CS571 AI LAB 06

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Collab Link for Q1:
.pl File attached for question

Q1

An expression is a theorem iff there does not exists a right-hand expression which is false corresponding to a true left-hand expression for implication symbol

```
Enter the expression to determine whether it is a theorem: (P=>Q)=>((~Q=>P)=>Q)
Q P (P=>Q)=>((~Q=>P)=>Q)
0 0 True
0 1 True
1 0 True
1 1 True
Result-> Is a Theorem!
```

```
Enter the expression to determine whether it is a theorem: (P)=>(PVQ)
Q P (P)=>(PVQ)
0 0 True
0 1 True
1 0 True
1 1 True
Result-> Is a Theorem!
```

```
Enter the expression to determine whether it is a theorem: (P^Q)=>(PVR)
Q P R (P^Q)=>(PVR)
0 0 0 True
0 0 1 True
0 1 0 True
0 1 1 True
1 0 0 True
1 0 1 True
1 1 0 True
1 1 1 True
Result-> Is a Theorem!
```

```
Enter the expression to determine whether it is a theorem: (b)=>(aVc)
a b c (b)=>(aVc)
0 0 0 True
0 0 1 True
0 1 0 False
0 1 1 True
1 0 0 True
1 0 1 True
1 1 0 True
1 1 1 True
Result-> Not a Theorem!
```

Q2

The objective of this problem was to write a prolog program to satisfy queries given a knowledge base

Given,

A, B and C belong to Himalayan club. Every member in the club is either a mountain climber or skier or both. A likes whatever B dislikes and dislikes whatever B likes. A likes rain and snow. No mountain climber likes rain. Every skiers likes snow

Question : *Is there a member who is a mountain climber but not a skier?*

```
himalayan_club(a).
himalayan_club(b).
himalayan_club(c).

% If notmc and notsk, then fail
himalayan_club(X):-notmc(X),notsk(X),!, fail.
himalayan_club(_).

like(a,rain).
like(a,snow).

like(a,X) :- dislike(b,X).
// like(b,X) :- like(a,X),!,fail.
// like(b,_).
dislike(a,X) :- like(b,X)

// mc(X):-like(X,rain),!,fail.
// mc(_).

notmc(X):-like(X,rain).
```

```
notsk(X):- dislike(X,snow).

// notmc(X):- mc(X),!,fail.
// notmc(_).

% If P likes Q, then fail
// dislike(P,Q):- like(P,Q),!,fail.
// dislike(_,__).

% Final query
query(X):-himalayan_club(X),mc(X),notsk(X),!.
```

The queries can be altered and checked for again

```
?- [knowledge].
true.

?- query(a).
false.

?- query(b).
true.

?- query(c).
true.
```