The University of Zambia

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ZCAS University

BIT221/BTS/BBM221: INTRODUCTION TO DATABASES

ASSIGNMENT No 2

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STUDENT NUMBER:	**ZU19254**
COURSE:	**INTRODUCTION TO DATABASES**
STUDY PROGRAM:	**BACHELOR OF SCIENCE IN INTERNET TECHNOLOGIES AND SECURITY**
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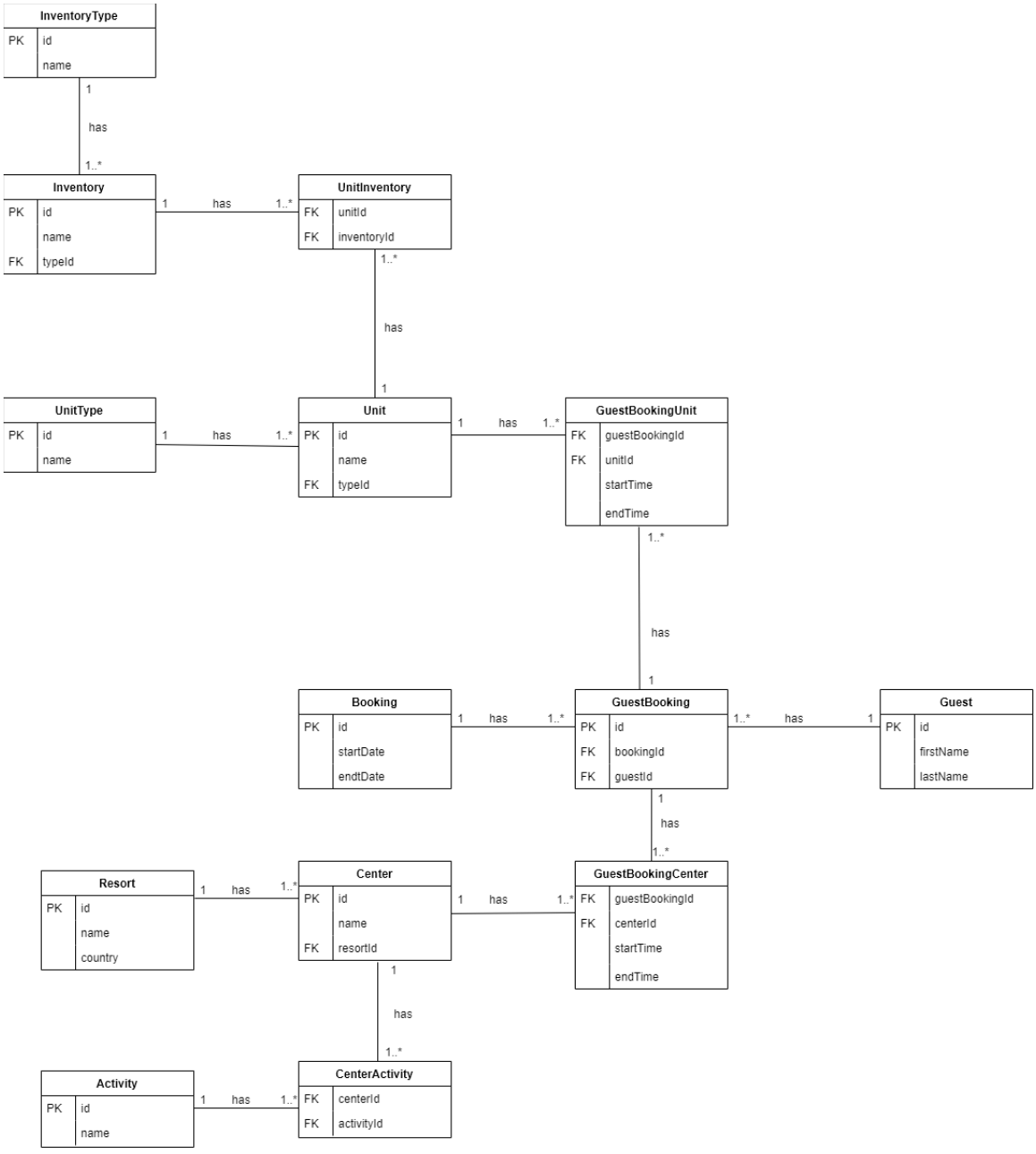
DATE:	**10TH MAY 2020**

TASK 1 – DESIGN

a) Bright Green Holidays ERD



b)

Normalization of the sample data provided resulted in a much more efficient ERD that will lead to less redundancy when updating and deleting values in the database tables. This is so because, some unnecessary fields had to be removed, such as the “Member y/n” field in the “Booking List” table that I found redundant as this can be solved with queries that give much more

accurate date for verification if someone is a member or not from the new “Customer” table as seen in the designed ERD.

