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Admission number: U19CS009

ARTIFICIAL INTELLIGENCE

ASSIGNMENT - 05

1. Perform Towers of Hanoi.

```
%U19CS009
%BRIJESH ROHIT

move(1,X,Y,_) :-
    write('Move top disk from '),
    write(X), write(' to '),
    write(Y),nl.

move(N,X,Y,Z) :-
    N>1,
    M is N-1,
    move(M,X,Z,Y),
    move(1,X,Y,_),
    move(M,Z,Y,X).

execute:-
    write('Move top disk from tower A to tower C'),nl.

toh(N):-
    N=:=1
    ->execute
    ;move(N,'tower A','tower C','tower B').
```

```
?- consult('u19cs009-ai-assign05-q1-toh.pl').
true.

?- toh(1).
Move top disk from tower A to tower C
true.

?- toh(2).
Move top disk from tower A to tower B
Move top disk from tower A to tower C
Move top disk from tower B to tower C
true .

?- toh(3).
Move top disk from tower A to tower C
Move top disk from tower A to tower B
Move top disk from tower C to tower B
Move top disk from tower A to tower C
Move top disk from tower B to tower A
Move top disk from tower B to tower C
Move top disk from tower A to tower C
true .
```

2. WAP to check whether the number is present in the list or not.

```
%U19CS009
%BRIJESH ROHIT

mem(X,[]):-
    write(X),
    write("'IS NOT' member of givem List"),
    nl.

mem(X,[X|_]):-
    write(X),
    write(" 'IS' member of givem List"),
    nl.

mem(X,[_|T]) :-
    mem(X,T).
```

```
?- consult('u19cs009-ai-assign05-q2-member-list.pl').
true.

?- mem(1,[1,2,3,4,5]).
1 'IS' member of givem List
true .

?- mem(1,[[1,2],3,4,5]).
1'IS NOT' member of givem List
true .

?- mem([1,2],[[1,2],3,4,5]).
[1,2] 'IS' member of givem List
true
Unknown action: / (h for help)
Action? .

?- mem([[1,2],3],[[1,2],3,4,5]).
[[1,2],3]'IS NOT' member of givem List
true .
```

3. WAP to add a number in the list.

```
%U19CS009
%BRIJESH ROHIT

concatMem([],X, [X]).
concatMem([Y|T1], X,[Y|T2]) :-
    concatMem(T1, X,T2).
```

```
?- consult('u19cs009-ai-assign05-q3-add-mem.pl').
true.

?- concatMem([1,2,a,s,d],brijesh,NewList).
NewList = [1, 2, a, s, d, brijesh].

?- concatMem([1,2,a,s,d],[1,2,3,4,5],NewList).
NewList = [1, 2, a, s, d, [1, 2, 3|...]].
```

4. WAP to concat two lists and store the result in third list.

```
%U19CS009
%BRIJESH ROHIT

concateList(L1,L2,L3):-
    append(L1,L2,L3).
```

```
?- consult('u19cs009-ai-assign05-q4-concat-list.pl').
true.

?- concateList([1,2,a,s,d],brijesh,NewList).
NewList = [1, 2, a, s, d|brijesh].

?- concateList([1,2,a,s],[ab,bc],NewList).
NewList = [1, 2, a, s, ab, bc].

?- concateList([1,2,a,s,d],[],NewList).
NewList = [1, 2, a, s, d].
```

5. WAP to delete an element from the list.

```
%U19CS009
%Brijesh Rohit

delEleAtIndex(1,[_|T],T).
delEleAtIndex(P,[X|Y],[X|R]):-
    P1 is P-1,
    delEleAtIndex(P1,Y,R).

delEle(A, [A|B], B).
delEle(A, [B, C|D], [B|E]) :-
    delEle(A, [C|D], E).
```

```
?- consult('u19cs009-ai-assign05-q5-del-ele.pl').
true.

?- delEle(1,[2,3,4,1],NewList).
NewList = [2, 3, 4] .

?- delEle(1,[2,3,4,1,1],NewList).
NewList = [2, 3, 4, 1] .

?- delEleAtIndex(3,[1,2,3,4,5,6],NewList).
NewList = [1, 2, 4, 5, 6] .

?- delEleAtIndex(0,[1,2,3,4,5,6],NewList).
false.

?- delEleAtIndex(10,[1,2,3,4,5,6],NewList).
false.

?- delEle(10,[2,3,4,1,1],NewList).
false.
```

6. WAP to sum the elements of a list of numbers.

```
%U19CS009
%Brijesh Rohit

sumList([],0).
sumList([H|T],Sum) :-
    sumList(T,Sum1),
    Sum is H + Sum1.
```

```
?- consult('u19cs009-ai-assign05-q6-list-sum.pl').
true.

?- sumList([1,2,3,4,5,6],Sum).
Sum = 21.

?- sumList([],Sum).
Sum = 0.

?- sumList([0],Sum).
Sum = 0.

?- sumList([10,-1,-2,-3,10],Sum).
Sum = 14.
```