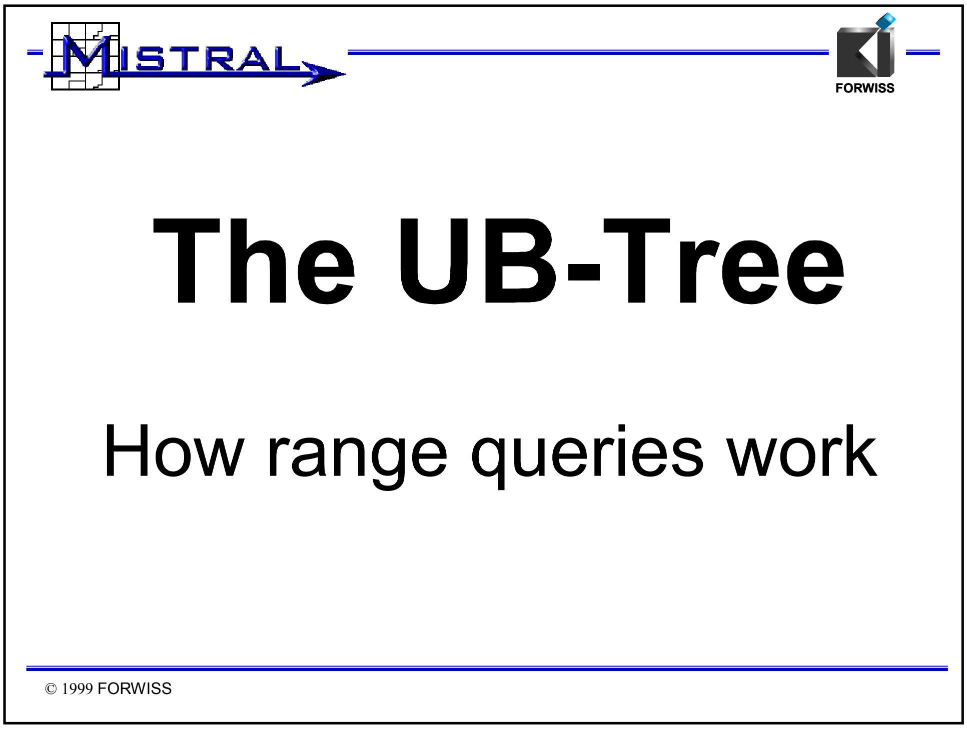

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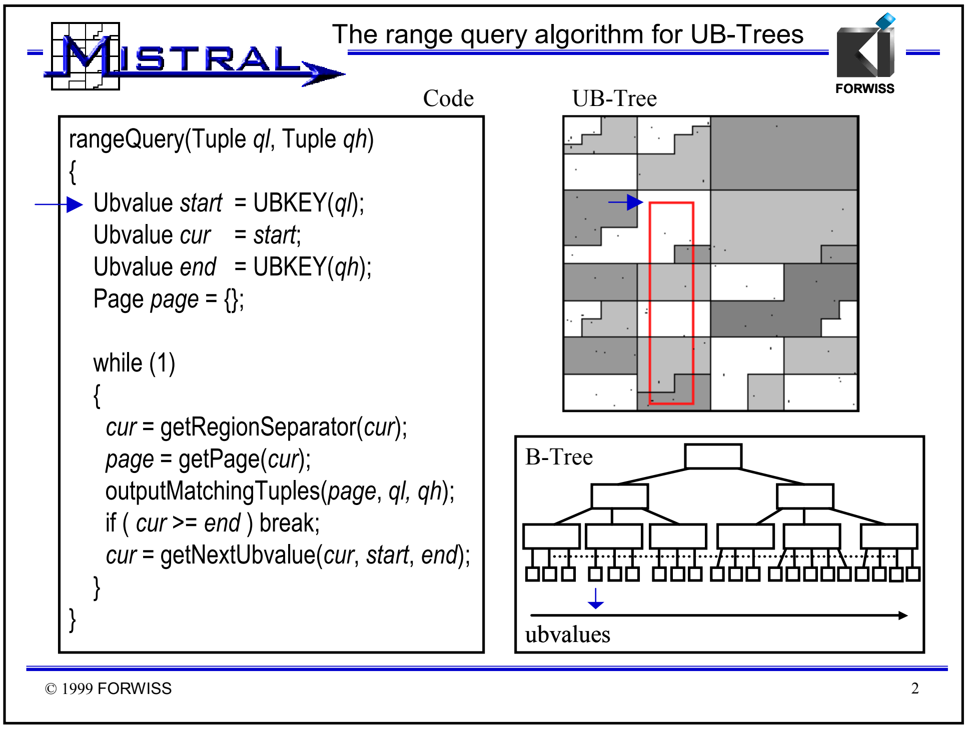
The UB-Tree

How range queries work



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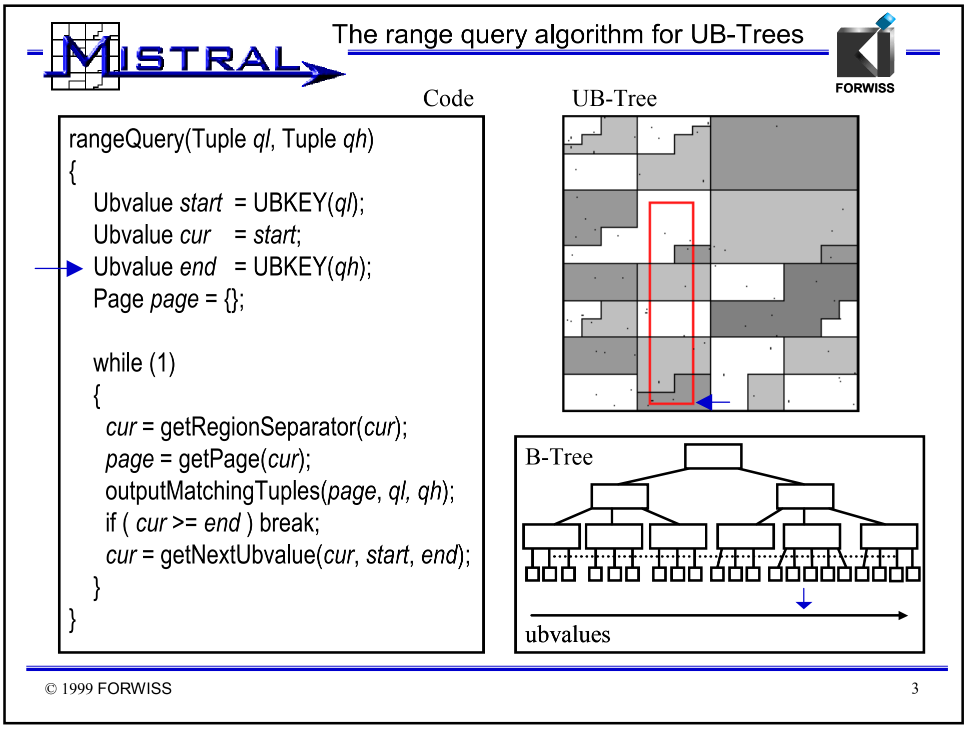
The range query algorithm for UB-Trees

FORWISS

```
rangeQuery(Tuple ql, Tuple qh)
{
→ Ubvalue start  = UBKEY(ql);
  Ubvalue cur    = start;
  Ubvalue end    = UBKEY(qh);
  Page page = {};

  while (1)
  {
   cur = getRegionSeparator(cur);
   page = getPage(cur);
   outputMatchingTuples(page, ql, qh);
   if ( cur >= end ) break;
   cur = getNextUbvalue(cur, start, end);
  }
}
```



The range query algorithm for UB-Trees

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     if ( cur >= end ) break;
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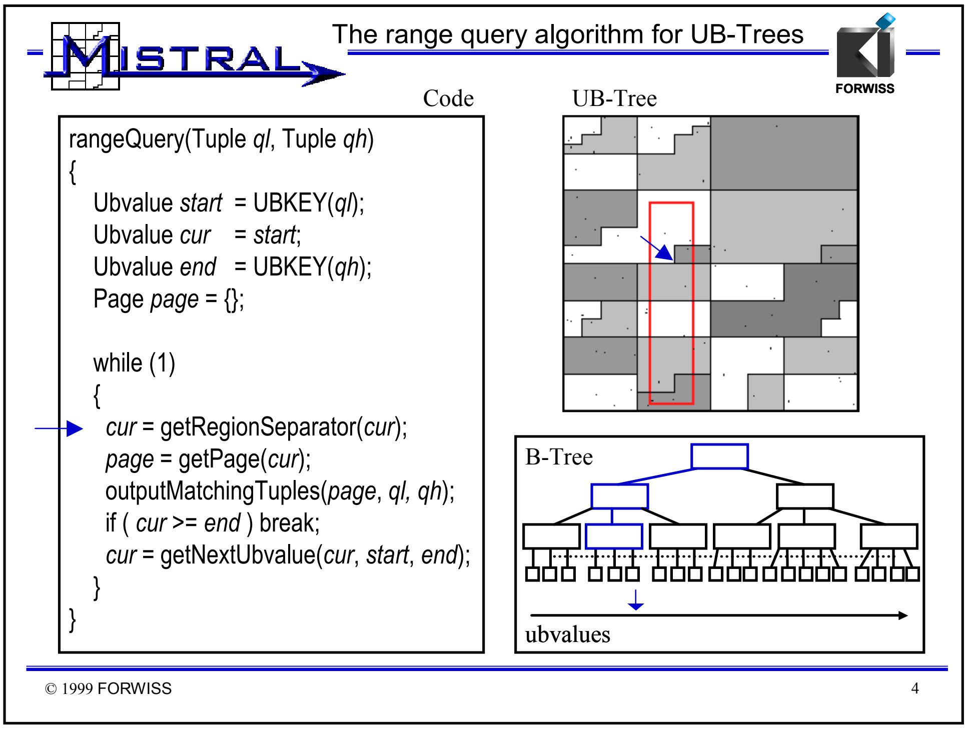
