

## Assignment Set 2 (Logic programming using Prolog)

### Problem 1: Finding Relationship and Gender

#### Execution:

uncle(X,Y) : Gives true if X is Y's uncle.

```
?- uncle(X,Y).  
X = kattappa,  
Y = avantika ;  
false.
```

halfsister(X,Y) : Gives true if X,Y are have one parent common, and X is female.

```
?- halfsister(X,Y).  
X = avantika,  
Y = shivkami ;  
X = shivkami,  
Y = avantika ;  
false.
```

### Problem 2: Searching for the Details of a Research Scholar

#### Execution:

SearchByName(X) : Gives all students data who has name X which are present in any one of the lists or both lists.

```
?- searchByName('Rajan').  
Name:Rajan  
Roll:4  
Email:rajan.garg@gmail.com  
Type:Regular  
Supervisor:D  
Co-supervisor:R  
true ;  
false.
```

SearchByRoll(X) : Gives all students data who has Roll number X which are present in any one of the lists or both lists.

```
?- searchByRoll(1).  
Name:Abhinav  
Roll:1  
Email:abhinav@gmail.com  
Type:Regular  
Supervisor:A  
Co-supervisor:  
true ;  
false.
```

### Problem 3: Path Finding Problem

#### Predicates:

add :- increases the count of number of paths, when a new path is found from A-B.

PrintC : - prints number of paths

printL :- prints shortest path

comp(Y) :- compares new path to previous shortest path

walk(A,B,V) :- traverse through all the paths between A,B and stores visited nodes in V.

#### Execution:

discover\_maze :- finds count and shortest paths b/w given destination points.

```
?- discover_maze.  
1--->12  
Total number of paths:20  
Shortest path:[11,17,23,22,16,15,14,8,2,1]  
1--->24  
Total number of paths:32  
Shortest path:[30,36,35,34,33,32,26,25,19,13,7,1]  
1--->36  
Total number of paths:32  
Shortest path:[35,34,33,32,26,25,19,13,7,1]  
13--->12  
Total number of paths:15  
Shortest path:[11,17,23,22,16,15,14,13]  
13--->24  
Total number of paths:8  
Shortest path:[30,36,35,34,33,32,26,25,19,13]  
13--->36  
Total number of paths:8  
Shortest path:[35,34,33,32,26,25,19,13]  
25--->12  
Total number of paths:45  
Shortest path:[11,17,23,22,16,15,14,13,19,25]  
25--->24  
Total number of paths:6  
Shortest path:[30,36,35,34,33,32,26,25]  
25--->36  
Total number of paths:6  
Shortest path:[35,34,33,32,26,25]  
true.
```

route(A,B) :- finds the total routes and shortest path b/w any 2 point A-B

```
?- route(8,15).  
8--->15  
Total number of paths:3  
Shortest path:[14,8]  
true.
```