Other fields were regrouped to create new entities for a much more accurate representation and, I believe, better data entry, analysis and more. An example is the ambiguity that could exists in the “Session and fees” table where two session numbers would have to be entered for the same session if the session happened on both the 1st and 2nd floor on the same day. Extracting the floor and the fee fields to create a new “Floor” table allows for the proper representation of the session and the floor. Therefore, their manipulation becomes easier. The sample data also shows different prices for each floor even if it not specified explicitly in the club’s background. Such normalization would allow changing of that logic to be easy rather than going through the whole table to change every instance if an error was ever made.

c)

1) InventoryType

fieldName	dataType	size	Constraint	description
id	int		Primary Key	inventory type unique identifier
name	varchar	50	not null	the name of the inventory type

2) Inventory

fieldName	dataType	size	Constraint	description
id	int		Primary Key	inventory unique identifier
name	varchar	50	not null	the name of the inventory item
typeId	int		Foreign key	inventory type unique identifier and link to the InventoryType table

3) UnitInventory

fieldName	dataType	size	Constraint	description
unitId	int		Foreign Key	the unit unique identifier and link to the Unit table
inventoryId	int		Foreign Key	the inventory unique identifier and link to the Inventory table

4) Unit

fieldName	dataType	size	Constraint	description
id	int		Primary Key	unit unique identifier
name	varchar	50	not null	the name of the unit
typeid	int		Foreign Key	the unit type unique identifier and link to the UnitType table

5) UnitType

fieldName	dataType	size	Constraint	description
id	int		Primary Key	the unit type unique identifier
name	varchar	50	not null	the name of the unit type

6) GuestBookingUnit

fieldName	dataType	size	Constraint	description
guestBookingId	int		Foreign Key	guest booking unique identifier and link to the GuestBooking table
unitId	int		Foreign Key	unit unique identifier and link to the Unit table
startTime	datetime		not null	the date and time at which a guest started staying in a unit during a specific booking
endTime	datetime			the date and time at which a guest stopped staying at a unit during a specific booking

7) GuestBooking

fieldName	dataType	size	Constraint	description
id	int		Primary Key	Guest booking unique identifier. Since multiple guests can have the same booking, this gives each user a unique identifier related to that specific guest
bookingId	varchar	100	Foreign Key	booking unique identifier and link to the Booking table
guestId	int		Foreign Key	guest unique identifier and link to the Guest table

8) Booking

fieldName	dataType	size	Constraint	description
id	varchar	100	Primary Key	booking unique identifier
startDate	date		not null	date the booking was made
endDate	date			date the booking ends

9) Guest

fieldName	dataType	size	Constraint	description
id	int		Primary Key	guest unique identifier
firstName	varchar	50	not null	guest first name
lastName	varchar	50	not null	guest last name

10) GuestBookingCenter

fieldName	dataType	size	Constraint	description
guestBookingId	int		Foreign Key	guest booking unique identifier and link to the GuestBooking table
centerId	int		Foreign Key	center unique identifier and link to the Center table
startTime	datetime		not null	the date and time a guest registered at a center during a specific booking
endTime	datetime			the date and time a guest deregistered at a center during a specific booking

11) Center

fieldName	dataType	size	Constraint	description
id	int		Primary Key	center unique identifier
name	varchar	75	not null	the name of the center
resortId	int		Foreign Key	resort unique identifier and link to the Resort table

12) Resort

fieldName	dataType	size	Constraint	description
id	int		Primary Key	resort unique identifier
name	varchar	75	not null	the resort's name
country	varchar	50	Not null	Country in which the resort is based

13) CenterActivity

fieldName	dataType	size	Constraint	description
centerId	int		Foreign Key	center unique identifier and link to the Center table
activityId	int		Foreign Key	activity unique identifier and link to the Activity table

14) Activity

fieldName	dataType	size	Constraint	description
id	int		Primary Key	activity unique identifier
name	varchar	50	not null	name of the activity

TASK 2

- Create the tables. Make sure you show the CREATE scripts as running in the programming environment

1. CREATE TABLE InventoryType

   (

   id int primary key,

   name varchar(50) not null

   );

2. CREATE TABLE Inventory

   (

   id int primary key,

   name varchar(50) not null,

   typeId int not null,

   foreign key(typeId) references InventoryType(id)

   );

3. CREATE TABLE UnitType

   (

   id int primary key,

   name varchar(50) not null

   );

4. CREATE TABLE Unit

   (

   id int primary key,

   name varchar(50) not null,

   typeId int not null,

   foreign key(typeId) references UnitType(id)

   );

5. CREATE TABLE UnitInventory

   (

   unitId int not null,

   inventoryId int not null,

   foreign key(unitId) references Unit(id),

   foreign key(inventoryId) references Inventory(id)

   );

6. CREATE TABLE Guest

   (

   id int primary key,

   firstName varchar(50) not null,

   lastName varchar(50) not null

   );

7. CREATE TABLE Booking

   (

   id varchar(100) primary key,

   startDate date not null,

   endDate date

   );

8. CREATE TABLE GuestBooking

   (

   id int primary key,

   bookingId varchar(100) not null,

   guestId int not null,

   foreign key(bookingId) references Booking(id),

   foreign key(guestId) references Guest(id)

   );

9. CREATE TABLE GuestBookingUnit

   (

   guestBookingId int not null,

   unitId int not null,

   startTime datetime not null,

   endTime datetime,

   foreign key(guestBookingId) references GuestBooking(id),

   foreign key(unitId) references Unit(id)

   );

