Graphenalgorithmen
Blatt 9

Markus Vieth Christian Stricker

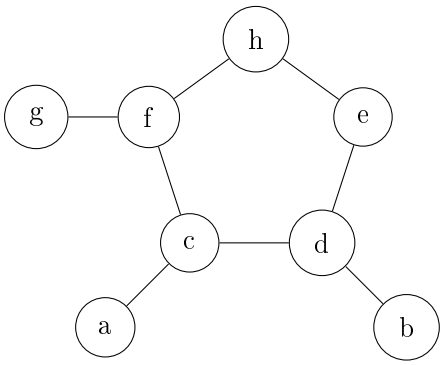
25. Januar 2017

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



$\boxed{U = \emptyset}$

$\boxed{C = \{a, b, c, d, e, f, g\}}$

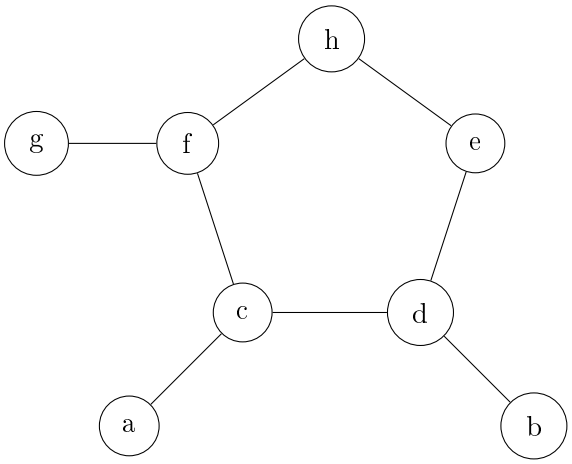
$\boxed{C \ni n_c = c}$

$\boxed{X = \emptyset}$

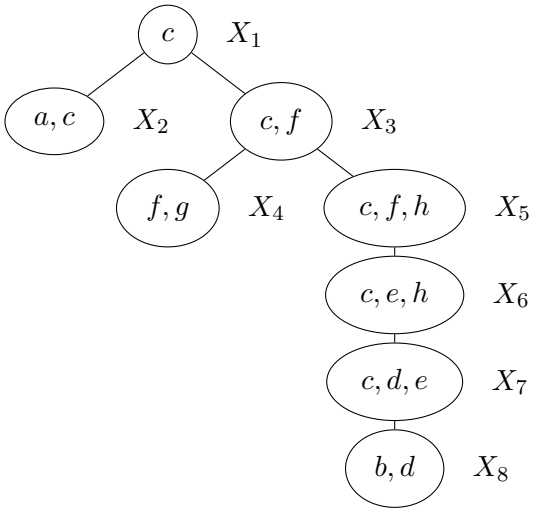
$\boxed{t = /}$

ⓒ X_1

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 $X_7 = X \cup S' = \{3,5,6,7,8,9,10\}$

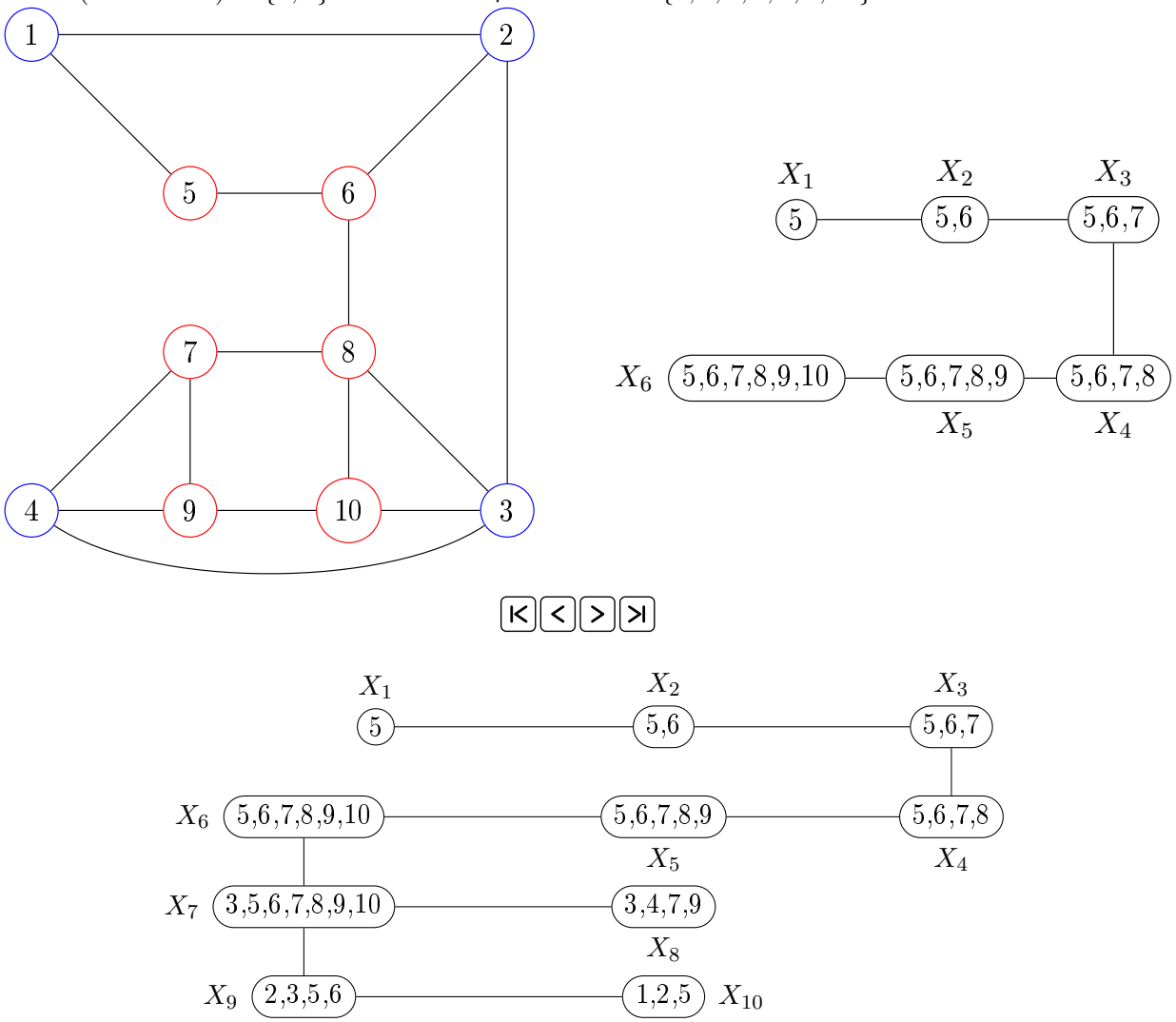


Abbildung 2: Result

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		$\{3,8\}$	/	/	/