

Algorithmen zur Visualisierung von Graphen

Teile & Herrsche-Algorithmen:
Bäume und serienparallele Graphen

Vorlesung im Sommersemester 2009

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09.07.2009

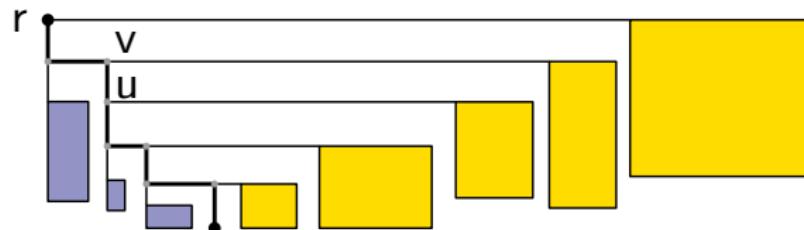
Wiederholung: rechtslastiges hv-Layout

Algorithmus hv-layout($T(v)$)

```
>>  $\Gamma_1 \leftarrow \text{hv-layout}(T_l(v))$ 
>>  $\Gamma_2 \leftarrow \text{hv-layout}(T_r(v))$ 
>> if  $T_l(v) \leq T_r(v)$  then return hor-combine( $\Gamma_1, \Gamma_2$ )
    else return hor-combine( $\Gamma_2, \Gamma_1$ )
```

Lemma: Platzbedarf eines rechtslastigen hv-Layouts: $O(n \log n)$

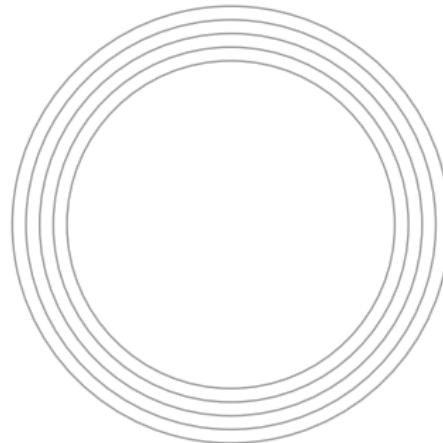
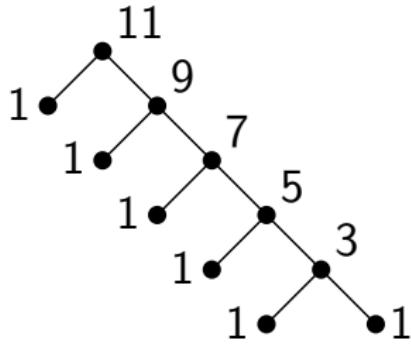
Beweisidee:



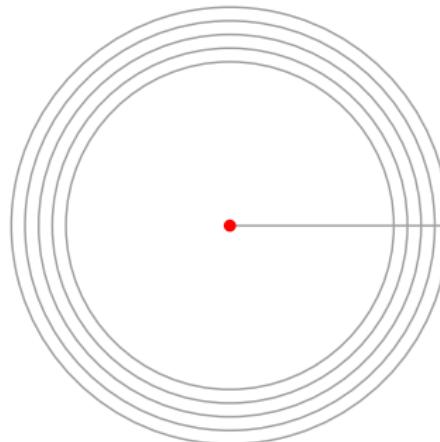
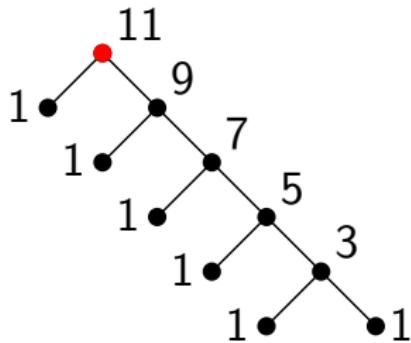
Radiale Baumlaysouts



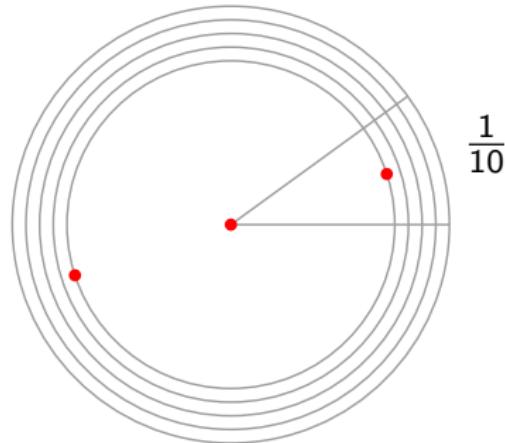
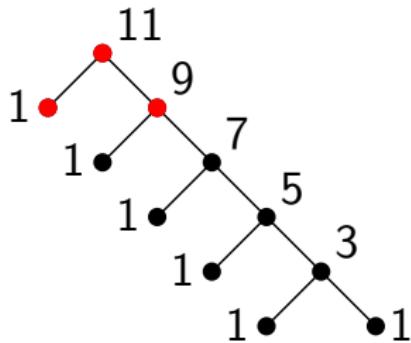
Beispiel Radiallayout



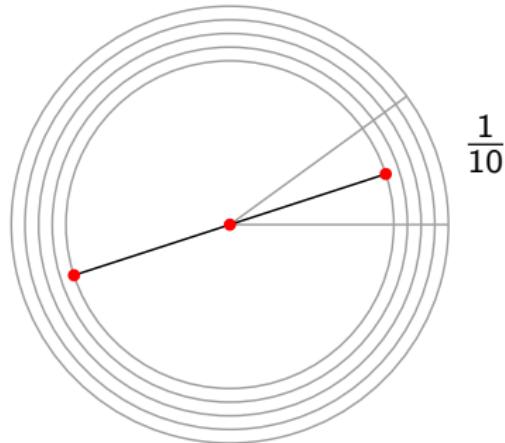
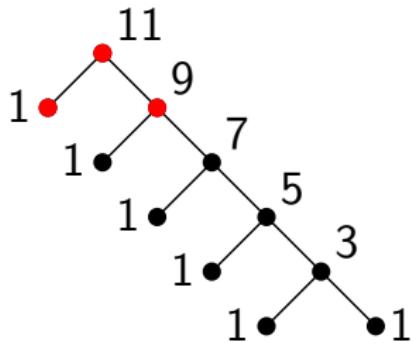
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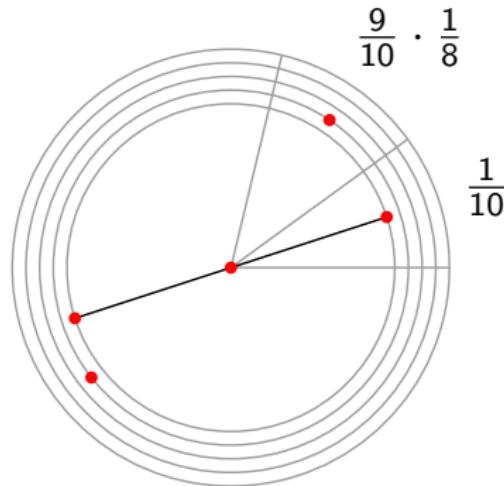
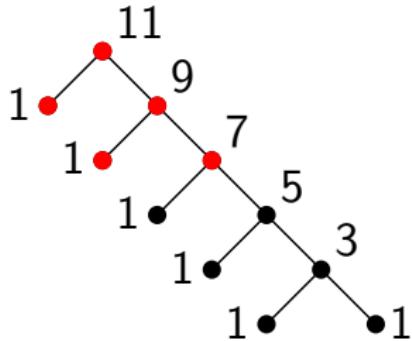
Beispiel Radiallayout



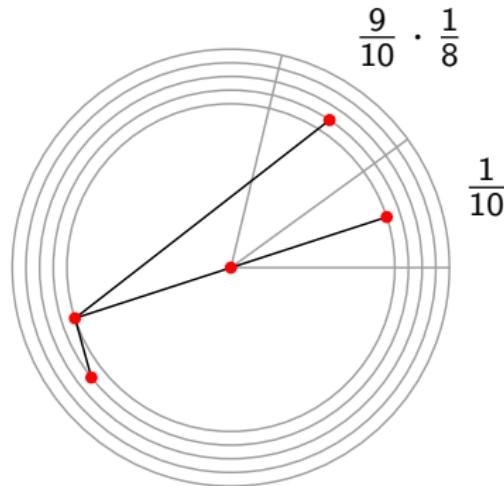
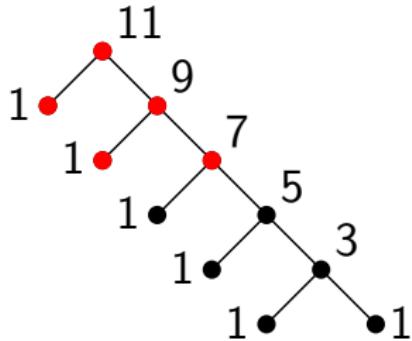
Beispiel Radiallayout