10. CREATE TABLE Resort

    (

    id int primary key,

    name varchar(75) not null,

    country varchar(50) not null

```
);
```

11.
```
CREATE TABLE Center
(
id int primary key,
name varchar(75) not null,
resortId int not null,
foreign key(resortId) references Resort(id)
);
```

12.
```
CREATE TABLE GuestBookingCenter
(
guestBookingId int not null,
centerId int not null,
startTime datetime not null,
endTime datetime,
foreign key(guestBookingId) references GuestBooking(id),
foreign key(centerId) references Center(id)
);
```

13.
```
CREATE TABLE Activity
(
id int primary key,
name varchar(50) not null
);
```

14.
```
CREATE TABLE CenterActivity
(
centerId int not null,
activityId int not null,
foreign key(centerId) references Center(id),
foreign key(activityId) references Activity(id)
```

);

DATA ENTRY

```
INSERT INTO Booking (id, startDate, endDate)
VALUES ('B2001', '01/July/2020', '14/July/2020')
VALUES ('B2003', '07/July/2020', '14/July/2020')
VALUES ('B2009', '07/July/2020', '14/July/2020')
VALUES ('B2010', '07/July/2020', '14/July/2020')
VALUES ('B2013', '15/July/2020', '22/July/2020')

INSERT INTO Guest
(id, firstName, lastName)
VALUES ('3399', 'Martina', 'Bywater')
VALUES ('3400', 'Dan', 'Bywater')
VALUES ('3300', 'David', 'Olusonga')
VALUES ('3301', 'Sonia', 'Chaplow')
VALUES ('4101', 'Maria', 'De Silva')
VALUES ('4102', 'Jermine', 'Easter')
VALUES ('3111', 'Ameer', 'Akhta')

INSERT INTO Resort
(id, name, country)
VALUES ( '1', 'Anjozorobe', 'Madagascar' )
VALUES ( '2', 'Tsingy De Bemaraha', 'Madagascar' )
VALUES ( '3', 'Miliwane', 'Swaziland' )
VALUES ( '4', 'Malolotja', 'Swaziland' )
```

```
INSERT INTO Center
(id, name, resortId)
VALUES ( '1', ' Anjozorobe Forest Center', '1' )
VALUES ( '2', 'Explores Center', '1' )
VALUES ( '3', 'Treetop Center', '2' )
VALUES ( '4', 'Miliwane Freedom Center', '3' )
VALUES ( '5', 'Highland Center', '4' )

INSERT INTO Activity
(id, name)
VALUES ( '1', ' Hiking')
VALUES ( '2', ' Conservation')
VALUES ( '3', ' Cycling')
VALUES ( '4', ' Mini-golf')
VALUES ( '5', ' Diving')
VALUES ( '6', ' Village Visit')

INSERT INTO UnitType
(id, name)
VALUES ( '1', 'Standard Tent')
VALUES ( '2', 'Deluxe Tent')
VALUES ( '3', 'Lodge')
VALUES ( '4', 'Yurt')
```

```
INSERT INTO Unit
(id, name, typeId)
VALUES ( '9934', 'Verdigis', '1')
VALUES ( '4500', 'Jade', '2')
VALUES ( '5670', 'Celadon', '2')
VALUES ( '2321', 'Aquamarine', '3')
VALUES ( '2500', 'Turquoise', '4')

INSERT INTO InventoryType
(id, name)
VALUES ( '1', 'Bedding')
VALUES ( '2', 'Kitchen Equipment')
VALUES ( '3', 'Outdoor Equipment')

INSERT INTO Inventory
(id, name, typeId)
VALUES ( '1', 'Set of bed sheets', '1')
VALUES ( '2', 'Pillows', '1')
VALUES ( '3', 'Coffee maker', '2')
VALUES ( '4', 'Cutlery set', '2')
VALUES ( '5', 'Crockery set', '2')
VALUES ( '6', 'Pan set', '2')
VALUES ( '7', 'Sun umbrella', '3')
VALUES ( '8', 'Lounger set', '2')
VALUES ( '9', 'Barbeque set', '3')
```

```
INSERT INTO CenterActivity
(centerId, activityId)
VALUES ( '1', '1')
VALUES ( '1', '2')
VALUES ( '1', '3')
VALUES ( '1', '4')
VALUES ( '2', '1')
VALUES ( '2', '5')
VALUES ( '4', '1')
VALUES ( '5', '1')
VALUES ( '5', '5')
VALUES ( '5', '6')

INSERT INTO GuestBooking
(id, bookingId, guestId)
VALUES ( '1', 'B2001', '3399')
VALUES ( '2', 'B2001', '3400')
VALUES ( '3', 'B2003', '3300')
VALUES ( '4', 'B2003', '3301')
VALUES ( '5', 'B2009', '4101')
VALUES ( '6', 'B2009', '4102')
VALUES ( '7', 'B2010', '3111')
VALUES ( '8', 'B2013', '3111')
```

INSERT INTO GuestBookingCenter

(guestBookingId, centerId, startTime, endTime)

VALUES ('1', '1', '07/01/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('2', '1', '07/01/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('3', '2', '07/07/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('4', '2', '07/07/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('5', '3', '07/07/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('6', '3', '07/07/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('7', '4', '07/07/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('8', '5', '07/15/2020 10:00:00', '07/22/2020 10:00:00')

