

Vario-scale data: developments in the server side

Technical University of Delft
GIS-technology section

MobiMap Consortium meeting

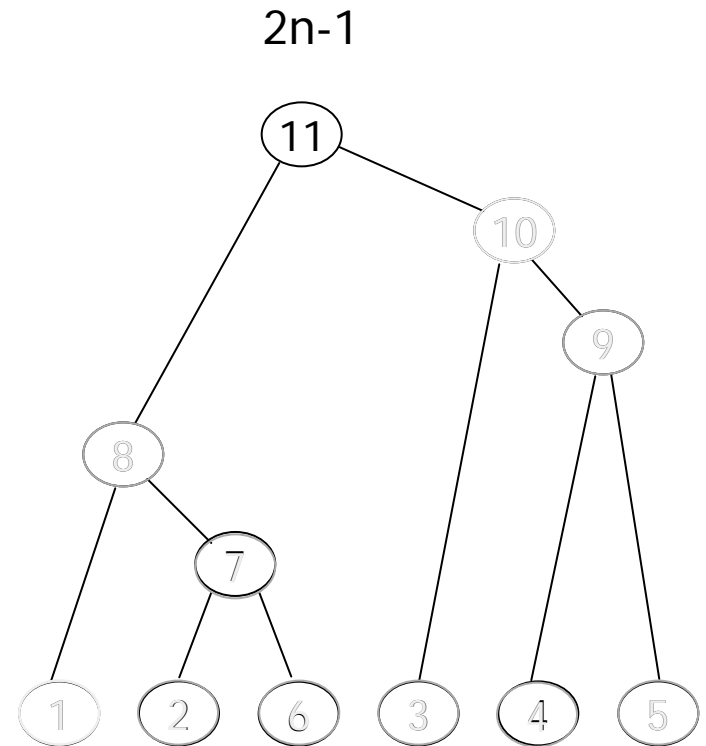
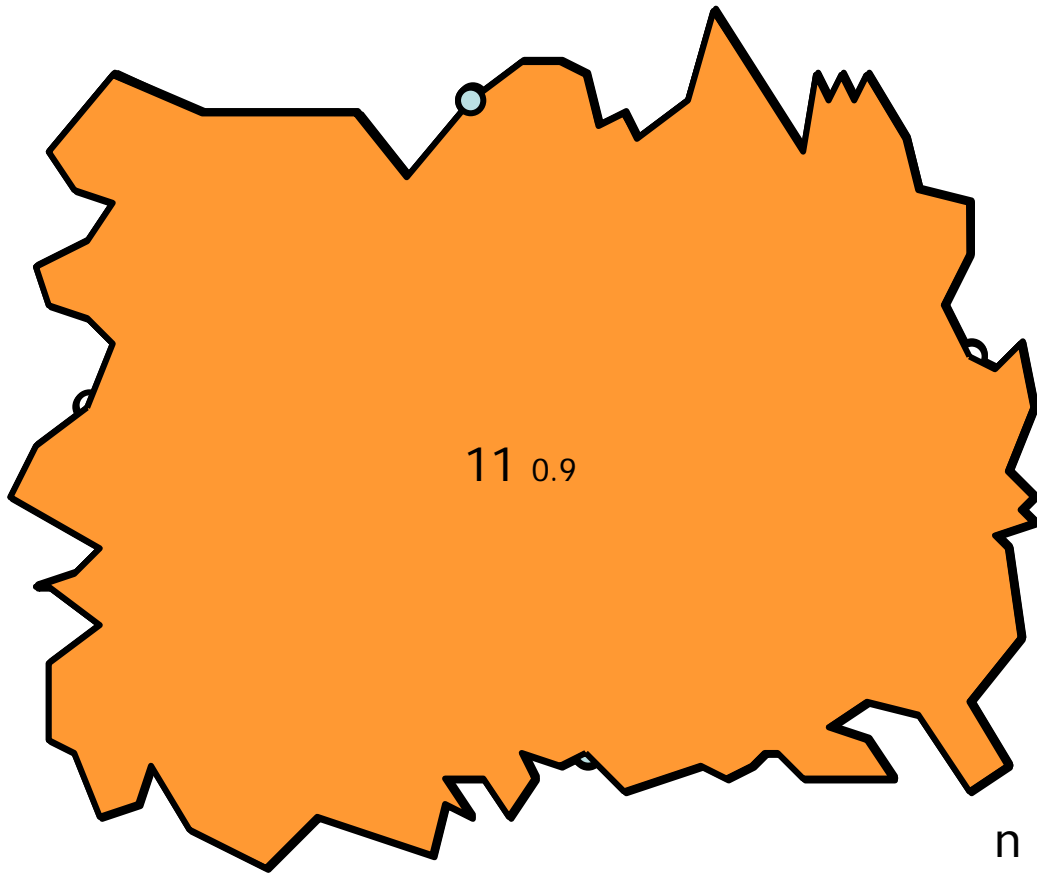
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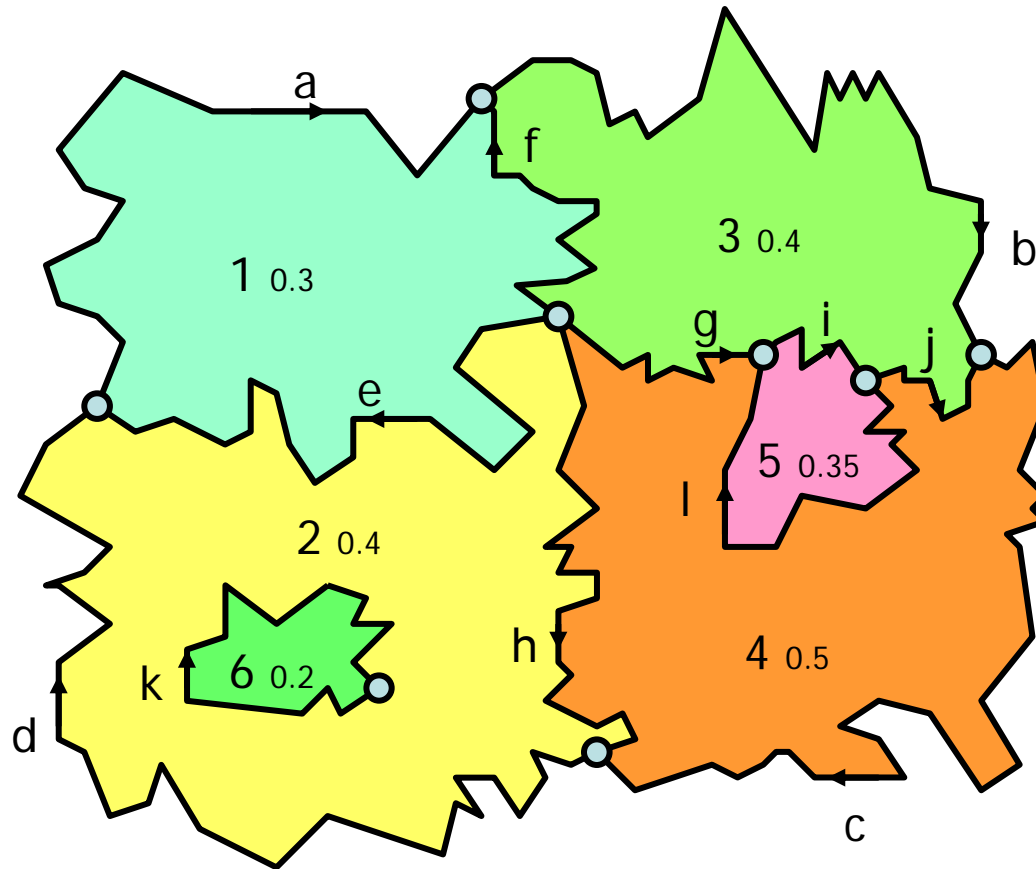
1. Background tGAP structure
2. Results from first implementation
3. Changes and additions

tGAP face tree

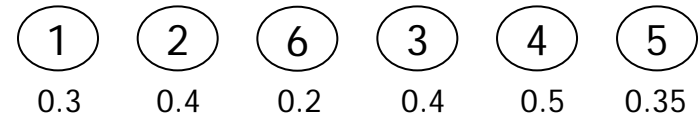


Constructing tGAP face tree

Step 0

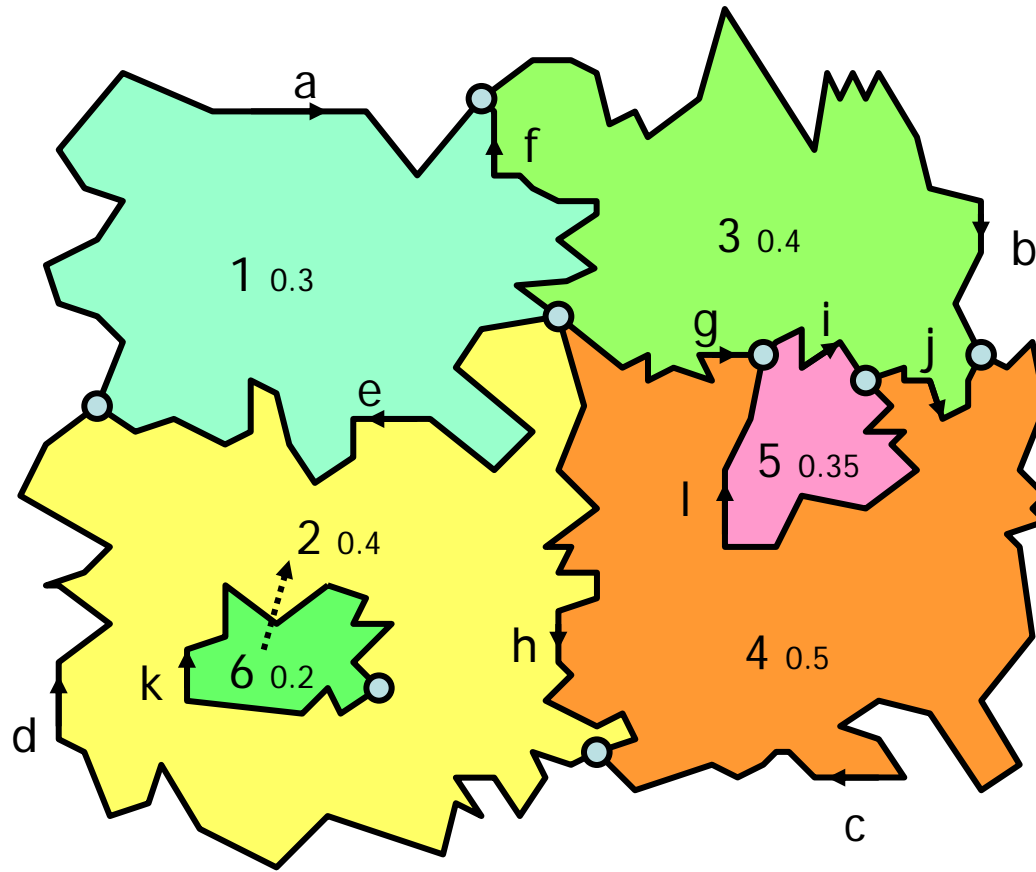


$$\text{Importance}(u) = \text{Area}(u) * \text{Class-Weight}(u)$$



Constructing tGAP face tree

Step 1

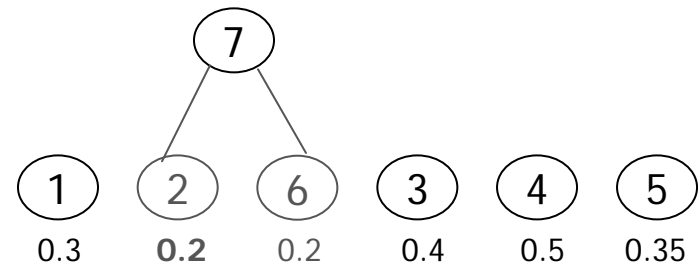
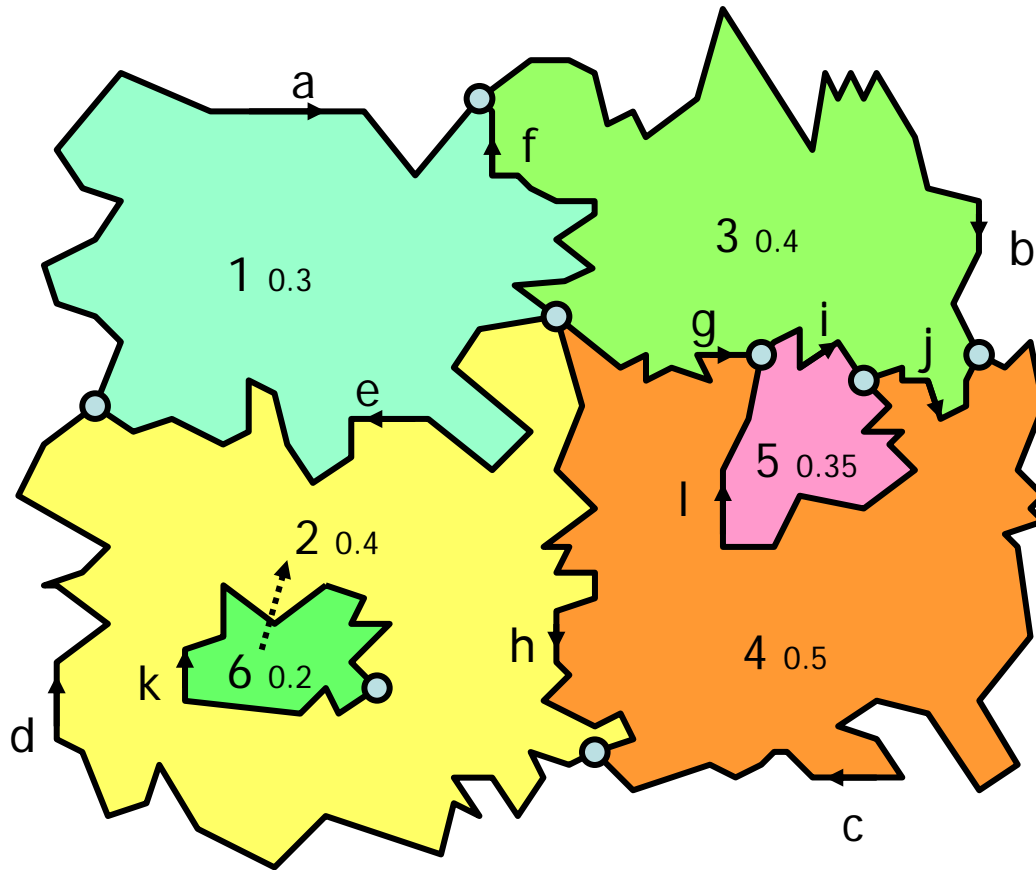


$$\text{Comp}(u,v) = \text{Length}(\text{Bnd}(u,v)) * \text{Class-Similarity}(u,v)$$

