

# Succinct Representation of Labeled Graphs

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Seminar on Algorithms for Compressed Graphs

Presentation-Date

# Note for the Slide Discussion

- graphics will be replaced in a later version by own graphics and some will be animated.
- Key points are not fixed, they just represent what should be explained on the slides.

# Motivation

- Large Graphs
  - ...
- 
- Goal/Advantage from this topic

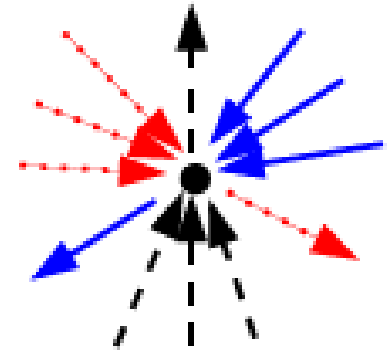
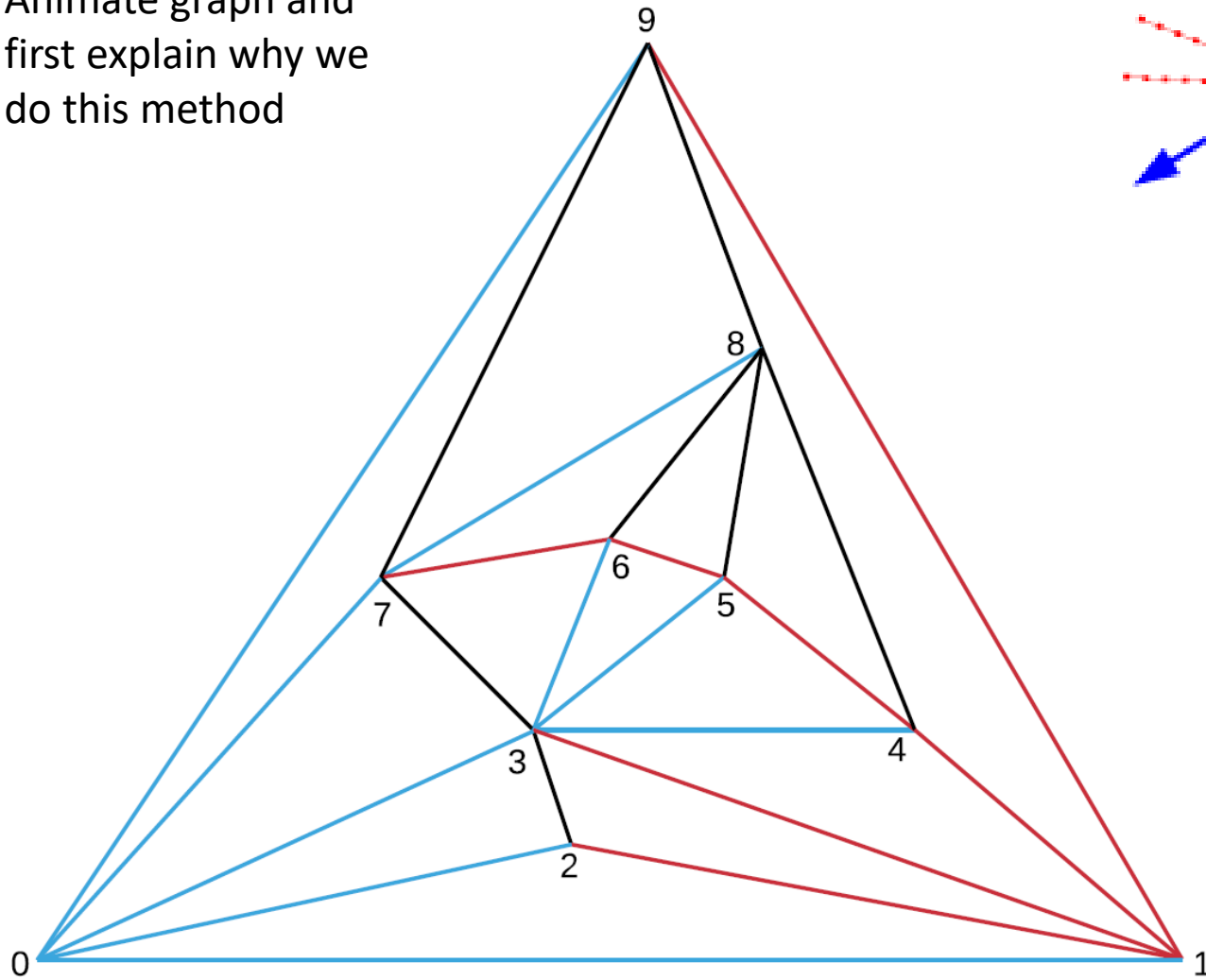
# Outline

- Triangulated Graphs
  - Creation of the Spanning Trees
  - Generate the parenthesized representation
  - Extension for labels using the example of edge (or vertices) labels
- Extended for planar graphs
- (Rough explanation for k-page Graph)

