

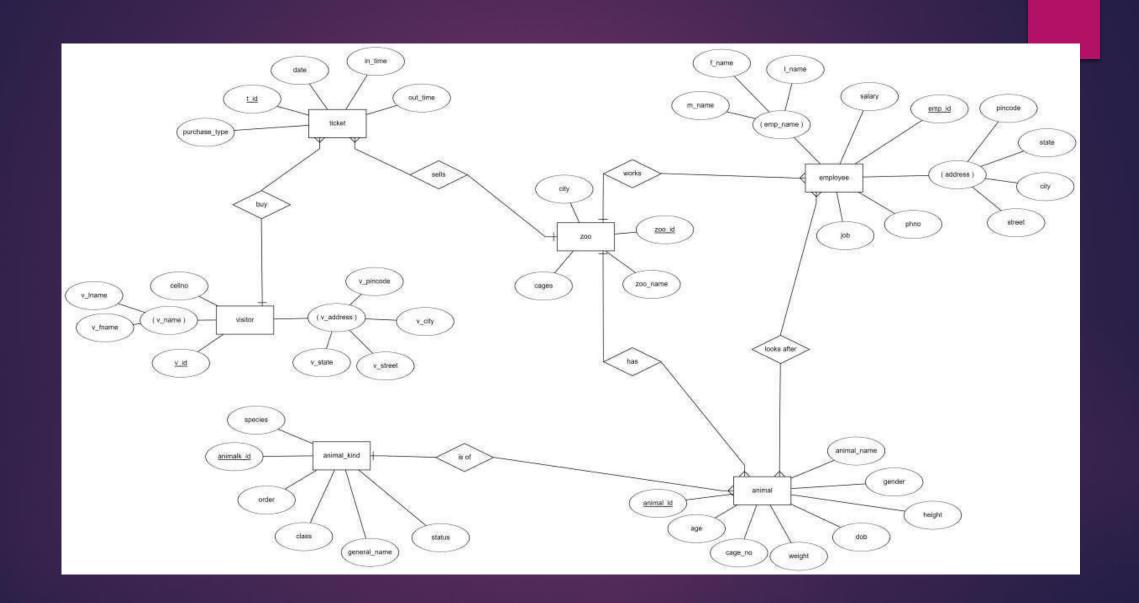
National Institute of Technology, Warangal

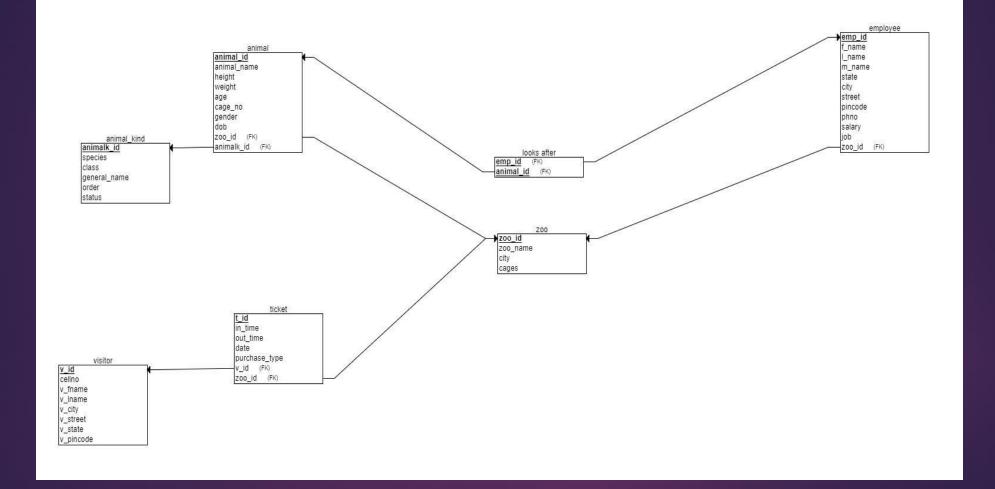
Department of Electrical And Electronics Engineering

ZOO MANAGEMENT DATABASE

Problem Statement

□ To help for conservation of the Wildlife and to raise awareness amongst the future generation about the preservation of fauna, create a database for zoos. This database has information about animals present in zoo, employees who work and take care of animals at the zoo. Also, the databases has information about the visitors who visit zoo.