INSERT INTO GuestBookingUnit

(guestBookingId, unitId, startTime, endTime)

VALUES ('1', '9934', '07/1/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('2', '9934', '07/1/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('3', '4500', '07/7/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('4', '4500', '07/7/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('5', '5670', '07/7/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('6', '5670', '07/7/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('7', '2321', '07/7/2020 10:00:00', '07/14/2020 10:00:00')

VALUES ('8', '2500', '07/15/2020 10:00:00', '07/22/2020 10:00:00')

```
INSERT INTO UnitInventory
(unitId, inventoryId)
VALUES ( '9934', '1')
VALUES ( '9934', '2')
VALUES ( '9934', '3')
VALUES ( '9934', '4')
VALUES ( '9934', '5')
VALUES ( '9934', '6')
VALUES ( '4500', '1')
VALUES ( '4500', '2')
VALUES ( '4500', '3')
VALUES ( '4500', '4')
VALUES ( '4500', '5')
VALUES ( '4500', '6')
VALUES ( '4500', '7')
VALUES ( '4500', '8')
VALUES ( '5670', '1')
VALUES ( '5670', '2')
VALUES ( '5670', '9')
VALUES ( '2321', '2')
VALUES ( '2321', '1')
VALUES ( '2321', '9')
VALUES ( '2500', '9')
```

INPUT SCREENSHOTS

Query1 | Activity

id	name	Click to Add
1	Hiking	
2	Conservation	
3	Cycling	
4	Mini-golf	
5	Diving	
6	Village Visit	

Query1 | Booking

id	startDate	endDate	Click to Add
B2001	7/1/2020	7/14/2020	
B2003	7/7/2020	7/14/2020	
B2009	7/7/2020	7/14/2020	
B2010	7/7/2020	7/14/2020	
B2013	7/15/2020	7/22/2020	

Query1 | Center

id	name	resortId	Click to Add
1	Anjozorobe Forest Center	1	
2	Explores Center	1	
3	Treetop Center	2	
4	Miliwane Freedom Center	3	
5	Highland Center	4	

Query1 | CenterActivity

centerId	activityId
1	1
2	1
4	1
5	1
1	2
1	3
1	4
2	5
5	5
5	6

Query1 | Guest

id	firstName	lastName	Click to Add
3111	Ameer	Akhta	
3300	David	Olusonga	
3301	Sonia	Chaplow	
3399	Martina	Bywater	
3400	Dan	Bywater	
4101	Maria	De Silva	
4102	Jermine	Easter	

Query1 | GuestBooking

id	BookingId	guestId	Click to Add
1	B2001	3399	
2	B2001	3400	
3	B2003	3300	
4	B2003	3301	
5	B2009	4101	
6	B2009	4102	
7	B2010	3111	
8	B2013	3111	

Query1 | GuestBookingCenter

guestBookingId	centerId	startTime	endTime
1	1	7/1/2020 10:00:00 AM	7/14/2020 10:00:00 AM
2	1	7/1/2020 10:00:00 AM	7/14/2020 10:00:00 AM
3	2	7/7/2020 10:00:00 AM	7/14/2020 10:00:00 AM
4	2	7/7/2020 10:00:00 AM	7/14/2020 10:00:00 AM
5	3	7/7/2020 10:00:00 AM	7/14/2020 10:00:00 AM
6	3	7/7/2020 10:00:00 AM	7/14/2020 10:00:00 AM
7	4	7/7/2020 10:00:00 AM	7/14/2020 10:00:00 AM
8	5	7/15/2020 10:00:00 AM	7/22/2020 10:00:00 AM

Query1 | GuestBookingUnit

guestBookingId	unitId	startTime	endTime
1	9934	7/1/2020 10:00:00 AM	7/14/2020 10:00:00 AM
2	9934	7/1/2020 10:00:00 AM	7/14/2020 10:00:00 AM
3	4500	7/7/2020 10:00:00 AM	7/14/2020 10:00:00 AM
4	4500	7/7/2020 10:00:00 AM	7/14/2020 10:00:00 AM
5	5670	7/7/2020 10:00:00 AM	7/14/2020 10:00:00 AM
6	5670	7/7/2020 10:00:00 AM	7/14/2020 10:00:00 AM
7	2321	7/7/2020 10:00:00 AM	7/14/2020 10:00:00 AM
8	2500	7/15/2020 10:00:00 AM	7/22/2020 10:00:00 AM

Query1 | Inventory

id	name	typeId	*Click to Add*
1	Set of bed sheets	1	
2	Pillows	1	
3	Coffee maker	2	
4	Cutlery set	2	
5	Crockery set	2	
6	Pan set	2	
7	Sun umbrella	3	
8	Lounger set	2	
9	Barbeque set	3	

Query1 | InventoryType

id	name	Click to Add
1	Bedding	
2	Kitchen Equipment	
3	Outdoor Equipment	

Query1 | Resort

id	name	country	Click to Add
1	Anjozorobe	Madagascar	
2	Tsingy De Be	Madagascar	
3	Miliwane	Swaziland	
4	Malolotja	Swaziland	

