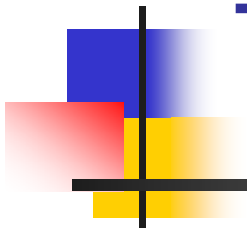
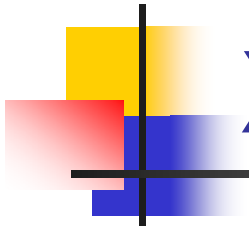


COMP4317: XML & Database
Tutorial 8: Streaming Xpath

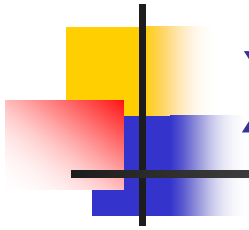
Week 9

Thang Bui @ CSE.UNSW



Xpath Evaluation on Tree

- void eval(exp, idx, node)
  - Evaluate filters if any
  - If (idx1 = slashslash(exp))
    - eval(exp, idx1, node)
  - If (exp[idx] == node.tag)
    - isEnd(exp, idx)? => return node on result
    - For any child x of node
      - eval(exp, idx+1, x)



Xpath Evaluation on Tree

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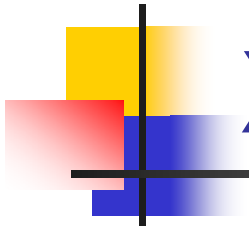
  - Evaluate filters if any
  - If (idx1 = slashslash(exp))
    - eval(exp, idx1, node)
  - If (exp[idx] == node.tag)
    - isEnd(exp, idx)? => return node on result
    - For any child x of node
      - eval(exp, idx+1, x)

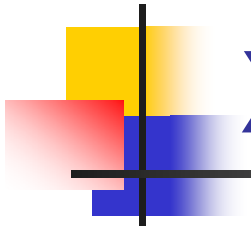
KMP/automaton!

repeated nodes?



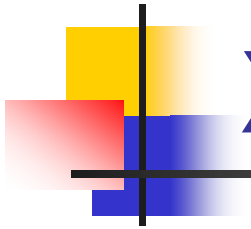
Xpath Evaluation on Tree (cont.)

- bool filter_eval(exp, idx, node)
  - If exp[idx] == “following-sibling”
    - return filter_eval(exp, idx, following(node))
  - If (exp[idx] == node.tag)
    - isEnd(exp, idx)? => return true
    - For any child x of node
      - filter_eval(exp, idx+1, x)
  - If (idx1 = slashslash(exp))
    - filter_eval(exp, idx1, node)



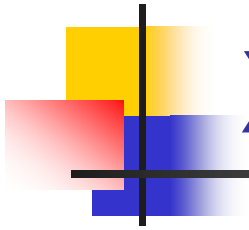
Xpath Evaluation on Tree

- Travel the tree
  - eval(root)
- Print the result
  - printNodeList
- Disadvantages?
  - Travel a subtree many times
    - (filter, main expression, slashslash expressions)



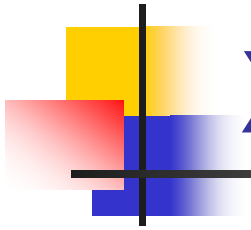
Xpath Evaluation on Tree

- Multiple recursive function calling
- vs.
- Multiple comparison (on multiple rails)



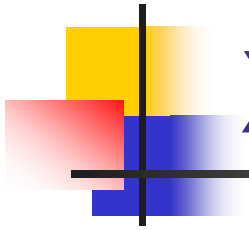
Xpath Evaluation on Tree

- For each node
  - Evaluate filters if any
  - For each “active” rail r
    - If (idx1 = slashslash(r.exp))
      - Make a new rail r1.exp = r.exp, r1.idx = idx1
    - If (r.exp[r.idx] == node.tag)
      - isEnd(r.exp, r.idx)? => return node on result
      - r.idx++



Xpath Evaluation on Tree

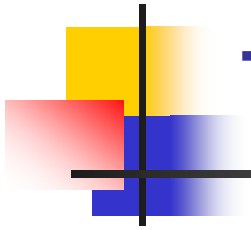
- Active rail?
  - /a/b => level 0 & level 1 only
    - level > 1 => inactive
  - //a/b => level idx and idx+1 only
    - Rail 1: level 0 and 1
    - Rail 2: level 1 and 2 (dup.)
    - Rail 3: level 2 and 3 (dup. of rail 2)
    - e.t.c.