Features Of Database:

Features of Database:

- Basic information about the animals is available and new species can be included into database, updates, deletions of existing animals is possible.
- > A track of visitors is maintained with some information about them.
- New employees can be added into zoos and updates about them and deletion can be done
- Tickets bought for an individual zoo can be recorded with also the type of payment method.
- Information about every animal present in a zoo is stored with options to add new animals into zoos, update the changes like change of caretaker and deletion of animal.

Normalisation

Entity: Animal Kind

- Animak id
- General_name
- species
- Order
- Class
- Status

This makes the Data one 1NF,2NF as all the columns are atomic, partial dependencies and transitive dependency are not present in data. The presence of functional dependency between the columns, order and class where neither of both are candidate keys break the 3NF, thus to reduce redundancy and to safeguard again anomalies the table is broken into 2 parts.

Entity: Taxonomy

- Order
- Class

This makes the data in 3NF, BCNF as the existing functional dependency between order and class is moved to another table.

Entity: Animal

- Animal ID
- Animal_name
- Origin
- Gender
- Weight
- Height
- Cage_NO
- Age

This data follows all the normal forms 1NF, 2NF, 3NF and BCNF are there are no columns with non-atomic values, and each column has unique name, no partial, transitive dependencies.

Entity: Employee

- Employee ID
- Employee First name
- Employee Last name
- Salary
- Role
- Phone number
- Pin Code
- Street
- City
- State

The 1 st normal form is violated in column phone number, as an employee maybe possess more than 1 contact number, distinguishing his personal contact number and work. Thus, the table to broken with new table consisting contact numbers of each personnel. The 3NF, BCNF requirements are not meet too, as the street depends on pin code, City depends on Street, State depends on City, i.e., there is a transitive dependency among the columns where none of them are candidate keys. Street, City, State are moved to another table with primary key as pin code.

Table: Contact

- Employee ID
- Phone number

Table: Address

- Pin code
- Street
- City

Table: Location

- City
- State

This breakdown of table into smaller table gives it all 4 normal forms namely 1NF, 2NF, 3NF, BCNF.

Entity: Zoo

- Zoo ID
- Zoo name
- City
- Capacity

The data is in all 1NF, 2NF, 3NF, BCNF. Therefore, needing no breaking down of tables for normalization of data.

