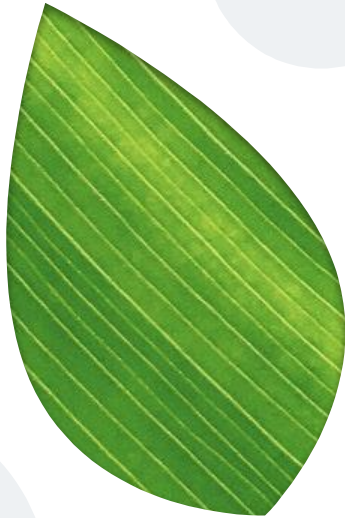




CoEfficient



Problem:

Vehicles waste gas, time, and money by driving extra distances when there is often a shorter route available.





Multi-point

(route can contain multiple points to visit)

Variable-order

(order does not have to be A-B-C-D-E, can be A-D-B-C-E)

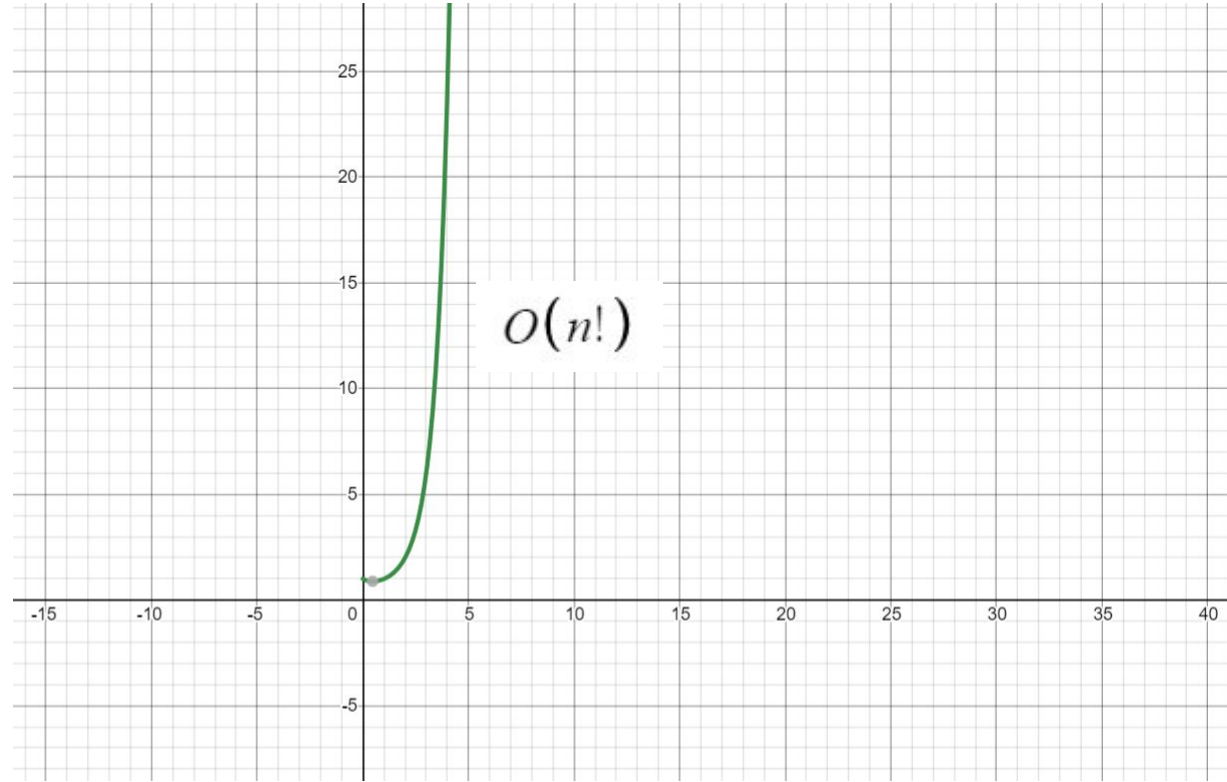
Route Optimization

(finds shortest path)