```

3



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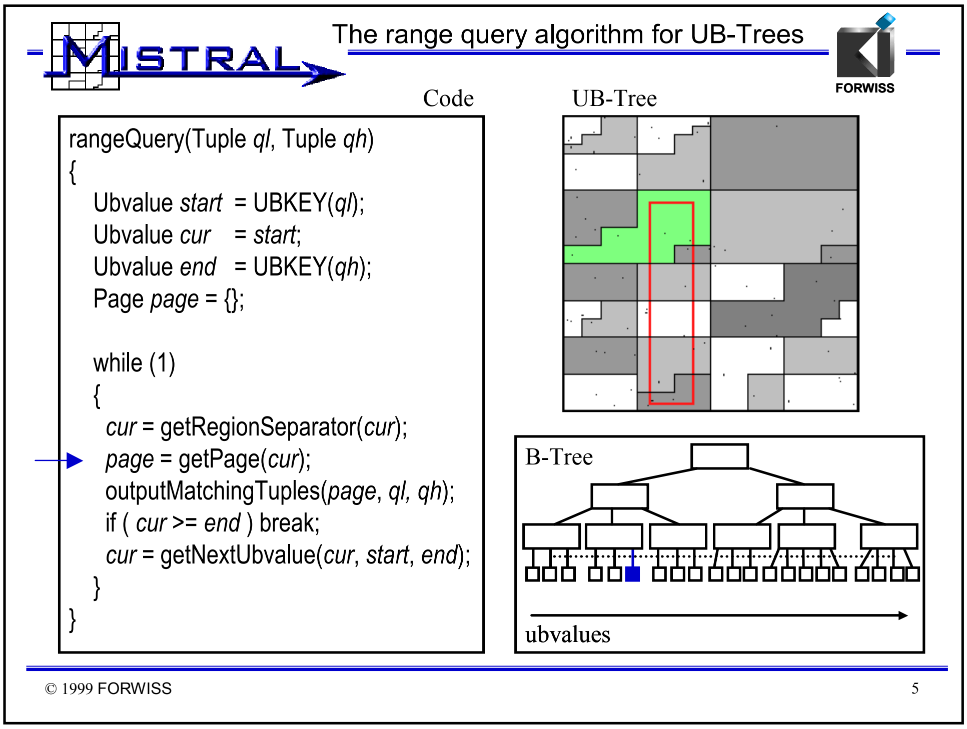
4



The range query algorithm for UB-Trees

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```

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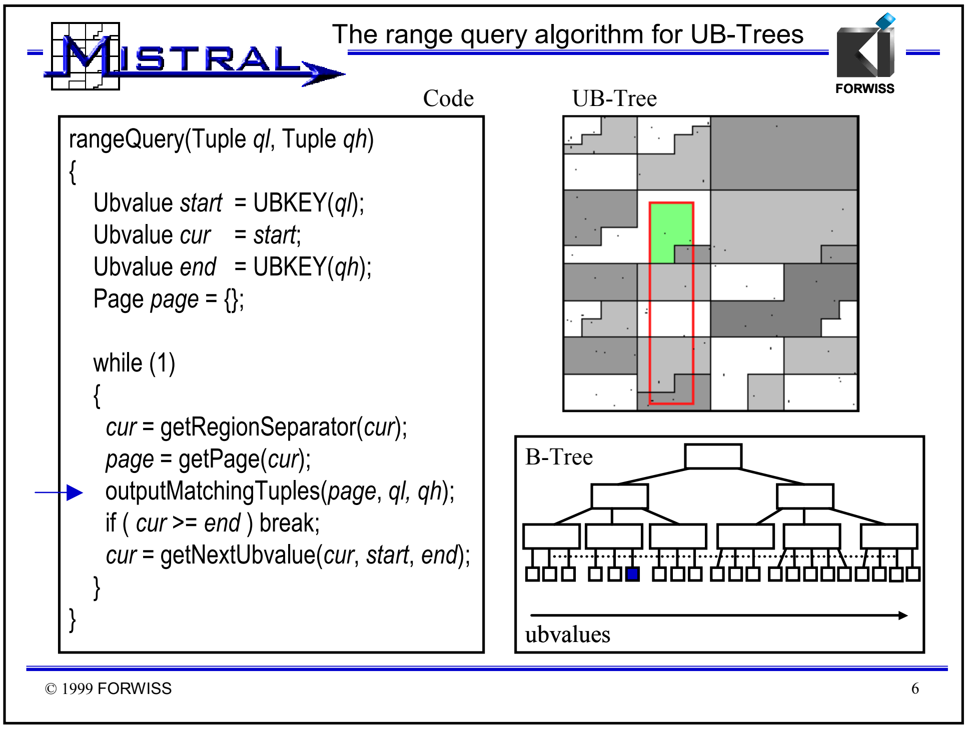

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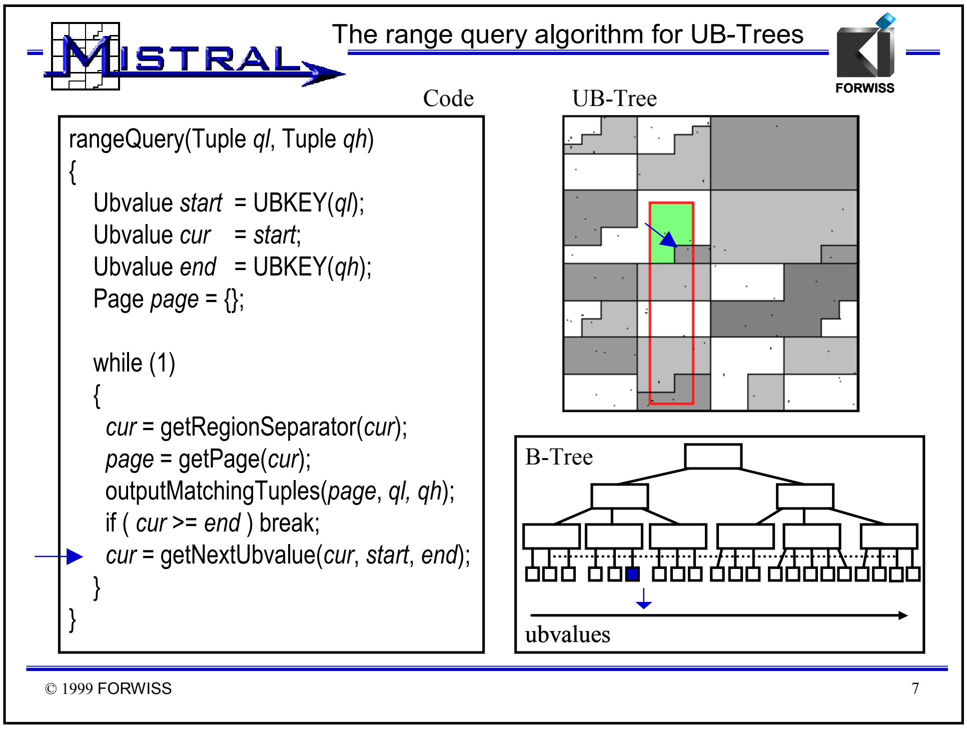

The range query algorithm for UB-Trees

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```

UB-Tree

B-Tree

ubvalues

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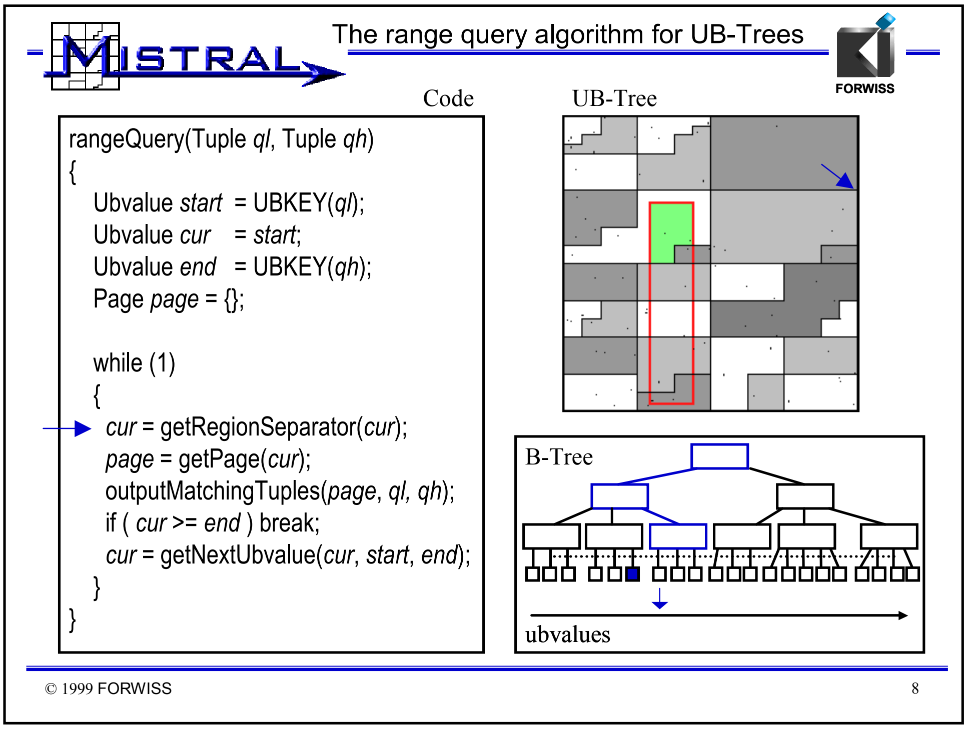
7



The range query algorithm for UB-Trees

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UB-Tree

B-Tree

ubvalues

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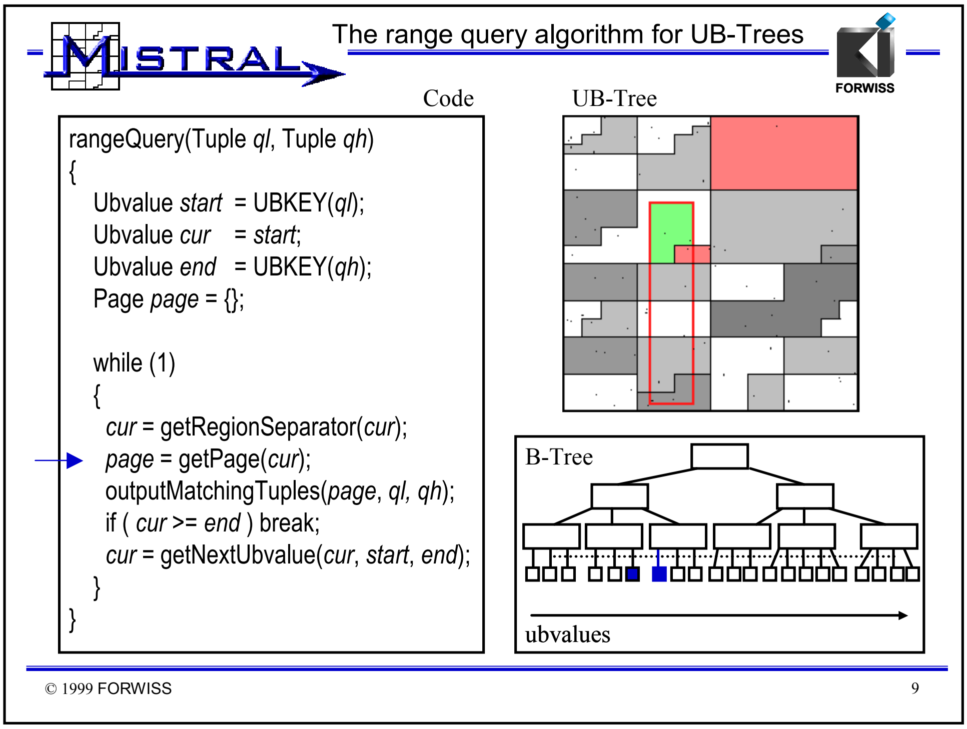

