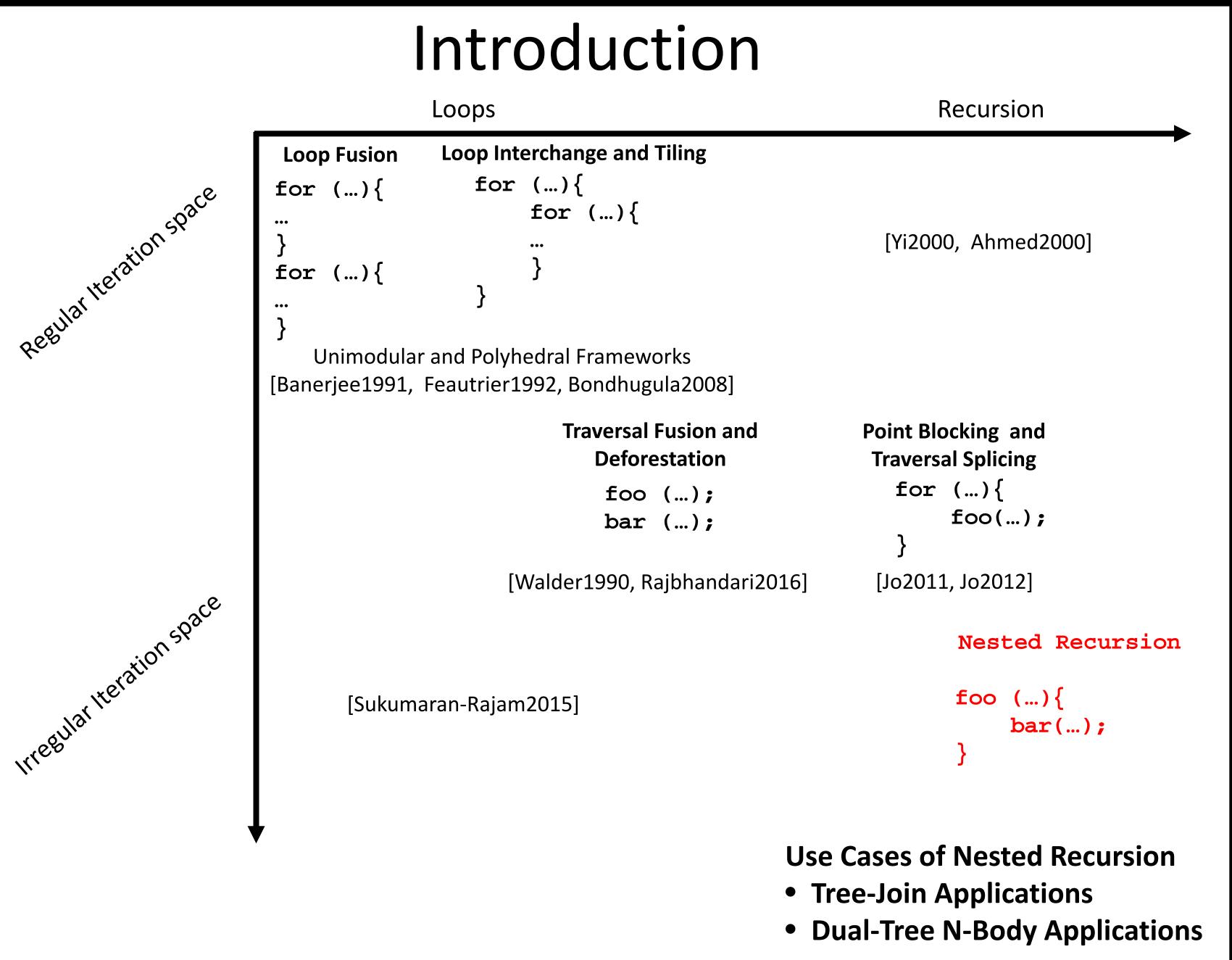


Locality Transformations for Nested Recursive Iteration Spaces Kirshanthan Sundararajah, Laith Sakka and Milind Kulkarni PURDUE School of Electrical and Computer Engineering, Purdue University

Outer



## Contributions

- Developed locality transformations for nested recursive iteration spaces
- Introduced recursion twisting, a recursion-friendly analog of loop titling
- Handling recursive iteration spaces with irregular bounds
- Achieved ~4x geo-mean performance enhancement using our transformations

## Recursion Interchange and Twisting

Nested Recursion

Inner

**Reuse Distance for the** 

**Inner Tree Nodes are** 

Bigger.

