

REPORT
ON

SOCCKER KIT DISTRIBUTION AND TRACKING DATABASE
SYSTEM FOR SMALL FOOTBALL CLUB

PRESENTED
BY

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1. Introduction

In the dynamic and highly competitive world of soccer, efficient resource management is vital for club success, particularly at the small club level. An often-overlooked aspect with significant cost implications is the improper utilisation and distribution of soccer kits among players, straining the financial resources and compromising the local identity of small or grassroots clubs (Fill-Your-Boots, 2022).

This issue is further exemplified in both big and as well as small clubs where players frequently swap or give away their jerseys, creating an exchange pattern that leads to additional expenses. Notably, clubs like Manchester United have made headlines for charging players the cost of swapped kits, emphasizing the financial burden and urging cost-effective measures (S. Lovett, 2016). Renowned players, including Cristiano Ronaldo, contribute to this problem and is known to have personally been covering the expenses of kits exchanged with opposition players or shared with a fan, underscoring the overall cost inefficiency (Krishnan, 2022). In response to limited supplies and rising costs, small clubs face the imperative need to find effective solutions to optimize kit usage, recognizing the evolving importance of soccer kits as crucial assets to football clubs. To address these challenges, a comprehensive solution is proposed – the development of a dedicated database tailored to tracking distribution and usage of soccer kit in small or grassroot soccer clubs. This initiative aims not only to reduce costs associated with kit misuse but also to establish a robust foundation for the growth and sustainability of grassroots soccer.

ANALYSIS OF BUSINESS AREA AND RULES

SCENARIO ANALYSIS

The soccer kit distribution and tracking system will effectively record each assignment of kit done for a player at every particular time and also retain information on the quantity that was assigned to the player for that kit , the status of this assignment when it started and the status when it was returned for a new issuance in this case damaged or exchanged to a fan or an opposition player, and the remaining quantity of this end status, also will capture the information about this kit and who supplies them , the players and the division they play for in our club and the coach in charge of these divisions so we can properly related information about player issues with kit to the coach for a proper physical monitoring when on field of play or training as these coaches supervises the players under the division they are in charge of.

INFORMATION NEEDS

With this Knowledge, we will have to collect and store information or data about the brand supplying these kits for this football club such as the brand name, their address and contact number. Collection of detailed information about the kits been supplied, such as its name.

Accurate information relating to each kit assignment or allocation done for a player at a particular given time, i.e. the date, the quantity and status of this assignment. Also, information about these players will be accurately collected and stored, along with data on the different divisions within the club they play for and the detailed information of coaches supervising or heading these divisions such the coach's name and type of coach they are.

Additionally, with this collected data, we would be able to track each kit assigned to a player and also identify possible ways to effectively curtail misuse and address each cause of this situation, which might be the player involved or the kit (especially when there's a clear trend of misuse for a particular kit in terms of different players), and also make sure the different division heads are properly equipped with the information they need to properly contribute to the mitigation of this misuse during games or training.

BUSINESS RULES

It is important to note that an assignment for a particular kit to a particular player cannot be duplicated or done twice in each day or date, and for this assignment, the quantity shouldn't exceed two (2).

A player needs only two sets of kits for a day as the games are divided into two halves of a soccer match or training, and these kits can be washed and kept in good condition after each game for reuse until they are worn out, exchanged with an opponent, or given away to a fan.

1. A player is assigned to one or more kit.
A kit can be assigned to one or more players.
A kit can be optional meaning there can be a kit not assigned to a player yet, this is mostly kit produced and supplied for the next football season.
2. A kit is supplied by one and only one brand.
A brand can supply one or more kit, i.e. multiple kit can be supplied by one brand.
3. A division contains one or more players.
Multiple players belong to one and only one division.
Optional – there could be a division without a player yet, maybe a newly created division in the club
4. A division is headed by one and only one coach in this case the division manager or head.
A coach can be in charge of or heads one or more division.
Also there could be coaches that don't head any division.