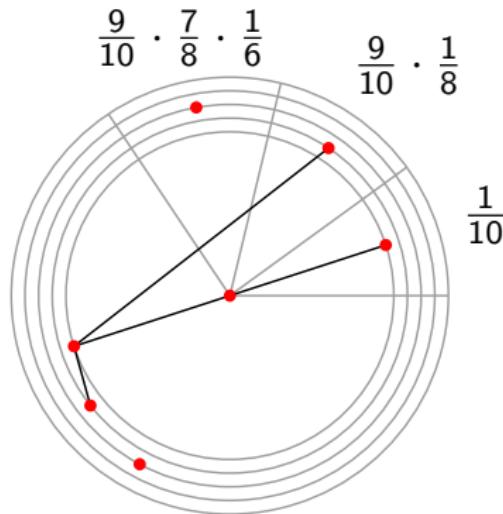
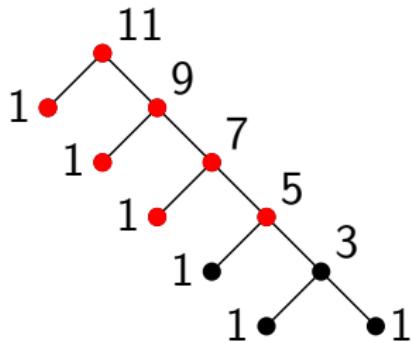
Beispiel Radiallayout



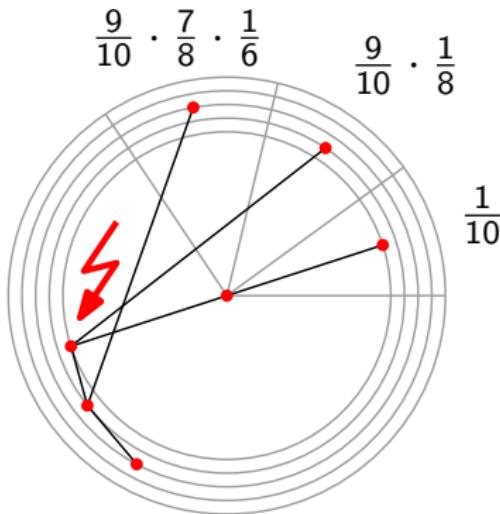
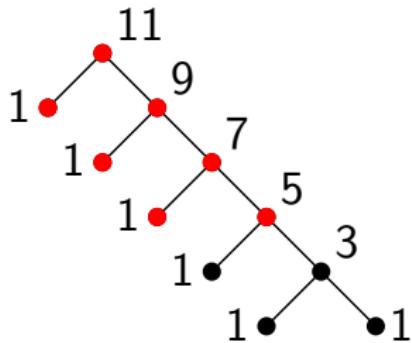
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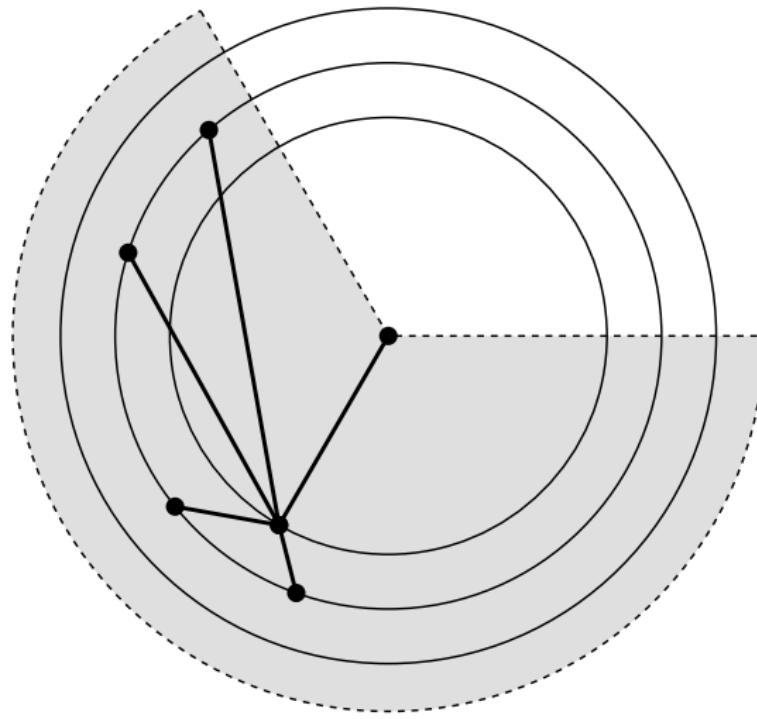
Beispiel Radiallayout



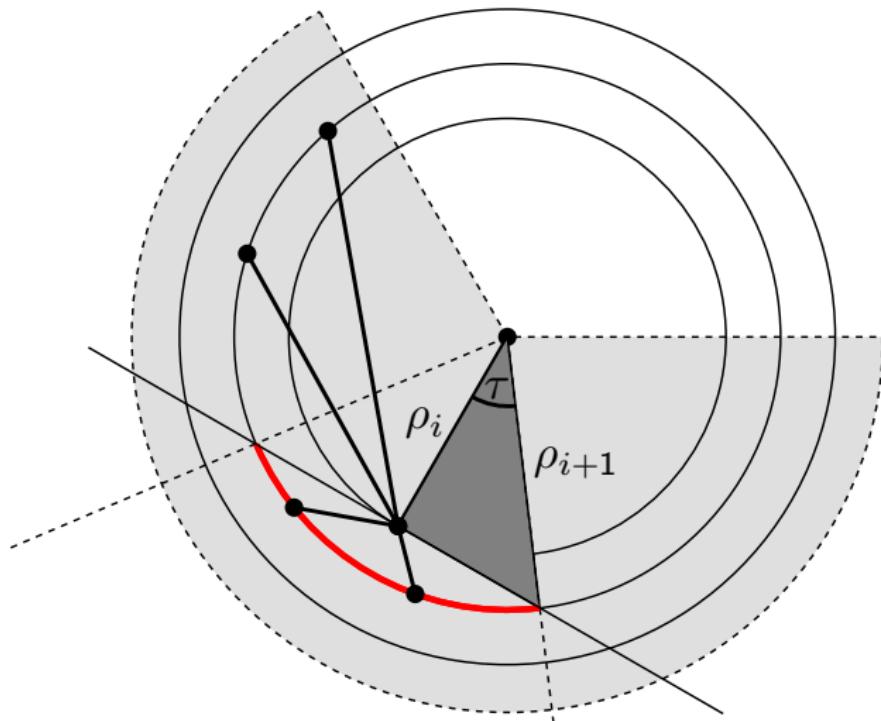
Beispiel Radiallayout



Verlassen des Kreisringsektors

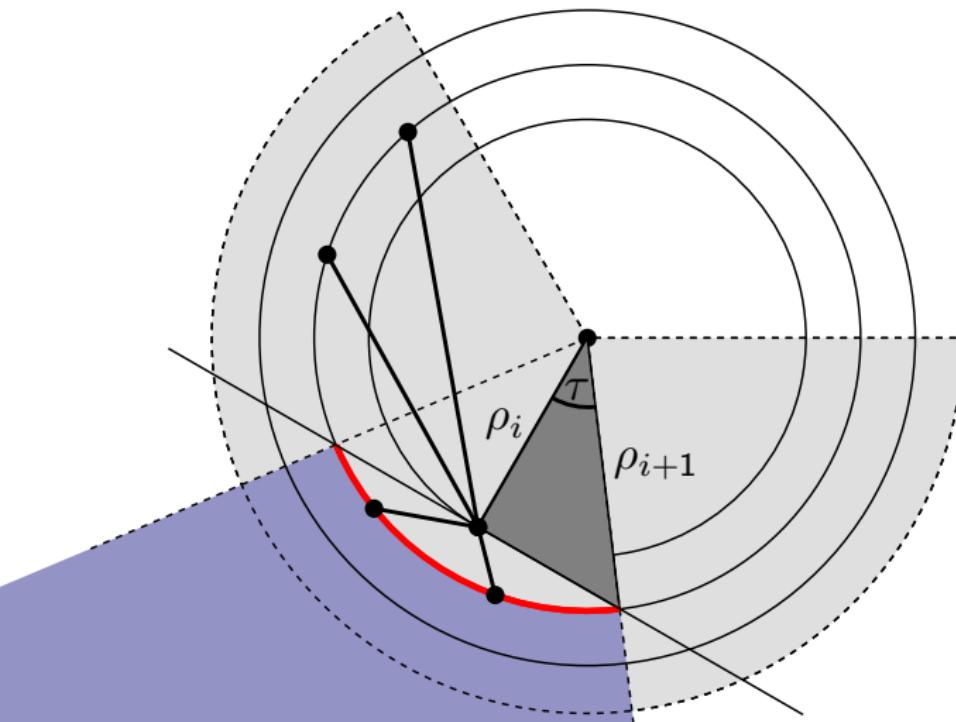


Verlassen des Kreisringsektors



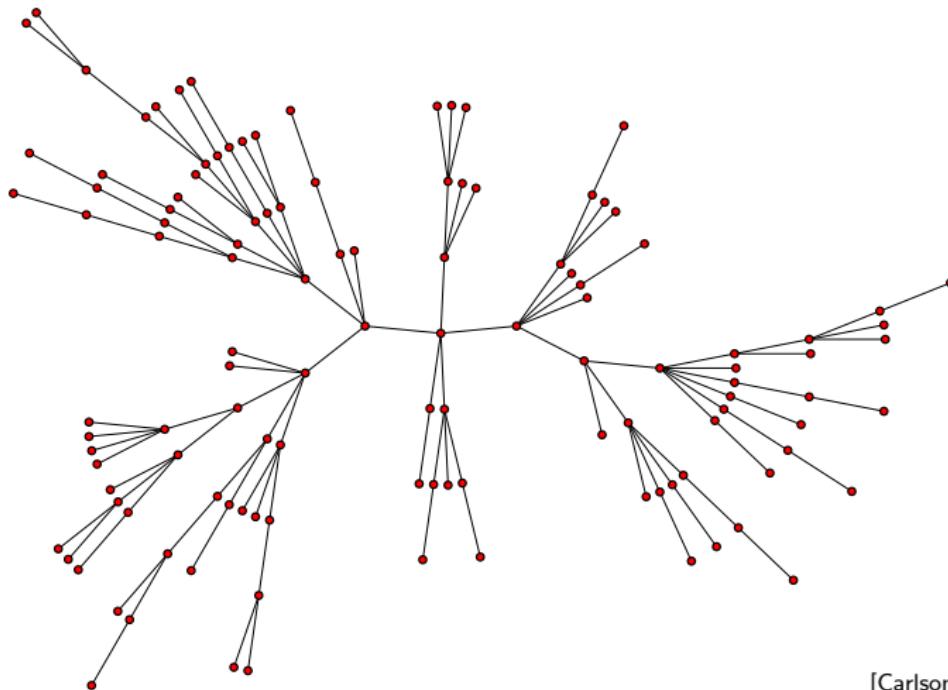
$$\cos \tau = \frac{\rho_i}{\rho_{i+1}}$$

