

# ITMC403

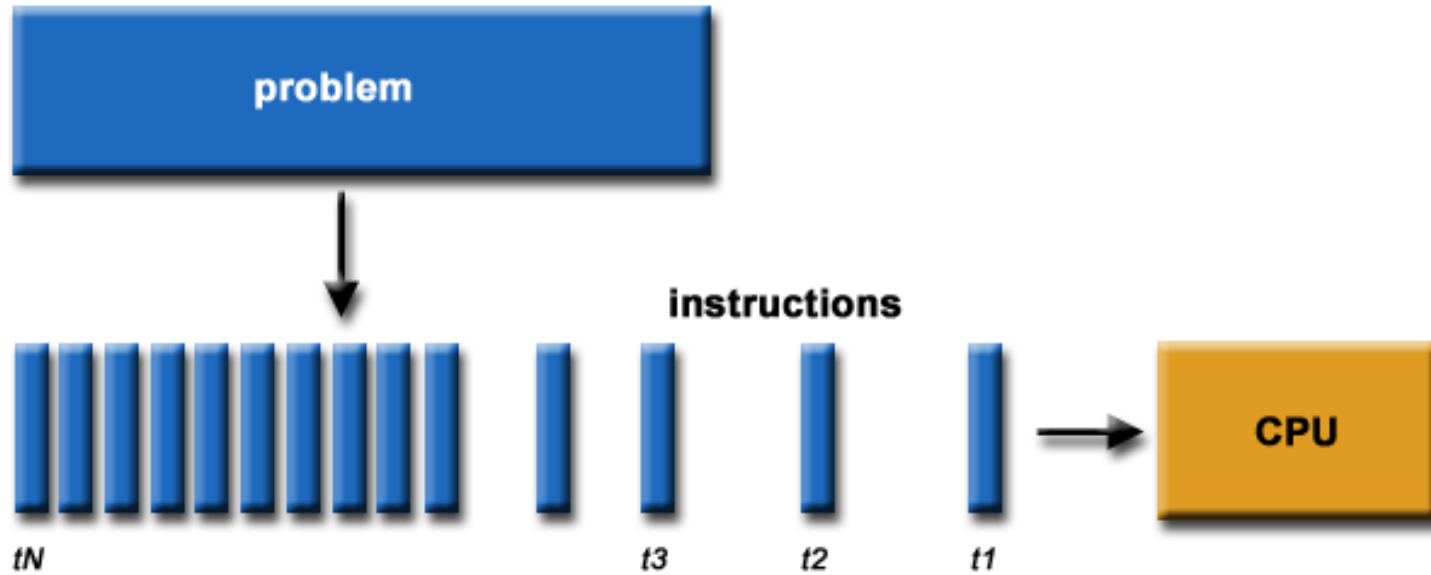
## Parallel and Distributed Computing



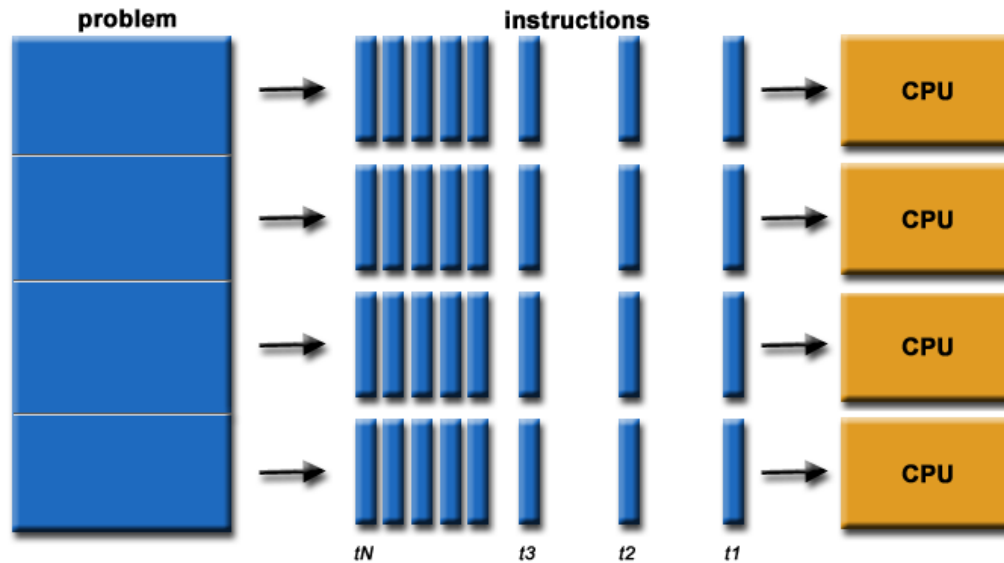
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Intro. of Parallel and Distributed  
Computing

