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Parallel Matrix Multiplication

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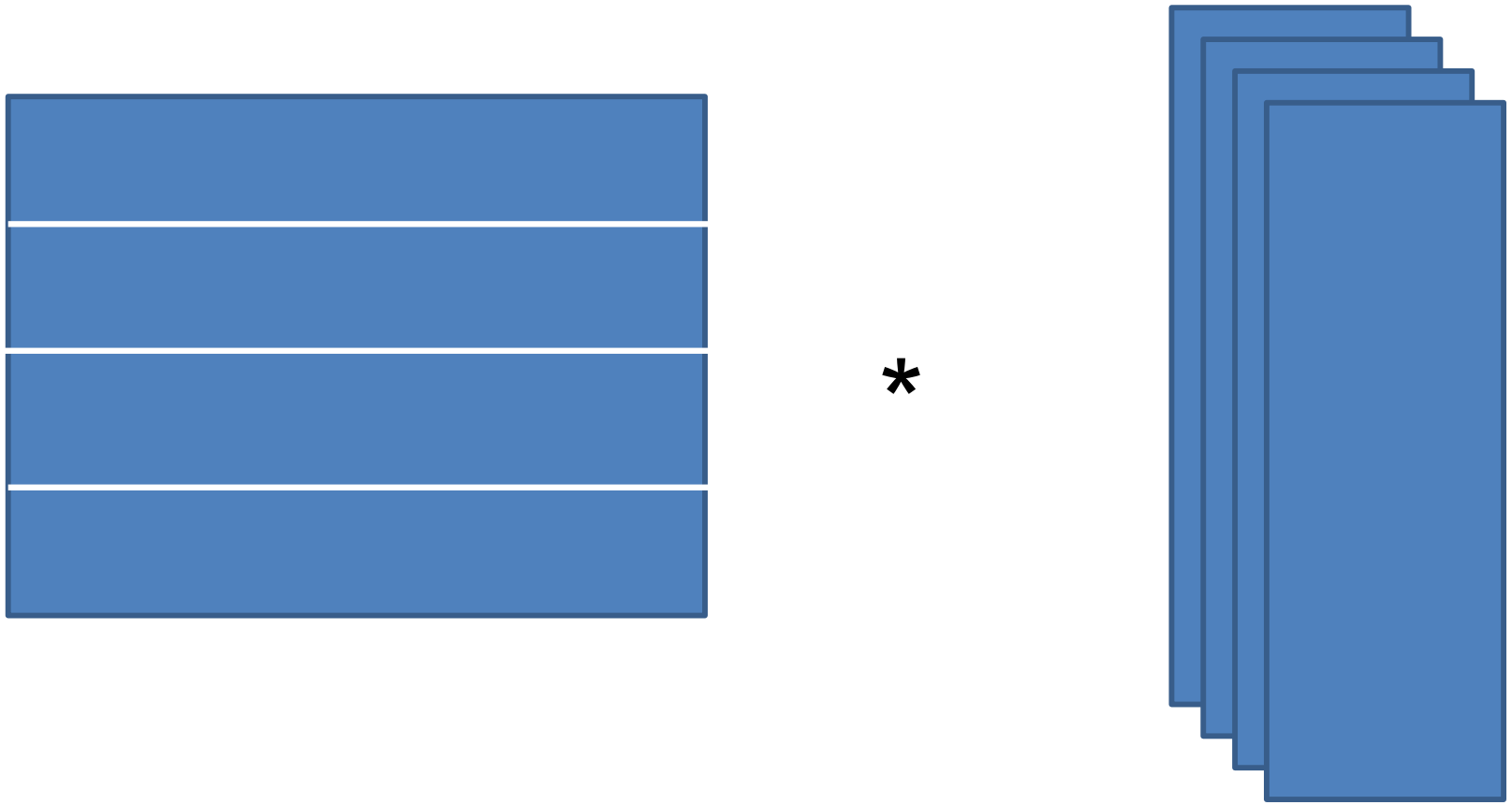
POLITECNICO
DI MILANO

