**20081419**

Red star f.c

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SUBJECT: HIGHER DIPLOMA IN BUSINESS SYSTEMS ANALYSIS

MODULE: DATABASE MODELLING

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# Introduction & Club Description

Red Star F.C are a Junior League club based in Waterford City. They are currently completing in the Waterford Junior League with over 20 registered members, comprised of Players, Managers and non-playing personnel.

The club wishes to create and maintain a database in order to be able to efficiently track both member registration details and bookings details for the Astroturf/ Clubhouse as the club currently rely on a file based system to keep track of both. This has led to double bookings of the Astroturf pitches and Clubhouse and a shortfall in membership fees due to data duplication whereby we are unaware of actual fees paid by each member and an incident whereby information on registrations were accidentally deleted. Also, there is an extended amount of time being dedicated to trying to keep the files up to date.

The club has a full Astroturf pitch, that can be divided up into 3 sections of one half pitch and two quarter pitches. It is possible to rent out the entire pitch when all the other pitches aren’t rented. Bookings can be taken by any staff member of the club.

The club also has a Clubhouse that has a function room, that can be rented for functions.

It is necessary for any person wishing to be a member of the club, to pay annual registrations fees that can be paid once off or in instalments. Membership fees for players is €240, for managers is €150 and for all other members €125.

# Security and Access

There will be 3 categories of Database user:

Staff:

Staff will have full access to the database in that they can create, read, update and delete entries/ tables in the database. Staff will have an unrestricted view of the database.

Member:

Members will have read only access to the Database. They can only view Member, Membership Type and Facility relations in the database. I have given full access to the Member relation, in order to allow for contact to be made between members of the club. Access has been given to the Membership Type relation in order to ascertain the date Fees are due and the amount of fees due for each Member. I have given access to the Facility table in order to allow Members to know what facilities can be booked and the cost to book the facilities. Additionally, they will have a restricted view of the Bookings relation entitled Customer\_Booking\_View in order for them to gauge when facilities are available to be booked.

Customer:

Customers will have read only access to the Database. They can only view the Facility relations in the database in an unrestricted manner. I have given access to the Facility table in order to allow Customers to know what facilities can be booked and the cost to book the facilities. Additionally, they will have a restricted view of the Bookings relation entitled Customer\_Booking\_View in order for them to gauge when facilities are available to be booked.

# Normalisation

### UNF

The club has kept details of bookings and member registration details in several separate excel files detailed below.

Customer File

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Customer Identity Number | Customer First Name | Customer Last Name | Customer Address 1 | Customer Address 2 | Customer Email | Customer Phone Number | Member or Non-Member |

Booking File

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Booking Identity Number | Customer First Name | Customer Last Name | Booking Date | Booking  Start Time | Booking Finish Time | Amount |

Member File

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Member Identity Number | Member First Name | Member Last Name | Member Address 1 | Member Address 2 | Member Email | Member Phone Number | Membership Type Code | Amount |

Staff File

|  |  |  |
| --- | --- | --- |
| Staff Identity Number | Staff First Name | Staff Last Name |

Payment File

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Payment Identity Number | Customer  First Name | Customer Last Name | Amount | Date Paid |

Membership File

|  |  |  |  |
| --- | --- | --- | --- |
| Member Type  Code | Membership Description | Annual Membership Fees | Due Date  Of Fees |

