Assignment 1

Problem 1:

Cross Puzzle problem:

The puzzle consists of a 3×3 board with eight numbered tiles and a blank space. **Every tile has one number from 0 to 7.** A tile adjacent to the blank space can slide **(left, right, up and down)** into the space. Your goal is to rearrange the blocks so that they are in order.

Note: Don't solve the problem using informed or uninformed search. Solve the problem using Prolog Backtracking.

6	1	3
4		5
7	2	0

Start State

	0	1
2	3	4
5	6	7

Goal State

Problem 2:

Metro Stations:

Given Cairo tunnel Metro stations attached in the file **metroStations.pl**, You are required to help the user in solving some of his/her question.

Task 1:

Show the full path taken by the metro, from a source station to a destination with limit number of Stations (can be any number or 'any' if u don't care), given by the user.

Ex:

Input: ?- Path(ataba,dokki,any,Z).

Output: Z = [[ataba, naguib], [naguib, sadat], [sadat, opera], [opera, dokki]].

Input: ?- Path(ataba,dokki,2,Z).

Output: false.

Input: ?- path(urabi,dar_elsalam,any,Z).

Output: Z = [[urabi, nasser], [nasser, sadat], [sadat, saad_zaghloul], [saad_zaghloul, alsayyeda_zeinab], [alsayyeda_zeinab, elmalek_elsaleh], [elmalek_elsaleh, margirgis], [margirgis, elzahraa], [elzahraa, dar_elsalam]].

Input: ?- path(ataba,sheratoon,any,Z).

Output: false.

Task 2:

Count number of stations directly connected to a given station. (Don't use any built in predicate (findall , bagof …).

Input: nstations(sadat,N).

Output: N = 4.

Input: nstations(helwan,L).

Output: L = 1.

Task 3:

Help the passengers and tell them the cost of moving from one station to another.

Rules:

- Stations <= 7 and one Line => **3 EGP**
- 7 < stations < 16 or more than one Line => **5 EGP**
- stations >= 16 => **7 EGP**

EX:

Input: cost(sadat,ataba,N).

Output: N = 3 EGP.

Input: cost(urabi,dar_elsalam,N).

Output: N = 5 EGP.

Task 4:

Check if a given path is valid. You have to make sure that you can travel with this path through the metro tunnel.

Ex:

Input:
checkPath([[sadat,saad_zaghloul],[saad_zaghloul,alsayyeda_zeinab]]).

Output: True.

Input: checkPath([[sadat,saad_zaghloul],[opera,dokki]]).

Output: false.

Remember: (Please read these notes carefully to avoid losing grades):

• In this assignment, you will work in teams. The minimum number of students in a team is 2 and the maximum is 3.

• Please submit one compressed folder containing your (.pl) file. The folder name should follow this structure: ID1_ID2_ID3_GX,Y

• Cheating students will take 0 and no excuses will be accepted. If you have any problems during the submission, contact your TA but don't, under any circumstances, give your code to your friends.

Submission Deadline: 20/5/2021