DBMS Project Report

PES University

Database Management Systems

UE18CS252

Submitted By

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<u>**Abstract of the Project :**</u>

The Database System that I have selected is Zoo Database Management System . It contains details such as the animals in the zoo , their complete Hierarchy of Classification , what kind of Food these animals eat , in which regions of the world they are found, the DB also contains data on the Employees who work in the Zoo , their Designation , their Names .The DB also contains the ZOO's working hours , it's locations. It also contains details about the visitors who visit the zoo like their name , the date on which they visited , the type of ticket that they've purchased.

All in all our Database is a mini-world example of how the zoo operates in the Real world.

Introduction

The ZOO database has 9 tables , viz,.

1. ANIMAL : It contains details of all the animals in the zoo. Like their names , species, kingdom which they belong to , it's ID.

2. EMPLOYEE : It contains details of all the employees who work in the zoo . Like their ID , name , the date that they were hired.

3. EXHIBIT : It contains details about the zoo . Such as the location of the zoo , it's working hours etc,.

4. FEEDING : It contains details about what type of food these animals eat.

5. OSTAFF : It contains details about the different departments in which the staff of the zoo work .

6. VISITOR : It contains details about the visitors who visit the zoo . Like their name , the date on which they visited , the type of ticket they purchased .

7. PERSON : It contains details about both the employees who work in the zoo and the visitors who visit the zoo.

8. ZOOKEEPER : It contains details about the zookeeper.

9. ZSKILLS : It contains the details about the skills in which the zookeeper is specialized in.

Data Model

The keys in the following entity sets are as follows:

1. PERSON : Person is considered a Base Table, no foreign keys. FullName is the Primary Key used.

2. ANIMAL : AnimalID is the Primary Key Used. Species is a foreign key referring to Species in FEEDING.

3. EMPLOYEE : EmployeeID is the Primary Key used. EmployeeFullName foreign key corresponds to FullName in PERSON

4. EXHIBIT : ExhibitID is the Primary Key Used. There is no Foreign Key.

5. FEEDING : Species is the Primary Key Used. There is no Foreign Key.

6. OSTAFF : StaffID is the Primary Key used. OEmpID foreign key refers to EmployeeID in EMPLOYEE

7. VISITOR : TicketNum is the Primary Key used. VisitorFullName foreign key corresponds to FullName in PERSON

8. ZOOKEEPER : KeeperID is the Primary Key used . ZEmpID Foreign key refers to EmployeeID in EMPLOYEE.

9. ZSKILLS : KSkillId combined with Skill is the Primary Key used. Composite Key KskillId refers to KeeperID in ZOOKEEPER.

The data types of the following tables are :

1. ANIMAL -

- ANIMALID – VARCHAR(9)
- NAME – VARCHAR(20)
- KINGDOM – VARCHAR(20)
- PHYLUM – VARCHAR(20)
- CLASS – VARCHAR(20)
- ORDER – VARCHAR(20)
- FAMILY – VARCHAR(20)
- GENUS – VARCHAR(20)
- SPECIES – VARCHAR(20)
- DateofBirth – DATE
- DateofAdmission – DATE

2. EMPLOYEE –

- EmployeeID - VARCHAR(10)
- HireDate - DATE
- EmployeeType - VARCHAR(20)
- EmployeeFullName VARCHAR(40)

3. EXHIBIT –

- ExhibitID - INT(3)

- Name - VARCHAR(20)
- Location - VARCHAR(20)
- Hours - VARCHAR(10)

4. FEEDING –
- Species – VARCHAR (100)
- FoodType – VARCHAR(50)

5. OSTAFF –
- StaffID - VARCHAR(10)
- DeskNum - INT(4),
- Department - VARCHAR(20)
- OEmpID - VARCHAR(10)

6. PERSON –
- FullName - VARCHAR(40)
- Street - VARCHAR(50)
- City - VARCHAR(20)
- ZipCode - INT(5)
- US_State - VARCHAR(20)
- DOB - DATE

7. VISITOR –
- TicketNum - INT(8)
- TicketType - VARCHAR(5)
- VisitDate - DATE
- VisitorFullName - VARCHAR(40)

8. ZOOKEEPER –
- KeeperID - VARCHAR(10)
- ZEmpID - VARCHAR(10)

9. ZSKILLS –
- KSkillID - VARCHAR(10)
- Skill - VARCHAR(50)

Relational Model:

PERSON: [BASE TABLE]

Fullname	Street	City	Zipcode	US.state	DOB

ANIMAL:

ANIMALID	Name	Kingdom	Phylum	Class	Order	Family	Genus	Speies (FK)	DOB	DOA

EMPLOYEE:

EmployeeID	HireDate	EmployeeType	Employee Fullname (FK)

EXHIBIT:

Exhibit ID	Name	Location	Hours

FEEDING:

Species	FoodType

OSTAFF:

STAFFID	DeskNum	Dept.	OEmpID(FK)

ZOOKEEPER:

KeeperID	ZEmpID (FK)

ZSKILLS:

KSKILLID (FK)	SKILL

VISITOR:

TICKETNUM	TICKETTYPE	VISITDATE	VISITORFULLNAME (FK)

