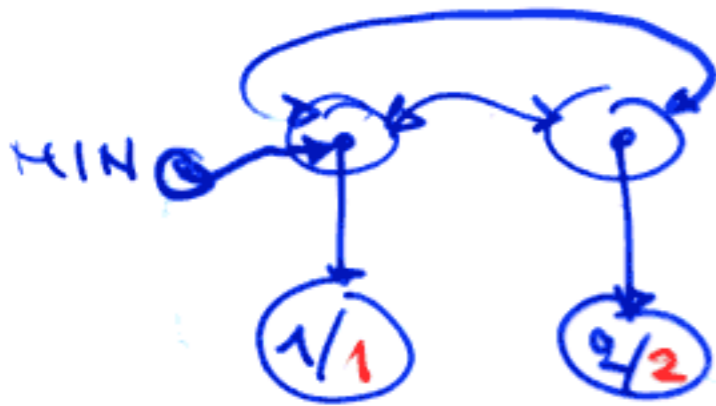


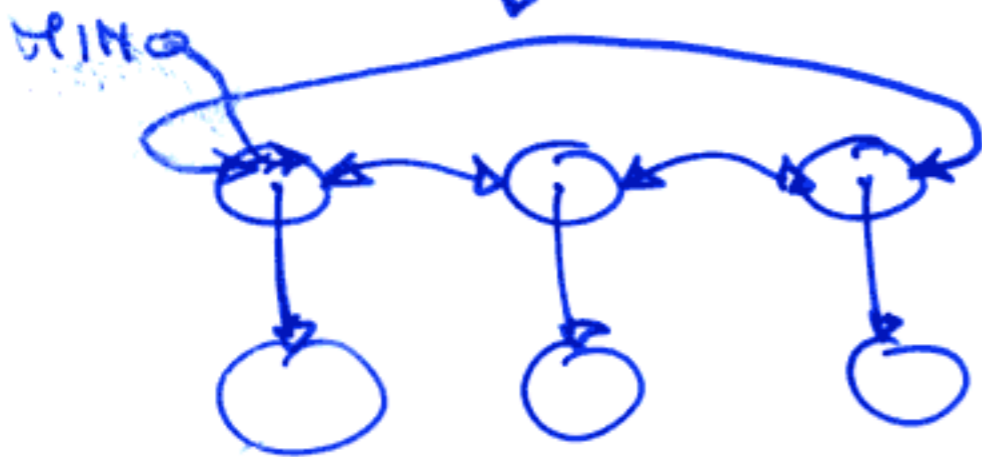
INSERT (1, 1, h)



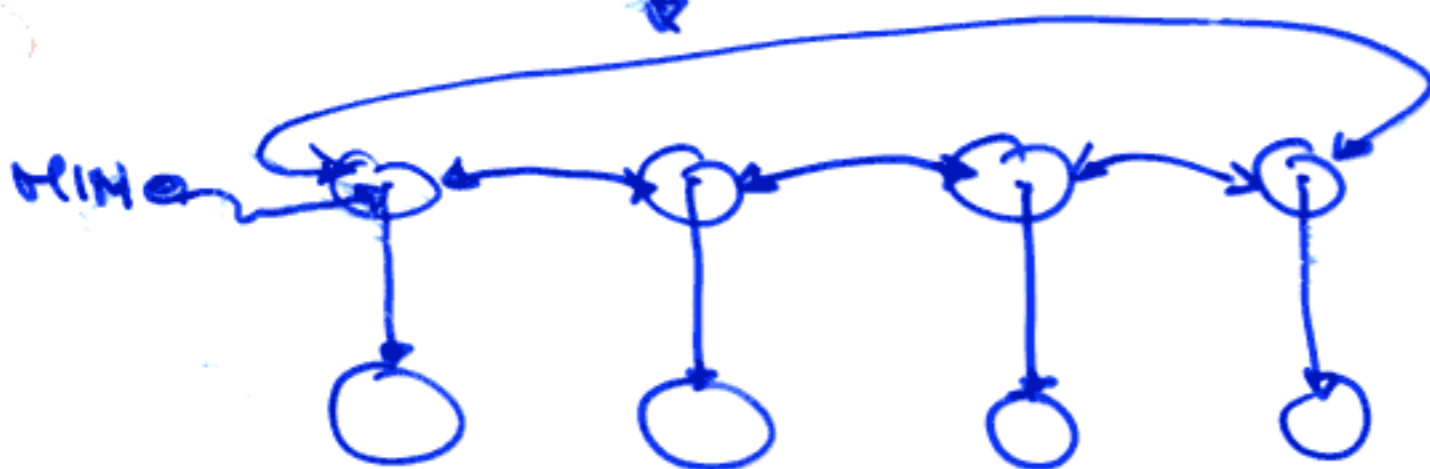
INSERT (2, 2, h)



INS



INS



FEIT: $O(1)$!

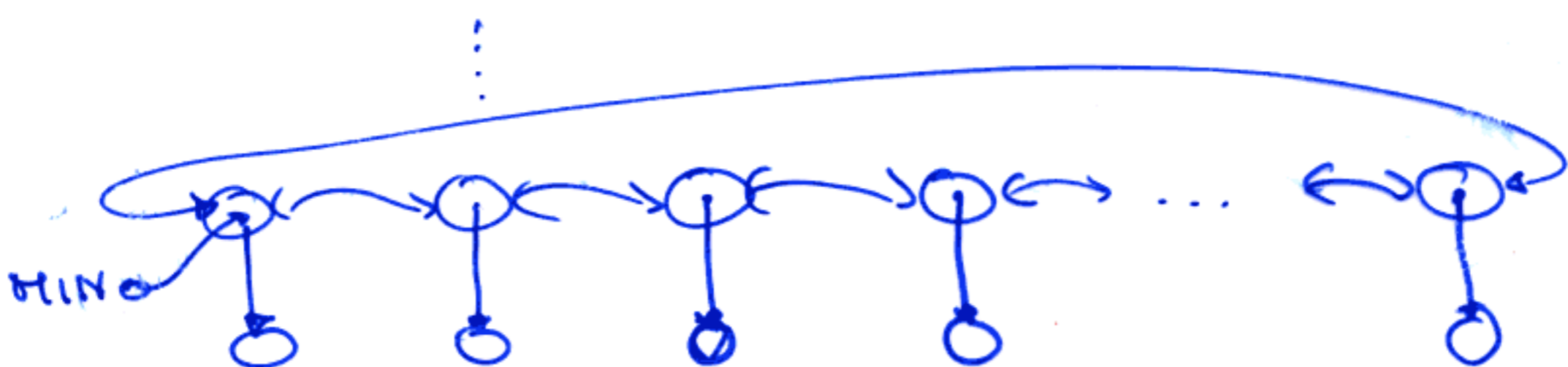
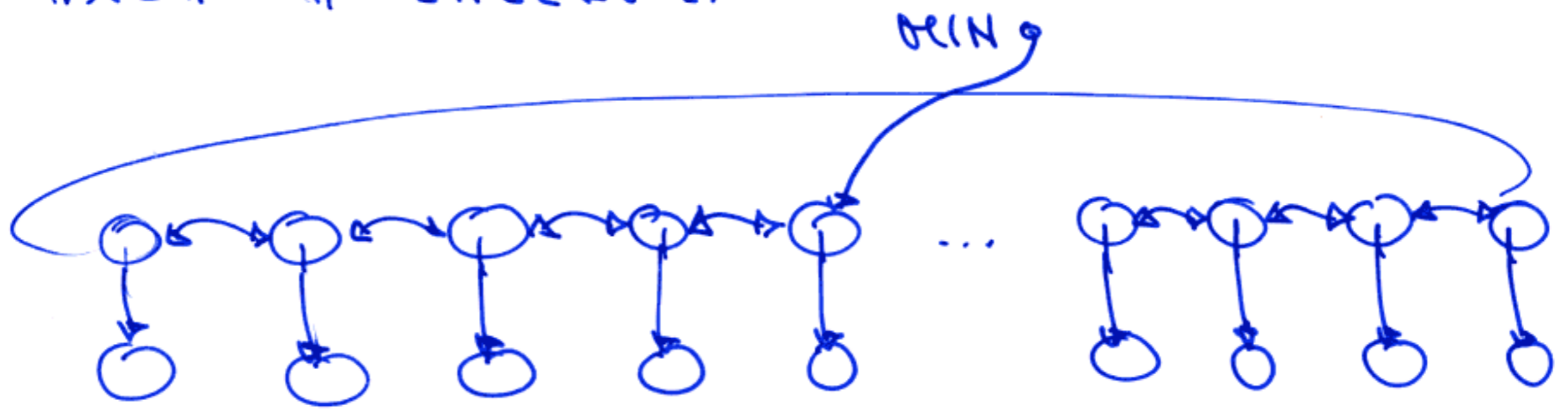