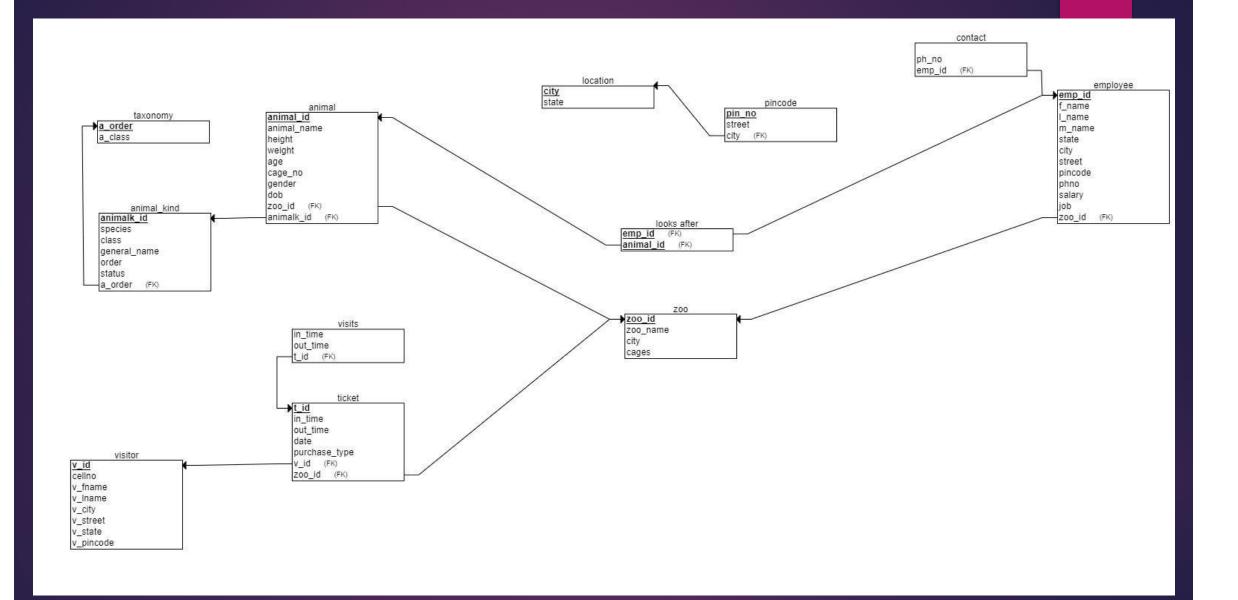
Entity: Visitor

- Visitor ID
- Visitor First Name
- Visitor Last Name
- Phone number
- Pin code
- Street
- City
- State

But creation of new tables is redundant as it already exists from breakdown of employee entity.

Relation Name	Туре	Explanation			
BUY	Many to 1	1 visitor can buy more than 1 ticket.			
		and 1 ticket can be given to 1 visitor only			
WORKS	Many to 1	A zoo has many working employees			
		and many employees can work in a single zoo			
SELLS	Many to 1	A zoo has many tickets and			
		many tickets can be sold by one zoo			
IS_OF	Many to 1	Many animals belong to 1 kingdom(animal species)			
		and single animal have 1 animal kind			
LOOKS_AFTER	Many to Many	Many Employees can look after one animal			
		Many animals can be looked upon by single employee			
HAS	Many to 1	One Zoo has many animals and			
		many animals can live in One zoo			

Relational scheme after normalisation



Creation of tables and insertion of data

```
create table zoo
(
zoo_id number primary key,
zoo_name varchar(100),
city varchar(100),
cages number
);

INSERT INTO zoo VALUES (10003, 'Sri Venkateswara Zoological Park', 'Tirupati', 69);
INSERT INTO zoo VALUES (10004, 'Kakatiya Zoological Park', 'Hanmakonda', 102);
INSERT INTO zoo VALUES (10007, 'Nehru Zoological Park', 'Hyderabad', 43);
INSERT INTO zoo VALUES (10009, 'Indira Gandhi Zoological Park', 'Visakhapatnam',39);
```

200_ID	Z00_NAME	СПА	CAGES
10009	Indira Gandhi Zoological Park	Visakhapatnam	39
19993	Sri Venkateswara Zoological Park	Tirupati	69
19994	Kakatiya Zoological Park	Hanmakonda	192
19997	Nehru Zoological Park	Hyderabad	43

```
create table taxonomy(
  a_order varchar(100) primary key,
  a class varchar(100)
INSERT INTO taxonomy VALUES ('Anura', 'Amphibia'); INSERT
INTO taxonomy VALUES ('Artiodactyla', 'Mammalia'); INSERT
INTO taxonomy VALUES ('Cardiida', 'invertebrate');
INSERT INTO taxonomy VALUES ('Carnivora', 'Mammalia');
INSERT INTO taxonomy VALUES ('Casuariiformes', 'Aves');
INSERT INTO taxonomy VALUES ('Ciconiiformes', 'Aves'); INSERT
INTO taxonomy VALUES ('Crocodilia', 'Reptilia'); INSERT INTO
taxonomy VALUES ('Cyclopoida', 'Hexanauplia'); INSERT INTO
taxonomy VALUES ('Decapoda', 'invertebrate'); INSERT_INTO
taxonomy VALUES ('Galliformes', 'Aves');
```

