

MPI Class Examples

- 1) Image Summation - Create an image consisting of 9 rows of 3 tiles each such that each row is calculated by a group of 4 MPI tasks as follows:

For row=0..8

- 3 workers (PE1, PE2, PE3) each create one tile using (for row=0..8):

```
{ Precondition: tile(:,)=0}
if ((abs(mype-1).eq.mod(row,3)).and.(i.eq.j))      tile(i,j) = 1
if ((abs(mype-3).eq.mod(row,3)).and.((i+j).eq.(n+1)))  tile(i,j) = 1
```
- 1 master (PE0) assembles the tiles from this row into a buffer and then writes the buffer out.

Here, n is the size of the tile (nxn). Use n=8.

- 2) Global Reduction
 - a. Distribute an array A on 4 PEs with initial values of $A(i)=i$, $i=1,\dots,1024$. Have each PE calculate a partial sum. Pass all partial sums to PE 0. Print out the global sum? Is this code scalable?
 - b. Use an MPI reduction call. How many PEs have the sum?
 - c. Use another call to send the answer to all PEs