Exercise 9: It’s Christmas time!

Task 1: Self-stabilization survey

a) Check out the algorithms from the lecture and the exercises. Make a table, marking each of them as one of the following: (i) trivially self-stabilizing (this includes trivial modifications), (ii) well-suited for the transformation from the lecture, (iii) self-stabilizing with straightforward modifications, (iv) solving a problem unsuitable for a self-stabilizing algorithm, (v) you believe it can be made self-stabilizing, but it’s not that simple, (vi) you believe it can’t be made self-stabilizing, but it’s not easy to show, and (vii) you haven’t the foggiest idea.

b) Add a bit of explanation where you think it’s helpful or needed.

c) Discuss unclear cases in the exercise session!

Task 2: Mandatory merriment

a) Meet everyone at the Christmas market on Sunday at 6 pm.

b) Prepare three slips of paper: (i) something that’s great about the lecture, (ii) something that should or could be improved, and (iii) something you found hilarious. Put them into the hat Cosmina will bring.

c) Take turns in drawing a slip and reading it out to the others.

d) Enjoy yourselves!

Task 3*: Christmas MST

<table>
<thead>
<tr>
<th>Color Tree</th>
<th>RGB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(255, 255, 0)</td>
</tr>
<tr>
<td>2</td>
<td>(34, 139, 34)</td>
</tr>
<tr>
<td>3</td>
<td>(165, 42, 42)</td>
</tr>
<tr>
<td>5</td>
<td>(255, 0, 0)</td>
</tr>
<tr>
<td>20</td>
<td>(193, 255, 244)</td>
</tr>
</tbody>
</table>

a) Determine the MST of the graph given in Figure 1! The edge weights are given in the table above, i.e., an edge labeled 1 has weight (255, 255, 0) (lexicographical order).

b) Color each MST edge according to its weight, reading it as an rgb code!

c) Look for other Christmas trees in the computer science literature! (Hint: xkcd.)

d) Have a Merry Christmas and a Happy New Year!

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1There’s no need to make separate entries for algorithms that are essentially the same, e.g., the various variants of Cole-Vishkin we encountered. (Unless this changes their category, of course.)

2Print for extra anonymity. I don’t know your handwritings, though, and Cosmina won’t tell anything.
Figure 1: Thinly disguised Christmas Tree.