**Bad Locality!!** 

Node root\_o, root\_i;

recurseOuter(Node o){

if ( o == NULL ) return;

recurseInner(o, root\_i);

recurseOuter(o.left);

recurseInner(Node o, Node i){

join(o.data, i.data);

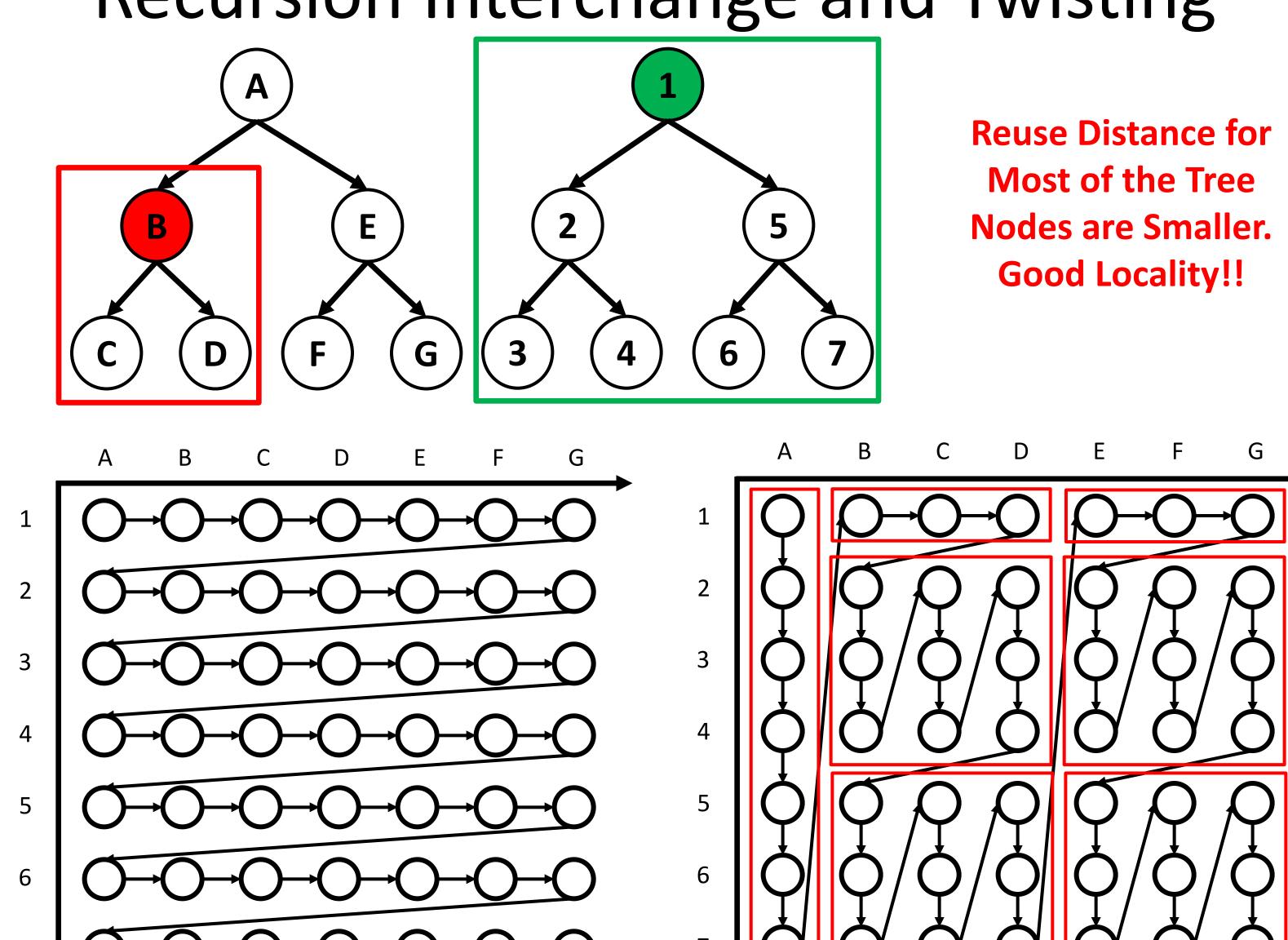
Input Size (Log Scale)