A_ORDER	A_CLASS
Апига	Amphibia
Artiodactyla	Mammelia .
Cardiida	invertebrate
Carniwora	<u> Mammelia</u>
Casuariiformes	Aves
Ciconiiformes	Aves
Crocodilia	Reptilia
Cyclopoida	Hexanauplia
Decapoda	invertebrate
Galliformes	Aves

```
create table animal kind
animalk id NUMBER primary key,
general name varchar(100),
species varchar(100),
a order varchar(100),
foreign key(a order) references taxonomy(a order),
status varchar(10)
INSERT INTO animal kind VALUES (105001, 'Bengal Tiger', 'Panthera tigris tigris', 'Carnivora', 'EN');
INSERT INTO animal kind VALUES (105002, 'African Lion', 'Panthera leo leo', 'Carnivora', 'VU');
INSERT INTO animal kind VALUES (105003, 'Chimpanzee', 'Pan troglodytes', 'primate', 'EN');
INSERT INTO animal kind VALUES (106001, 'King Cobra', 'Ophiophagus hannah', 'serpentes', 'VU');
INSERT INTO animal_kind VALUES (102001, 'Openbill Stork', 'Anastomus oscitans', 'Ciconiiformes', 'LC');
INSERT INTO animal_kind VALUES (101001, 'Red Eye Tree Frog', 'Agalychnis callidryas', 'Anura', 'LC');
INSERT INTO animal_kind VALUES (101002, 'Asiatic salamanders', 'Hynobius oyamai', 'Urodela', 'VU');
```

INSERT INTO animal_kind VALUES (103001, 'Lined Seahorse', 'Hippocampus erectus', 'Syngnathiformes', 'VU'); INSERT INTO animal_kind VALUES (101003, 'Axolotl', 'Ambystoma mexicanum', 'Urodela', 'CR'); INSERT INTO animal_kind VALUES (104001, 'Crustaceans', 'Acanthocyclops hypogeus', 'Cyclopoida', 'VU');

MIDWLK_ID	GENERAL_NAME	SPECIES	A_ORDER	STATUS
195991	Bengal Tiger	Panthera tigris tigris	Carnivora	EN
195992	African Lion	Panthera leo leo	Carnivora	WU
192991	Openbill Stork	Anastomus oscitans	Ciconiiformes	LC
191991	Red Eye Tree Frog	Agalychnis callidryas	Anura	LC
184991	Crustaceans	Acanthocyclops hypogeus	Cyclopoida	w

```
create table animal(
 animal_id number primary key,
animal_name varchar(100),
cage_no number,
height number,
weight number,
age number,
gender varchar(10),
origin varchar(100),
animalk_id NUMBER,
FOREIGN KEY (animalk_id) REFERENCES
animal_kind(animalk_id),
zoo_id number,
FOREIGN KEY(zoo_id) REFERENCES zoo(zoo_id)
);
```

```
INSERT INTO animal VALUES (30001, 'King Cobra', 101, 23, 1, 2, 'M', 'North america', 105001, 10009); INSERT INTO animal VALUES (30002, 'Monkey', 102, 31, 15, 9, 'M', 'africa', 105002, 10009); INSERT INTO animal VALUES (30004, 'Alligator', 104, 60, 19, 5, 'M', 'india', 102001, 10003); INSERT INTO animal VALUES (30005, 'Elephant', 105, 188, 430, 21, 'F', 'North america', 101001, 10003); INSERT INTO animal VALUES (30006, 'Hyena', 106, 265, 11, 8, 'M', 'india', 104001, 10004); INSERT INTO animal VALUES (30007, 'Ostrich', 107, 90, 7, 6, 'F', 'UK', 105001, 10004); INSERT INTO animal VALUES (30008, 'Hippopotamus', 108, 305, 11, 5, 'M', 'india', 102001, 10007); INSERT INTO animal VALUES (30009, 'Zebra', 109, 168, 43, 11, 'M', 'Australia', 105002, 10003); INSERT INTO animal VALUES (30010, 'PeaCock', 110, 22, 23, 2, 'F', 'North america', 104001, 10009); INSERT INTO animal VALUES (30011, 'White Tiger', 111, 130, 245, 7, 'M', 'india', 101001, 10003);
```

