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Subject: Graphic Matroid Parity Implementation - Questions
Date: May 22, 2022 at 3:07 PM
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Dear Matt,

Thank you again for sharing the Pascal implementation of your algorithm.
After a few minimal tweaks, the program compiles and we were able to run it just fine!

We were testing many graphic matroid parity instances related to feedback vertex sets in subcubic graphs (in order to test some hypothesis). We noticed that for some inputs, the program would not terminate and for others, incorrect results are returned. We tried fixing the program for a while but could not find what exactly causes these errors.

Here is the smallest input we have found to yield an incorrect output:

```
21
1 12
1 13
2 14
2 15
2 3
3 12
4 14
4 16
5 9
5 13
6 17
6 18
5 7
7 10
4 7
4 17
1 8
1 15
3 8
8 16
9 19
9 20
10 19
10 21
6 11
6 20
11 18
11 21
0 0
0
```

This instance gives a matching of 9 pairs (proposed_matching.png):
Pairs [1,2,3,4,5,6,7,11,13]

However, there is a larger matching of 10 pairs (bigger_matching.png):
Pairs [1,3,4,5,6,8,9,11,12,14]

While studying the details of the journal version of the article, I noticed that there seems to be no distinctions between the pair of a transform and a normal pair in the blossom step (as far as I understand). In the implementation however, the pair of a transform is explicitly skipped. Could this lead to the wrong result we see above?

We would be grateful for any hints about what is going on.

All the best,
Benjamin Peyrille.