2. LOGICAL MODEL DIAGRAM

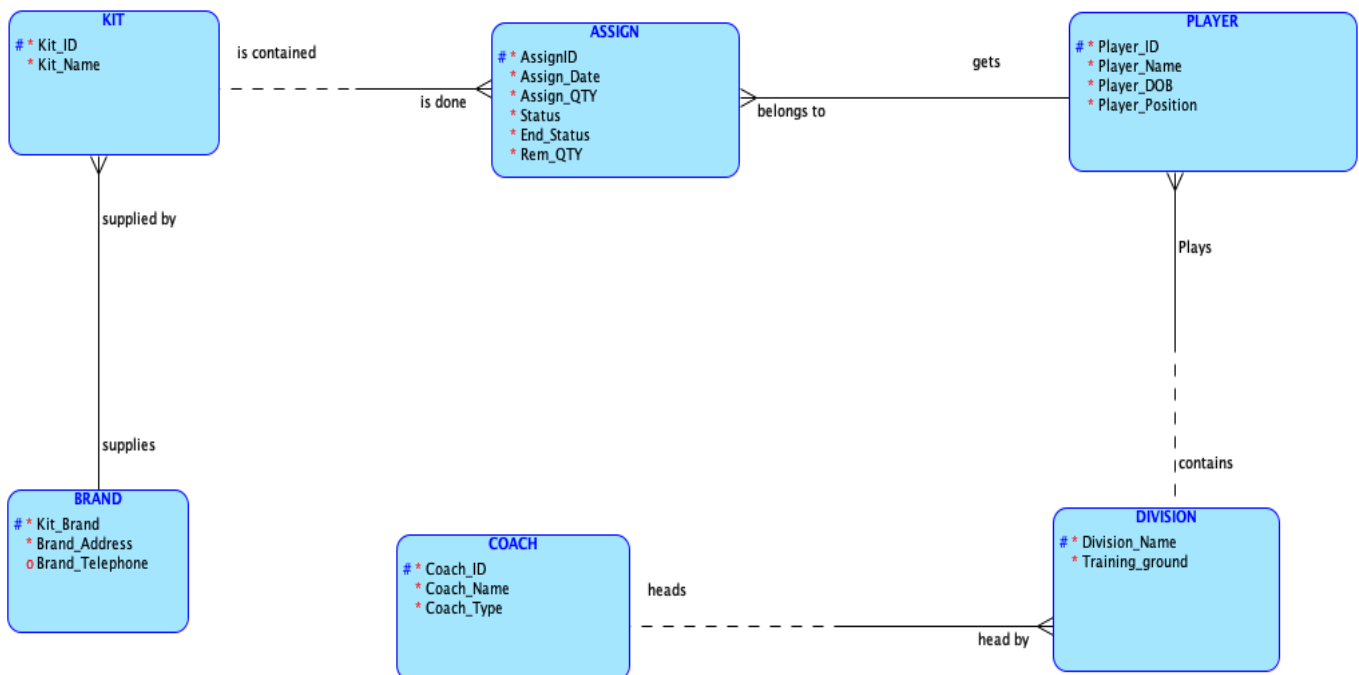


Figure 1 - logical model diagram of soccer kit distribution and tracking system

Figure 1 displays a logical model diagram illustrating six entities with varied relationships and cardinalities. An "assign" entity is introduced to resolve the many-to-many relationship between "kit" and "player," differing from Oracle Modeller's default resolution. See the appendix for details.

3. ENTITY RELATIONSHIP (ER) MODEL DIAGRAM

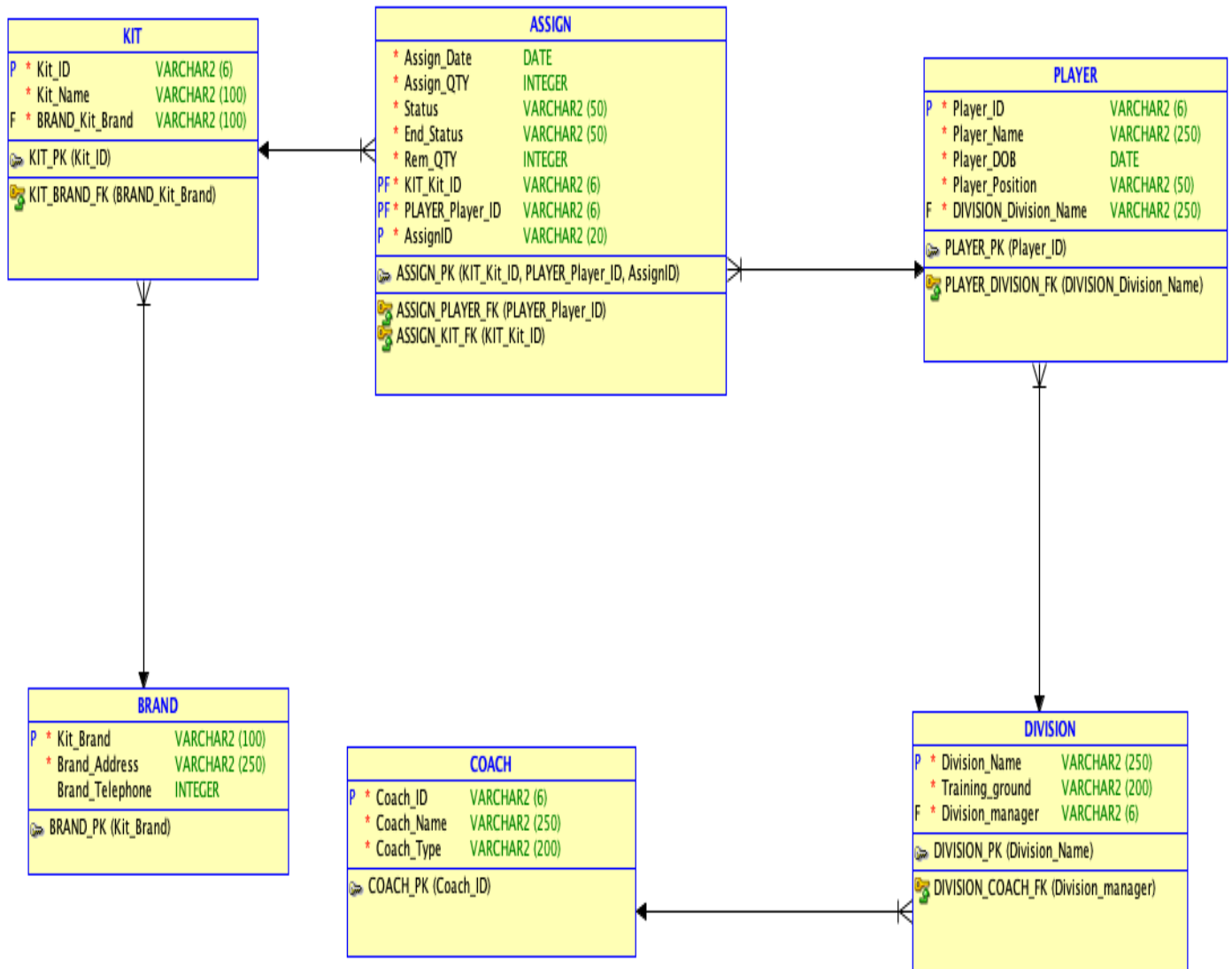


Figure 2- Entity relationship diagram

Figure 2 above is an entity relationship diagram generated using a logical model, aiming to accurately model the relationship and cardinality depicted in the model. It uses referential integrity or a foreign key, to resolve one-to-many relationships by placing the primary key of the entity side of the one cardinality as a foreign key inside the entity side of the many cardinality.

