Birla Institute of Technology & Science, Pilani

1st Semester 2019-2020

CS F214 - Logic in Computer Science

Assignment 1

**Problem 1 (6M)**

Given a weighted undirected graph G = (V, E). The weight on an edge (v1, v2) represents the distance between the vertices v1 and v2 {vi V; and (vi, vj)E}. Given a set of weights of edges in the form of prolog clauses:

weight(p, q, 20).

weight(q, r, 5).

Write a prolog program to check if there exists a path between two given vertices. Print the path and its length, if it exists. For example:

?- findPath(p, r, Path, L).

the prolog interpreter should print

Path = [p, q, r]

L = 25

Note that the user should print an alternative path if it exists on each press of a semi colon and print **no** if no path exists.

Your program should avoid traversing through cycles, if any.

**Problem 2 (2+4+4+4 = 14M)**

Write a Prolog predicate for each of the following operations on a list:

1. sublist(X,Y): true if list X is a sublist of list Y. A sublist is the original list, in the same order, but with no/some elements removed.
2. has\_triplicate(X): true if list X contains at least three copies of an element. It also prints the element which is triplicated.
3. remove\_nth(N,X,Y): prints list Y which is the list X with its Nth element removed. If X does not have an Nth element then the predicate should fail. Assume that N > 0 .
4. remove\_every\_other(X,Y): prints a list Y which is the list X with every other element removed (the two lists should have the same first element).

Note: Each predicate should be able to print the alternative solutions if they exist.