IFS 242 Class Individual Assignment, 2023

Due Date : 8 May 2023,17:00

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The Development Process

Problem

1. The Problem Statement : (Analysis Phase)
    - Overview
    - The Requirements
    - Entities Involved
2. Use Case Diagrams : (Analysis + Design Phase)
    - Use Case Diagrams
    - Data Entities Involved
    - Database Tables

Solution

3. Entity Related Diagrams : (Design Phase)
    - Designing The Database.
4. Database Implementation : (Implementation phase)
    - SQL DDL Queries
    - SQL DML Queries

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1. The Problem Statement

Overview :

The adventure games company is in need of transitioning its operations to online while maintaining proper record-keeping as they are becoming popular.
The organisation decides to make use of a Relational Database to keep proper records.

The Requirements :

The employee of the adventure company should be able to…

- Keep record of the adventures: Adventure name, Adventure environment (indoors or outdoors) Adventure duration (60 - 90 minutes) Adventure Cost, Adventure location and place (2 fields, 7 playing rooms).
  (Adventures have 2 playing fields and 7 adventure rooms therefore the indoor adventures have multiple locations, therefore they should be able to record what location the adventure is held
- Keep record of group information, which adventures they have booked and the number of people in the group as well as the observer assigned to the group. The group must contain at least 2 and no more than 6 people. A group can have many players,therefore the employee should be able to view all the players who are part of a specific group.
- Keep record of attendance: Record whether or not any group turns up for an adventure or is a no show.
- Keep record of the slots available: Record the information regarding the slots available, there are two slots in the morning and two slots in the evening. Slots are open everyday except for Mondays.
- Keep record of the bookings : Record the slots that have been booked by each group.
- Keep record of the observers : Record the name of the observer and the employee's cell phone number.
- Keep record of the players in case of an emergency : Record player SA ID number, player name and surname, player emergency number,own cell phone number and player

email. (The company will have to record the activity of each player as a player can participate in many adventures).

Players/people should be able to…

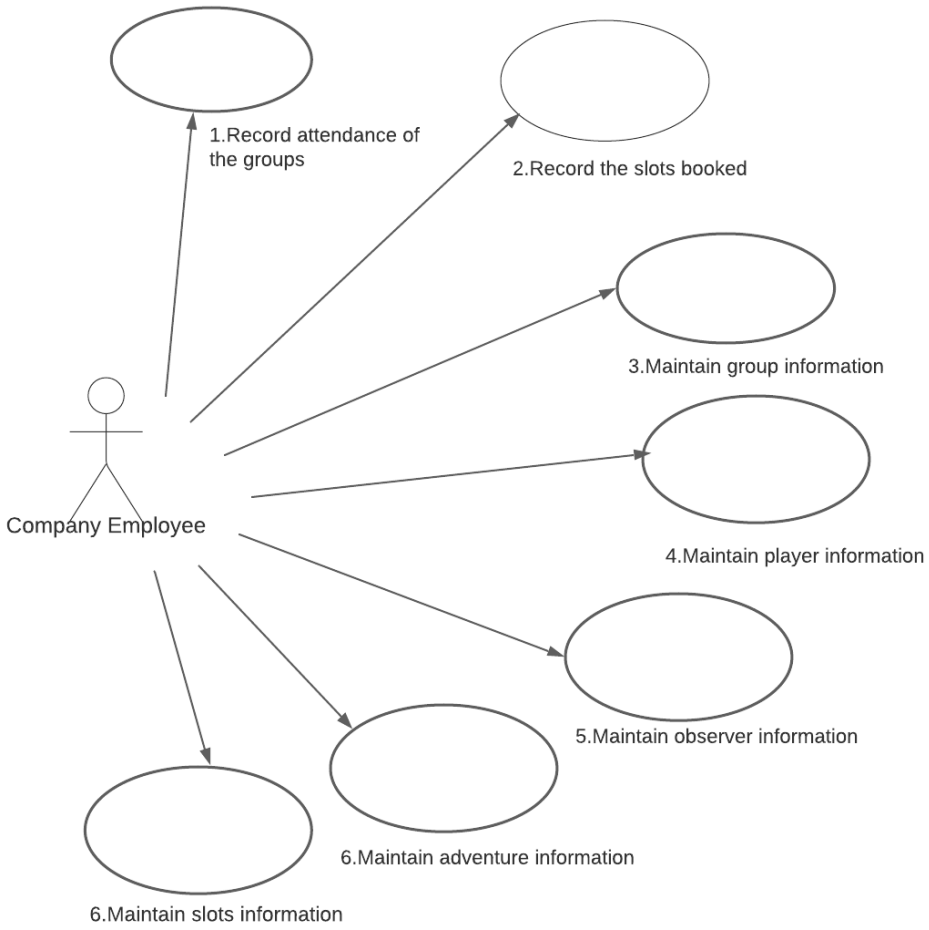
- View the slots available: View the information regarding the slots available, there are two slots in the morning and two slots in the evening. Slots are open everyday except for Mondays.
- View the 6 adventures the company offers: Adventure name, Adventure environment (indoors or outdoors) Adventure duration (60 - 90 minutes) Adventure Cost, Adventure location and place (2 fields, 7 playing rooms).
  (Adventures have 2 playing fields and 7 adventure rooms therefore the indoor adventures have multiple locations, therefore they should be able to record what location the adventure is held