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```

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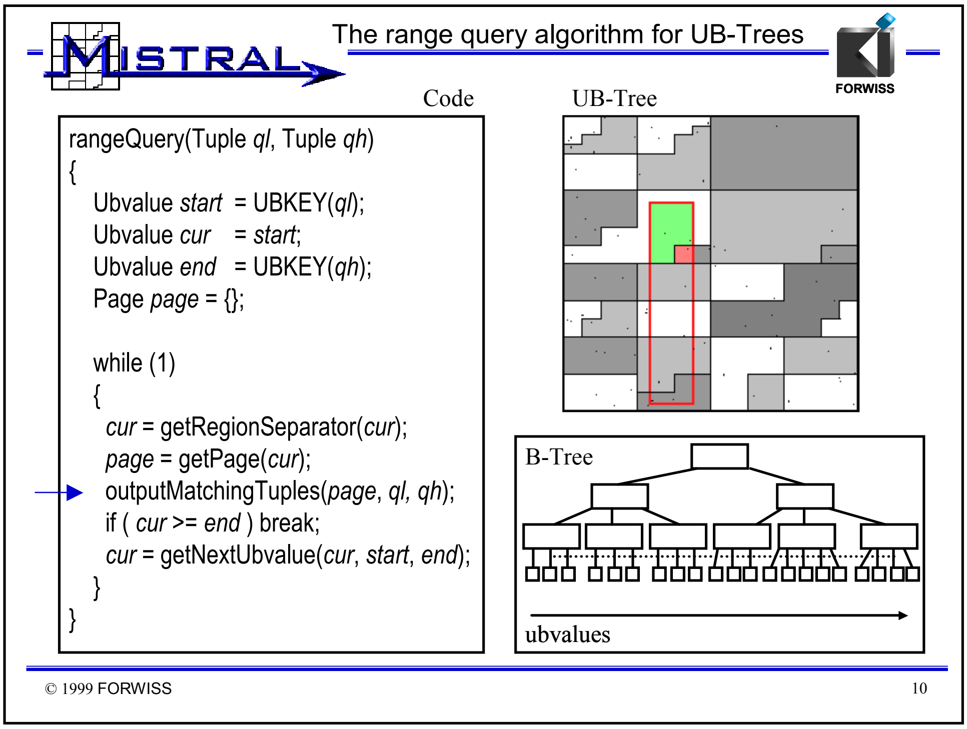

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```

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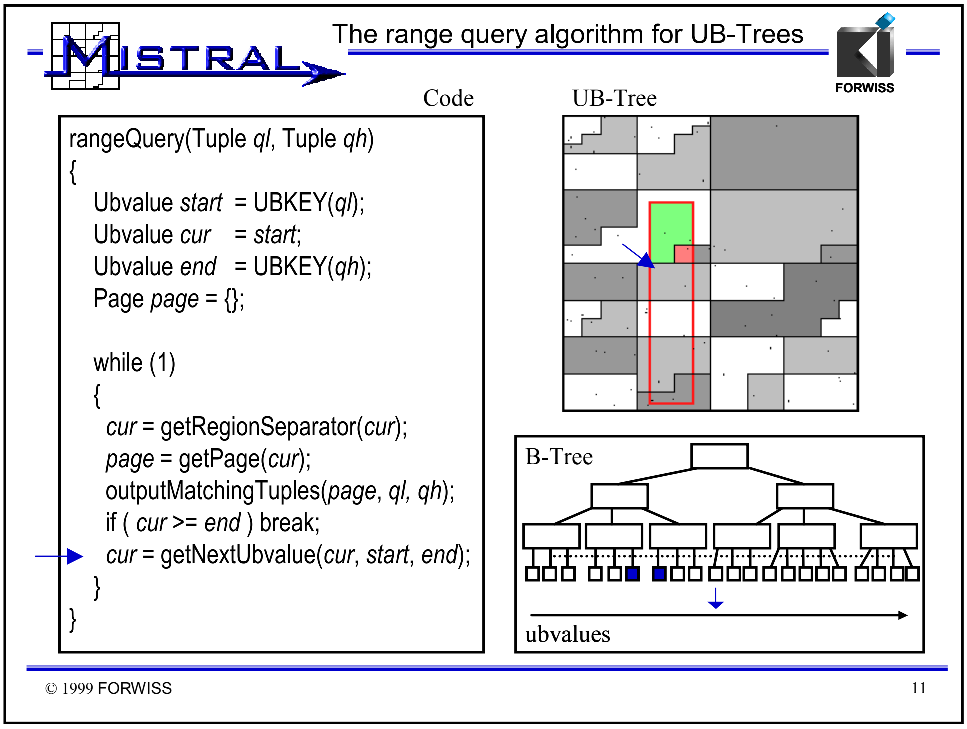

The range query algorithm for UB-Trees

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```

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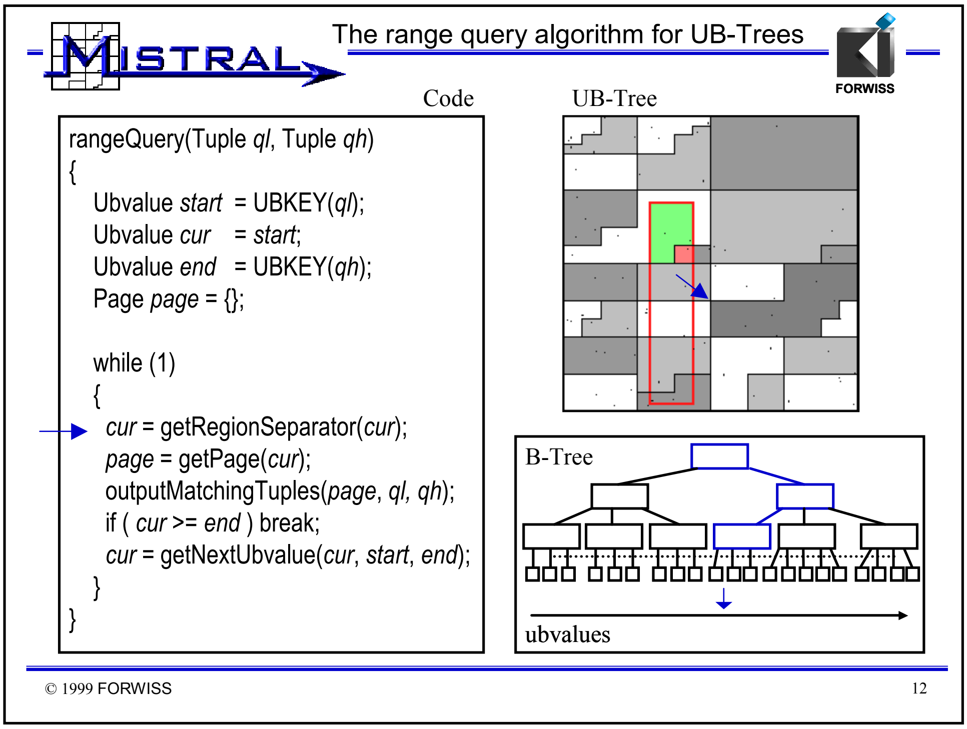

The range query algorithm for UB-Trees

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```

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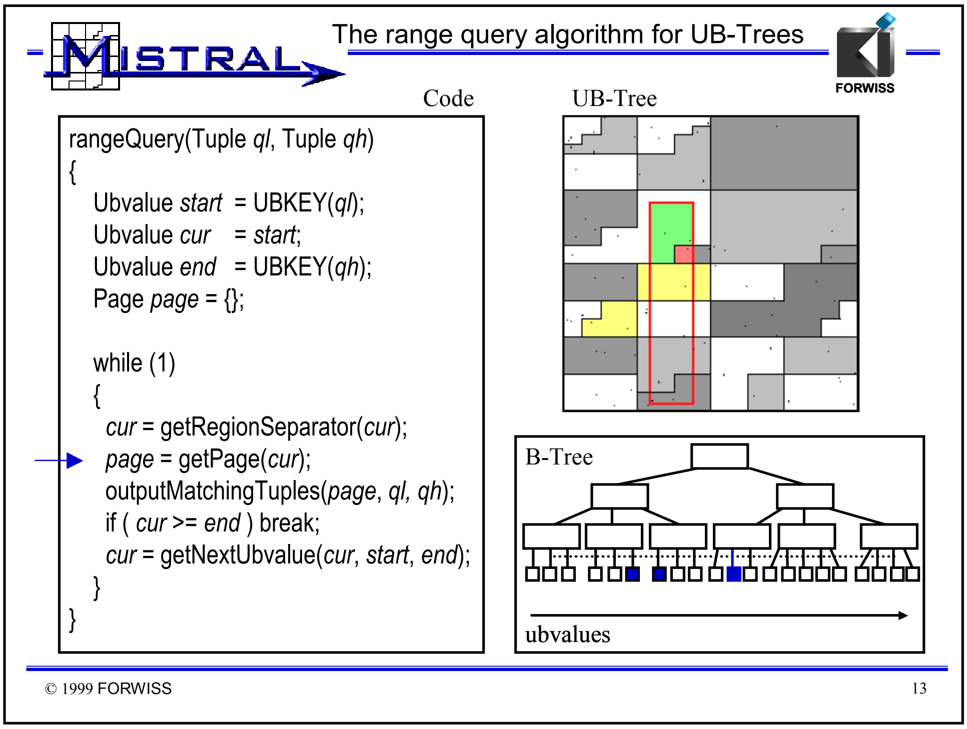

The range query algorithm for UB-Trees

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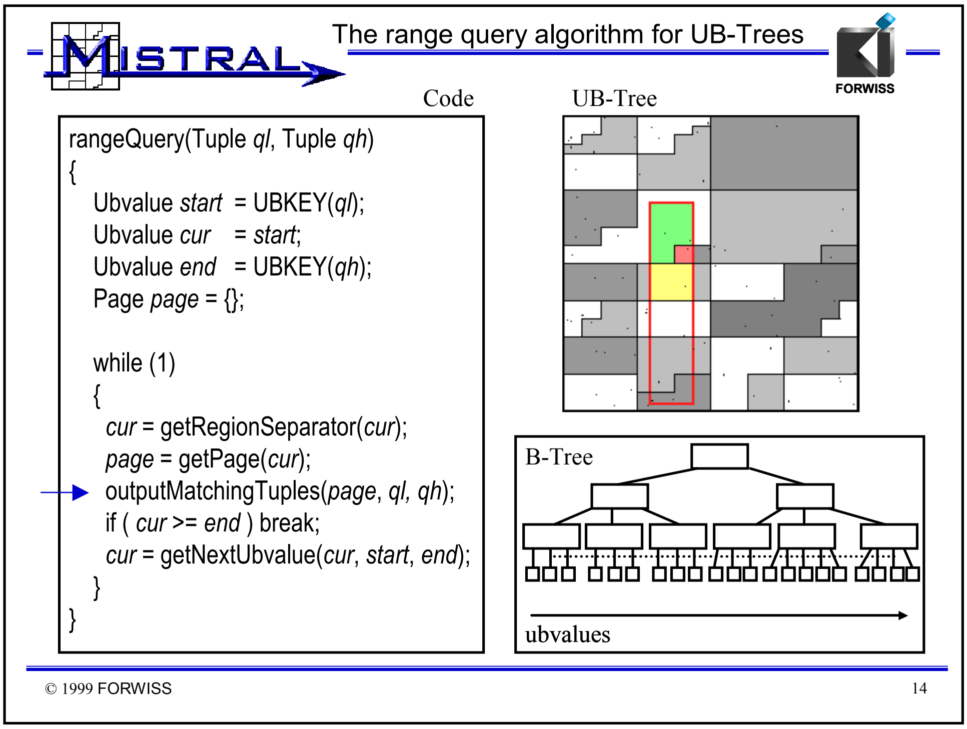

