IE801B Homework Assignment 5

1 Implementation

Implement the labeling algorithm of Feillet et al. (2004) to solve the Elementary Shortest-Path Problem with Resource Constraint (ESPPRC) in the context of the Capacitated Vehicle Routing Problem (CVRP).

Use the following three instances from the CVRPLIB (`http://vrp.galgos.inf.puc-rio.br/index.php/en/`):

1. `P-n16-k8`

2. `A-n32-k5`

3. `B-n64-k9`

Use the dual variable values provided in the separate CSV files.

2 Submission

Submit the following files for this assignment:

1. A PDF report that summarizes your code, experiments, and findings. LaTeX is recommended but not required. Using a Jupyter notebook is fine. Describe your experimental settings: CPU, RAM, OS, language version, package version, computational time, etc. In most cases, this is the only file that I will read. I will read your source code if necessary. In your report, describe how you used AI tools; this is not for grading but for my own education on how students are using AI tools.

2. Your code files.

    - Do NOT submit your algorithm code as a Jupyter Notebook. You can use Jupyter while developing your code but not in the submission.

    - You can write your main code as `main.py` and import it to your Jupyter notebook to create the final report.

    - In your report, specify which source file is the file that I need to run to reproduce the results. If you choose to use C/C++/Java, describe how I can compile and run the code. For C/C++, `cmake` is recommended.

    - I read your submissions in VSCode. So files readable within VSCode are allowed (except `.ipynb`). Examples are `.pdf, .m, .cpp, .jl, .py, .csv, .png, .gif`, etc.

Please upload each file (PDF and source codes) separately without zipping unless you have too many separate files or use special directory structures. If you prefer to submit your code via a GitHub repo, that is okay, too. You need to mention the repo URL and the specific commit SHA. Please make sure that I have access to the repo. My GitHub account name is `chkwon`.

References

Feillet, D., Dejax, P., Gendreau, M., and Gueguen, C. (2004). An exact algorithm for the elementary shortest path problem with resource constraints: Application to some vehicle routing problems. *Networks: An International Journal*, 44(3):216–229.