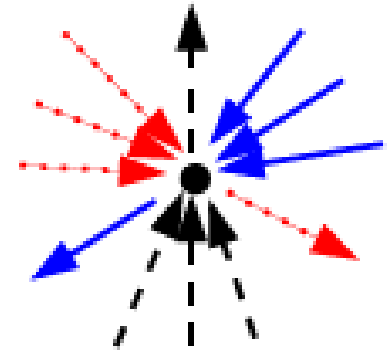
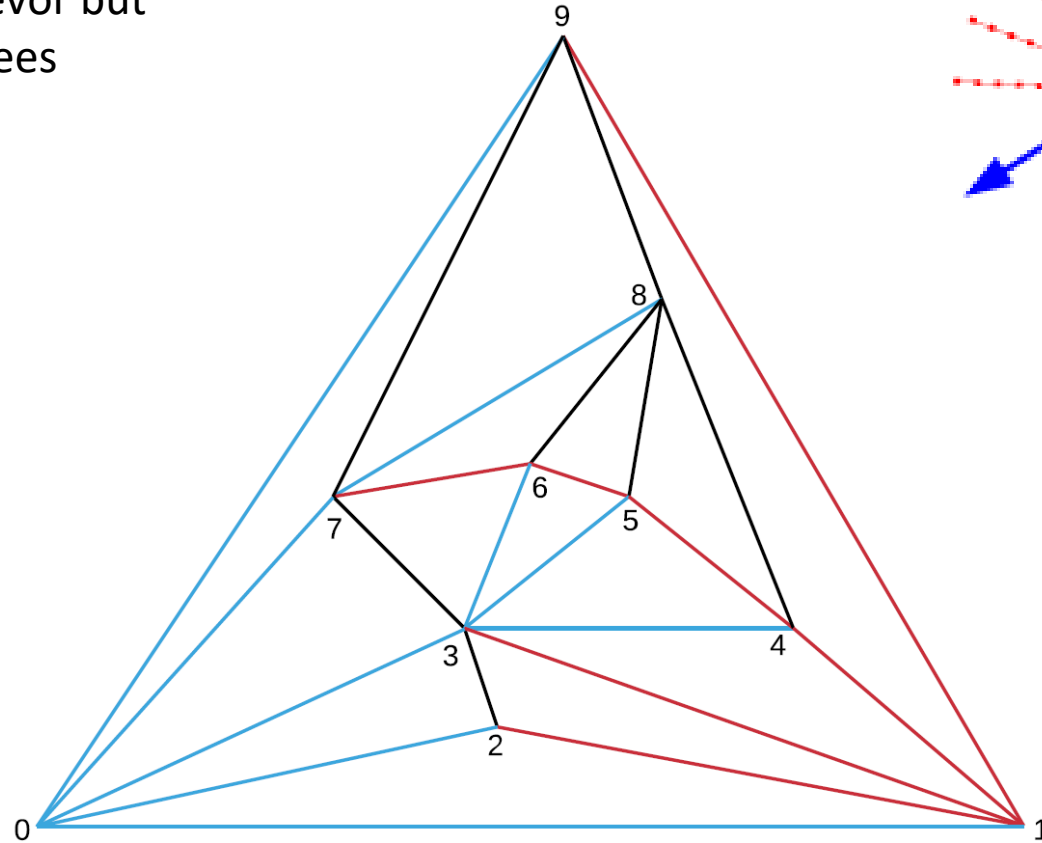
# Planar/Triangulated Graphs

- Planar Graph  
(Insert Picture to explain)
- Triangulated Graphs  
(Insert Picture to explain)

Animate graph and  
first explain why we  
do this method



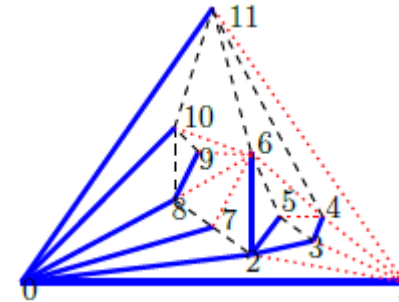
Like slide bevor but  
for other Trees



formally how to do that

# Parenthesized representation

- Pics currently not for the example on the slides before



- Explain and also the other cases



# Parenthesized representation

- How to merge the different parentheses
- As comparison insert here the Tree T1 to the compare

$$S \left( ([[[[()()]{}]]\{\}]\{\})\{\}\{[[[]\{\}()\{\}(\}] (\{\}\{\}(\{\}))\{\}(\{\}\{\})] ) \right)$$

0 1    1 2 3 4    4 3 5    5 6    6 2 7    7 8    9 9 8 10    10 11    11 0

# Parenthesized representation

- How to read the parentheses
- [To be extended]

$$S \left( ([[[[()([)](\{[\{\}())\}\{()][\{()\{\}())\}]([\{\}\{\}({})])\{\}(\{\}\{\})]) \right)$$

0 1    1 2 3 4    4 3 5    5 6    6 2 7    7 8    9 9 8 10    10 11    11 0

# Parenthesized representation

- Why to use the parentheses
- Explain Results and supported functions

# Labeled Graphs

- Not yet clear how I can present this usefully

# Planar Graphs

- Explain (with pic) how to transform from Planar to Triangulated
- What does it mean for the space and functions-runtime?

# K-Page Graphs

- Not yet clear how I can present this usefully
- Non formally, only explain what k-Page graphs are and the results (e.g. that the check for adjacent will be faster ( $O(\lg k)$ ) than for others works)

# Summary

- Recap shortly
- Embed results
  - Compression of the space to the information-theoretic minimum. Runtimes like uncompressed

# End

Thank you for your attention!



# Literature

- J  r  my Barbay, Luca Castelli Aleardi, Meng He, J. Ian Munro: Succinct Representation of Labeled Graphs, ISAAC 2007.
- ...