The range query algorithm for UB-Trees

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```

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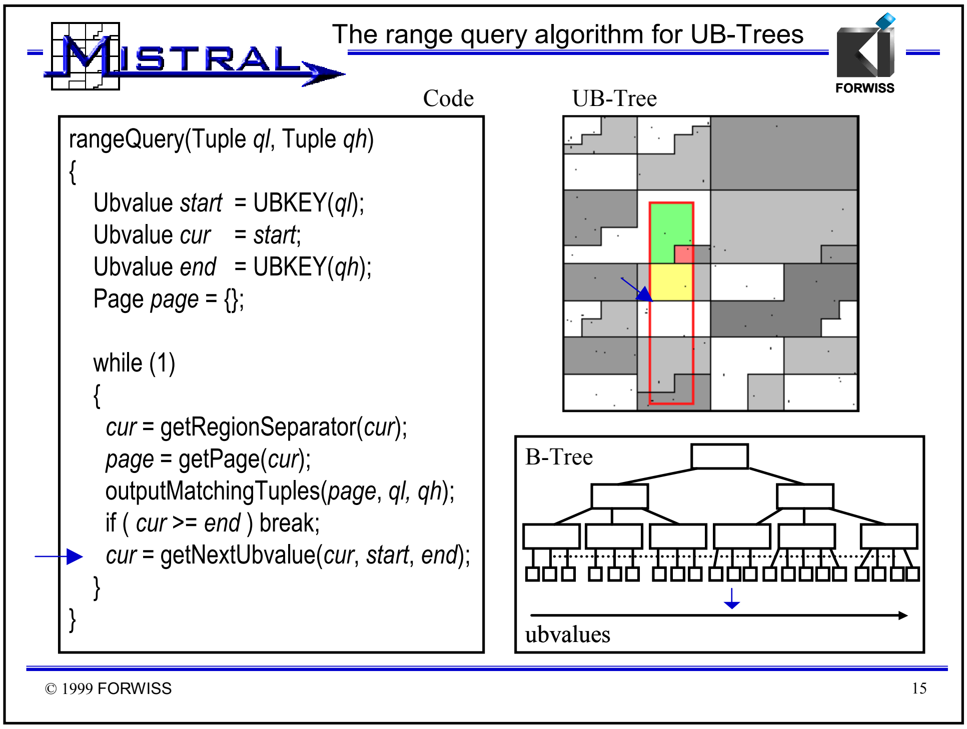

The range query algorithm for UB-Trees

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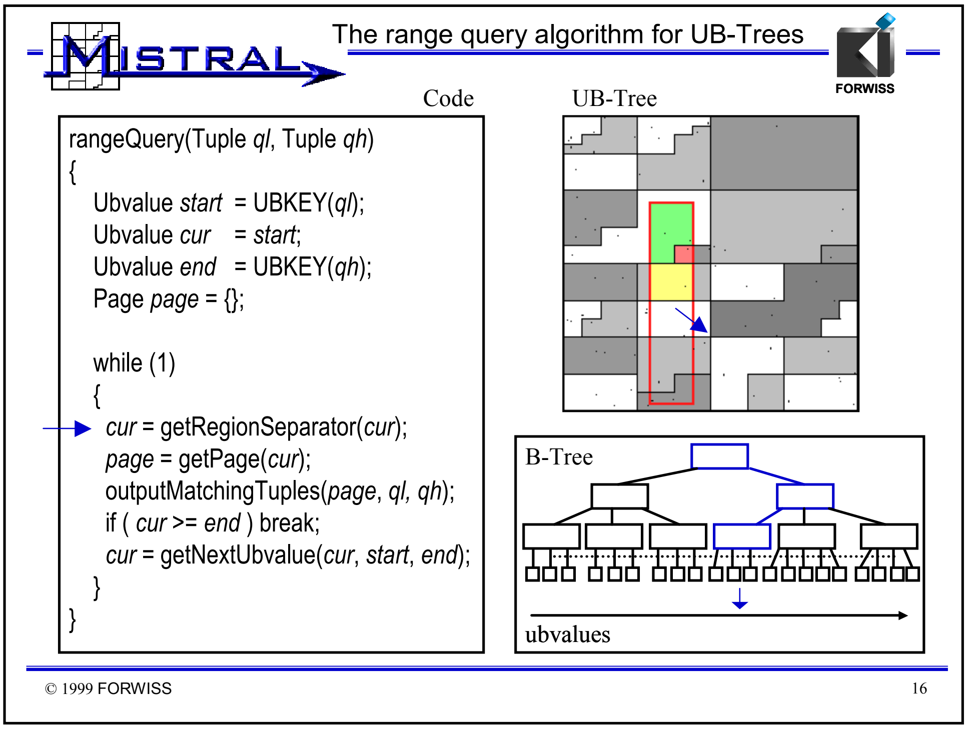

The range query algorithm for UB-Trees

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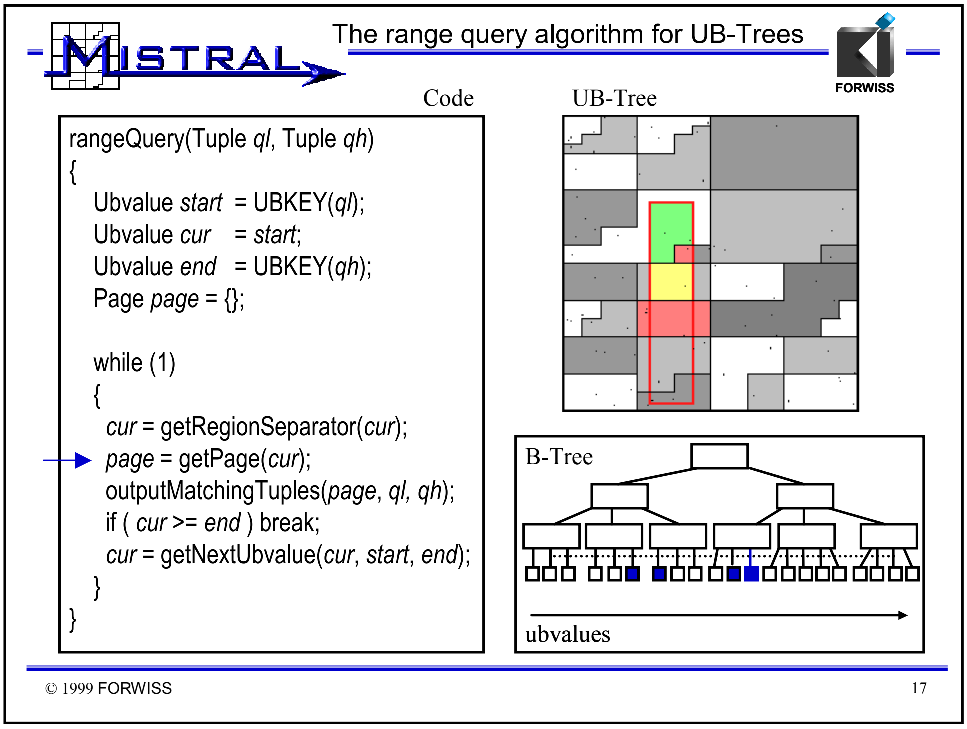

The range query algorithm for UB-Trees

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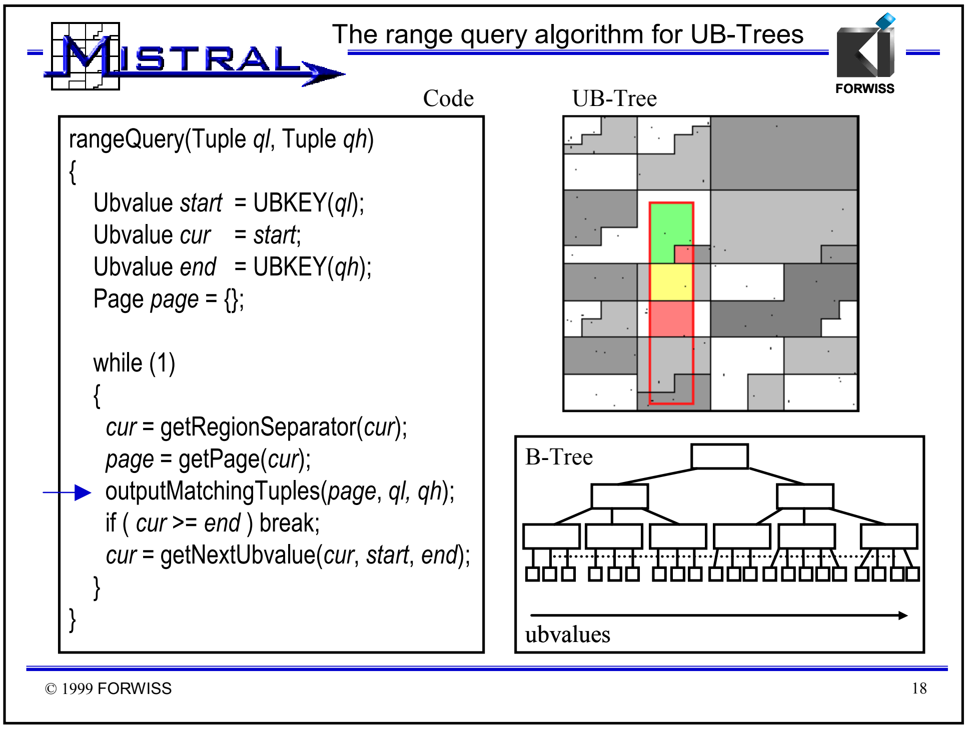
17



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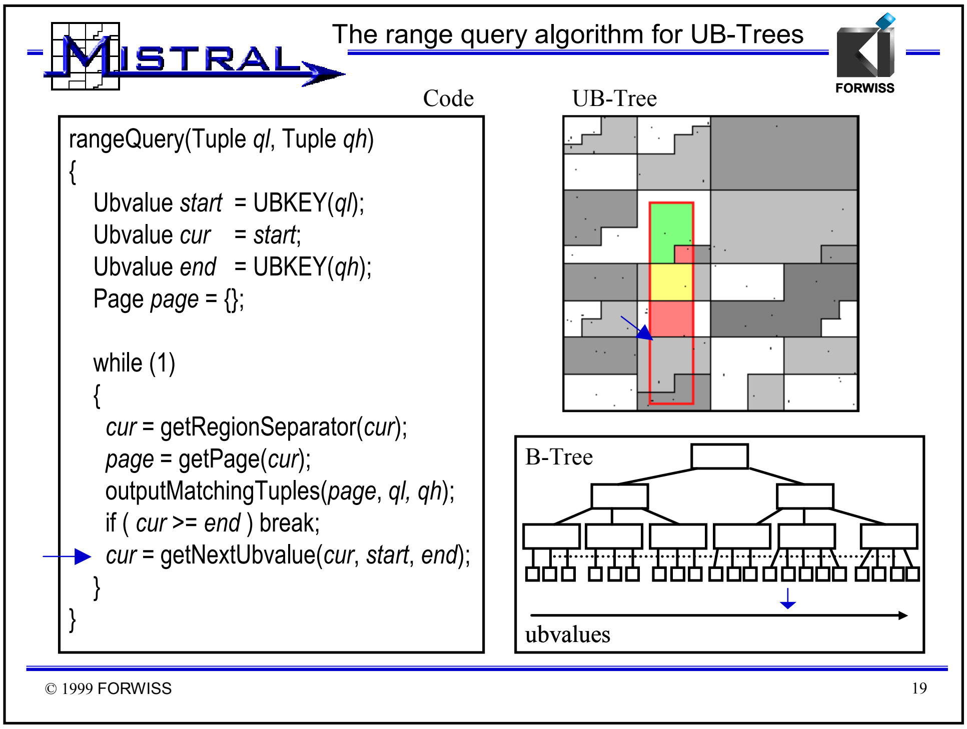
18



The range query algorithm for UB-Trees

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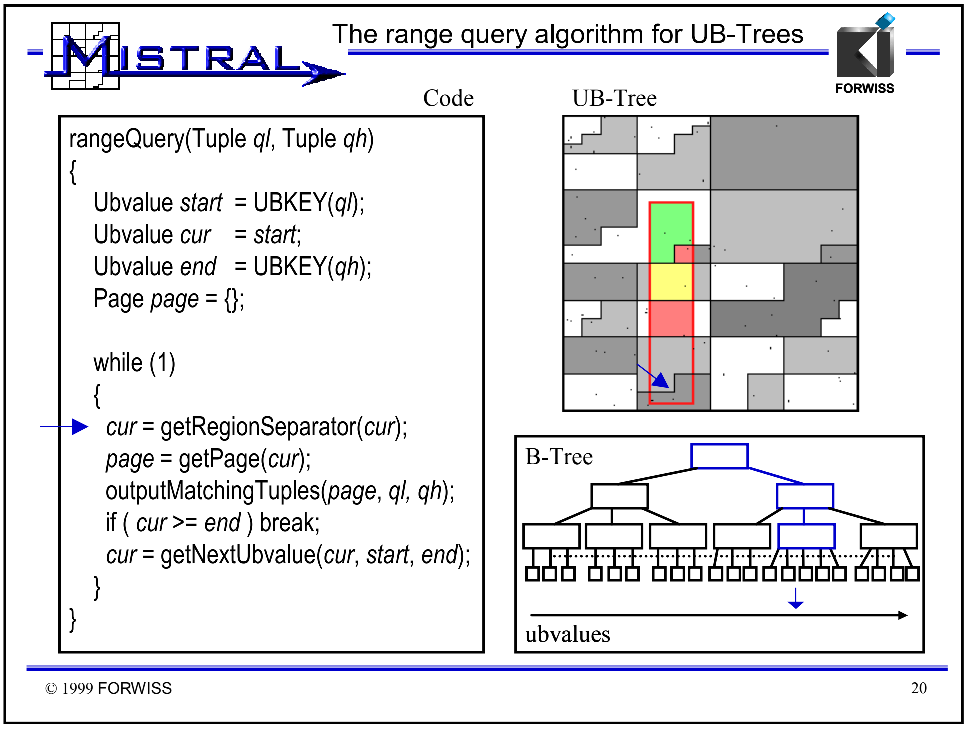