The assign entity has two foreign keys added as composite primary keys, assign_id, player_playerid, and kit_kit_id, which uniquely identify the entity occurrence. The foreign key coach_id, introduced to the division entity, was renamed to division manager to capture the essence of the relationship. The properties in these six entities are defined to capture the right type of data for all attributes in the soccer kit scenario mainly storing variable characters with defined limit, integer types, and date data types.

4. NORMALIZATION OF THE DATABASE FOR THIS APPLICATION AREA

We created an unnormalized table scenario that accommodates the full functional example of our application area scenario, which is the soccer kit distribution and tracking system for players in football clubs.

4.1 UNNORMALIZED TABLE

Assign_ID	Assign_Date	Assign_QTY	Status	End_Status	Rem_QTY	Kit_ID	Kit_Name	Kit_Brand	Brand_Address	Brand_Telephone	PlayerID	Player_Name	Player_DOB	Player_Position	Division_Name	Training_ground	CoachID	Coach_Name	Coach_Type	
001	14/01/2024	2	Active	Active		2	SCSN00	Socks	Nike	Manchester	1922768900	B18	Bruno	08/09/94	CAM	Senior	CarGT1	C200	E.TenHag	Headcoach
		2	Active	Shared		1	NJSY18	Named numbered Jersey	Nike	Manchester	1922768900	B18	Bruno	08/09/94	CAM	Senior	CarGT1	C200	E.TenHag	Headcoach
		1	Active	Active		1	BOTS00	Boots	Puma	Wolverhampton	7656899700	B18	Bruno	08/09/94	CAM	Senior	CarGT1	C200	E.TenHag	Headcoach
002	14/01/2024	2	Active	Damaged		0	GLVS00	Gloves	Adidas	Birmigham	8455902101	A24	Onana	02/04/96	GK	Senior	CarGT1	C200	E.TenHag	Headcoach
		2	Active	Active		2	TJSY24	Numbered Trainers24	Nike	Manchester	1922768900	A24	Onana	02/04/96	GK	Senior	CarGT1	C200	E.TenHag	Headcoach
		1	Active	Active		2	SHNG00	Shinguards	Puma	Wolverhampton	7656899700	A24	Onana	02/04/96	GK	Senior	CarGT1	C200	E.TenHag	Headcoach
003	15/01/2024	2	Active	Active		2	GLVS00	Gloves	Adidas	Birmigham	8455902101	A24	Onana	02/04/96	GK	Senior	CarGT1	C200	E.TenHag	Headcoach
004	29/01/2024	2	Active	Active		2	TJSY00	No numbered Trainers	Adidas	Birmigham	8455902101	M37	Mainoo	19/04/05	CM	Academy CAT 1	CarGT2	C200	E.TenHag	Headcoach
005	30/01/2024	1	Active	Active		1	UJSY00	Unamed No number jersey	Nike	Manchester	1922768900	M37	Mainoo	19/04/05	CM	Academy CAT 1	CarGT2	C200	E.TenHag	Headcoach
006	01/02/2024	2	Active	Active		2	TJSY00	No numbered Trainers	Adidas	Birmigham	8455902101	EW201	Ethan Wheatley	20/01/06	ST	Academy CAT 2	CarGT6	C001	T.Binnion	Academy2 coach
		2	Active	Active		2	UJSY00	Unamed No number jersey	Nike	Manchester	1922768900	EW201	Ethan Wheatley	20/01/06	ST	Academy CAT 2	CarGT6	C001	T.Binnion	Academy2 coach

Figure 3- Unnormalized form

Here, it's clear that on assign_id 001, three allocations were done for the player, but the full entries were not completed, and repeating groups existed, so we tried to resolve this in our first normal form below.

4.2 FIRST NORMAL FORM (INF)

In this stage, we resolve the repeating groups and make sure that our table is in an atomic state.

We identify the unique identifier that uniquely identifies each entry or occurrence in our table (Good Bird's Eye Primary Key).

PRIMARY KEY → ASIGN_ID, KIT_ID, PLAYER_ID.

These three attributes have been identified as the unique identifiers for each entry in our table. Our table below in Figure 1.3 now clearly satisfies the first normal form.

Assign_ID	Assign_Date	Assign_QTY	Status	End_Status	Rem_QTY	KIT_ID	KIT_Name	Kit_Brand	Brand_Address	Brand_Telephone	PlayerID	Player_Name	Player_DOB	Player_Position	Division_Name	Training_ground	CoachID	Coach_Name	Coach_Type
001	14/01/2024	2	Active	Active		2 SCSN00	Socks	Nike	Manchester	1922768900	B18	Bruno	08/09/94	CAM	Senior	CarGT1	C200	E.TenHag	Headcoach
001	14/01/2024	2	Active	Shared		1 NJSY18	Named numbered Jersey	Nike	Manchester	1922768900	B18	Bruno	08/09/94	CAM	Senior	CarGT1	C200	E.TenHag	Headcoach
001	14/01/2024	1	Active	Active		1 BOTS00	Boots	Puma	Wolverhampton	7656899700	B18	Bruno	08/09/94	CAM	Senior	CarGT1	C200	E.TenHag	Headcoach
002	14/01/2024	2	Active	Damaged		0 GLVS00	Gloves	Adidas	Birmigham	8455902101	A24	Onana	02/04/96	GK	Senior	CarGT1	C200	E.TenHag	Headcoach
002	14/01/2024	2	Active	Active		2 TJSY24	Numbered Trainers24	Nike	Manchester	1922768900	A24	Onana	02/04/96	GK	Senior	CarGT1	C200	E.TenHag	Headcoach
002	14/01/2024	1	Active	Active		2 SHNG00	Shinguards	Puma	Wolverhampton	7656899700	A24	Onana	02/04/96	GK	Senior	CarGT1	C200	E.TenHag	Headcoach
003	15/01/2024	2	Active	Active		2 GLVS00	Gloves	Adidas	Birmigham	8455902101	A24	Onana	02/04/96	GK	Senior	CarGT1	C200	E.TenHag	Headcoach
004	29/01/2024	2	Active	Active		2 TJSY00	No numbered Trainers	Adidas	Birmigham	8455902101	M37	Mainoo	19/04/05	CM	Academy CAT 1	CarGT2	C200	E.TenHag	Headcoach
005	30/01/2024	1	Active	Active		1 UJSY00	Unamed No number jersey	Nike	Manchester	1922768900	M37	Mainoo	19/04/05	CM	Academy CAT 1	CarGT2	C200	E.TenHag	Headcoach
006	01/02/2024	2	Active	Active		2 TJSY00	No numbered Trainers	Adidas	Birmigham	8455902101	EW201	Ethan Wheatley	20/01/06	ST	Academy CAT 2	CarGT6	C001	T.Binnion	Academy2 coach
006	01/02/2024	2	Active	Active		2 UJSY00	Unamed No number jersey	Nike	Manchester	1922768900	EW201	Ethan Wheatley	20/01/06	ST	Academy CAT 2	CarGT6	C001	T.Binnion	Academy2 coach