if ( i == NULL ) return;

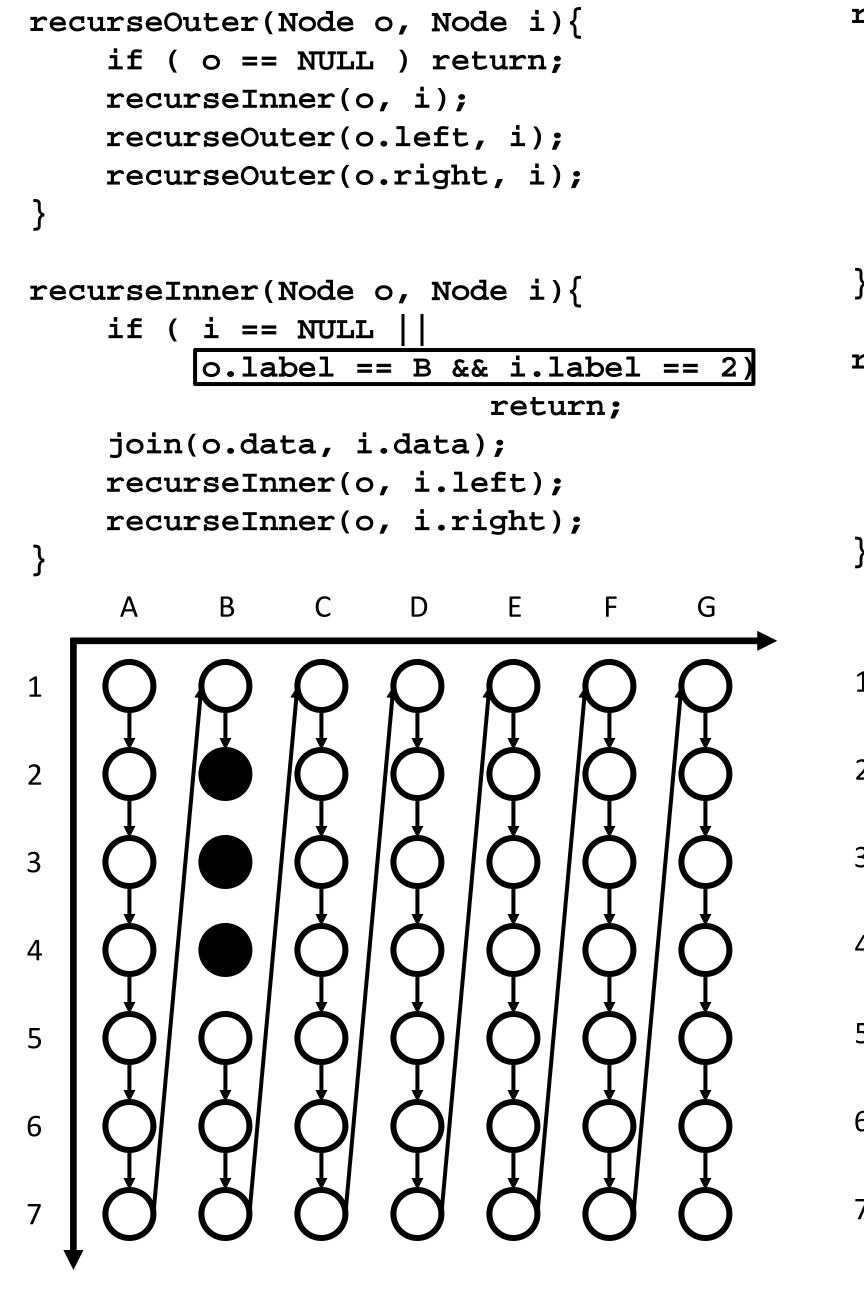
recurseInner(o, i.left);

