name of the instructor.
	w2052209_contactNumber	Contact number of the instructor for communication
	w2052209_email	Email address of the instructor
	w2052209_expertiseLevel	Level of expertise or specialization of the instructor (e.g., beginner, advanced)
w2052209_Session	w2052209_sessionId{PK}	Unique identifier for each session offered in Racketminster.
	w2052209_startTime	Start time of the session
	w2052209_endTime	End time of the session
	w2052209_type	Type of session (e.g., supervised, unsupervised)
w2052209_Supervised	w2052209_type	Specifies supervised session category (e.g., fitness-play, group coaching)
	w2052209_equipmentNeeded	Equipment required for the session (e.g., rackets, balls)
	w2052209_level	Level requirement for participation in the supervised session
w2052209_Personal	w2052209_focusArea	Specific areas of focus in a personal training session
	w2052209_instructorNote	Notes made by the instructor for personalized training guidance
w2052209_Group	w2052209_sessionType	Group session category, such as social-fun or group coaching
	w2052209_size	Maximum number of participants in a group session
w2052209_Fitness	w2052209_exerciseType	Type of exercise performed during a fitness-play session
	w2052209_fitnessLevel	Fitness level required for participants in the fitness-play session

w2052209_GroupCoaching	w2052209_coachingLevel	Level of coaching provided in the group coaching session
w2052209_SocialFun	w2052209_activities	List of activities conducted in a social-fun session, such as games and social exercises
w2052209_Unsupervised	w2052209_sessionFormat	Format of the unsupervised session (e.g., singles or doubles)
	w2052209_sessionType	Category of the unsupervised session, such as open play
	w2052209_duration	Duration of the unsupervised session
w2052209_Single		
w2052209_Double		

QUESTION 6: CONCEPTUAL EERD QUALITY & NOTATIONS



Assumptions

- Each court has their own equipments and they are not used in other court.
- Every caretacker does not need to manage a maintain record. The record related to the assing court must be maintained.
- One court can have only one session for a specific time duration.

Coursework Part B: Logical ERD