Entities

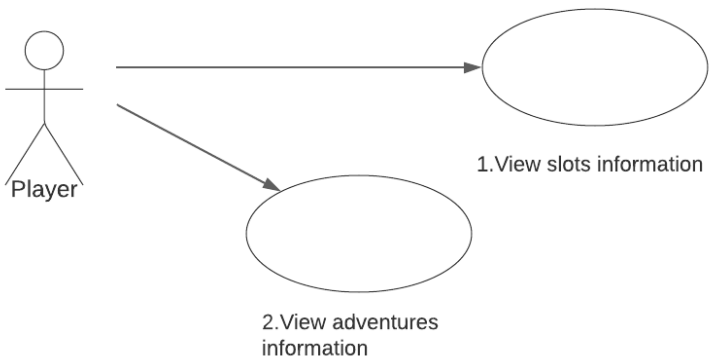
- Adventure : This entity represents the adventure games provided by the company.
- Attendance : This entity represents whether or not a group has shown up.
- Player : This entity represents the individuals who are players.
- Observer : This entity represents the employees of the company who accompany each group during their adventure.
- Slots : This entity represents the information regarding the slots available.
- Bookings : This entity represents the slots that have been booked by the groups.
- Groups : This entity represents the group of people who come to play adventure games.

2. Use Case Diagrams for the Adventure Game Company

Use case 1 :



Use case 2 :



Data entities (final entities) :

- Adventure : This entity represents the different adventure games provided by the company.
- Attendance : This entity represents whether or not a group has shown up.
- Player : This entity represents the individuals who are part of a group.
- Observer : This entity represents the employees of the company who accompany each group during their adventure.
- Slots : This entity represents the information regarding the slots available.
- Bookings : This entity represents the slots that have been booked by the groups.
- Groups : This entity represents the group of people who come to play adventure games.
- group_players : This entity represents the players who are part of each group.
- adventure_location : This entity represents the different locations each adventure takes place in.
- player_participation : This entity represents the different adventures each player has taken part in.

Database Tables :

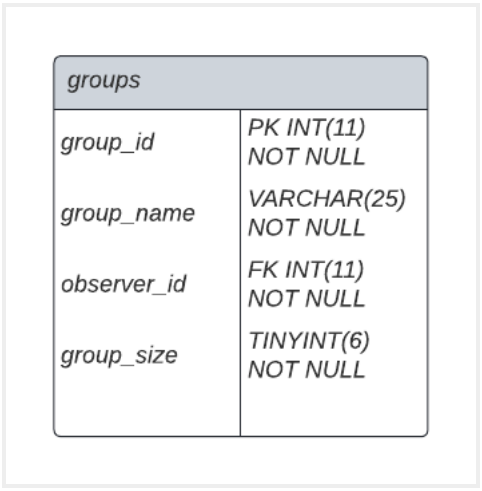
Adventure location

adventure_location	
adventure_location_id	*PK INT(11) NOT NULL*
adventure_location	*VARCHAR(25) NOT NULL*
adventure_id	*FK INT(11)*