Entity Relation Diagram:
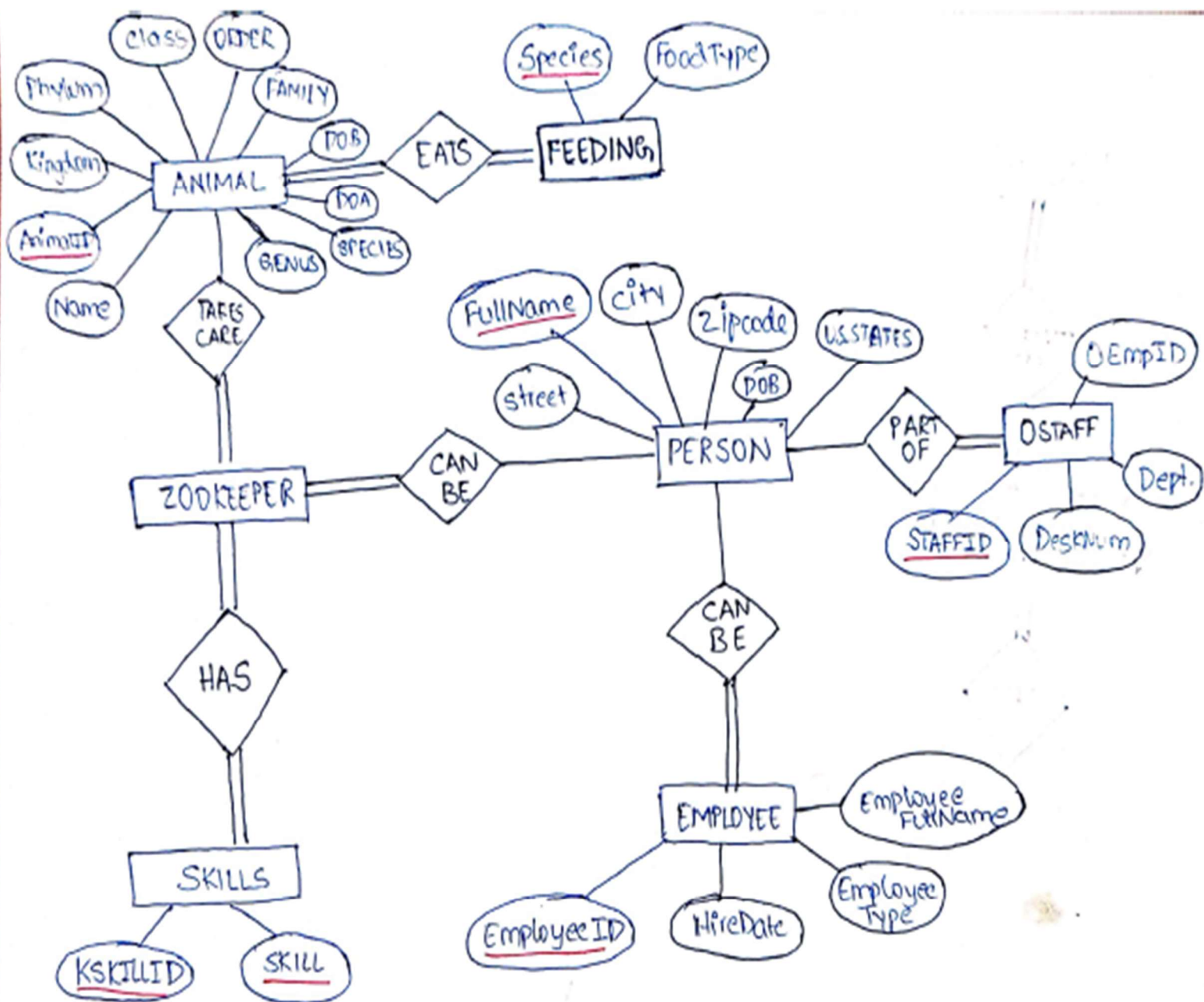
FUNCTIONAL DEPENDENCIES:

- AnimalId - > {Name , Kingdom , Phylum , Class , Order , Family , Genus , Species , Date of Birth , Date of Admission}

- Name - > { AnimalId , Kingdom , Phylum , Class , Order , Family , Genus , Species , Date of Birth , Date of Admission }

- Date of Birth -> {Name , species , Date of Admission}

- Date of Admission -> {Name , species , Date of Birth}

- EmployeeID -> {HireDate , EmployeeType , EmployeeFulName}

- HireDate –> { EmployeeFulName , EmployeeID }

- EmployeeFulName -> { EmployeeID , HireDate , EmployeeType }

- ExhibitID -> {Name , Location , Hours}

- Name -> { ExhibitID , , Location , Hours }

- Species -> {FoodType}

- StaffID -> {DeskNum , Department , OEmpID}

- DeskNum -> { StaffID , Department , OEmpID }

- OEmpID -> {StaffID , DeskNum , Department}

- FullName -> {Street , City , ZipCode , US_state , DateOfBirth}

- TicketNum -> {TicketType , VisitDate , VisitorFullName}

- VisitorFullName -> { TicketNum , TicketType , VisitDate }

- KeeperID -> {ZEmpID}

- ZEmpID -> {KeeperID}

Normalization:

On converting the ER model to Relational Schema following all the rules of ER Model to Relational Schema Mapping , our DB in the normal form i.e. our Database obeys 1st NF , 2nd NF , 3rd NF , BCNF , 4th NF , 5th NF .
However under the following circumstances the Relations may violate the following Normal Form:.

VIOLATION OF 2nd NORMAL FORM:

If we consider the ZSkills Table . It doesn't have a primary key , so we use both KSkillID and SKILL as the composite key . If we join this table with ZOOKEEPER table then the KeeperId attribute of the ZOOKEEPR tables violates the 2nd Normal Form as it depends only on the KSkillID attribute.
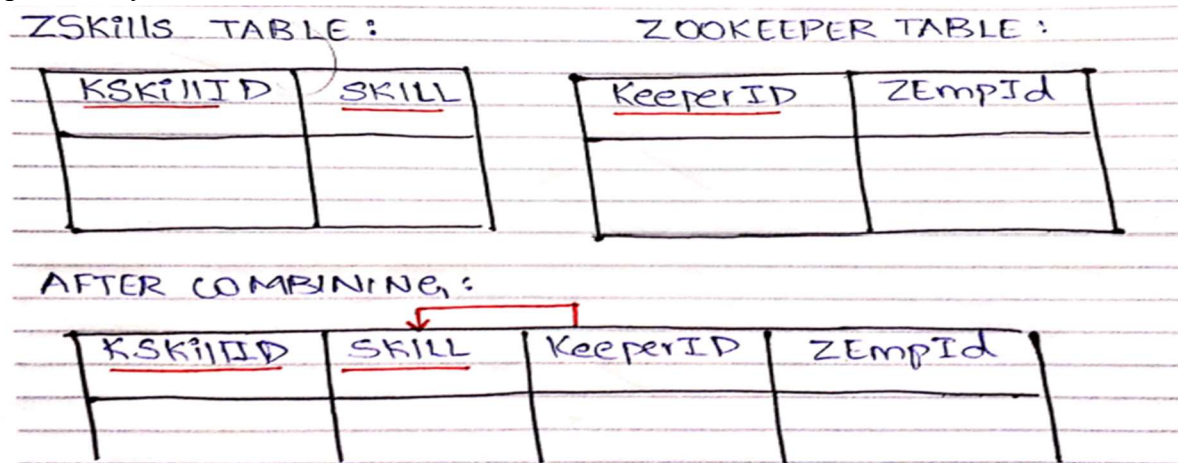
VIOLATION OF 3RD NORMAL FORM :