Xpath Evaluation on Tree

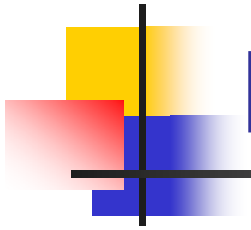
- Filter?
  - Filter rail
    - Stop at the first satisfied filter instance
      - Stop all other instance filter rail for the same subtree root **node**
  - End of a node?
    - All remained filter rails for that node are failed!
      - Remove a node from the candidate result list

Streaming Xpath Evaluation – Top-down evaluation

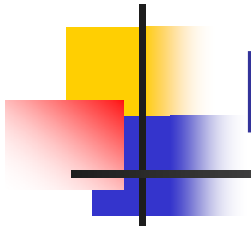


- startElement
  - For each active rail r
    - If (idx1 = slashslash(r.exp))
      - Make a new rail r1.exp = r.exp, r1.idx = idx1
    - If (r.exp[r.idx] == node.tag)
      - isEnd(r.exp, r.idx)? => return node on result (building subtree from here!)
      - r.idx++

Streaming Xpath Evaluation – Bottom-up evaluation



- Reverse expression
- endElement
  - All nodes from the root to that node are on the stack (reverse order)
    - If exp is matched back to the root => result
      - Just like a string to other string!