- | | | | | | |
|-----|-----|-----|-----|-----|------|
| ① | ② | ⑥ | ③ | ④ | ⑤ |
| 0.3 | 0.4 | 0.2 | 0.4 | 0.5 | 0.35 |

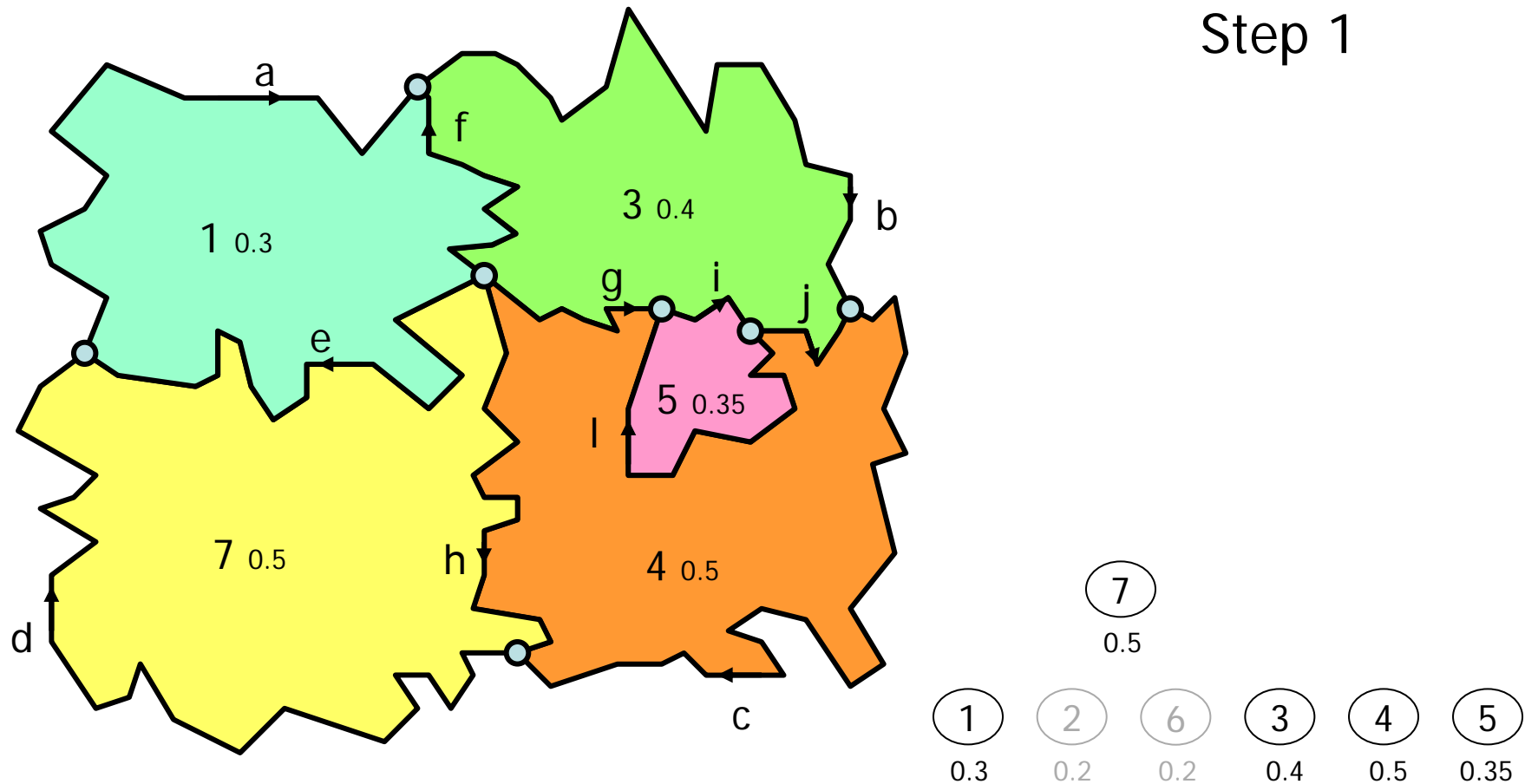
Constructing tGAP face tree

Step 1



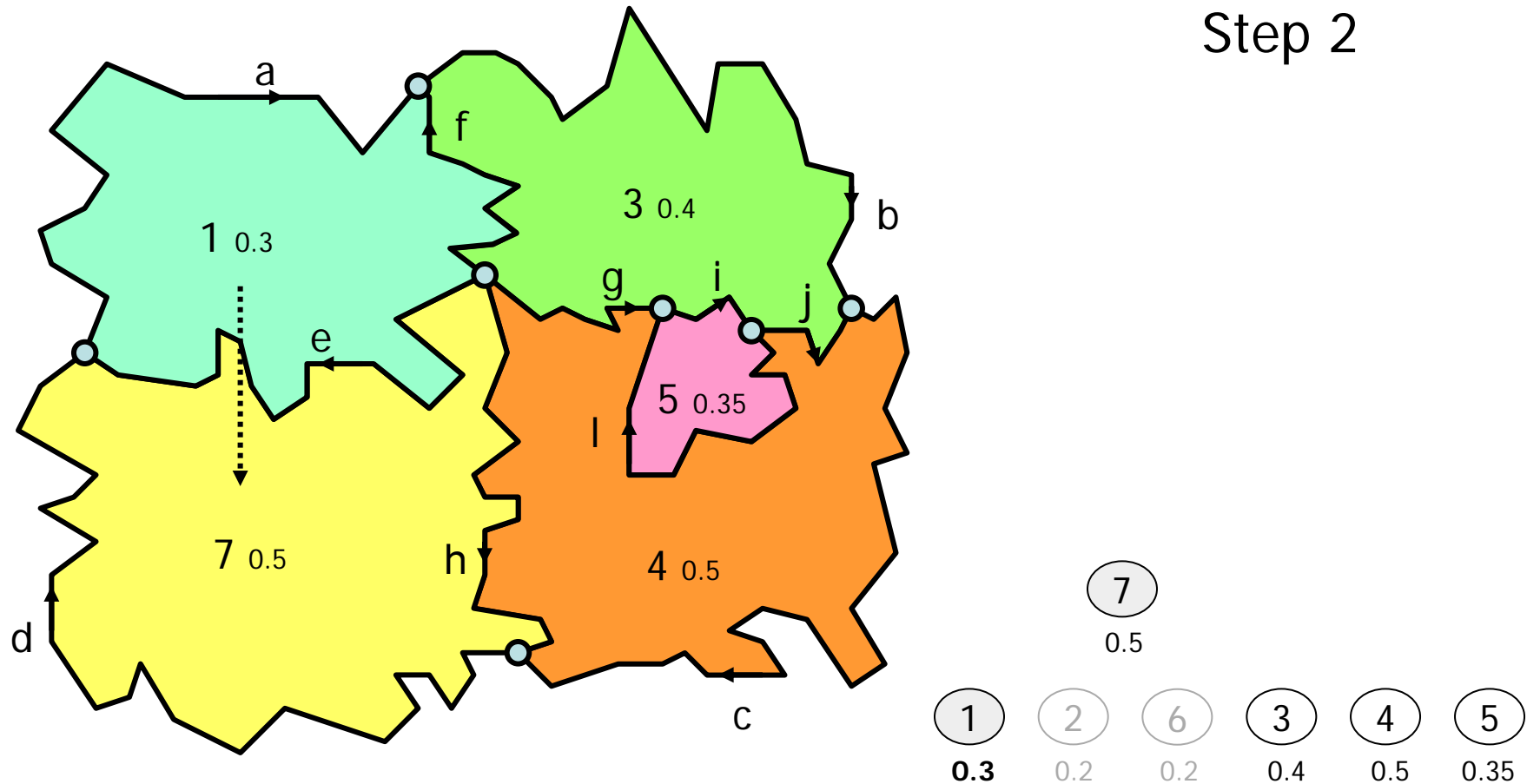
Constructing tGAP face tree

Step 1



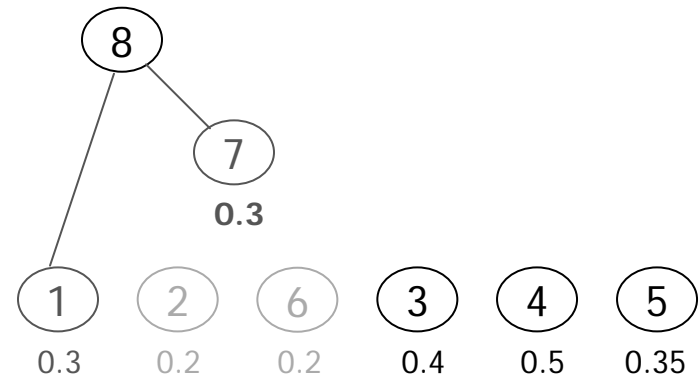
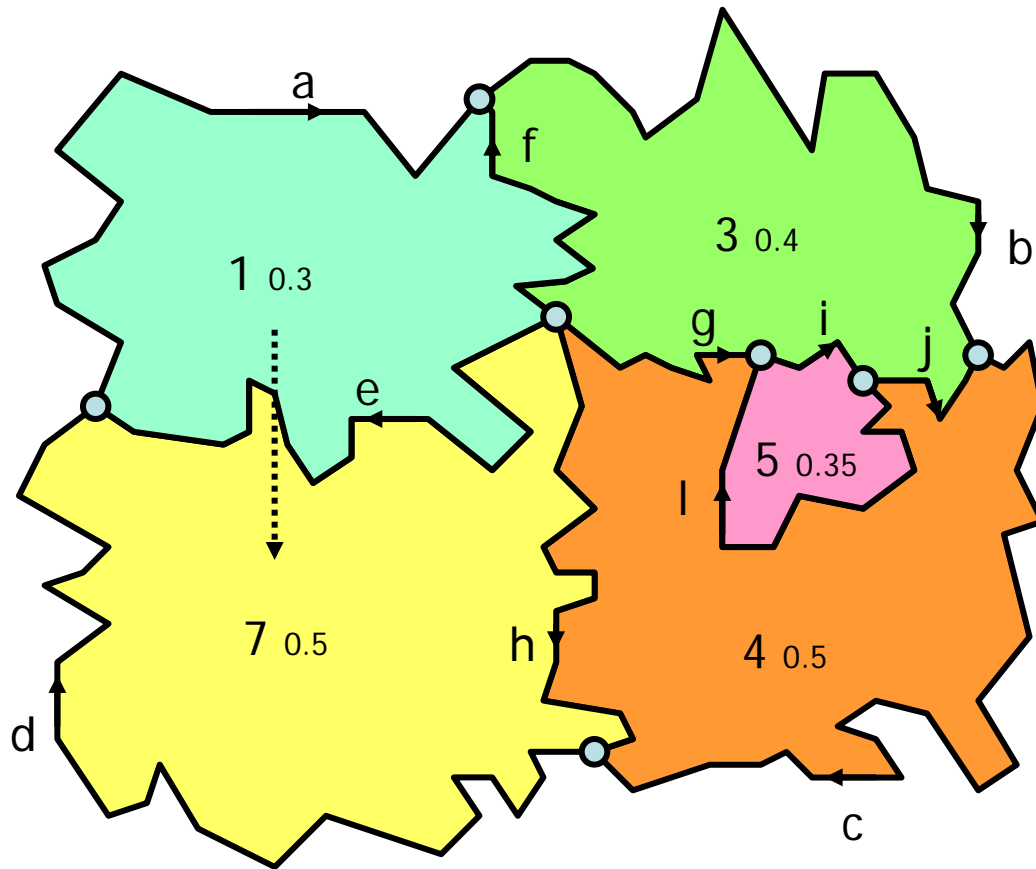
Constructing tGAP face tree