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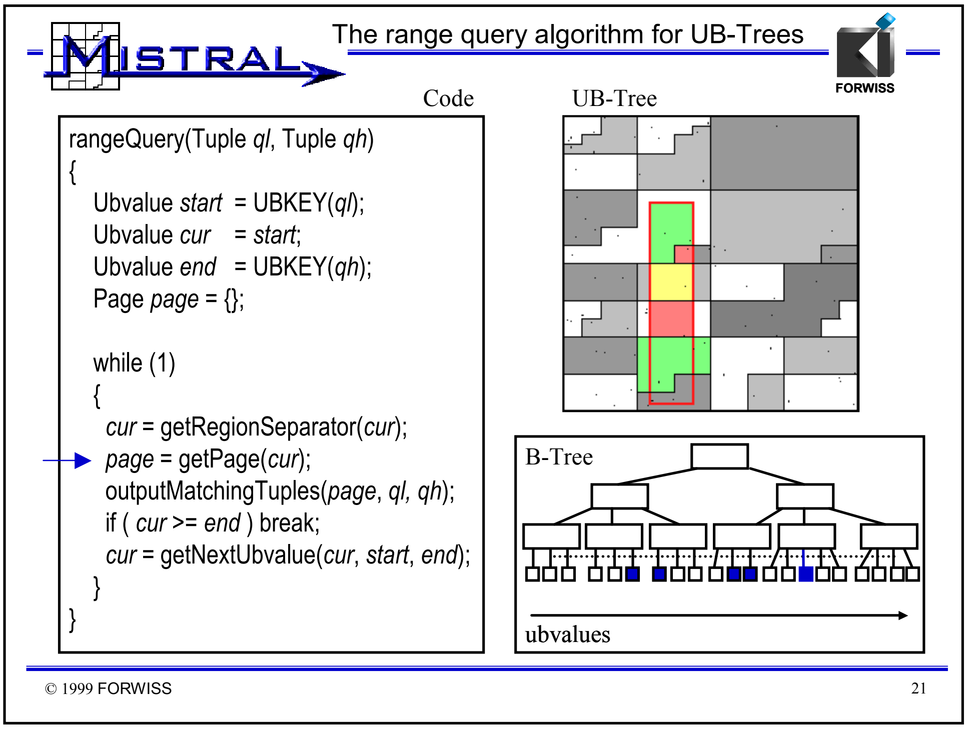

The range query algorithm for UB-Trees

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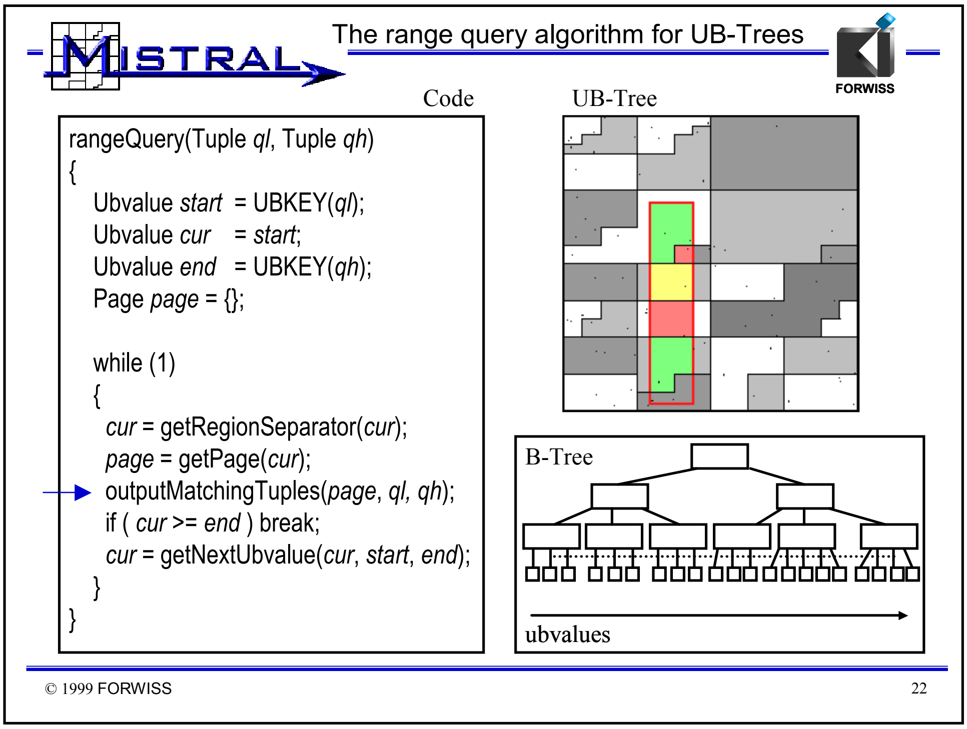
21



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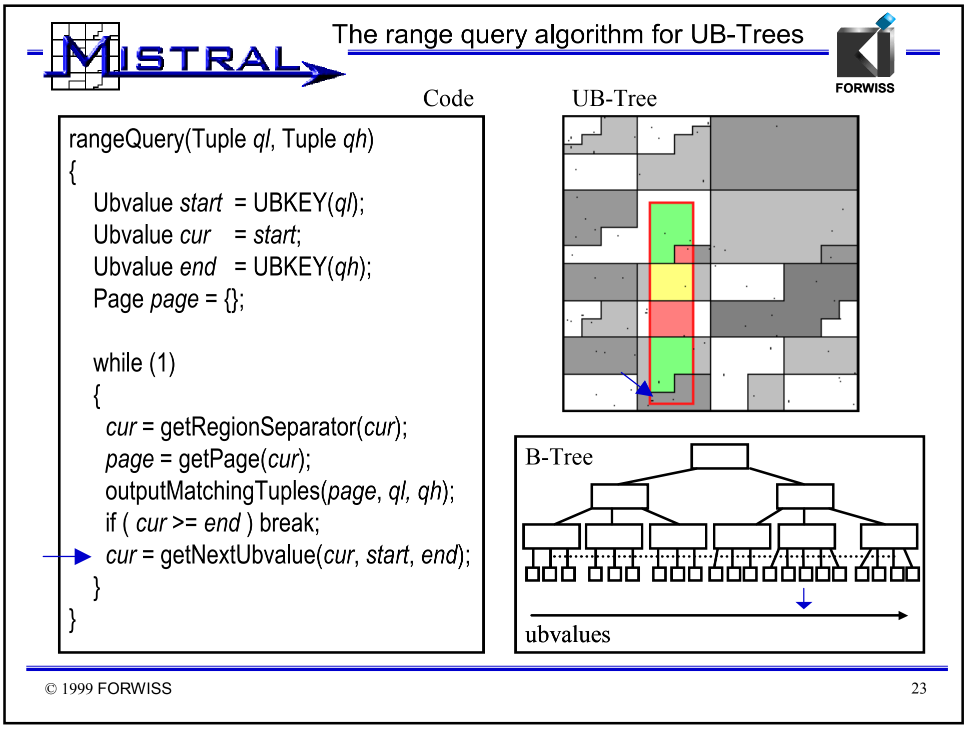
22



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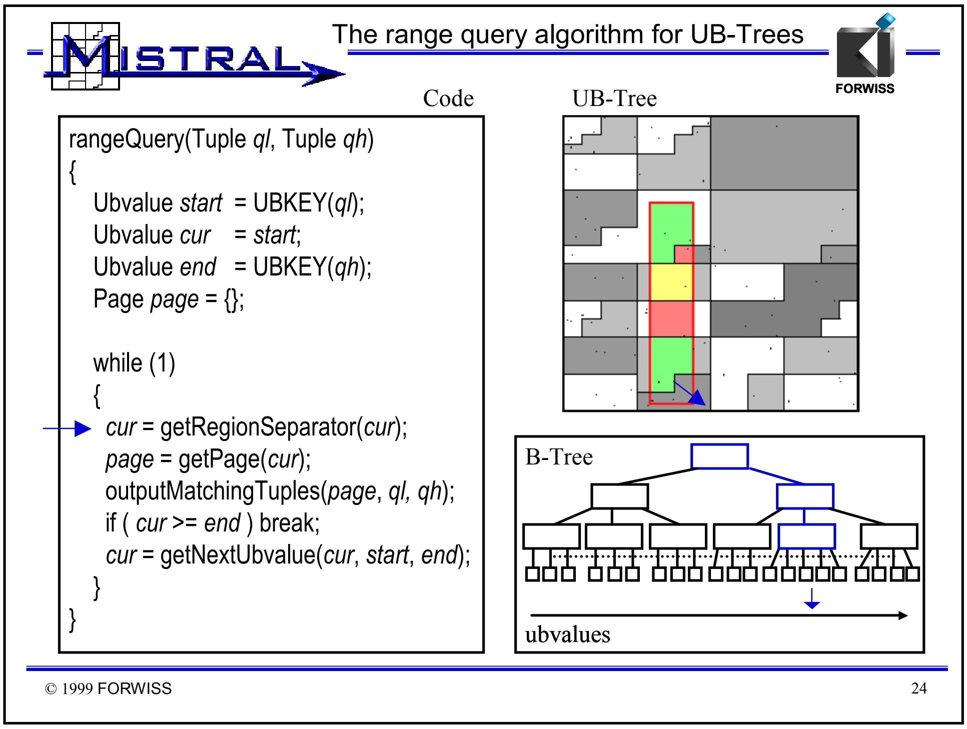
23



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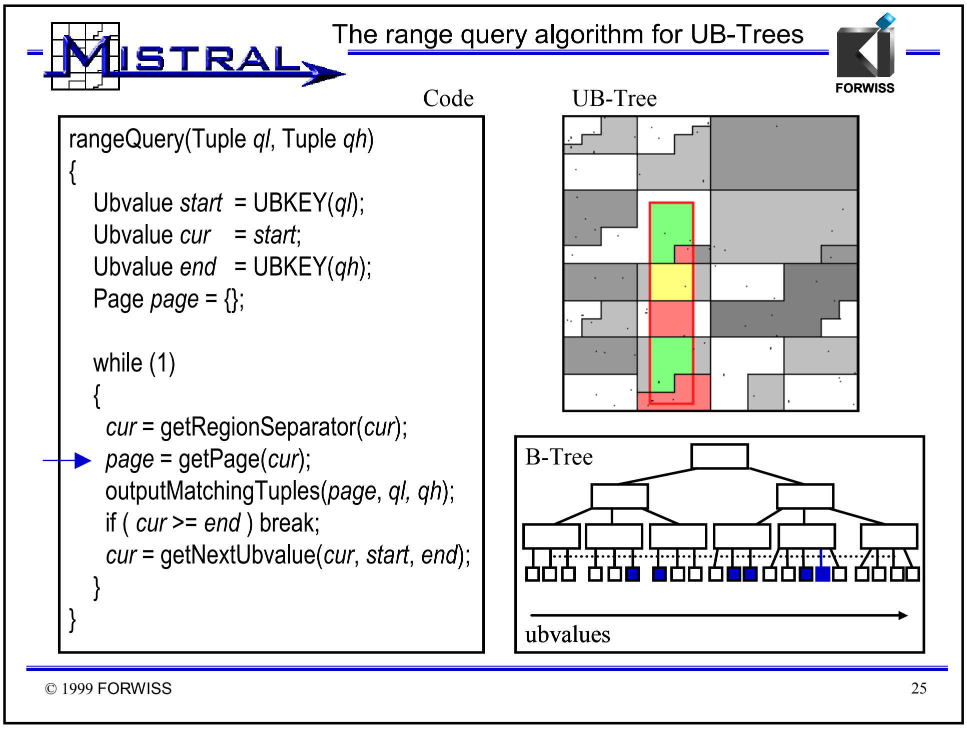
24



The range query algorithm for UB-Trees

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```

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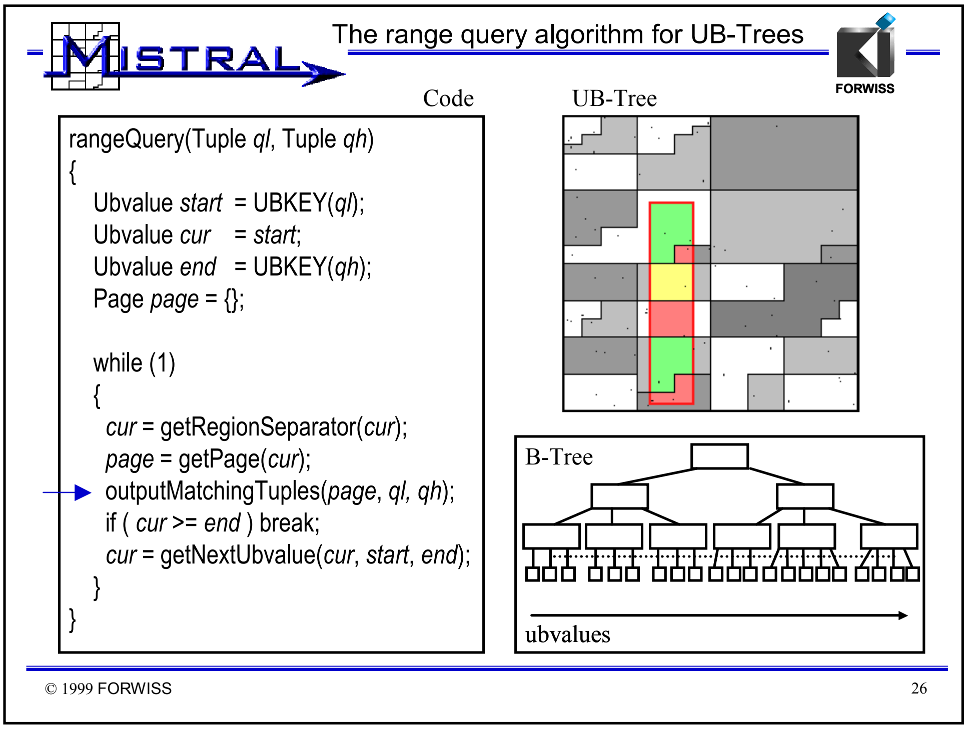
25



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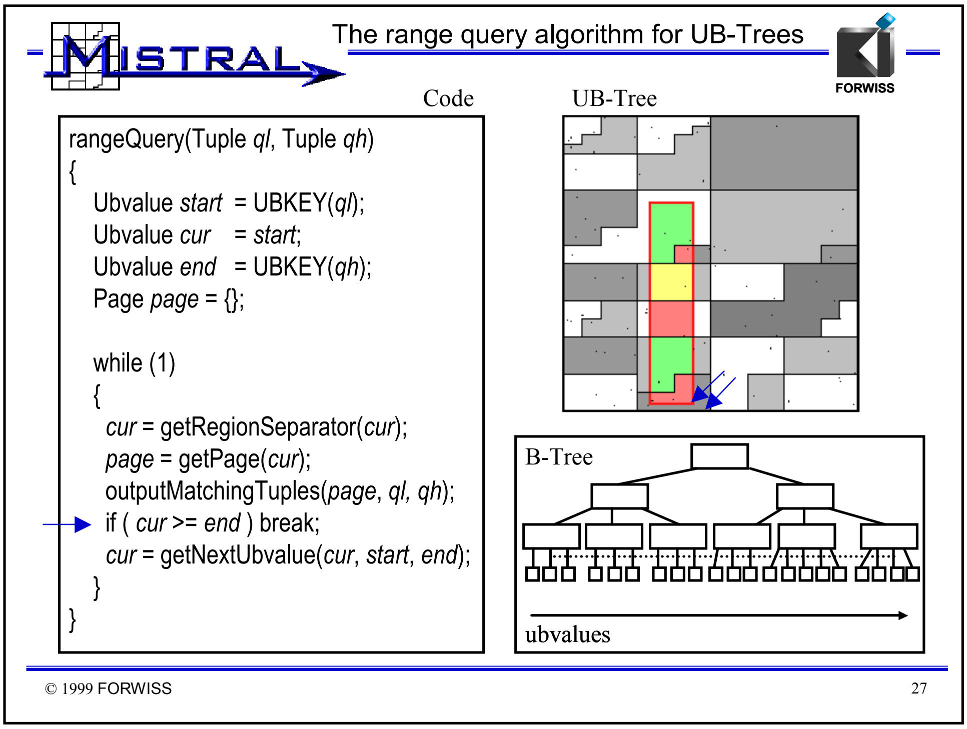