BILD 7

NACH m INSERT:



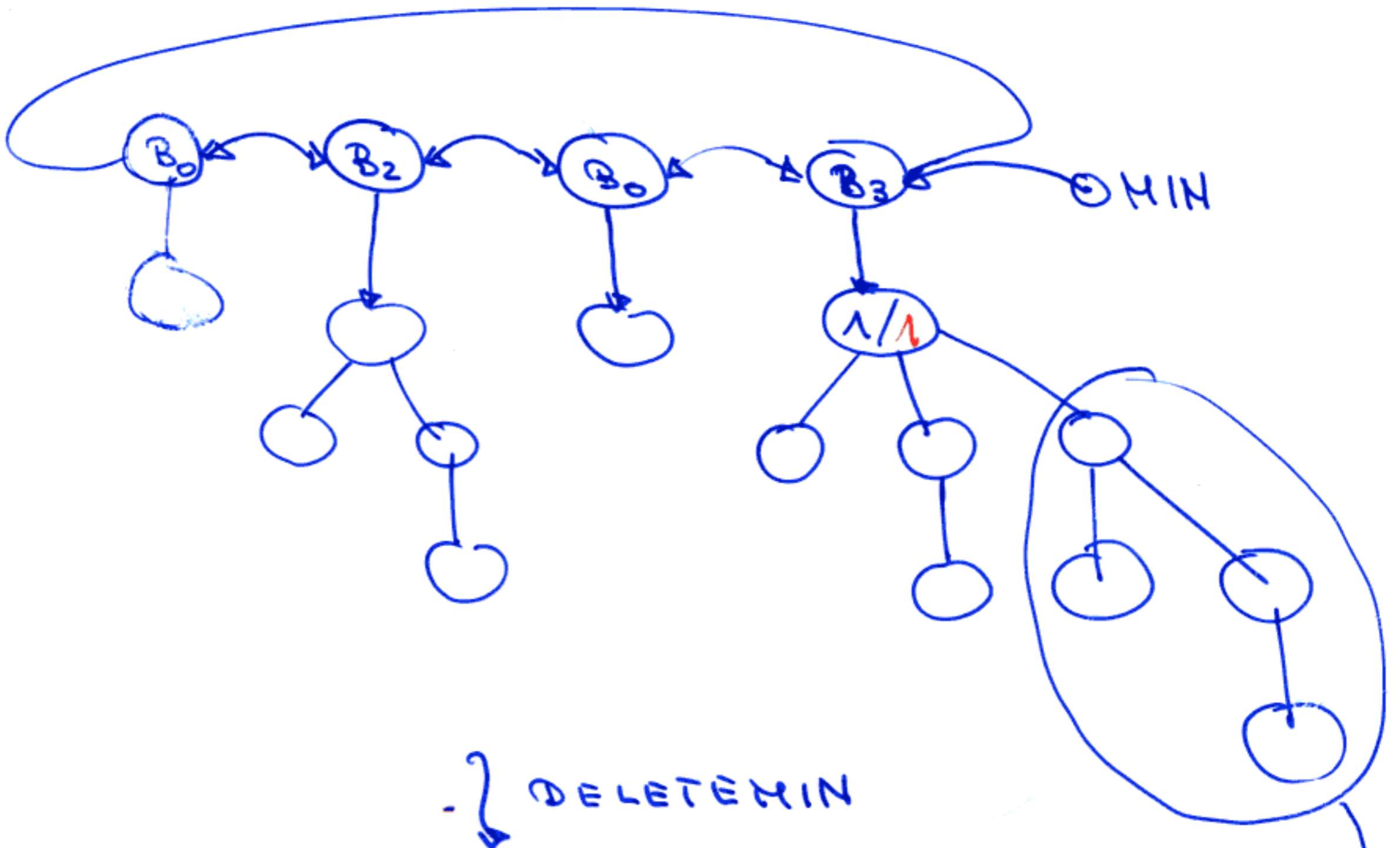
DELETE-MIN(h)

WEG.

MIN



NEUES MINIMUM SUCHE: $\Omega(m)$.



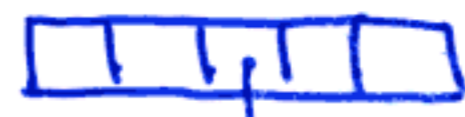
DELETÉMIN

ELEMENTE = $8 + 1 + 4 + 1 = 14$

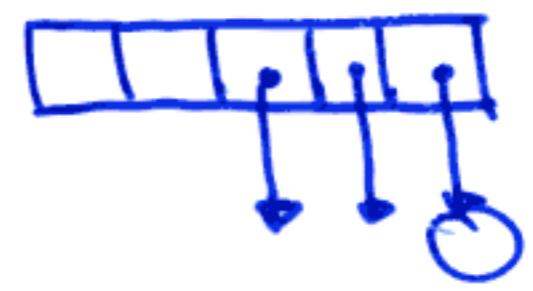


A

1.



3.



5.

