EzTravel: The Travelling Salesman Problem

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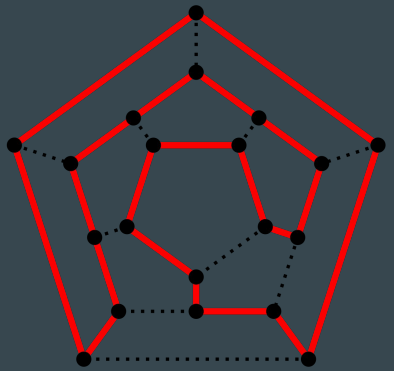
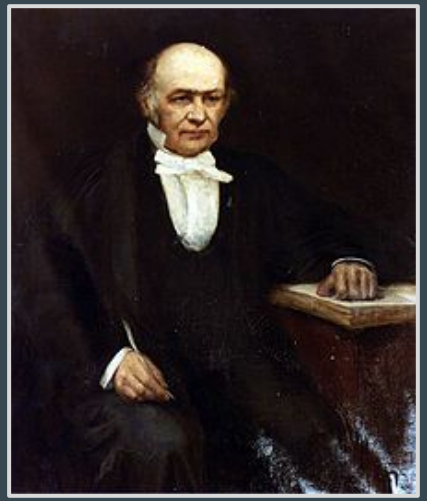
Problem Definition

- Find the lowest weight cycle through a graph
  - Travelling salesman problem
- Achieve this goal as efficiently as possible
  - This solution can be applied to several real world applications
- Provide an idea for a practical use

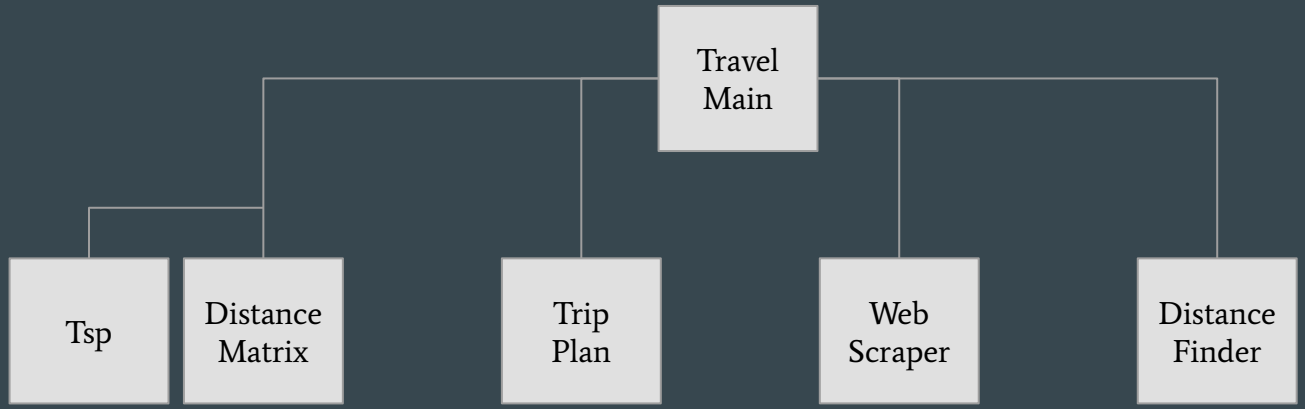




What is my project?

- Travel assistant
  - Web scraper
  - Geocoder
  - Algorithm to develop the lowest-weight hamiltonian cycle

