Exercise Sheet 05

Deadline for submission is Friday Jun-03-22, 23.59h at your Olat course.

Task 1

4 p.

Let σ be an incoming train for the TMP with

$$\sigma = (1, 2, 3, 4, 3, 1, 4, 5, 4, 1)\,.$$

1. Build the corresponding interval graph and find a minimum coloring.
2. Present the corresponding track assignment of the coloring (cf. slide 180).

Task 2

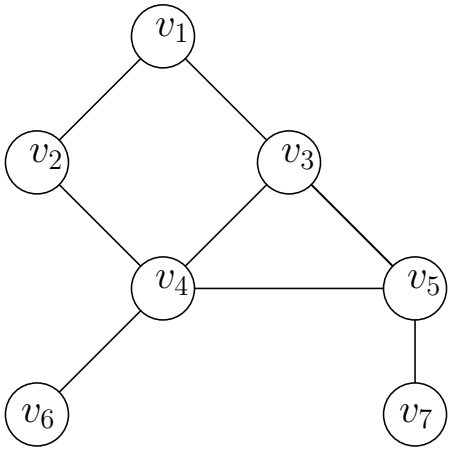
8 p.

DSatur was introduced by Daniel Brélaz in 1979. It works similar to the greedy-approach on slide 152 (Algorithm 5) but utilizes the 'degree of saturation' of nodes: "We define the saturation degree of a vertex as the number of different colors to which it is adjacent (colored vertices)." According to Brélaz (1979):

Algorithm 1 DSatur

1: Arrange the vertices by decreasing order of degrees: $v_1, ..., v_n$
2: Color a vertex of maximal degree with color 1.
3: Choose a vertex with a maximal saturation degree. If there is an equality, choose any vertex of maximal degree in the uncolored subgraph.
4: Color the chosen vertex with the least possible (lowest numbered) color.
5: If all the vertices are colored, stop. Otherwise, return to 3.

1. What is the runtime behavior of Algorithm 1?
2. Color the following graph with the given node numbering with Algorithm 5:



3. Color the same graph with the DSatur.

Task	1	2	total
Points	4	8	12
reached			