Verlassen des Kreisringsektors



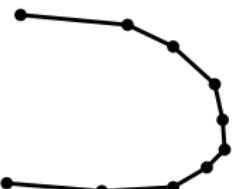
$$\cos \tau = \frac{\rho_i}{\rho_{i+1}}$$

Konvexe Baumlauts mit optimalen Winkeln



[Carlson, Eppstein '07]

Definition: konvexer Bogen, konvexe Facette



konvexer Bogen:
Winkelintervall $\leq \pi$

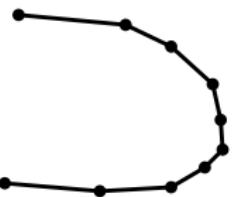


kein konvexer Bogen:
Winkelintervall $> \pi$



kein konvexer Bogen:
Winkelfolge nicht monoton

Definition: konvexer Bogen, konvexe Facette



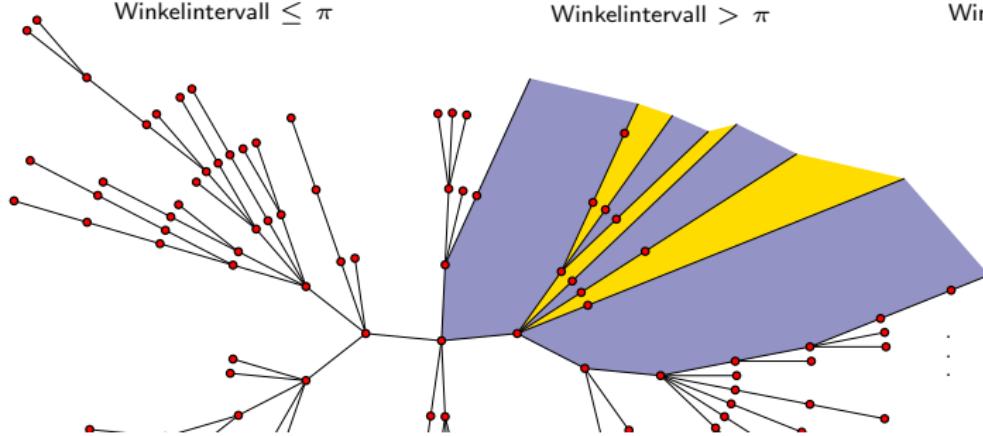
konvexer Bogen:
Winkelintervall $\leq \pi$



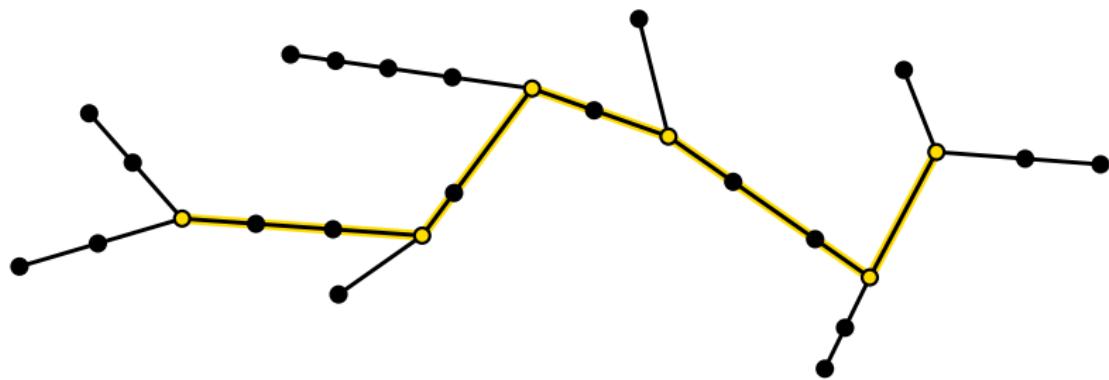
kein konvexer Bogen:
Winkelintervall $> \pi$



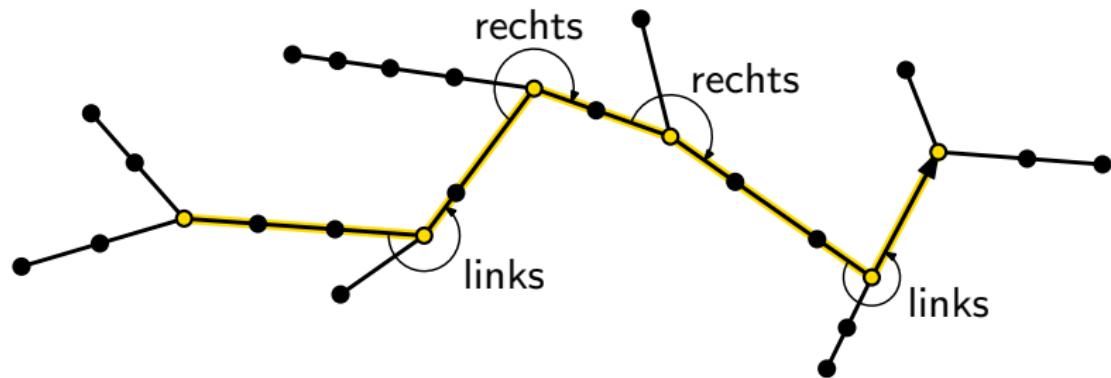
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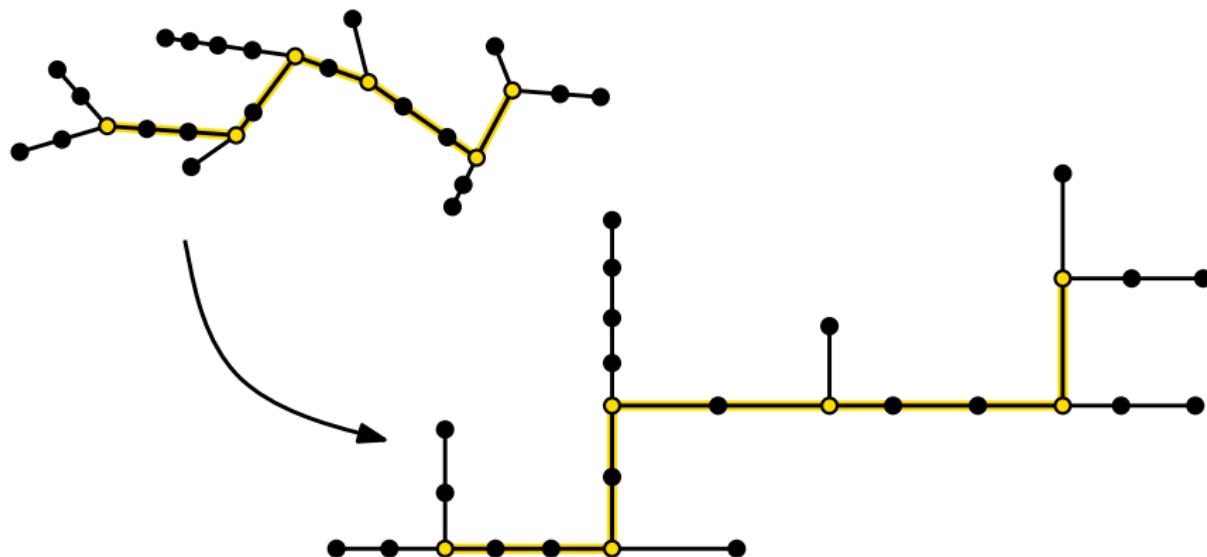
Definition: Ranke



