Reflection on Personal Pursuit

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My learning goal is to grasp the basics of metro system. I intended to build up an application which is able to find the optimal metro system.

I successfully reached my learning goal. The application works very well. This was the first time in my life that I made such a big application and it is able to run.

1. I developed my transportation knowledge. What I mainly learned is the four step travel demand model. I learned how to analyze the travel demand based on social economic data, how to distribute trips from zone to zone, how to make traffic assignment. Based on my personal understanding, the metro operation company can be seen as a seller. The residents are their customers. The four step travel demand model actually tells sellers what services the customers need and how many services they need. Sellers provide several scenarios of metro system. My application stands in a position between sellers and customers. The application tells sellers whether or not each metro scenario is able to satisfy customer' s demand. If it cannot satisfy, sellers can make adjustment on their scenario. I think this is very interesting.

2. I improved my programming skill to a large extent. Before doing this project, my programming skill was very weak. I lacked enough knowledge in programming. During this project, 1) I learned how to make a correct definition, 2) how to solve syntax problems, 3) how to do a matrix calculation. 4) I especially learned how to choose a proper data structure. Sometimes more than one type of data structures are all able to satisfy the programming demand. But some of them are inconvenient. A proper data structure can make the code clear and reduce the running time of the application. 5) I learned Dijkstra shortest path algorithm. It is very handy and powerful. 6) I learning what running time means, why it is important to reduce the running time, and how to reduce it. Before this personal pursuit, I only learned some theory about the running time. During this project, I practiced on my own and realized that it is indeed very important to minimize the running time. I payed an attention on what commands should be in a loop and what commands are better to stay out of a loop. This has a big influence on the running time. I was very happy to see that my adjustments were efficient. There are still some parts that I do not know how to reduce running time. My supervisor helped me. I learn a lot from his guide.

3. I made an improvement in my learning method. I learned how to simplify a system. I learned how to grasp the skeleton of a system. A problem that I faced was that I was lost in thousands of factors and functions. After struggling for a long time, I got a solution. My solution was to focus on the main input and main output of each step in the model, instead of being distracted by detailed factors. I also distinguished direct-related factors from indirect-related factors. At the same time, I read the same learning materials for three or four times. The more time I read, the clearer I feel. Finally, I made a table to show the core of the metro system. I am very pleased that I solved this problem.

To sum up, the goal for this personal pursuit was challenging for me. I felt a lot of pressure. I overcame the difficulties. I made a big progress in learning transportation knowledge, learning programming skill and improving my learning method.

Evidence：

1) **Instruction of the application:**
   See folder "Instruction of the Application". I gave an instruction on what this application is about. I also put the unit of all variables into an excel file.
2) **Code:**
   See folder "MetroSystem". "final final code.py" is a file to run the application. "final final code.docx" is a copy of the code. This is for people who do not have python installed on their computers to see the code.
3) **Input file:**
   Under the folder "MetroData", folders "CaseData" and "Scenario##" contain all the input files. In each scenario folder, there is a **picture** which visualize the input.
4) **Output file:**
   Under the folder "MetroData", folders "Output##" contains the output csv files.
5) **Conceptual model:**
   See file "conceptual model v2 20160423.docx". This conceptual model shows the design and plan of the application.
6) **Notes of personal pursuit:**
   See file "notes of personal pursuit.docx".

Feedback from my supervisor (k.m.vanzuilekom@utwente.nl):
See file "Certificate-QiaoRen Certificate PP.docx".