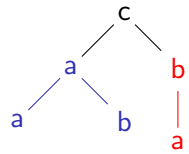
Stackless Processing of Streamed Trees

Corentin Barloy, Filip Murlak, Charles Paperman

Highlights 2021

Processing streamed trees

XML encoding of trees:



$\langle c \rangle$
  $\langle a \rangle$
    $\langle a \rangle \langle / a \rangle$
    $\langle b \rangle \langle / b \rangle$
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  $\langle b \rangle$
    $\langle a \rangle \langle / a \rangle$
  $\langle / b \rangle$
$\langle / c \rangle$

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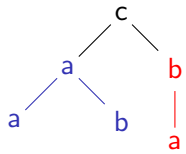

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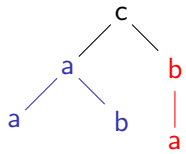

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For instance, the RPQ associated to ca^*b.

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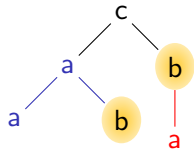

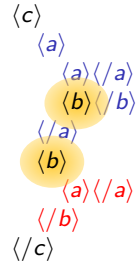

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Evaluation in constant memory VS linear memory

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- It is very limited: $//a/b$ and $//a//b$ are not doable.
- All RPQs can be evaluated with a stack, but this is costly.

Evaluation in logarithmic memory (Stackless automata)

Main ingredients:
- a finite state machine,
- a counter that stores the current depth in the tree,
- a finite number of registers where the counter values can be stored,
- can compare register values with the current depth.

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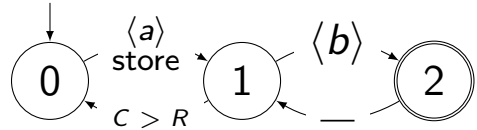
Evaluating:

$(a+b+c)^*a(a+b+c)^*b$

//a//b



Main result

Theorem

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(`//a//b` is doable but still not `//a/b`)

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- Ongoing work on vectorization.