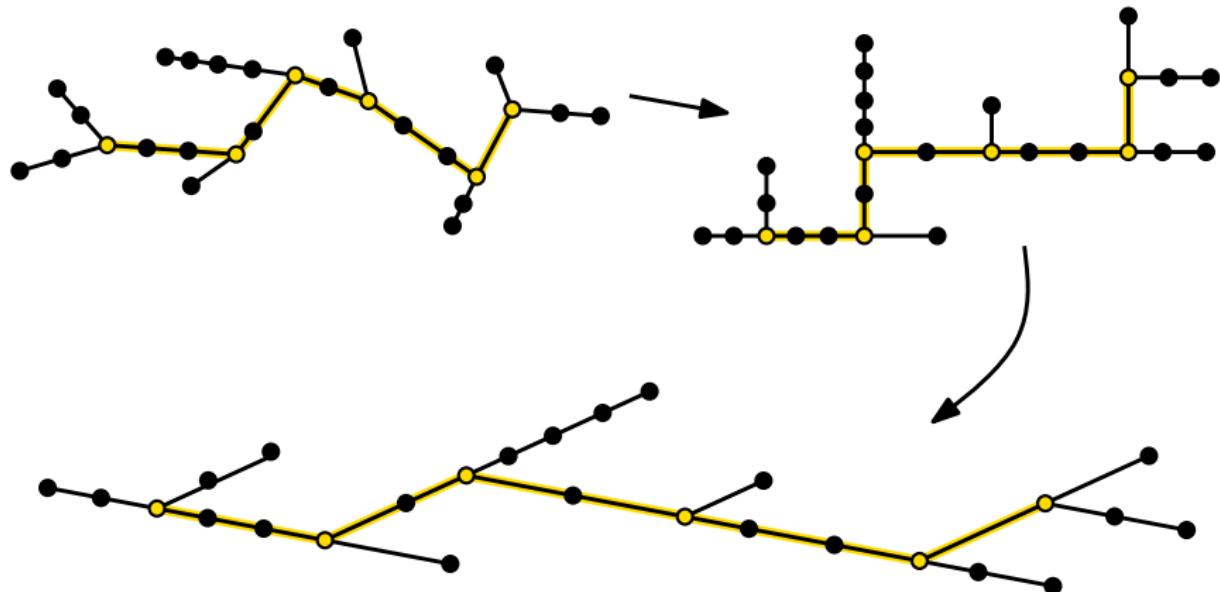
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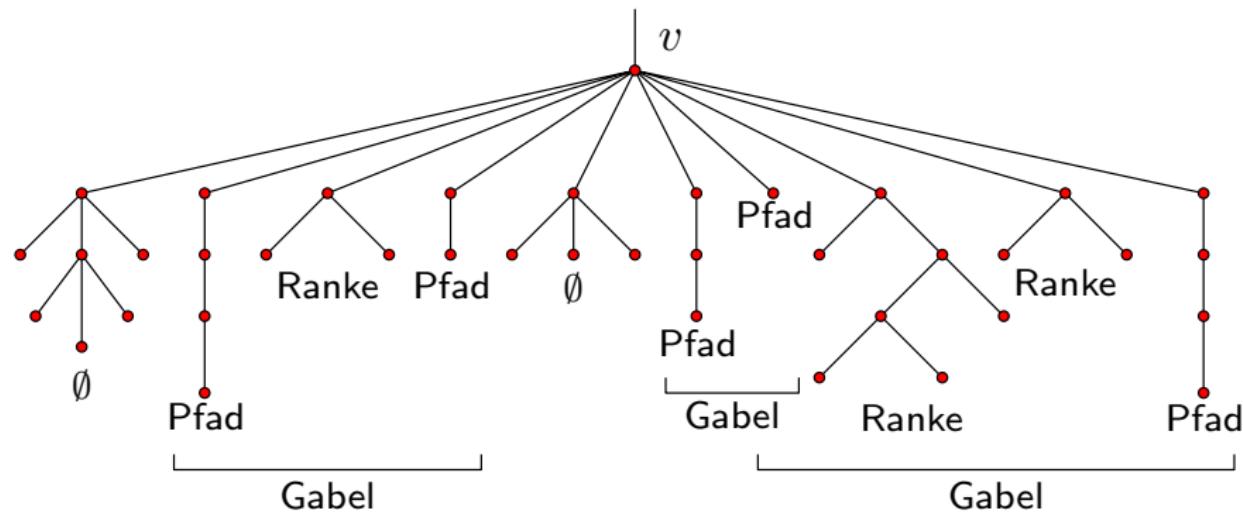
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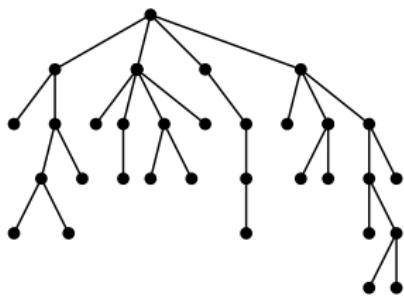
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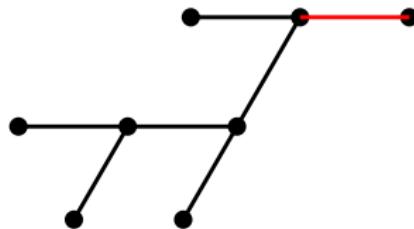
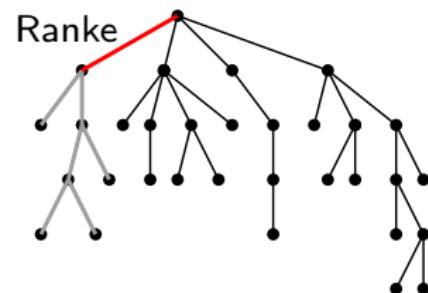
Pfade, Ranken, Gabeln



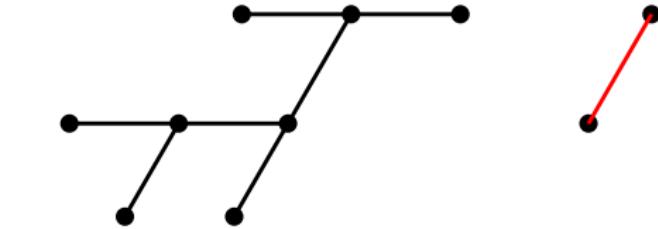
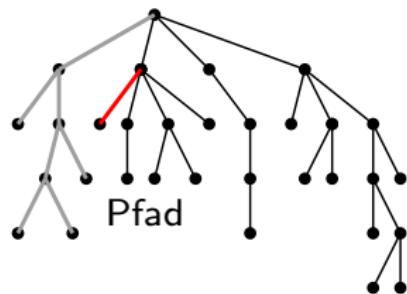
Beispiel