Figure 4- First Normal Form

4.3 SECOND NORMAL FORM

Here, we resolve partial dependencies.

To satisfy the second normal form, we have to make sure our table is in the first normal form and that every non-key column or attribute is dependent on parts of the primary key or unique identifier.

So, for our table, we check what is dependent on parts of the primary key identified in our 1NF.

ASSIGN_ID, KIT_ID, PLAYERID → assign_date, assign_qty, rem_qty, status, end_status.

KIT_ID → kit_name, kit_brand, brand_address, brand_telephone.

PLAYER_ID → player_name, player_dob, player_position, division_name, training_ground, coach_id,
Coach_name, coach_type.

ASSIGN TABLE

Assign_ID	Kit_ID	PlayerID	Assign_Date	Assign_QTY	Status	End_Status	Rem_QTY
001	SCSN00	B18	14/01/2024	2	Active	Active	2
001	NJSY18	B18	14/01/2024	2	Active	Shared	1
001	BOTS00	B18	14/01/2024	1	Active	Active	1
002	GLVS00	A24	14/01/2024	2	Active	Damaged	0
002	TJSY24	A24	14/01/2024	2	Active	Active	2
002	SHNG00	A24	14/01/2024	1	Active	Active	2
003	GLVS00	A24	15/01/2024	2	Active	Active	2
004	TJSY00	M37	29/01/2024	2	Active	Active	2
005	UJSY00	M37	30/01/2024	1	Active	Active	1
006	TJSY00	EW201	01/02/2024	2	Active	Active	2
006	UJSY00	EW201	01/02/2024	2	Active	Active	2

KIT-BRAND TABLE

Kit_ID	Kit_Name	Kit_Brand	Brand_Address	Brand_Telephone
SCSN00	Socks	Nike	Manchester	1922768900
NJSY18	Named number	Nike	Manchester	1922768900
BOTS00	Boots	Puma	Wolverhampton	7656899700
GLVS00	Gloves	Adidas	Birmingham	8455902101
TJSY24	Numbered Training	Nike	Manchester	1922768900
SHNG00	Shinguards	Puma	Wolverhampton	7656899700
TJSY00	No numbered	Adidas	Birmingham	8455902101
UJSY00	Unnamed No number	Nike	Manchester	1922768900

PLAYER-DIVISION-COACH TABLE

PlayerID	Player_Name	Player_DOB	Player_Position	Division_Name	Training_ground	CoachID	Coach_Name	Coach_Type
B18	Bruno	08/09/94	CAM	Senior	CarGT1	C200	E.TenHag	Headcoach
A24	Onana	02/04/96	GK	Senior	CarGT1	C200	E.TenHag	Headcoach
M37	Mainoo	19/04/05	CM	Academy CAT 1	CarGT2	C200	E.TenHag	Headcoach
EW201	Ethan Wheatley	20/01/06	ST	Academy CAT 2	CarGT6	C001	T.Binnion	Academy2 coach

4.4 THIRD NORMAL FORM

Here, we resolve transitive dependencies.

To satisfy the third normal form, we must make sure our table is in the second normal form and that every non-key column or attribute that is dependent on another non-key or non-prime attribute is fully resolved.

So, for our tables, we check for what is dependent on a non-prime attribute.

KIT_BRAND → brand_address, brand_telephone.

DIVISION_NAME → training_ground.

COACH_ID → Coach_name, coach_type.

The assign table remains as it from the second normal form stage.

4.4.1. ASSIGN TABLE

Assign_ID	Assign_Date	Kit_ID	PlayerID	Asign_QTY	Status	End_Status	Rem_QTY
001	14/01/2024	SCSN00	B18	2	Active	Active	2
001	14/01/2024	NJSY18	B18	2	Active	Shared	1
001	14/01/2024	BOTS00	B18	1	Active	Active	1
002	14/01/2024	GLVS00	A24	2	Active	Damaged	0
002	14/01/2024	TJSY24	A24	2	Active	Active	2
002	14/01/2024	SHNG00	A24	1	Active	Active	2
003	15/01/2024	GLVS00	A24	2	Active	Active	2
004	29/01/2024	TJSY00	M37	2	Active	Active	2
005	30/01/2024	UJSY00	M37	1	Active	Active	1
006	01/02/2024	TJSY00	EW201	2	Active	Active	2
006	01/02/2024	UJSY00	EW201	2	Active	Active	2

The kit table reveals a transitive dependency, kit_brand, with brand address and brand telephone being non-prime attributes. A new table, brand, is created for these attributes, making kit_brand the primary key and referencing it as a foreign key in kit table.