Query1 | Unit

id	name	typeId	Click to Add
2321	Aquamarine	3	
2500	Turquoise	4	
4500	Jade	2	
5670	Celadon	2	
9934	Verdigis	1	

Query1 | UnitInventory

unitId	inventoryId
9934	1
4500	1
5670	1
2321	1
9934	2
4500	2
5670	2
2321	2
9934	3
4500	3
9934	4
4500	4
9934	5
4500	5
9934	6
4500	6
4500	7
4500	8
5670	9
2321	9
2500	9

Query1 | UnitInventory | UnitType

id	name	Click to Add
1	Standard Tent	
2	Deluxe Tent	
3	Lodge	
4	Yurt	

- List data on all bookings and guests

SELECT gb.id, b.id, b.startDate, b.endDate, g.id, g.firstName, g.lastName, c.name, u.name, ut.name

FROM Booking b, Guest g, GuestBooking gb, GuestBookingCenter gbc, Center c, GuestBookingUnit gbu, Unit u, UnitType ut

WHERE gb.bookingId = b.id

AND gb.guestId = g.id

AND gbc.guestBookingId = gb.id

AND gbc.centerId = c.id

AND gbu.guestBookingId = gb.id

AND gbu.UnitId = u.id

AND u.typeId = ut.id

Query1

gb.id	b.id	startDate	endDate	g.id	firstName	lastName	c.name	u.name	ut.name
1	B2001	7/1/2020	7/14/2020	3399	Martina	Bywater	Anjozorobe Forest Center	Verdigis	Standard Tent
2	B2001	7/1/2020	7/14/2020	3400	Dan	Bywater	Anjozorobe Forest Center	Verdigis	Standard Tent
3	B2003	7/7/2020	7/14/2020	3300	David	Olusonga	Explores Center	Jade	Deluxe Tent
4	B2003	7/7/2020	7/14/2020	3301	Sonia	Chaplow	Explores Center	Jade	Deluxe Tent
5	B2009	7/7/2020	7/14/2020	4101	Maria	De Silva	Treetop Center	Celadon	Deluxe Tent
6	B2009	7/7/2020	7/14/2020	4102	Jermine	Easter	Treetop Center	Celadon	Deluxe Tent
7	B2010	7/7/2020	7/14/2020	3111	Ameer	Akhta	Miliwane Freedom Center	Aquamarine	Lodge
8	B2013	7/15/2020	7/22/2020	3111	Ameer	Akhta	Highland Center	Turquoise	Yurt

- List data on all resorts, centres, units and unit types

  SELECT c.id, c.name, r.id, r.name, r.country

  FROM Resort r, Center c

  WHERE c.resortId = r.id

Query1

c.id	c.name	r.id	r.name	country
1	Anjozorobe Forest Center	1	Anjozorobe	Madagascar
2	Explores Center	1	Anjozorobe	Madagascar
3	Treetop Center	2	Tsingy De Bemaraha	Madagascar
4	Miliwane Freedom Center	3	Miliwane	Swaziland
5	Highland Center	4	Malolotja	Swaziland

  SELECT u.id, u.name, ut.id, ut.name

  FROM Unit u, UnitType ut

  WHERE u.typeId = ut.id

Query1

u.id	u.name	ut.id	ut.name
9934	Verdigis	1	Standard Tent
4500	Jade	2	Deluxe Tent
5670	Celadon	2	Deluxe Tent
2321	Aquamarine	3	Lodge
2500	Turquoise	4	Yurt

- List data on all inventory items for all units

```
SELECT u.id, u.name, i.id, i.name,it.id, it.name

FROM Unit u, Inventory i, InventoryType it, UnitInventory ui

WHERE ui.unitId = u.id

AND ui.inventoryId = i.id

AND i.typeId = it.id
```

Query1

u.id	u.name	i.id	i.name	it.id	it.name
9934	Verdigis	1	Set of bed sheets	1	Bedding
4500	Jade	1	Set of bed sheets	1	Bedding
5670	Celadon	1	Set of bed sheets	1	Bedding
2321	Aquamarine	1	Set of bed sheets	1	Bedding
9934	Verdigis	2	Pillows	1	Bedding
4500	Jade	2	Pillows	1	Bedding
5670	Celadon	2	Pillows	1	Bedding
2321	Aquamarine	2	Pillows	1	Bedding
9934	Verdigis	3	Coffee maker	2	Kitchen Equipment
4500	Jade	3	Coffee maker	2	Kitchen Equipment
9934	Verdigis	4	Cutlery set	2	Kitchen Equipment
4500	Jade	4	Cutlery set	2	Kitchen Equipment
9934	Verdigis	5	Crockery set	2	Kitchen Equipment
4500	Jade	5	Crockery set	2	Kitchen Equipment
9934	Verdigis	6	Pan set	2	Kitchen Equipment
4500	Jade	6	Pan set	2	Kitchen Equipment
4500	Jade	7	Sun umbrella	3	Outdoor Equipment
4500	Jade	8	Lounger set	2	Kitchen Equipment
5670	Celadon	9	Barbeque set	3	Outdoor Equipment
2321	Aquamarine	9	Barbeque set	3	Outdoor Equipment
2500	Turquoise	9	Barbeque set	3	Outdoor Equipment