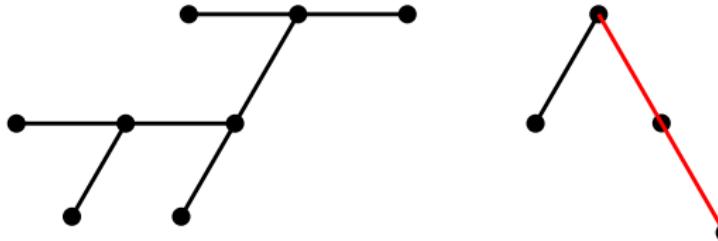
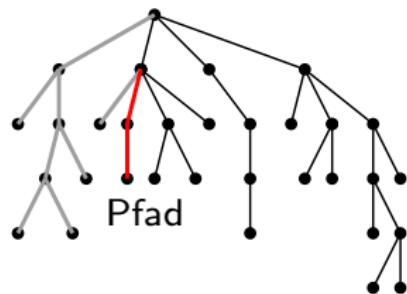
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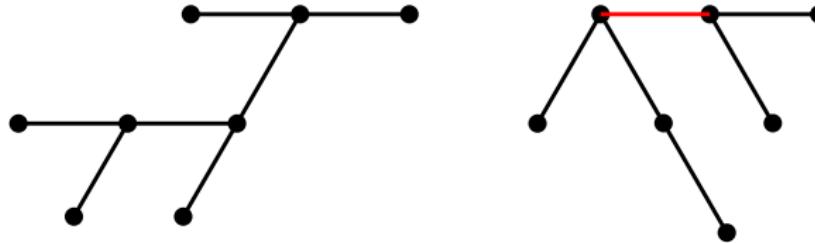
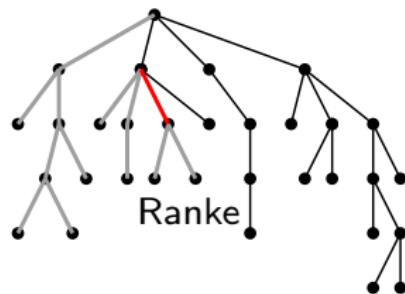
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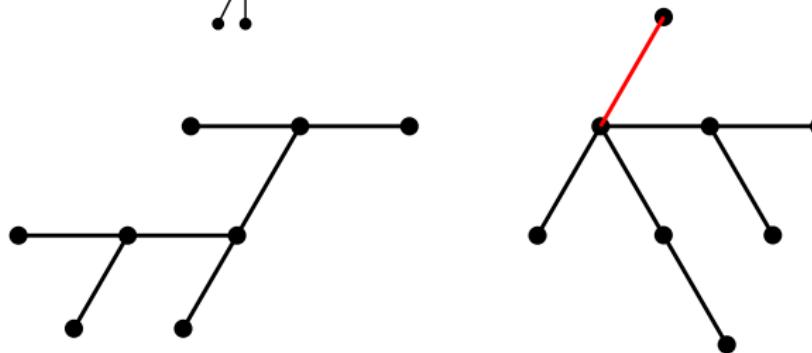
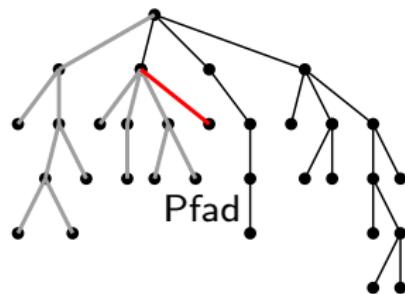
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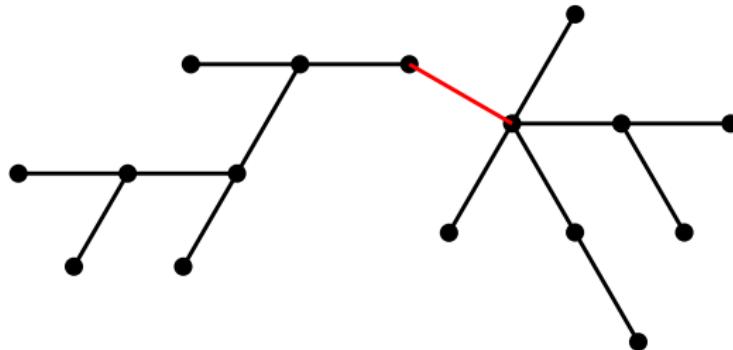
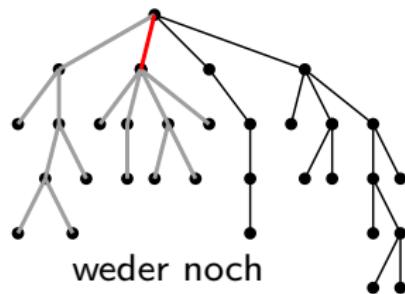
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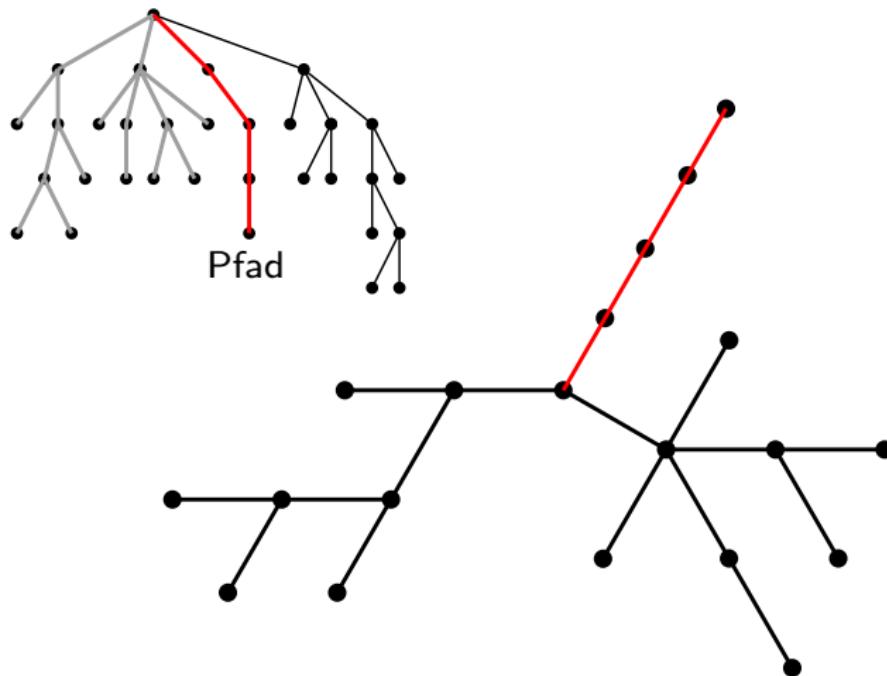
