

MATH-600, Spring 2013

Project 2: Group specific question

Group	Last name	First name	Group question
1	Finger Gros Béchara Kazagli	Flavio Jonas Rami Evanthia	Evacuation scenario
2	Lindberg Lücker Monge	Hannah Florian Julien	Fixed Origin-Destination (OD)
3	Nikolic Robenek Valiya	Marija Tomas Rahul	Fixed pedestrian links with fixed OD
4	Anderson Zeimetz Mian	Paul Fränz Alberto	Emission Analysis with fixed OD
5	Samoili Vocialta Taheri Karimi	Sofia Marco Seyedeh Shima	Shopping centre with fixed OD

Group 1

Flavio, Jonas, Rami, Evanthia

Topic

Evacuation scenario

A tornado is to hit the area and you are asked to design an evacuation plan. The safe areas are located in the North (using the two top intersections). The pedestrian only links cannot be used because of the fixtures and other obstacles. The only way is to use the existing links. You also have the option to make them one-way. Based on simulated annealing, design an optimal combination of road directions to optimize the evacuation. Present a detailed analysis and clearly justify the choice of your objective function. Analyze the time needed to bring everyone to safety, with and without pedestrian only links.

Note:

1. Make reasonable assumptions where required.
2. Please contact me if any clarification is needed.

Group 2

Hannah, Florian, Julien

Topic

Fixed Origin-Destination (OD)

Instead of the previous scheme in which a vehicle can exist the system at intersection with some probability, now you assign them a fixed destination at the time when they get onto the system from some origin link. Try two schemes:

1. All the destinations uniformly distributed along the network
2. More destinations are located central than on the peripheries

Now, rerun your optimization to find the combination of pedestrian links with these two situations. Compare the three solutions and present a detailed analysis.

Note:

1. Make reasonable assumptions where required.
2. Please contact me if any clarification is needed.

Group 3

Marija, Tomas, Rahul

Topic

Fixed pedestrian links with fixed OD

Whenever a vehicle gets onto the system, now you assign a fixed destination to it. Where the destinations are uniformly distributed along the system.

Rerun your optimization to generate new combination of pedestrian links.

There is an alternative proposal coming from the Mayor office of making link 41, 44, 45, and 57 as pedestrian links only. Additionally, the speeds on link 28, 43, 46, and 67 are reduced to half in order to maintain pedestrian safety in the intersection. Compare in detail, your optimal solution to this one. Which solution is better, please justify? What are the convergence characteristics of your solution? Discuss in detail.

Note:

1. Make reasonable assumptions where required.
2. Please contact me if any clarification is needed.

Group 4

Alberto, Fränz, Paul

Topic

Emission Analysis with fixed OD

Whenever a vehicle gets onto the system, now you assign a fixed destination to it. Where the destinations are uniformly distributed along the system.

Vehicles when idle, release high level of Carbon monoxide (CO) emissions. According to Environment Protection Agency (EPA), the value of this emission is 388 g/hr. The Mayor of Sioux fall is concerned about the health issues related to CO emissions. He wants to make sure that the emissions are in control. To address her concerns:

1. Compute the expected level of emissions from the network during the simulation before and after the pedestrian only links.
2. Recompute the optimal combination of the pedestrian links in a way that the worst link emission is not more than 1.5 times of the original network and the total level of CO emissions do not increase than before.

Present a comprehensive analysis to the Mayor.

Note:

1. Make reasonable assumptions where required.
2. Please contact me if any clarification is needed.

Group 5

Marco, Seyedeh, Sofia

Topic

Shopping centre with fixed OD

Whenever a vehicle gets onto the system, now you assign a fixed destination to it. Where the destinations are uniformly distributed along the system.

In the first project you were asked to analyze the influence of three new buildings. Now use the same configuration and get an optimum combination of pedestrian links.

Compare it with the optimal solution without the new buildings. If you were given a choice to place the buildings anywhere else (except for the boundaries), where would you locate them? Compare the optimal solution based on your choice of location with the previous two. Discuss and justify in detail.

Note:

1. Make reasonable assumptions where required.
2. Please contact me if any clarification is needed.