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2XB3  Lab 2

No Left turn Route

# Team roles

Hassaan Malik – Project Leader and Lead Researcher

Paul Warnick – Log Admin and Lead designer

Trevor Rae – Mapping Technician and Project Tester

No objective changes were made and project plan will remain the same.

# Abstract

Left turns waste a lot of time and gas since the driver is doing nothing but waiting to make their turn against the flow of traffic. In some cases the driver will wait two or three light changes before they can actually make the turn. This makes driving route inefficient and by driving straight and making three rights turns instead and save gas and even save the driver a lot of time. This would be ideal for anyone going to multiple points in a city such as a delivery trucks, home repair calls, cleaning services etc. This application will use the ArcGIS API to get the locations the user needs to go to and display the route the without any left turns. By using is application the user will be able to save time when doing their job, complete more tasks as well as save gas.

# Objects and Scope

A huge issue for the world right now is global warming. One of the main contributors to global warming is the pollution emitted from motor vehicles. Reducing the emission of these will help to better the environment that we live in and reduce the rate of global warming. Motor vehicles waiting to make a left turn waste gas since they are not moving anywhere and just have to wait patiently. A way to reduce the amount of emission that is produced is by not making left turns at all and only make them when it is either truly necessary or when the driver is in an area where they feel it will be quicker. This can be done by using an application that shows the driver how to get from point A to point B without having to take left turns. This application would be ideal for any vehicle that drives around moving to multiple points. An example of this is delivery trucks since they have to drive around all day delivering packages to many locations around an area of the city. Other areas this application can be useful include telecom serve calls, plumber coming to homes, road inspectors, etc. Transport trucks or cars going long distances don’t make many left turns so this application won’t really suit them. This application will allow a company using this application to save money on fuel, save time when delivery packages and allow them to maximize their efficiency. UPS is already using this since 2004 for their own delivery trucks which they have proven works in the real world and have saved 10 million gallons of gas equivalent to taking 5,300 cars of the road a year. Left hand turns are also notorious for causing accidents since a driver is making a turn against the traffic and by using this application a people lives can be saved. This application will allow the user to enter as multiple locations that they need to go to. The order locations will not matter since the algorithm will find the best way to get there. Then application will show the user the route they need to take based on the fast no left turn algorithm. My motivation for making this is application is so that I can help improve the environment. We are already feeling the effects of global warming and it will only get worse and if I can do something that will help multiple companies save money as well as save the environment then I am doing my part as a human being.

# Input/Output

The input that the user will give is the locations that the user needs to go to. For example the ten houses that they need to deliver a package too. The application will use the ArcGIS API to search for the locations that the user has entered. Using the API it will allow us to create a route without any left turns. The output of this will display a map and the route that the user needs to get to each of the locations that they have entered.

# Algorithm challenges of the project

The challenges of this for this project will be first searching for the locations entered by the user through the database. Then using a graphing algorithm and a sorting algorithm to see which location is closest to the user. Next using Dijkstra's algorithm we need to calculate the route that the user needs to take without any left turns. The challenge with making the no left turn algorithm is also checking when it is more efficient to actually make a left turn this is because sometimes there could be one way streets, long roads where there isn’t an intersection for a long time, dead ends etc. Checking for all of possible issues will be the greatest challenge when working with this application.

# Project Timetable

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| Milestone Number | Task |
| 1 | Create the user interface  Using the API, create the map that will display on screen and allow for the user to type |
| 2 | Search for location  Search through the API data base and get the data from the API |
| 3 | Search for Multiple locations and sort them from closest to farthest  Search through the API data base for multiple locations and get the data from the API, then sort the locations from closest to farthest from the user |
| 4 | Display normal route  Using the data given by the API create a route that the user would take with left turns |
| 5 | No left turns  Create a route for the user that does not take any left turns, this route will not take anything into consideration like if the right turn is worse for the driver |
| 6 | No left turns with considerations  Create a route for the user that is efficient and take all issues into consideration |
| 7 | Display the route on the map  Using the API display the route that the user needs to take and give step by step directions. |

# References

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