4.4.2. KIT TABLE

Kit_ID	Kit_Name	Kit_Brand
SCSN00	Socks	Nike
NJSY18	Named numbered Jersey	Nike
BOTS00	Boots	Puma
GLVS00	Gloves	Adidas
TJSY24	Numbered Trainers24	Nike
SHNG00	Shinguards	Puma
TJSY00	No numbered Trainers	Adidas
UJSY00	Unnamed No number jersey	Nike

4.4.3. BRAND TABLE

Kit_Brand	Brand_Address	Brand_Telephone
Nike	Manchester	1922768900
Puma	Wolverhampton	7656899700
Adidas	Birmigham	8455902101

In the player division coach table, transitive dependency was noticed, which was the division name, where the training ground attribute depends on this and both non-prime attributes; hence, a new table division is created with the division name as the primary key, and this becomes a foreign key in the player table.

Furthermore, there exists yet another transitive dependency in the division table, which is the coach_id. Here, the coach name and type depend on this, and all three are non-prime attributes in the division table, resulting in a new table called the coach table, where the coach_id becomes the primary key or unique identifier, which is referenced as a foreign key in the division table and renamed as a constraint foreign key with the name division manager in the division table to accurately capture the relationship that exists between both tables where a coach can head multiple divisions but a division is headed by one and only one coach

4.4.4. PLAYER TABLE

PlayerID	Player_Name	Player_DOB	Player_Position	Division_Name
B18	Bruno	08/09/94	CAM	Senior
A24	Onana	02/04/96	GK	Senior
M37	Mainoo	19/04/05	CM	Academy CAT 1
EW201	Ethan Wheatley	20/01/06	ST	Academy CAT 2

4.4.5. DIVISION TABLE

Division_Name	Training_ground	Division_manager
Senior	CarGT1	C200
Academy CAT 1	CarGT2	C200
Academy CAT 2	CarGT6	C001

4.4.6 COACH TABLE

CoachID	Coach_Name	Coach_Type
C200	E.TenHag	Headcoach
C001	T.Binnion	Academy2 coach

5. IMPLEMENTATION AND OUTPUTS

5.1 TABLES CREATION IN ORACLE LIVE SQL.

5.1.1 Creating the coach table.

SQL Worksheet

```

1 CREATE TABLE coach (
2     coach_id varchar(6) NOT NULL PRIMARY KEY,
3     coach_name varchar(250) NOT NULL,
4     coach_type varchar(250) NOT NULL
5 );

```

Table created.

5.1.2 Creating the brand table.

SQL Worksheet

```
1 CREATE TABLE brand (  
2     kit_brand varchar(100) NOT NULL PRIMARY KEY,  
3     brand_address varchar(250) NOT NULL,  
4     brand_telephone varchar(20)  
5 );
```

Table created.

5.1.3 Creating the division table.

SQL Worksheet

```
1  
2 CREATE TABLE division (  
3     division_name varchar(250) NOT NULL PRIMARY KEY,  
4     training_ground varchar(250) NOT NULL,  
5     division_manager varchar(6) NOT NULL,  
6     CONSTRAINT division_manager_fk FOREIGN KEY (division_manager)  
7     REFERENCES coach(coach_id)  
8 );
```

Table created.

5.1.4 Creating the kit table.

SQL Worksheet

```
1  
2 CREATE TABLE kit (  
3     kit_id varchar(6) NOT NULL PRIMARY KEY,  
4     kit_name varchar(100) NOT NULL,  
5     kit_brand varchar(100),  
6     FOREIGN KEY (kit_brand) REFERENCES brand(kit_brand)  
7 );  
8
```

Table created.

5.1.5 Creating the player table.

SQL Worksheet

```
1  
2 CREATE TABLE player (  
3     player_id varchar(6) NOT NULL PRIMARY KEY,  
4     player_name varchar(250) NOT NULL,  
5     player_dob date NOT NULL,  
6     player_position varchar(50) NOT NULL,  
7     division_name varchar(250) NOT NULL,  
8     FOREIGN KEY (division_name) REFERENCES division(division_name)  
9 );  
10
```

Table created.

5.1.6 Creating the Assign table.

SQL Worksheet

```
1
2 CREATE TABLE assign(
3     assign_id varchar(20) NOT NULL,
4     assign_date date NOT NULL,
5     kit_id varchar(6) NOT NULL,
6     player_id varchar(6) NOT NULL,
7     assign_qty int NOT NULL,
8     status varchar(50) NOT NULL,
9     end_status varchar(50) NOT NULL,
10    rem_qty int NOT NULL,
11    PRIMARY KEY (assign_id, kit_id, player_id),
12    FOREIGN KEY (kit_id) REFERENCES kit(kit_id),
13    FOREIGN KEY (player_id) REFERENCES player(player_id)
14 );
15
```

Table created.

5.1.7 Overview of all created tables in our Schema.

Schema

Upload Script Actions + Create Database Object

Schema
My Schema
Sort By
Name
Options
☒ Primary Objects
☐ Primary and Subordinate
Reset Search

ASSIGN
Table
Status: Valid
Created 5 minutes ago

BRAND
Table
Status: Valid
Created 26 minutes ago

COACH
Table
Status: Valid
Created 32 minutes ago

DIVISION
Table
Status: Valid
Created 22 minutes ago

KIT
Table
Status: Valid
Created 17 minutes ago

PLAYER
Table
Status: Valid
Created 12 minutes ago

5.2 TABLES POPULATION

5.2.1 Populating brand table.

SQL Worksheet

```
1
2 INSERT INTO brand (kit_brand, brand_address, brand_telephone)
3     WITH b AS (
4         SELECT 'Nike', 'Manchester', '1922 768900' FROM dual UNION ALL
5         SELECT 'Puma', 'Wolverhampton', '07656 899700' FROM dual UNION ALL
6         SELECT 'Adidas', 'Birmingham', '08455 902101' FROM dual
7     )
8     SELECT * FROM b;
9
10 SELECT * FROM brand;
11
```

3 row(s) inserted.

