3. P. PODDAR INSTITUTE OF MANAGEMENT & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
RICHARD STALMAN LAB (C-102)
ACADEMIC YEAR: 2018-2019 [ODD SEMESTER]

LIST OF EXPERIMENTS

Course: Artificial Intelligence Lab
Code: CS793C
Branch: CSE

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<tr><th>TOPIC</th><th>LIST OF EXPERIMENTS</th><th>CO</th><th>PO/PSO</th></tr>
<tr><td>Family tree related problems</td><td>
E1.
Clauses:
parent(tom,bob).
parent(pam,bob).
parent(tom,liz).
parent(bob,ann).
parent(bob,pat).
parent(pat,jim).
male(tom).
male(jim).
male(bob).
female(liz).
female(pat).
female(ann).

offspring(Y,X) : -
parent(X,Y).
mother(X,Y) : -
parent(X,Y), female(X).
grandparent(X,Y) :-
parent(X,Z), parent(Z,Y).
sister(X,Y) :-
parent(Z,X), parent(Z,Y),
female(X), not(X==Y).
haschild(X) :-
parent(X,Y).

With reference to the above clauses answer the following queries:
• Who is the grandmother of ann?
• Who are the grand children of bob?
• Who is jim’s aunt?
• Who is the brother of liz?
• Name the parents in the family tree except ann’s parents.
• Who is jim’s great grandfather?
• Define the relation hastwochild and find out the parents who have two children.
• Define a relation uncle and find out the name of persons who have uncles.
• Define a recursive predecessor relation.
• Find out the predecessors of jim.

E2.
Solve the following problem using Prolog using the family tree diagram given below:

Consider ritu, mita, amita, sonia, dipti are female and rest all are male.
Write appropriate clauses and goals to answer the following queries:
• Who is the grandmother of sudip?
• Who is the grandson of mita?
</td><td>C01</td><td>PO1, PO2, PO3, PO4, PO8, PO9, PO10 & PSO1, PSO2</td></tr>
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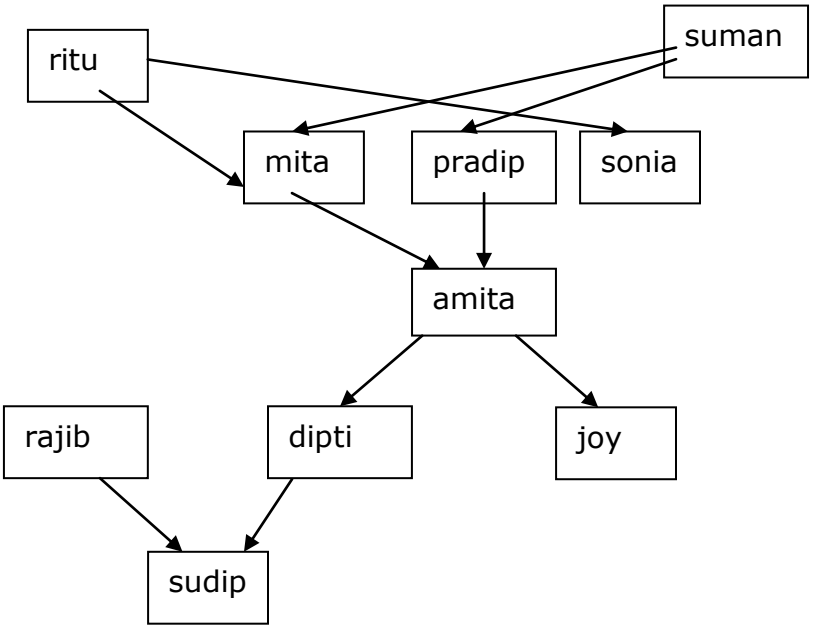
	• Who is the grandfather of dipti? • Who is the aunt of amita?  		
Problems on List: delete, find, even/odd numbered elements, shift	**E3.** Write a goal to delete the first three elements and the last three elements from a list L producing list L1. **E4.** Write a goal, using *conc* to delete the last three elements from a list L producing another list L2. (*Hint: L is the concatenation of L2 and three element list)*. **E5.** Define the relation: ***last(Item,List)*** so that Item is the last element of a list List. Write two versions: (a) using the ***conc*** relation. (b) without ***conc***. **E6.** Define two predicates: ***evenlength(List)*** and ***oddlength(List)***, so that they are true if their argument is a list of even or odd length respectively. For example, the list [a,b,c,d] is 'evenlength' and [a,b,c] is 'oddlength'. **E7.** Define the relation ***shift(List1,List2)*** so that List2 is List1 "shifted rotationally" by one element to the left. For example, ?_shift([1,2,3,4,5],L1) produces: L1=[2,3,4,5,1]	C02	PO1, PO2, PO3, PO4, PO8, PO9, PO10 & PSO1, PSO2
Problems on List: reverse,	**E8.** Define the relation:	C02	PO1, PO2,