Step 2



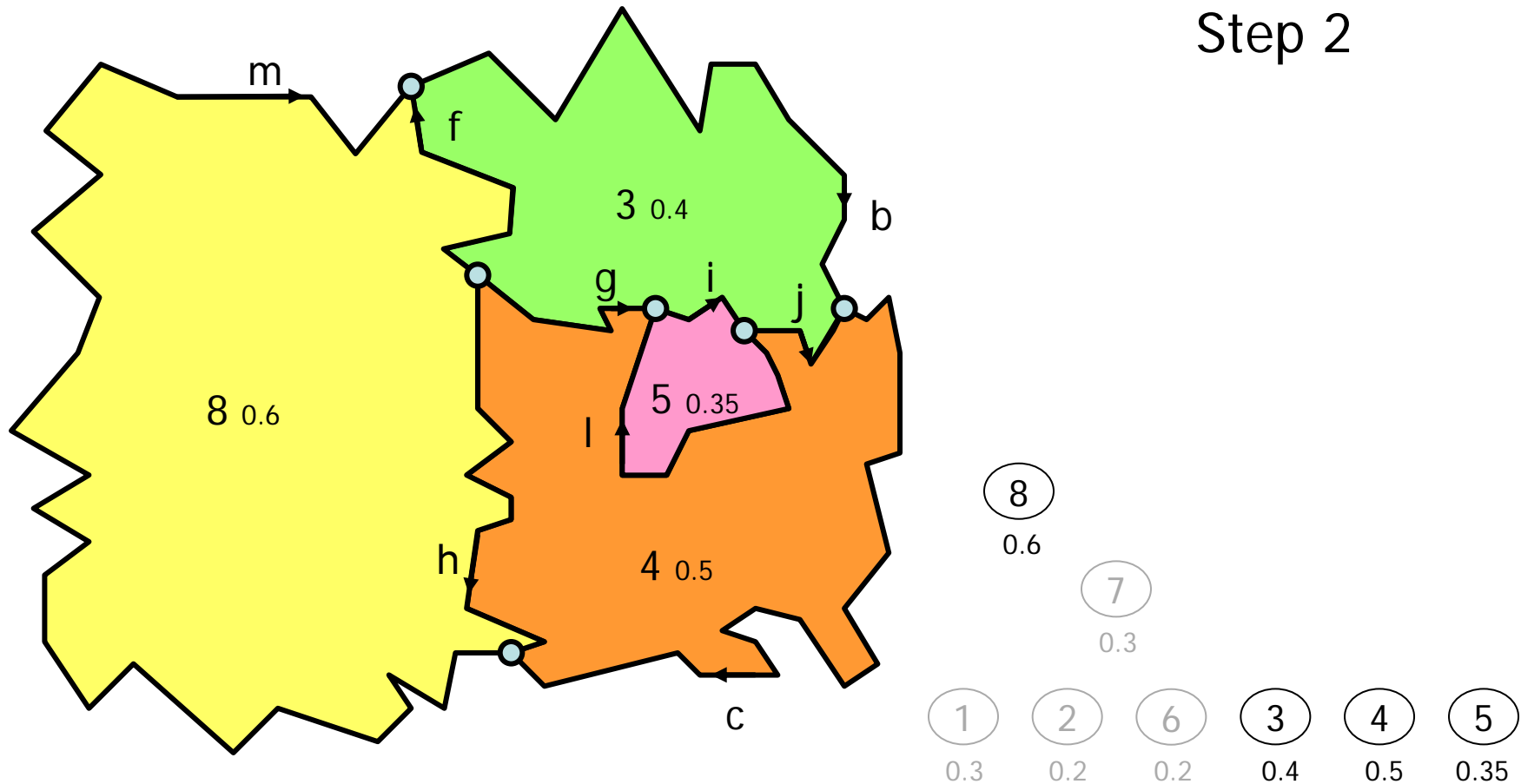
Constructing tGAP face tree

Step 2



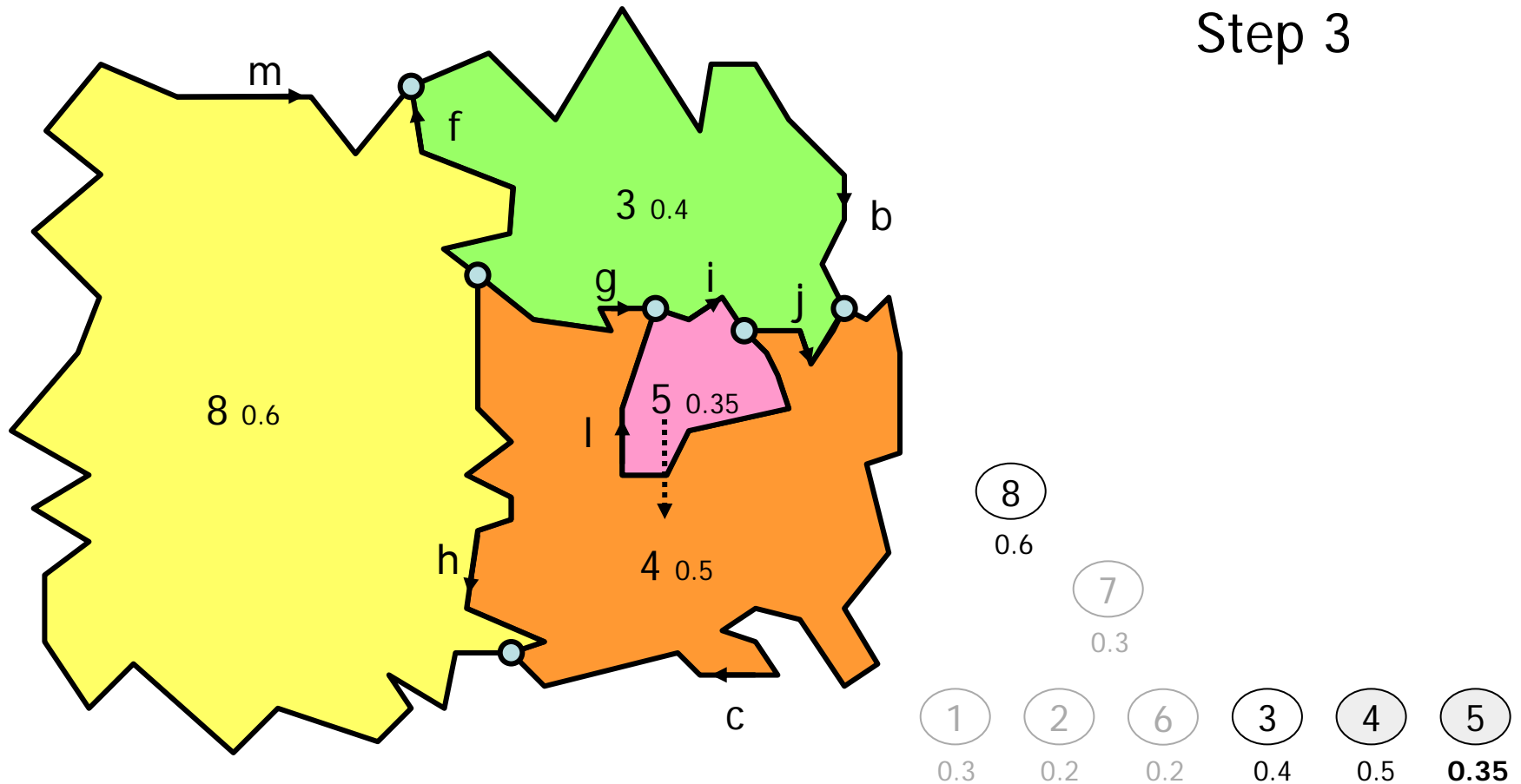
Constructing tGAP face tree

Step 2



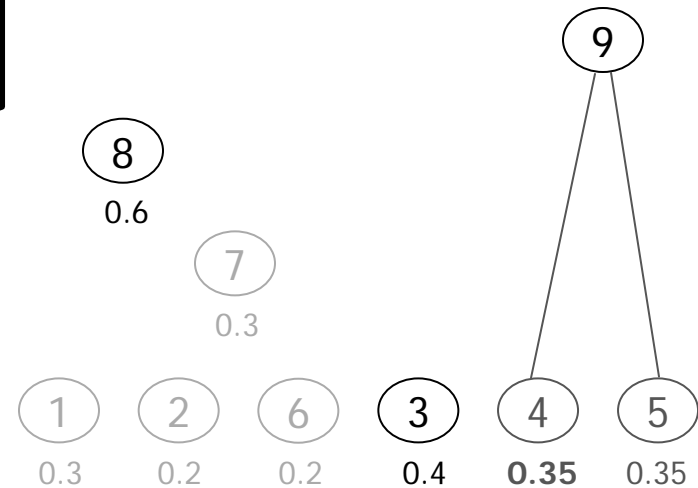
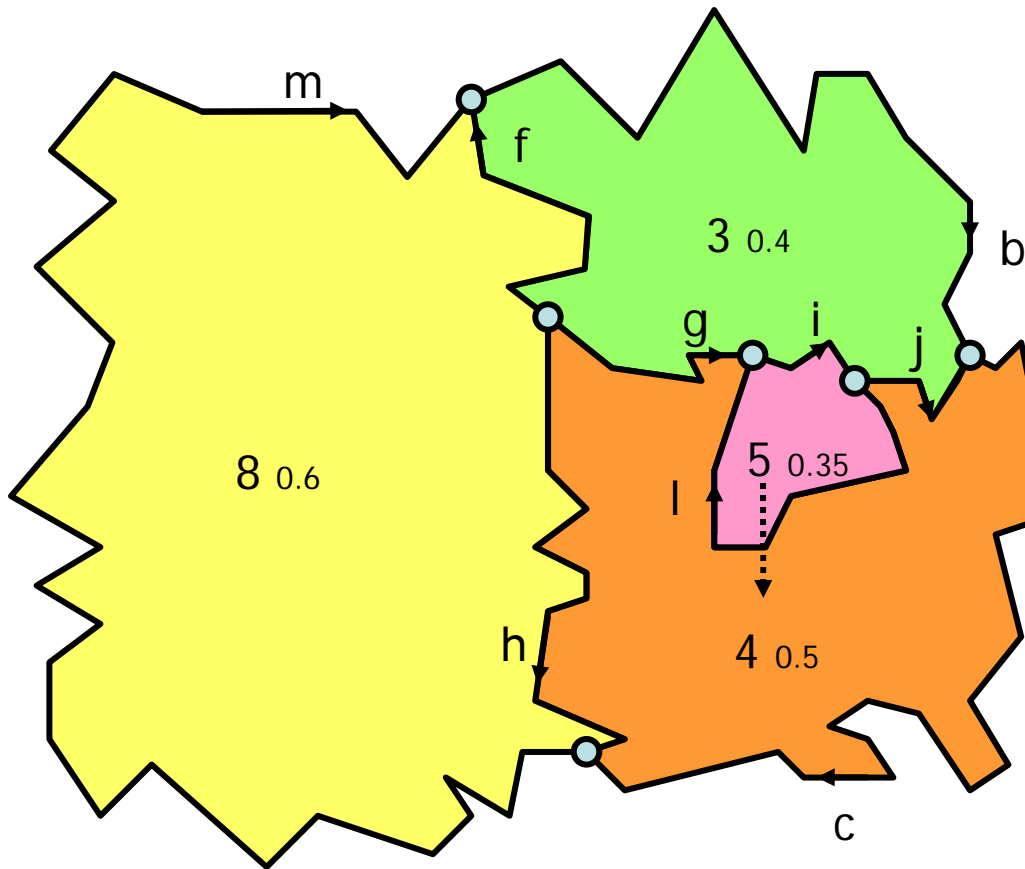
Constructing tGAP face tree