Goals

- Write a **parallel program** to perform matrix multiplication
- Recall that you can represent a **dense matrix** in memory as a vector, or array
  - rows are stored one after another
- The initial code already implements a dense_matrix class
  - `operator *` performs serial matrix multiplication
  - `data()` returns a pointer to the data elements
- You have a skeleton for the main function, where the input matrices are read from file and the final result is printed to screen

Goals

- As parallelization scheme split the left hand operand in stripes by row and replicate the right hand matrix on all the processes



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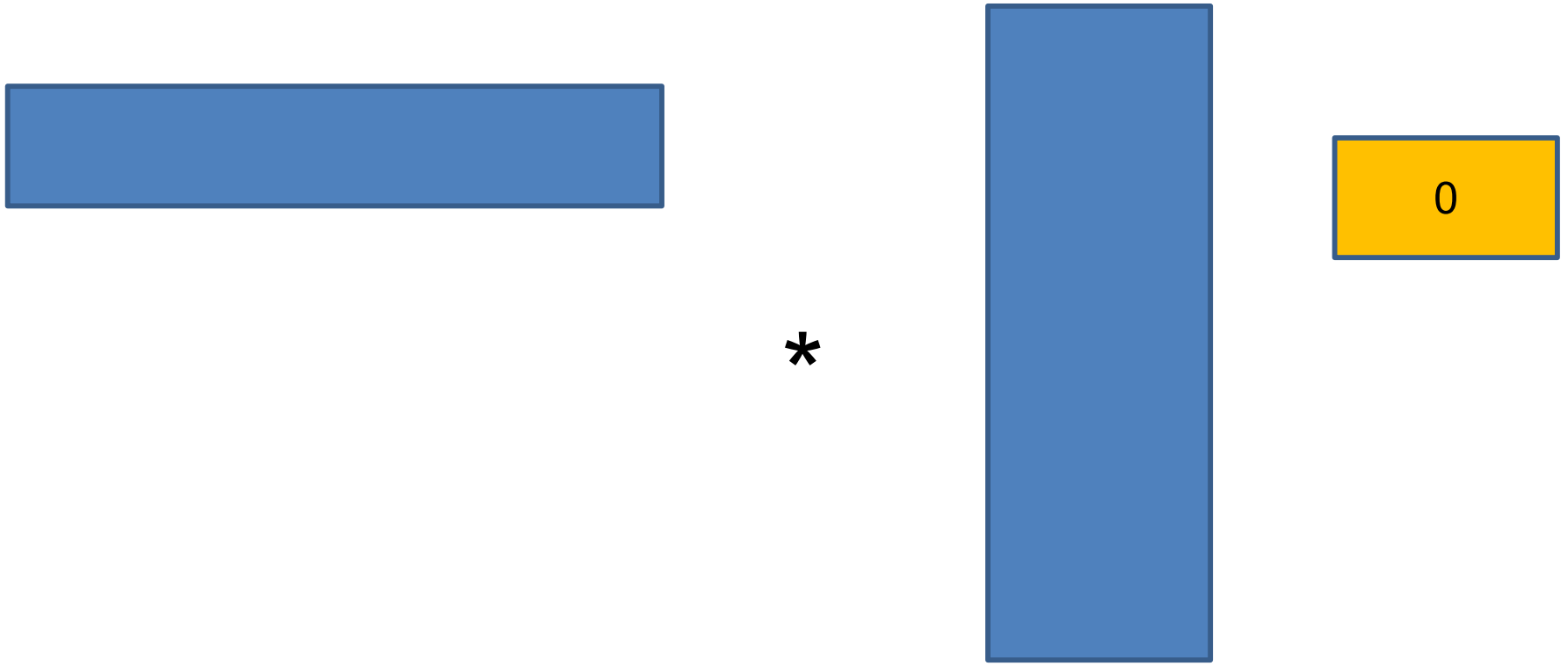