The below data is what was held on details of customers in the excel files previously used. It is required for the data to be flattened:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| CustID  A1001  A1002  A1003  A1004  A1005  A1006  A1007  A1008  A1009  A1010  A1011  A1012  A1013  A1014  A1015  A1016  A1017  A1018  A1019  A1020 | CustFName  Ray  Thomas  Barry  Warren  Quentin  Andy  Harry  Paul  Mick  Roman  Theo  Lyle  Fred  Daniel  Damian  Clinton  Cornell  Chong  Raleigh  Luke | CustLName  Roche  Lyons  Egan  Roche  Tarantino  Reid  Young  Rohan  Orpen  Weaver  Garcia  Salas  Todd  Briggs  Shaffer  Sosa  Martin  Chan  Pennington  Mahoney | CustAddr1  123 Hyde Road  12 Hurley Lane  7 Johns Hill  89 Glen Cove  65 Bills Park  34 Earls Place  122 Uluru Park  33 Oaks Place  33 Old Road  88 Park Road  123 Riverwalk  22 Hunts Hill  66 York Street  123 The Glen  56 The Folly  73 Willow Row  95 Phillips Hill  754 Earls Row  34 The Igloo  7 Church Row | CustAddr2  Dunmore  Tramore  Waterford  Waterford  Kilmeaden  Waterford  Tramore  Woodstown  Ballygunner  Waterford  Tramore  Dunmore  Kilmeaden  Waterford  Ballygunner  Tramore  Waterford  Kilmeaden  Ballygunner  Waterford | CustEmail  Ray1@hotmail.com  Tomo@hotmail.com  Barry@gmail.com  Warren76@gmail.com  Q92@hotmail.com  Andy@gmail.com  HarHar@gmail.com  Rohan@hotmail.com  Mo@hotmail.com  Roman@gmail.com  Theo@hotmail.com  Lyle@gmail.com  Fred@hotmail.com  Daniel@gmail.com  Damian@gmail.com  Clinton@hotmail.com  Cornell@hotmail.com  Chong@gmail.com  Raleigh@hotmail.com  Luke@hotmail.com | CustPhoneNo  0897889876  0876123432  0831345487  0854560098  0871903987  0891339664  0861099002  0872179209  0837895972  0873106627  0884532711  0858957767  0892844084  0862907103  0891165541  0853167307  0877654911  0894233273  0878667327  0882348765 | Member  True  False  True  False  False  True  False  True  True  False  False  False  False  False  False  False  False  False  False  False |

### 1NF

Candidate keys have been identified in Red Font and highlighted yellow, while repeating columns have been highlighted in blue. The customer data we had held has now been flattened to remove repeating rows.

Customer File

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Customer Identity Number | Customer First Name | Customer Last Name | Customer Address 1 | Customer Address 2 | Customer Email | Customer Phone Number | Member or Non-Member |

Booking File

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Booking Identity Number | Customer First Name | Customer Last Name | Booking Date | Booking  Start Time | Booking Finish Time | Amount |

Member File

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Member Identity Number | Member First Name | Member Last Name | Member Address 1 | Member Address 2 | Member Email | Member Phone Number | Membership Type Code | Amount |

Staff File

|  |  |  |
| --- | --- | --- |
| Staff Identity Number | Staff First Name | Staff Last Name |

Payment File

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Payment Identity Number | Customer  First Name | Customer Last Name | Amount | Date Paid |

Membership Type

|  |  |  |  |
| --- | --- | --- | --- |
| Member Type  Code | Membership Description | Annual Membership Fees | Due Date  Of Fees |

Customer Data has been flattened below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| CustID  A1001  A1002  A1003  A1004  A1005  A1006  A1007  A1008  A1009  A1010  A1011  A1012  A1013  A1014  A1015  A1016  A1017  A1018  A1019  A1020 | CustFName  Ray  Thomas  Barry  Warren  Quentin  Andy  Harry  Paul  Mick  Roman  Theo  Lyle  Fred  Daniel  Damian  Clinton  Cornell  Chong  Raleigh  Luke | CustLName  Roche  Lyons  Egan  Roche  Tarantino  Reid  Young  Rohan  Orpen  Weaver  Garcia  Salas  Todd  Briggs  Shaffer  Sosa  Martin  Chan  Pennington  Mahoney | CustAddr1  123 Hyde Road  12 Hurley Lane  7 Johns Hill  89 Glen Cove  65 Bills Park  34 Earls Place  122 Uluru Park  33 Oaks Place  33 Old Road  88 Park Road  123 Riverwalk  22 Hunts Hill  66 York Street  123 The Glen  56 The Folly  73 Willow Row  95 Phillips Hill  754 Earls Row  34 The Igloo  7 Church Row | CustAddr2  Dunmore  Tramore  Waterford  Waterford  Kilmeaden  Waterford  Tramore  Woodstown  Ballygunner  Waterford  Tramore  Dunmore  Kilmeaden  Waterford  Ballygunner  Tramore  Waterford  Kilmeaden  Ballygunner  Waterford | CustEmail  Ray1@hotmail.com  Tomo@hotmail.com  Barry@gmail.com  Warren76@gmail.com  Q92@hotmail.com  Andy@gmail.com  HarHar@gmail.com  Rohan@hotmail.com  Mo@hotmail.com  Roman@gmail.com  Theo@hotmail.com  Lyle@gmail.com  Fred@hotmail.com  Daniel@gmail.com  Damian@gmail.com  Clinton@hotmail.com  Cornell@hotmail.com  Chong@gmail.com  Raleigh@hotmail.com  Luke@hotmail.com | CustPhoneNo  0897889876  0876123432  0831345487  0854560098  0871903987  0891339664  0861099002  0872179209  0837895972  0873106627  0884532711  0858957767  0892844084  0862907103  0891165541  0853167307  0877654911  0894233273  0878667327  0882348765 | Member  True  False  True  False  False  True  False  True  True  False  False  False  False  False  False  False  False  False  False  False |

