**Lab Report**

Title: Lab 3: Traveling Salesman

Notice: Dr. Bryan Runck

Author: Cole Anderson

Date: 4/1/21

**Project Repository:**<https://github.com/and04671/GIS5572/tree/main/Lab3>

**Abstract**

*<Delete this text in light grey throughout>*

*250 words max. Clearly summarize the following major sections. Each gets one or two sentences.*

**Problem Statement**

2 delivery drivers starting from 1436 Lone Oak Rd, St Paul, MN 55121 at 8:00 AM must deliver 10 packages to 10 listed addresses and return to the start point in the shortest time possible. Find the best (fastest) routes between the 2 drivers, avoiding both 94 and 35W. Solve the problem in ArcGIS Pro and ArcGIS Online using your own constructed network dataset. (Can compare with ESRI’s proprietary network services)

Deliveries:

5525 Cedar Lake Rd S, St Louis Park, MN 55416

225 Thomas Ave N #700, Minneapolis, MN 55405  MUST arrive between 10 and 11am

701 N 5th St, Minneapolis, MN 55401

920 E Lake St #123, Minneapolis, MN 55407

783 Harding St NE, Minneapolis, MN 55413

4165 W Broadway Ave, Robbinsdale, MN 55422

1321 E 78th St, Bloomington, MN 55425

12547 Riverdale Blvd, Coon Rapids, MN 55448

9875 Hospital Dr, Maple Grove, MN 55369

3300 Oakdale Ave N, Robbinsdale, MN 55422 MUST arrive between 10 and 11am

Lab Goals:

1. Learn to create your own network dataset
2. Learn how to perform optimal routing in ArcPro and ArcOnline
3. Generate a routing map to support decision-making
4. Compare routing in ArcOnline versus in ArcPro

ArcPro

Create an ND dataset

Edit properties to fit

Add points layer for drops and start

Probably have to geocode addresses

Create a VRP layer (it will reference ND in contents)

Add locations via import orders w/ times and map, max violation time

Add start/stop via import depots w/

Add routes (make a lot of assumptions/interpretations)

Set properties for VRP layer

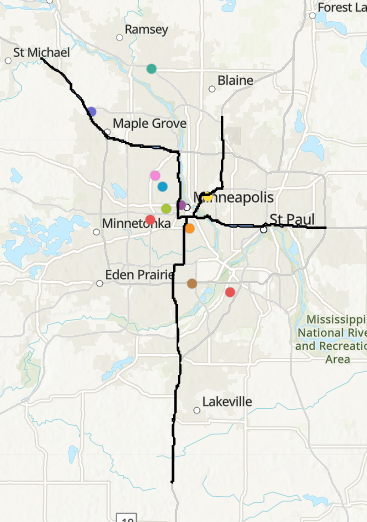
Directions in directions pane

Process for Online:

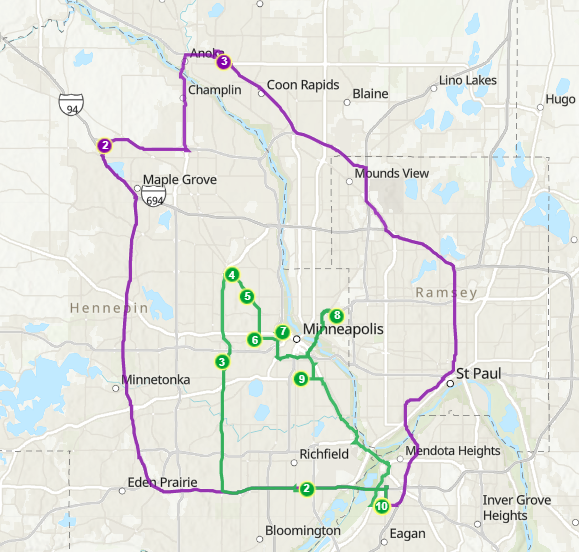
Use Proximity > Plan routes

Import original route CSVS, not geocoded

To get barriers select out interstates in arcpro, buffer (do not allow buffer to cross any order points = .001 decimal degrees)



No barriers: no time restraints on 2 stops



Barriers, no time restraints

“2000 feature limit exceeded”

Table 1. Problem Statement Requirements

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **#** | **Requirement** | **Defined As** | **Spatial Data** | **Attribute Data** | **Dataset** | **Preparation** |
| 1 | Street Network |  |  |  |  |  |
| 2 | Hit all targets |  |  |  |  |  |
| 3 | Hit time targets |  |  |  |  |  |
| 4 |  |  |  |  |  |  |

**Input Data**

*Describe the data in two paragraphs max. Fill out the table.*

Table 2. Input Data

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Title** | **Purpose in Analysis** | **Link to Source** |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
|  |  |  |  |

**Methods**

*Include a data flow diagram or screenshot from model builder. Do references in line (Rammankutty, 2033). Document any and all steps that you did to the input data in the data flow diagram. Provide natural language description of the most important steps, giving a narrative arc and provide well formatting screenshots with a boarder and centered throughout.*

**Results**

*Show the results in figures and maps. Describe how they address the problem statement.*

**Results Verification**

*How do you know your results are correct? This can be a qualitative or quantitative verification.*

**Discussion and Conclusion**

*What did you learn? How does it relate to the main problem?*

**References**

*Use a common format*

**Self-score**

*Fill out this rubric for yourself and include it in your lab report. The same rubric will be used to generate a grade in proportion to the points assigned in the syllabus to the assignment.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Category** | **Description** | **Points Possible** | **Score** |
| **Structural Elements** | All elements of a lab report are included **(2 points each)**:  Title, Notice: Dr. Bryan Runck, Author, Project Repository, Date, Abstract, Problem Statement, Input Data w/ tables, Methods w/ Data, Flow Diagrams, Results, Results Verification, Discussion and Conclusion, References in common format, Self-score | 28 |  |
| **Clarity of Content** | Each element above is executed at a professional level so that someone can understand the goal, data, methods, results, and their validity and implications in a 5 minute reading at a cursory-level, and in a 30 minute meeting at a deep level **(12 points)**. There is a clear connection from data to results to discussion and conclusion **(12 points)**. | 24 |  |
| **Reproducibility** | Results are completely reproducible by someone with basic GIS training. There is no ambiguity in data flow or rationale for data operations. Every step is documented and justified. | 28 |  |
| **Verification** | Results are correct in that they have been verified in comparison to some standard. The standard is clearly stated **(10 points)**, the method of comparison is clearly stated **(5 points)**, and the result of verification is clearly stated **(5 points)**. | 20 |  |
|  |  | 100 |  |

**Property Tracking:**

**TRAVEL ATTRIBUTES**

**Costs > Distance Cost**

**Keep Name, change Units to \_\_\_Miles\_**

**Keep Evaluator default**

**Cost > Create new cost > Time Cost**

**Change Name to units, change Units to \_\_Hours\_\_**

**Evaluators:**

**Roadlines (Along & Against) > Field Script > [Shape (miles)]/[SPEED\_IMP (mph)] = hours**

**Travel Modes > create new travel mode**

**Name: Car Distance**

**Desc: n/a**

**Type: Driving**

**Impedence: “Length”**

**Time Cost: “Minutes” (or whatever it was named under costs)**

**U turns: ?**

**Restrictions**

**Name: Interstate**

**Turn off 35W and 94**

**DIRECTIONS**

**Check the box**