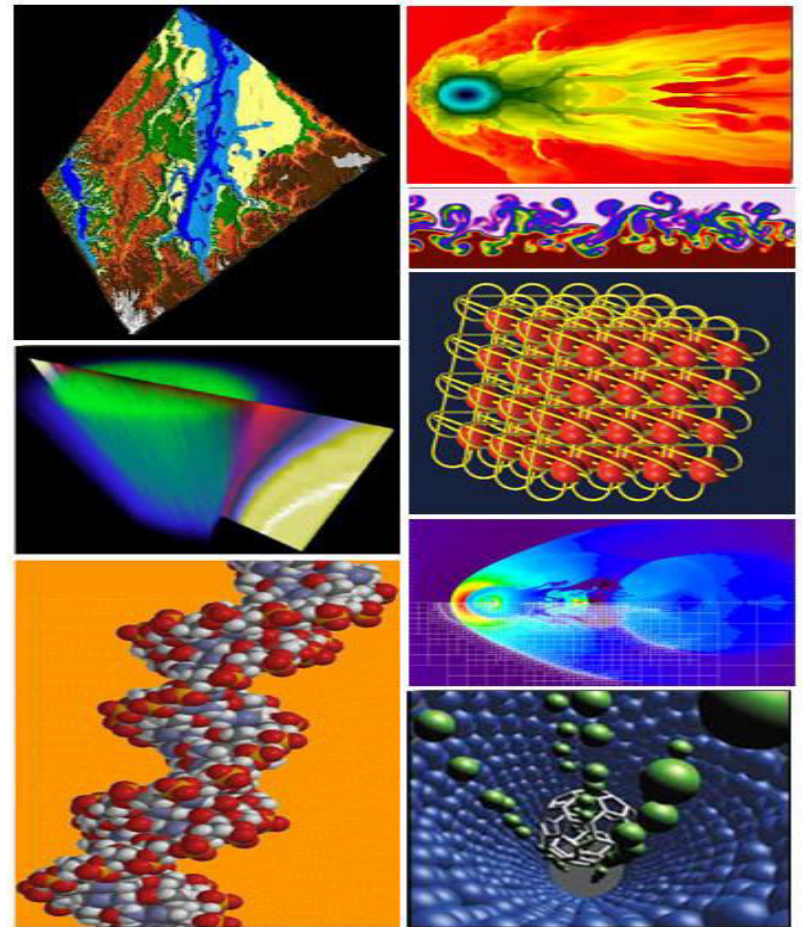
# Sequential Programming



# Parallel Programming

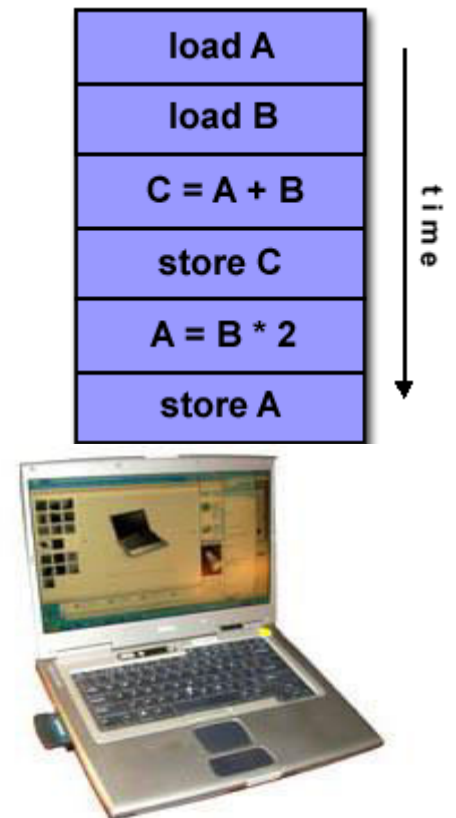


# Uses for Parallel Computing



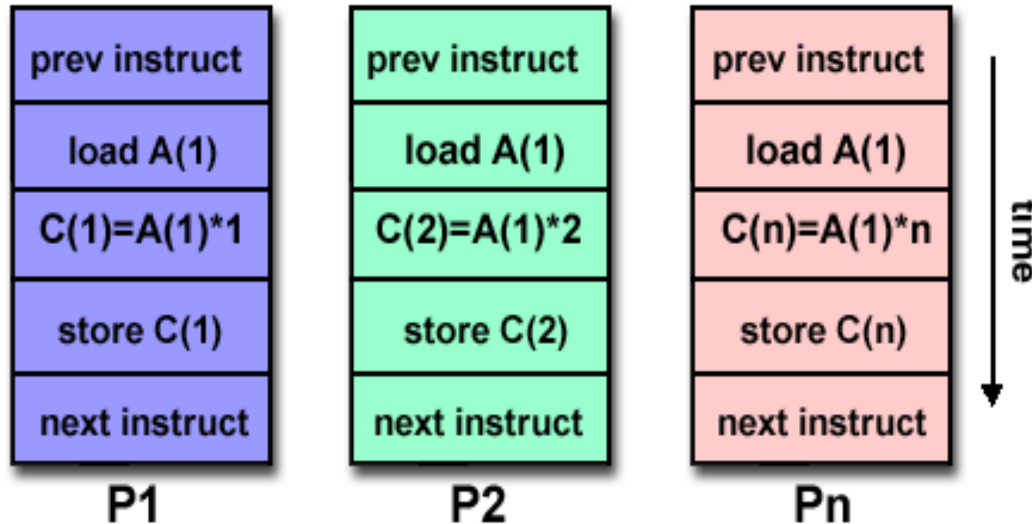
# Flynn's Taxonomy

- Single Instruction, Single Data (SISD):