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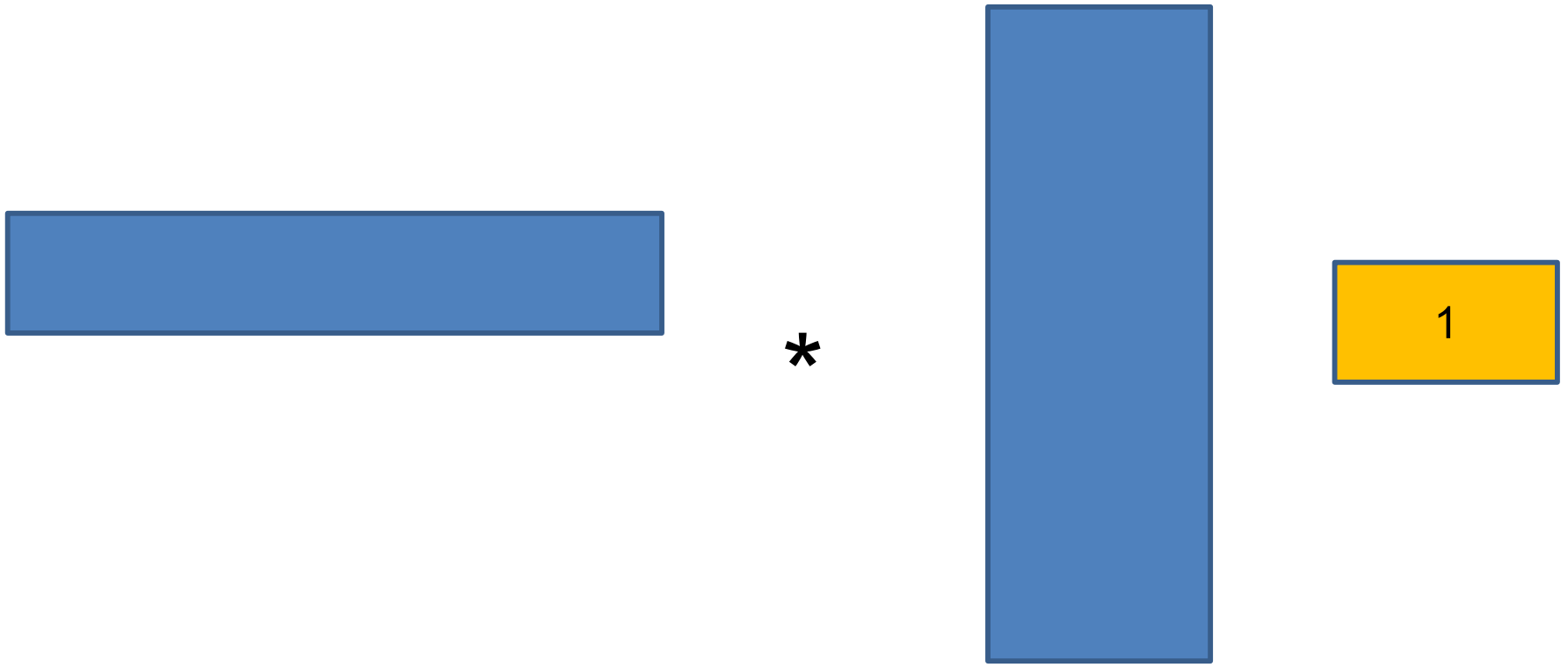