Approach

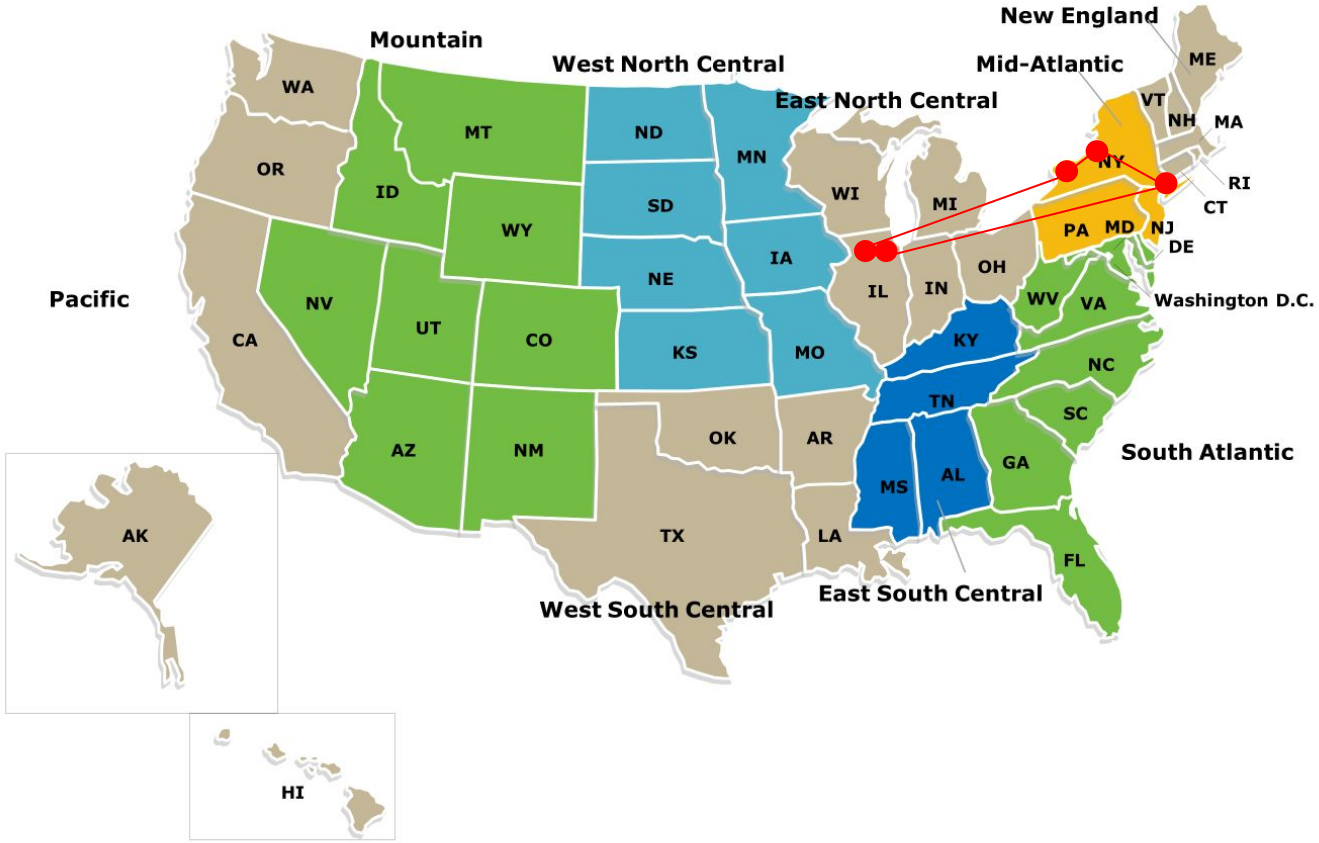

Travel Main
Tsp
Distance Matrix
Trip Plan
Web Scraper
Distance Finder

Challenges

- Implementing the travelling salesman algorithm
- Proper usage of the Google Maps API
  - Proper URL formatting
  - Http response library
- Avoiding connection timeouts when scraping the web
  - Thread.sleep(100) was necessary
- Formatting the UI to work with multiple different inputs

Results & Analysis

- Travelling salesman algorithm $O(n^2)$
- Web scraping algorithm $O(n)$ + Thread.sleep(100)
  - Wait time is necessary to avoid timeout
- Geocoding algorithm $O(n * m)$
  - Uses country and city array
- Average total runtime (1 country & 3 states) is ~ 11 seconds


New England
Mountain
West North Central
Mid-Atlantic
East North Central
ME
VT
NH
MA
NY
RI
CT
WA
OR
ID
MT
WY
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SD
NE
MN
IA
WI
MI
PA
MD
NJ
DE
Pacific
NV
UT
CO
KS
MO
IL
IN
OH
WV
VA
Washington D.C.
CA
KY
NC
TN
SC
AZ
NM
OK
AR
GA
South Atlantic
MS
AL
AK
TX
LA
FL
West South Central
East South Central
HI

Thank You!

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References:

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