If we join the ANIMAL table and the FEEDING then , the species key in the ANIMAL table depends on the species key in the FEEDING table even if it isn't a primary key . Hence violating the 3rd NORMAL FORM.
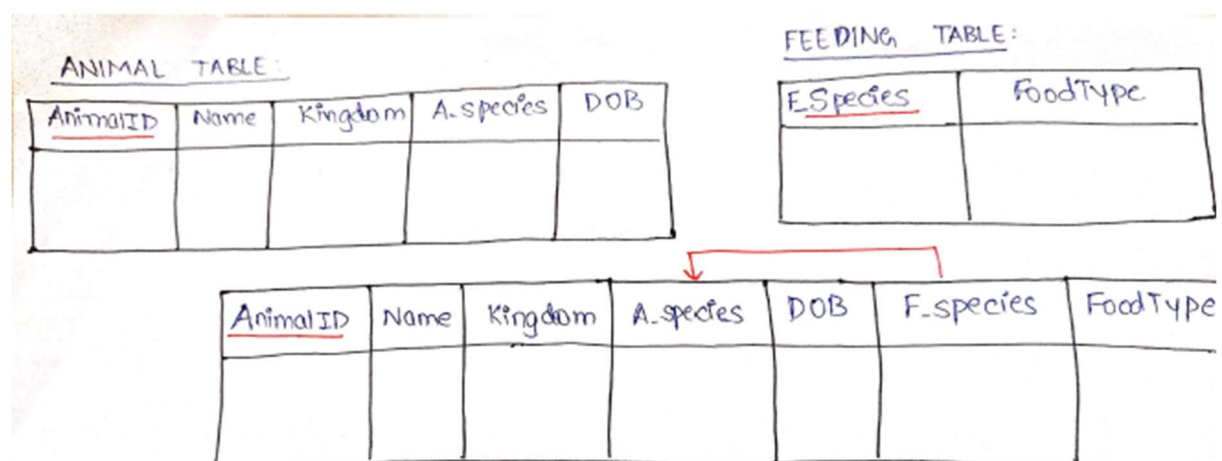
DATA DEFINITION LANGUAGE:

CREATE DATABASE project;

USE project;

CREATE TABLE PERSON(

FullName VARCHAR(40) NOT NULL,

Street VARCHAR(50),

City VARCHAR(20),

ZipCode INT(5),

US_State VARCHAR(20),

DOB DATE,

CONSTRAINT PERSON_PK PRIMARY KEY (FullName));

CREATE TABLE VISITOR(

TicketNum INT(8) NOT NULL,

TicketType VARCHAR(5),

VisitDate DATE ,

VisitorFullName VARCHAR(40),

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CONSTRAINT VISITOR_PK PRIMARY KEY(TicketNum),

CONSTRAINT VISITOR_FK FOREIGN KEY(VisitorFullName) REFERENCES PERSON(FullName));



CREATE TABLE EMPLOYEE(

EmployeeID VARCHAR(10) NOT NULL,

HireDate DATE,

EmployeeType  VARCHAR(20),

EmployeeFullName VARCHAR(40),

CONSTRAINT EMPLOYEE_PK PRIMARY KEY(EmployeeID),

CONSTRAINT EMPLOYEE_FK FOREIGN KEY(EmployeeFullName) REFERENCES PERSON(FullName));



CREATE TABLE OSTAFF(

StaffID VARCHAR(10) NOT NULL,

DeskNum INT(4),

Department  VARCHAR(20),

OEmpID VARCHAR(10),

CONSTRAINT OSTAFF_PK PRIMARY KEY(StaffID),

CONSTRAINT OSTAFF_FK FOREIGN KEY(OEmpID) REFERENCES EMPLOYEE(EmployeeID));
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CREATE TABLE ZOOKEEPER(

KeeperID VARCHAR(10) NOT NULL,

ZEmpID VARCHAR(10),

CONSTRAINT ZOOKEEPER_PK PRIMARY KEY(KeeperID),

CONSTRAINT ZOOKEEPER_FK FOREIGN KEY(ZEmpID) REFERENCES
EMPLOYEE(EmployeeID));



CREATE TABLE ZSKILLS(

KSkillID VARCHAR(10) NOT NULL,

Skill VARCHAR(50),

CONSTRAINT ZSKILLS_PK PRIMARY KEY(KSkillID, Skill),

CONSTRAINT ZSKILLS_FK FOREIGN KEY(KSkillID) REFERENCES
ZOOKEEPER(KeeperID));



CREATE TABLE EXHIBIT(

ExhibitID INT(3) NOT NULL,

Name VARCHAR(20),

Location VARCHAR(20),

Hours VARCHAR(10),

CONSTRAINT EXHIBIT_PK PRIMARY KEY(ExhibitID));
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CREATE TABLE FEEDING(

Species VARCHAR(100),

FoodType VARCHAR(50),

CONSTRAINT FEEDING_PK PRIMARY KEY (Species));


CREATE TABLE ANIMAL(

AnimalID VARCHAR(9) NOT NULL,

Name VARCHAR(20),

Kingdom VARCHAR(20),

Phylum VARCHAR(20),

Class VARCHAR(20),

Order VARCHAR(20),

Family VARCHAR(20),

Genus VARCHAR(20),

Species VARCHAR(100),

DateofBirth DATE,

DateofAdmission DATE,

CONSTRAINT ANIMAL_PK PRIMARY KEY (AnimalID),
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CONSTRAINT ANIMAL_FK FOREIGN KEY (Species) REFERENCES FEEDING (Species));

insert into PERSON values ('Michael Michael', '441 Loomis Lane', 'Tacoma', '98411', 'Washington', '2015/06/12');

insert into PERSON values ('Meera Sakshi', '8519 Sycamore Parkway', 'Topeka', '66667', 'Kansas', '2012/06/11');

insert into PERSON values ('Safiya Irene', '238 Dorton Way', 'Fairfax', '22036', 'Virginia', '1995/10/20');

insert into PERSON values ('George Zoghindy', '4406 Fairfield Center', 'Huntington', '25705', 'West Virginia', '1931/08/09');

insert into PERSON values ('Patrick Johnson', '55 Valley Edge Drive', 'Kansas City', '64199', 'Missouri', '2001/04/02');

insert into PERSON values ('Denise Simmons', '7 Carberry Park', 'Phoenix', '85020', 'Arizona', '1961/12/19');