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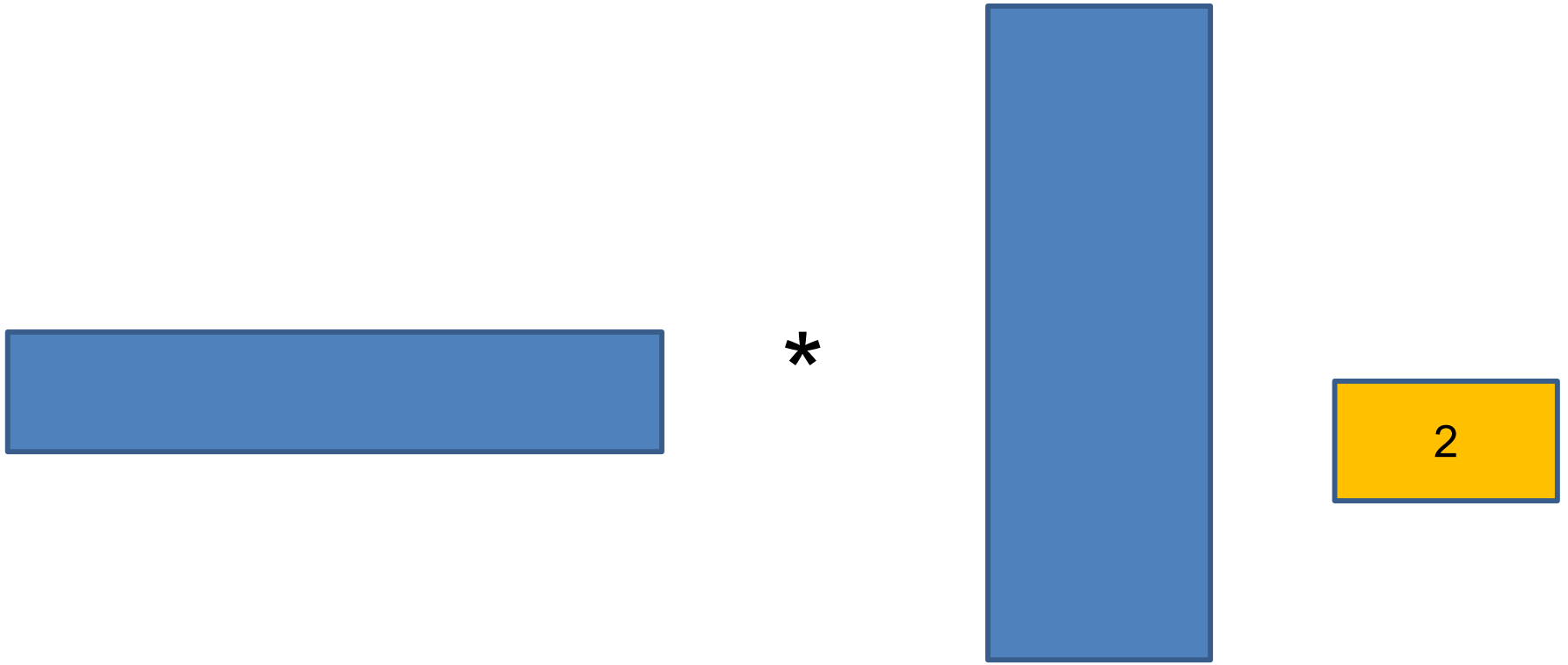

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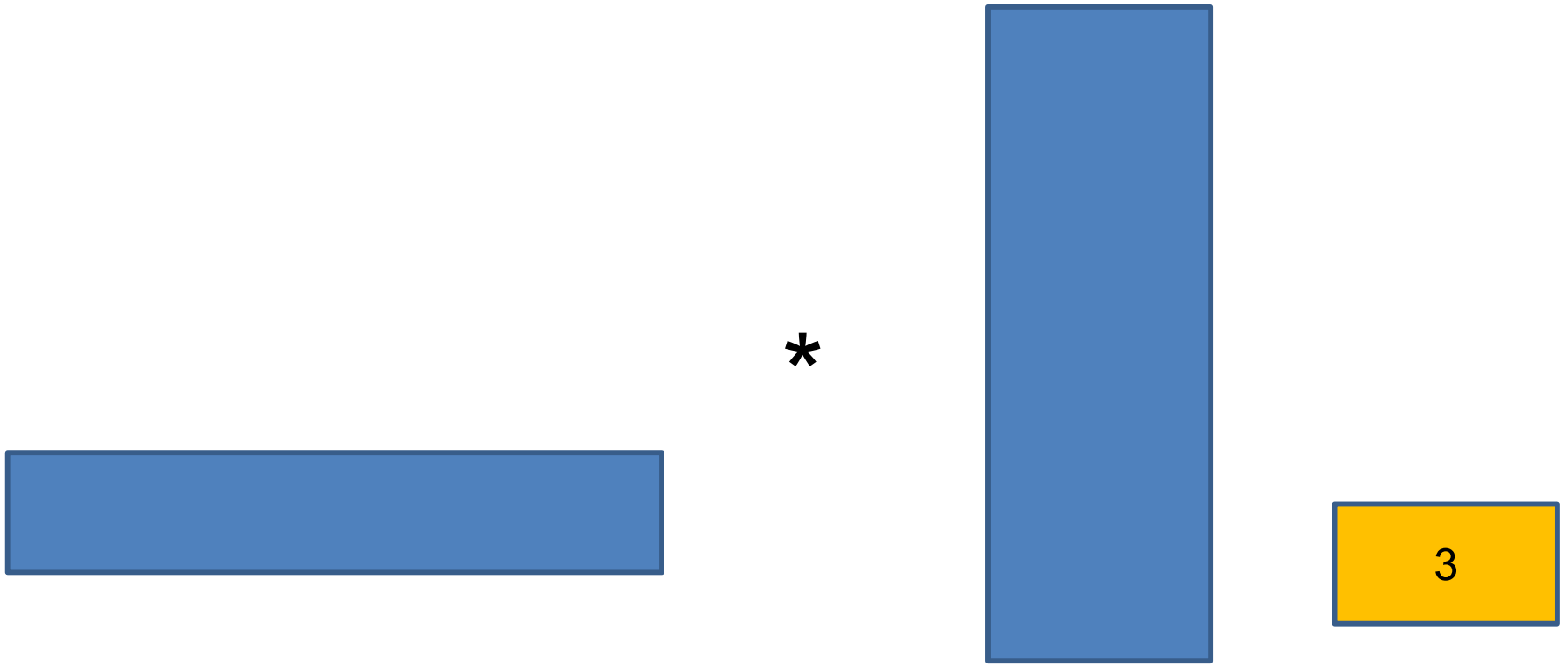