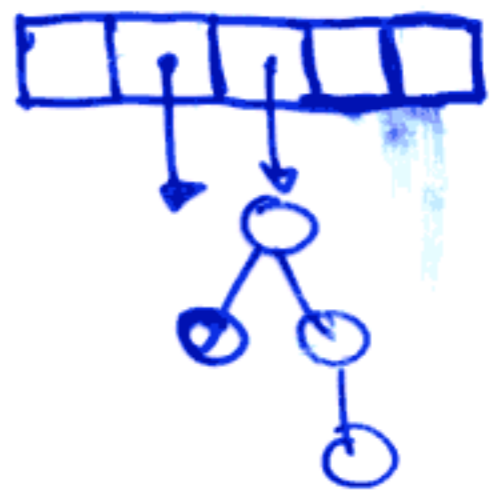
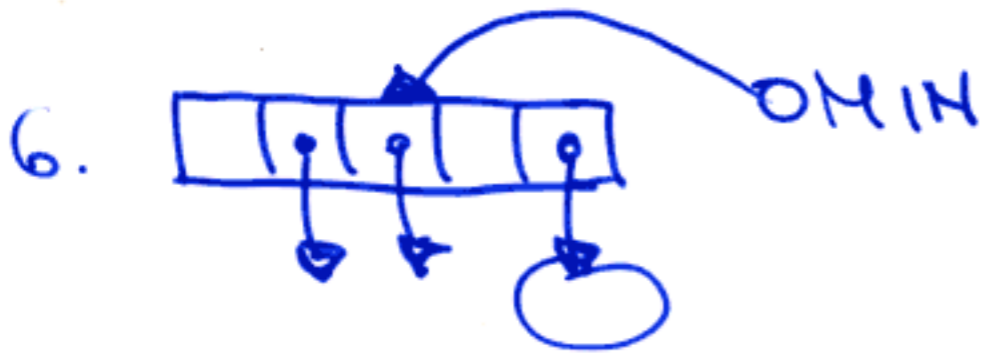
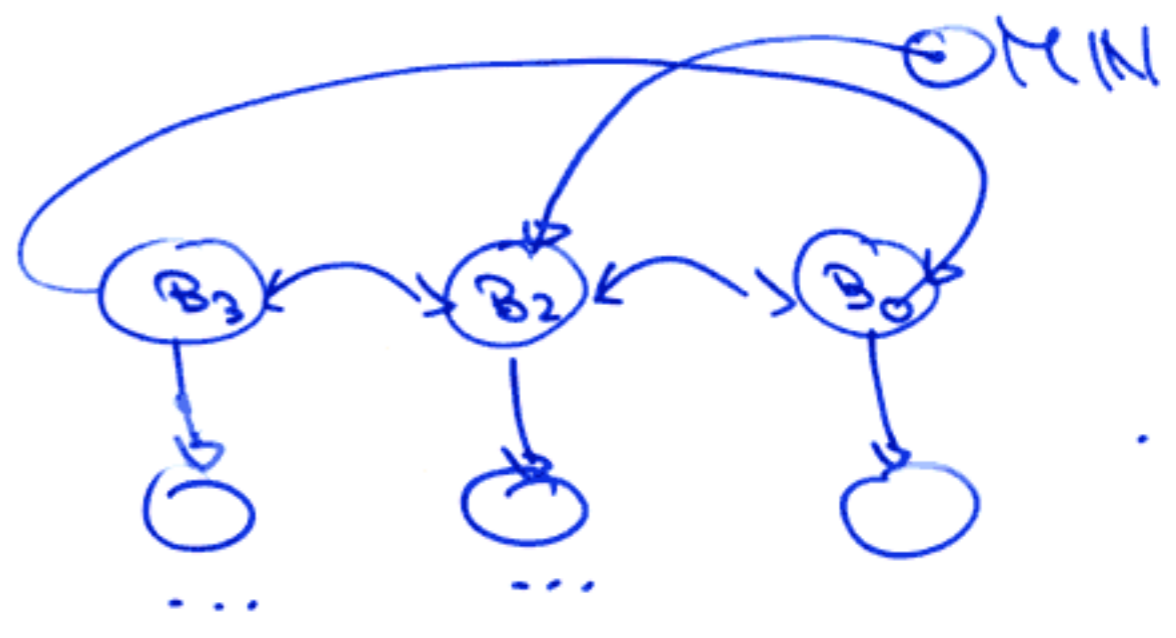
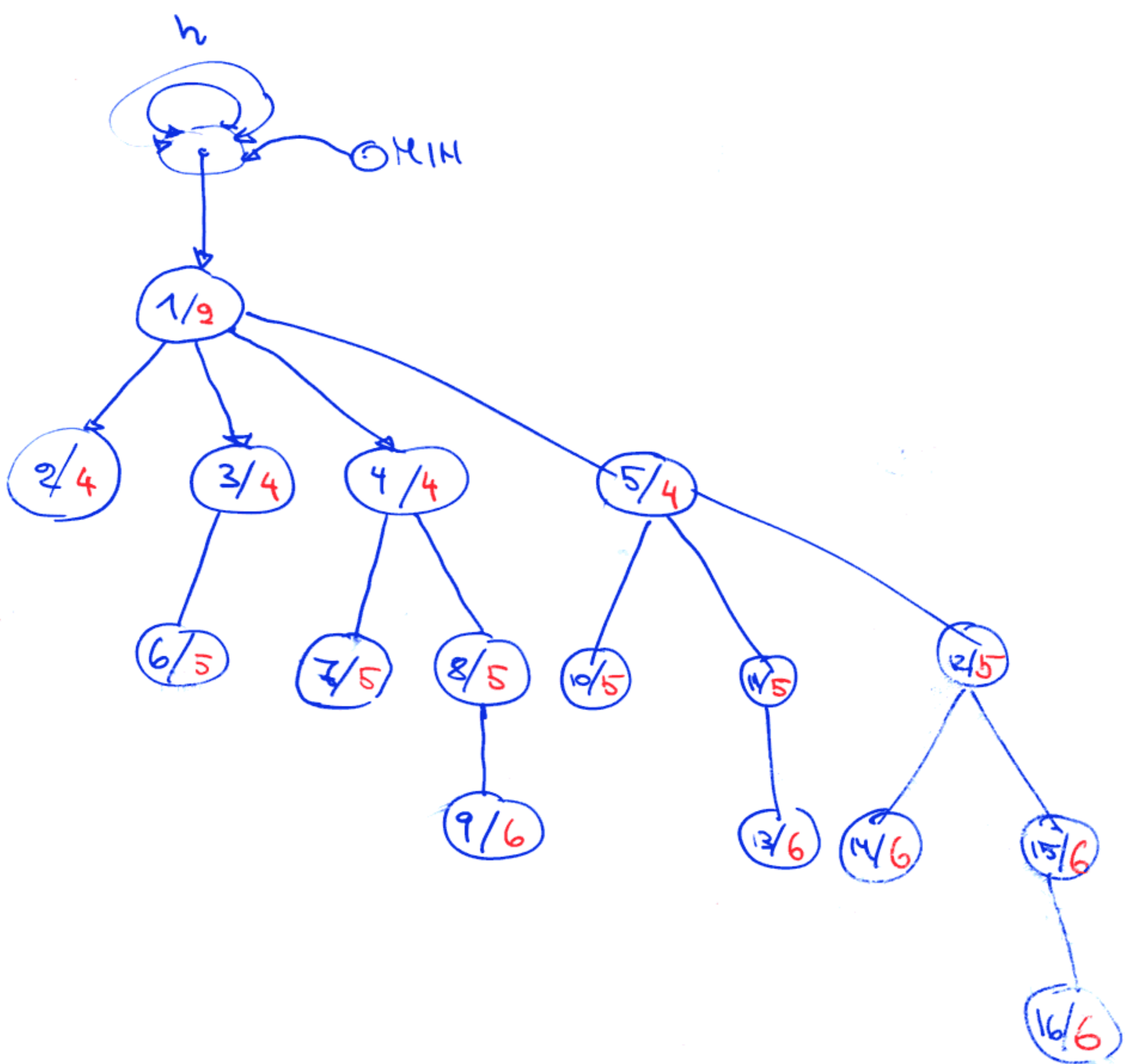


BILD 9



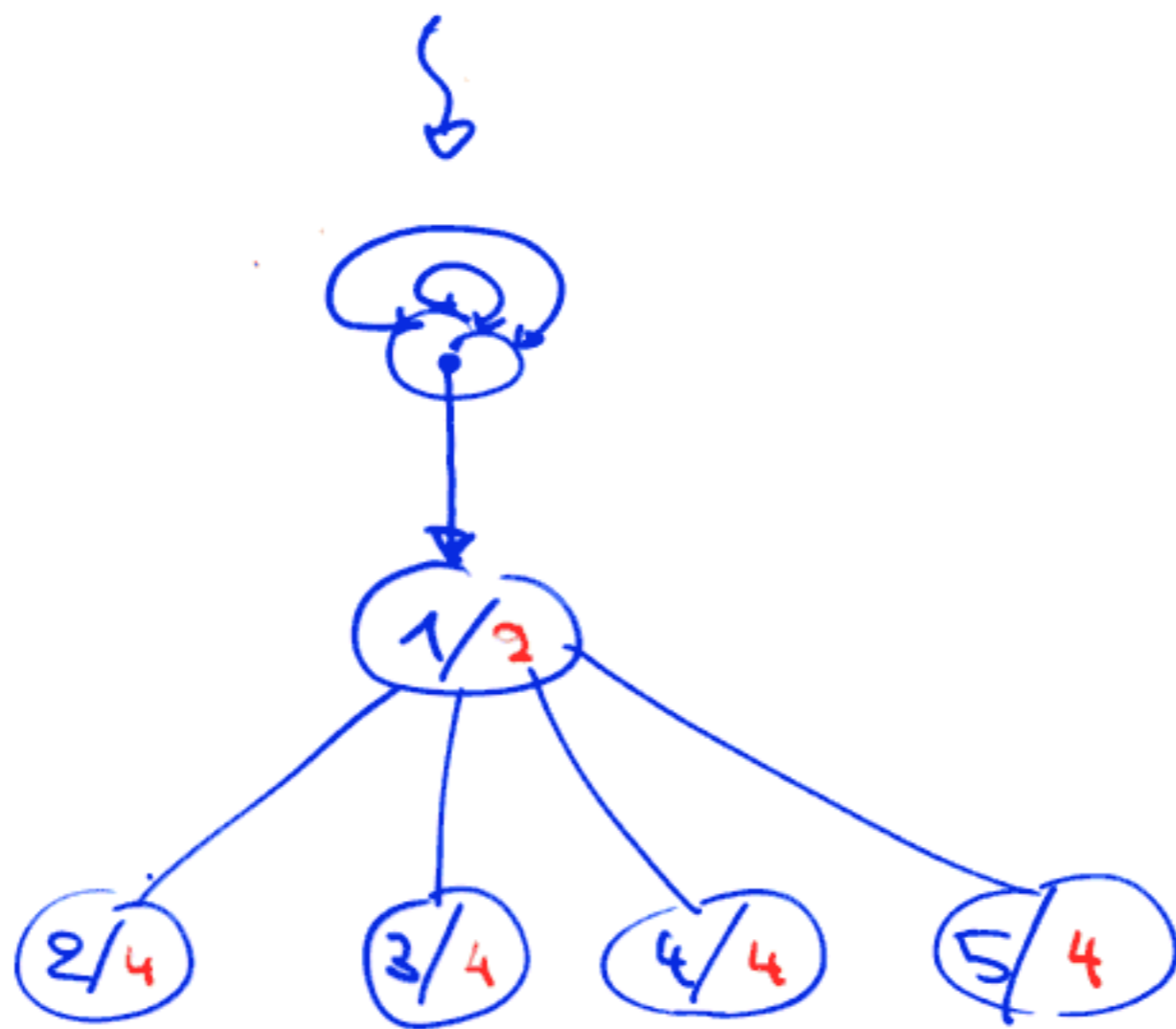
ZIRKULÄRE LIŞTE :