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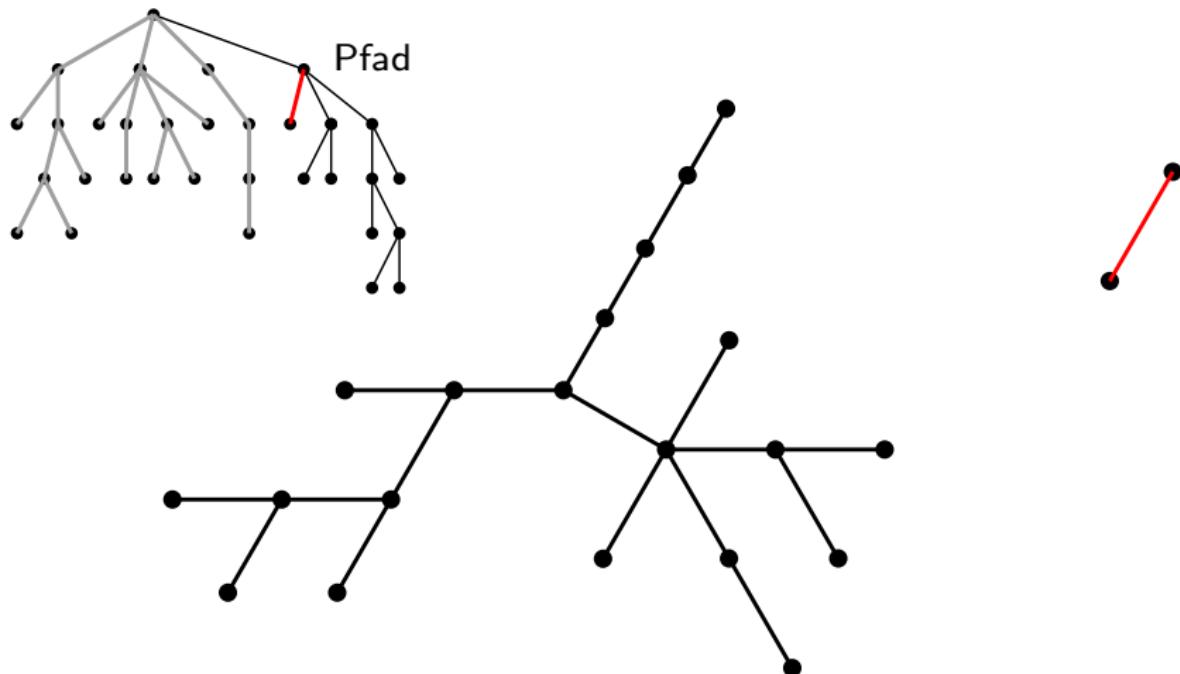
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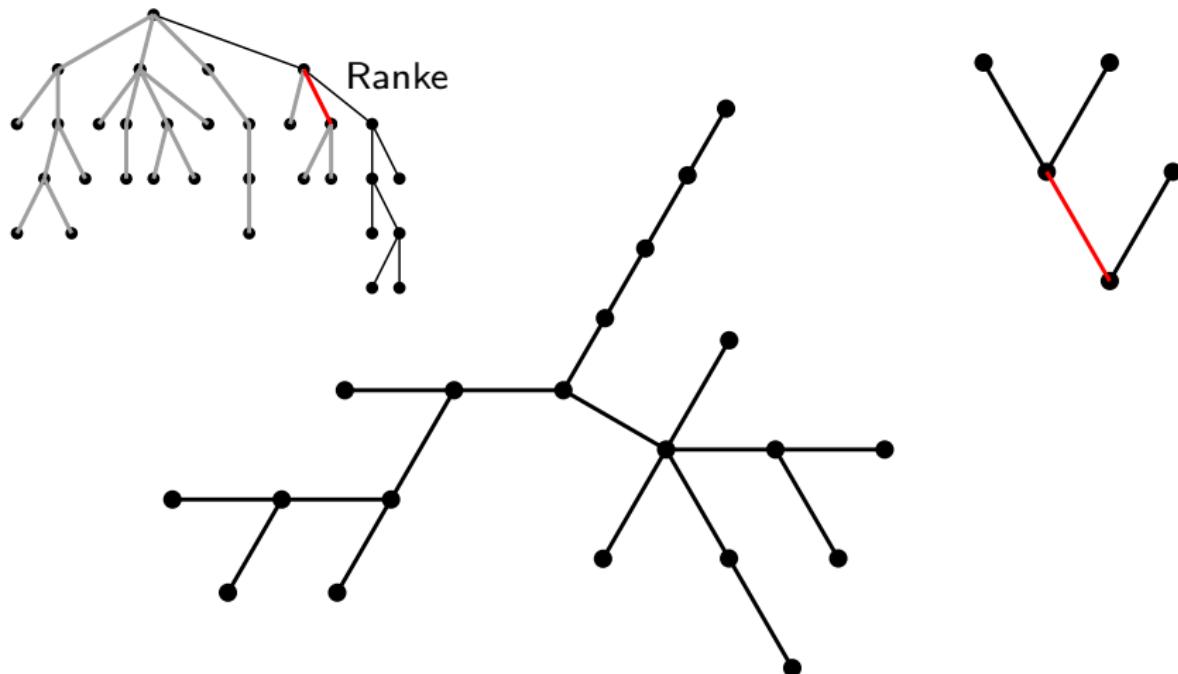
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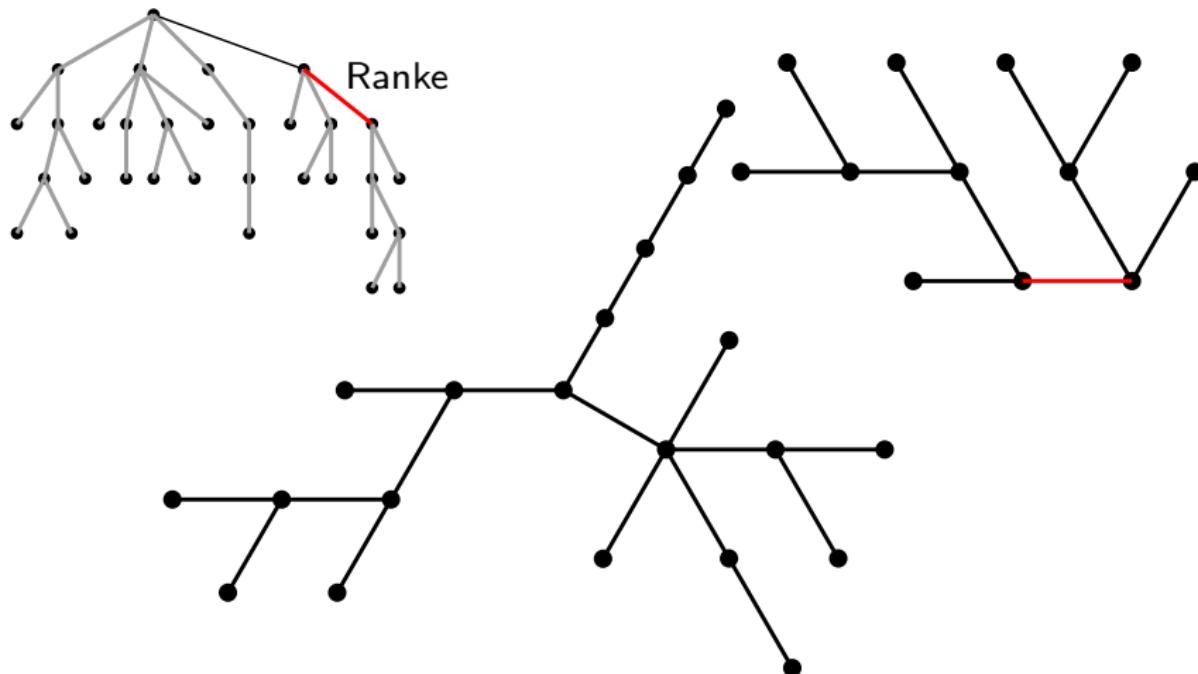
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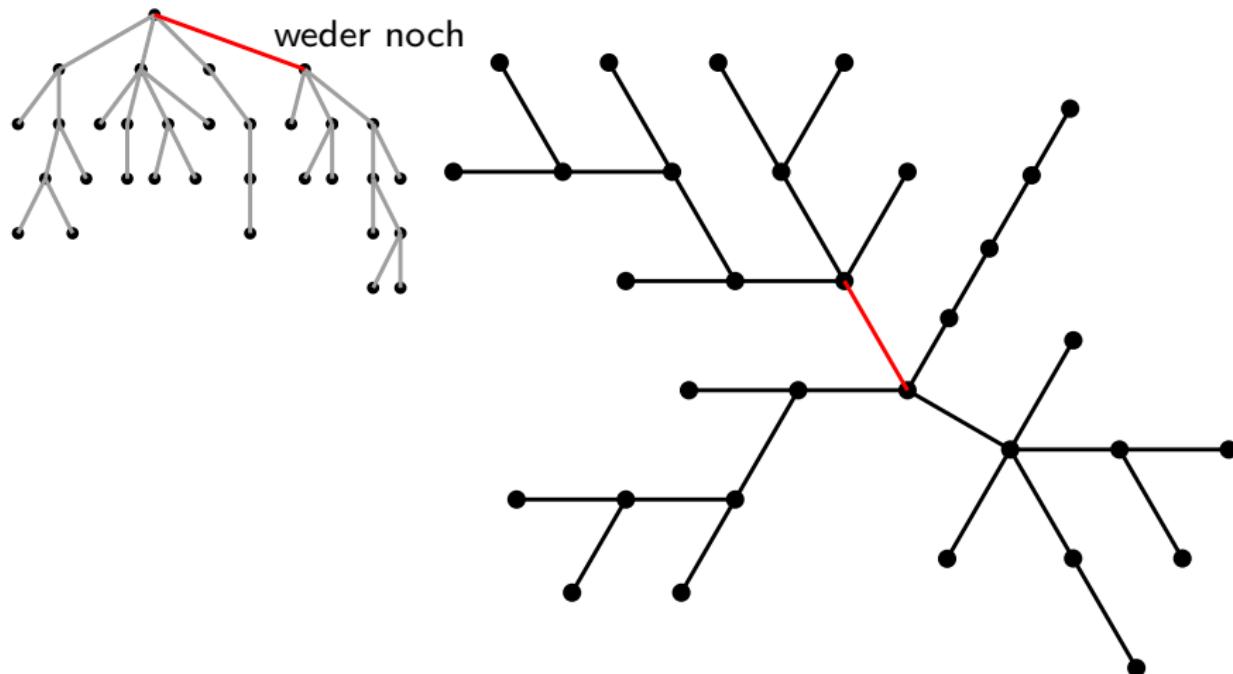
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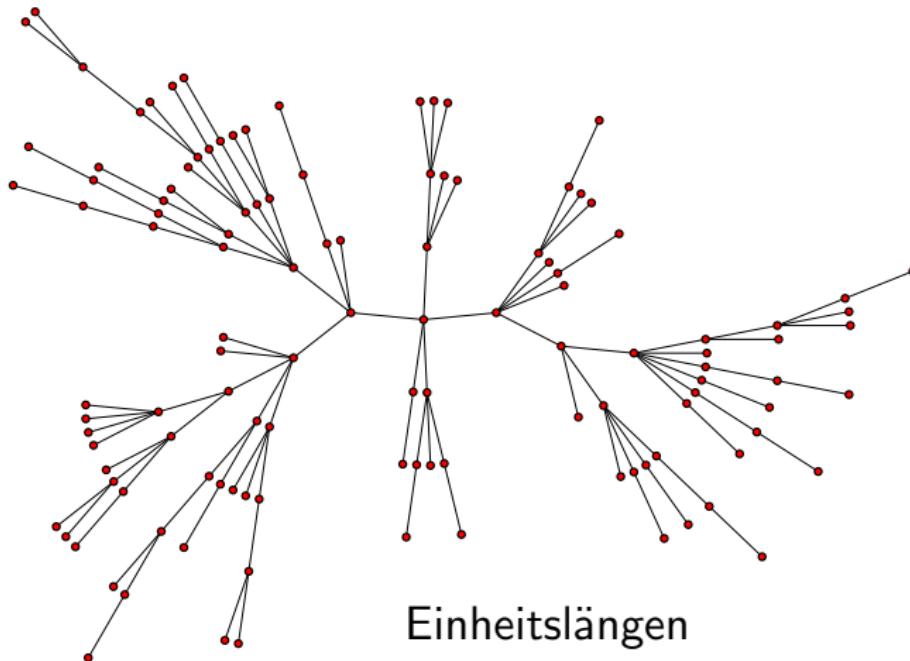
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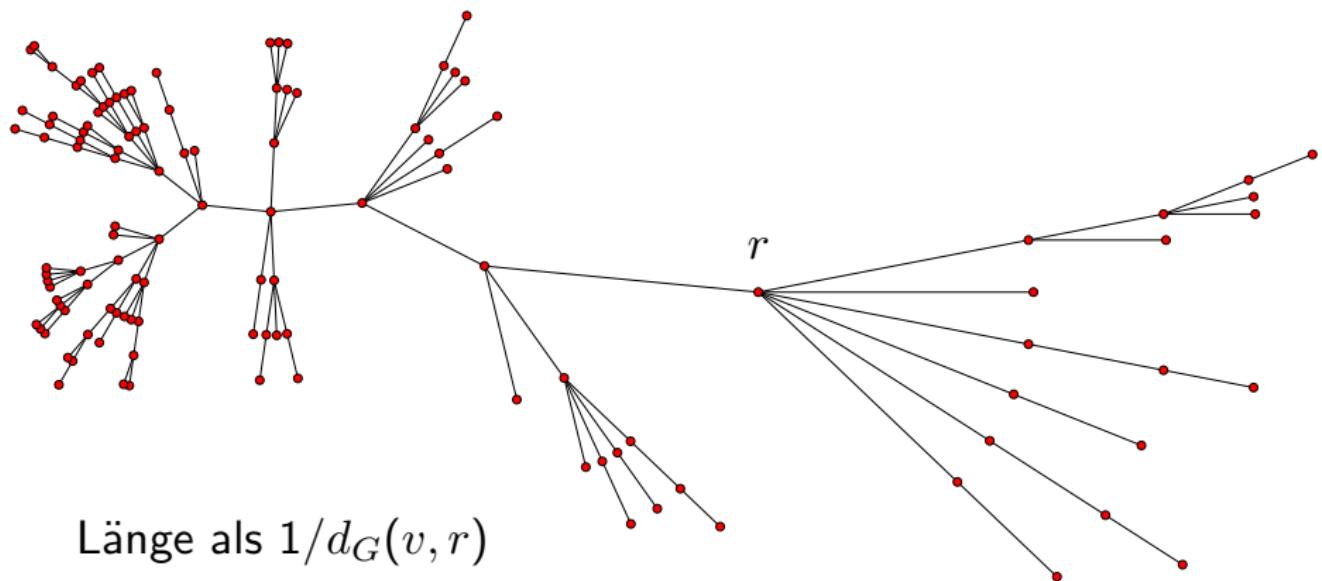
Beispiel