insert into PERSON values ('Lara Gall', '30269 Arizona Junction', 'Saint Petersburg', '33737', 'Florida', '1976/04/09');

insert into PERSON values ('Karen Reed', '8067 Cottonwood Crossing', 'Birmingham', '35210', 'Alabama', '2011/12/06');

insert into PERSON values ('Chris Turner', '05 Sycamore Plaza', 'Brooklyn', '11220', 'New York', '1945/09/20');

insert into PERSON values ('Joseph Samadi', '5 Dennis Street', 'Jackson', '38308', 'Tennessee', '1984/04/01');

insert into PERSON values ('Brandon Perez', '3664 Stoughton Crossing', 'Atlanta', '30392', 'Georgia', '1984/10/11');

insert into PERSON values ('Stephanie Ross', '4595 Kensington Pass', 'Springfield', '62776', 'Illinois', '1961/05/22');

insert into PERSON values ('Donald Russell', '52859 Tony Drive', 'Jackson', '39204', 'Mississippi', '1994/07/16');

insert into PERSON values ('Patricia Butler', '91501 Grasskamp Court', 'Amarillo', '79165', 'Texas', '1970/10/04');

insert into PERSON values ('Diana Robinson', '3 Hoard Pass', 'Sacramento', '94286', 'California', '1944/4/11');

insert into PERSON values ('Nuzhat Zaman', '5358 Summit Center', 'Pittsburgh', '15210', 'Pennsylvania', '1951/11/21');

insert into PERSON values ('Cornelius Adisa', '50445 Melby Avenue', 'Fort Worth', '76162', 'Texas', '1977/07/23');

insert into PERSON values ('Wendell Gray', '537 Rutledge Drive', 'Fresno', '93778', 'California', '1960/07/23');

insert into PERSON values ('Pamela Ida', '70 Summer Ridge Lane', 'Lake Charles', '70607', 'Louisiana', '1976/12/06');

insert into PERSON values ('Jose Garcia', '546 Red Cloud Point', 'Augusta', '30911', 'Georgia', '2001/07/08');

insert into PERSON values ('Patrick Grant', '0 Summit Place', 'Winston Salem', '27150', 'North Carolina', '1993/01/22');

insert into PERSON values ('Wanda Wallace', '05 Debra Avenue', 'Lincoln', '68510', 'Nebraska', '1980/09/17');

insert into PERSON values ('Albert Chapman', '1652 Pepper Wood Road', 'Houston', '77212', 'Texas', '1959/05/02');

insert into PERSON values ('Christina Ross', '23 Autumn Leaf Road', 'Jeffersonville', '47134', 'Indiana', '1952/09/27');

insert into PERSON values ('Phyllis Burns', '19 Kinsman Plaza', 'Toledo', '43610', 'Ohio', '1981/07/20');

insert into PERSON values ('Amy Rice', '7068 Westport Avenue', 'West Palm Beach', '33416', 'Florida', '1987/08/14');

insert into PERSON values ('Aaron Ray', '17 Merrick Lane', 'Indianapolis', '46266', 'Indiana', '1961/05/15');

insert into PERSON values ('James Ray', '8806 Sachs Pass', 'Minneapolis', '55446', 'Minnesota', '1994/02/12');

insert into PERSON values ('Irene Bailey', '395 Upham Lane', 'Newton', '02162', 'Massachusetts', '2016/04/03');

insert into PERSON values ('Wayne Myers', '0 Iowa Park', 'Columbus', '43204', 'Ohio', '1978/06/19');

insert into PERSON values ('Linda Ramos', '010 Farragut Terrace', 'Fort Wayne', '46857', 'Indiana', '1967/07/26');

insert into PERSON values ('Stephanie Hart', '8899 Tennessee Park', 'Charleston', '25356', 'West Virginia', '1936/12/18');

insert into PERSON values ('Amy Reed', '58 Loeprich Way', 'Lawrenceville', '30045', 'Georgia', '1942/04/14');

insert into PERSON values ('Phyllis Watkins', '6562 Onsgard Pass', 'Colorado Springs', '80930', 'Colorado', '2000/11/30');

insert into PERSON values ('Bruce Foster', '09 Shasta Junction', 'Honolulu', '96825', 'Hawaii', '1994/09/16');

insert into PERSON values ('Russell Phillips', '18850 Sutteridge Circle', 'Yakima', '98907', 'Washington', '2003/01/20');

insert into PERSON values ('Lisa Carroll', '709 Saint Paul Junction', 'Mesa', '85205', 'Arizona', '1944/04/30');

insert into PERSON values ('Dennis Frazier', '3 Lien Court', 'Omaha', '68197', 'Nebraska', '2001/03/26');

insert into PERSON values ('Evelyn Bailey', '271 Summer Ridge Court', 'Tallahassee', '32399', 'Florida', '1978/03/07');

insert into PERSON values ('Scott Wallace', '3844 Iowa Park', 'Saint Petersburg', '33715', 'Florida', '1991/04/16');

insert into VISITOR values ('35725953', 'Day', '2010/03/08', 'Patrick Grant');

insert into VISITOR values ('35642460', 'Day', '2010/07/10', 'Wanda Wallace');

insert into VISITOR values ('20169288', 'Day', '2013/01/26', 'Albert Chapman');

insert into VISITOR values ('67633330', 'Day', '2015/02/14', 'Christina Ross');

insert into VISITOR values ('56022177', 'Day', '2015/04/13', 'Phyllis Burns');

insert into VISITOR values ('35704041', 'Year', '2012/08/09', 'Amy Rice');

insert into VISITOR values ('56022334', 'Day', '2016/08/13', 'Aaron Ray');

insert into VISITOR values ('35421887', 'Day', '2015/09/21', 'James Ray');

insert into VISITOR values ('50483717', 'Day', '2010/03/03', 'Irene Bailey');

insert into VISITOR values ('50076647', 'Day', '2011/12/21', 'Wayne Myers');

insert into VISITOR values ('51001403', 'Day', '2016/06/05', 'Linda Ramos');

insert into VISITOR values ('30081856', 'Day', '2011/09/04', 'Stephanie Hart');

insert into VISITOR values ('48415204', 'Year', '2010/08/10', 'Amy Reed');

insert into VISITOR values ('54922569', 'Year', '2014/05/08', 'Phyllis Watkins');

insert into VISITOR values ('35801019', 'Year', '2013/01/23', 'Bruce Foster');

insert into VISITOR values ('35551133', 'Year', '2015/02/13', 'Russell Phillips');