### 2NF

|  |  |
| --- | --- |
| Customer Table | * Customer Identity Number (Primary Key) * Customer First Name * Customer Last Name * Customer Address 1 * Customer Address 2 * Customer Email * Customer Phone Number * Member or Non-Member |
| Booking Table | * Booking Identity Number (Primary Key) * Booking Date * Booking Start Time * Booking Finish Time * Customer Identity Number (Foreign Key) * Facility Identity Number (Foreign Key) * Staff Identity Number (Foreign Key) |
| Member Table | * Member Identity Number (Primary Key) * Member First Name * Member Last Name * Member Address 1 * Member Address 2 * Member Email * Member Phone Number * Membership Type Code (Foreign Key) |
| Facility Table | * Facility Identity Number (Primary Key) * Facility Description * Facility Cost |
| Staff Table | * Staff Identity Number (Primary Key) * Staff First Name * Staff Last Name |
| Payment Table | * Payment Identity Number (Primary Key) * Amount Paid * Date of Payment * Customer Identity Number (Foreign Key) * Member Identity Number (Foreign Key) |
| Member Type Table | * Membership Type Code (Primary Key) * Membership Description * Annual Membership Fee * Due Date of Fees |

# Tables

## Meta Data

### Table: Customer

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **FIELD** | **TYPE** | **SIZE** | **NULL/not NULL** | **DEFAULT** | **CONSTRAINTS** | **INDEX** | **DESCRIPTION** |
| CustID | Varchar | 5 | Not Null |  | Unique | Primary Key | Customer Identity Number |
| CustFName | Char | 15 | Null |  |  |  | Customer First Name |
| CustLName | Char | 15 | Null |  |  |  | Customer Last Name |
| CustAddr1 | Varchar | 45 | Null |  |  |  | Customer Address 1 |
| CustAddr1 | Varchar | 45 | Null |  |  |  | Customer Address 2 |
| CustEmail | Varchar | 45 | Null |  |  |  | Customer Email |
| CustPhoneNo | Integer | INT | Null |  |  |  | Customer Phone Number |
| Member | TinyINT | INT | Not Null |  |  |  | Member or Non-Member |

### TABLE: Payment

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **FIELD** | **TYPE** | **SIZE** | **NULL/not NULL** | **DEFAULT** | **CONSTRAINTS** | **INDEX** | **DESCRIPTION** |
| PayID | Varchar | 5 | Not Null |  | Unique | Primary Key | Payment Identity Number |
| Amount | Currency | 8 |  | Null |  |  | Amount Paid |
| DatePaid | Date | 8 |  | Null |  |  | Date of Payment |
| CustID | Varchar | 5 |  |  |  | Foreign Key | Customer Identity Number |
| MemberID | Varchar | 5 |  |  |  | Foreign Key | Member Identity Number |

