COL703
Logic for Computer Science
Assignment 1

**Submission Deadline: Sunday, October 25, 2020, 23:59**

**Aim** : The aim of the assignment is to compute transitive closures and also to illustrate that unlike other languages, Prolog gives you back-tracking for free and thus enables you to compute all solutions (if any) to a problem. This assignment also aims to get you familiarised with Prolog.

**Problem Statement** : In this assignment, you have to program the Delhi Metro as an instance of route searching. The data-base of the Delhi Metro will be provided separately. You have to define a 3-ary predicate,
*paths(X, Y, LL)*
where LL is the list of all acyclic paths by which a traveller can go from metro station X to metro station Y using only the metro. Clearly X must be the head of each list in LL and Y must be the last element in each list of LL. For example, if you want to travel from Janakpuri West to Botanical garden, you can either travel on blue line or on magenta line or some other acyclic path whose head is Janakpuri West and end is Botanical Garden. Further LL is sorted in non-descending order of the number of hops where
*hop(X,Y)*
means (i) X and Y are adjacent stations on the same line (either X is the successor or the predecessor of Y) or (ii) X and Y are the same station but an interchange from one line to another is necessary. Note that changing line on a station is also counted in the number of hops. For eg. Changing from yellow line to blue line at Rajiv Chowk is considered as a hop.

**Logistics/Instructions** :

1. The assignment has to be done individually.
2. The assignment has to be done in Prolog only.
3. You can define helper predicates but make sure that **paths** and **hop** predicates are as defined above.
4. The assignment will be automatically graded against some test cases so make sure that you adhere to the specifications provided above. Failure to do so will result in a 0.
5. We will employ various plagiarism checks so until and unless you are sure that you are smarter than us, don't cheat. Getting caught in plagiarism will get you -x marks where x is the weightage of this assignment in the course.
6. If you any doubts regarding the assignment, please post it on the teams channel of the course. We will **not** be entertaining doubts over mail or any other medium except teams.

**Submission**: Only the submissions uploaded to the programming assignment named "A1: Logic Programming" on `gradescope.com` will be accepted. You will be submitting a single file $entryNumber\_A1.pl$. So if your entry number is 2016CS50391, the submitted file should be $2016CS50391\_A1.pl$