Graph PW3

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1 API PW2

For this project, we used *Johan Barçon*'s API. We made a few changes, notably in the *Edge*, *Graph* and *UndirectedGraph* classes. All changes are described in the *README.md* file.

2 Strategies

We implemented two strategies for the pairwise matching of the odd degree nodes.

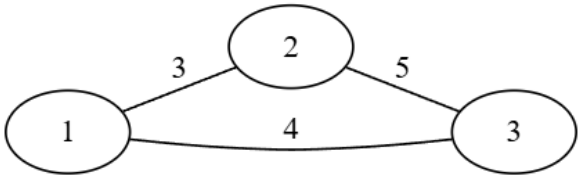
The first one is the *Minimal-length Pairwise Matching by Enumeration* algorithm provided in the topic (function `lengthPairwiseMatching()`).

The second one consist in randomly matching the nodes, (function `length PairwiseMatchingRandom()`.

3 Tests Examples

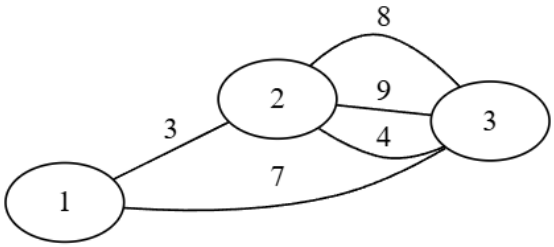
Next are representations of some of the graph we used to test this project. All of them are available in the project.

On disjoint graph, the program will function only if the other part is constituted of single node(s) without edges (Figure 6 and 7).



Type: Eulerian
Eulerian Circuit: [1-(3)-2, 2-(5)-3, 3-(4)-1]
Total Cost: 12
Extra Cost: 0

Figure 1: Eulerian Graph

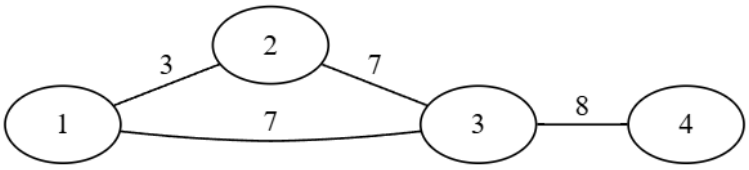


Type: Eulerian
Eulerian Circuit: [1-(3)-2, 2-(8)-3, 3-(8)-2, 3-(7)-1]
Total Cost: 26
Extra Cost: 0

Figure 2: Eulerian with Multi-edges Graph

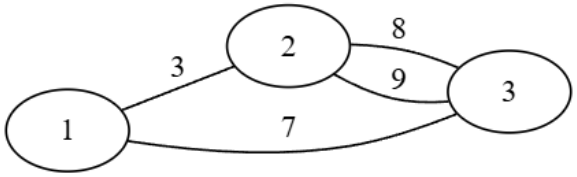
Type: Eulerian
Eulerian Circuit: [1-(3)-2, 2-(7)-3, 3-(7)-2, 2-(3)-1]
Total Cost: 20
Extra Cost: 0

Figure 3: Eulerian with Multi-edges Graph, Special Case for Recursivity



Type: Semi-Eulerian
Semi-Eulerian Trail: [3-(7)-1, 1-(3)-2, 2-(7)-3, 3-(8)-4]
Total Cost: 25
Extra Cost: 0

Figure 4: Semi-Eulerian Graph



Type: Semi-Eulerian
Semi-Eulerian Trail: [2-(3)-1, 1-(7)-3, 3-(8)-2, 2-(8)-3]
Total Cost: 26
Extra Cost: 0