### Table: Member

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **FIELD** | **TYPE** | **SIZE** | **NULL/not NULL** | **DEFAULT** | **CONSTRAINTS** | **INDEX** | **DESCRIPTION** |
| MemberID | Varchar | 5 | Not Null |  | Unique | Primary Key | Member Identity Number |
| MemberFName | Char | 15 |  | Null |  |  | Member First Name |
| MemberLName | Char | 15 |  | Null |  |  | Member Last Name |
| MemberAddr1 | Varchar | 45 |  | Null |  |  | Member Address 1 |
| MemberAddr2 | Varchar | 45 |  | Null |  |  | Member Address 2 |
| MemberEmail | Varchar | 45 |  | Null |  |  | Member Email |
| MemberPhoneNo | Integer | 10 |  | Null |  |  | Member Phone Number |
| MemberTypeCode | Varchar | 5 | Not Null |  |  | Foreign Key | Membership Type Code |

### Table: Booking

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **FIELD** | **TYPE** | **SIZE** | **NULL/not NULL** | **DEFAULT** | **CONSTRAINTS** | **INDEX** | **DESCRIPTION** |
| BookID | Varchar | 5 | Not Null |  | Unique | Primary Key | Booking Identity Number |
| BookDate | Date | 8 |  | Null |  |  | Booking Date |
| BookSTime | Time | 8 |  | Null |  |  | Booking Start Time |
| BookFTime | Time | 8 |  | Null |  |  | Booking Finish Time |
| CustID | Varchar | 5 | Not Null |  |  | Foreign Key | Customer Identity Number |
| FacilityID | Varchar | 5 | Not Null |  |  | Foreign Key | Facility Identity Number |
| StaffID | Varchar | 5 | Not Null |  |  | Foreign Key | Staff Identity Number |

### Table: Staff

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **FIELD** | **TYPE** | **SIZE** | **NULL/not NULL** | **DEFAULT** | **CONSTRAINTS** | **INDEX** | **DESCRIPTION** |
| StaffID | Varchar | 5 | Not Null |  | Unique | Primary Key | Staff Identity Number |
| StaffFName | Char | 15 |  | Null |  |  | Staff First Name |
| StaffLName | Char | 15 |  | Null |  |  | Staff Last Name |

### Table: Facility

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **FIELD** | **TYPE** | **SIZE** | **NULL/not NULL** | **DEFAULT** | **CONSTRAINTS** | **INDEX** | **DESCRIPTION** |
| FacilityID | Varchar | 5 | Not Null |  | Unique | Primary Key | Facility Identity Number |
| FacilityDesc | Char | 15 |  | Null |  |  | Facility Description |
| FacilityCost | Currency | 8 |  | Null |  |  | Facility Cost |

### Table: Membership Type

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **FIELD** | **TYPE** | **SIZE** | **NULL/not NULL** | **DEFAULT** | **CONSTRAINTS** | **INDEX** | **DESCRIPTION** |
| MemberTypeCode | Varchar | 5 | Not Null |  | Unique | Primary Key | Membership Type Code |
| MemberTypeDesc | Char | 30 |  | Null |  |  | Membership Description |
| AnnualMemberFee | Currency | 8 |  | Null |  |  | Annual Membership Fee |
| FeeDueDate | Date | 8 |  | Null |  |  | Due Date of Fees |

## Table Layout

### Table: Customer

|  |  |
| --- | --- |
| Customer Table | * Customer Identity Number (Primary Key) * Customer First Name * Customer Last Name * Customer Address 1 * Customer Address 2 * Customer Email * Customer Phone Number * Member or Non-Member |

### Table: Payment

|  |  |
| --- | --- |
| Payment Table | * Payment Identity Number (Primary Key) * Amount Paid * Date of Payment * Customer Identity Number (Foreign Key) * Member Identity Number (Foreign Key) |

### Table: Member

|  |  |
| --- | --- |
| Member Table | * Member Identity Number (Primary Key) * Member First Name * Member Last Name * Member Address 1 * Member Address 2 * Member Email * Member Phone Number * Membership Type Code (Foreign Key) |

### Table: Booking

|  |  |
| --- | --- |
| Booking Table | * Booking Identity Number (Primary Key) * Booking Date * Booking Start Time * Booking Finish Time * Customer Identity Number (Foreign Key) * Facility Identity Number (Foreign Key) * Staff Identity Number (Foreign Key) |