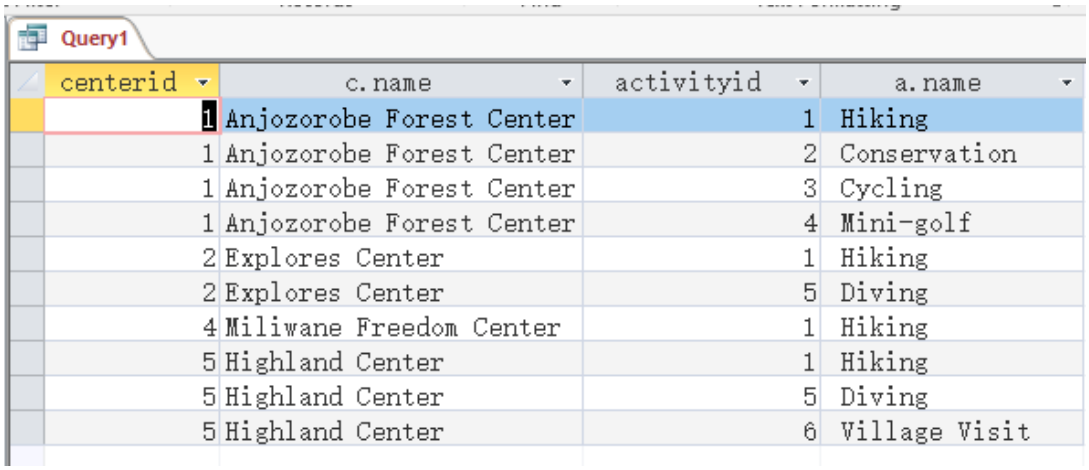
- List data on the activities found at all centres

  SELECT ca.centerid, c.name, ca.activityid, a.name

  FROM Center c, Activity a, CenterActivity ca

  WHERE ca.centerId = c.id

  AND ca.activityId = a.id



Query1

centerid	c.name	activityid	a.name
1	Anjozorobe Forest Center	1	Hiking
1	Anjozorobe Forest Center	2	Conservation
1	Anjozorobe Forest Center	3	Cycling
1	Anjozorobe Forest Center	4	Mini-golf
2	Explores Center	1	Hiking
2	Explores Center	5	Diving
4	Miliwane Freedom Center	1	Hiking
5	Highland Center	1	Hiking
5	Highland Center	5	Diving
5	Highland Center	6	Village Visit

- Select the booking ID, guest ID and names for guests for booking B2001

  SELECT gb.bookingId, gb.guestId, g.firstName, g.lastName

  FROM Booking b, Guest g, GuestBooking gb

  WHERE gb.guestId = g.id

  AND gb.bookingId = b.id

  AND gb.bookingId = 'B2001'

Query1

bookingId	guestId	firstName	lastName
B2001	3399	Martina	Bywater
B2001	3400	Dan	Bywater

- Change Ameer Akhtar's end date Highland Center to 29th July 2020

  UPDATE Booking b

  SET b.endDate = '7/29/2020'

  WHERE b.id = 'B2013'

GuestBookingCenter | GuestBooking | Center | Booking

id	startDate	endDate	Click to Add
B2001	7/1/2020	7/14/2020	
B2003	7/7/2020	7/14/2020	
B2009	7/7/2020	7/14/2020	
B2010	7/7/2020	7/14/2020	
B2013	7/15/2020	7/29/2020	

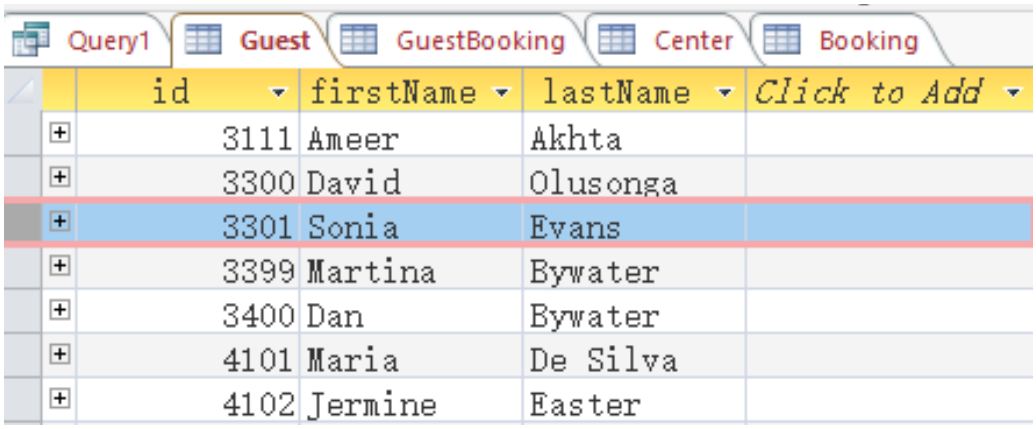
- Change the name of guest Sonia Chaplow to Sonia Evans

  UPDATE Guest g

  SET lastName = 'Evans'

  WHERE g.firstName = "Sonia"

  AND g.lastName = "Chaplow"