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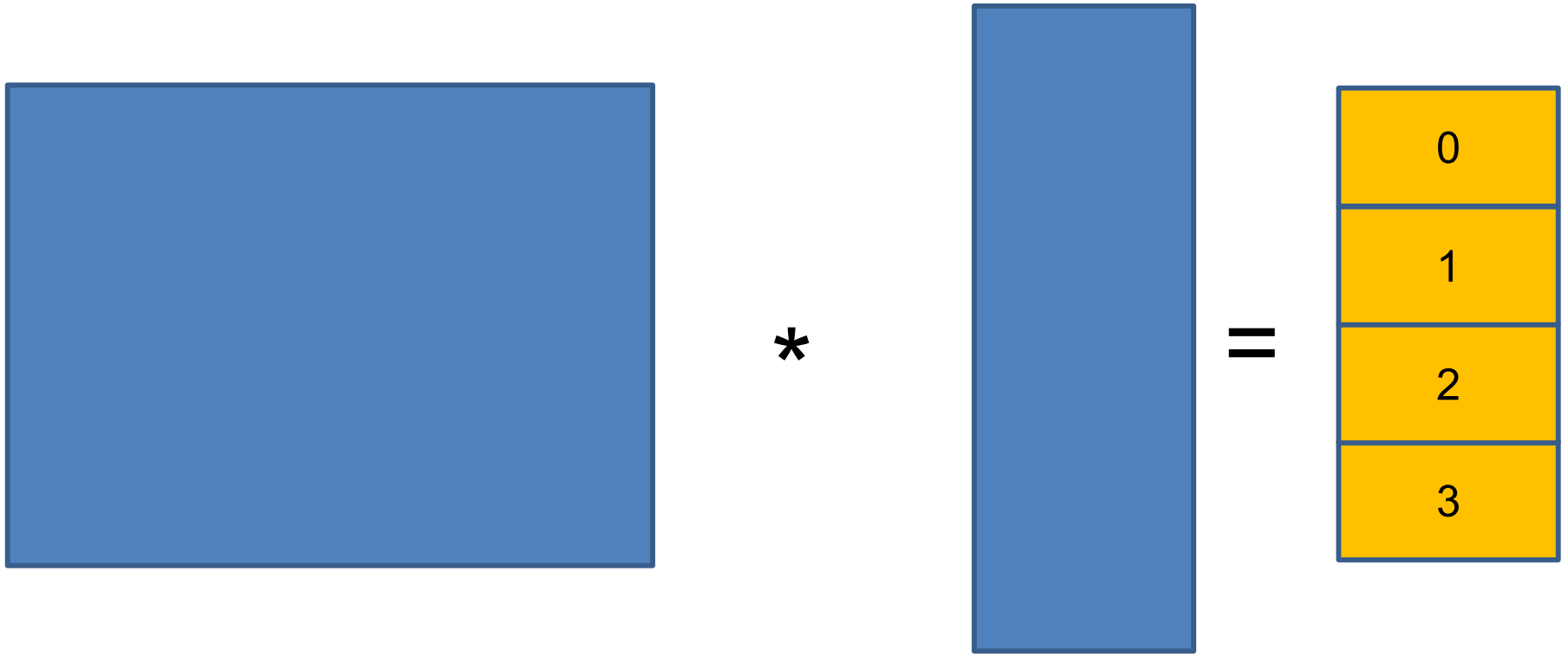