DECREASE-KEY(16, 1, h); DELETE-MIN
 DECREASE-KEY(15, 1, h); DELETE-MIN
 DECREASE-KEY(14, 1, h); DELETE-MIN
 ...
 DECREASE-KEY(6, 1, h); DELETE-MIN

BILD 11

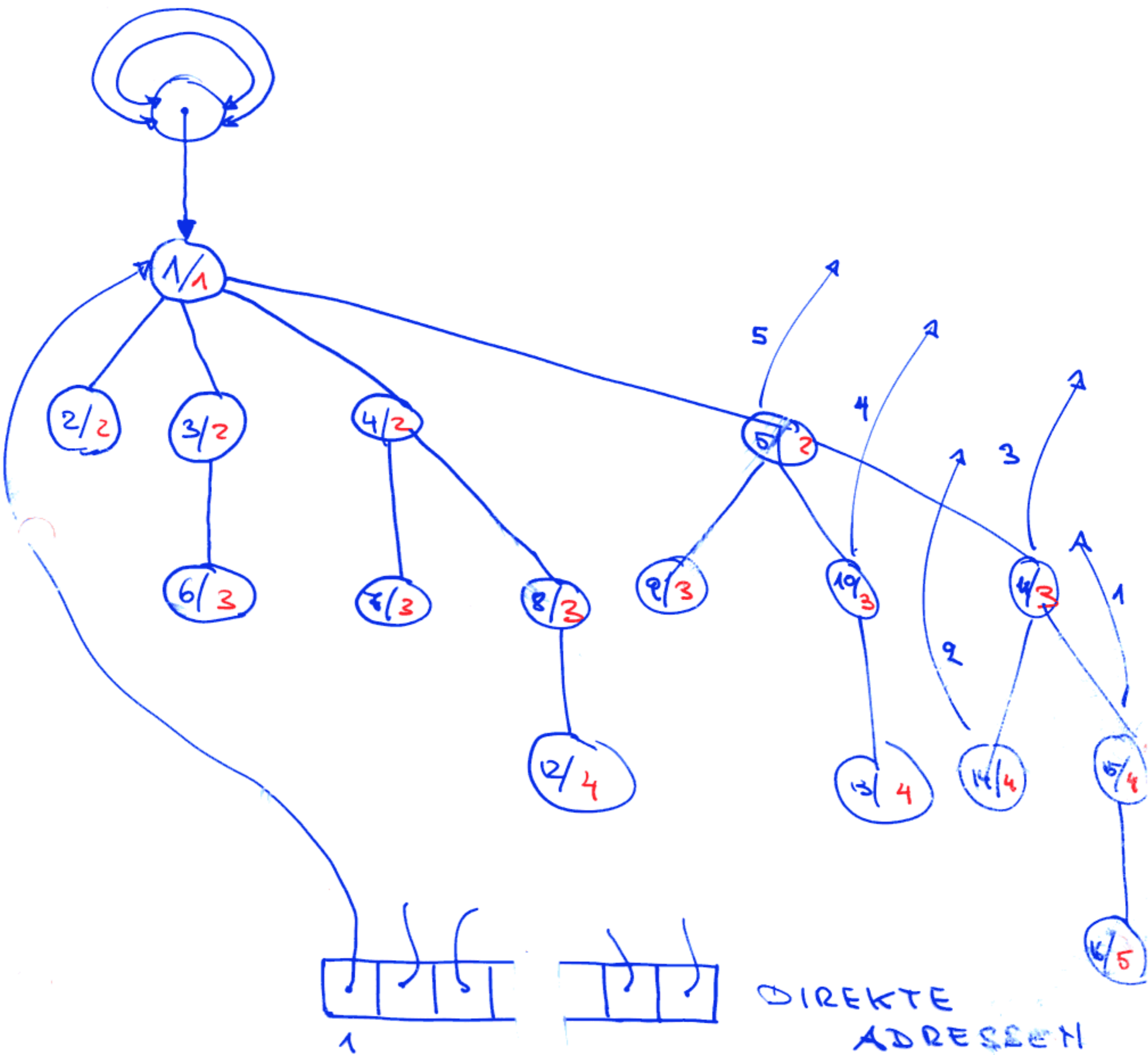


DELETE-MIN \leadsto BEWEIS VON
 SATZ 1.10 GENT
 NICHT MEHR.

PROBLEM: NICHT MEHR

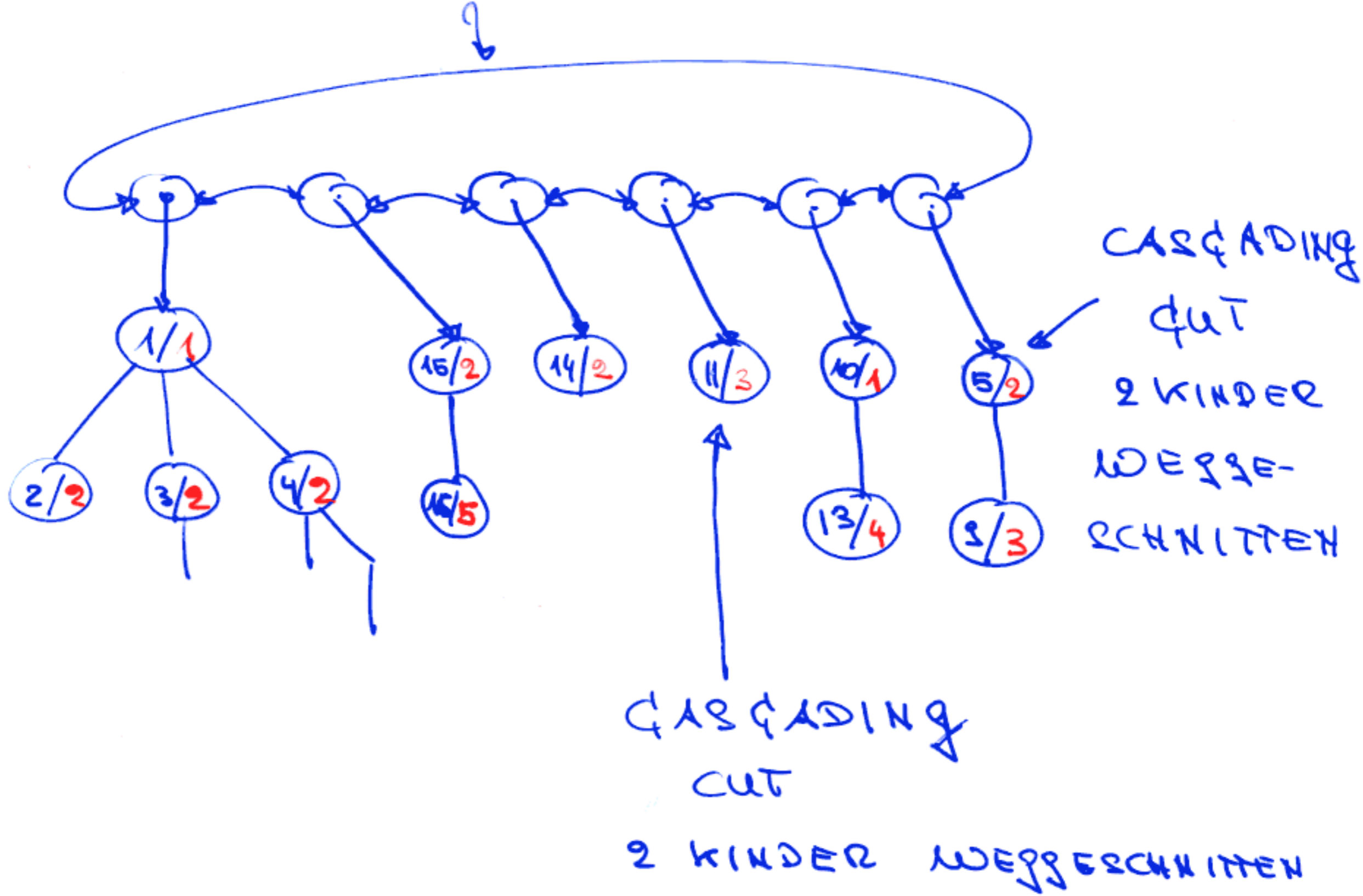
#KINDER DER WURZEL $O(\log N)$

SONDERN EHER $\Omega(N)$.