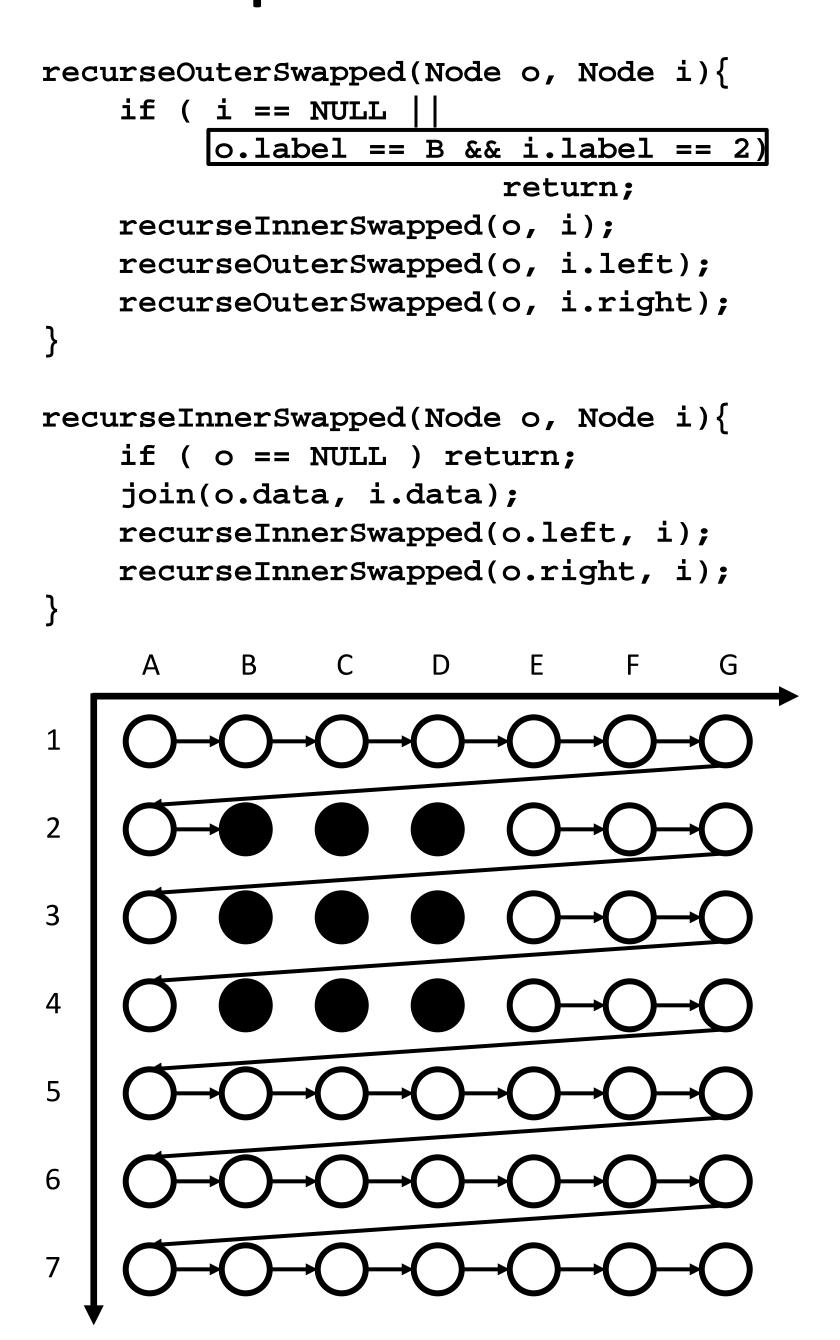
recurseInner(o, i.right);

recurseOuter(o.right);



## Irregular Iteration Spaces





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MM

Benchmarks

## Results