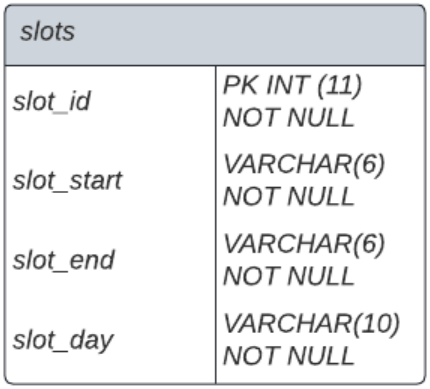
Adventure

adventures	
adventure_id	*PK INT(11) NOT NULL*
adventure_name	*VARCHAR(25) NOT NULL*
adventure_environment	*VARCHAR(10) NOT NULL*
adventure_price	*DECIMAL(8,2) NOT NULL*
adventure_duration	*VARCHAR(5) NOT NULL*
adventure_place	*VARCHAR(25) NOT NULL*

Groups



Slots



Player

player	
player_id	PK INT(11) NOT NULL
player_sa_id_num	CHAR(13) NOT NULL
player_name	VARCHAR(25)
player_lastname	VARCHAR(25)
player_gender	CHAR(1) ('M' or 'F')
player_emergency_num	CHAR(12)
player_number	CHAR(12)
player_email	VARCHAR(50)

Observer

observer	
observer_id	PK INT(11) NOT NULL
observer_name	VARCHAR(25) NOT NULL
observer_number	CHAR(12) NOT NULL

Attendance

attendance	
attendance_id	PK INT(11) NOT NULL
attendance_status	VARCHAR(10) NOT NULL
group_id	FK INT(11) NOT NULL

Player participation

player_participation	
player_part_id	PK INT(11) NOT NULL
adventure_id	FK INT(11) NOT NULL
player_id	FK INT(11) NOT NULL
booking_id	FK INT(11)NOT NULL

Groups Players

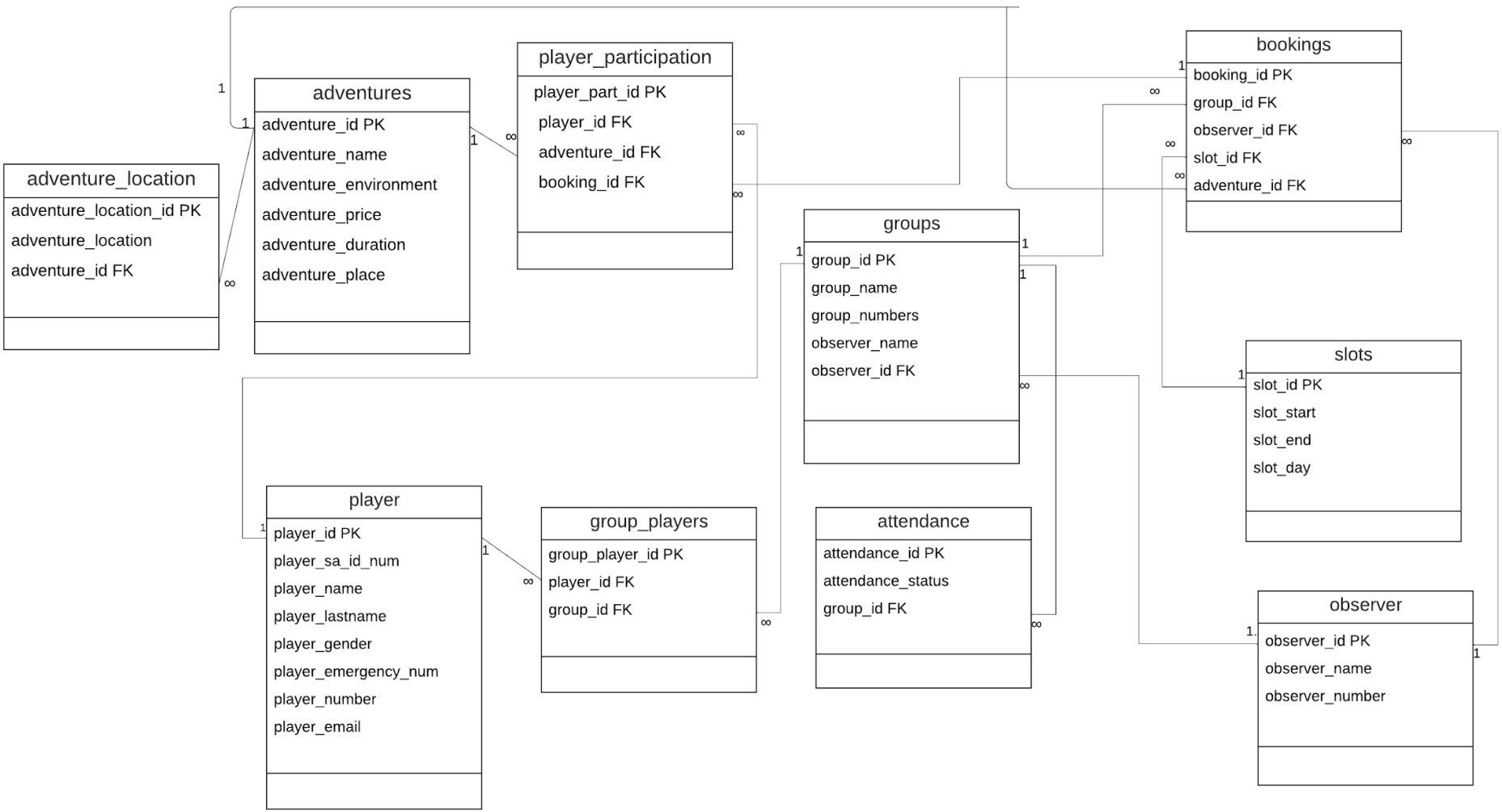
group_players	
group_player_id	PK INT NOT NULL
player_id	FK INT(11) NOT NULL
group_id	FK INT(11) NOT NULL