Quantum Machine Learning

(used Qiskit quantum information science kit and IBM-Q quantum cloud computer)

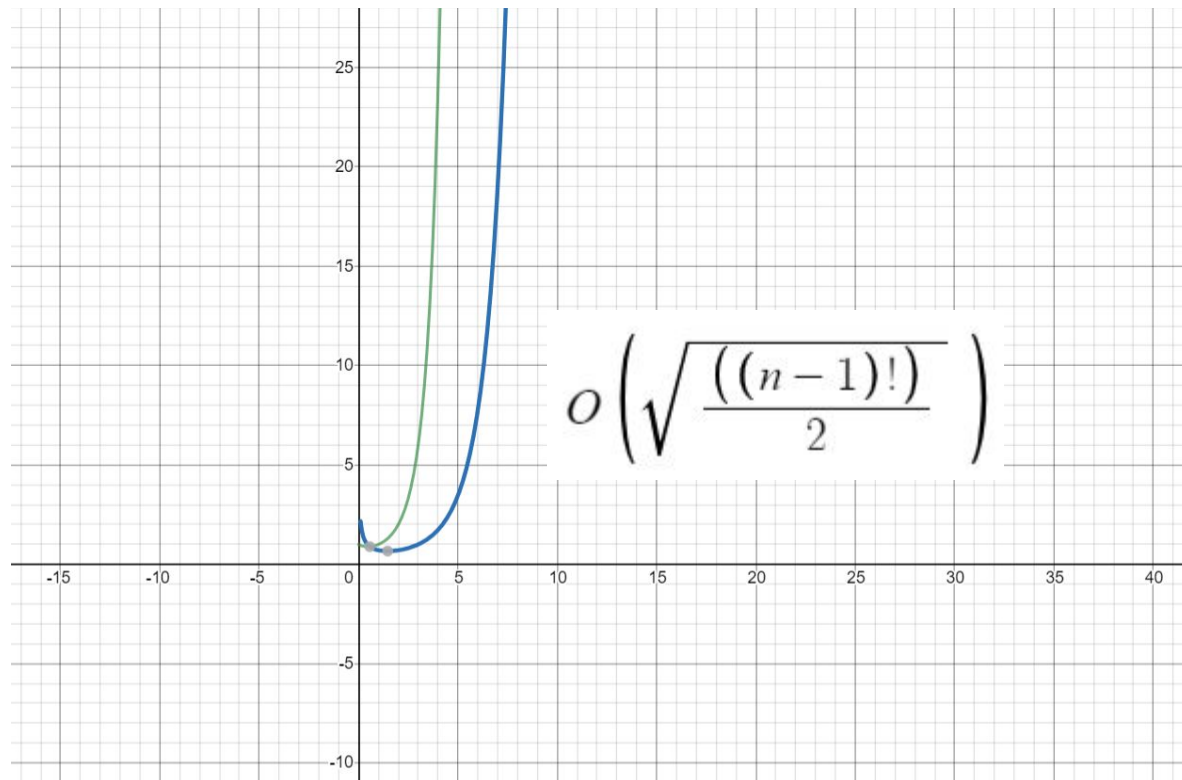
NP Hard





Google Maps API + Quantum Computing + Machine Learning







+

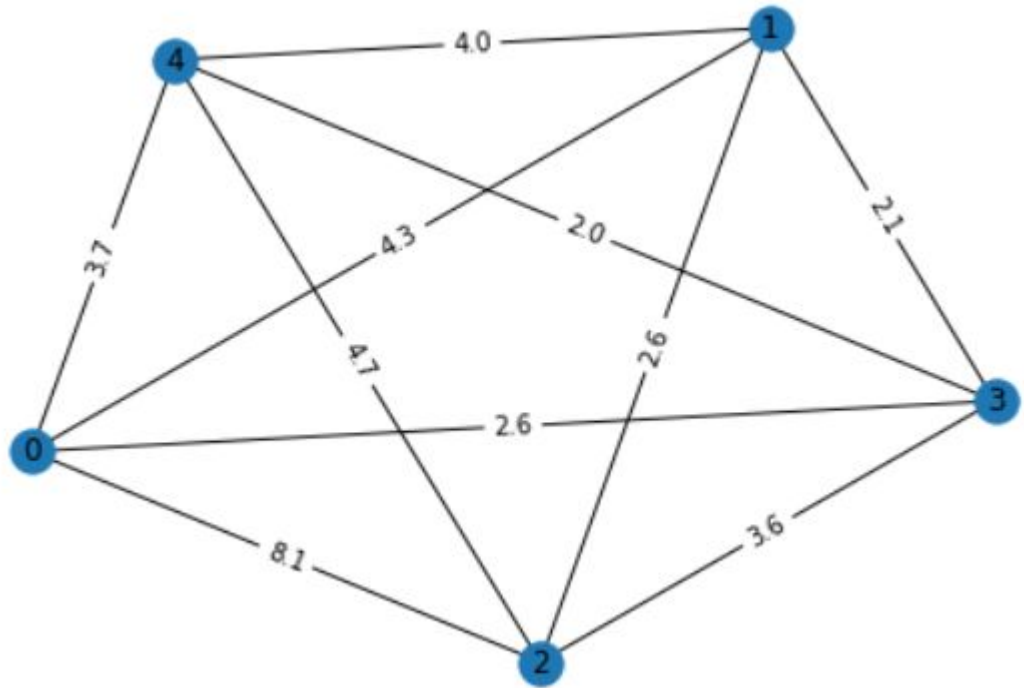


Google Maps

```
(( [ 0., 50., 107., 113., 62.],  
  [ 50., 0., 60., 69., 26.],  
  [107., 60., 0., 14., 71.],  
  [113., 69., 14., 0., 83.],  
  [ 62., 26., 71., 83., 0.] ])
```

