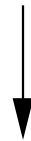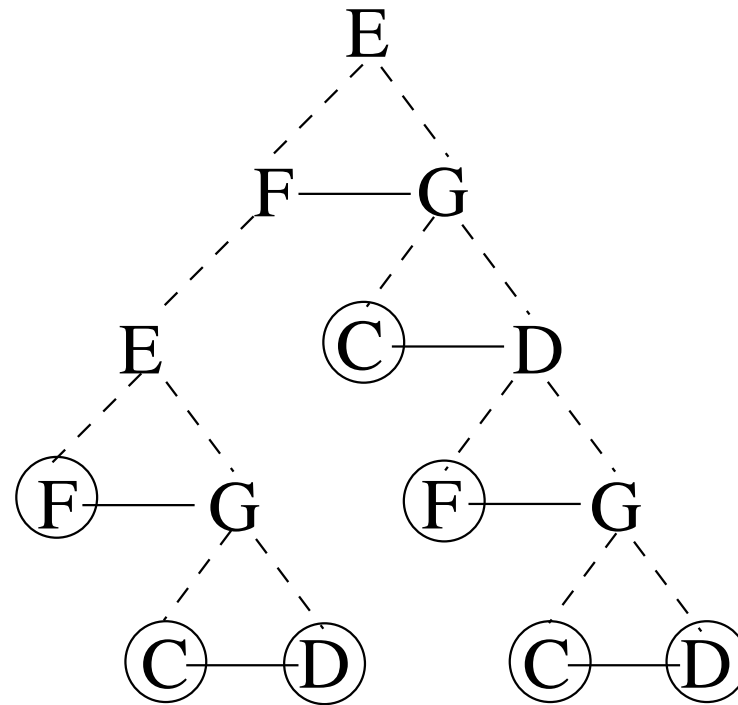# A Yield Operation for Multidimensional Tree Structures
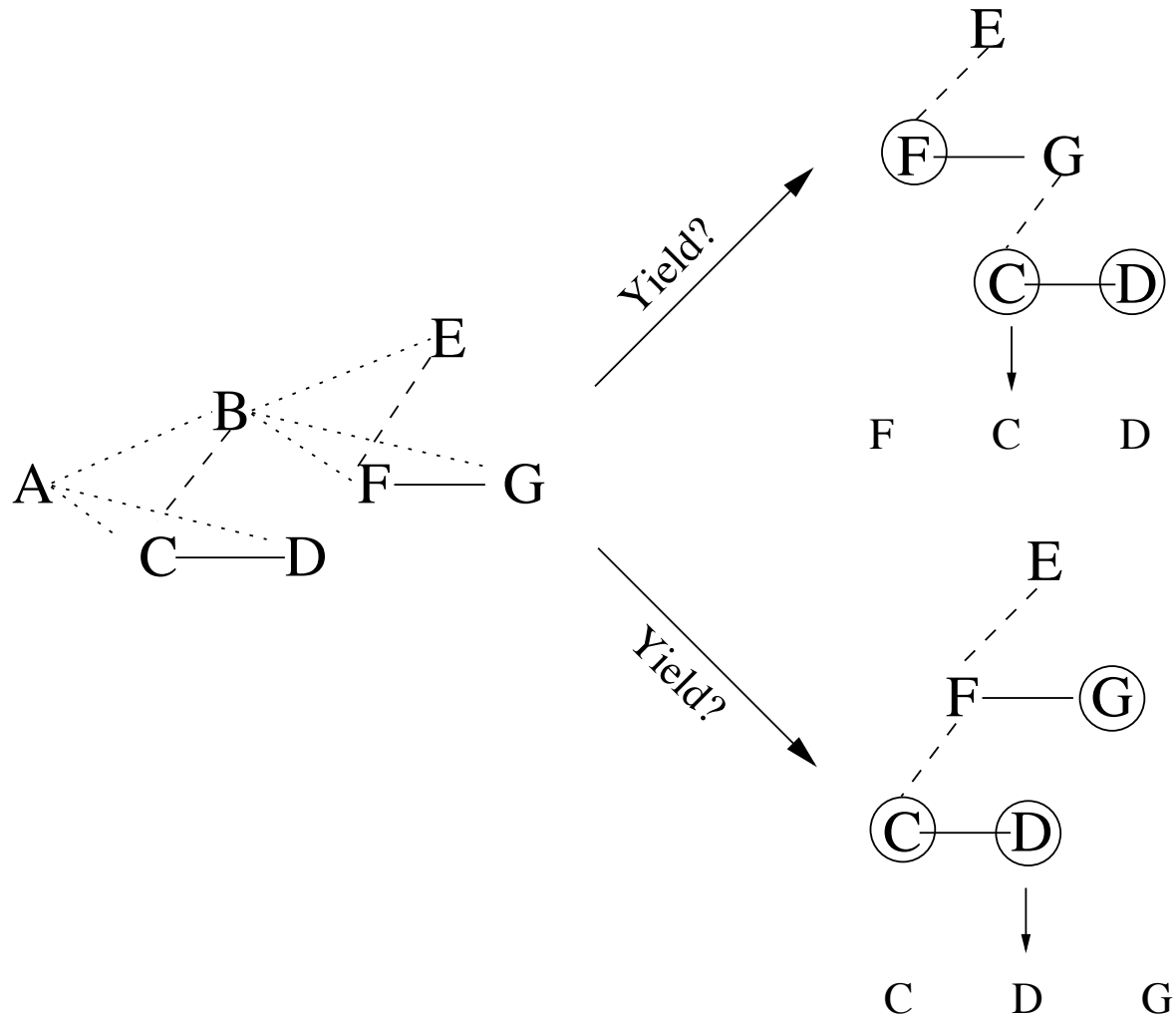
Alex Lemann, David Brown,