Längenzuweisungen

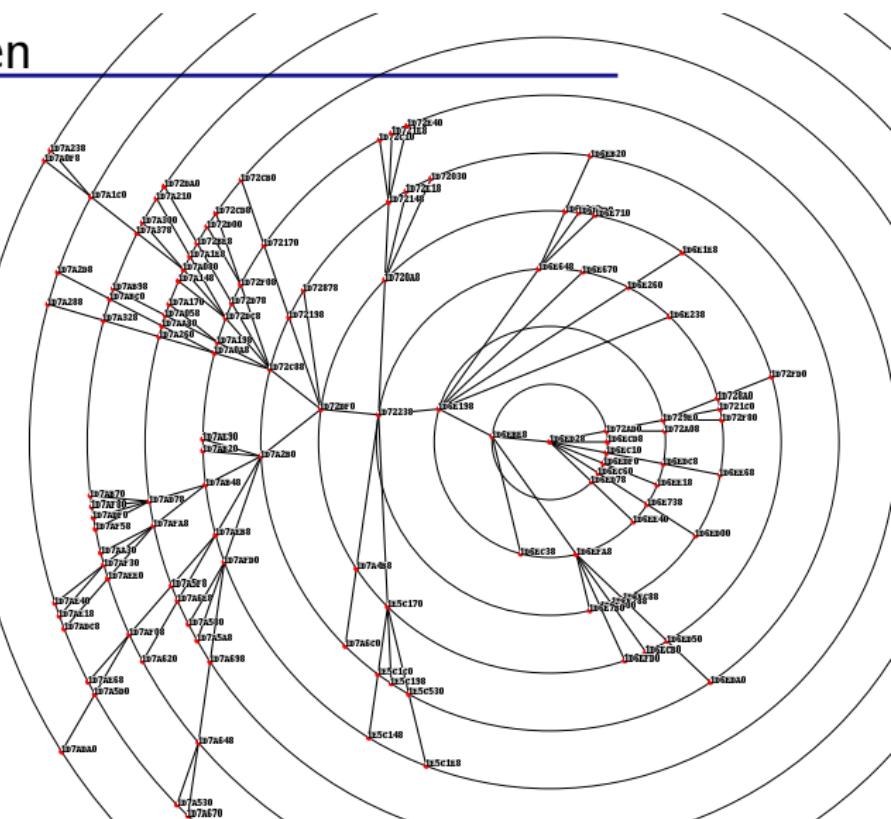


Längenzuweisungen



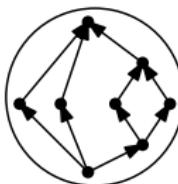
Länge als $1/d_G(v, r)$

Längenzuweisungen

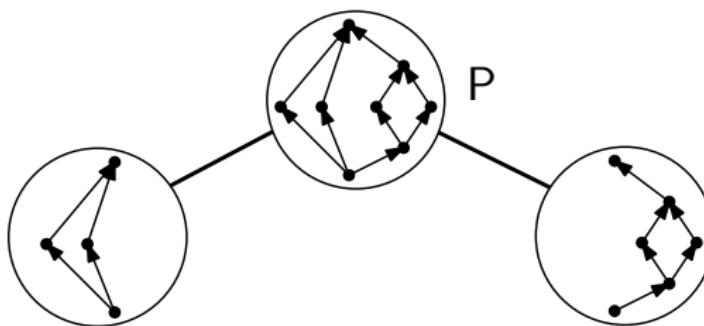


Radiallayout

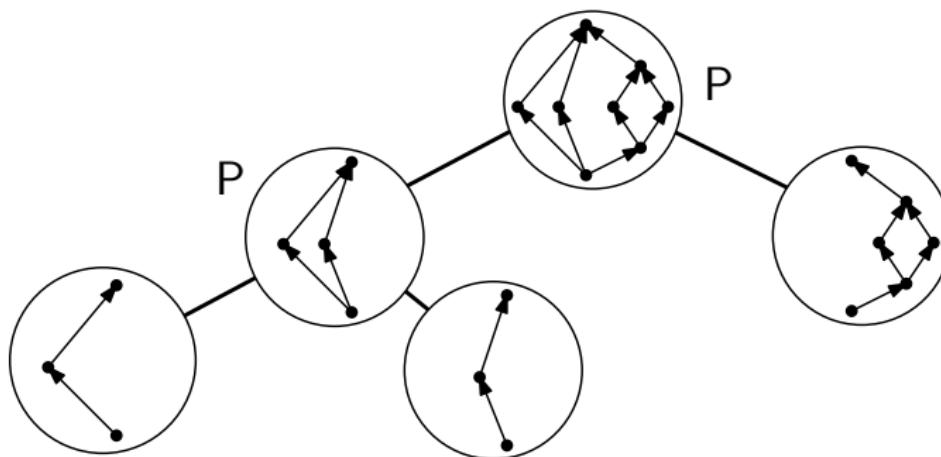
Serienparallele Graphen: Dekompositionsbaum