KIT_BRAND	BRAND_ADDRESS	BRAND_TELEPHONE
Nike	Manchester	1922 768900
Puma	Wolverhampton	07656 899700
Adidas	Birmingham	08455 902101

Download CSV

3 rows selected.

5.2.2 Populating the kit table.

SQL Worksheet

```
1 INSERT INTO kit (kit_id, kit_name, kit_brand)
2   WITH k AS (
3     SELECT 'SCSN00', 'Socks', 'Nike' FROM dual UNION ALL
4     SELECT 'NJSY18', 'Named numbered Jersey', 'Nike' FROM dual UNION ALL
5     SELECT 'BOTS00', 'Boots', 'Puma' FROM dual UNION ALL
6     SELECT 'GLVS00', 'Gloves', 'Adidas' FROM dual UNION ALL
7     SELECT 'TJSY24', 'Numbered Trainers24', 'Nike' FROM dual UNION ALL
8     SELECT 'SHNG00', 'Shinguards', 'Puma' FROM dual UNION ALL
9     SELECT 'TJSY00', 'No numbered Trainers', 'Adidas' FROM dual UNION ALL
10    SELECT 'UJSY00', 'Unnamed No number jersey', 'Nike' FROM dual
11  )
12  SELECT * FROM k;
13
14  SELECT * FROM Kit;
```

8 row(s) inserted.

5.2.3 Populating the Coach table.

SQL Worksheet

```
1
2 INSERT INTO coach (coach_id, coach_name, coach_type)
3   WITH c AS (
4     SELECT 'C200', 'E.TenHag', 'Headcoach' FROM dual UNION ALL
5     SELECT 'C001', 'T.Binnion', 'Academy2 coach' FROM dual
6   )
7   SELECT * FROM c;
8
9   SELECT * FROM coach;
```

2 row(s) inserted.

COACH_ID	COACH_NAME	COACH_TYPE
C200	E.TenHag	Headcoach
C001	T.Binnion	Academy2 coach

5.2.4 Populating the Division table.

SQL Worksheet

```
1
2 INSERT INTO division (division_name, training_ground, division_manager)
3   WITH d AS (
4     SELECT 'Senior', 'CarGT1', 'C200' FROM dual UNION ALL
5     SELECT 'Academy CAT 1', 'CarGT2', 'C200' FROM dual UNION ALL
6     SELECT 'Academy CAT 2', 'CarGT6', 'C001' FROM dual
7   )
8   SELECT * FROM d;
9
10  SELECT * FROM division;
```

3 row(s) inserted.

5.2.5 Populating the Player table.

SQL Worksheet

Clear

```
1
2 INSERT INTO player (player_id , player_name, player_dob, player_position, division_name)
3     WITH p AS (
4         SELECT 'B18', 'Bruno', DATE '1994-09-08', 'CAM', 'Senior' FROM dual UNION ALL
5         SELECT 'A24', 'Onana', DATE '1996-04-02', 'GK', 'Senior' FROM dual UNION ALL
6         SELECT 'M37', 'Mainoo', DATE '2005-04-19', 'CM', 'Academy CAT 1' FROM dual UNION ALL
7         SELECT 'EW201', 'Ethan Wheatley', DATE '2006-01-20', 'ST', 'Academy CAT 2' FROM dual
8     )
9     SELECT * FROM p;
10
11 SELECT * FROM player;
```

4 row(s) inserted.

5.2.6 Populating the Assign table.

SQL Worksheet

ClearFindActionsSave

```
1
2 INSERT INTO assign (assign_id, assign_date, kit_id, player_id, assign_qty, status, end_status, rem_qty)
3     WITH assignment_data AS (
4         SELECT '001' AS assign_id, DATE '2024-01-14' AS assign_date, 'SCSN00' AS kit_id, 'B18' AS player_id, 2 AS assign_qty,
5             'Active' AS status, 'Active' AS end_status, 2 AS rem_qty FROM dual UNION ALL
6         SELECT '001', DATE '2024-01-14', 'NJSY18', 'B18', 2, 'Active', 'Shared', 1 FROM dual UNION ALL
7         SELECT '001', DATE '2024-01-14', 'BOTS00', 'B18', 1, 'Active', 'Active', 1 FROM dual UNION ALL
8         SELECT '002', DATE '2024-01-14', 'GLVS00', 'A24', 2, 'Active', 'Damaged', 0 FROM dual UNION ALL
9         SELECT '002', DATE '2024-01-14', 'TJSY24', 'A24', 2, 'Active', 'Active', 2 FROM dual UNION ALL
10        SELECT '002', DATE '2024-01-14', 'SHNG00', 'A24', 1, 'Active', 'Active', 2 FROM dual UNION ALL
11        SELECT '003', DATE '2024-01-15', 'GLVS00', 'A24', 2, 'Active', 'Active', 2 FROM dual UNION ALL
12        SELECT '004', DATE '2024-01-29', 'TJSY00', 'M37', 2, 'Active', 'Active', 2 FROM dual UNION ALL
13        SELECT '005', DATE '2024-01-30', 'UJSY00', 'M37', 1, 'Active', 'Active', 1 FROM dual UNION ALL
14        SELECT '006', DATE '2024-02-01', 'TJSY00', 'EW201', 2, 'Active', 'Active', 2 FROM dual UNION ALL
15        SELECT '006', DATE '2024-02-01', 'UJSY00', 'EW201', 2, 'Active', 'Active', 2 FROM dual
16    )
17    SELECT * FROM assignment_data;
18
```

11 row(s) inserted.

5.3 QUERIES FOR DATABASE

Query1 :: Using a nested query to see the player who shared their kit, the kit involved, and the coach in charge of the division the player plays for.