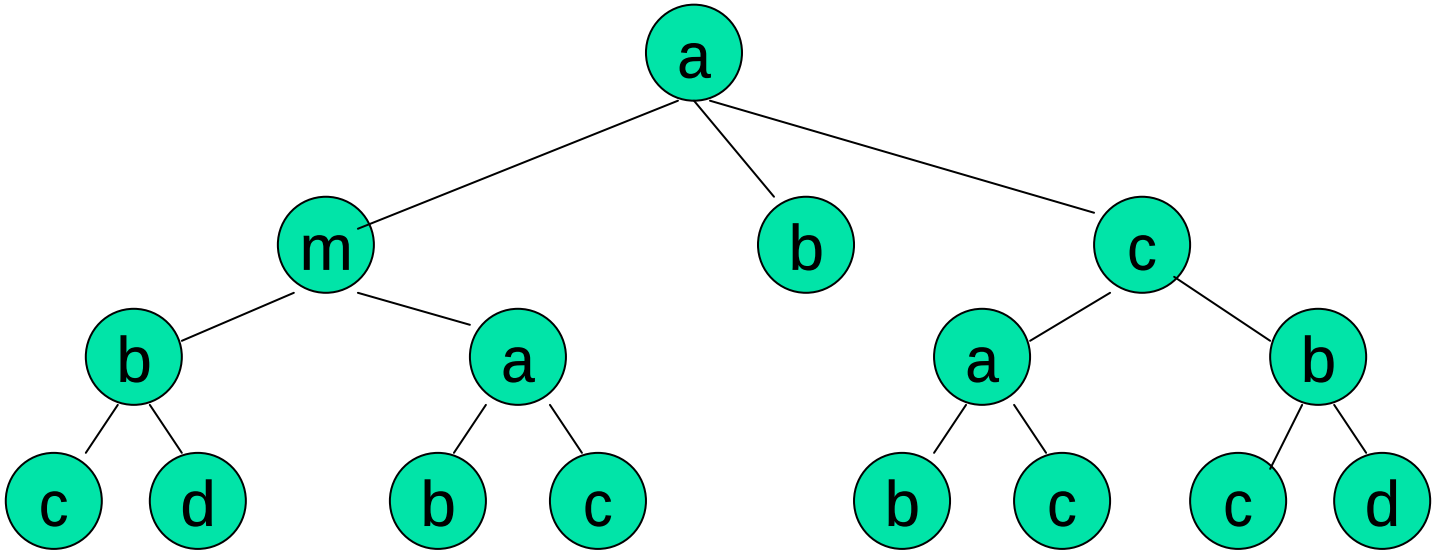


Example

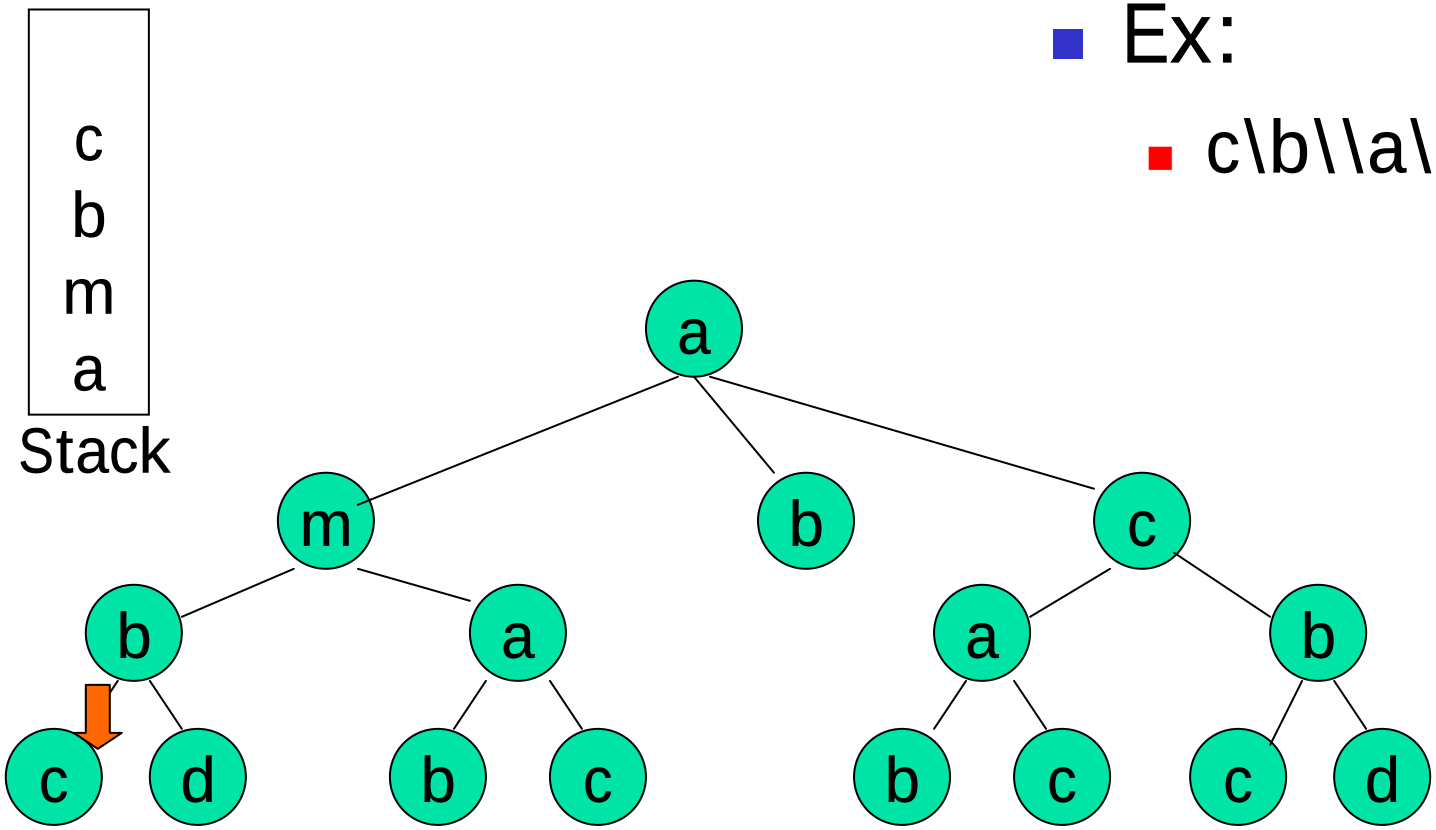
- Expression:
  - /a//b/c
- Reverse:
  - c\b\\a\