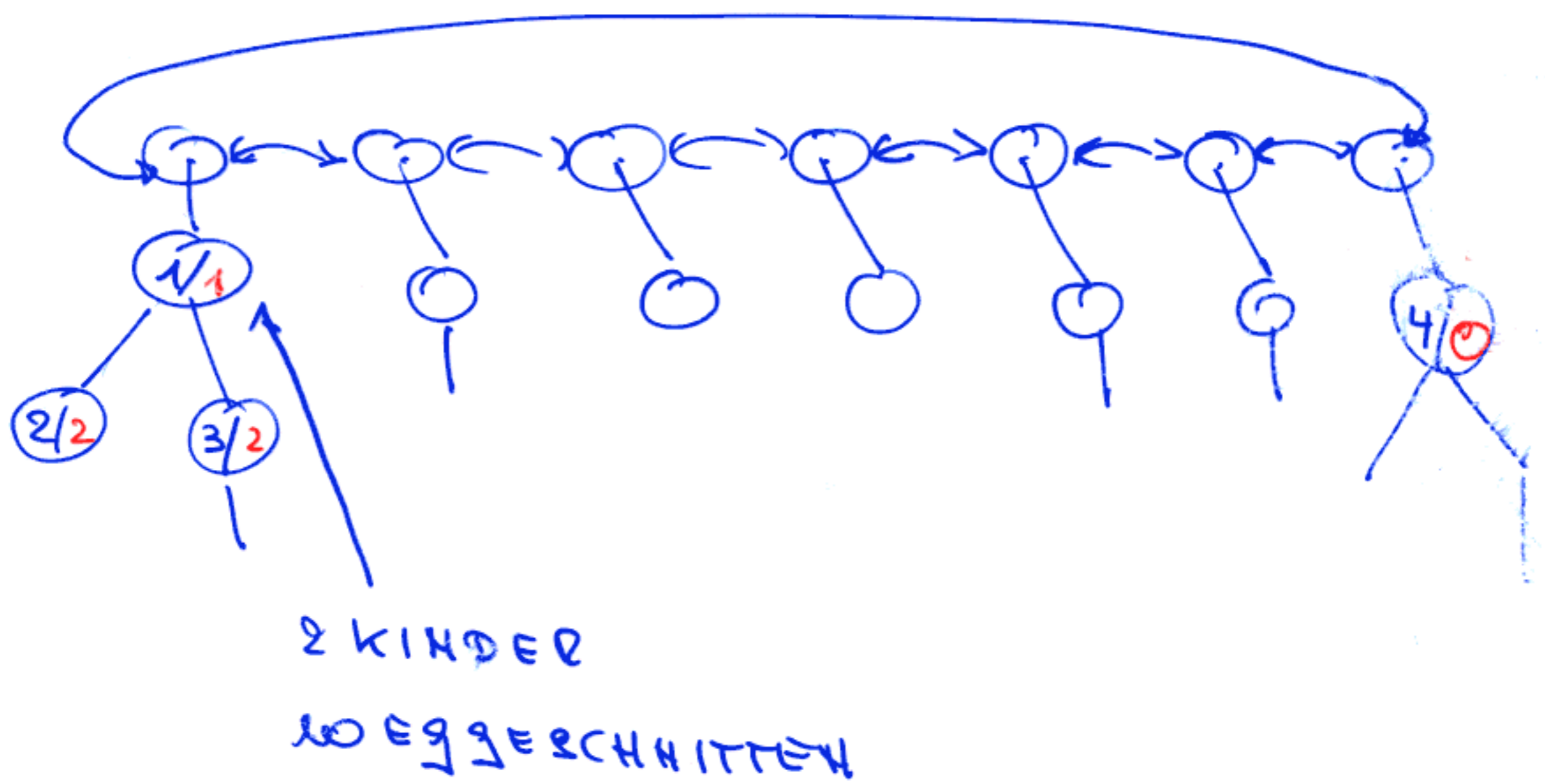


DECREASE-KEY(15, 2, k);
 DECREASE-KEY(14, 2, k);
 DECREASE-KEY(10, 1, k)

BILD 13



DECREASE-KEY(4, 0, h) ↓



KNOTEN NICHT WURZEL ⇒ MAXIMAL 1

KIND IST RAUSGESCHNITTEN.

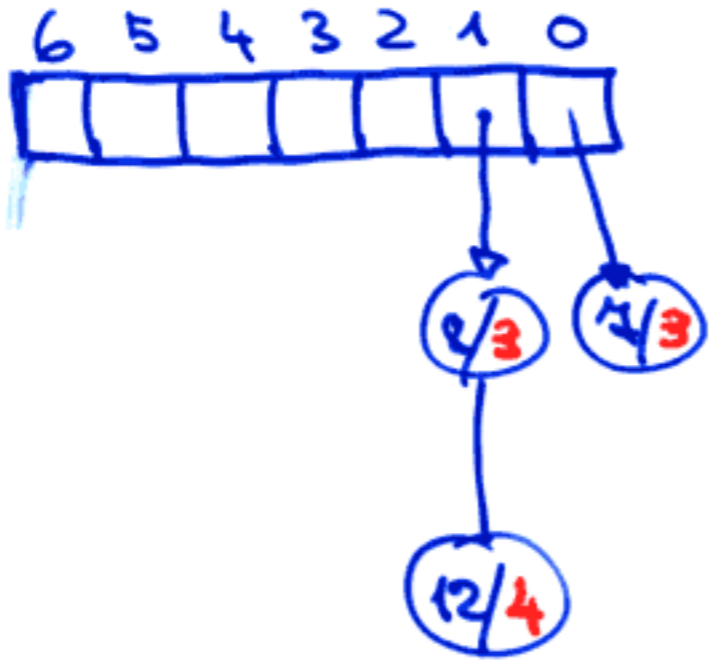
BILD 14

BEVOR ER WIEDER WURZEL WIRD.

