Matrix Transposition

<table>
<thead>
<tr>
<th>A_{11}</th>
<th>A_{12}</th>
<th>...</th>
<th>A_{1n}</th>
</tr>
</thead>
<tbody>
<tr>
<td>A_{m1}</td>
<td>A_{m2}</td>
<td>...</td>
<td>A_{mn}</td>
</tr>
</tbody>
</table>

For every element (i,j)
\[ A_T(i,j) = A(j,i) \]

How to do this in parallel?
Matrix Transposition

We can divide it into sub-matrices, assign one to each process, do local transposition, and assemble them.
Parallel Matrix Transposition

1. Create a process grid;
2. Divide the matrix into sub-matrices accordingly and assign one to each process;
3. Let each process perform local transposition;
4. Send the transposed sub-matrix to the root process for assembling.