Step 3



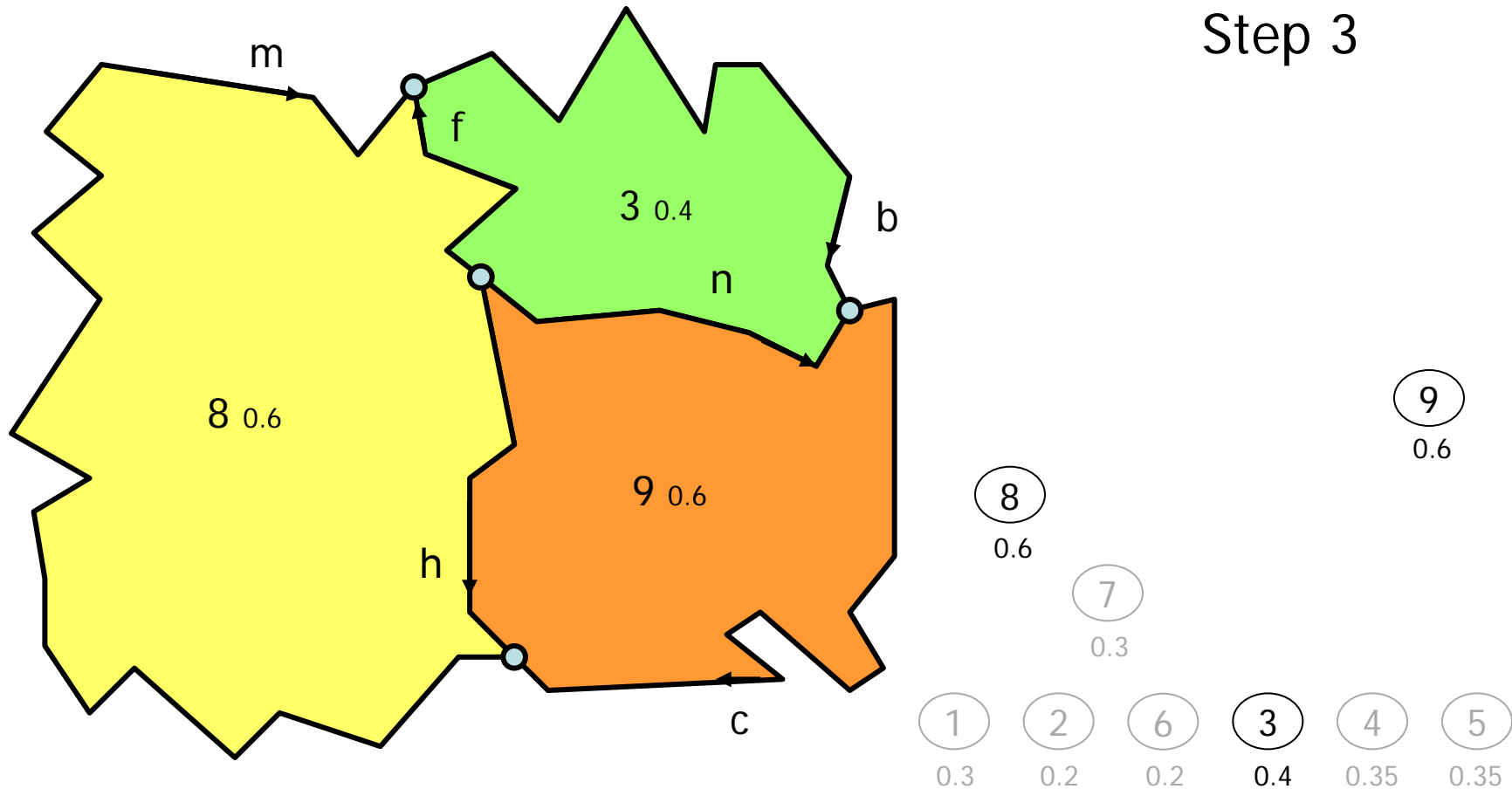
Constructing tGAP face tree

Step 3



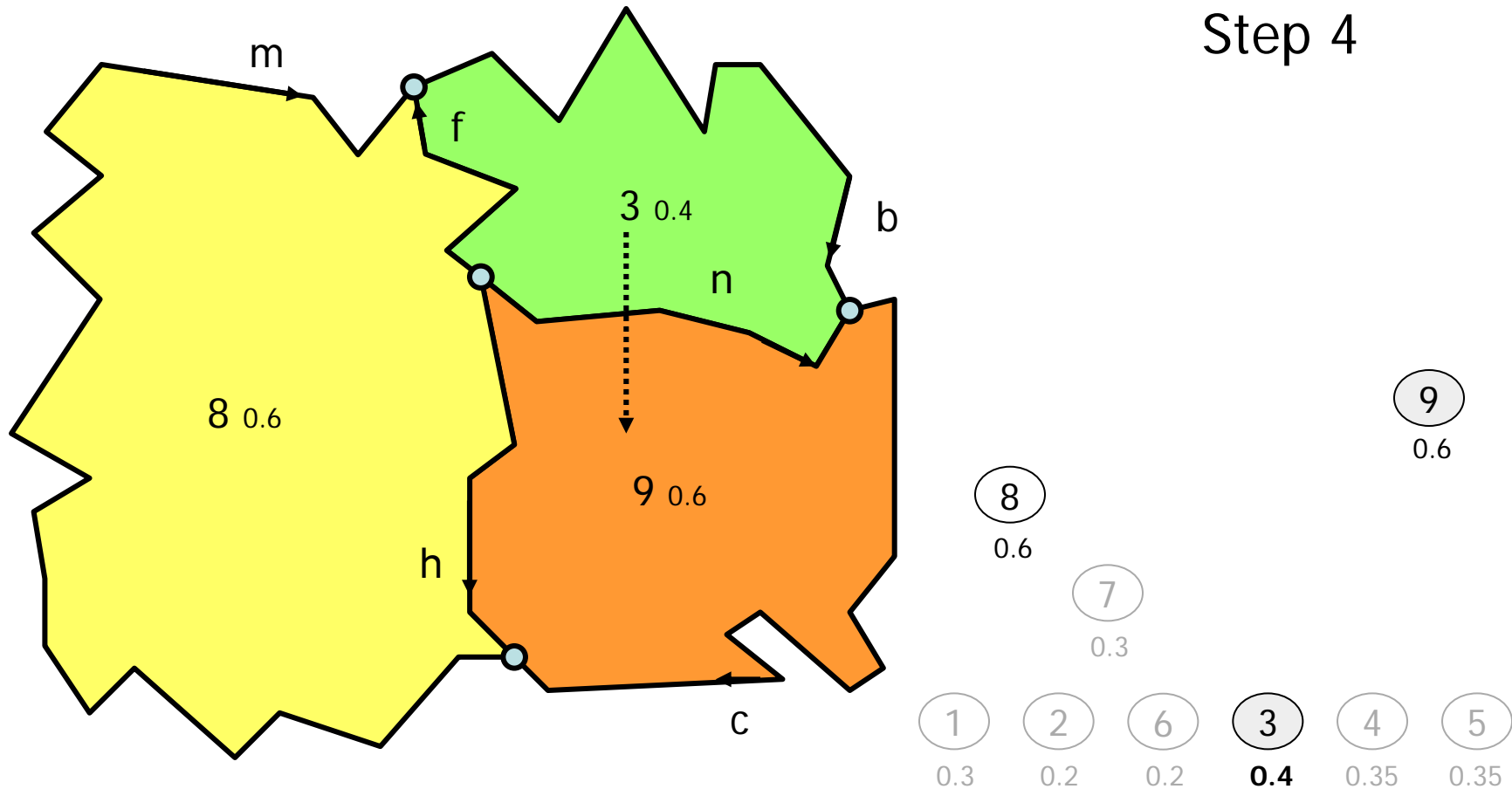
Constructing tGAP face tree

Step 3

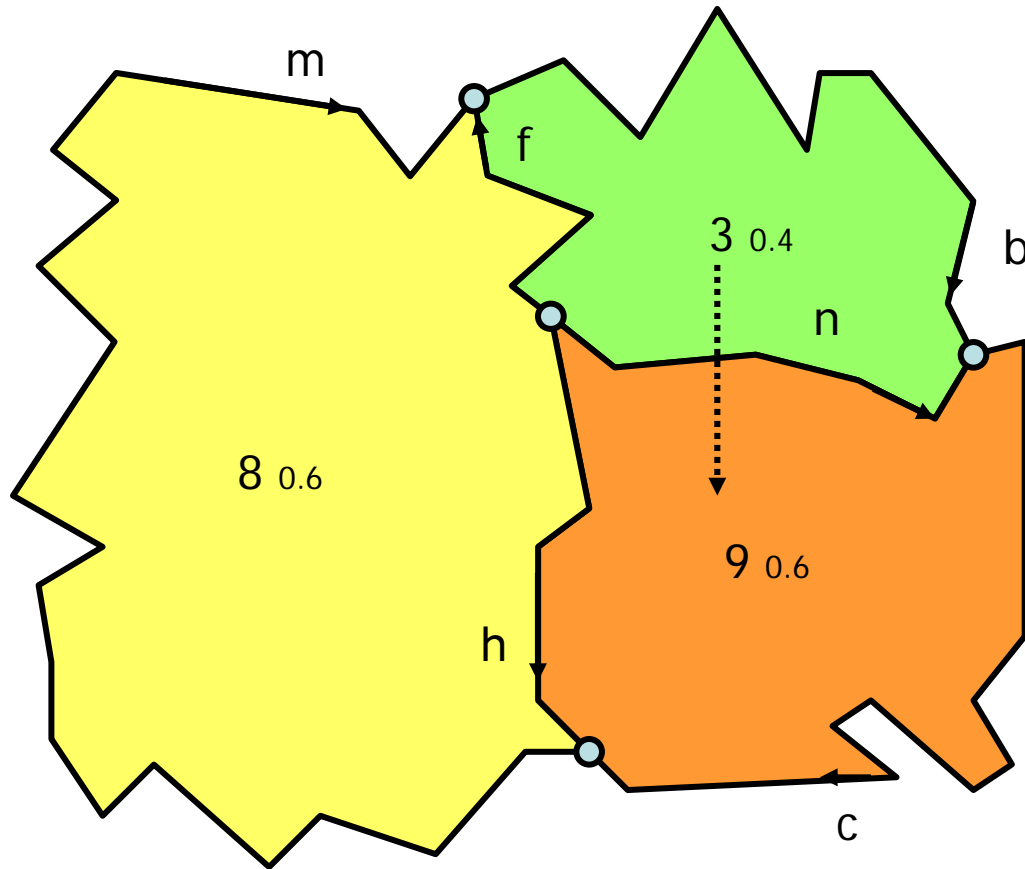


Constructing tGAP face tree

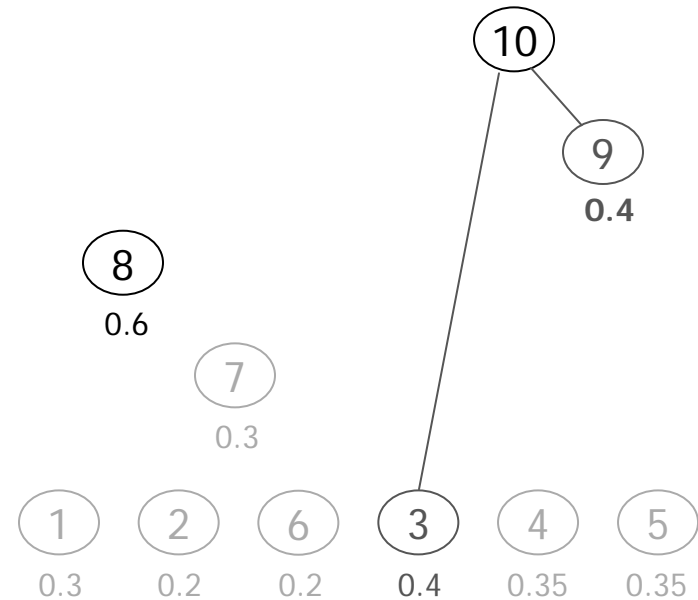
Step 4



Constructing tGAP face tree

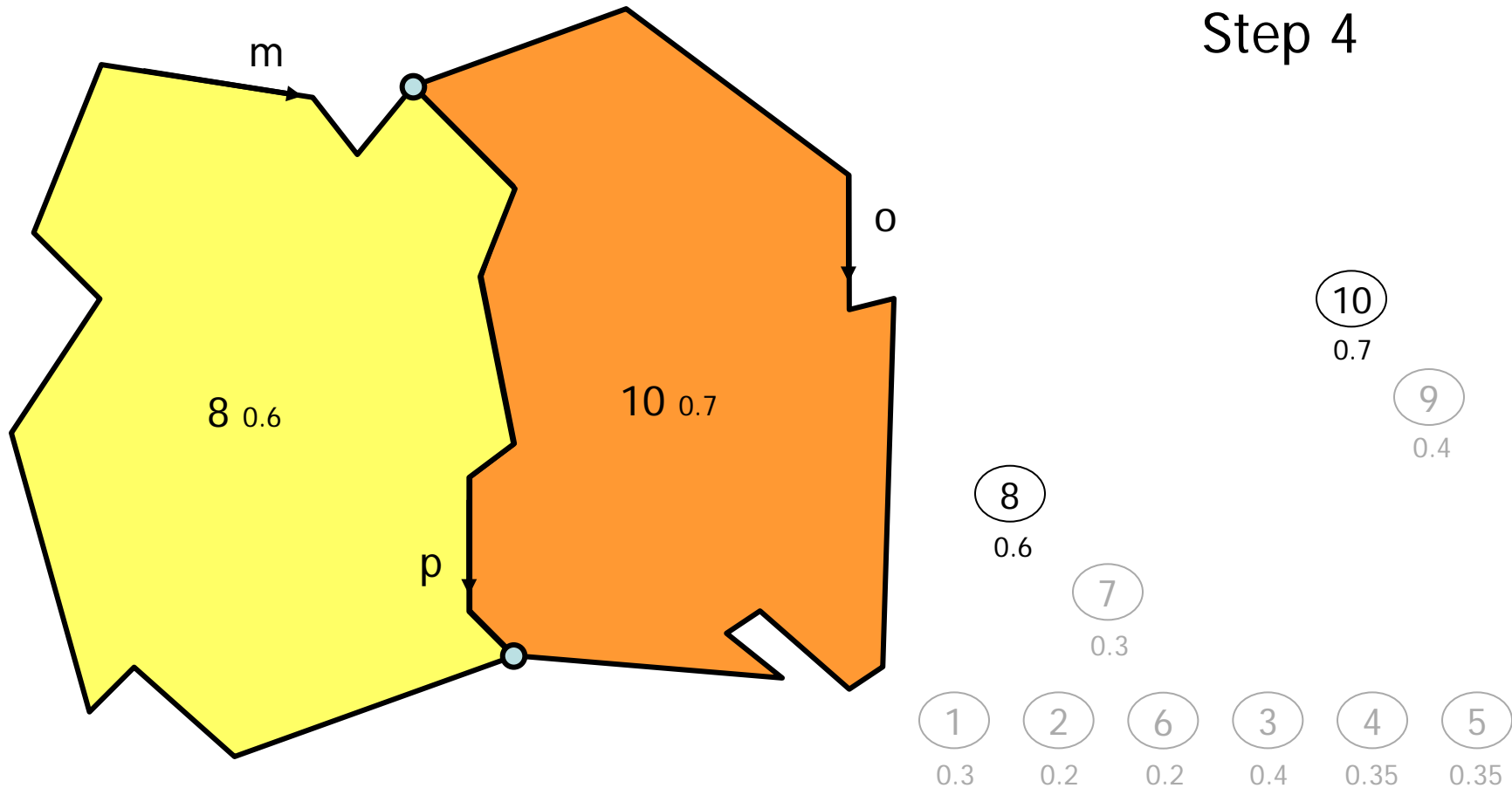


Step 4