Bookings

bookings	
booking_id	PK INT(11) NOT NULL
booking_date	DATE NOT NULL
observer_id	FK INT(11) NOT NULL
group_id	FK INT(11)NOT NULL
slot_id	FK INT(11) NOT NULL
adventure_id	FK INT(11) NOT NULL

3. Entity Related Diagram

KEYS : FK = Foreign Key, PK = Primary Key , 1=1, infinity symbol = many


adventure_location
adventure_location_id PK
adventure_location
adventure_id FK
adventures
adventure_id PK
adventure_name
adventure_environment
adventure_price
adventure_duration
adventure_place
player_participation
player_part_id PK
player_id FK
adventure_id FK
booking_id FK
bookings
booking_id PK
group_id FK
observer_id FK
slot_id FK
adventure_id FK
groups
group_id PK
group_name
group_numbers
observer_name
observer_id FK
slots
slot_id PK
slot_start
slot_end
slot_day
player
player_id PK
player_sa_id_num
player_name
player_lastname
player_gender
player_emergency_num
player_number
player_email
group_players
group_player_id PK
player_id FK
group_id FK
attendance
attendance_id PK
attendance_status
group_id FK
observer
observer_id PK
observer_name
observer_number

4. Database Implementation

1. DDL Queries to build database tables :

Creating the Database:

```
CREATE DATABASE adventure
```

Creating the tables

```
CREATE TABLE adventures (
adventure_id INT NOT NULL,
PRIMARY KEY (adventure_id),
adventure_name VARCHAR(25) NOT NULL,
adventure_environment VARCHAR(25) NOT NULL,
adventure_price  DECIMAL(4,2) NOT NULL,
adventure_duration VARCHAR(5) NOT NULL,
adventure_place VARCHAR(25) NOT NULL,
);
INSERT INTO adventure (adventure_id, adventure_name, adventure_environment,
adevnture_price, adventure_duration,adventure_place)
VALUES
(1,'Bouldering', 'Indoor', '80.00', '60min','Adventure room'),
(2,'Horse-riding','Outdoor', '120.00', '90min','Playing Field'),
(3,'Iceskating', 'Indoor', '180.00', '60min','Adventure room'),
(4,'Lazer Tag', 'Indoor', '80.00', '60min','Adventure room'),
(5,'Paintballing', 'Outdoor', '150.00', '90min','Playing Field'),
(6,'Scavenger Hunt', 'Indoor', '90.00', '60min','Adventure room'),

CREATE TABLE adventure_location (
adventure_location_id INT  NOT NULL,
```

```
adventure_location VARCHAR(25) NOT NULL,
adventure_id INT(11) NOT NULL)
PRIMARY KEY(adventure_location_id);

INSERT INTO adventure_location (adventure_location_id, adventure_location, adventure_id)
VALUES
(1,’Rygrass Field’,2),
(2,’Longwood Field’,5),
(3,’Room1’,6),
(4,’Room2’,6),
(5,’Room3’,1),
(6,’Room4’,1),
(7,’Room5’,4),
(8,’Room6’,4),
(9,’Room7’,3);
ALTER TABLE `adventure_location` ADD FOREIGN KEY (`adventure_id`) REFERENCES
`adventures `(`adventure_id`) ON DELETE CASCADE ON UPDATE CASCADE;

CREATE TABLE observer (
observer_id INT NOT NULL,
