

Graphenalgorithmen

Blatt 8

Markus Vieth

Christian Stricker

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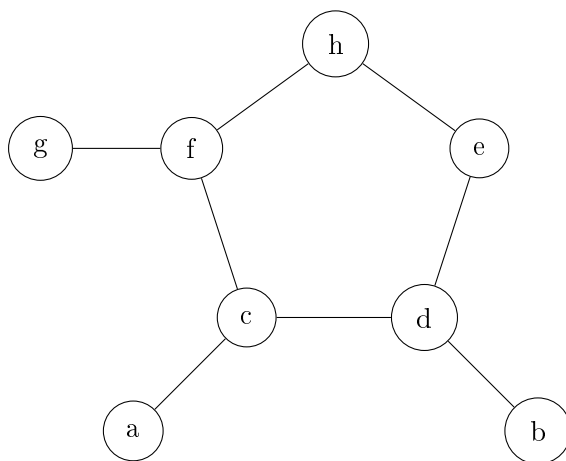
1 Aufgabe 1: Separator im Graphen G (10 Punkte)

2 Aufgabe 2: Cops and Robber (10 Punkte)

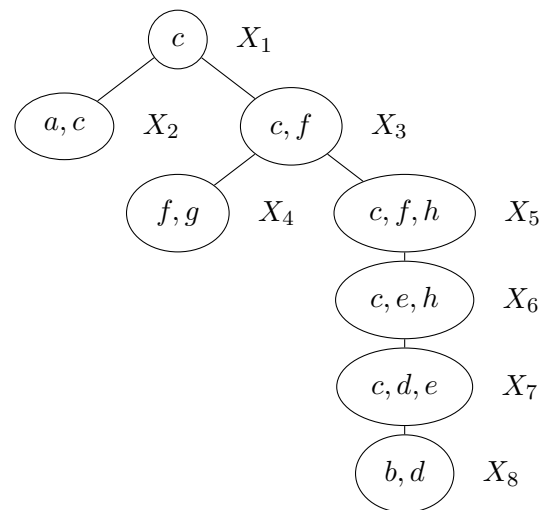
3 Aufgabe 3: Baumzerlegung berechnen (20 Punkte)

3.1 a

step	0	1	2	3	4	5	6	7	Result
U	\emptyset	$\{c\}$	$\{a, c\}$	$\{a, c, f\}$	$\{a, c, f, g\}$	$\{a, c, f, g, h\}$	$\{a, c, e, f, g, h\}$	$\{a, c, d, e, f, g, h\}$	V
C	V	$\{a\}$	$\{b, d, e, f, g, h\}$	$\{g\}$	$\{b, d, e, h\}$	$\{b, d, e\}$	$\{b, d\}$	$\{b\}$	\emptyset
$C \ni n_C$	c	a	f	g	h	e	d	b	$/$
X	\emptyset	$\{c\}$	$\{c\}$	$\{f\}$	$\{c, f\}$	$\{c, h\}$	$\{c, e\}$	$\{d\}$	\emptyset
t	$/$	1	1	3	3	5	6	7	$/$



(a) Graph G



(b) Tree decomposition T

Abbildung 1: Result

3.2 b

$X = \{5, 6, 7, 8, 9, 10\}$ ist nicht $w + 1 = 3$ verbunden, da $Y = \{7, 9, 10\}$ und $Z = \{5, 6, 8\}$ durch $S = \{8, 3\}$ separierbar ist. Weiter gilt:

$$\begin{array}{ccccccc} |S| & < & |Y| & = & |Z| & \leq & w + 1 \\ 2 & < & 3 & = & 3 & \leq & 3 \end{array}$$

$S' = S \cap (Y \cup Z \cup C) = \{3, 8\}$ und somit $X_7 = X \cup S' = \{3, 5, 6, 7, 8, 9, 10\}$

step	...	7	8	9	10
U		$\{5, 6, 7, 8, 9, 10\}$	$\{3, 5, 6, 7, 8, 9, 10\}$	$\{3, 4, 5, 6, 7, 8, 9, 10\}$	$\{2, 3, 4, 5, 6, 7, 8, 9, 10\}$
C		$\{1, 2, 3, 4\}$	$\{4\}$	$\{1, 2\}$	$\{1\}$
$C \ni n_C$		/	4	2	1
X		$\{5, 6, 7, 8, 9, 10\}$	$\{3, 7, 9\}$	$\{3, 5, 6\}$	$\{2, 5\}$
t		6	7	7	9
Y		$\{7, 9, 10\}$	/	/	/
Z		$\{5, 6, 8\}$	/	/	/
S		$\{3, 8\}$	/	/	/