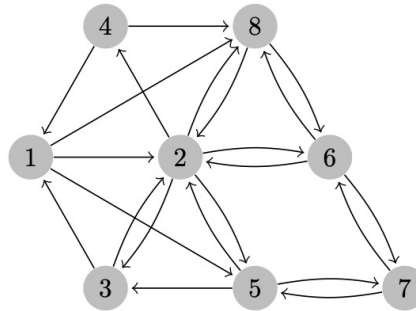


1. Consider a kidney exchange problem on the following graph:



- (a) By inspection, determine an optimal solution for the case of pairwise matching, as well as the case of packing with cycles of length 3 at most.
 - (b) Confirm the solutions using the software provided.
2. Consider the kidney exchange problem on the following graph, given by an adjacency list for each vertex (from a realistic example):

Node	Links
1	9 13 20
2	9
3	2 4 5 6 7 8 9 11 13 15 16 17 19 20
4	9 13 20
5	9 13 20
6	9 13 20
7	2 4 5 8 9 11 13 15 16 17 19
8	9 13 20
9	1 13
10	
11	2 13
12	2 3 4 5 6 7 8 9 13 15 16 17 19 20
13	3 4 5 6 7 8 9 15 16 17 20
14	8 13
15	1 9 13 18 20
16	13 20
17	9 13 20
18	2 3 4 5 6 7 8 9 11 13 15 16 17 19 20
19	1 9 13 18 20
20	8 16

Determining the total number of transplants in the optimal solution in the following cases:

- (a) Matching cycles may have 2 vertices at most.
- (b) Matching cycles may have 3 vertices at most.
- (c) Matching cycles may have 4 vertices at most.