ANIMAL_ID	A NIMA L_NAME	CAGE_ND	HEIGHT	WEIGHT	AGE	GENDER	ORIGIN	ANIMALK_ID	Z00_ID
30010	PeaCock	110	22	23	2	F	North america	104001	10009
30004	Alligator	104	60	19	5	м	india	102001	10003
30005	Elephant	105	188	430	21	F	North america	101001	10003
30006	Нуепа	106	265	11	8	м	india	104001	10004
30007	Ostrich	197	90	7	6	F	UK	105001	10004
30008	Hippopotamus	108	305	11	5	м	india	102001	10007
30009	Zebra	109	168	43	11	м	Australia	105002	10003
30011	White Tiger	111	130	245	7	м	india	101001	10003
30001	Kinf Cobra	101	23	1	2	м	North america	105001	10009
30002	Monkey	102	31	15	9	M	africa	105002	10009

```
create table location(
city varchar(100) primary key,
state varchar(100));
```

```
INSERT INTO location VALUES ('Hyderabad', 'Telangana');
INSERT INTO location VALUES ('Warangal', 'Telanagana');
INSERT INTO location VALUES ('Visakhapatnam', 'Andharapradesh');
INSERT INTO location VALUES ('Tirupathi', 'Andhara pradesh');
```

CITY	STATE		
Hyderabad	Telangana		
Warangal	Telanagana		
Visakhapatnam	Andhara pradesh		
Tirupathi	Andhara pradesh		

create table pincode(
pinnum number primary key,
street varchar(100),
city varchar(100),
FOREIGN KEY (city) REFERENCES location(city));

INSERT INTO PINCODE VALUES (500002, 'DILSHUKNAGAR', 'HYDERABAD'); INSERT INTO PINCODE VALUES (500016, 'BANJARA HILLS', 'HYDERABAD'); INSERT INTO PINCODE VALUES (500060, 'VIDYANAGAR', 'HYDERABAD'); INSERT INTO PINCODE VALUES (500125, 'KUKATPALLI', 'HYDERABAD'); INSERT INTO PINCODE VALUES (600004, 'KAZIPET', 'WARANGAL');

INSERT INTO PINCODE VALUES (600008, 'SUBEDARI', 'WARANGAL'); INSERT INTO PINCODE VALUES (600021, 'LB NAGAR', 'WARANGAL'); INSERT INTO PINCODE VALUES (600035, 'SHAMBUNIPET', 'WARANGAL'); INSERT INTO PINCODE VALUES (600055, 'HANMAKONDA', 'WARANGAL');

РПИЛИ	STREET	СПУ
599992	Dilshuknagar	Hyderabad
599916	Banjara Hills	Hyderabad
599969	Vidyanagar	Hyderabad
599969	Miyapur	Hyderabad
599125	Kukatpalli	Hyderabad
699994	Kazipet	Warangal
699993	Subedari	Warangal
699921	LB nagar	Warangal
699935	Shambunipet	Warangal
699955	Hanmakonda	Warangal

```
CREATE TABLE EMPLOYEE
(

EMP_IDNUMBERPRIMARYKEY,

EMP_FNAME VARCHAR(100),

EMP_MNAME VARCHAR(100),

EMP_LNAMEVARCHAR(100),

SALARYNUMBER,

ZOO_IDNUMBER,

FOREIGNKEY(ZOO_ID)REFERENCESZOO(ZOO_ID),

PINNUM NUMBER,

FOREIGNKEY(PINNUM) REFERENCESPINCODE(PINNUM)
);
```