SQL Worksheet

ClearFindActionsSaveRun

```
1
2 SELECT p.player_id, p.player_name, a.kit_id, k.kit_name, a.assign_qty,
3     a.rem_qty, p.division_name, d.division_manager, c.coach_name, c.coach_type
4 FROM
5     player p
6 JOIN
7     ( SELECT * FROM assign
8       WHERE end_status = 'Shared'
9     ) a ON p.player_id = a.player_id
10 JOIN
11     kit k ON a.kit_id = k.kit_id
12 JOIN
13     division d ON p.division_name = d.division_name
14 JOIN
15     coach c ON d.division_manager = c.coach_id;
```

PLAYER_ID	PLAYER_NAME	KIT_ID	KIT_NAME	ASSIGN_QTY	REM_QTY	DIVISION_NAME	DIVISION_MANAGER	COACH_NAME	COACH_TYPE
B18	Bruno	NJSY18	Named numbered Jersey	2	1	Senior	C200	E.TenHag	Headcoach

Download CSV

The query above uses a nested or inner query to select only the rows from the **assign** table where **end_status** is 'Shared', and then joins the result with the player table on player_id, then joins the outcome with the other tables to retrieve the other desired information. It is also important to point out that join only also means inner join.

Query2:: Retrieving the kit that has the most assigned quantity, the players or players it was assigned to, and also the brand that supplies it with their address using a Common Table Expression (CTE).

SQL Worksheet

Clear

Find

Actions

```

1
2 WITH KitAssignments AS (
3     SELECT k.kit_id, k.kit_name, b.kit_brand, b.brand_address, a.player_id,
4           p.player_name, p.division_name, SUM(a.assign_qty) AS total_assign_qty
5     FROM kit k
6     JOIN
7           brand b ON k.kit_brand = b.kit_brand
8     JOIN
9           assign a ON k.kit_id = a.kit_id
10    JOIN
11           player p ON a.player_id = p.player_id
12    GROUP BY
13           k.kit_id, k.kit_name, b.kit_brand, b.brand_address, a.player_id, p.player_name, p.division_name
14 )
15
16 SELECT kit_id, kit_name, kit_brand, brand_address, total_assign_qty, player_id, player_name, division_name
17 FROM KitAssignments
18 WHERE
19     total_assign_qty = (SELECT MAX(total_assign_qty) FROM KitAssignments);

```

KIT_ID	KIT_NAME	KIT_BRAND	BRAND_ADDRESS	TOTAL_ASSIGN_QTY	PLAYER_ID	PLAYER_NAME	DIVISION_NAME
GLVS00	Gloves	Adidas	Birmingham	4	A24	Onana	Senior

Download CSV

The WITH clause above, also known as a Common Table Expression (CTE), is used to create a temporary result set that we can reference within the context of a larger query. It's particularly useful for breaking down complex queries into smaller, more manageable parts.

Query3 : Retrieve the kit_id and kit name details of kits, along with their respective brand information.

SQL Worksheet

Clear

Fin

```

1
2 SELECT K.kit_id, k.kit_name, b.*
3 FROM kit k
4 JOIN brand b ON k.kit_brand = b.kit_brand;

```

KIT_ID	KIT_NAME	KIT_BRAND	BRAND_ADDRESS	BRAND_TELEPHONE
SCSN00	Socks	Nike	Manchester	1922 768900
NJSY18	Named numbered Jersey	Nike	Manchester	1922 768900
BOTS00	Boots	Puma	Wolverhampton	07656 899700
GLVS00	Gloves	Adidas	Birmingham	08455 902101
TJSY24	Numbered Trainers24	Nike	Manchester	1922 768900
SHNG00	Shinguards	Puma	Wolverhampton	07656 899700
TJSY00	No numbered Trainers	Adidas	Birmingham	08455 902101
UJSY00	Unnamed No number jersey	Nike	Manchester	1922 768900

Download CSV

8 rows selected.

6. SECURITY, INTEGRITY AND ETHICAL ASPECTS OF DATA GOVERNANCE.

Data governance is a success factor for Database systems and has an overall positive effect on the performance of organizations. The goal is to reduce risks and expenses associated with data while optimising its value. (Abraham, Schneider and vom Brocke, 2019).

Using internal standards and policies that regulate data usage, data governance is the act of overseeing the accessibility, usability, integrity, and security of the data in enterprise systems. It's becoming more and more important as businesses deal with tightening data privacy laws and depending more and more on data analytics to streamline operations and inform strategic business decisions. The aspects of data governance that are especially important for database management are security, integrity, and ethics. To guarantee that data is handled ethically, safely, and responsibly, each of these components has a specific function to perform.

Security: Securing sensitive data requires putting strong access controls in place to stop illegal access. Setting user roles and permissions is necessary to guarantee that only people with the proper authority can access or change data. The responsibility for controlling access to data items under discretionary access control rests with the proper authority (Smyth, 2010). Data protection in transit and at rest can be achieved by utilising encryption techniques. Because of the extra security layer this provides, intercepted or stolen data is harder for unauthorised parties to decipher. Regular security audits and monitoring operations assist in quickly identifying and addressing any potential vulnerabilities or suspicious activity. It's critical to have a well-defined plan for handling incidents.

Integrity: A key component of data management is data integrity, which guarantees that information is accurate, consistent, and dependable over its entire lifecycle. Maintaining data integrity is not only a recommended practice but also a strategy imperative in the digital age, as data supports almost every area of business operation (Duggineni, 2023). It is very Important to implement data Validation checks which ensures that only accurate and reliable information is entered into the database, this helps to maintain the integrity of the data over time. Monitoring database alterations via version control systems guarantees that they are recorded, making it simple to pinpoint the origin of any possible problems with data integrity.