Figure 5: Semi-Eulerian with Multi-edges Graph

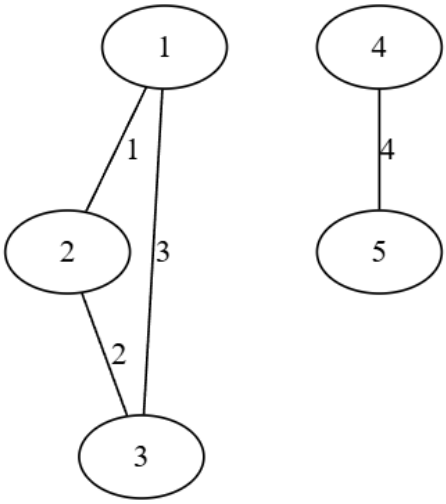


Figure 6: Disjoint Graph

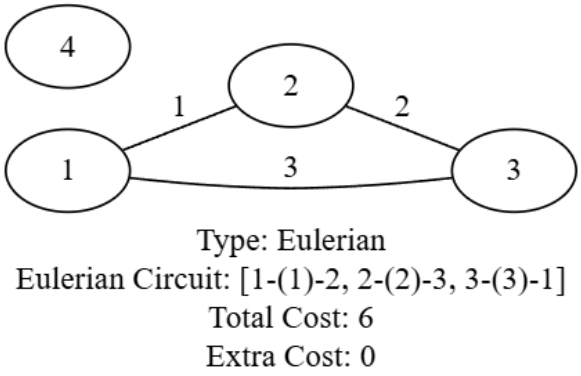


Figure 7: Disjoint Graph with single node

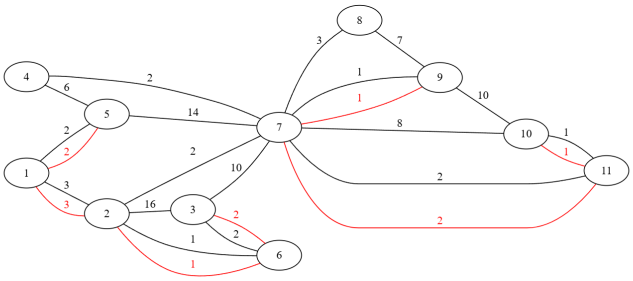


Figure 8: Non-Eulerian Graph Example

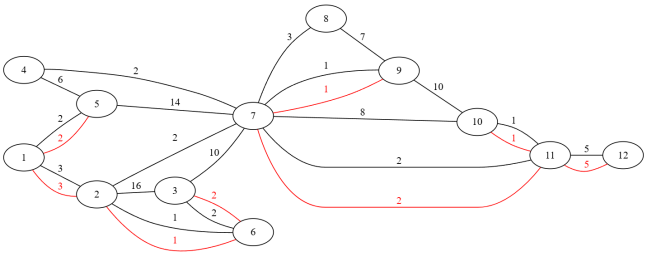


Figure 9: Non-Eulerian Graph with 6 odd degree nodes with optimal method for pairing odd degree nodes

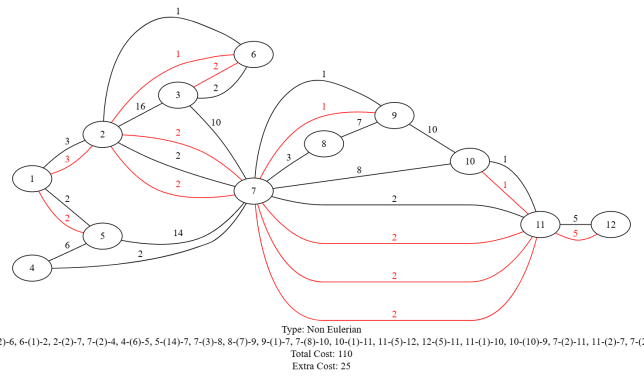
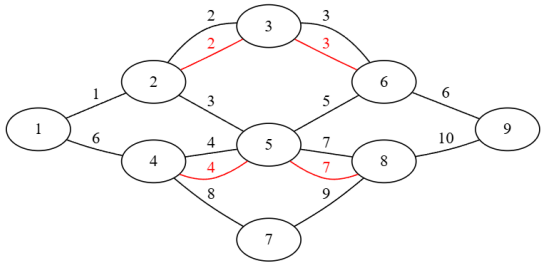


Figure 10: Non-Eulerian Graph with 6 odd degree nodes with random matching method for pairing odd degree nodes



Type: Non Eulerian
Chinese Circuit: [1-(1)-2, 2-(2)-3, 3-(3)-6, 6-(5)-5, 5-(4)-4, 4-(8)-7, 7-(9)-8, 8-(7)-5, 5-(7)-8, 8-(10)-9, 9-(6)-6, 6-(3)-3, 3-(2)-2, 2-(3)-5, 4-(6)-1]
Total Cost: 76
Extra Cost: 16

Figure 11: Non-Eulerian Graph, Lecture Example