Prolog Programming Assignment

1) How does the queries in kb.pl file are executed ?

→ Code: loves (vincent, mia).
loves (marcellus, mia)
loves (Pumpkin, honey_bunny)
loves (honey_bunny, Pumpkin)

jealous (x, y) :-
loves (x, z),
loves (y, z).

Query 1 : ? - loves (x, mia)
output : X = Vincent
X = Marcellus

Explanation : Here as we know Vincent loves Mia as well as Marcellus loves Mia. Thus the kb assumes that x is either Vincent or Marcellus.

Query 2 : ? - jealous (x, y)
output : X = Y, Y = Vincent
X = Vincent
Y = Marcellus
X = Marcellus
X = Y, Y = Marcellous

X = Y, Y = Pumpkin
X = Y, Y = Honey, bunny

Explanation : As there is no fixed parameter in our query. The query will produce output of every jealous (X, Y) pair on our prolog code. The 'jealous()' rule follows:
jealous (X, Y) :- loves (X, Z), loves (Y, Z).

Initially, X and Y both were associated to Vincent, i.e. Self association : It then follows Reflexive property for the rest of the prolog code.

2. How does the queries in lists.pl file are executed?

→ Code :-

```
Suffix (Xs, Ys) :-
append (_, Ys, Xs) -

Prefix (Xs, Ys)
append (Ys, _, Xs)

Suffix (Xs, Zs),
Prefix (Zs, Ys).

Rrev ([], [])
rrev ([H] TO], L] :-
rrev (To, T),
```

Query 1 :

? sublist ([a,b,c,d,e], [c,d])

output : true

Explanation : If elements c and d are present in the list [a,b,c,d,e] then it returns true if not then it returns false.

Query 2 :

? - suffix ([a,b,c], zs)

output : zs = [a,b,c]

zs = [b,c]

zs = [c]

zs = []

Explanation : Suffix in general eliminates the first element from the list until the list is empty. As there are no more elements in the list, the output will be displayed as 'false'.

3. Create a prolog code to find factorial of a number,

→ factorial (0,1).

factorial (N,F) :-

N > 0,

N1 is N-1

factorial (N1, F1),

F is N*F-1

Query : ? - Factorial (3, w)

Output : w = 6

4. In Complex dataset movies.pl write query strings and results of query execution for any of 5 tasks.

→ a. In which year was the movie American Beauty released ?

Query : ? - movie (american_beauty, Y)

Output : Y = 1999

b. Find movies released in year 2000

Query : ? - movie (M, 2000)

Output : M = days_from_the_mountain

M = O_brother_where_art_thou

M = ghost_world

c. Find movies released before 2000.

Query : ? - movie (M, Y), Y < 2000

Output : M = american_beauty

Y = 1999

M = anna

Y = 1987

M = barton_fink

Y = 1991 ...

d. Find the movies released after 1990.

Query : ?- movie (M, Y), Y > 1990

Output : M = american_beauty,
Y = 1999
M = barton_fink,
Y = 1991 ....

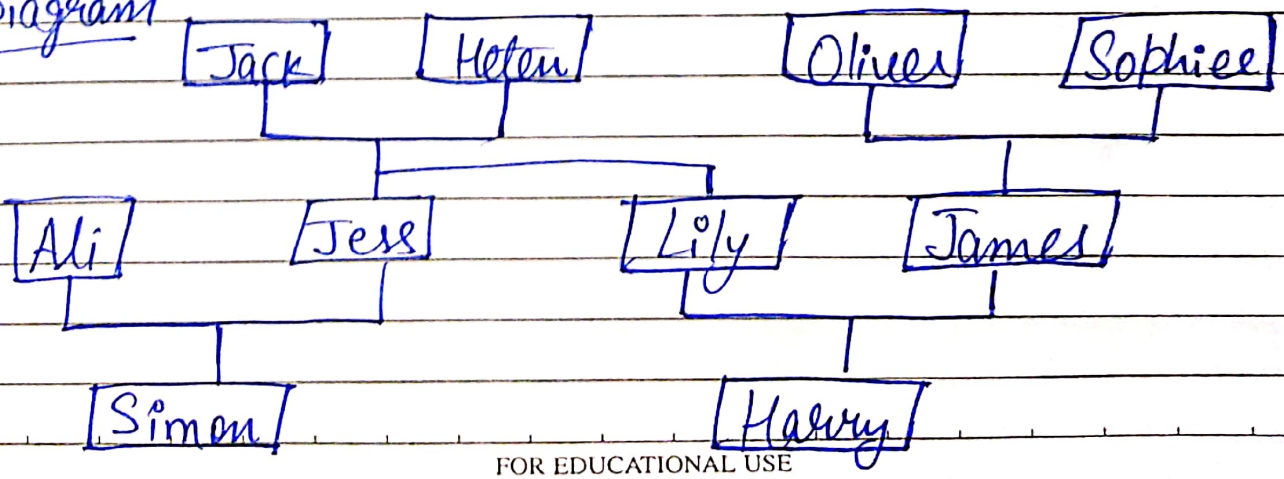
e. Find a director of a movie in which Starlett Johansson appeared.

Query : ?- actress (M, Scarlet_Johnson_),
director (M, D)

Output : D - Peter_webber,
M = girl_with_a_pearl_earring

5. Draw a family tree of you long abitrary family. Which has the following relations mother, father, daughter, son, grandson, grand mother, Sibling, uncle, person, male, female. You need to convert it into KB and write atleast 6 queries and query results on your KB.

→ Diagram



Query 1 : ?-mother_of (X, jess)
output : X = helen

Query 2 : ? parent_of (X, Simon)
output : X = jess

Query 3 : ?-Sister_of (X, lily)
output : X = jess

Query 4 : ?-parent_of (X, harry)
output : X = lily
X = James

Query 5 : ?-aunt_of (X, Simon)
output : X_lily

Query 6 : ?- grandfather_of (X-harry)
output : X_jack.