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: ?- 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 = marcellus
X = Y, Y = pumpkin
X = Y, Y = honey-bunny

Explanation: As there is no fixed parameters 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 himself, 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)

sublist (XS, YS) :-
suffix (XS, ZS):
prefix (ZS, YS)

nrev ([], [])
nrev ([H|T], L) :-
nrev (T, T)
append (T, [H], L)

Query 1 : ?- sublist ([a, b, c, d, e], [c, d]).
output : True.

Explanation: A sublist procedure looks for a match between the first elements of the the sublist & the main_list i.e here [c,d] is the sublist of the main list [a,b,c,d,e]. As the main list contains the sublist [c,d] the output is true. Else the output would have been false.

Query 2: ?- suffix([a,b,c],zs)

Output: zs = [a,b,c]
zs = [b,c]
zs = [c]
zs = []
false

Explanation: Suffix in general eliminates the front elements from a list, here, by using suffix procedure. [a,b,c] elements are removed from a & continues until all the elements are removed. As there are no more elements in the list, the output will be displayed as 'false'.

Q. 3] programming ubare a Prolog code to find factorial of a number?

Ans: Code: factorial(0,1).
factorial(N,F):-

N>0
N1 is N-1
factorial (N1, F1)
N is N* F1.

Query : ?- factorial (3, W).

Output : W = 6

Q.4] In examples data set movies.pl write query strings & 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 the movies released in year 2000.

Query : ?- movie (M, 2000).
Output : M = down_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
X = 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

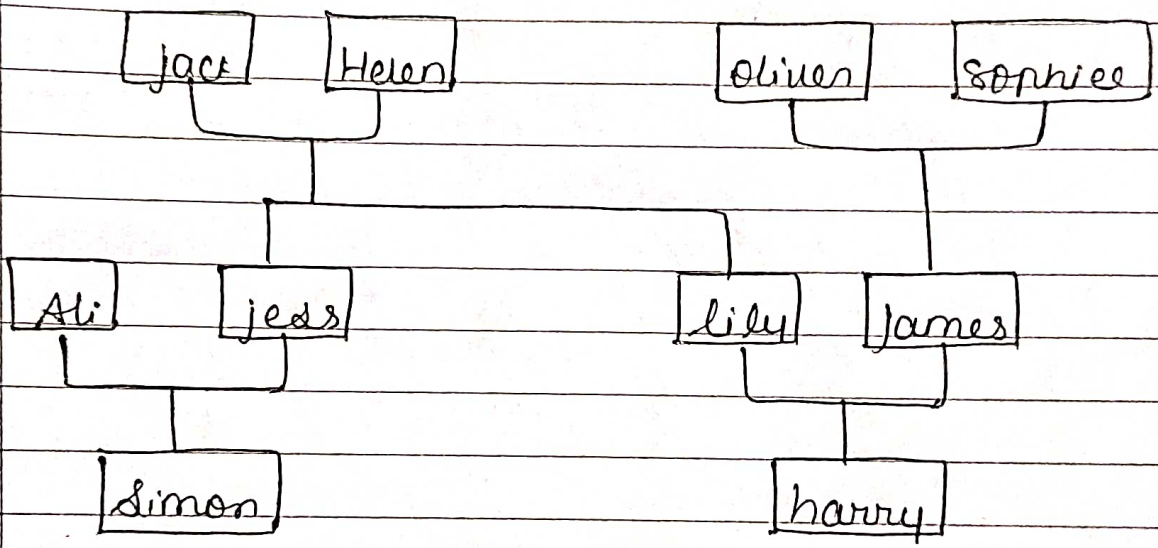
M = barton_fink
Y = 1991

e) find a director of a movie in which scarlett johansson appeared.

Query : ?- actress (M, Scarlett_johnansson,) _), director (M, D)
Output : D = peter_webber
M = girl_with_a_pearl_earring.

Q.5] Draw a family tree of your any arbitrary family which has the following relations mother, father, daughter, son, grandson, grandmother, sibling, uncle, person, male, female. you need to convert it into KB & write atleast 6 queries & query results on your KB.

→ Diagram:



family tree

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