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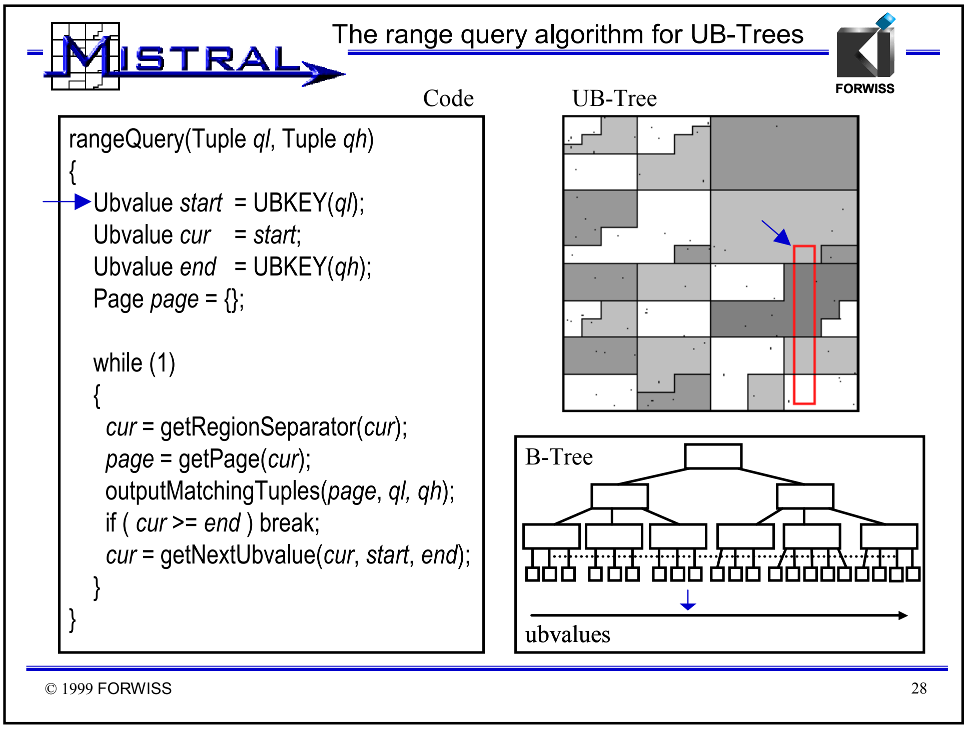

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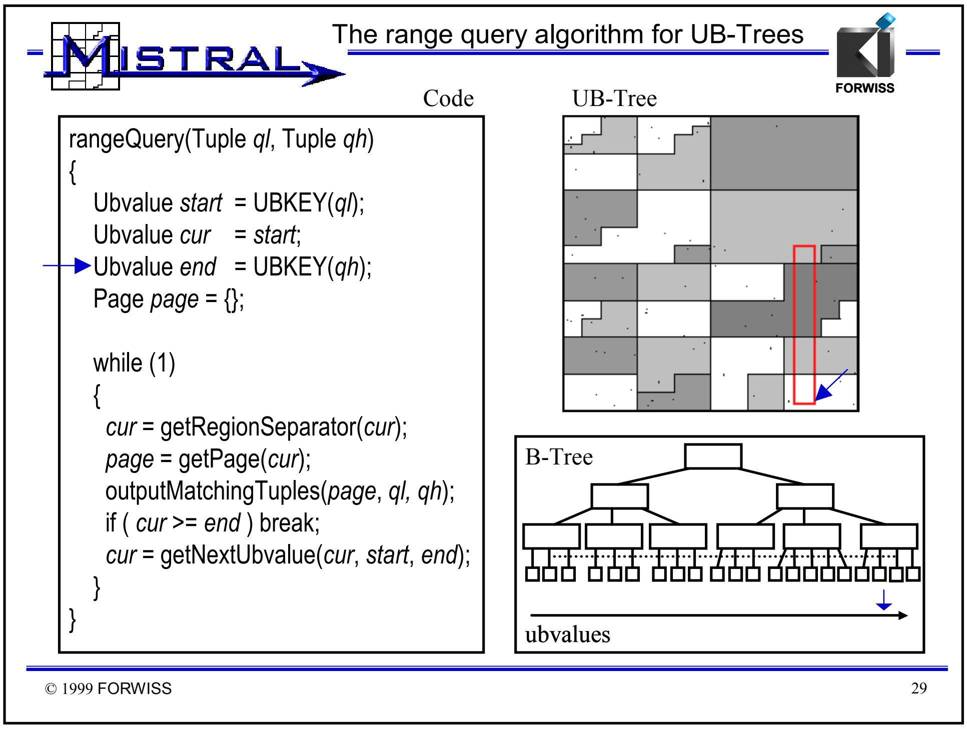

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The range query algorithm for UB-Trees

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Code

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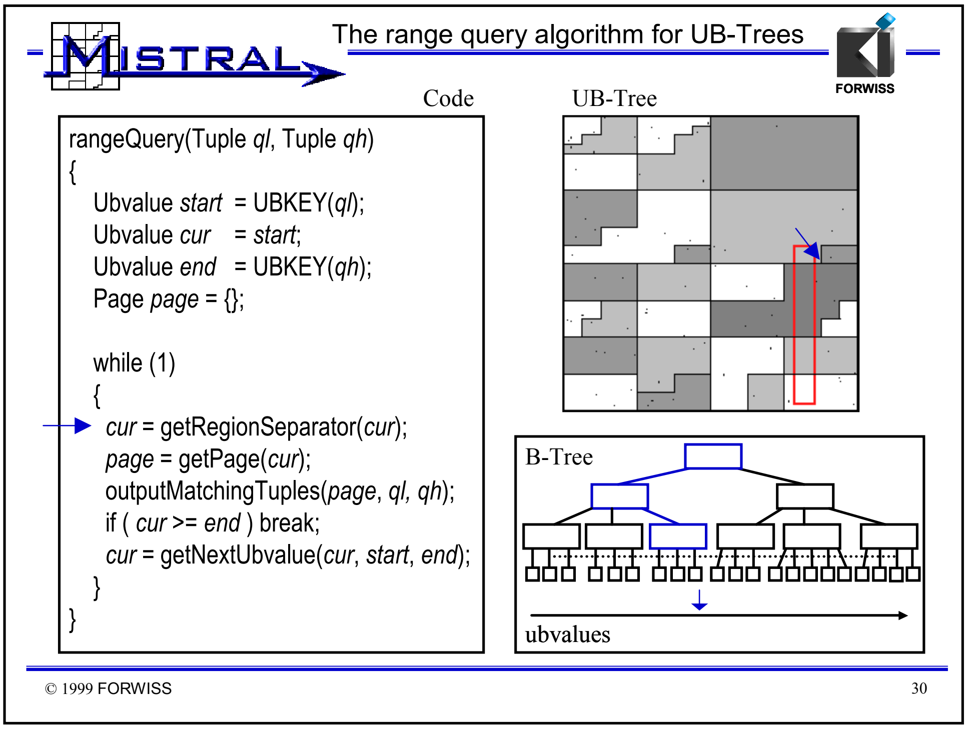

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The range query algorithm for UB-Trees

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Code

```
rangeQuery(Tuple ql, Tuple qh)
{
   Ubvalue start  = UBKEY(ql);
   Ubvalue cur    = start;
   Ubvalue end    = UBKEY(qh);
   Page page = {};

   while (1)
   {
     cur = getRegionSeparator(cur);
     page = getPage(cur);
