#### Instructions

First solve this euler project problem:

https://projecteuler.net/problem=345

But you will use the matrix provided in the attached excel spreadsheet.

Your solution must use this algorithm: https://en.wikipedia.org/wiki/Hungarian\_algorithm.

Your matrix must be a square matrix so test the matrix and make sure it is square before proceeding.  If it is not square print "Not a square matrix - terminating ... ".

There is a simple way of using the Hungarian algorithm in R to solve the matrix optimization (sum) problem.  This problem is not asking you to sum all the values but find the optimal values within the matrix so do not use R's sum ( ) - that won't be right.

Once you've solved the problem - surround it with system.time and execute it 1000 times once again finding the max, min, and mean time of solution - plot those for visual representation of the three values.

As comments in your document - provide the links you used to research this problem.

Use this to test problems solution for correct path: (using matrix provided)

You should also test with smaller matrix described in the problem - did you get = 3315 ?

Optimal assignment:

1 => 5, 2 => 11, 3 => 8, 4 => 2, 5 => 1, 6 => 12, 7 => 18, 8 => 16, 9 => 14,

10 => 3, 11 => 19, 12 => 6, 13 => 13, 14 => 7, 15 => 9, 16 => 10, 17 => 4,

18 => 15, 19 => 17, 20 => 20

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