insert into VISITOR values ('35715531', 'Day', '2012/08/06', 'Lisa Carroll');

insert into VISITOR values ('35483582', 'Year', '2014/08/12', 'Dennis Frazier');

insert into VISITOR values ('35280968', 'Day', '2013/07/13', 'Evelyn Bailey');

insert into VISITOR values ('67625461', 'Year', '2011/08/24', 'Scott Wallace');

insert into EMPLOYEE values ('MM0000000', '1980-01-01', 'Office', 'Michael Michael');

insert into EMPLOYEE values ('MS0568794', '2001-05-07', 'Office', 'Meera Sakshi');

insert into EMPLOYEE values ('SI7844526', '1996-10-21', 'Office', 'Safiya Irene');

insert into EMPLOYEE values ('GZ4621112', '1999-04-26', 'Office', 'George Zoghindy');

insert into EMPLOYEE values ('PJ1234567', '2005-12-12', 'Office', 'Patrick Johnson');

insert into EMPLOYEE values ('DS8874591', '2016-04-12', 'Office', 'Denise Simmons');

insert into EMPLOYEE values ('LG0548123', '2017-01-17', 'Office', 'Lara Gall');

insert into EMPLOYEE values ('KR8756212', '1997-06-23', 'Office', 'Karen Reed');

insert into EMPLOYEE values ('CT2154221', '2000-05-24', 'Office', 'Chris Turner');

insert into EMPLOYEE values ('JS6427475', '2008-09-12', 'Office', 'Joseph Samadi');

insert into EMPLOYEE values ('BP8745621', '2013-05-10', 'Office', 'Brandon Perez');

insert into EMPLOYEE values ('SR3456706', '1994-09-25', 'Office', 'Stephanie Ross');

insert into EMPLOYEE values ('DR7250462', '2004-07-12', 'Zookeeper', 'Donald Russell');

insert into EMPLOYEE values ('PB7345570', '1998-11-11', 'Zookeeper', 'Patricia Butler');

insert into EMPLOYEE values ('DR0976835', '2002-02-15', 'Zookeeper', 'Diana Robinson');

insert into EMPLOYEE values ('NZ7677443', '1996-01-01', 'Zookeeper', 'Nuzhat Zaman');

insert into EMPLOYEE values ('CA9454890', '2012-01-08', 'Zookeeper', 'Cornelius Adisa');

insert into EMPLOYEE values ('WG3437555', '2008-03-01', 'Zookeeper', 'Wendell Gray');

insert into EMPLOYEE values ('PI5729383', '1987-04-30', 'Zookeeper', 'Pamela Ida');

insert into EMPLOYEE values ('JG6877451', '2002-08-30', 'Zookeeper', 'Jose Garcia');

insert into OSTAFF values ('os01', 21, 'Human Resources', 'MM0000000');

insert into OSTAFF values ('os02', 33, 'Accounts Payable', 'MS0568794');

insert into OSTAFF values ('os03', 44, 'Maintenenace', 'SI7844526');

insert into OSTAFF values ('os04', 20, 'Management', 'GZ4621112');

insert into OSTAFF values ('os05', 01, 'Finance', 'PJ1234567');

insert into OSTAFF values ('os06', 11, 'Finance', 'DS8874591');

insert into OSTAFF values ('os07', 91, 'Human Resources', 'LG0548123');

insert into OSTAFF values ('os08', 22, 'Management', 'KR8756212');

insert into OSTAFF values ('os09', 99, 'Guest Relations', 'CT2154221');

insert into OSTAFF values ('os010', 10, 'Guest Relations', 'JS6427475');

insert into OSTAFF values ('os011', 12, 'Buying', 'BP8745621');

insert into OSTAFF values ('os012', 18, 'Management', 'SR3456706');

insert into ZOOKEEPER values ('s01', 'DR7250462');

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insert into ZOOKEEPER values ('s02', 'PB7345570');

insert into ZOOKEEPER values ('s03', 'DR0976835');

insert into ZOOKEEPER values ('s04', 'NZ7677443');

insert into ZOOKEEPER values ('s05', 'CA9454890');

insert into ZOOKEEPER values ('s06', 'WG3437555');

insert into ZOOKEEPER values ('s07', 'PI5729383');

insert into ZOOKEEPER values ('s08', 'JG6877451');


insert into ZSKILLS values ('s01', 'Maintenenace');

 insert into ZSKILLS values ('s02', 'Feed Supply');

 insert into ZSKILLS values ('s03', 'Mammalia Care');

 insert into ZSKILLS values ('s04', 'Intensive Care');

 insert into ZSKILLS values ('s05', 'Vegetarian Feed');

 insert into ZSKILLS values ('s06', 'Fish Feed');

 insert into ZSKILLS values ('s07', 'Meat Feed');

 insert into ZSKILLS values ('s08', 'Guest Interaction');


 Insert into FEEDING values ('Panthera leo', 'Meat');

 Insert into FEEDING values ('Gorilla gorilla', 'Fruit vegetables');

 Insert into FEEDING values ('Bradypus tridactylus', 'Bugs leaves');
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Insert into FEEDING values ('Loxodonta africana', 'Vegetables');

Insert into FEEDING values ('Giraffa camelopardalis', 'Vegetables');

Insert into FEEDING values ('Ailuropoda melanoleuca', 'Bamboo');

Insert into FEEDING values ('Crocodylus porosus', 'Meat');

Insert into FEEDING values ('Struthio camelus', 'Alfalfa grains vegetables');

Insert into FEEDING values ('Zalophus californianus', 'Fish');

Insert into FEEDING values ('Myrmecophaga tridactyla', 'Ants');

Insert into FEEDING values ('Camelus dromedarius', 'Vegetables');

Insert into FEEDING values ('Conraua goliath', 'Bugs');

Insert into FEEDING values ('Phoenicopterus ruber', 'Shrimp');

Insert into FEEDING values ('Acinonyx jubatus', 'Meat');

Insert into FEEDING values ('Acipenser fulvescens', 'Fish');

Insert into FEEDING values ('Aplysia vaccaria', 'Algae');

Insert into FEEDING values ('Phyllorhiza punctata', 'Algae');

Insert into FEEDING values ('Diceros bicornis', 'Vegetables');

Insert into FEEDING values ('Tyrannosaurus rex', 'Meat');

Insert into FEEDING values ('Panthera tigris', 'Meat');