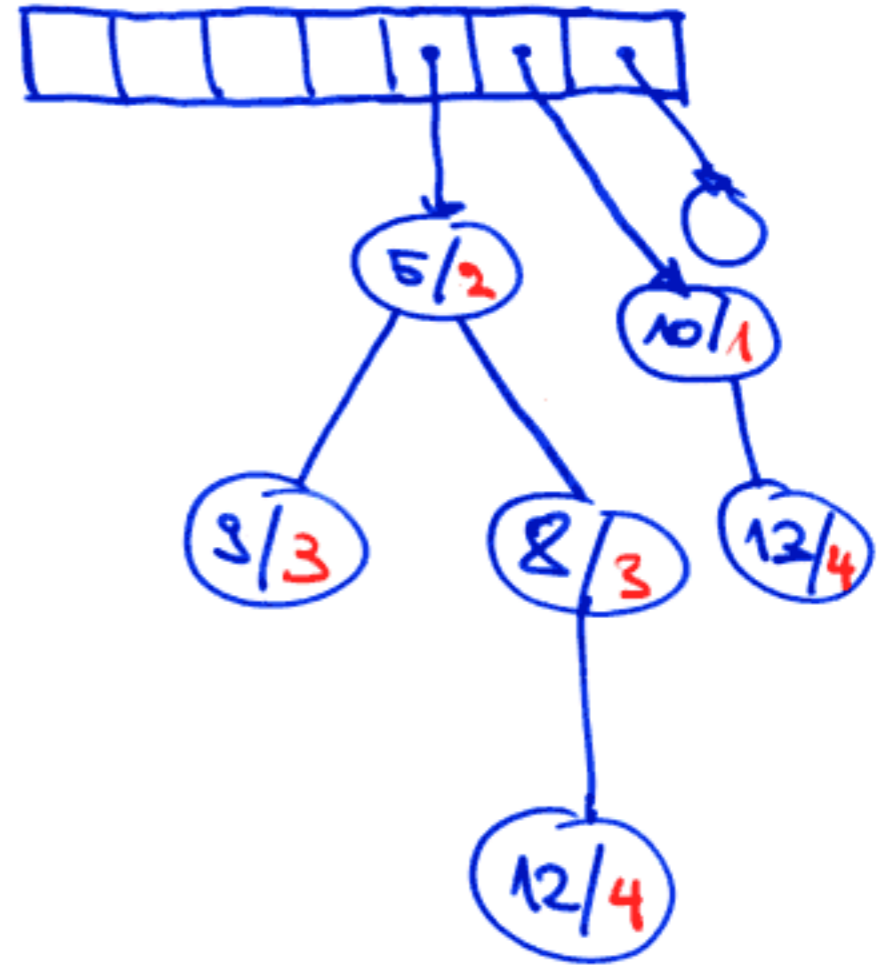
DELETEN IN



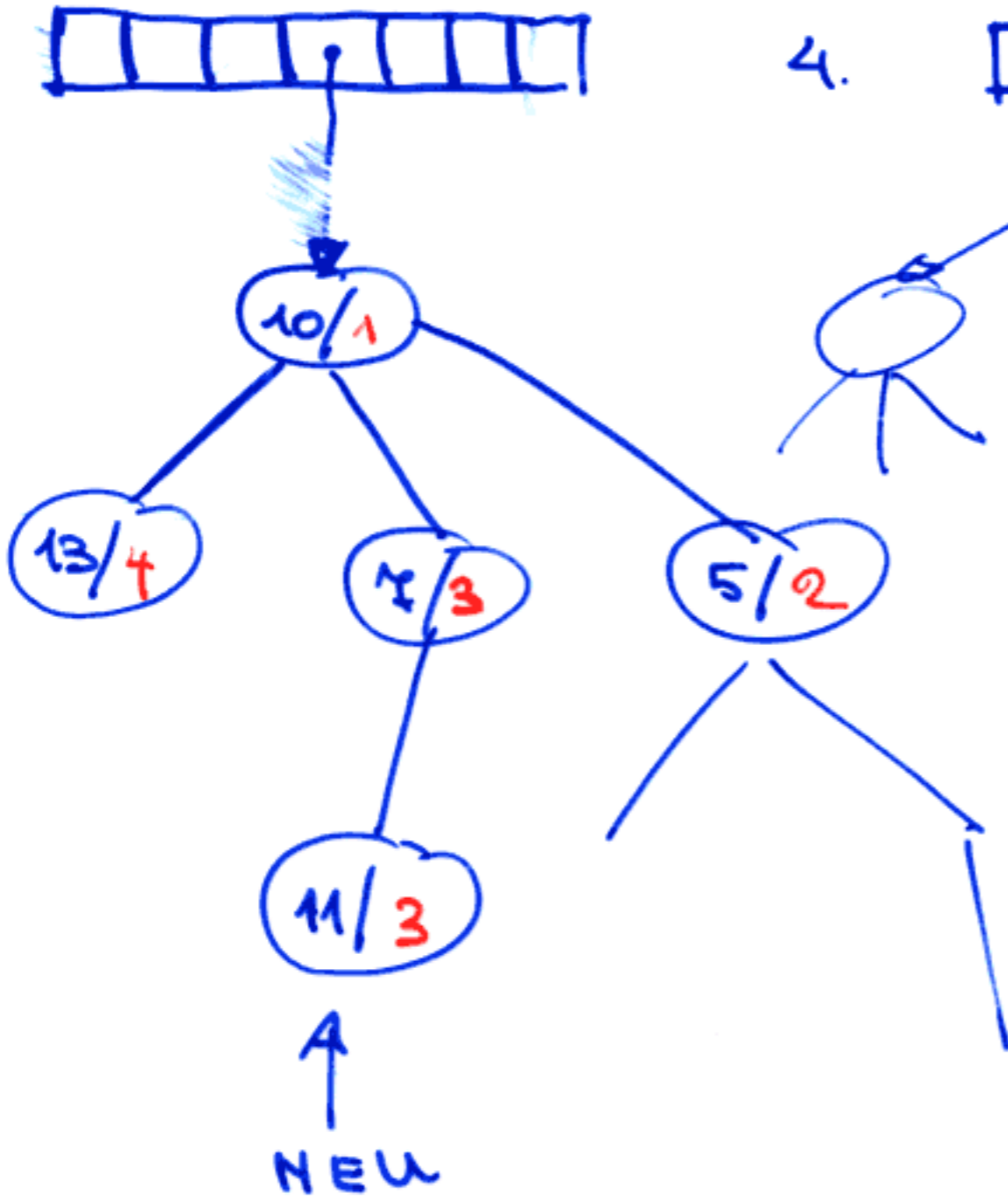
1.



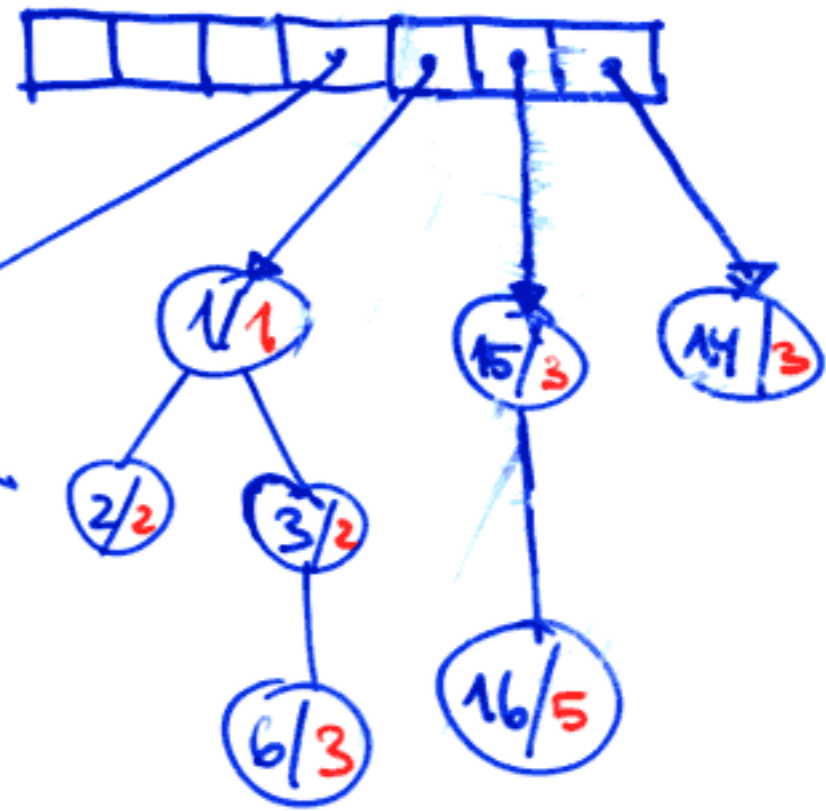
2.



3.



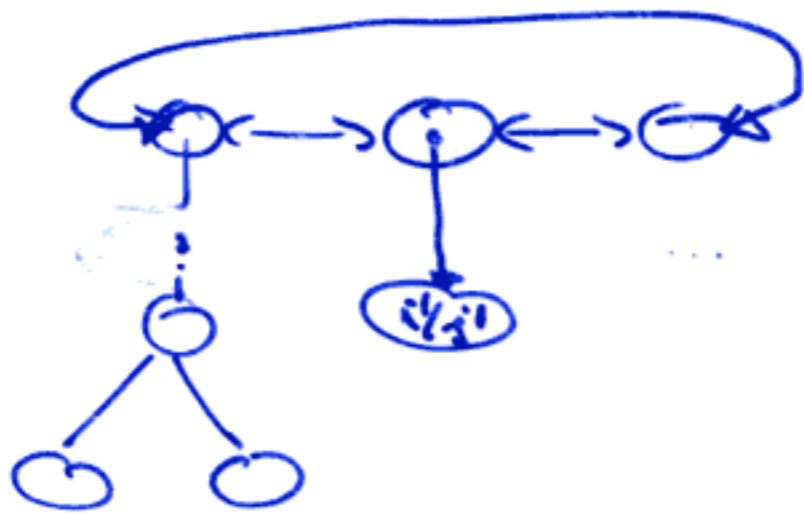
4.



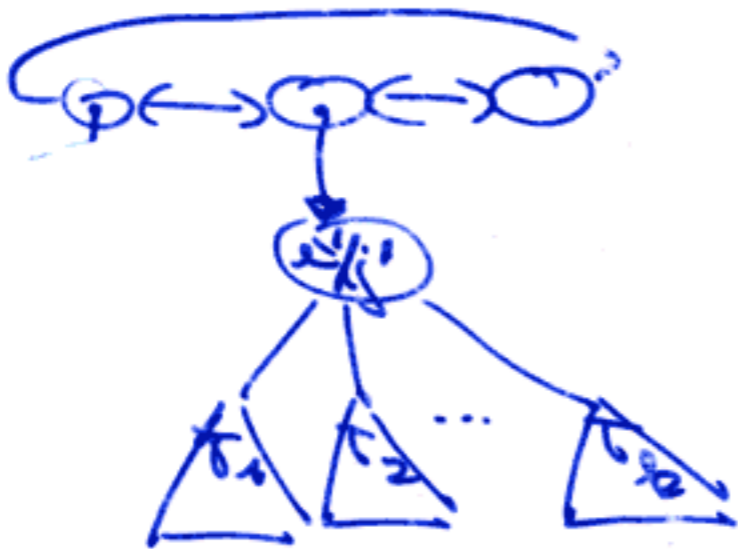
BEA.: ZUFÄLLIG
BINOMIALER
HEAP.