Using Google Maps API, we get the distance matrix

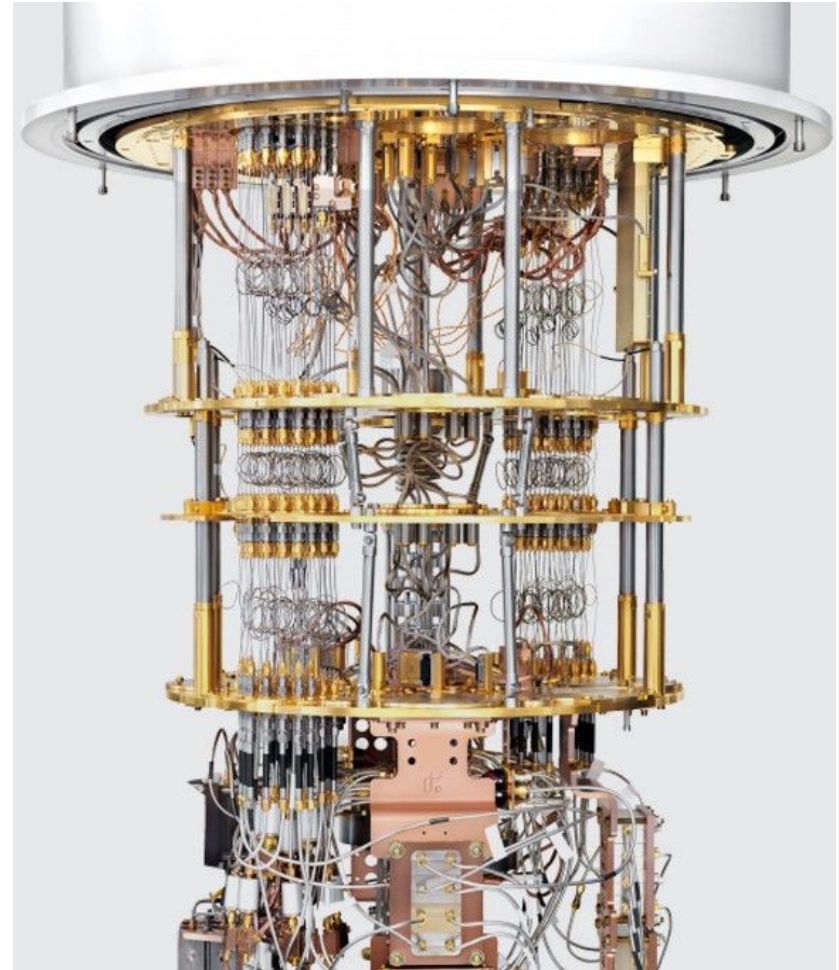


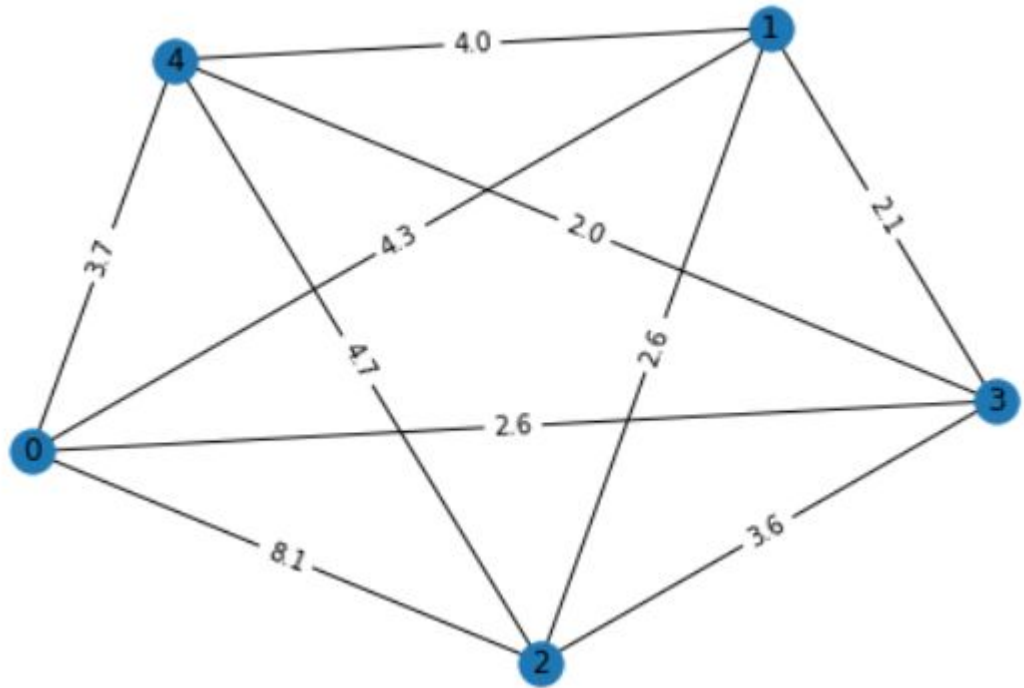


Plot Graph
Nodes and edges are not to scale



Format
data and use a
quantum machine
learning algorithm





Ans = [3, 4, 1, 0, 2]

Ans = [3, 4, 1, 0, 2]



A screenshot of the Google Maps mobile app interface. The left sidebar shows a list of destinations: 1040 Broadview Ave, East York, ON M4K; Cosburn Ave, East York, ON M4J 2N2; Leaside, East York, ON M4G 3M2; Flemington Park, North York, ON M3C 1; and 1500 Woodbine Ave, East York, ON M4C. The main map area displays a blue route starting from 1040 Broadview Avenue and ending at 1500 Woodbine Ave. A callout box on the route indicates a travel time of 28 minutes and a distance of 12.7 km. The map shows various landmarks and parks in the area, including Leaside, North York, and East York. The bottom of the screen shows a search bar with the text "Explore 1500 Woodbine Ave" and a small satellite view inset.



Questions