observer_name VARCHAR(25) NOT NULL,
observer_number CHAR(12) NOT NULL,
PRIMARY KEY (observer_id)
);
INSERT INTO observer (
observer_id, observer_name, observer_number
)
VALUES
(1, 'John', '(081)7123456'),
(2, 'Jane', '(061)7789012'),
(3, 'Aqeelah', '(082)8345678'),
```

```
(4, 'Xosi', '(081)7652341'),
(5, 'Nathi', '(082)6671234'),
(6, 'Kira', '(082)7683465');

CREATE TABLE player (
player_id INT NOT NULL,
PRIMARY KEY (player_id ),
player_sa_id_num CHAR(13) NOT NULL,
player_name VARCHAR(25) NOT NULL,
player_lastname VARCHAR(25) NOT NULL,
player_gender CHAR(1) NOT NULL ,
player_emergency_num VARCHAR(12)  NOT NULL,
player_number CHAR(12) NOT NULL,
player_email VARCHAR(50) NOT NULL);

INSERT INTO player (`player_id`, `player_sa_id_num`, `player_name`,`player_lastname`,
`player_gender`, `player_emergency_num`, `player_number`, `player_email`)
VALUES
('1', '0310215092089', 'Ilyaaz', 'Muhammad', 'M', '(081)4256678', '(061)5467789',
'Ilyaazmuhammad@gmail.com')
 ('2','0110030182089','Rania', 'Solomons','F','(081)3456799','(082)6758897',
'Raniasolomons@gmail.com');
('3','0211145789045','Yahya', 'Solomons','M','(081)3456799','(081)6783738',
'Yahyasolomons@gmail.com'),
('4','0611035976089','Mikaeel','Omar','M','(072)6781234','(061)3517892',
'Mikaeelomar1@gmail.com'),
('5','0310135035014','Muhammad','Peters','M','(082)4567890','(082)4182571',
'Muhammadpeters@gmail.com'),
('6','0211145789045','Jared','Ackers','M','(081)3247580','(061)8727898',
'JaredAcker123@gmail.com'),
('7','0112295888075', 'Josh','Nightley','M','(061)5647890','(082)7836785','JoshN@gmail.com'),
```

('8','0112051752076','Ally','Berlin','F','(082)8762637','(081)5126677','AlleyBerlin@icloud.com'),
('9','0211145789045','Lily', 'Saline','F','(062)7653879','((081)6751122','LilySaline@icloud.com');

CREATE TABLE slots (
slot_id INT NOT NULL,
PRIMARY KEY(slot_id),
slot_start VARCHAR(6) NOT NULL,
slot_end VARCHAR(6) NOT NULL,
slot_day VARCHAR(10) NOT NULL,
);

INSERT INTO slots (slot_id, slot_start, slot_end, slot_day)
VALUES
('1', '08:00', '09:00', 'Tuesday'),
('2', '9:30 ', '11:00', 'Tuesday'),
('3', '13:00', '14:00', 'Tuesday'),
('4', '14:30', '16:00', 'Tuesday'),
('5', '08:00', '09:00', 'Wednesday'),
('6', '9:30 ', '11:00', 'Wednesday'),
('7', '13:00', '14:00', 'Wednesday'),
('8', '14:30', '16:00', 'Wednesday'),
('9', '08:00', '09:00', 'Thursday'),
('10', '9:30 ', '11:00', 'Thursday'),
('11', '13:00', '14:00', 'Thursday'),
('12', '14:30', '16:00', 'Thursday'),
('13', '08:00', '09:00', 'Friday'),
('14', '9:30 ', '11:00', 'Friday'),
('15', '14:30', '16:00', 'Friday'),
('16', '08:00', '09:00', 'Saturday'),
('17', '9:30 ', '11:00', 'Saturday'),
('18', '14:30', '16:00', 'Saturday'),