palindrome, translate, subset	***reverse(List, ReversedList)*** that reverses lists. For example, reverse([a,b,c,d] is [d,c,b,a]). **E9.** Define the predicate ***palindrome(List)*** (a) Using ***reverse*** relation. (b) Not using ***reverse*** relation. **E10.** Define the relation ***translate(List1,List2)*** to translate a list of numbers between 0 and 9 to a list of the corresponding words. For example, ?_translate([3,5,1,3],X) produces: X=[three,five,one,three]. Use the following as an auxiliary relation: ***means(0,zero). means(1,one)……means(9,nine).*** **E11.** Define the relation ***subset(Set,Subset)***, where Set and Subset are two lists representing two sets and such that Subset is the subset of Set. Use it to check for subset relation as well as generate all possible subsets from a given set.		PO3, PO4, PO8, PO9, PO10 & PSO1, PSO2
Problems on List: divide list, generate integers within a range, sum of subset	**E12.** Define the relation ***dividelist(List,List1,List2)*** so that the elements of List are partitioned between List1 and List2, and List1 and List2 are of approximately the same length. For example, dividelist([a,b,c,d,e],[a,c,e],[b,d]). dividelist([p,q,r,s],[p,r],[q,s]). **E13.** Define the predicate ***subsum(Set, Sum, Subset)*** so that Set is a list of numbers, Subset is a subset of these numbers, and the sum of the numbers in Subset is Sum. For example, ?- subsum([1,2,3,4,5], 5, Sub). Sub = [1,2,2]; Sub = [2,3]; Sub = [5]; …….. **E14.** Define the procedure ***between(N1,N2,X)*** which, for two given integers N1 and N2, generates integers X that satisfy the constraint N1 ≤ X ≤ N2.	C02	PO1, PO2, PO3, PO4, PO8, PO9, PO10 & PSO1, PSO2
Recursive Problems – Factorial, GCD, Fibonacci series, Tower of Hanoi	**E15.** Write a prolog program to find out the ***factorial*** of a given number. **E16.** Write a prolog program to find out the ***GCD*** of two numbers.	CO3	PO1, PO2, PO3, PO4, PO8, PO9,

	E17. Write a prolog program to find out the n-th term of the ***Fibonacci*** series. **E18.** Write a prolog program to implement the ***Towers of Hanoi*** problem: Move n disks from pin 'a' to pin 'b' using pin 'c'.		PO10 & PSO1, PSO2
Implement different sorting techniques	**E19.** Write a prolog program to implement ***Bubble sort***. **E20.** Write a prolog program to implement ***Insertion sort***.	CO1, CO2	PO1, PO2, PO3, PO4, PO8, PO9, PO10 & PSO1, PSO2
Implement Divide & Conquer type sorting techniques	**E21.** Write a prolog program to implement ***Quick sort***. **E22.** Write a prolog program to ***merge two sorted lists*** producing a third list. For example, ?- merge([2,5,6,6,8], [1,3,5,9], L). L = [1,2,3,5,5,6,6,8,9]	CO1, CO2	PO1, PO2, PO3, PO4, PO8, PO9, PO10 & PSO1, PSO2
Implement Blind Search Techniques	**E23.** Write a prolog program to implement ***Depth First Search***. **E24.** Write a prolog program to implement ***Breadth First Search***.	CO4	PO1, PO2, PO3, PO4, PO8, PO9, PO10 & PSO1, PSO2
Implement Hill Climbing algorithm	**E25.** Write a program to solve 8-Puzzle problems using Hill climbing algorithm.	CO5	PO1, PO2, PO3, PO4, PO8, PO9, PO10 & PSO1,

			PSO2
Implement A* algorithm	**E26.** Write a program to solve 8-Puzzle problems using A* algorithm.	CO5	PO1, PO2, PO3, PO4, PO8, PO9, PO10 & PSO1, PSO2

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