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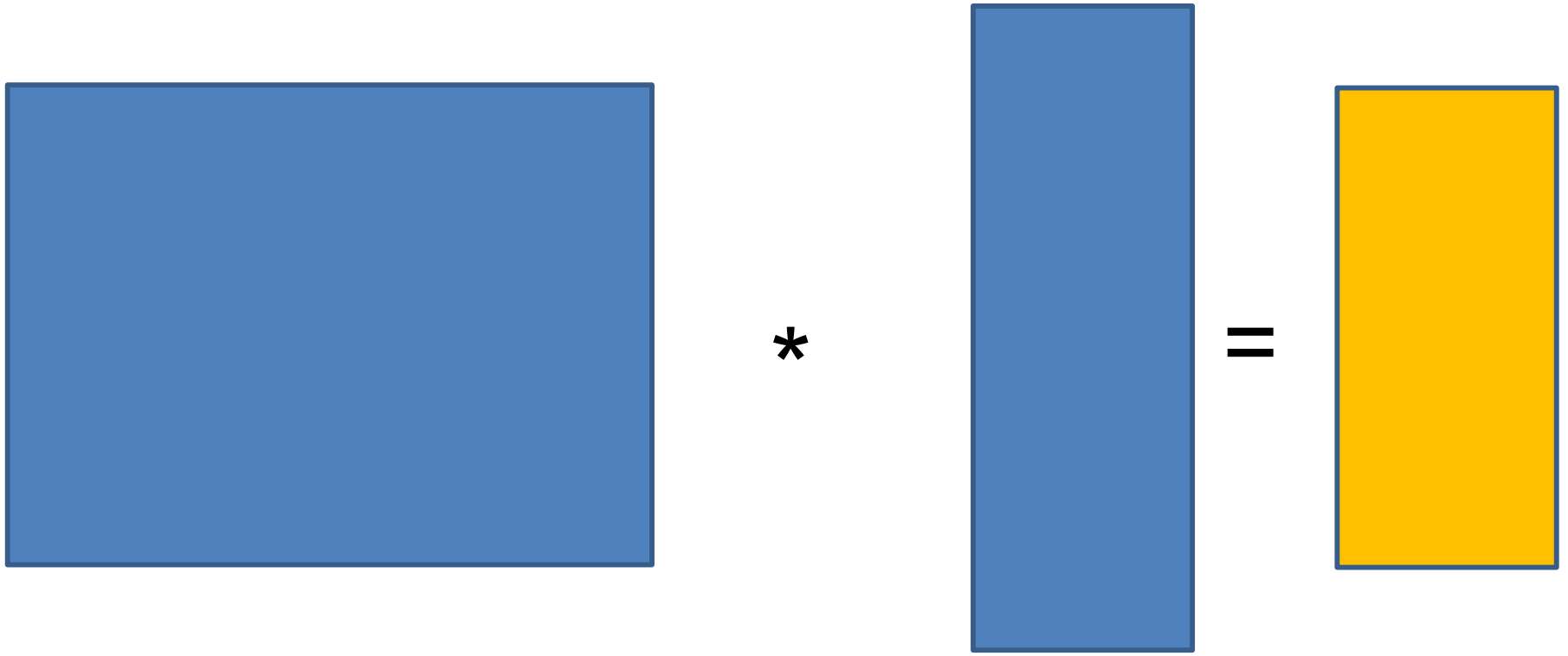

Goals

- When you collect the partial slices, make the full result available on all processes (on rank 0 could be enough but this way results is avalable at all processes and solution is more general)
- Assume that all the matrix dimensions are multiples of the communicator size
- Input matrices are provided as text files and file names are obtained from the command line