     outputMatchingTuples(page, ql, qh);
     if ( cur >= end ) break;
     cur = getNextUbvalue(cur, start, end);
   }
}
```

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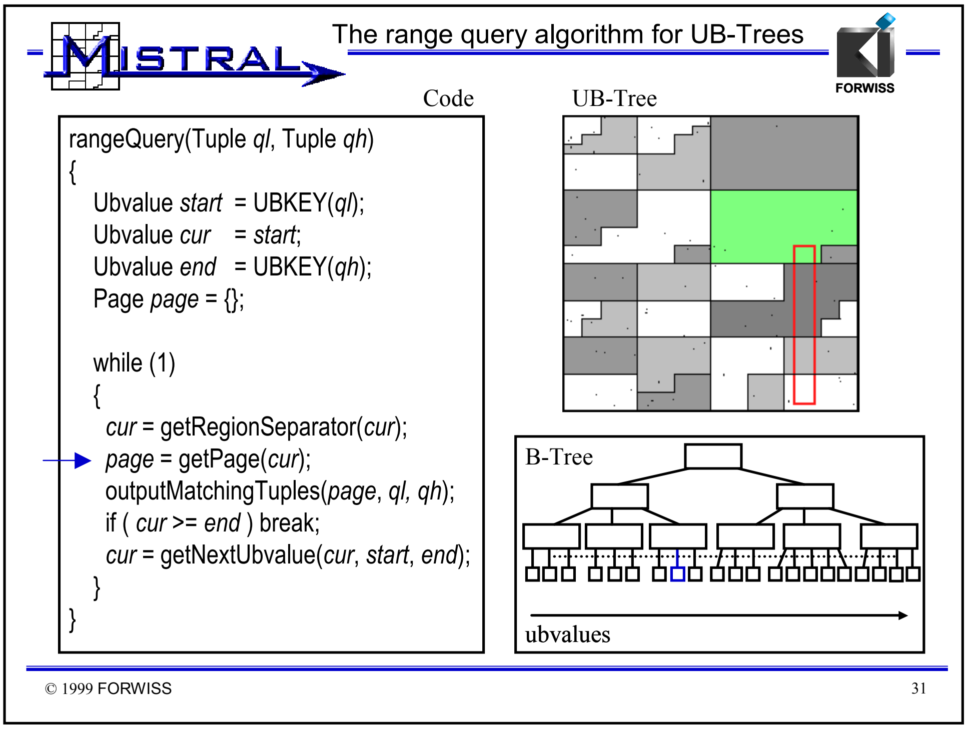

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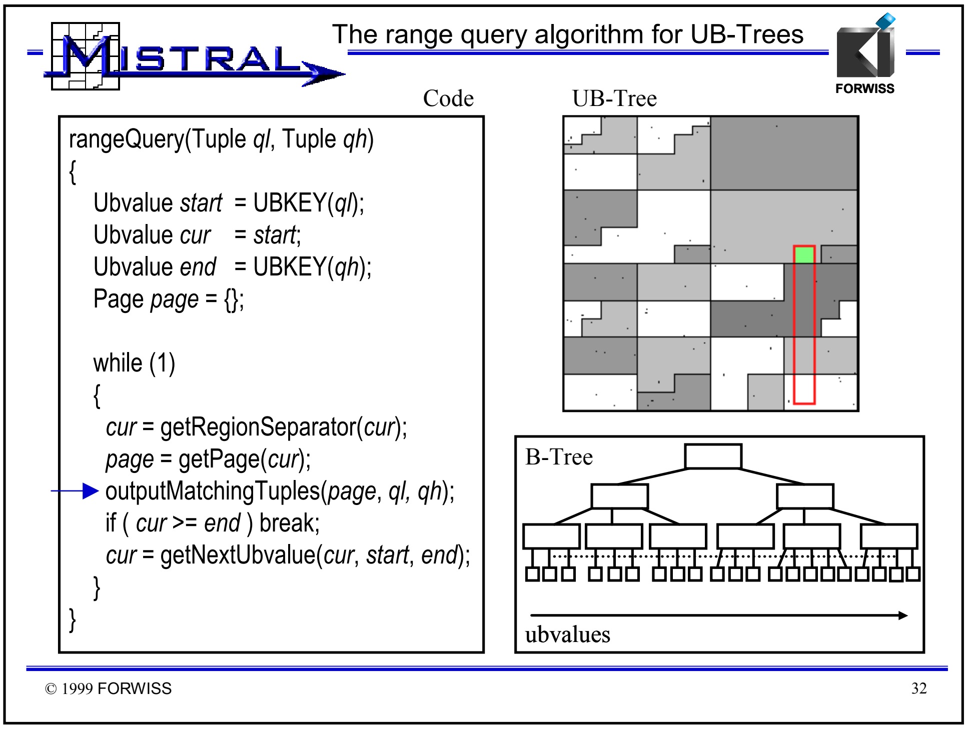

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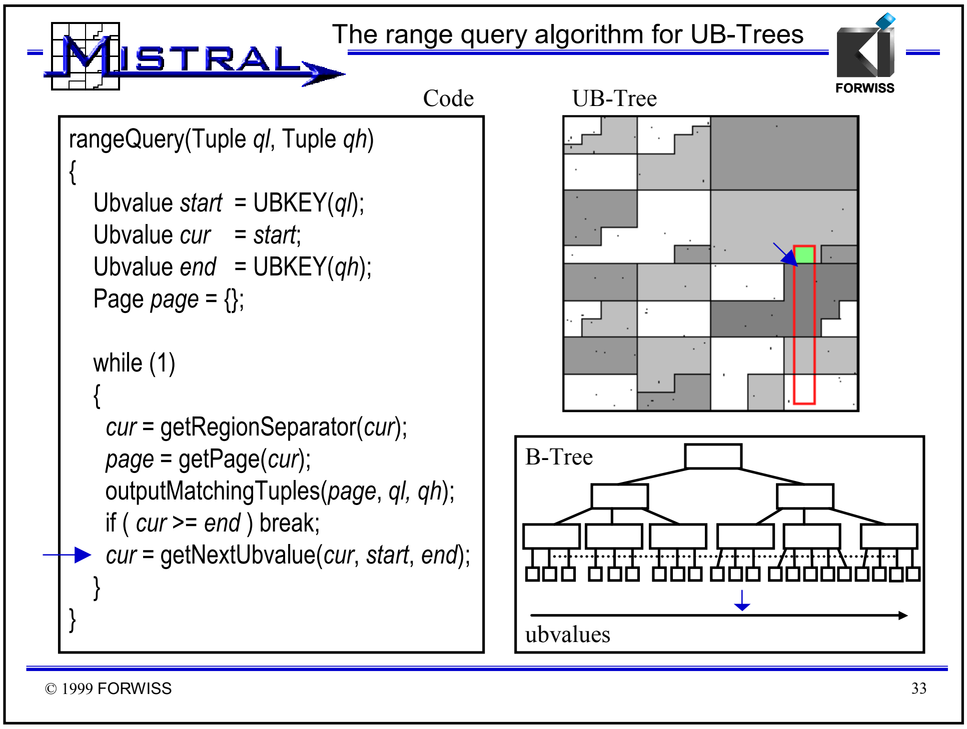

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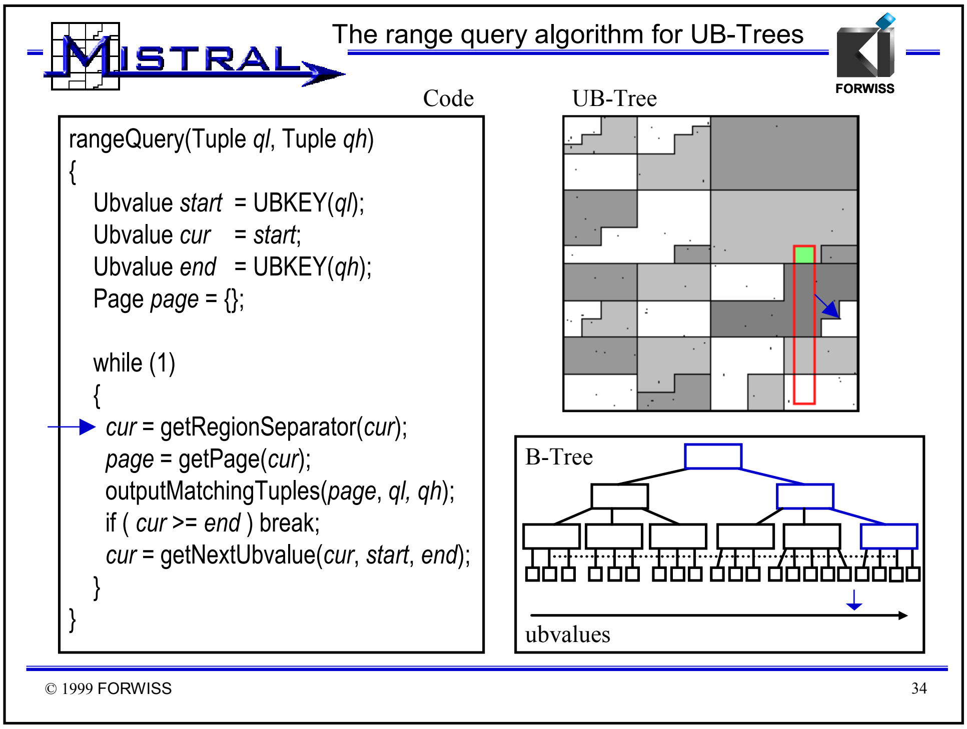

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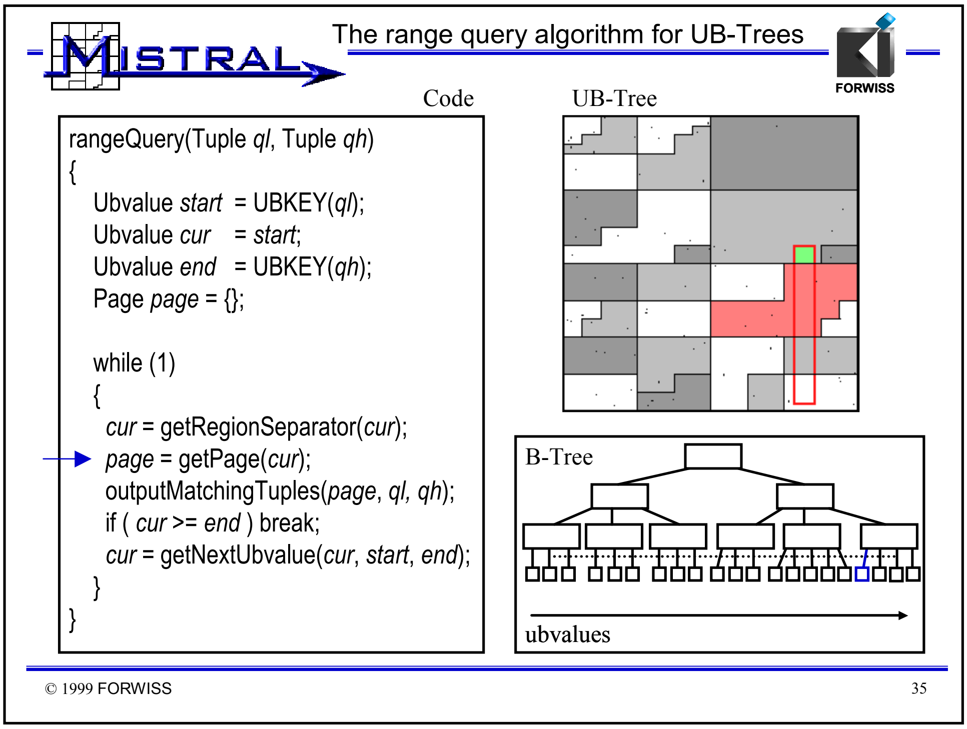

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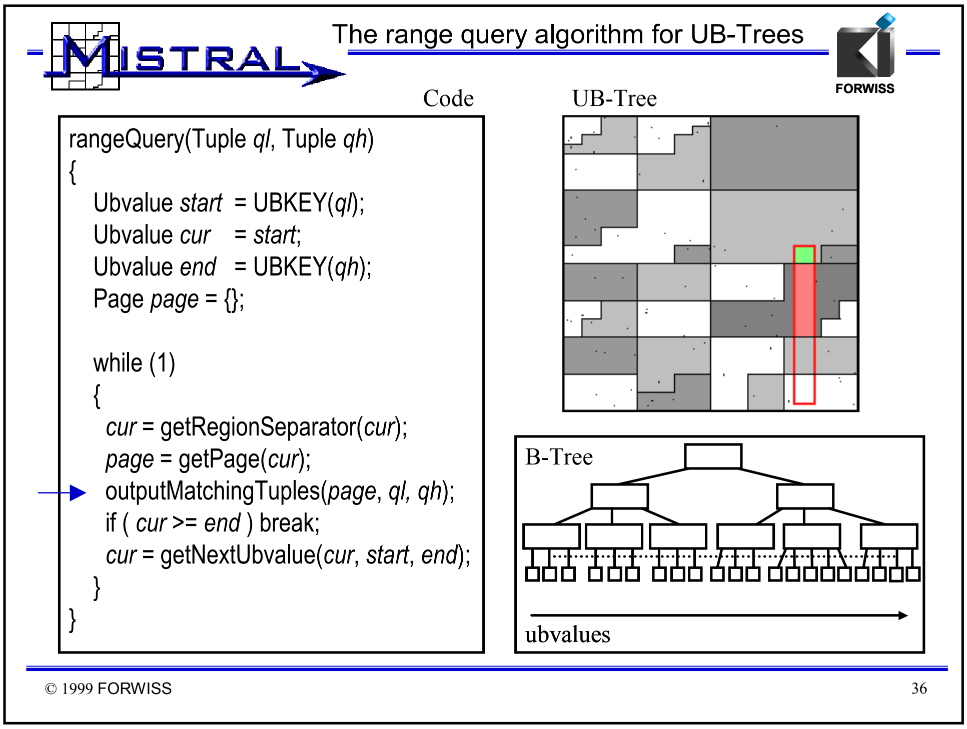
35



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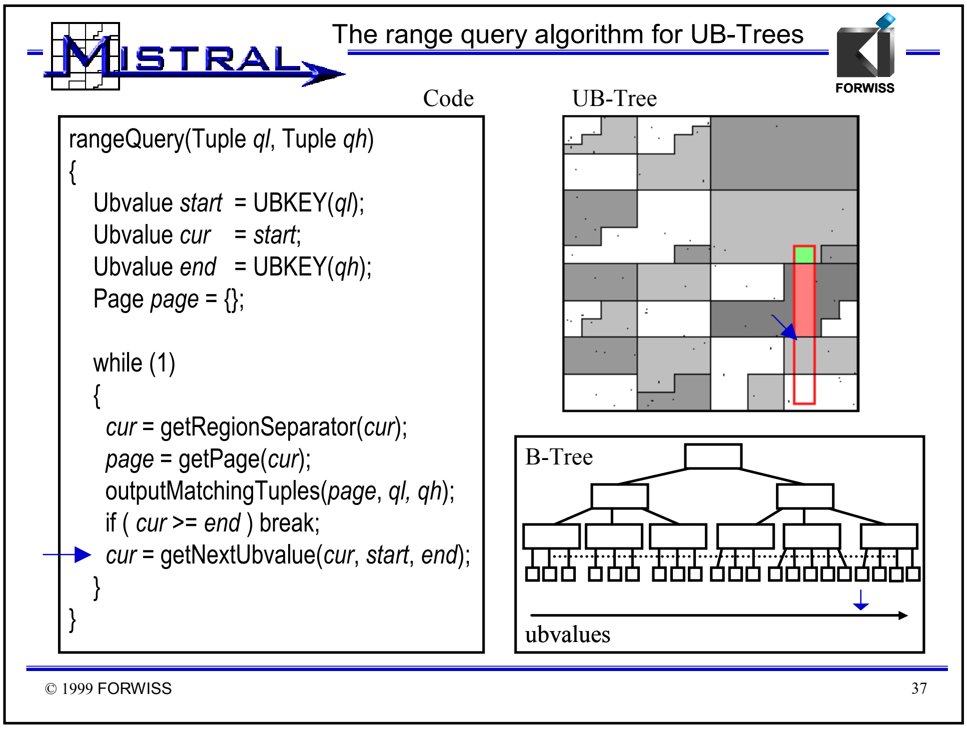
36