B4P_ID	EMP_FRAME	EMP_MNAME	EMP_LINAME	SALARY	Z00_ID	РПИМ
1992	Sankar	kolapali	security	15888	19999	588816
1993	Samvidha	jaaron	cagekeeper	15899	19997	699955
1994	Rohith	pinnamraju	gatekeeper	15899	19994	500125
1995	пачееп	allu ratna	cagekeeper	15888	19993	500125
1996	varun	reddy	cagekeeper	29999	10007	599125
1997	rajesh	Ameragani	cagekeeper	15999	10009	699921
1999	vinay	Gundapalli	cagekeeper	29999	19999	699998
1010	shiva reddy	ramala	cagekeeper	29999	19997	699955

INSERTINTO EMPLOYEE VALUES (1001, 'RAGHU', 'PHANESH', 'SANITARY', 60000, 10004, 500001); INSERT INTO EMPLOYEE VALUES (1002, 'SANKAR', 'KOLAPALI', 'SECURITY', 15000, 10007, 600055); INSERTINTO EMPLOYEE VALUES (1004, 'ROHITH', 'PINNAMRAJU', 'GATEKEEPER', 15000, 10004, 500125); INSERTINTO EMPLOYEE VALUES (1005, 'NAVEEN', 'ALLU RATNA', 'CAGEKEEPER', 15000, 10003, 500125); INSERTINTO EMPLOYEE VALUES (1006, 'VARUN', 'REDDY', 'CAGEKEEPER', 20000, 10007, 500125); INSERTINTO EMPLOYEE VALUES (1007, 'RAJESH', 'AMARAGANI', 'CAGEKEEPER', 15000, 10009, 600021); INSERTINTO EMPLOYEE VALUES (1008, 'WASEEM', 'AGARWAL', 'CAGEKEEPER', 15000, 10009, 600008); INSERTINTO EMPLOYEE VALUES (1009, 'VINAY', 'GUNDAPALLI', 'CAGEKEEPER', 20000, 10009, 600008); INSERTINTO EMPLOYEE VALUES (1010, 'SHIVAREDDY', 'RAMALA', 'CAGEKEEPER', 20000, 10007, 600055);

```
create table contact(
  emp_id number,
FOREIGN KEY (emp_id) REFERENCES employee(emp_id),
number);
```

INSERT INTO contact VALUES (1001, 8741122565);
INSERT INTO contact VALUES (1002, 6179485234);
INSERT INTO contact VALUES (1003, 7849562134);
INSERT INTO contact VALUES (1004, 9844565225);
INSERT INTO contact VALUES (1005, 9848522338);
INSERT INTO contact VALUES (1006, 6320154879);
INSERT INTO contact VALUES (1007, 8484879111);
INSERT INTO contact VALUES (1008, 9787488845);
INSERT INTO contact VALUES (1009, 9784684135);
INSERT INTO contact VALUES (1010, 7454846513);

PHONE_ND
6179485234
7849562134
9844565225
9848522338
6329154879
8484879111
9784684135
7454846513

```
create table visitor( v id number PRIMARY KEY,
phone no number,
pinnum number, foreign key (pinnum) references pincode(pinnum),
v_fname varchar(100),
v Iname varchar(100)
INSERT INTO visitor VALUES (1000002, 8247423616, 500001, 'Sandhya', 'Dhanavath');
INSERT INTO visitor VALUES (1000003, 9848522338, 500002, 'Shankar', 'Tejavath');
INSERT INTO visitor VALUES (1000004, 7532148967, 500060, 'Waseem', 'Syed');
INSERT INTO visitor VALUES (1000005, 6459783120, 500125, 'Manoj', 'Boganadham');
INSERT INTO visitor VALUES (1000006, 8524615397, 500069, 'Infi', 'Chan');
INSERT INTO visitor VALUES (1000007, 9754125896, 600004, 'Bhushank', 'Kul');
INSERT INTO visitor VALUES (1000008, 8462157930, 600055, 'Abhiram', 'Nallama');
INSERT INTO visitor VALUES (1000009, 6841759325, 600008, 'Ashish', 'Anand');
INSERT INTO visitor VALUES (1000010, 8945632178, 600154, 'Lakshita', 'Chowdary');
INSERT INTO visitor VALUES (1000011, 9685741232, 600035, 'Nayan', 'Jyothi');
INSERT INTO visitor VALUES (1000012, 8675941236, 600021, 'Ranil', 'Bala');
INSERT INTO visitor VALUES (1000013, 7849562134, 600154, 'Tanisha', 'Agarwal');
```

