Task1

A neighbourhood of a solution with this specific problem would be a 2 change neighbour. By swapping two neighbouring participants in the ranking, it gives a new solution which would be a neighbour to the first. For example with the solution graphs:

Solution A: [3,2,6,1,4,5] Neighbouring Solution: [3,2,6,4,1,5]

2

3

1

6

5

4

4

5

6

1

3

2

With the graph of the first 6 participants:

4

5

3

2

2

6

18

4

10

4

6

1

6

12

12

The Kemeny Ranking of Solution A would be 10 as participant ‘4’ beat participant ‘2’ by 10.

By changing the solution by swapping two neighbouring participants, you only need to check the orders which have changed. As participants ‘3’, ‘2’ and ‘6’ are still ahead of ‘4’ and ‘1’ these edges do not need to be checked. And as ‘5’ is still behind ‘4’ and ‘1’ these don’t have to be checked either.

The only edges which need to be checked would be the edge between these two nodes. In this case the ranking would stay as 10.