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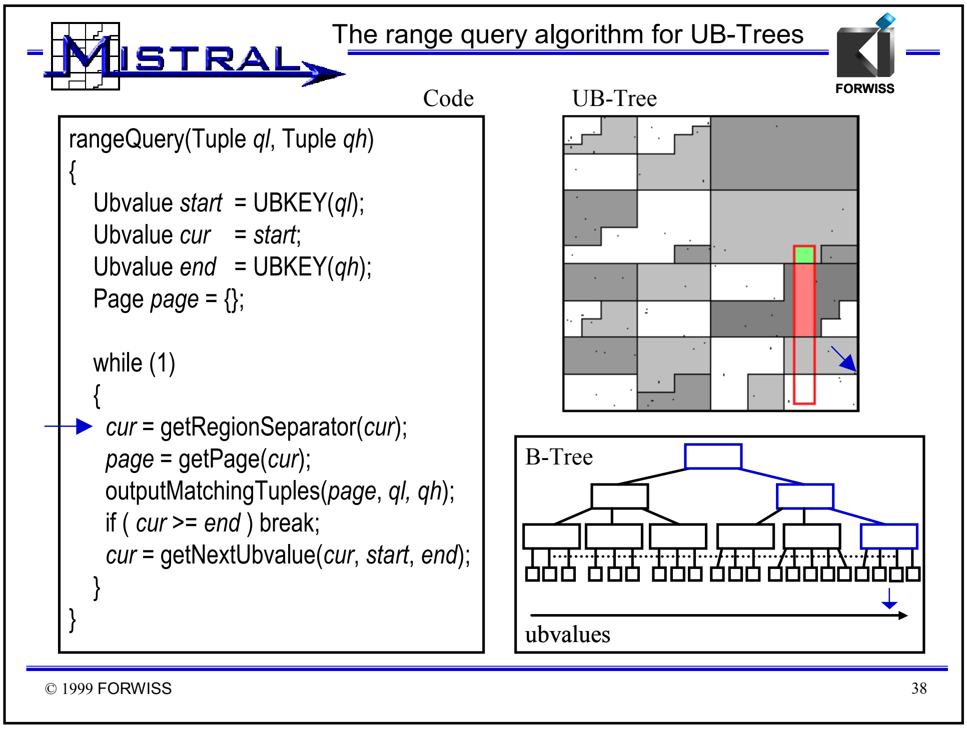
37



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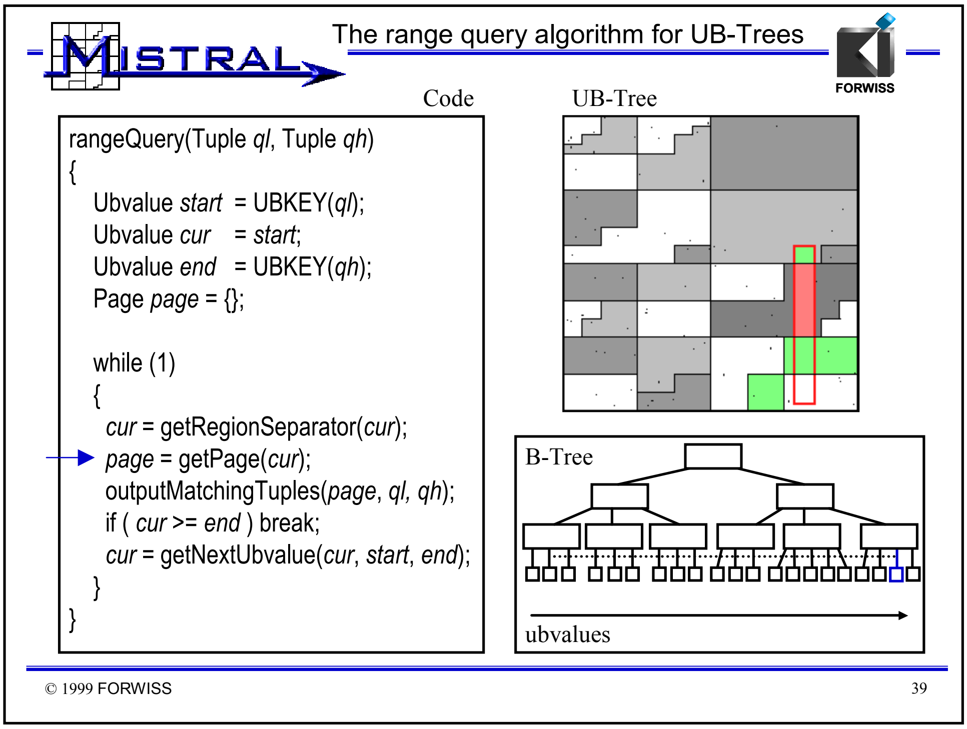
38



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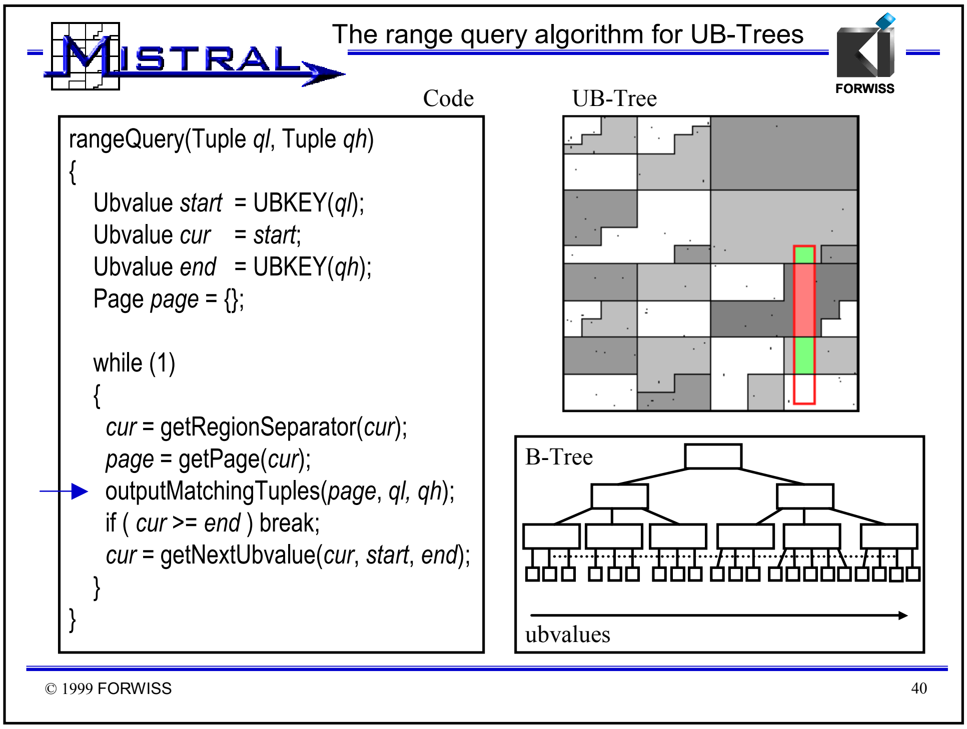
39



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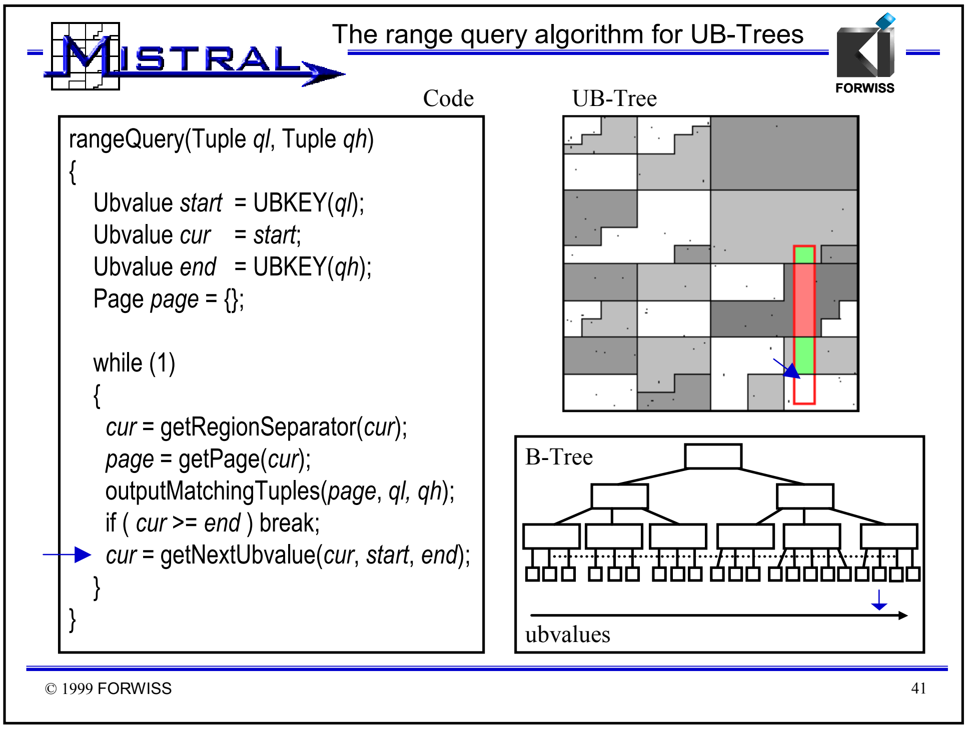
40



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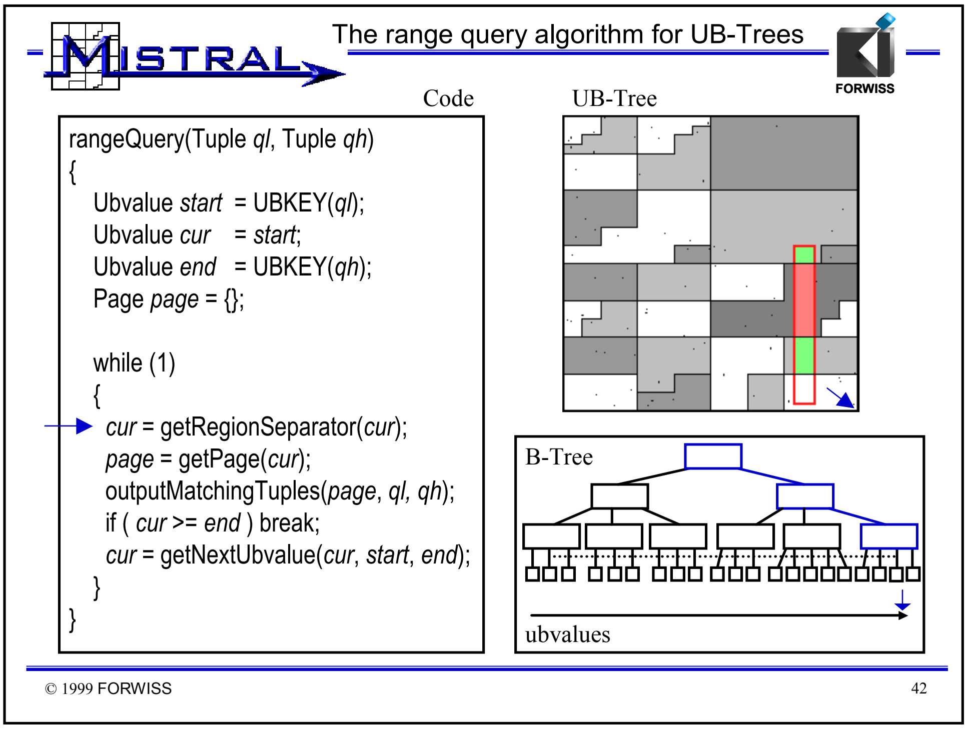
41



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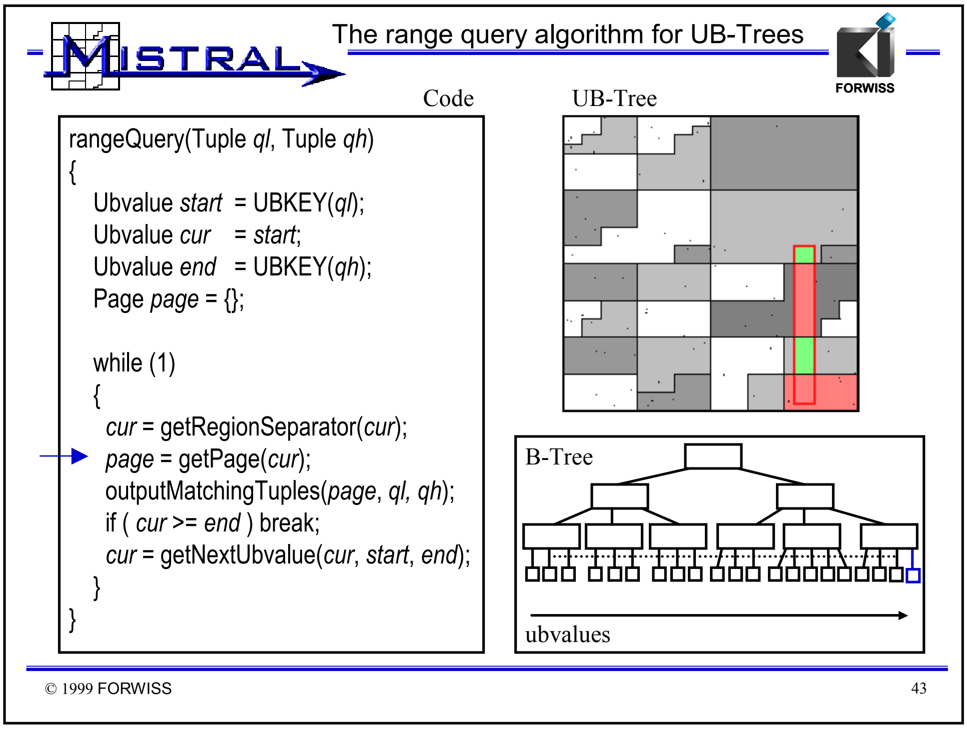
42



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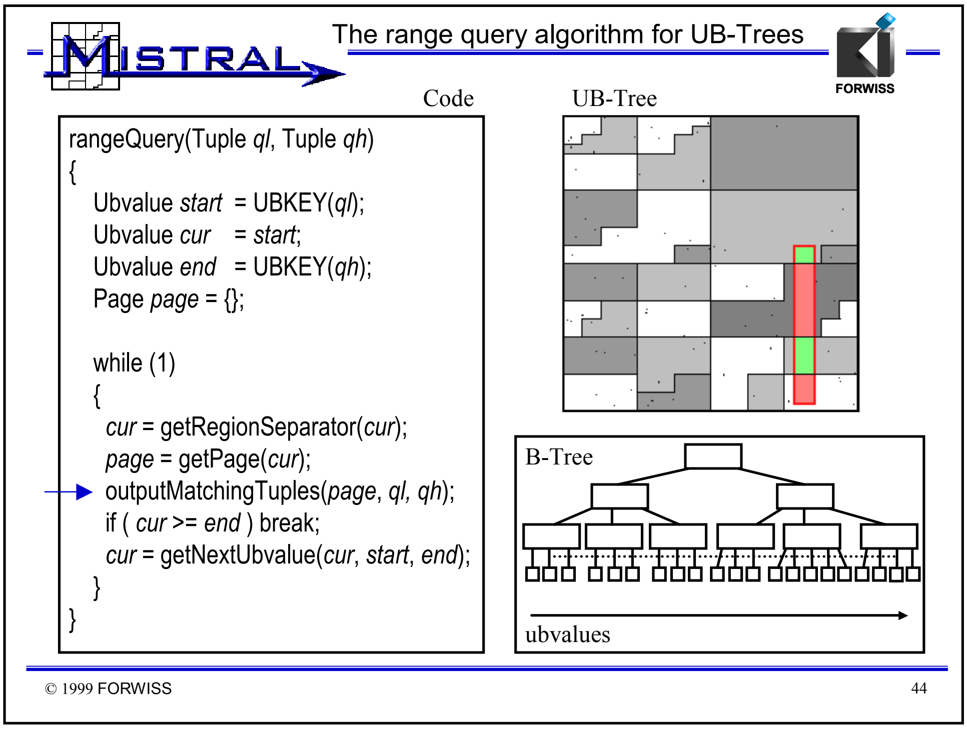
43



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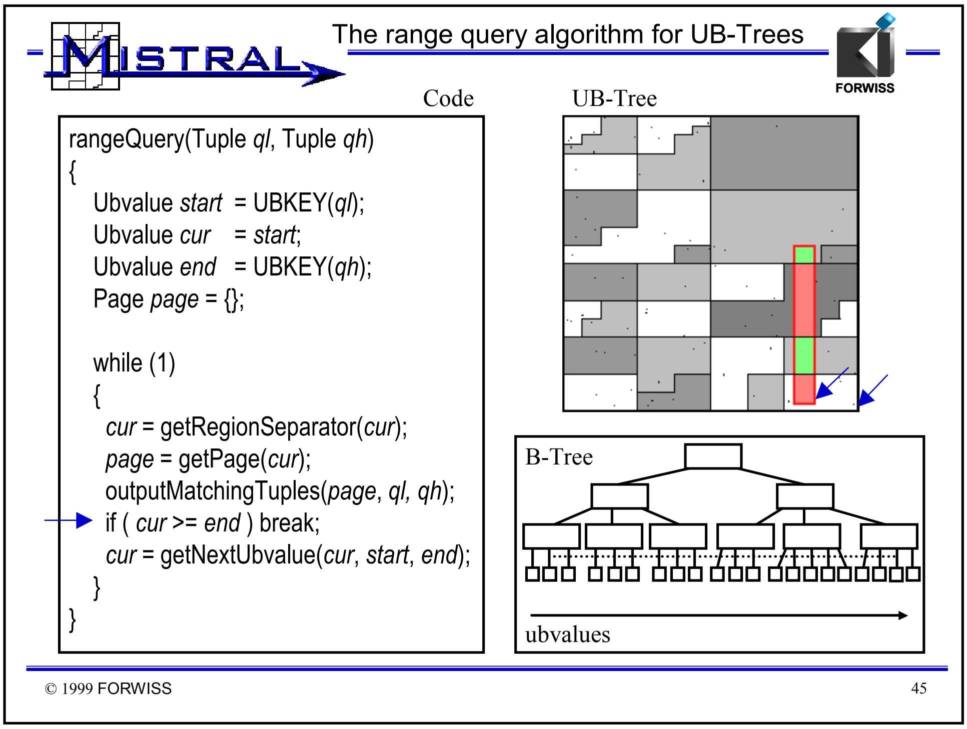
44



MISTRAL

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UB-Tree