Computer Programming Paradigms Lab

PROLOG Lab 1

1. Type the following program:

```
dog(fido).
cat(felix).
animal(X):-dog(X).

Check the following goals:
animal(felix).
animal(fido).
```

2. Type the following program:

```
dog(fido).
cat(mary). dog(rover).
dog(tom). cat(harry).
dog(henry).
cat(bill). cat(steve).
```

Check the following goals:

```
dog(X).
listing(dog).
cat(X),dog(Y).
cat(X),dog(X).
```

3. Write a program to put facts indicating that a lion, a tiger and a cow are animals into the database and to record that two of them (lion and tiger) are carnivores. Save your program to a disk file and load it. Check that the database is correct using **listing**.
   Enter goals to test whether:
   (a) there is such an animal as a tiger in the database
   (b) a cow and a tiger are both in the database (a conjunction of two goals)
   (c) a lion is an animal and also a carnivore
   (d) a cow is an animal and also a carnivore.

   Solution:

```
animal(lion).
animal(tiger).
animal(cow).
carnivore(lion).
carnivore(tiger).
```

4. Type the following program into a file and load it into Prolog.
   /* Animals Database */

```
animal(mammal,tiger,carnivore,stripes).
animal(mammal,hyena,carnivore,ugly).
animal(mammal,lion,carnivore,mane).
animal(mammal,zebra,herbivore,stripes).
animal(bird,eagle,carnivore,large).
animal(bird,sparrow,scavenger,small).
animal(reptile,snake,carnivore,long).
animal(reptile,lizard,scavenger,small).
```

Devise and test goals to find (a) all the mammals, (b) all the carnivores that are mammals, (c) all the mammals with stripes, (d) whether there is a reptile that has a mane.

Solution:

```
a. animal(mammal,A,_,_).
b. animal(mammal,A,carnivore,_).
c. animal(mammal,A,_,stripes).
d. animal(reptile,A,_,mane).
```

5. Do unification & resolution on the following:

```
capital(london,england).
european(england):-write("God save the Queen!"),nl.
pred(X, 'european capital'):-capital(X,Y), european(Y), write(X),nl.
```

Check with:

```
pred(london,A).
```

You should get the output:

```
God save the Queen!
London
A='european capital'
```

6. Do unification & resolution on the following:

```
mother(ann,henry).
mother(ann,mary).
mother(jane,mark).
mother(jane,francis).
mother(annette,jonathan).
mother(mary,bill).
mother(janice,louise).
mother(lucy,janet).
mother(louise,caroline).
mother(louise,martin).
father(henry,jonathan).
father(john,mary).
father(francis,william).
father(francis,louise).
father(john,mark).
father(gavin,lucy).
father(john,francis).
father(martin,david).
father(martin,janet).
parent(victoria,george).
parent(victoria,edward).
parent(X,Y):-write('mother?'),nl,mother(X,Y),
write('mother!'),nl.
parent(A,B):-write('father?'),nl,father(A,B),
write('father!'),nl..
parent(elizabeth,charles).
parent(elizabeth,andrew).
```

Give the goal:

```
parent(john,Child), write('the child is '), write(Child),nl.
```

You should get the output:

```
mother?
father?
father!
the child is mary
Child = mary ;
father!
the child is mark
Child = mark ;
father!
the child is francis
Child = francis.
```