('19', '13:00', '14:00', 'Saturday'),
('20', '08:00', '09:00', 'Sunday'),
('21', '9:30 ', '11:00', 'Sunday');

CREATE TABLE group_players (
group_player_id INT NOT NULL,
PRIMARY KEY(group_player_id),
player_id INT NOT NULL,
group_id INT NOT NULL
);
INSERT INTO group_players (group_player_id,group_player_name, group_name,player_id,
group_id)
VALUES
(1,1,1),
(2,2,1),
(3,3,1),
(4,4,1),
(5,2,2),
(6,5,2),
(7,4,3),
(8,6,3),
(9,7,4),
(10,1,4),
(11,2,5),
(12,8,5),
(13,9,6),
(14,8,6),
(15,10,6),
(16,2,7),
(17,9,7),
(18,8,7),

```
 (19,4,7);

ALTER TABLE `group_players` ADD FOREIGN KEY (`group_id`) REFERENCES
`groups`(`group_id`) ON DELETE CASCADE ON UPDATE CASCADE;
ALTER TABLE `group_players` ADD FOREIGN KEY (`player_id`) REFERENCES
`player`(`player_id`) ON DELETE RESTRICT ON UPDATE RESTRICT;

CREATE TABLE player_participation (
player_part_id INT NOT NULL,
PRIMARY KEY (player_part_id),
adventure_id INT NOT NULL,
booking_id,
player_id INT NOT NULL);
INSERT INTO player_participation (player_part_id, adventure_id, booking_id, player_id)
VALUES
(1,5,1,2),
(2,2,2,2),
(3,4,5,2),
(4,5,7,2),
(5,4,5,8),
(6,3,6,8),
(7,2,2,5),
(8,3,6,9),
(9,3,6,10),
(10,5,7,9),
(11,5,7,10),
(12,5,7,11),
(13,5,7,4),
(14,5,1,3),
(15,5,1,4),
(16,5,1,1),
```

```
(17,6,3,4),
(18,6,3,6),
(19,1,4,7),
(20,1,4,1);

ALTER TABLE `player_participation` ADD CONSTRAINT `player_participation_ibfk_1`
FOREIGN KEY (`adventure_id`) REFERENCES `adventures`(`adventure_id`) ON DELETE
CASCADE ON UPDATE CASCADE;
ALTER TABLE `player_participation` ADD FOREIGN KEY (`booking_id`) REFERENCES
`bookings`(`booking_id`) ON DELETE RESTRICT ON UPDATE RESTRICT;
ALTER TABLE `player_participation` ADD FOREIGN KEY (`player_id`) REFERENCES
`player`(`player_id`) ON DELETE RESTRICT ON UPDATE RESTRICT;

CREATE TABLE attendance (
  attendance_id INT NOT NULL PRIMARY KEY,
  attendance_status VARCHAR(10) NOT NULL,
  group_id INT NOT NULL
);

INSERT INTO attendance (attendance_status,group_id)
VALUES
  (1, 'present',1),
  (2, 'present',2),
  (3, 'present',3),
  (4, 'present',4),
  (5, 'present',5),
  (6, 'present',6),
  (7, 'present',7);

ALTER TABLE ‘attendance’ ADD FOREIGN KEY (`group_id`) REFERENCES
`groups`(`group_id`) ON DELETE CASCADE ON UPDATE CASCADE;
```

```
CREATE TABLE groups (
group_id INT NOT NULL,
group_name VARCHAR(25) NOT NULL,
PRIMARY KEY (group_id),
group_size INT NOT NULL,
observer_id INT NOT NULL);
INSERT INTO groups (group_id, group_name,group_numbers,observer_id)
VALUES
(1,'Warriors',4,1),
(2,'Wildtamers',2,2),
(3,'MysterySolvers',2,3),
(4,'FearlessFighters',2,4),
(5,'Survivors',2,5),
(6,'Gliders',2,6),
(7,'Vultures',5,3);
ALTER TABLE ‘groups’ ADD FOREIGN KEY (`observer_id`) REFERENCES
`observer`(`observer_id`) ON DELETE CASCADE ON UPDATE CASCADE;

CREATE TABLE bookings (
    booking_id INT NOT NULL,
    PRIMARY KEY (booking_id),
    booking_date DATE NOT NULL,
    adventure_id INT NOT NULL,
    group_id INT NOT NULL,
    observer_id INT NOT NULL,
    slot_id INT NOT NULL
);
INSERT INTO bookings (
    booking_id,
    booking_date,
```

```
   group_id,
   observer_id,
   slot_id,
   adventure_id,)
VALUES
(1,'2021-06-23',1,1,6,5),
(2,'2021-06-23',2,2,8,2),
(3,'2021-06-22',3,3,3,6),
(4,'2021-06-19',4,4,20,1),
(5,'2021-06-15',5,5,1,4)
(6,'2021-06-09',6,6,7,3)
(7,''2021-06-19',7,3,21,5);

ALTER TABLE ‘bookings’ ADD FOREIGN KEY (`group_id`) REFERENCES
`groups`(`group_id`) ON DELETE CASCADE ON UPDATE CASCADE;
ALTER TABLE ‘bookings’ ADD FOREIGN KEY (`observer_id`) REFERENCES
`observer`(`observer_id`) ON DELETE CASCADE ON UPDATE CASCADE;
ALTER TABLE ‘bookings’ ADD FOREIGN KEY (`slot_id`) REFERENCES `slots`(`slot_id`)
ON DELETE CASCADE ON UPDATE CASCADE;
```

