CS361: Artificial Intelligence
Assignment 1

Cairo University
Faculty of Computers and Information

Problem 1:

Given Cairo tunnel Metro stations* attached in the file problem1.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, given by the user.

```
path(ataba,dokki,Z).
Z = [[ataba, naguib], [naguib, sadat], [sadat, opera], [opera,
dokki]] .

path(urabi,dar_elsalam,Z).
Z = [[urabi, nasser], [nasser, sadat], [sadat, saad_zaghloul],
[saad_zaghloul, alsayyeda_zeinab], [alsayyeda_zeinab,
elmalek_elsaleh], [elmalek_elsaleh, margirgis], [margirgis,
elzahraa], [elzahraa, dar_elsalam]].

path(ataba,sheratoon,Z).
false.
```

Task 2:

Count number of stations directly connected to a given station.

```
nstations(sadat,N).
N = 4.

nstations(helwan,L).
L = 1.
```

Task 3:

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

```
checkPath([[sadat,saad_zaghloul],[saad_zaghloul,alsayyeda_zeinab]]).
True.

checkPath([[sadat,saad_zaghloul],[opera,dokki]]).
false.
```

Problem 2:

Calculate the numerical integration for the function x^2 using the trapezoidal rule. Use only integer step values e.g. 1,2,3… . The integration function take the start and end range and the step vale.

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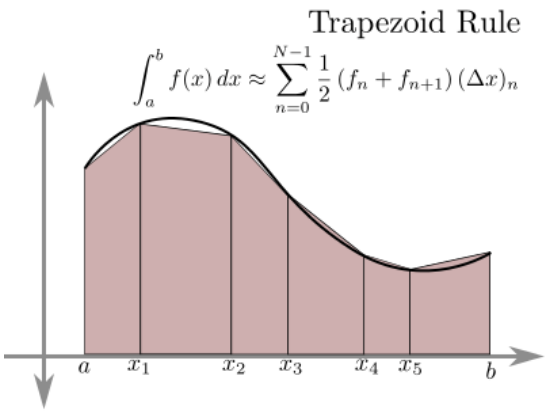
```
integrate(2,20,1,R).
R = 2667.

integrate(2,4,2,R).
R = 20.

integrate(2,4,1,R).
R = 19.0.
```

Hint: *Numerical integration is based on approximating the integral range using a first or second order polynomial. In case we use the interpolating function to be a straight line it generates a set of trapeziums. Calculating the area of each trapezium and summing the results is considered the integration value.*
Online calculator to verify your results: *http://www.wolframalpha.com/widgets/view.jsp?id=40563c7ee6ef51c162833327f8a3880d*



*https://en.wikipedia.org/wiki/List_of_Cairo_Metro_stations