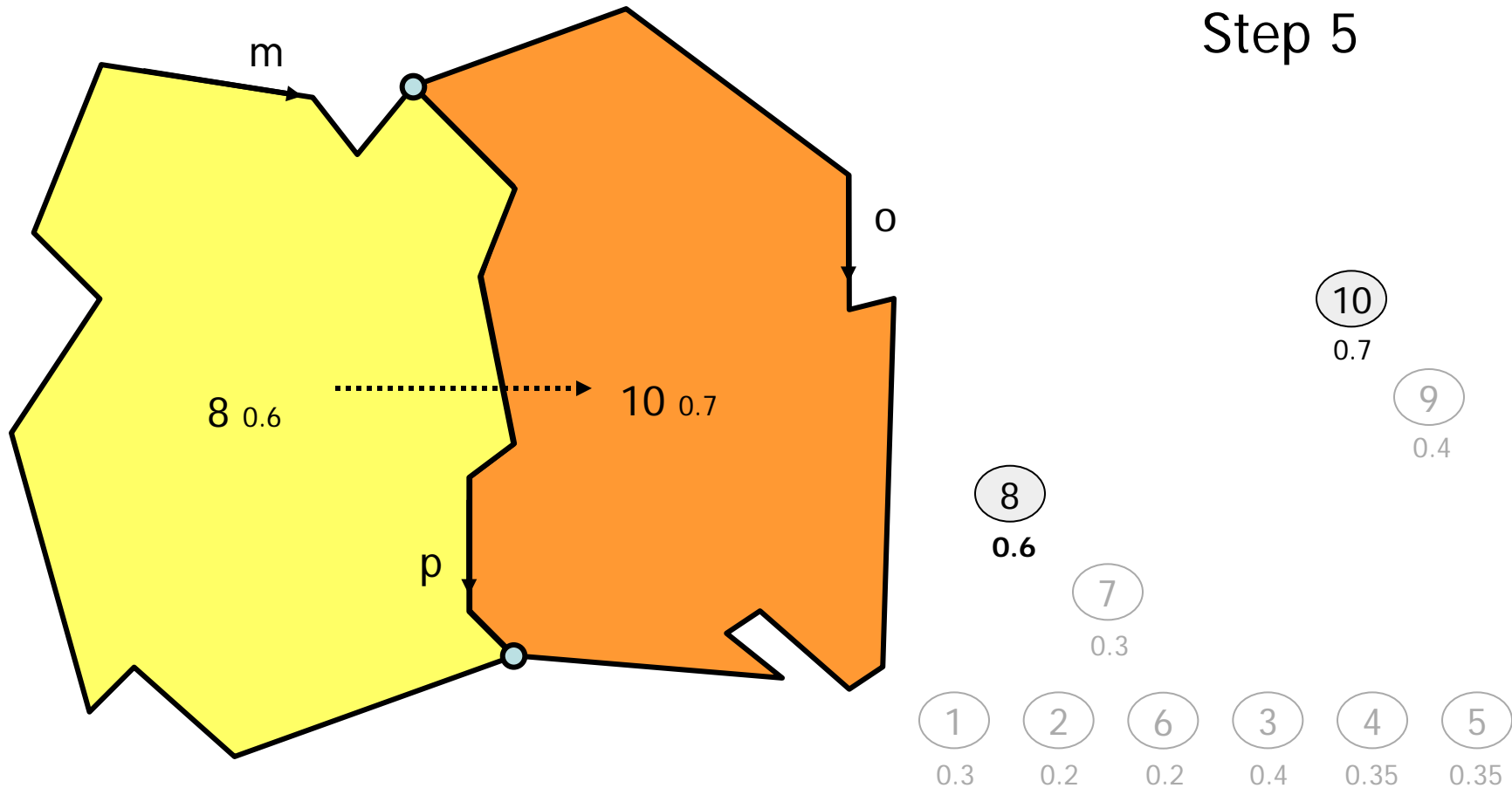
Constructing tGAP face tree

Step 4

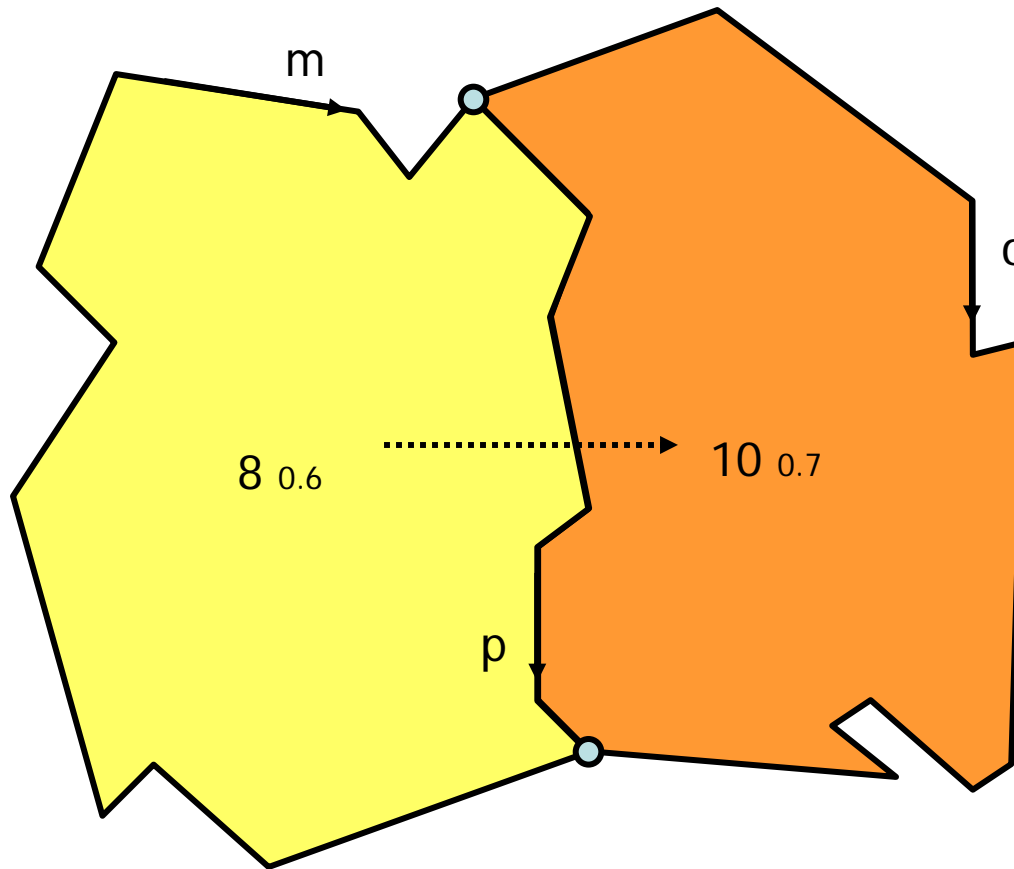


Constructing tGAP face tree

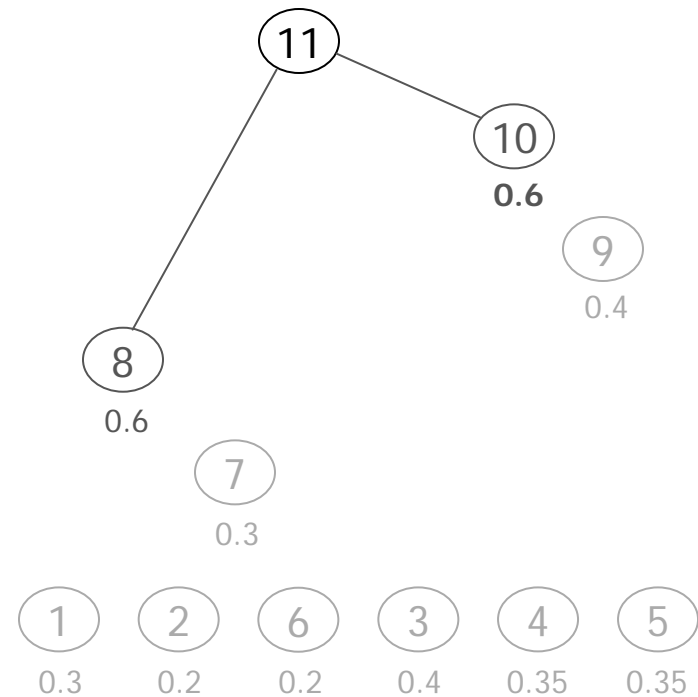
Step 5



Constructing tGAP face tree

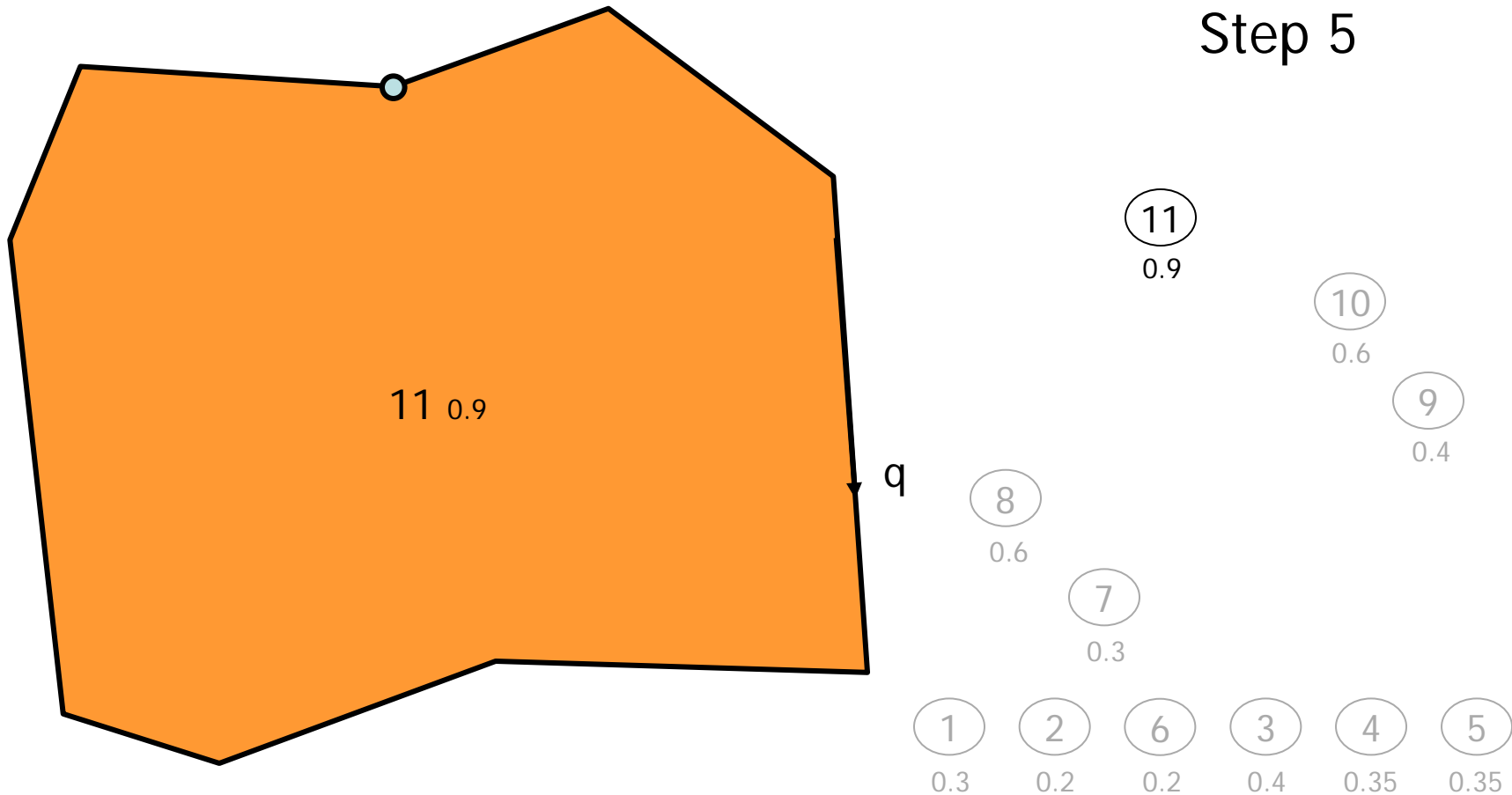


Step 5

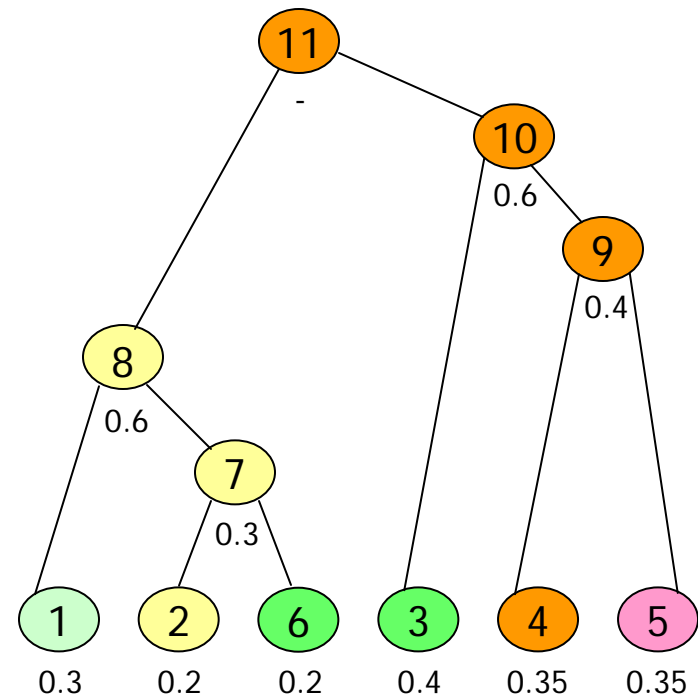
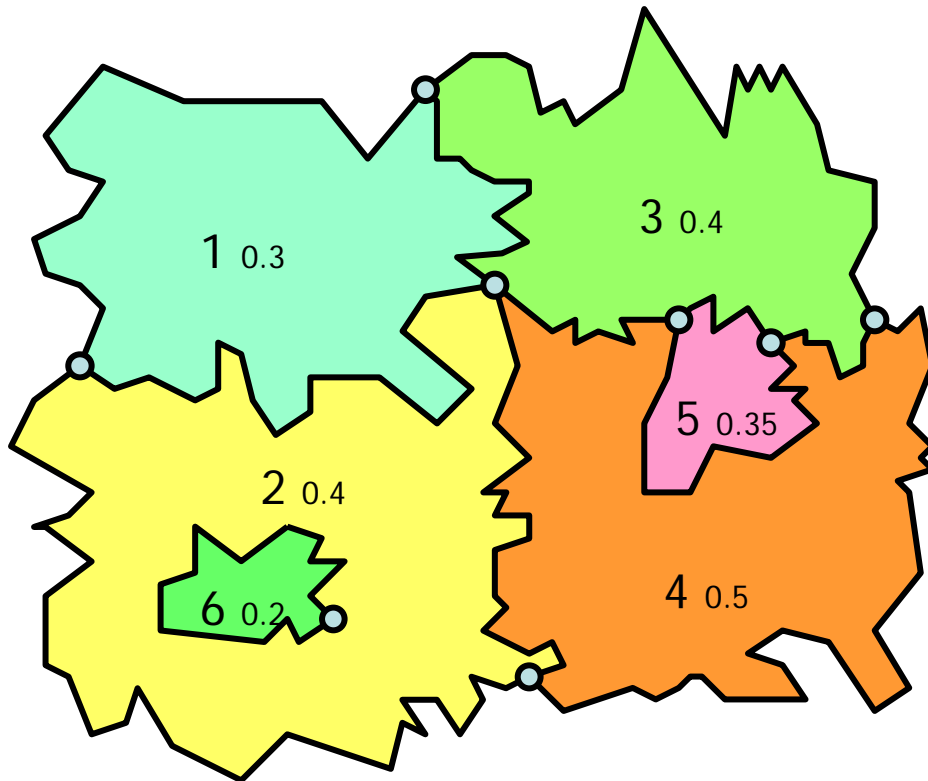