2. SELECT * FROM `player` ORDER BY `player_lastname` ASC;
3. INSERT INTO `player`(`player_id`, `player_sa_id_num`, `player_name`, `player_lastname`, `player_gender`, `player_emergency_number`, `player_number`, `player_email`);
   VALUES ([value1],[value2],[value3],[value4],[value5],[value6],[value7],[value8])
   Inserting player named ‘Kefilwe Grace’
   INSERT INTO `player`(`player_id`, `player_sa_id_num`, `player_name`, `player_lastname`, `player_gender`, `player_emergency_number`, `player_number`, `player_email`) VALUES
   (11,`0611034976059`,Kefilwe,Grace,F,(081)8976574,(021)6968443,Kefilwegrace45@gmail.com)

4. //
5. SELECT player_participation.player_id, player.player_name, groups.group_name, adventures.adventure_name, slots.slot_day, bookings.slot_id
   FROM player_participation, player, groups, adventures, slots, bookings
   WHERE player.player_id = player_participation.player_id
   AND player_participation.adventure_id = adventures.adventure_id
   AND player_participation.booking_id = bookings.booking_id
   AND bookings.slot_id = slots.slot_id
   AND adventures.adventure_name = 'Paintballing' AND slots.slot_day = 'Sunday'
   AND groups.group_name = 'Vultures';
6. SELECT DISTINCT group_name
   FROM groups
   WHERE group_id IN(SELECT group_id FROM group_players WHERE player_id = '2');
7. SELECT adventures.adventure_name, bookings.booking_date, player_participation.player_id
   FROM adventures, bookings, player_participation, player
   WHERE player_participation.player_id = player.player_id
   AND player_participation.adventure_id = bookings.adventure_id
   AND bookings.adventure_id = adventures.adventure_id
   AND player.player_id = '3';
8. SELECT COUNT(adventure_id) AS count_participation
   FROM player_participation WHERE adventure_id = '5';
9. SELECT DISTINCT adventure_name
   FROM adventures
   WHERE adventure_id IN (SELECT adventure_id FROM bookings WHERE booking_date = '2021-06-23');
10. SELECT observer.observer_name, observer.observer_number, bookings.booking_date, slots.slot_day, slots.slot_start, slots.slot_end
    FROM observer, bookings, slots
    WHERE observer.observer_id = bookings.observer_id

```
AND bookings.slot_id = slots.slot_id
AND bookings.booking_date = '2021-06-15'
AND slots.slot_start = '08:00'
AND slots.slot_end = '09:00'
AND slots.slot_day = 'Tuesday';
```

END