LexBFS and its applications

Guillaume Aubian

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Overview

What's in a graph ?

W

e consider non-oriented, simple and **connected** graphs

INCLUDE GRAPHS EXAMPLES AND COUNTEREXAMPLES

Generic Search

INCLUDE GRAPH EXAMPLE

Definition

for i in 1, . . . , n let u an unvisited marked vertex (any vertex if i = 1) visit u for v in neighbours(u) mark v

Another Characterization

Let's number vertices in the order they are visited.

Theorem

An order σ corresponds to a Generic Search if and only if

$$\forall a <_\sigma b <_\sigma c, ac \in E \text{ and } ab \notin E, \exists d <_\sigma b \text{ st } db \in E$$

INCLUDE DRAWING

DFS

INCLUDE GRAPH EXAMPLE

Definition

for i in 1, . . . , n u an unvisited vertex with maximum label (any vertex if i = 1) visit u for v in neighbours(u) label[v] = i

Another Characterization

Let's number vertices in the order they are visited.

Theorem

An order σ corresponds to a DFS if and only if

INCLUDE DRAWING

BFS

Definition

for i in n, . . . , 1 u an unvisited vertex with maximum label (any vertex if i = n) visit u for v in neighbours(u) if v has no label label[v] = i

INCLUDE GRAPH EXAMPLE

Another Characterization

Let's number vertices in the order they are visited.

Theorem

An order σ corresponds to a BFS if and only if

INCLUDE DRAWING

Let's rewrite BFS

Definition

for i in n, . . . , 1 let u an unvisited vertex with maximum first element of the label (any vertex if i = n) visit u for v in neighbours(u) append i to label[v]

INCLUDE GRAPH EXAMPLE

Here is LexBFS

Definition

for i in n, . . . , 1 let u an unvisited vertex with lexicographical maximum label visit u for v in neighbours(u) append i to label[v]

INCLUDE GRAPH EXAMPLE

Another Characterization

Let's number vertices in the order they are visited.

Theorem

An order σ corresponds to a LexBFS if and only if

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- Beamer
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Instructor	Title
Sascha Frank	LaTeX Course 1
Sascha Frank	Course serial