### Table: Staff

|  |  |
| --- | --- |
| Staff Table | * Staff Identity Number (Primary Key) * Staff First Name * Staff Last Name |

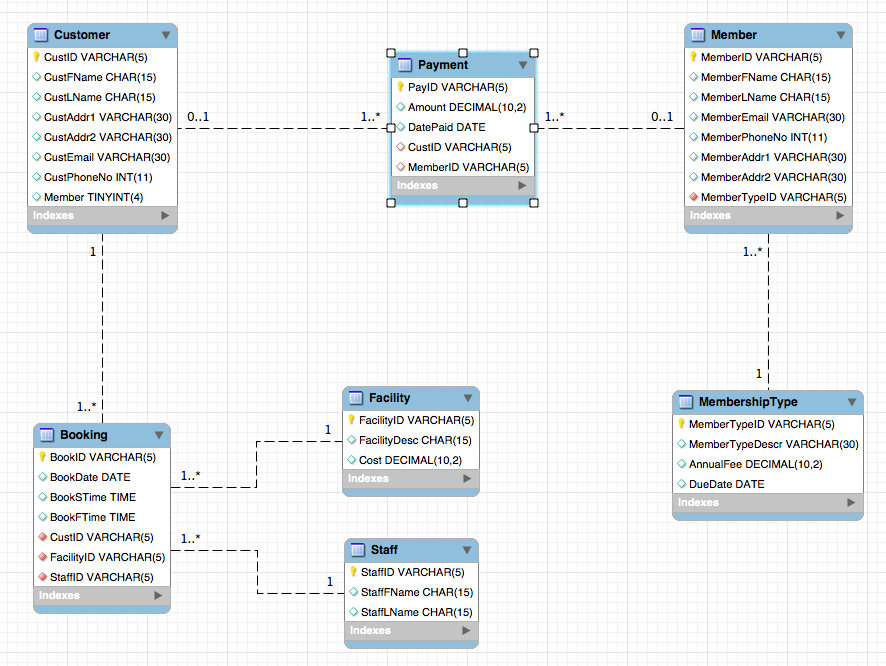
### Table: Facility

|  |  |
| --- | --- |
| Facility Table | * Facility Identity Number (Primary Key) * Facility Description * Facility Cost |

### Table: Membership Type

|  |  |
| --- | --- |
| Member Type Table | * Membership Type Code (Primary Key) * Membership Description * Annual Membership Fee * Due Date of Fees |

## ER DIAGRAM:



# Queries

## Query 1:

### Show all members with address with ‘town’ in the name.

SELECT \* FROM Member

WHERE MemberAddr2 LIKE '%town';

## Query 2:

### Show all members with address like ‘Dun’.

SELECT \* FROM Member

WHERE MemberAddr2 LIKE 'Dun\_\_\_\_';

## Query 3:

### Show the facilities that can be booked for 55 or less

SELECT \* FROM Facility

WHERE cost <= 55;

## Query 4:

### Show all payments received from Members between 17th September and 21st September.

SELECT PayID, Amount, DatePaid,MemberID FROM Payment

WHERE DatePaid BETWEEN '2017-09-17' AND '2017-09-21'

and MemberID is not null

## Query 5:

### Show all Customers from Kilmeaden, Tramore or Ballygunner and order by surname.

SELECT \* FROM Customer

WHERE CustAddr2 IN ( 'Kilmeaden', 'Tramore','Ballygunner')

ORDER BY CustLName;

## Query 6:

### Show average payment made

SELECT AVG (Amount) AS Average\_Amount\_Paid

FROM Payment;

## Query 7:

### Show Maximium, minimium and average cost of membership

Select max(AnnualFee) as Most\_Expensive, min(AnnualFee) as Least\_Expensive, avg(AnnualFee) as Average\_Membership\_Cost

from MembershipType

## Query 8:

### Join: Show all members who are players

SELECT Member.MemberID AS Member\_Identity, Member.MemberFName as Member\_First\_Name, Member.MemberLName as Member\_Last\_Name,