Constructing tGAP face tree

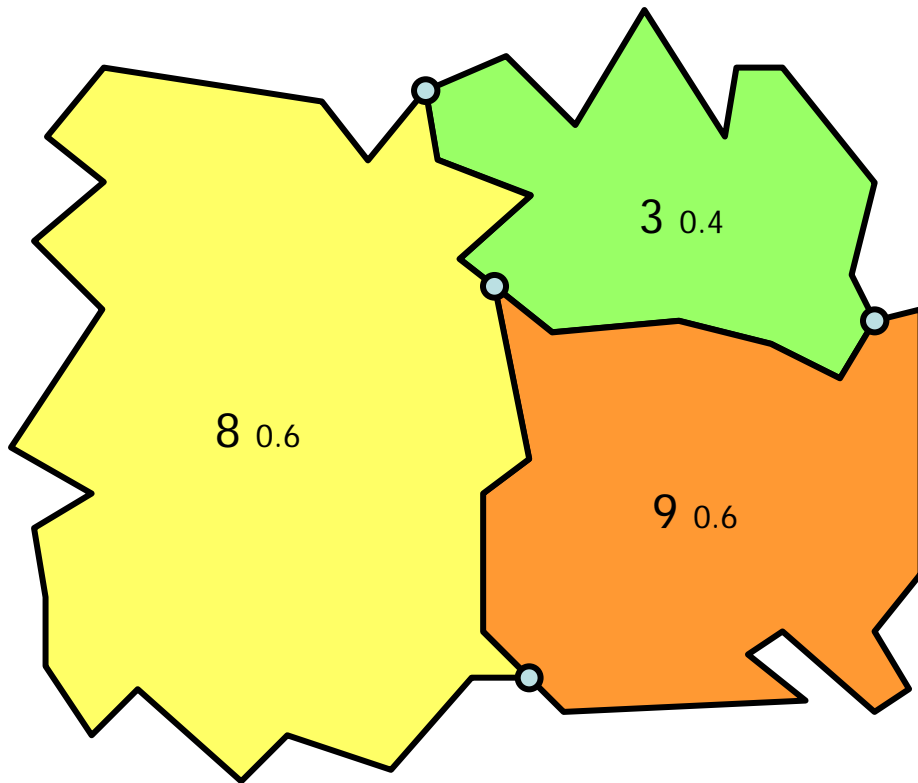
Step 5



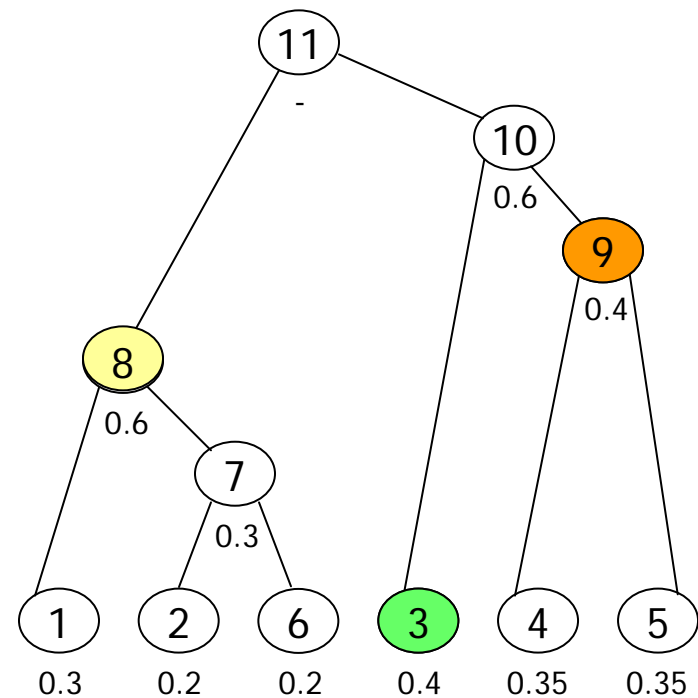
tGAP face tree



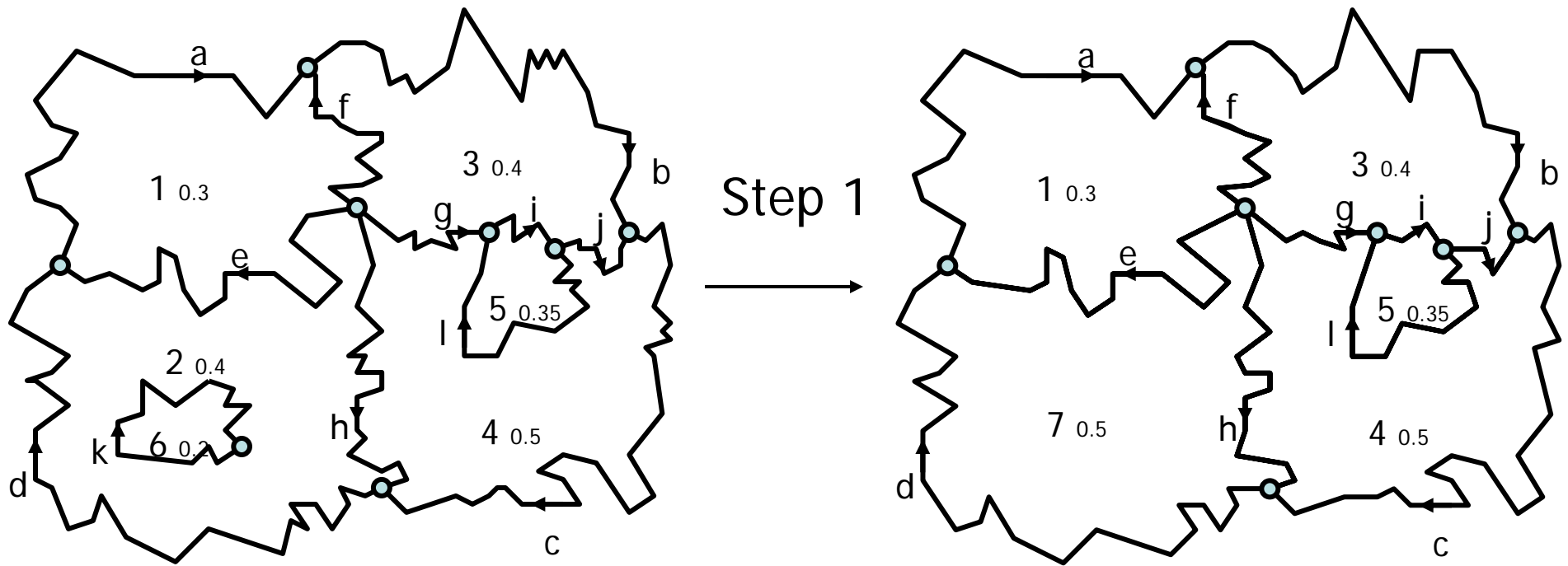
Using tGAP face tree



Importance = 0.38

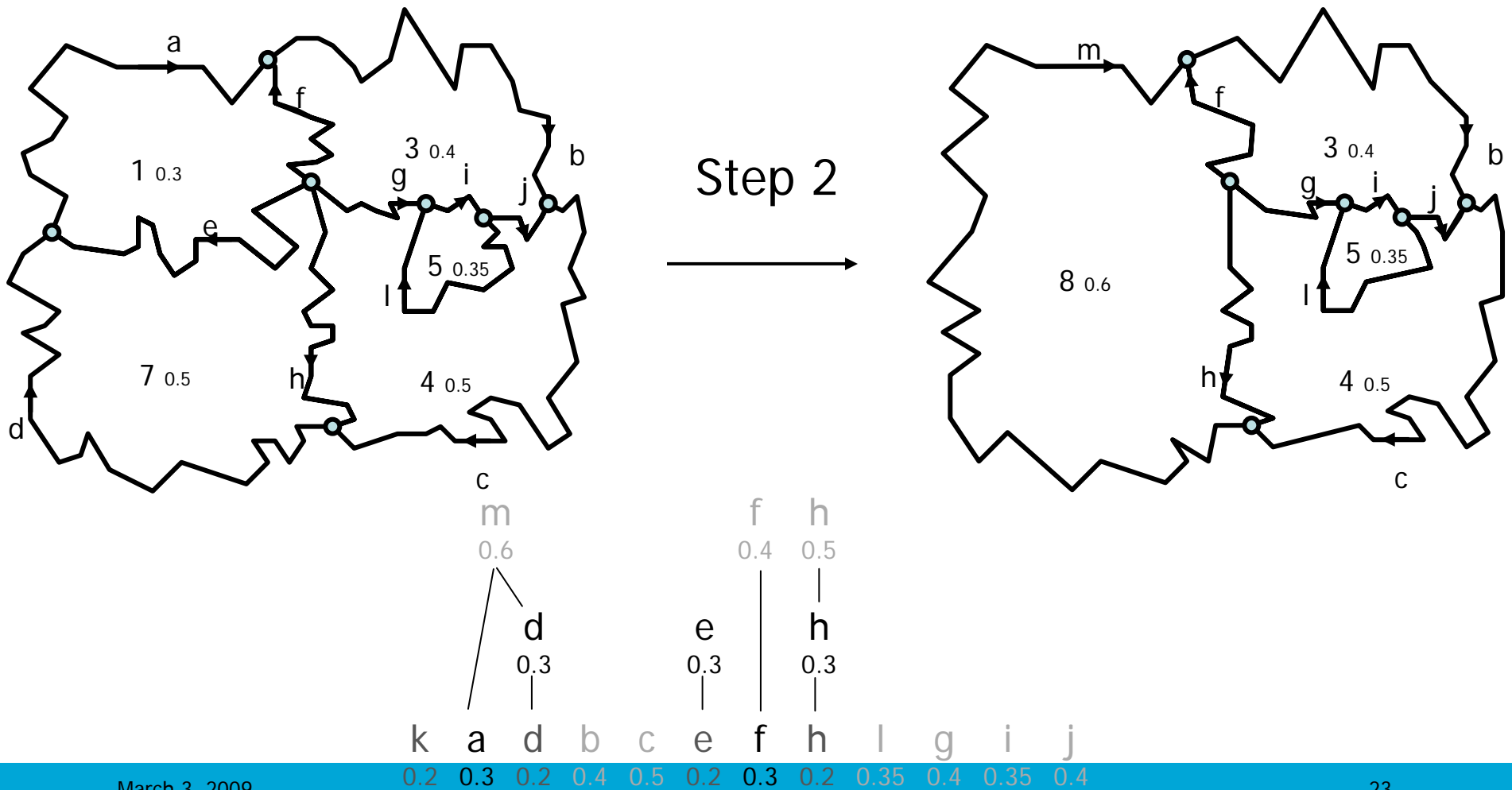


tGAP edge forest



			d			e		h			
			0.5			0.3		0.5			
k	a	d	b	c	e	f	h	l	g	i	j
0.2	0.3	0.2	0.4	0.5	0.2	0.3	0.2	0.35	0.4	0.35	0.4

