



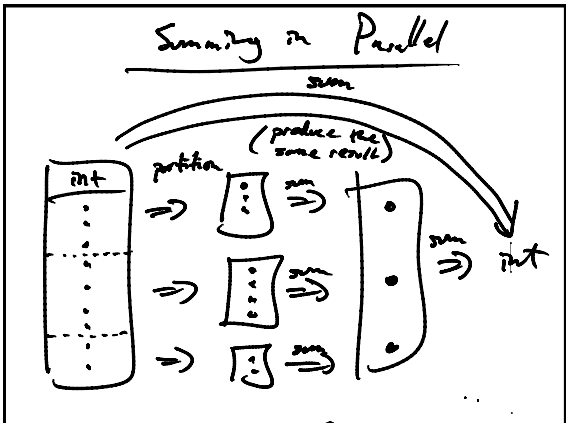
So far

Comprehensions \Rightarrow mapping
 (nesting) \Rightarrow joining
 (ifs) \Rightarrow filtering

but what about reducing?!

Example: Sum

$\Rightarrow 21$
 operates on many rows together



Monoids

		<u>Examples</u>
Set	$X: \text{Set}$	\mathbb{Z} \mathbb{R} Matrices
Id	$e: X$	0 1 I
Op	$\cdot: X \times X \rightarrow X$	$+$ \cdot \cdot
Id-prop	$\forall x: X. e \cdot x = x = x \cdot e$	(proofs)
Assoc-prop	$\forall x, y, z \in X. (x \cdot y) \cdot z = x \cdot (y \cdot z)$	