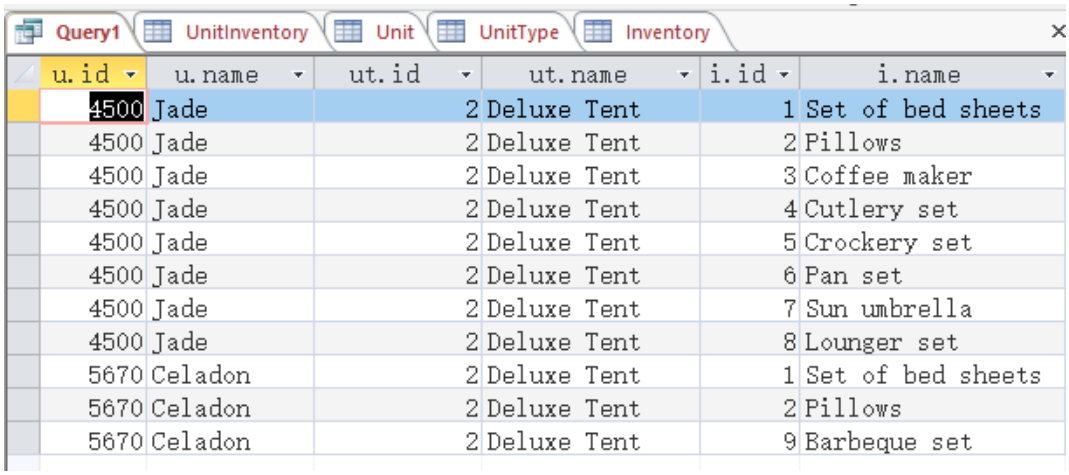


Query1 | Guest | GuestBooking | Center | Booking

id	firstName	lastName	Click to Add
3111	Ameer	Akhta	
3300	David	Olusonga	
3301	Sonia	Evans	
3399	Martina	Bywater	
3400	Dan	Bywater	
4101	Maria	De Silva	
4102	Jermine	Easter	

- List all inventory items for all the deluxe tents

```
SELECT u.id, u.name, ut.id, ut.name, i.id, i.name
FROM Inventory i, Unit u, UnitType ut, UnitInventory ui
WHERE ui.unitId = u.id
AND ui.inventoryId = i.id
AND u.typeId = ut.id
AND ut.name = "Deluxe Tent"
```



Query1 | UnitInventory | Unit | UnitType | Inventory

u.id	u.name	ut.id	ut.name	i.id	i.name
4500	Jade	2	Deluxe Tent	1	Set of bed sheets
4500	Jade	2	Deluxe Tent	2	Pillows
4500	Jade	2	Deluxe Tent	3	Coffee maker
4500	Jade	2	Deluxe Tent	4	Cutlery set
4500	Jade	2	Deluxe Tent	5	Crockery set
4500	Jade	2	Deluxe Tent	6	Pan set
4500	Jade	2	Deluxe Tent	7	Sun umbrella
4500	Jade	2	Deluxe Tent	8	Lounger set
5670	Celadon	2	Deluxe Tent	1	Set of bed sheets
5670	Celadon	2	Deluxe Tent	2	Pillows
5670	Celadon	2	Deluxe Tent	9	Barbeque set

- List all the guests who are staying at Anjozorobe Forest Centre and which units they are staying at

SELECT g.id, g.firstName, g.lastName, c.name, u.id, u.name

FROM Guest g, GuestBooking gb, GuestBookingCenter gbc, GuestBookingUnit gbu, Unit u, Center c

WHERE gb.guestId = g.id

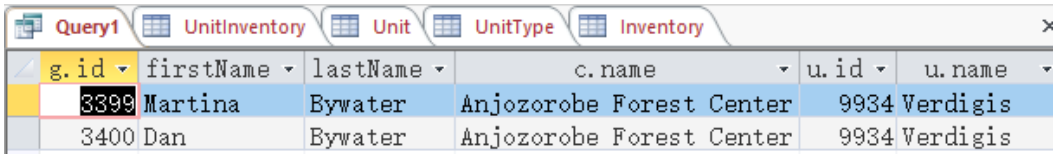
AND gbc.guestBookingId = gb.id

AND gbc.centerId = c.id

AND gbu.guestBookingId = gb.id

AND gbu.unitId = u.id

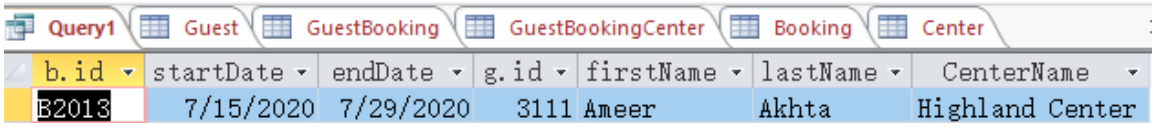
AND c.name = "Anjozorobe Forest Center"



g.id	firstName	lastName	c.name	u.id	u.name
3399	Martina	Bywater	Anjozorobe Forest Center	9934	Verdigis
3400	Dan	Bywater	Anjozorobe Forest Center	9934	Verdigis

- List the details of all the bookings at Highland centre including the dates of the bookings