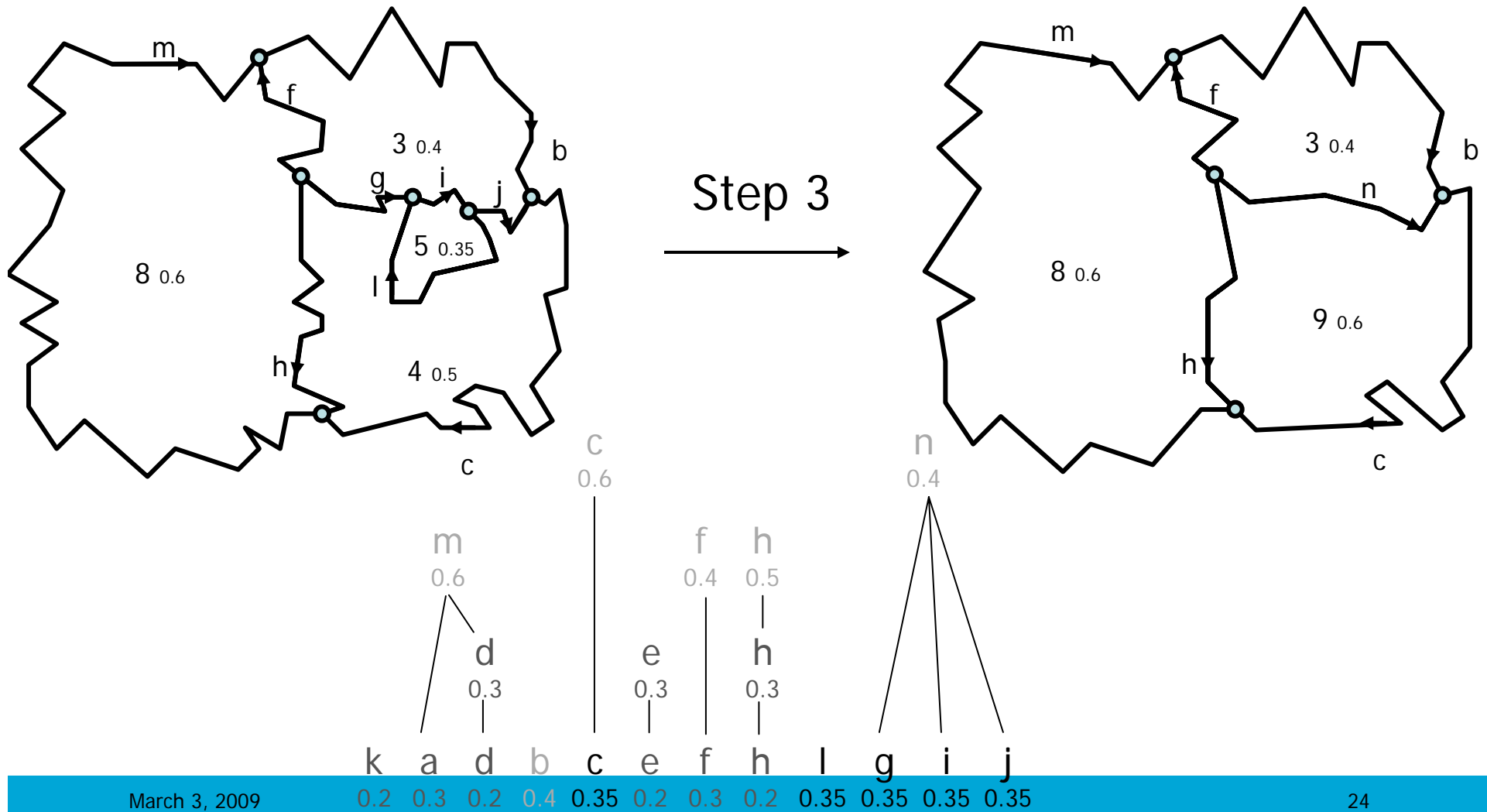
tGAP edge forest



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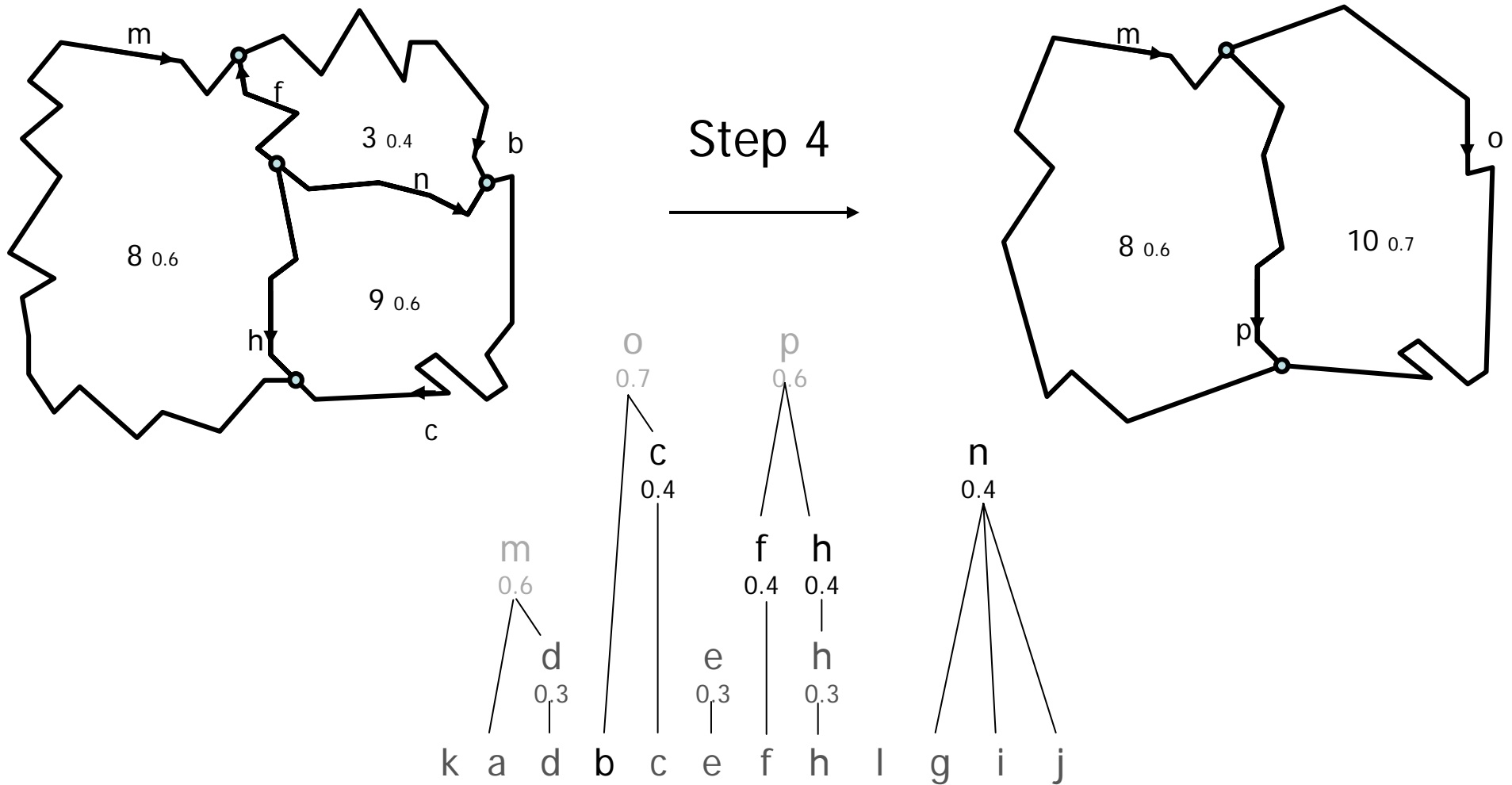
tGAP edge forest



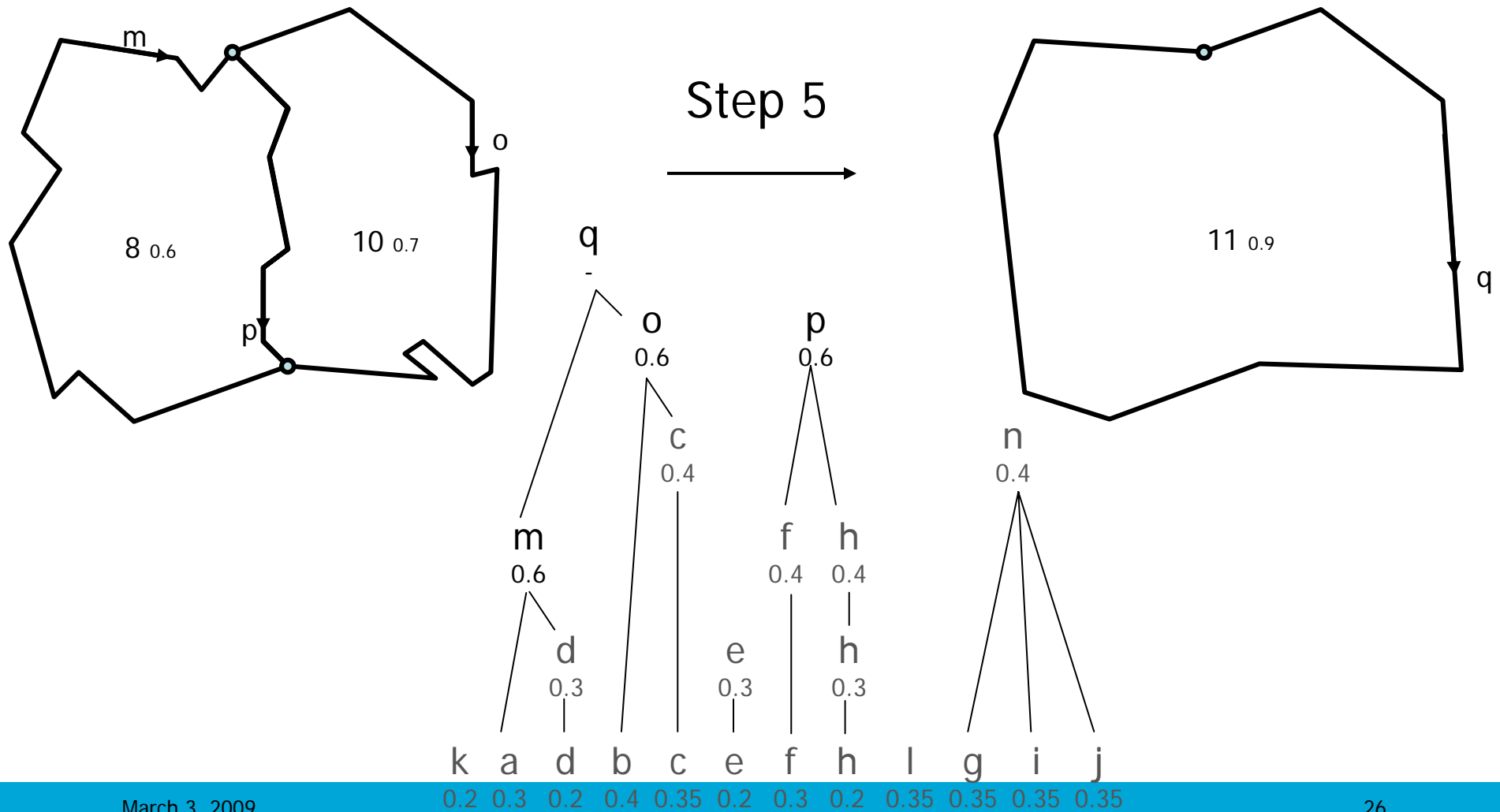
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tGAP edge forest