Ethics: Data Ethics are the norms of behaviour that promote appropriate judgments and accountability when acquiring or using data, with the goals of protecting civil liberties, minimizing risks to individuals and society, and maximizing the public good. It's essential to follow privacy laws and have people's express consent before their data is collected or used. The organisation leaders set the moral standard, and when that standard is not communicated, privacy issues are more likely to arise (Weaver et al. 1999). This includes abiding by applicable laws and regulations including the GDPR and HIPAA. Transparently outlining data procedures fosters stakeholder and user trust. An attempt should be made to reduce bias in data collection and analysis. This involves making certain that algorithms used for analysis do not reinforce or magnify pre-existing biases and that fair data collection procedures are followed.

APPLICATION OF SECURITY, INTEGRITY, AND ETHICAL ASPECTS OF DATA GOVERNANCE IN SOCCER KIT DISTRIBUTION AND TRACKING DATABASE SYSTEM.

It's crucial to consider how data pertaining to divisions, coaches, brands, assignments, players, and kits are maintained to preserve security, maintain integrity, and comply with ethical standards when applying these concepts to the management of soccer kits within grassroots organisations. The use of role-based access controls to guarantee that only individuals with the proper authorization can access private data, such as

player personal information or transactions pertaining to kit assignments. Encrypt sensitive data, especially player and coach personal information, both in transit and at rest to guard against illegal access and interception. To keep an eye on and investigate any unauthorised or suspicious activity, keep audit records of any data access and modifications made within the system.

To guarantee that the system has accurate data such as player information, kit quantities, input validation tests must be implemented. Make use of procedures to keep data consistent, making sure that modifications to kit numbers or statuses are appropriately mirrored throughout all pertinent system components. To find and fix any errors or discrepancies in player information, kit management, and other relevant data, conduct routine data quality audits. Make sure that coaches' and players' personal information is only gathered and processed with permission, and only for justifiable uses pertaining to team operations and kit management. Be open and honest with stakeholders about the uses, storage, and security of their data. This includes explicit guidelines for the use and rights of data. Handle player data and kit assignments without prejudice or discrimination. Make sure that decisions are handled fairly and that every player has equal access to the equipment.

Incorporating security, integrity, and ethical issues into the administration of football kits and associated data can enhance operational efficiency and effectiveness for grassroots club, while also fostering trust among players, coaches, and other stakeholders. Respecting and defending individual rights while upholding the highest standards of data security and quality is ensured by the organization's adherence to these principles.

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APPENDIX

Image of the detailed description of the logical model

2. LOGICAL MODEL DIAGRAM

Figure 1 presents a logical model diagram for a scenario involving six entities with different relationships and cardinalities.

The KIT entity, with attributes kit_id the unique identifier and kit name, has a supply relationship() with the BRAND entity, the supply relationship is a one-to-many , where one brand supplies many kits and many kits are supplied by one and only one brand. The kit_brand serving as the unique identifier for the brand entity, the brand address and phone number store information about each supplier.

The Kit entity and Player entity have a many-to-many relationship, which was resolved at the logical model level to accurately capture detailed information and its unique identifier. This led to the introduction of the ASSIGN entity, which was introduced instead of using the default entity relationship attribute provided by Oracle data modeller software. The many-to-many relationship between player and kit is now resolved with the assign entity, introducing a one-to-many relationship defined as a kit being contained in one or more assignments and a many-to-one relationship where at least one assignment belongs to one and only one player. There could be a kit without an assignment represented by dotted lines in the logical model.

The player entity and division relationship is one-to-many, with one division containing one or more players and at least one player playing for one and only one division. The division entity and coach relationship is another one-to-many relationship, with at least one division headed by one and only one coach and in reverse, a coach heads one or more divisions.

In conclusion, the relationship and cardinalities depicted in Figure 1 align with the business rules and analysis conducted for this scenario, ensuring only necessary information and data is collected and stored for an efficient distribution and tracking system for the soccer kit.

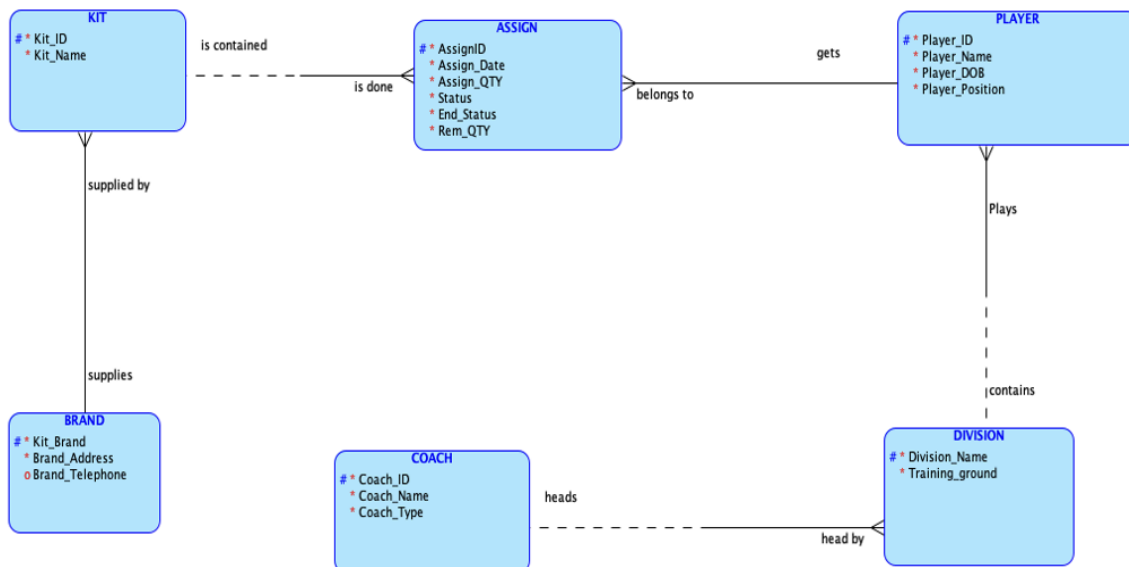


Figure 1 - logical model diagram of soccer kit distribution and tracking system