MembershipType.MemberTypeDescr as Membership\_Type\_Description, MembershipType.AnnualFee, MembershipType.DueDate

FROM Member, MembershipType

WHERE Member.MemberTypeID = MembershipType.MemberTypeID

AND MembershipType.MemberTypeID = 'T1001';

## Query 9:

### Join: Show All Non-Playing Members

SELECT Member.MEMBERID, Member.MEMBERFNAME, Member.MEMBERLNAME,

MembershipType.MEMBERTYPEDESCR, MembershipType.ANNUALFEE, MembershipType.DUEDATE

FROM MEMBER, MEMBERSHIPTYPE

WHERE Member.MEMBERTYPEID = MembershipType.MEMBERTYPEID

AND MembershipType.MEMBERTYPEID in ('T1002','T1003')

## Query 10:

### Join: All Bookings taken by Dan Smith

SELECT Staff.StaffID as Staff\_Identity, Staff.stafffname as Staff\_First\_Name, Staff.staffLName as Staff\_Last\_Name,

Booking.bookid as Booking\_Identity, Booking.bookdate as Booking\_Date, Booking.bookstime as Booking\_Start\_Time, Booking.bookftime as Booking\_Finish\_Time

FROM staff, booking

WHERE Booking.StaffID = Staff.StaffID

AND Staff.staffID = 'S1003';

## Query 11:

### Join: Details of Customers who have booked the clubhouse.

SELECT Customer.CUSTID as Customer\_Identity, Customer.CUSTFNAME as Customer\_First\_Name, Customer.CUSTLNAME as Customer\_Last\_Name,

Booking.BOOKID as Booking\_Identity, Booking.BOOKDATE as Booking\_Date, Booking.BOOKSTIME as Booking\_Start\_Time, Booking.BOOKFTIME as Booking\_Finish\_Time,

Facility.FACILITYID as Facility\_Identity, Facility.FACILITYDESC as Facility\_Description

FROM BOOKING, CUSTOMER, Facility

WHERE Facility.FacilityID = Booking.FacilityID

AND Booking.CustID = Customer.CustID

and Facility.FacilityID = 'F1004'

## Query 12:

### Outer Join: Show all members, their membership type and the cost of their membership and details of when they paid their Annual Fees

SELECT Member.MemberID as Member\_Identity, Member.MemberFName as Member\_First\_Name, Member.MemberLName as Member\_Last\_Name, MembershipType.MemberTypeDescr as Membership\_Type\_Description, MembershipType.AnnualFee, Payment.PayID as PaymentID, Payment.DatePaid, Payment.Amount

from Payment

INNER join Member

on Member.MemberID = Payment.MemberID

INNER join MembershipType

on MembershipType.MemberTypeID = Member.MemberTypeID

## Query 13:

### Outer Join: Shows who was each bookings customer, the staff member who took the booking and the facility being used by each booking.

SELECT Customer.CustFName as Customer\_First\_Name, Customer.CustLName as Customer\_Last\_Name, Booking.BookID as Booking\_Identity, Booking.BookDate as Booking\_Date, Booking.BookSTime as Booking\_Start\_Time, Booking.BookFTime as Booking\_Finish\_Time, Staff.StaffID as Staff\_Identity, Staff.StaffFName as Staff\_First\_Name, Staff.StaffLName as Staff\_Last\_Name, Facility.FacilityID as Facility\_Identity, Facility.FacilityDesc as Facility\_Description

FROM Customer

inner join Booking

on Booking.CustID = Customer.CustID

INNER JOIN Facility

ON Booking.FacilityID = Facility.FacilityID

INNER JOIN Staff

ON Booking.StaffID = Staff.StaffID

# Views

## View 1:

### Booking Details:

Shows all details of bookings held in the database.

## View 2:

### Bookings Taken that finish before 8:00:

Shows all details of bookings held in the database that finish before 8:00.

## View 3:

### Customer Booking View:

Shows all details of bookings held in the database that a customer will be able to see.

## View 4:

### Highest Payment:

Shows all details of the top 10 payments made.