	EAGER B.H. w.c. amount		LAZY B.H. w.c. amount		FIB. HEAP w.c. amount	
INSERT	$O(\log m)$	$O(1)$	$O(1)$	$O(1)$	$O(1)$	$O(1)$
DELETE-MIN	$O(\log m)$	$O(\log u)$	$O(m)$	$O(\log m)$	$O(m)$	$O(\log m)$
MIN	$O(1)$	$O(1)$	$O(1)$	$O(1)$	$O(1)$	$O(1)$
DECREASE-KEY	$O(\log m)$	$O(\log m)$	$O(\log m)$	$O(\log m)$	$O(m)$	$O(1)$
DEL	-	-	-	-	$O(m)$	$O(1)$

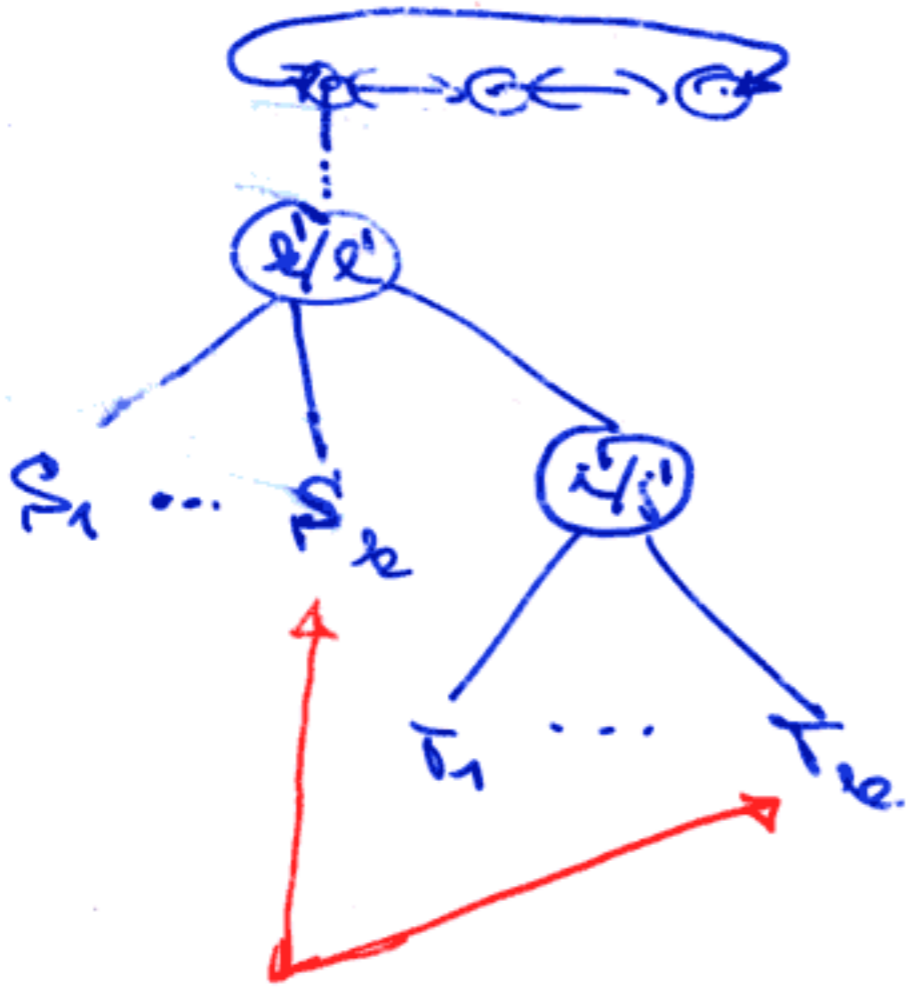
WIE WIRD EIN KNOTEN MARKIERT?