SELECT b.id, b.startDate,b.endDate ,g.id, g.firstName, g.lastName, c.name as CenterName
FROM Guest g, GuestBooking gb, GuestBookingCenter gbc,Center c, Booking b
WHERE gb.guestId = g.id
AND gb.bookingId = b.id
AND gbc.guestBookingId = gb.id
AND gbc.centerId = c.id
AND c.name = "Highland Center"



Task 3

- Firstly, the Inventory table should be altered to add a replacement cost field. This would allow the management and staff to know exactly how much each inventory item costs. The table should also be altered in such a manner that it includes more items from the units that could get damaged and need replacement at some time in the future. Such as bulbs and so on. In short, the Inventory table, should account for every element/item in every unit and taking account their replacement costs.
- Add a Staff and Role table to the database. The Staff table should contain the id as primary key, first and last name, role id as foreign key and center id as another foreign key. The Role table on the other hand should have id as primary key, name of the role and a pay per month field. The purpose of the pay per month field is to be able to allocate how much each role is worth on a monthly basis. Considering that the relationship between the Staff and Role table is that, *a staff can have only one role and that a role can belong to many staff,* it means that the pay per month field in the Role table would automatically specify the staff pay rate as long as the role id field in the Staff table has a not null constraint and references the id field in the Role table correctly. It is also important to mention that the relationship between the Staff and Center table is that, *each staff belongs to only one center and a center can have multiple staff.*
- Finally, to calculate how much each work at each unit and center costs, the following instructions would have to be followed.
    - **Work cost per unit:** add the pay per month of all staff with an associated role name of "unit maintenance" at a center and divide the sum by the number of units in the center.
    - **Work cost per center:** add the pay per month of all staff at a center.

TASK 4

- A distributed database is one in which data is stored in databases that are geographically separate. In the scenario given, the companies being taken over already have their own databases. Therefore, to redesign or relocate the databases could prove troublesome. Furthermore, I suggest that the data should remain in the locations that it already is and the company should instead use a Distributed Database Management System to manipulate the databases and keep them synchronized to appear and behave as one.
- The advantages and disadvantages of the distributed database compared to a centralized database are listed below:
    - **Advantages:**
        - **Modular development:** If a database needs to be expanded, a distributed database only needs addition of new hardware and data at the local site and connecting it to the rest of the database system without interrupting the normal functions of it. However, with a centralized database, much more effort is required to restructure the database and this would definitely interrupt the normal function of it.
        - **Higher reliability:** In case of failure, the whole centralized database will cease operation but a distributed database will continue operating if one of its databases fails. Maybe the performance might reduce, depending on configurations and uses, but it will still remain functional. Hence making it more reliable.
        - **Faster response:** If data is well distributed, then queries from users can be handled from local sites or sites closest to the user, making the responses much faster. In centralized databases, data always has to go to the main and central database computer before it can respond. This could lead to slow response times if it has to respond to customers in geographically distant areas.
    - **Disadvantages:**

- **Expensive and complex software:** distributed databases management systems require expensive and complex software to maintain coordination and data transparency across the different sites.
- **Processing Overhead:** there can easily be a processing overhead issue considering that small operations including large ones need a large number of calculations and operations to keep harmonized data across databases.
- **Data integrity:** updating and altering data at various sites causes a potential risk of data integrity. This is always a worrying item with distributed databases.

TASK 5

The company's requirements have been met as is evident from the system created. The database tables are well created and designed. The relationships and constraints prevent usual data entry errors from occurring such as the ones noticeable in their previous tables. The tables are designed in such a way as to reduce redundancy and still stay efficient in data storage and management. Due to the normalization of the database, it creates much more tables than was previously in existence. However, the company's requirement is to be able store data for them to efficiently run their business. The database is built in such a way that queries can be created, like the ones created for this project that will easily put the data together for much easier management without compromising on the quality of the data storage itself. Thereby allowing Bright Green Holidays to run a business with an efficient data storage system for all their needs.

By breaking their data down and creating much more clear entities, I was able to create constraints throughout the database that strive to only keep relevant data in. This in turn standardized the data being stored in the database. In short, for the data to be stored in the designed database, it has to abide by certain standards that are being enforced by the relationships and constraints built into the database.

ASSUMPTIONS

- Booking can have many guests and guests can belong to many bookings, in case they make more bookings as returning customers/guests.
- Since centres can have many activities, I have also assumed that those activities can belong to multiple centres.
- A guest may stay at a particular centre during a specific booking and they may change centres during that booking for a specific period.
- A guest may change units for a specific period during the same booking. If they change centres, they may or may not change units.
- A guest of the same booking may stay in different units and centres as desired.
- pan set is a kitchen equipment while sun umbrella is an outdoor equipment
- Milwane was misspelled and should instead be Miliwane.
- The time a guest registered in a centre and a unit is at 10:00:00 AM of the date they made the booking and the time they terminated their registration at that centre and unit is also at 10:00:00 AM
- Since Booking Details table given is only showing one boking id, I assume that it is showing the unit they checked in is exactly the same in case there are multiple users. However, due to my assumption that different guests can have the same booking but different units if desired, I will show the unit a guest checked in. But each record entered will be specific to that guest using the GuestBooking table id column I created. I believe this will cut out the ambiguity.