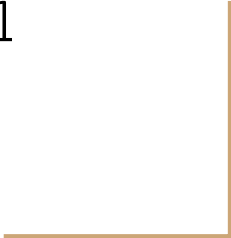# Programming, Problem Solving, and Algorithms

CPSC203, 2019 W1

Announcements

Project 3 released soon. Due 11:59p, Nov 29.

"Problem of the Day" continues!
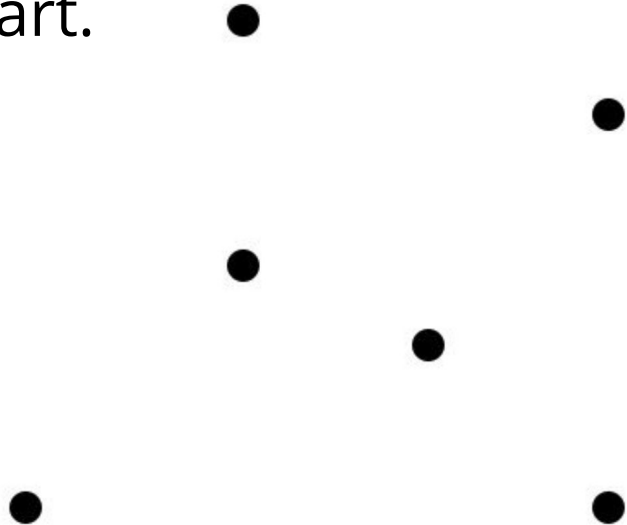
Today:

Shortest Path

Maps!

How many Starbucks are in Vancouver?

Running Errands

Determine the least cost route through a set of given locations, returning to the start.

Running Errands

Describe how you find the least cost route through a set of given locations.

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Traveling Salesperson Problem (TSP)

One of the most well-studied problems in computational mathematics.

No algorithm works on all input configurations.

What does "works" mean?

Traveling Salesperson Problem (TSP)

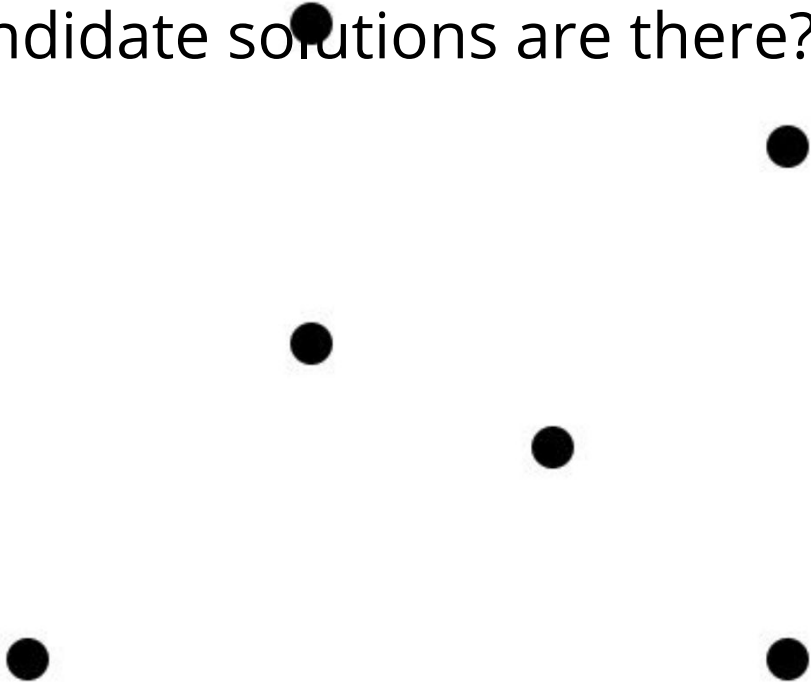Most common approach to computationally infeasible problems:

Sacrifice optimality for feasibility --
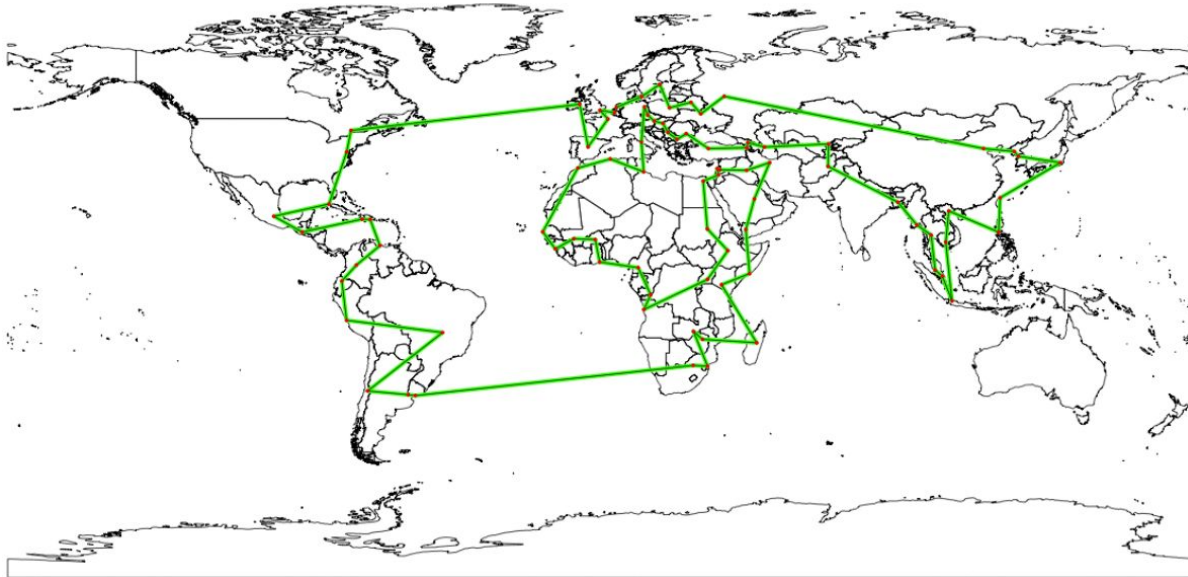Heuristic

Approximation

TSP how many routes?

Suppose you have 6 locations. How many different candidate solutions are there? Generalize to k locations?

_____

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Demo Blog

Plan for Code

Data available:

Steps to assemble a solution:

1. _____

2. _____

3. _____

4. _____

Map applications

Three parts:

1. Assembling the data - OSM, local data stores, statsCan, etc. This is mostly the art of assembling geodataframes.

2. Computing on the data - osmnx simplifies graph algorithms and computation, but also supports other spatial computation.

3. Visualizing the data - matplotlib for static maps, folium for interactive maps.

POTD #38 Tue

https://github.students.cs.ubc.ca/cpsc203-2019w-t1/potd36

Describe any snags you run into:

1. Line ___ : _____
2. Line ___ : _____
3. Line ___ : _____
4. Line ___ : _____
5. Line ___ : _____

ToDo for next class…

POTD: Continue every weekday! Submit to repo.

Reading: TLACS Ch 10 & 12 (lists and dictionaries)

References:

https://www.youtube.com/watch?v=wsSEKm-rU6U

https://github.com/gboeing/osmnx-examples/tree/master/notebooks

https://gist.github.com/psychemedia/b49c49da365666ba9199d2e27d002d07