LINKS

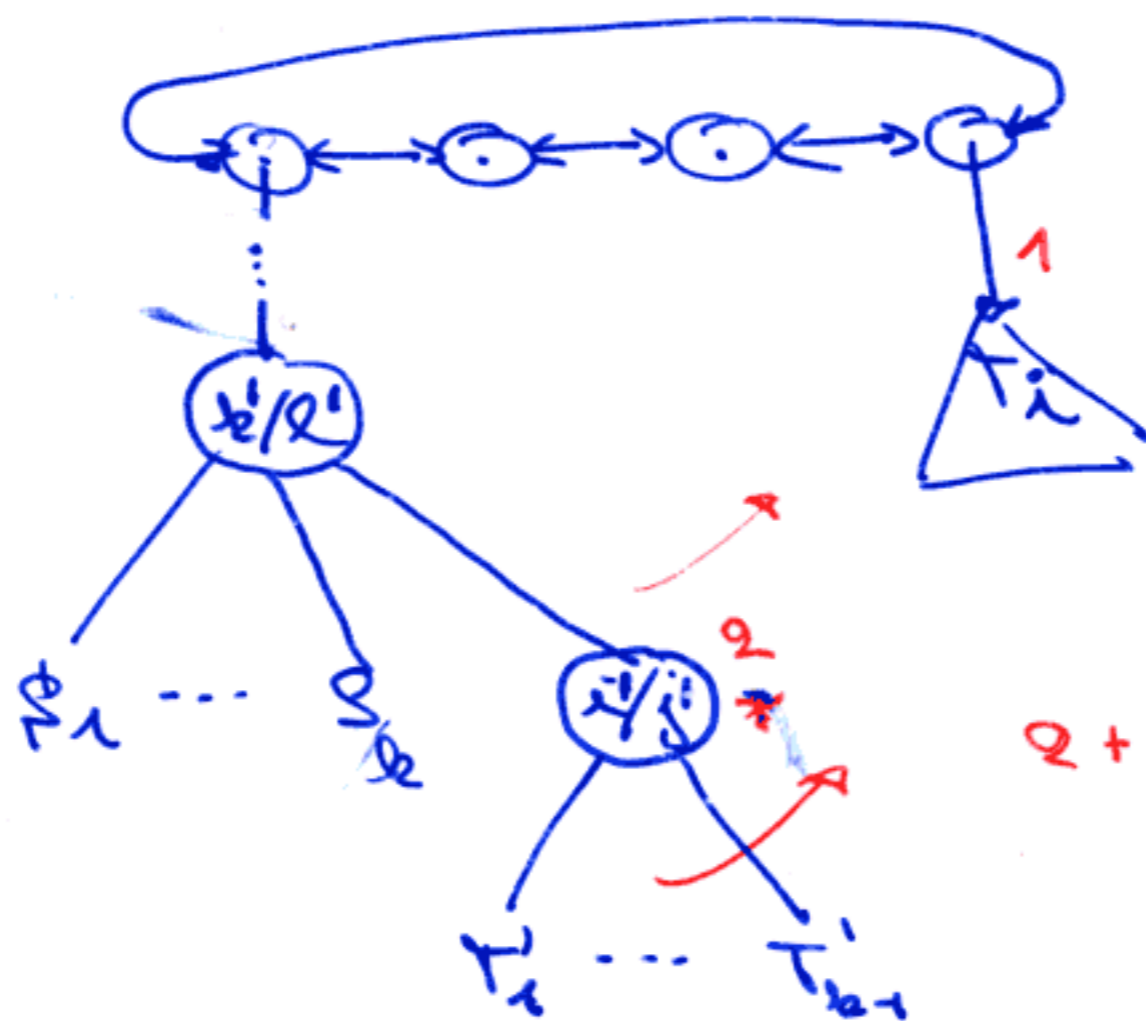


LINK, WOO (i/j) NACH UNTEN GEHT



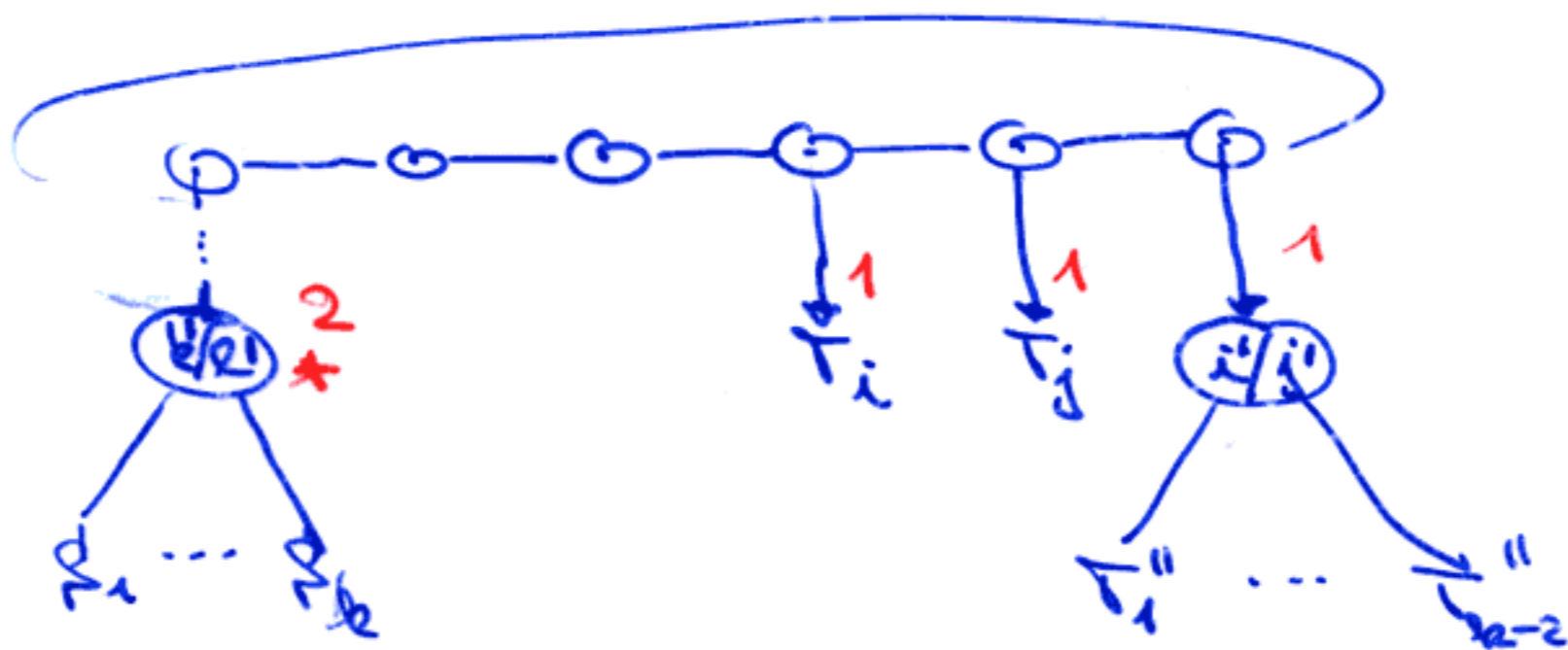
GLEICHE #KINDER BEI LINK.

↓ CUT VON T_i



$2+1$ ZUSÄTZLICH ZÄHLEN.

↓ CUT VON T_j



$2+1$ ZUSÄTZLICH

CASCADING CUT:

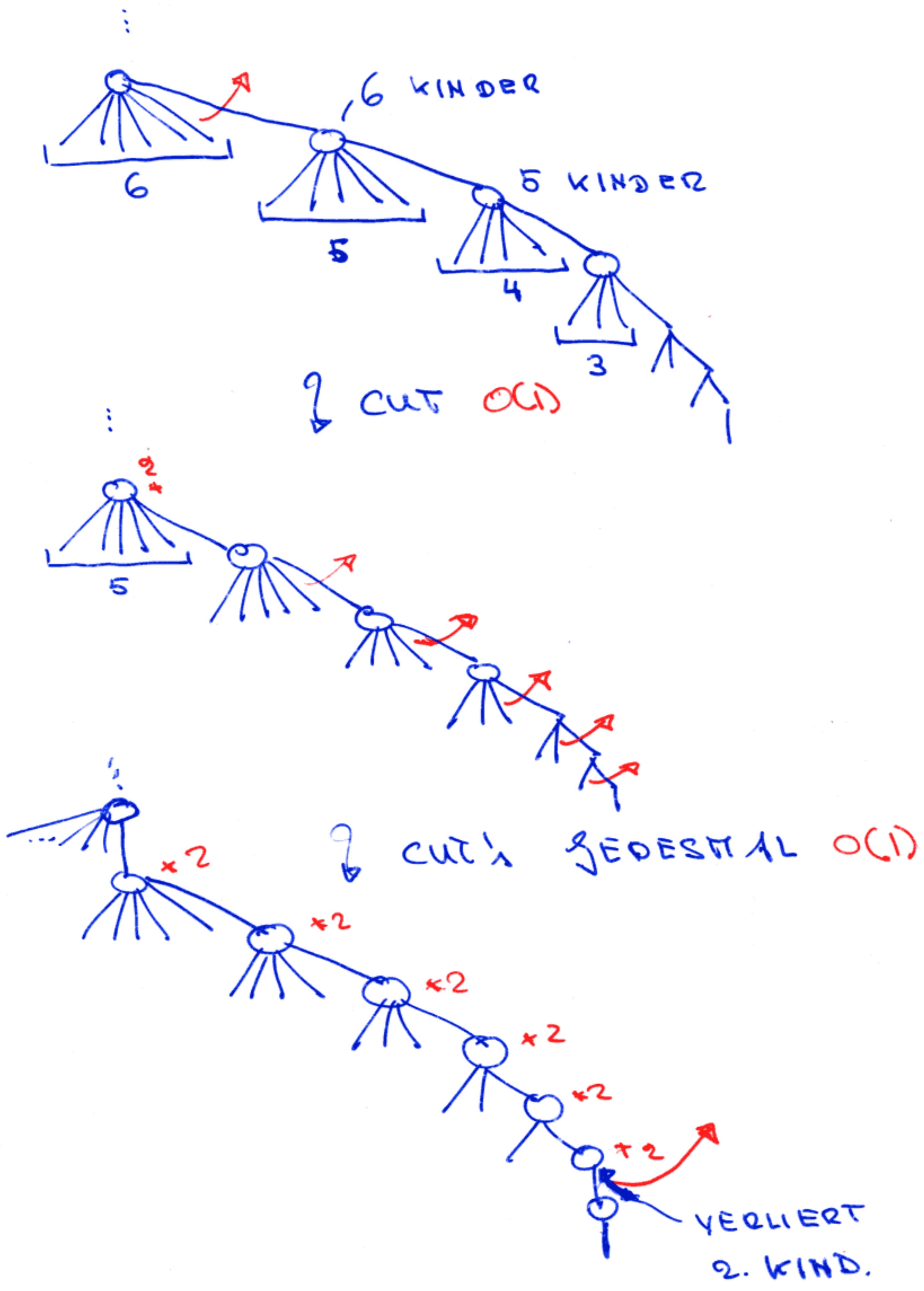
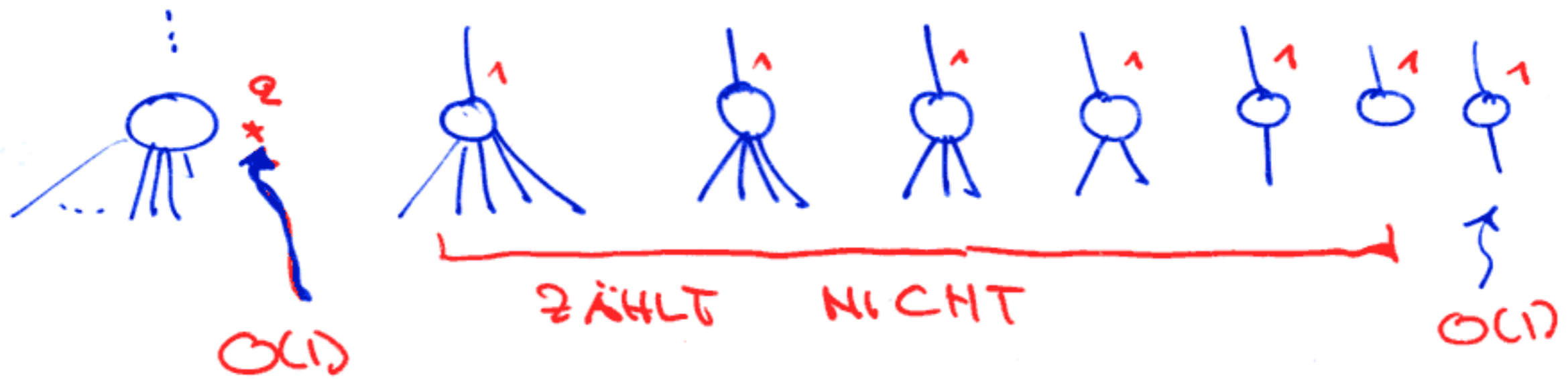


BILD 19

↓ CUT ZÄHLEN $O(1)$



ERGÄNZUNGEN:

WIRD EIN KNOTEN WURZEL, SO VERLIERT ER DIE MARKIERUNG.

KNOTEN MARKIERT

⇒

ZWISCHEN LINK UND CUT MIT DEM KNOTEN WIRD 1 KIND WEGGESCHNITTEN.

KNOTEN KANN MEHRERE KINDER VERLIEREN. IST DANN ZWISCHENDURCH WURZEL.