Bottom-up Evaluation

- Ex:
  - c\b\\a\



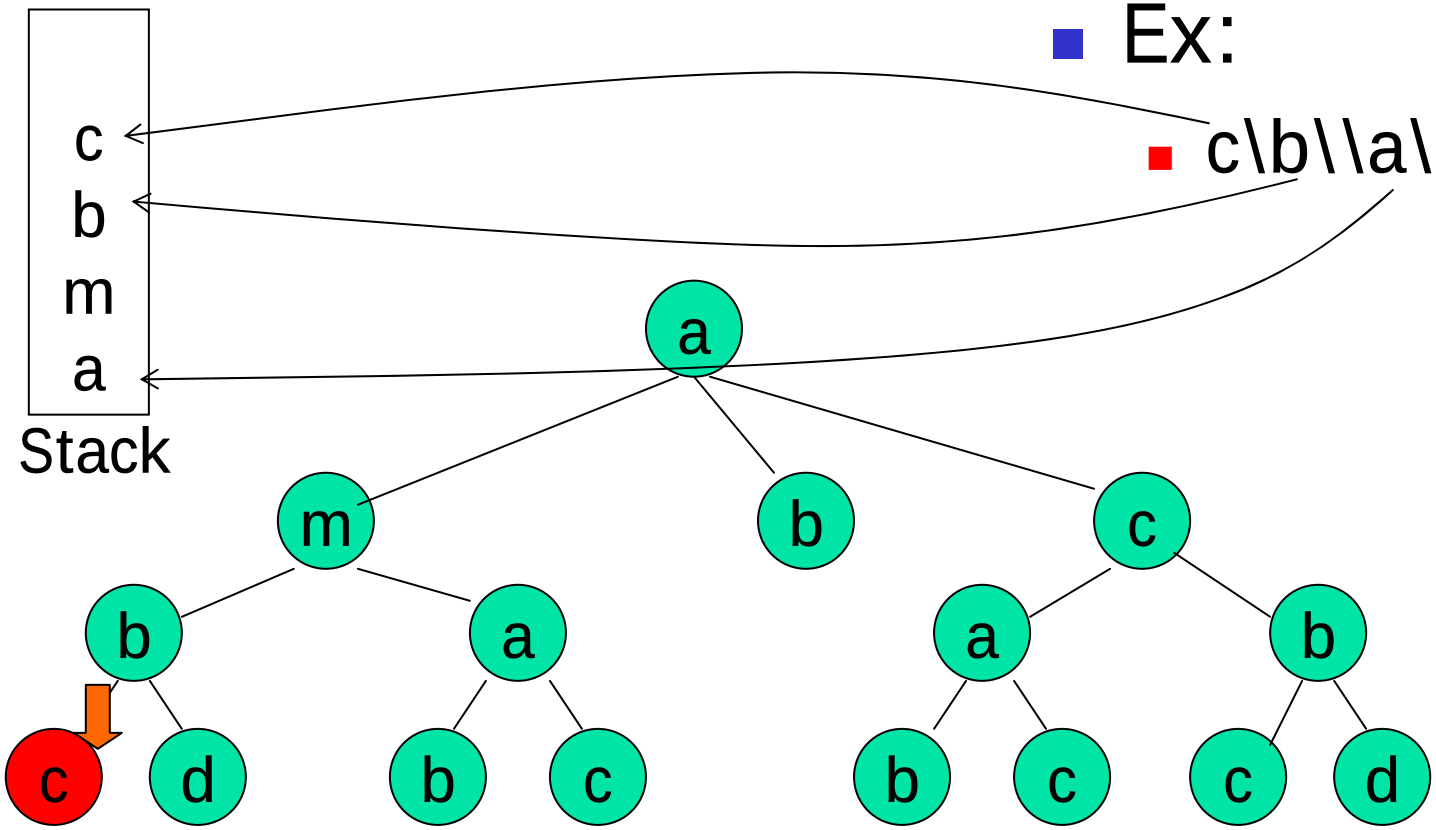
Bottom-up Evaluation



- Ex:
  - c\b\\a\