Insert into ANIMAL values ('GCYFH6I7N', 'Simba', 'Animalia', 'Chordata', 'Mammalia', 'Carnivora', 'Felidae', 'Panthera', 'Panthera leo', '2002-03-13', '2005-04-19');

Insert into ANIMAL values ('P1JBYN6PT', 'Harambe', 'Animalia', 'Chordata', 'Mammalia', 'Primates', 'Homindae', 'Gorilla', 'Gorilla gorilla', '1999-06-13', '2000-07-02');

Insert into ANIMAL values ('GM9NUOJDJ', 'Sid', 'Animilia', 'Chordata', 'Mammalia', 'Pilosa', 'Bradypodidae', 'Bradypus', 'Bradypus tridactylus', '2004-09-13', '2007-08-30');

Insert into ANIMAL values ('HLLFQRW9U', 'Dumbo', 'Animalia', 'Chordata', 'Mammalia', 'Proboscidea', 'Elephantidae', 'Loxodonta', 'Loxodonta africana', '1998-10-30', '2002-05-13');

Insert into ANIMAL values ('JA9OT10AH', 'Orisa', 'Animalia', 'Chordata', 'Mammalia', 'Artiodactyla', 'Giraffidae', 'Giraffa', 'Giraffa camelopardalis', '2001-03-12', '2002-04-15');

Insert into ANIMAL values ('4W09NXB54', 'Pangwang', 'Animalia', 'Chordata', 'Mammalia', 'Carnivora', 'Ursidae', 'Ailuropoda', 'Ailuropoda melanoleuca', '2000-11-13', '2003-02-13');

Insert into ANIMAL values ('NN624WSLJ', 'Tick Tock', 'Animalia', 'Chordata', 'Reptilia', 'Crocodilia', 'Crocodylidae', 'Crocodylus', 'Crocodylus porosus', '1998-10-16', '1999-04-12');

Insert into ANIMAL values ('1BJXQTTI8', 'Bucko', 'Animalia', 'Chordata', 'Aves', 'Struthioniformes', 'Struthionidae', 'Struthio', 'Struthio camelus', '1994-09-04', '1996-05-11');

Insert into ANIMAL values ('ZRQKF55JK', 'Baxter', 'Animalia', 'Chordata', 'Mammalia', 'Carnivora', 'Otaeiidae', 'Zalophus', 'Zalophus californianus', '2001-11-02', '2002-04-13');

Insert into ANIMAL values ('0KRMB0E8Q', 'Fred', 'Animalia', 'Chordata', 'Mammalia', 'Pilosa', 'Myrmecophagidae', 'Myrmecophaga', 'Myrmecophaga tridactyla', '1999-04-20', '2002-03-02');

Insert into ANIMAL values ('ZDJWZIIPS', 'Humpy', 'Animalia', 'Chordata', 'Mammalia', 'Artiodactyla', 'Camelidae', 'Camelus', 'Camelus dromedarius', '1993-06-29', '1998-07-12');

Insert into ANIMAL values ('7Z2IWWZIW', 'Bob', 'Animalia', 'Chordata', 'Amphibia', 'Anura', 'Conrauidae', 'Conraua', 'Conraua goliath', '2002-05-17', '2002-07-14');

Insert into ANIMAL values ('UBDDV1JL9', 'Pinky', 'Animalia', 'Chordata', 'Aves', 'Phoenicopteriformes', 'Phoenicopteridae','Phoenicopterus', 'Phoenicopterus ruber', '2004-03-13', '2004-05-17');

Insert into ANIMAL values ('3UVFLK9VL', 'Speedy', 'Animalia', 'Chordata', 'Mammalia', 'Carnivora', 'Felidae', 'Acinonyx', 'Acinonyx jubatus', '1999-10-17', '2000-02-13');

Insert into ANIMAL values ('IH08QHDZD', 'Dooker', 'Animalia', 'Chordata', 'Actinopterygii', 'Acipenseriformes', 'Acipenseridae', 'Acipenser', 'Acipenser fulvescens', '2001-03-12', '2001-05-13');

Insert into ANIMAL values ('Q1DV6E67Z', 'Sticky', 'Animalia', 'Mollusca', 'Gaastropoda', 'Aplysiomorpha', 'Aplysiidae', 'Aplysia', 'Aplysia vaccaria', '2003-07-25', '2004-02-12');

Insert into ANIMAL values ('I6X2BZTHQ', 'Slimy', 'Animalia', 'Cnidaria', 'Scyphozoa', 'Rhizostomae', 'Mastigiidae', 'Phyllorhiza', 'Phyllorhiza punctata', '2004-07-22', '2004-08-23');

Insert into ANIMAL values ('MKZVRI7KA', 'Pointy', 'Animalia', 'Chordata', 'Mammalia', 'Perissodactyla', 'Rhinocerotidae', 'Diceros', 'Diceros bicornis', '1996-04-25', '2000-04-12');

Insert into ANIMAL values ('TR29GHHQH', 'Reptar', 'Animalia', 'Chordata','Reptilia', 'Saurischia', 'Tyrannosauridae', 'Tyrannosaurus', 'Tyrannosaurus rex', '1995-11-13', '1995-12-13');

Insert into ANIMAL values ('S2IDJLAEK','Tigger', 'Animalia', 'Chordata', 'Mammalia', 'Carnivora', 'Felidae', 'Panthera', 'Panthera tigris', '2001-04-27', '2003-06-17');

insert into EXHIBIT (ExhibitID, Name, Location, Hours) values (65, 'Frozen Mountain', 'North Zone', '9:00-5:00');

insert into EXHIBIT (ExhibitID, Name, Location, Hours) values (11, 'Rocky Hill', 'West Zone', '9:00-5:00');

insert into EXHIBIT (ExhibitID, Name, Location, Hours) values (08, 'Tropical Paradise', 'West Zone', '9:00-5:00');

insert into EXHIBIT (ExhibitID, Name, Location, Hours) values (98, 'Bird Watch', 'South Zone', '3:00-4:00');

insert into EXHIBIT (ExhibitID, Name, Location, Hours) values (10, 'Predator Zone', 'East Zone', '9:00-5:00');

insert into EXHIBIT (ExhibitID, Name, Location, Hours) values (50, 'Discover Earth', 'East Zone', '9:00-5:00');

TRIGGERS:

Triggers are the SQL codes that are automatically executed in response to certain events on a particular table. These are used to maintain the integrity of the data.