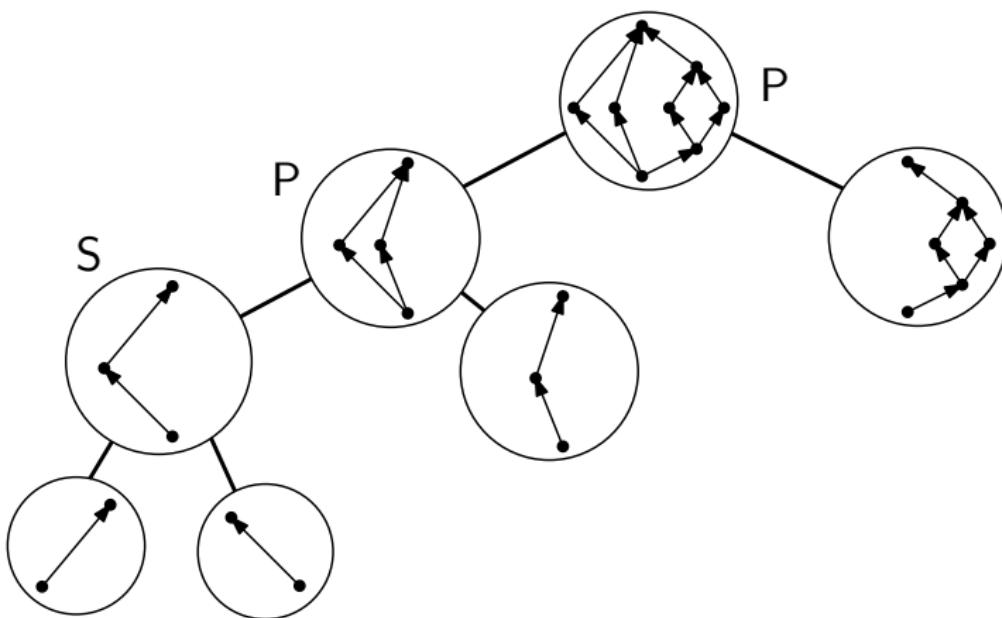
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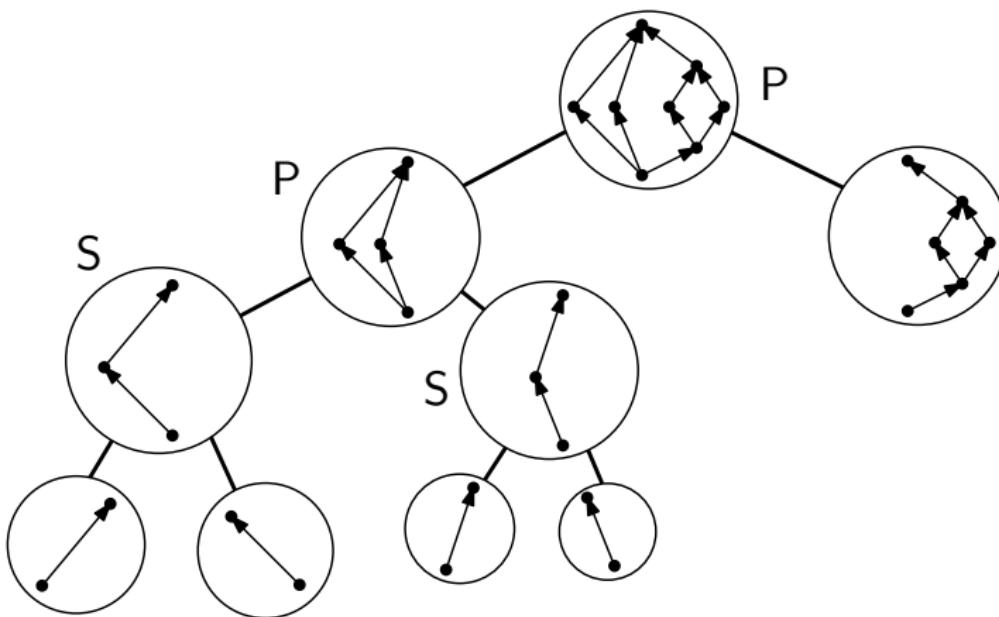
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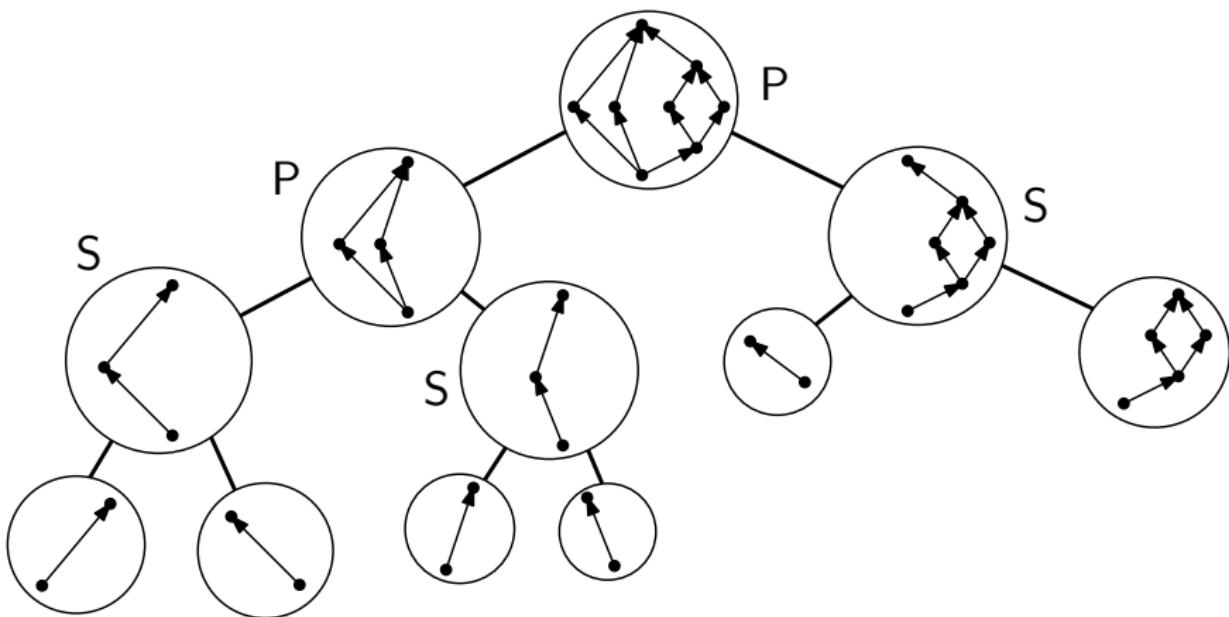
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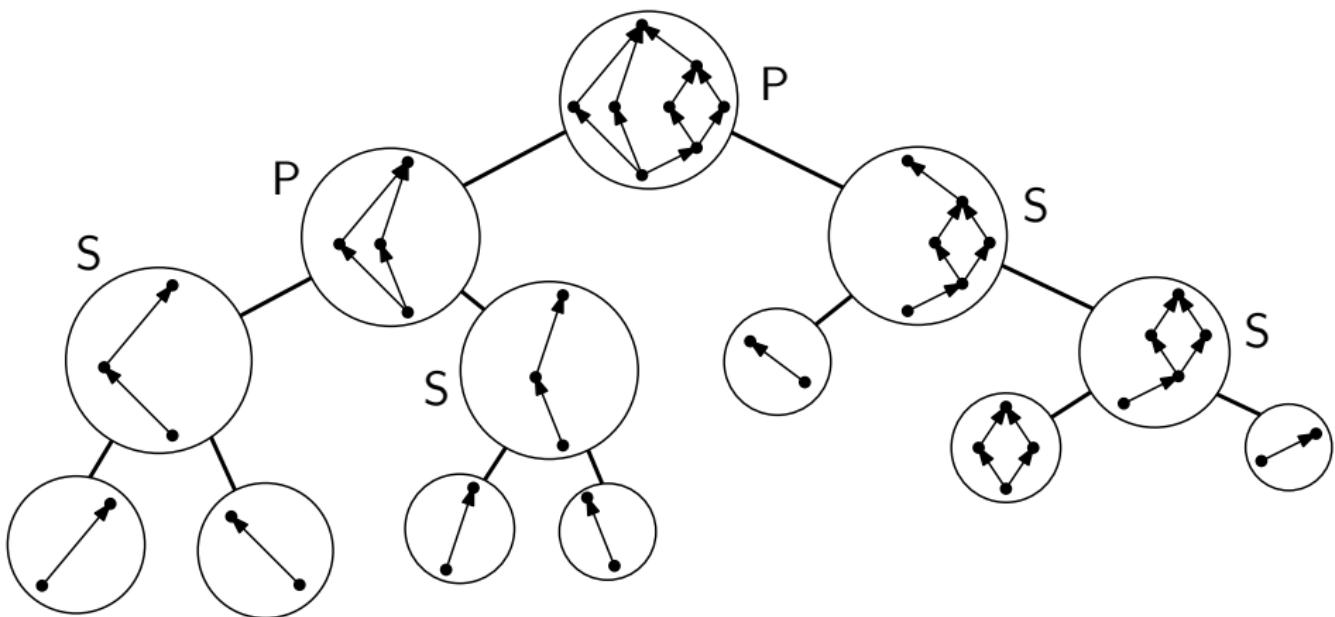
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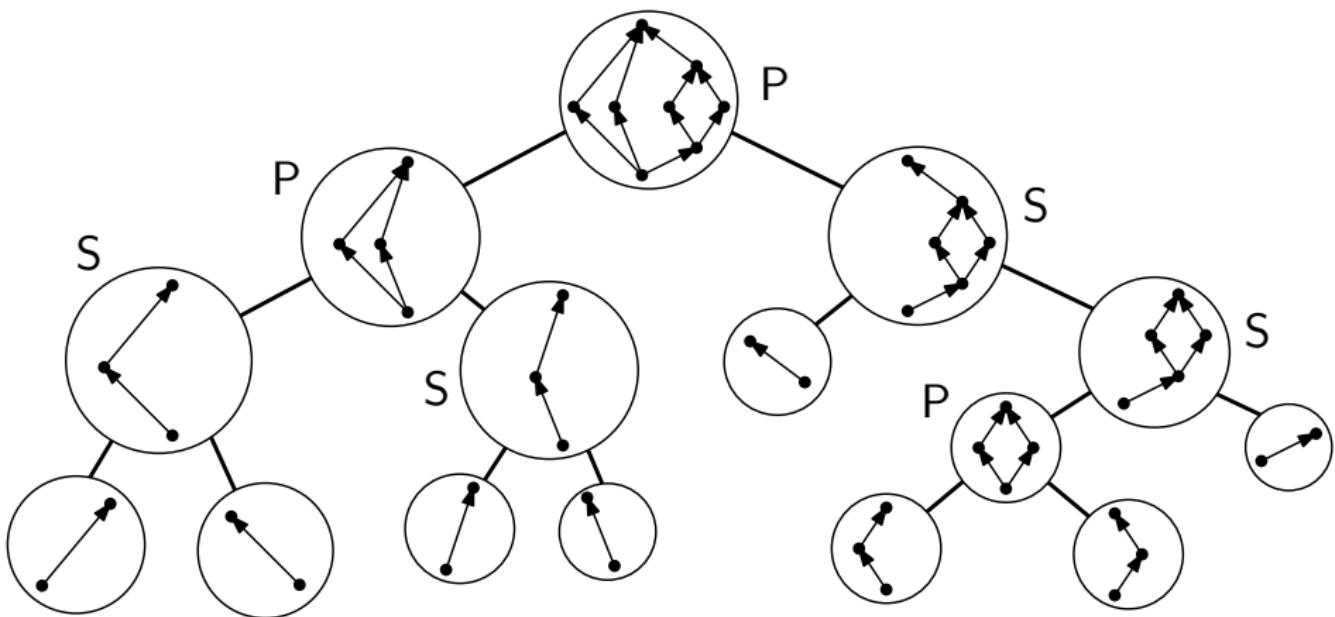
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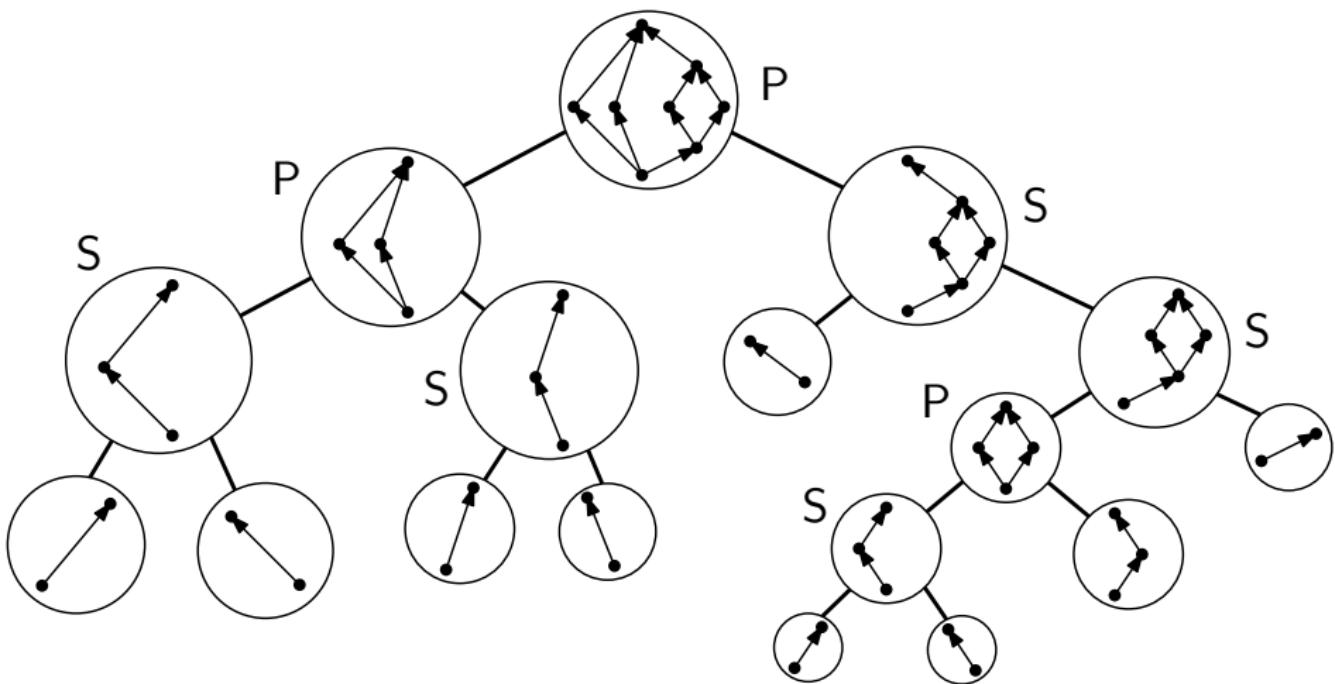
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