V_ID	PHONE_NO	PINNUM	V_FNAME	V_LNAME
1000003	9848522338	500002	Shankar	Tejavath
1000004	7532148967	500060	Waseem	Syed
1000005	6459783120	500125	Manoj	Boganadham
1000006	8524615397	500069	Infi	Chan
1000007	9754125896	600004	Bhushank	Kul
1000008	8462157930	600055	Abhiram	Nallama
1000009	6841759325	600008	Ashish	Anand
1000011	9685741232	600035	Nayan	Jyothi
1000012	8675941236	600021	Ranil	bala

```
create table purchase(
purchase_id number primary key,
varchar(100));
```

```
insert into purchase values(102,'Credit Card'); insert into purchase values(103,'Cash'); insert into purchase values(104,'UPI'); insert into purchase values(105,'e-wallets');
```

PURCHASE_ID	PURCHASE_NAME
102	Credit Card
103	Cash
104	UPI
105	e-Wallets

```
create table ticket(
ticket id number primary key,
ticket_date date,
v id number,
 FOREIGN KEY (v_id) REFERENCES visitor(v_id),
 purchase id number,
 FOREIGN KEY (purchase_id) REFERENCES purchase(purchase_id),
zoo_id number, FOREIGN KEY (zoo_id) REFERENCES zoo(zoo_id));
INSERT INTO ticket VALUES (9034351, '15-08-2020', 1000002, 104, 10004);
INSERT INTO ticket VALUES (2110003, '15-02-2020', 1000003, 104, 10007);I
NSERT INTO ticket VALUES (6382682, '15-02-2020', 1000004, 103, 10003);I
NSERT INTO ticket VALUES (6824217, '14-02-2020', 1000005, 102, 10007);
INSERT INTO ticket VALUES (5193139, '15-02-2020', 1000006, 103, 10009);
INSERT INTO ticket VALUES (5542291, '14-02-2020', 1000007, 102, 10003);
INSERT INTO ticket VALUES (2580752, '14-02-2020', 1000008, 104, 10007);
INSERT INTO ticket VALUES (9154961, '15-02-2020', 1000009, 102, 10007);
INSERT INTO ticket VALUES (8391607, '14-02-2020', 1000010, 101, 10007);
INSERT INTO ticket VALUES (1329791, '14-02-2020', 1000011, 102, 10007);
```

TICKET ID	TICKET DATE	V ID	PURCHASE ID	200 ID
2110003	15-02-2020	1999993	164	19997
6382682	15-02-2020	1999994	193	19993
6824217	14-92-2929	1999995	102	19997
5193139	15-02-2020	1999996	193	19999
5542291	14-92-2929	1000007	102	19993
2589752	14-92-2929	1999993	194	19997
9154961	15-02-2020	1999999	102	19997
1329791	14-92-2929	1000011	102	19997

```
create table looks after(
 animal id number,
FOREIGN kEY (animal_id) REFERENCES animal(animal_id),
FOREIGN KEY (emp_id) REFERENCES employee(emp_id));
INSERT INTO looks after(animal id, emp id) VALUES (30010, 1002);
INSERT INTO looks_after(animal_id, emp_id) VALUES (30004, 1003);
INSERT INTO looks_after(animal_id, emp_id) VALUES (30005, 1004);
INSERT INTO looks after(animal id, emp id) VALUES (30006, 1005);
INSERT INTO looks_after(animal_id, emp_id) VALUES (30007, 1006);
INSERT INTO looks_after(animal_id, emp_id) VALUES (30008, 1007);
INSERT INTO looks_after(animal_id, emp_id) VALUES (30009, 1000);
INSERT INTO looks_after(animal_id, emp_id) VALUES (30011, 1010);
INSERT INTO looks_after(animal_id, emp_id) VALUES (30001, 1009);
INSERT INTO looks_after(animal_id, emp_id) VALUES (30002, 1010);
```