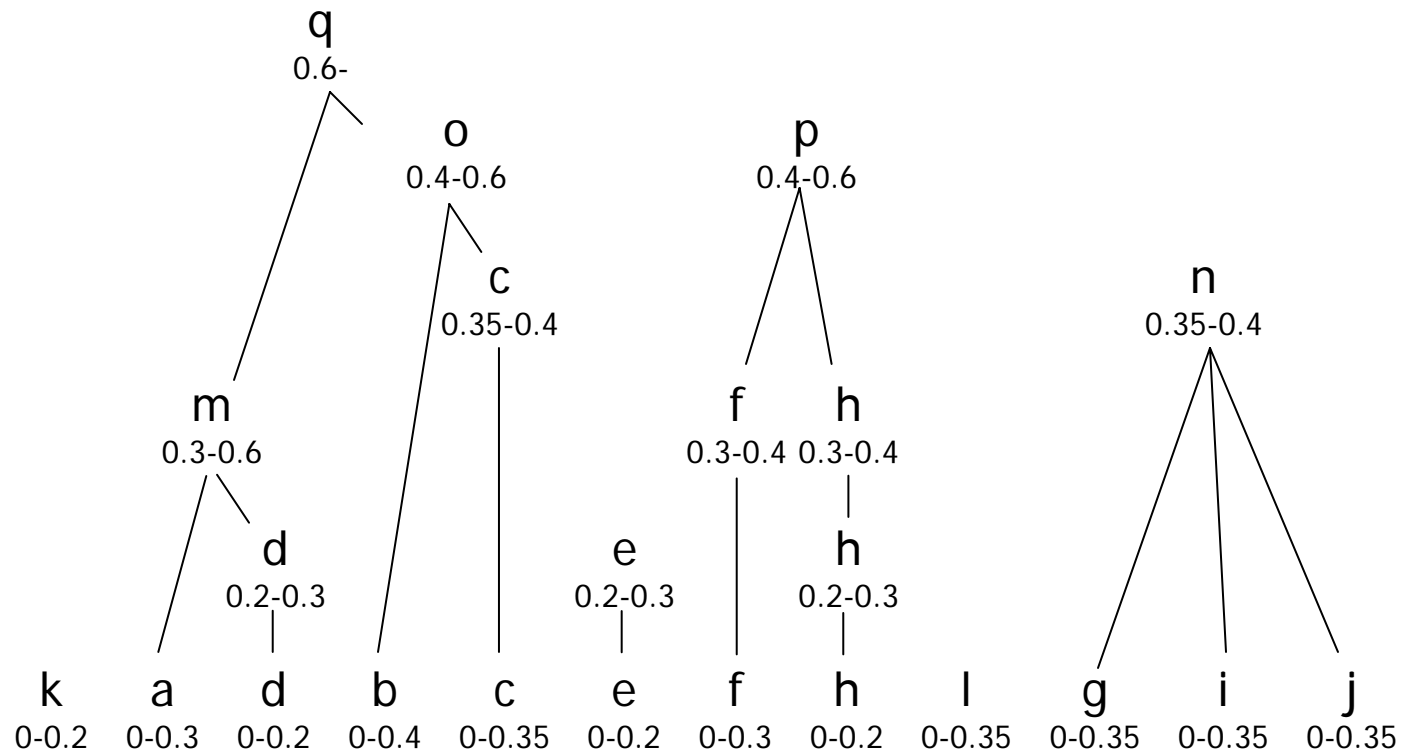
tGAP edge forest



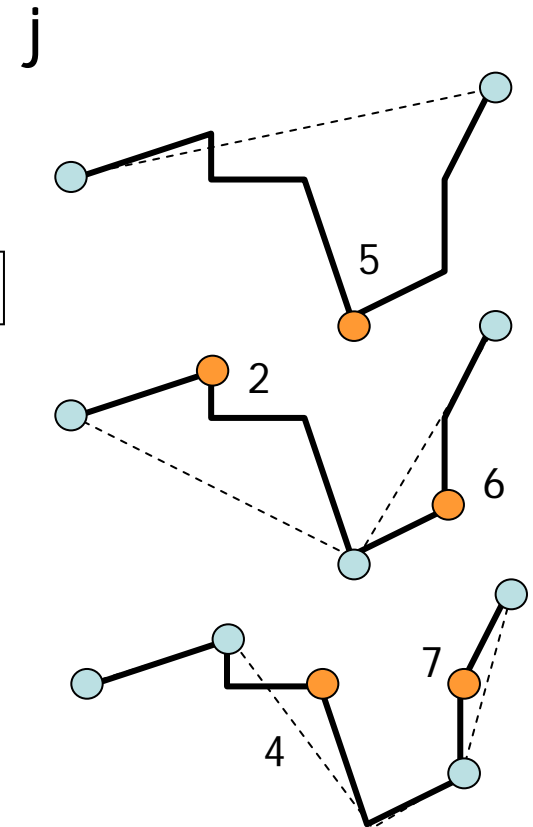
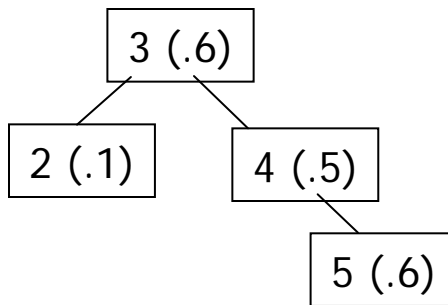
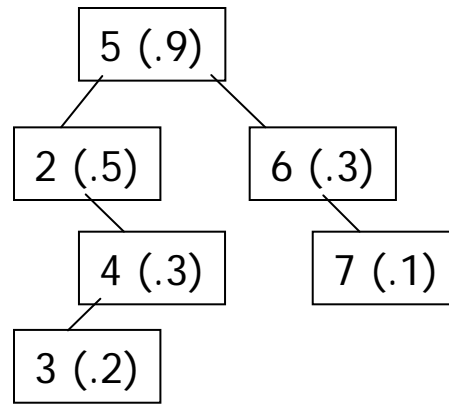
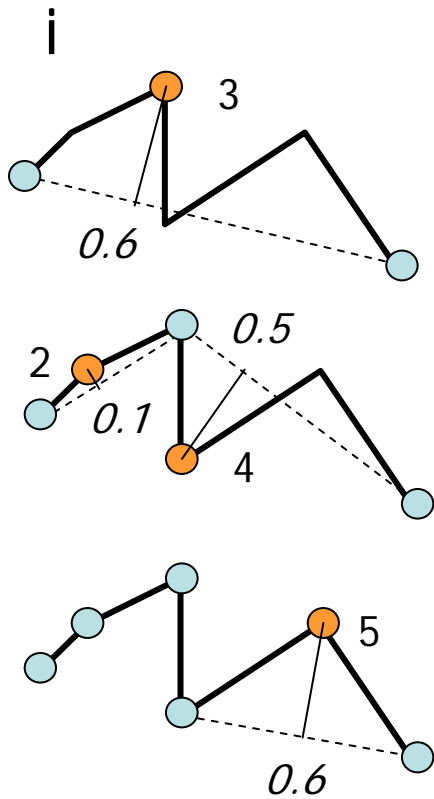
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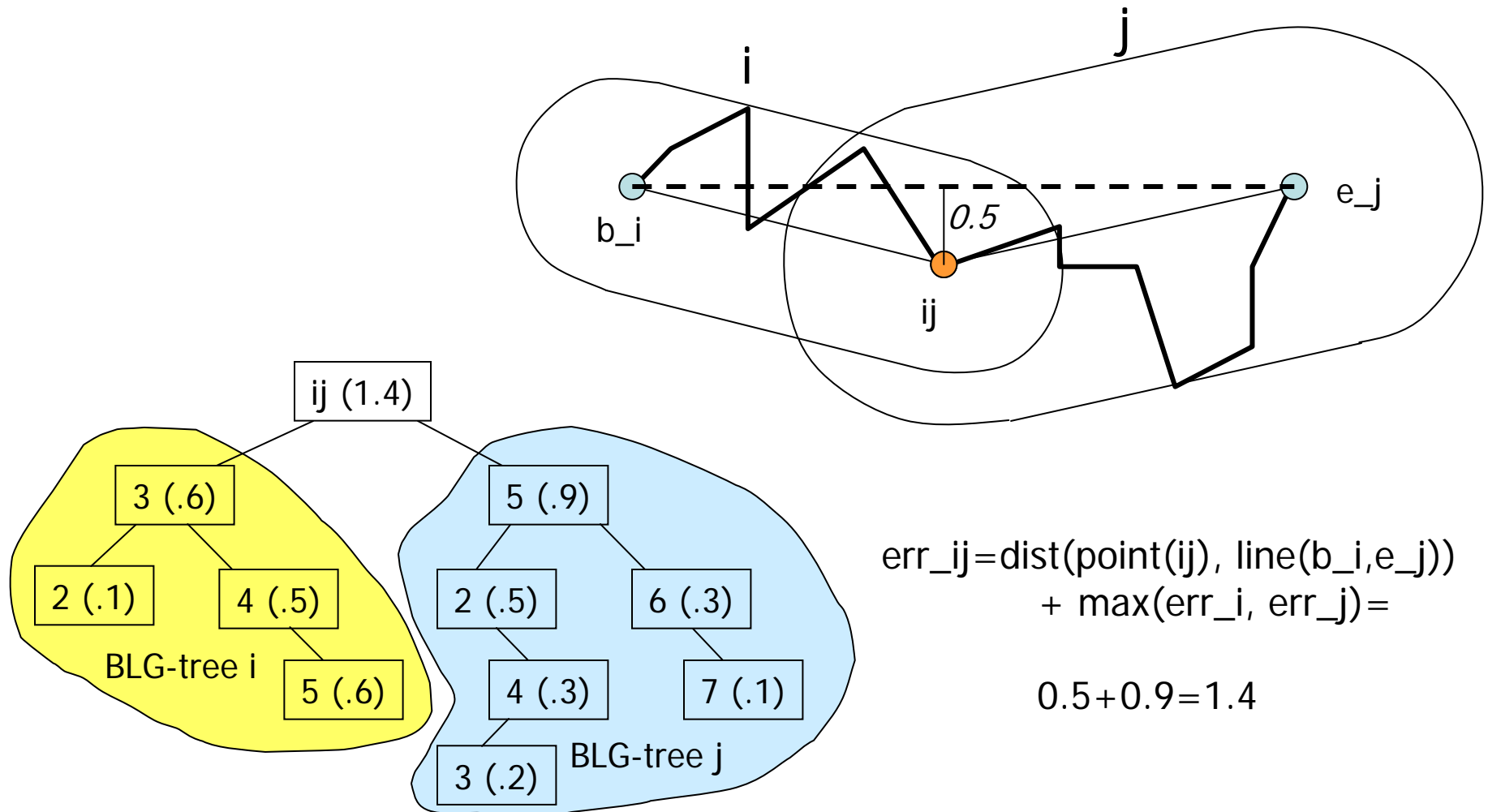
tGAP edge forest



BLG edge trees



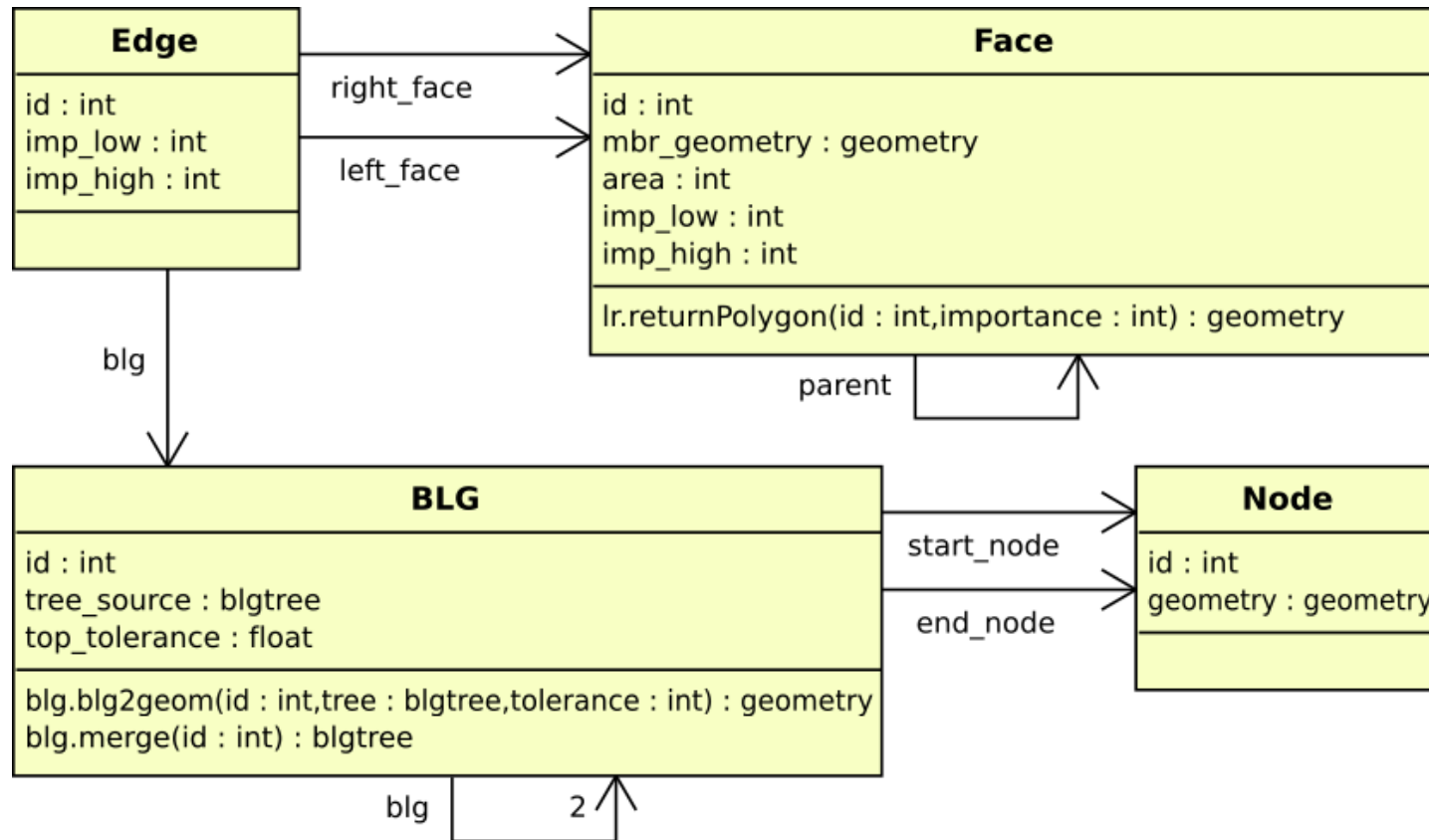
Joined BLG trees



Implementation of tGAP: combination of tables & structures

GAP face tree	allow face selection
GAP edge forest	allow line selection
BLG tree	allow line simplification
3D R-tree	allow fast selection

UML diagram for tGAP tables



Source topology and tGAP tables

Source topology

face	<u>id</u>
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edge	<u>id</u>	geometry	left-face	right-face	start-node	end-node
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node	<u>id</u>	geometry
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tGap structure

face	<u>id</u>	mbr-geometry	area	imp-low	imp-high	parent-id
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edge	<u>id</u>	<u>imp-low</u>	imp-high	blg-id	left-face	right-face
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blg	<u>id</u>	tree-source	top-toleran	start-node	end-node
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node	<u>id</u>	geometry
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tGAP storage requirements

- Several test datasets (small/medium/large): cadastral and topographic data (1:1.000-1:10.000)

		Source topology		tGAP structure		
dataset	table	size (MB)	# of rows	size (MB)	# of rows	# of distinct 'id' rows
Cadastral (small)	face	0.01	161	0.05	321	
	edge	<i>0.12</i>	<i>499</i>	<i>0.17</i>	<i>3938</i>	<i>770</i>
	blg			0.16	791	
	node	0.02	341	0.02	341	
Cadastral (large)	face	0.66	50238	16.84	100475	
	edge	<i>38.55</i>	<i>178815</i>	<i>148.87</i>	<i>3258262</i>	<i>263223</i>
	blg			51.48	272046	
	node	4.87	129441	4.87	129441	
Amsterdam	face	2.02	170368	56.27	340735	
	edge	<i>94.16</i>	<i>418530</i>	<i>291.38</i>	<i>7113680</i>	<i>614707</i>
	blg			132.84	658219	
	node	10.7	281216	10.7	281216	

tGAP storage improvements

- tgap_edge 'explodes': 17 times more than base edges, many versions of same edge (at different impl levels). However only few attributes change left, right, imp
 - All versions of edge in same record+varray's for variable attributes
 - Decrease number of rows or columns at the expense of more calculations

tGAP storage improvements

face table

id	mbr-geometry	area	imp-low	imp-high	parent-id
1			0	0.3	8
2			0	0.2	7
3			0	0.4	10
4			0	0.35	9
5			0	0.35	9
6			0	0.2	7
7			0.2	0.3	8
8			0.3	0.6	10
9			0.35	0.4	11
10			0.4	0.6	11
11			0.6		

edge table

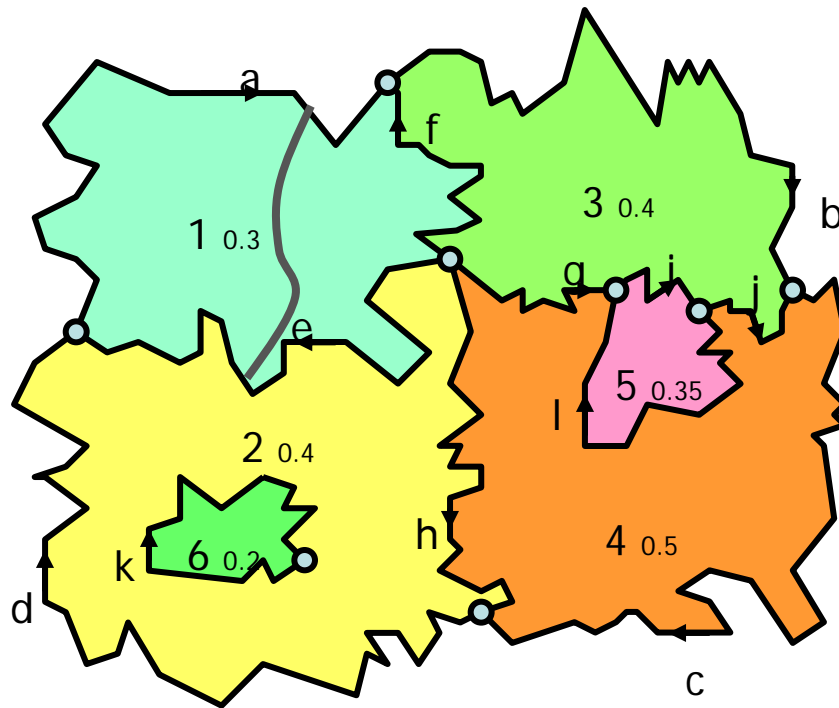
id	imp-low	imp-high	blg-id	left-face	right-face
a	0.00	0.30		0	1
b	0.00	0.40		0	3
c	0.00	0.35		0	4
d	0.00	0.20		0	2
e	0.00	0.20		2	1
f	0.00	0.30		1	3
g	0.00	0.35		3	4
h	0.00	0.20		4	2
i	0.00	0.35		3	5
j	0.00	0.35		3	4
k	0.00	0.20		2	6
l	0.00	0.35		4	5
d	0.20	0.30		0	7
e	0.20	0.30		7	1
h	0.20	0.30		4	7
m	0.30	0.60		0	8
f	0.30	0.40		8	3
h	0.30	0.40		4	8
c	0.35	0.40		0	9
n	0.35	0.40		3	9
o	0.40	0.60		0	10
p	0.40	0.60		10	8
q	0.60			0	11

tGAP improvements

- Selection & merging of areas based only on area
- Importance calculated from iteration number
- Use class weight and class similarity functions
- Calculate importance from weights of classes

Updating tGAP

- Local update, control the propagation effect



- Delete old edges
- Delete their BLG (&joined)
- Create new from splitting
- Add the new edge
- Create BLG trees for all new

Updating tGAP

- Local update, control the propagation effect