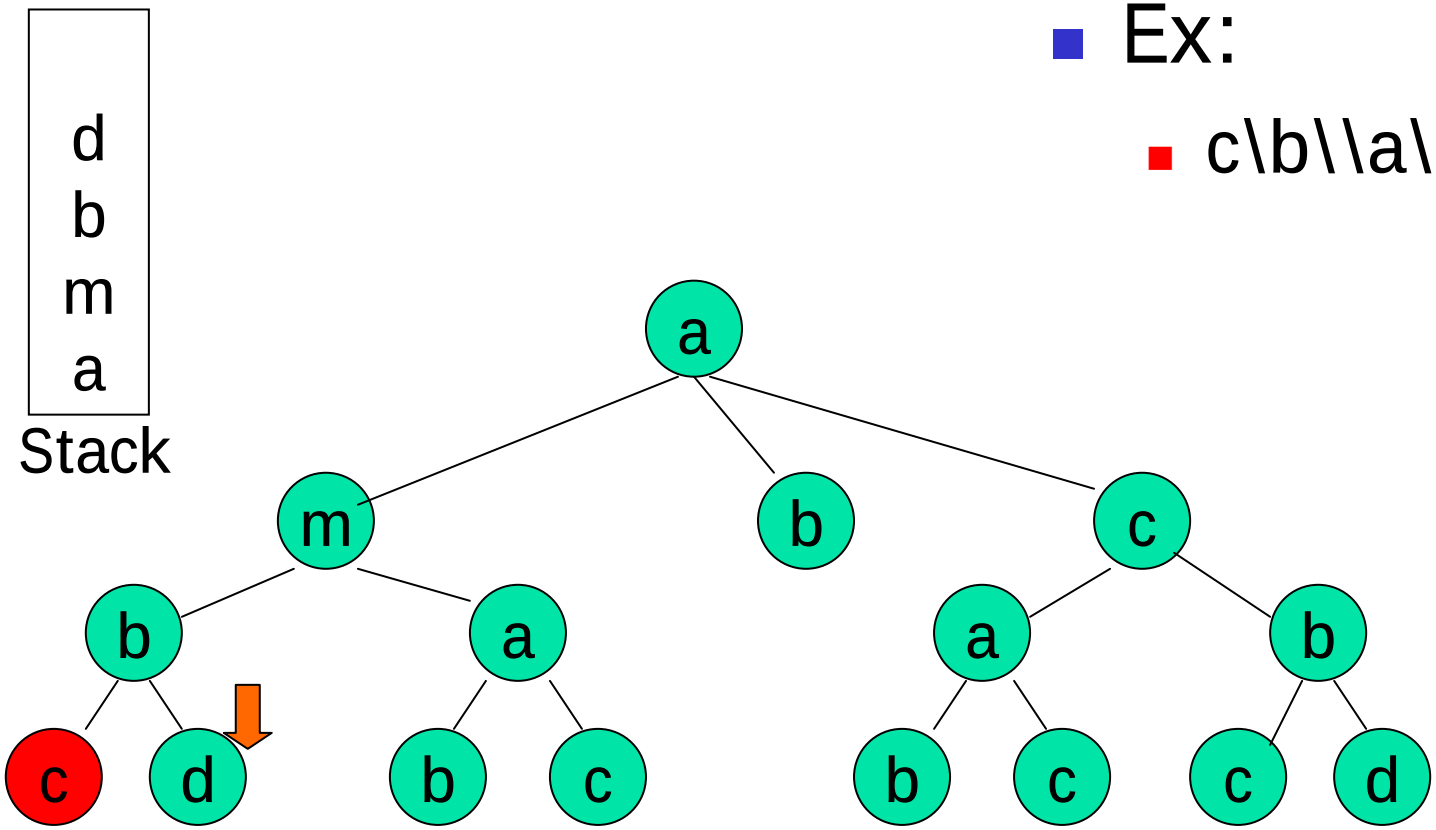
Bottom-up Evaluation

- Ex:
  - c\b\\a\



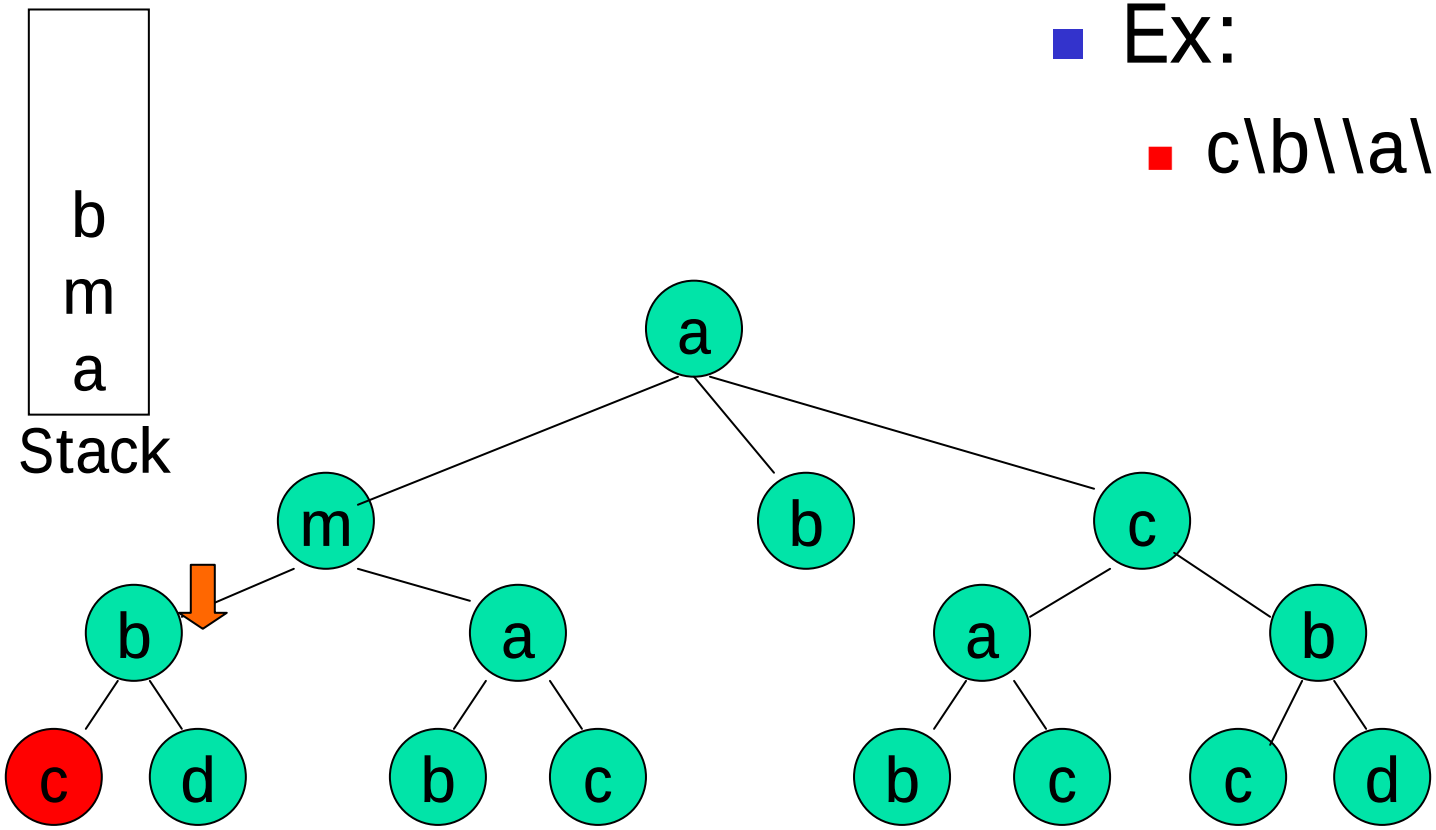
Bottom-up Evaluation

- Ex:
  - c\b\\a\



Bottom-up Evaluation

- Ex:
  - c\b\\a\



Bottom-up Evaluation

- Ex:
  - c\b\\a\