ANIMAL_ID	EMP_ID
30004	1005
30009	1005
30010	1002
30004	1003
30005	1004
30006	1005
30007	1006
30008	1007
30011	1010
30001	1009
30002	1010

```
create table visits(
ticket_id number PRIMARY KEY,
FOREIGN KEY (ticket_id) REFERENCES ticket(ticket_id), in time TIMESTAMP,
 out time TIMESTAMP);
INSERT INTO visits VALUES (1329791, to timestamp('16/02/2020 10:53:10', 'dd/mm/yyyy
HH24:MI:SS'),to_timestamp( '16/02/2020 16:53:15','dd/mm/yyyy HH24:MI:SS'));INSERT INTO visits
VALUES (9154961, to timestamp('2020-02-16 10:53:45','yyyy/mm/dd HH24:MI:SS'),
to timestamp('2020-02-16 16:07:41','yyyy/mm/dd HH24:MI:SS'));INSERT INTO visits VALUES
(5542291, TO_TIMESTAMP('2020/02/16 10:45:55','yyyy/mm/dd HH24:MI:SS'),
TO_TIMESTAMP('2020/02/16 16:05:09','yyyy/mm/dd HH24:MI:SS'));INSERT INTO visits VALUES
(5193139, TO_TIMESTAMP('2020/02/16 10:57:30','yyyy/mm/dd HH24:MI:SS'),
TO TIMESTAMP('2020/02/16 16:07:11','yyyy/mm/dd HH24:MI:SS'));INSERT INTO visits VALUES
(6824217, TO TIMESTAMP('2020/02/16 10:59:37','yyyy/mm/dd HH24:MI:SS'),
TO_TIMESTAMP('2020/02/16 16:49:04','yyyy/mm/dd HH24:MI:SS'));INSERT INTO visits VALUES
(2110003, TO_TIMESTAMP('2020/02/16 10:35:55','yyyy/mm/dd HH24:MI:SS'),
TO_TIMESTAMP('2020/02/16 16:39:35','yyyy/mm/dd HH24:MI:SS'));INSERT INTO visits VALUES
(6382682, TO TIMESTAMP('2020/02/16 10:19:33','yyyy/mm/dd HH24:MI:SS'),
TO TIMESTAMP('2020/02/16 16:37:00','yyyy/mm/dd HH24:MI:SS'));
```

TICKET_ID	IN_TIME	OUT_TIME
6824217	16-FEB-20 10.59.37.000000 AM	16-FEB-20 04.49.04.000000 P
1329791	16-FEB-20 10.53.10.000000 AM	16-FEB-20 04.53.15.000000 P
9154961	16-FEB-20 10.53.45.000000 AM	16-FEB-20 04.07.41.000000 P
5542291	16-FEB-20 10.45.55.000000 AM	16-FEB-20 04.05.09.000000 P
5193139	16-FEB-20 10.57.30.000000 AM	16-FEB-20 04.07.11.000000 P
2110003	16-FEB-20 10.35.55.000000 AM	16-FEB-20 04.39.35.000000 P
6382682	16-FEB-20 10.19.33.000000 AM	16-FEB-20 04.37.00.000000 P