Colin Kern, Greg Sandstrom

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Yield Operation

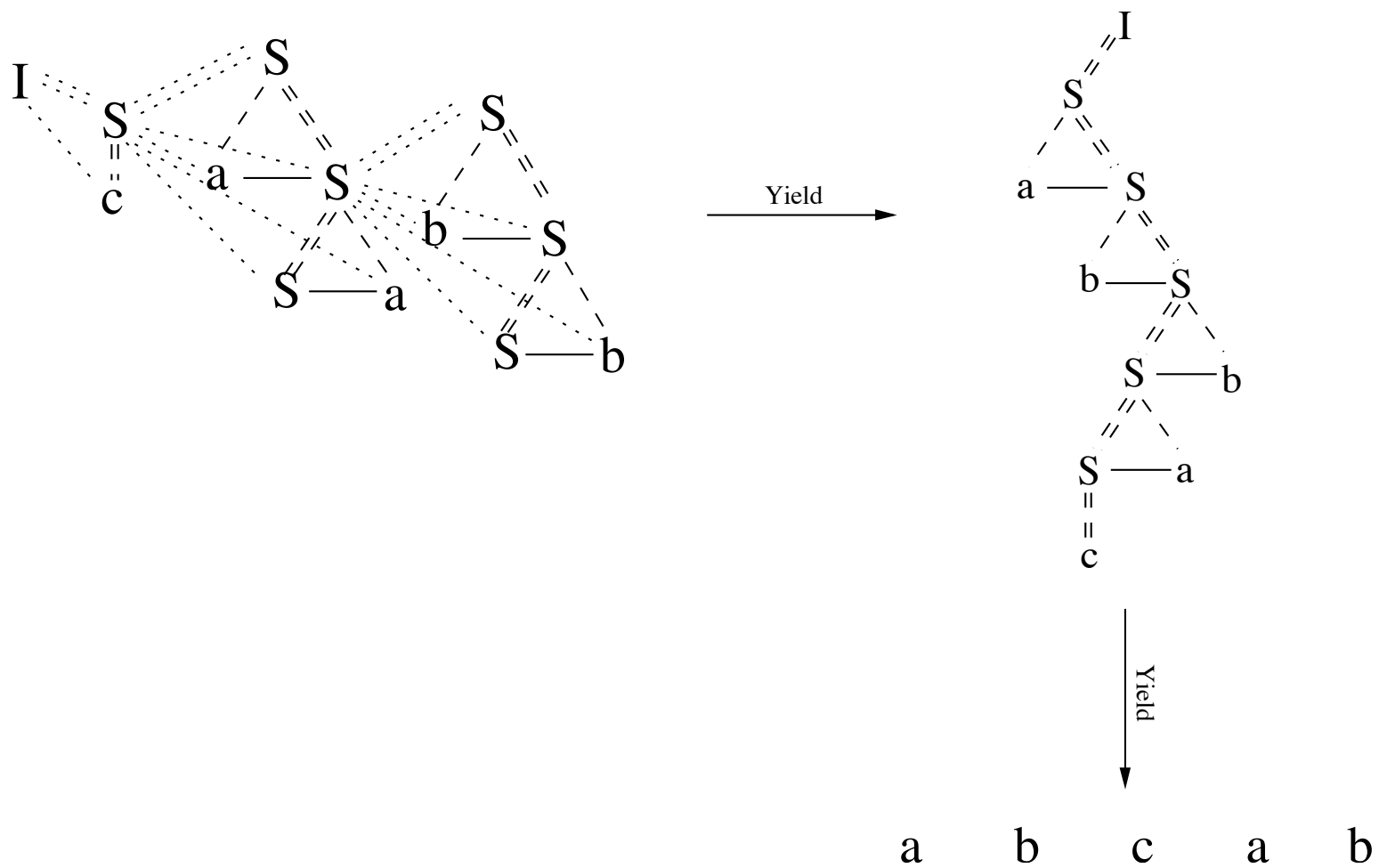# Yield Operation Ambiguity

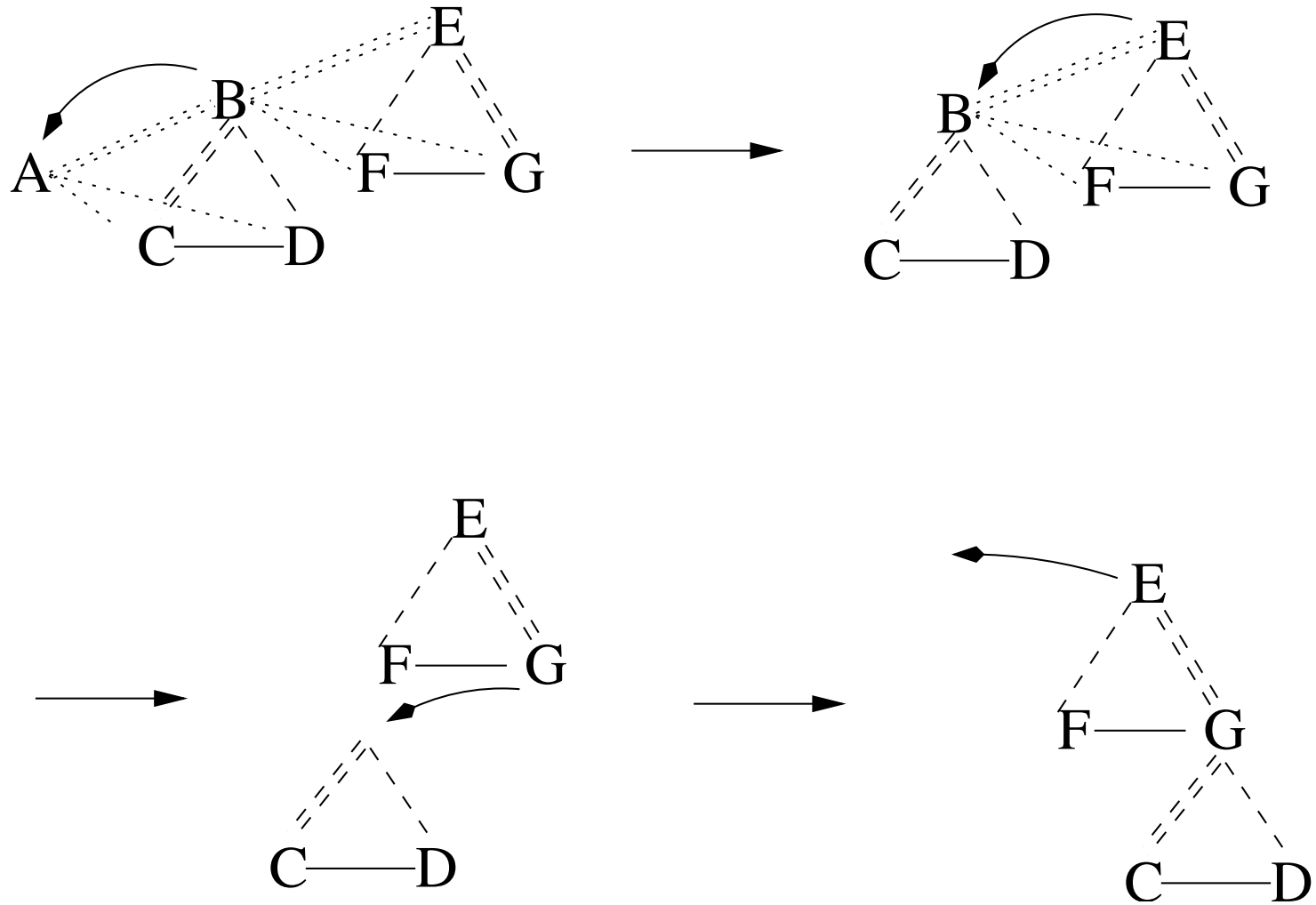# Higher-Dimensional Yield Operation

a   b   c   a   b
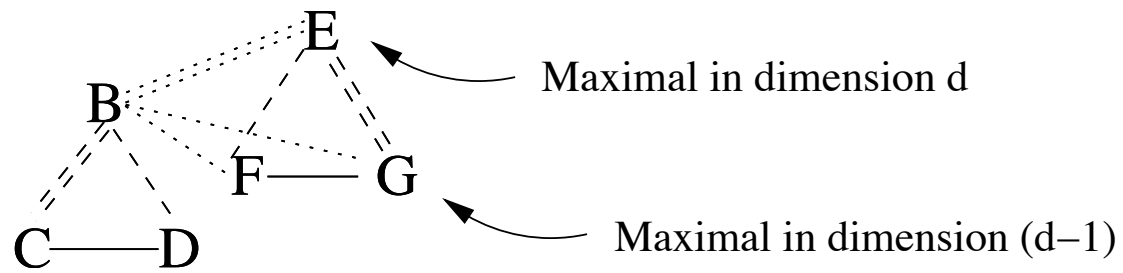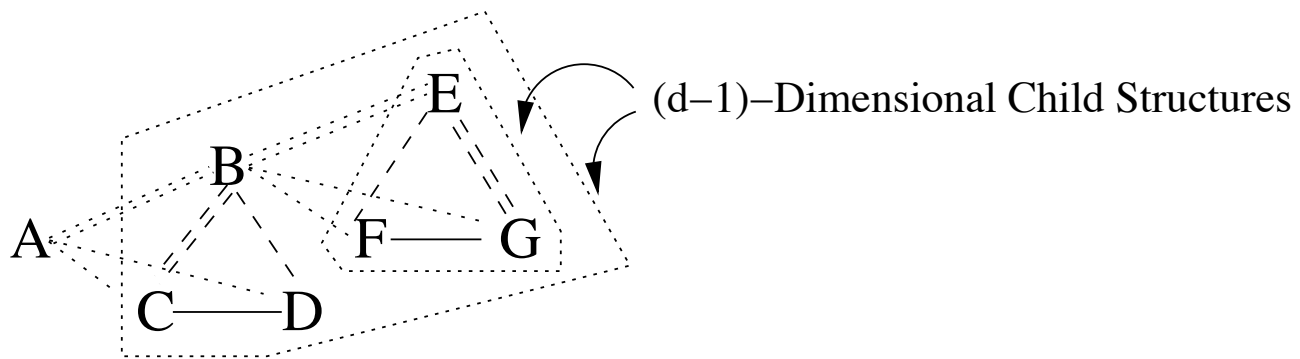
Algorithm

- Top-down, recursive descent.

- Reduces a d-dimensional tree to a $(d-1)$-dimensional tree.

- For each node n in d-dimensional spine: replace n with its $(d-1)$-dimensional child-structure.

- If n had a $(d-1)$-dimensional successor, is made the successor of the maximal $(d-1)$-dimensional child of n.

Algorithm Example

Justification of Algorithm

(d−1)−Dimensional Child Structures

Maximal in dimension d

Maximal in dimension (d−1)

Future Work

- Iteration of yield operation allows use of multi-dimensional trees as string-generating formalisms.

- As the dimensionality increases, so does the generative capacity.

- Infinite hierarchy equivalent to Weir's Control Language Hierarchy (Context-Free Grammars for $d = 2$, Tree Adjoining Grammars for $d = 3, \ldots$).