SYNTAX:

Create Trigger Trigger_Name

(Before | After) [Insert | Update | Delete]

on [Table_Name]

[for each row | for each column]

[trigger_body]

The trigger that I've used is to calculate the Total Amount the visitor has to pay based on the number of hours he has stayed at the zoo:

```
263 •   CREATE TRIGGER total_revenue
264     BEFORE INSERT
265     ON exhibit
266     FOR EACH ROW
267     SET NEW.TotalAmount=NEW.NoOfHours*NEW.FeePerHour;
268
```

Before Insertion:

ExhibitID	Name	Location	Hours	NoOfHours	FeePerHour	TotalAmount
8	Tropical Paradise	West Zone	9:00-5:00	8	50	400
10	Predator Zone	East Zone	8:00-12:00	4	45	180
11	Rocky Hill	West Zone	9:00-5:00	8	50	400
50	Discover Earth	East Zone	8:00-12:00	4	45	180
65	Frozen Mountain	North Zone	7:00-8:00	1	65	65
98	Bird Watch	South Zone	6:00-10:00	4	30	120
NULL	NULL	NULL	NULL	NULL	NULL	NULL

AFTER INSERTION:

```
•  INSERT INTO exhibit(ExhibitID,Name,Location,Hours,NoOfHours,FeePerHour) values(100,"New Zoo","North Zone","7:00-10:00",3,50);
```

ExhibitID	Name	Location	Hours	NoOfHours	FeePerHour	TotalAmount
8	Tropical Paradise	West Zone	9:00-5:00	8	50	400
10	Predator Zone	East Zone	8:00-12:00	4	45	180
11	Rocky Hill	West Zone	9:00-5:00	8	50	400
50	Discover Earth	East Zone	8:00-12:00	4	45	180
65	Frozen Mountain	North Zone	7:00-8:00	1	65	65
98	Bird Watch	South Zone	6:00-10:00	4	30	120
100	New Zoo	North Zone	7:00-10:00	3	50	150
NULL	NULL	NULL	NULL	NULL	NULL	NULL

TRANSACTIONS

A transaction is a unit of work that is performed against a database. Transactions are units or sequences of work accomplished in a logical order, whether in a manual fashion by a user or automatically by some sort of a database program. Practically, you will club many SQL queries into a group and you will execute all of them together as a part of a transaction.

BEFORE INSERTION:

```
•  START TRANSACTION;
•  insert into PERSON values ('MANOJ PATIL', 'MALLESWARAM', 'BANGALORE', '560003', 'KARNATAKA', '1950/05/02');
•  SAVEPOINT transaction1;
```

FullName	Street	City	ZipCode	US_State	DOB
...a Carroll	709 Saint Paul Sancton	Mesa	85205	Arizona	1944-04-30
MANOJ PATIL	MALLESWARAM	BANGALORE	560003	KARNAT...	1950-05-0
...n...i	8519 Sycamore Parkway	Topeka			...-11
Michael Michael	441 Loomis Lane	Tacoma	98411	Washing...	2015-06-12
Nuzhat Zaman	5358 Summit Center	Pittsburgh	15210	Pennsyl...	1951-11-21
Pamela Ida	70 Summer Ridge Lane	Lake Charles	70607	Louisiana	1976-12-06
Patricia Butler	91501 Grasskamp Court	Amarillo	79165	Texas	1970-10-04
Patrick Grant	0 Summit Place	Winston Salem	27150	North C...	1993-01-22
Patrick Johnson	55 Valley Edge Drive	Kansas City	64199	Missouri	2001-04-02
Phyllis Burns	19 Kinsman Plaza	Toledo	43610	Ohio	1981-07-20
Phyllis Watkins	6562 Onsgard Pass	Colorado Springs	80930	Colorado	2000-11-30
Russell Phillips	18850 Sutteridge Circle	Yakima	98907	Washing...	2003-01-20
Safiya Irene	238 Dorton Way	Fairfax	22036	Virginia	1995-10-20
Scott Wallace	3844 Iowa Park	Saint Petersburg	33715	Florida	1991-04-16
Stephanie Hart	8899 Tennessee Park	Charleston	25356	West Vir...	1936-12-18
Stephanie Ross	4595 Kensington Pass	Springfield	62776	Illinois	1961-05-22
Wanda Wallace	05 Debra Avenue	Lincoln	68510	Nebraska	1980-09-17
Wayne Myers	0 Iowa Park	Columbus	43204	Ohio	1978-06-19
Wendell Gray	537 Rutledge Drive	Fresno	93778	California	1960-07-23
NULL	NULL	NULL	NULL	NULL	NULL

AFTER INSERTION:

We insert a new row and we can revert back to transaction 1.

```
4      |
5 ●    insert into PERSON values ('ABC', 'MG ROAD', 'CHENNAI', '660003', 'TAMIL NADU', '1971/11/13');
6
7
```

FullName	Street	City	ZipCode	US_State	DOB
Aaron Ray	17 Merrick Lane	Indianapolis	46266	Indiana	1961-05-15
ABC	MG ROAD	CHENNAI	660003	TAMIL N...	1971-11-1...
Albert Chapman	1652 Pepper Wood Road	Houston	77212	Texas	1959-05-02
Amy Reed	58 Loeprich Way	Lawrenceville	30045	Georgia	1942-04-14
Amy Rice	7068 Westport Avenue	West Palm Beach	33416	Florida	1987-08-14
Brandon Perez	3664 Stoughton Crossing	Atlanta	30392	Georgia	1984-10-11
Bruce Foster	09 Shasta Junction	Honolulu	96825	Hawaii	1994-09-16
Chris Turner	05 Sycamore Plaza	Brooklyn	11220	New York	1945-09-20
Christina Ross	23 Autumn Leaf Road	Jeffersonville	47134	Indiana	1952-09-27
Cornelius Adisa	50445 Melby Avenue	Fort Worth	76162	Texas	1977-07-23
Denise Simmons	7 Carberry Park	Phoenix	85020	Arizona	1961-12-19
Dennis Frazier	3 Lien Court	Omaha	68197	Nebraska	2001-03-26
Diana Robinson	3 Hoard Pass	Sacr Sacramento 94286	California	1944-04-11
Donald Russell	52859 Tony Drive	Jackson	39204	Mississippi	1994-07-16
Evelyn Bailey	271 Summer Ridge Court	Tallahassee	32399	Florida	1978-03-07
George Zoghindy	4406 Fairfield Center	Huntington	25705	West Vir...	1931-08-09
Irene Bailey	395 Upham Lane	Newton	2162	Massach...	2016-04-03
James Ray	8806 Sachs Pass	Minneapolis	55446	Minnesota	1994-02-12
Jose Garcia	546 Red Cloud Point	Augusta	30911	Georgia	2001-07-08
Joseph Samadi	5 Dennis Street	Jackson	38308	Tennessee	1984-04-01
Karen Reed	8067 Cottonwood Crossing	Birmingham	35210	Alabama	2011-12-06
Lara Gall	30269 Arizona Junction	Saint Petersburg	33737	Florida	1976-04-09
Linda Ramos	010 Farragut Terrace	Fort Wayne	46857	Indiana	1967-07-26
				Arizona	1944-04-30
MANOJ PATIL	MALLESWARAM	BANGALORE	560003	KARNAT...	1950-05-0...
		Topeka	66667		2012-06-11

