Data-Parallel Operations I

Parallel Programming in Scala

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Parallel Collections

In Scala, most collection operations can become data-parallel.

The `.par` call converts a sequential collection to a parallel collection.

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(1 until 1000).par
  .filter(n => n % 3 == 0)
  .count(n => n.toString == n.toString.reverse)
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However, some operations are not parallelizable.

Non-Parallelizable Operations

Task: implement the method `sum` using the `foldLeft` method.

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Does this implementation execute in parallel?

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def sum(xs: Array[Int]): Int = {
  xs.par.foldLeft(0)(_ + _)
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```

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Why not?

Non-Parallelizable Operations

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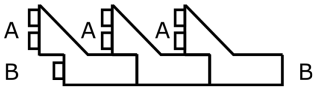

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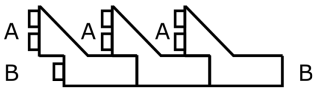

Operations `foldRight`, `reduceLeft`, `reduceRight`, `scanLeft` and `scanRight` similarly must process the elements sequentially.

The `fold` Operation

Next, let's examine the `fold` signature:

```
def fold(z: A)(f: (A, A) => A): A
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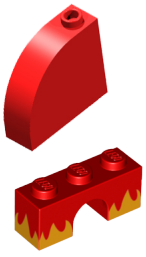

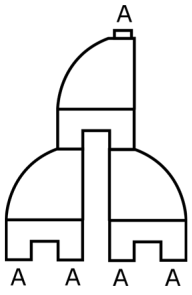

The `fold` operation can process the elements in a reduction tree, so it can execute in parallel.