● **ROLLBACK TO SAVEPOINT transaction1;**

FullName	Street	City	ZipCode	US_State	DOB
Aaron Ray	17 Merrick Lane	Indianapolis	46266	Indiana	1961-05-15
Albert Chapman	1652 Pepper Wood Road	Houston	77212	Texas	1959-05-02
Amy Reed	58 Loeprich Way	Lawrenceville	30045	Georgia	1942-04-14
Amy Rice	7068 Westport Avenue	West Palm Beach	33416	Florida	1987-08-14
Brandon Perez	3664 Stoughton Crossing	Atlanta	30392	Georgia	1984-10-11
Bruce Foster	09 Shasta Junction	Honolulu	96825	Hawaii	1994-09-16
Chris Turner	05 Sycamore Plaza	Brooklyn	11220	New York	1945-09-20
Christina Ross	23 Autumn Leaf Road	Jeffersonville	47134	Indiana	1952-09-27
Cornelius Adisa	50445 Melby Avenue	Fort Worth	76162	Texas	1977-07-23
Denise Simmons	7 Carberry Park	Phoenix	85020	Arizona	1961-12-19
Dennis Frazier	3 Lien Court	Omaha	68197	Nebraska	2001-03-26
Diana Robinson	3 Hoard Pass	Sacramento	94286	California	1944-04-11
Donald Russell	52859 Tony Drive	Jackson	39204	Mississippi	1994-07-16
Evelyn Bailey	271 Summer Ridge Court	Tallahassee	32399	Florida	1978-03-07
George Zoghindy	4406 Fairfield Center	Huntington	25705	West Vir...	1931-08-09
Irene Bailey	395 Upham Lane	Newton	2162	Massach...	2016-04-03
James Ray	8806 Sachs Pass	Minneapolis	55446	Minnesota	1994-02-12
Jose Garcia	546 Red Cloud Point	Augusta	30911	Georgia	2001-07-08
Joseph Samadi	5 Dennis Street	Jackson	38308	Tennessee	1984-04-01
Karen Reed	8067 Cottonwood Crossing	Birmingham	35210	Alabama	2011-12-06
Lara Gall	30269 Arizona Junction	Saint Petersburg	33737	Florida	1976-04-09
Linda Ramos	010 Farragut Terrace	Fort Wayne	46857	Indiana	1967-07-26
...a Carroll	709 Saint Paul Junction	Mesa	85205	Arizona	1944-04-30
MANOJ PATIL	MALLESWARAM	BANGALORE	560003	KARNAT...	1950-05-0...
Meera Sakshi	8519 Sycamore Parkway	Topeka	66667	Kansas	2012-06-...
Michael ...	441 Loomis Lane	Tacoma	98411	...ington...	2015-06-12
Nuzhat Zaman	5358 Summit Center	Pittsburgh	15210	Pennsyl...	1951-11-21

person 1 ✕

SQL QUERIES

1.] Nested Queries :

- To find the type of food a specific type of species eat.

```
●    SELECT *
     FROM feeding
   ⊖ WHERE species=Any(
       SELECT species
       FROM animal
       WHERE animal.species=feeding.species);
```

Species	FoodType
Acinonyx jubatus	Meat
Acipenser fulvescens	Fish
Ailuropoda melanoleuca	Bamboo
Aplysia vaccaria	Algae
Bradypus tridactylus	Bugs leaves
Camelus dromedarius	Vegetables
Conraua goliath	Bugs
Crocodylus porosus	Meat
Diceros bicornis	Vegetables
Giraffa camelopardalis	Vegetables
Gorilla gorilla	Fruit veget...
Loxodonta africana	Vegetables
Myrmecophaga tridactyla	Ants
Panthera leo	Meat
Panthera tigris	Meat
Phoenicopterus ruber	Shrimp
Phyllorhiza punctata	Algae
Struthio camelus	Alfalfa grai...
Tyrannosaurus rex	Meat
Zalophus californianus	Fish
NULL	NULL

2.]Aggregate Queries:

- To find the number of Visitors and Employees from a particular state.(Count Function)

-
```
SELECT US_STATE, COUNT(FULLNAME)
FROM PERSON
GROUP BY US_STATE
ORDER BY COUNT(FULLNAME) DESC;
```

US_STATE	COUNT(FULLNAME)
Florida	4
Indiana	3
Texas	3
Georgia	3
Arizona	2
Nebraska	2
California	2
West Virginia	2
Washington	2
Ohio	2
Hawaii	1
New York	1
Mississippi	1
Massachusetts	1
Minnesota	1
Tennessee	1
Alabama	1
KARNATAKA	1
Kansas	1
Pennsylvania	1

3.]Join Queries:

- To find the food type associated to the proper name of the animal.

- ```sql
  SELECT ANIMAL.Name, FEEDING.FoodType
  FROM ANIMAL
  JOIN FEEDING
  ON ANIMAL.Species = FEEDING.Species;
  ```

Name	FoodType
Fred	Ants
Bucko	Alfalfa grains vegetables
Speedy	Meat
Pangwang	Bamboo
Bob	Bugs
Simba	Meat
Sid	Bugs leaves
Dumbo	Vegetables
Slimy	Algae
Dooker	Fish

CONCLUSION

The project is a mini world representation of an actual ZOO. By referring to this project you can actually understand the working of the ZOO . This database has very few tuples , to obtain a clearer point of view ,a database with large tuples needs to be used.

LIMITATIONS:

- The database has very few tuples in it . A database with more number of rows should be considered to have a more clear cut understanding.
- Developing a more intuitive front end and back end for user .