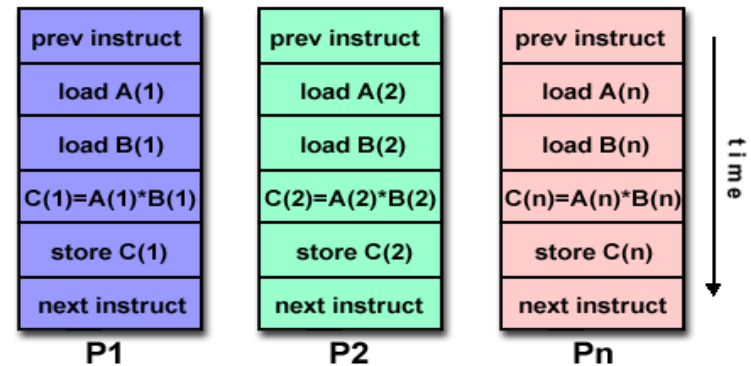
# Flynn's Taxonomy

- Multiple Instruction, Single Data (MISD):

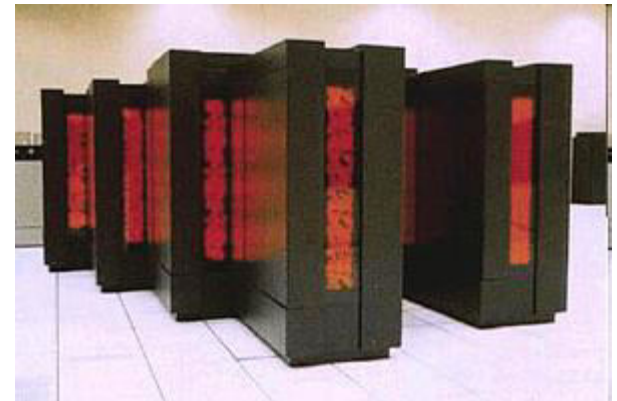


# Flynn's Taxonomy

- Single Instruction, Multiple Data (SIMD):



Cray Y-MP

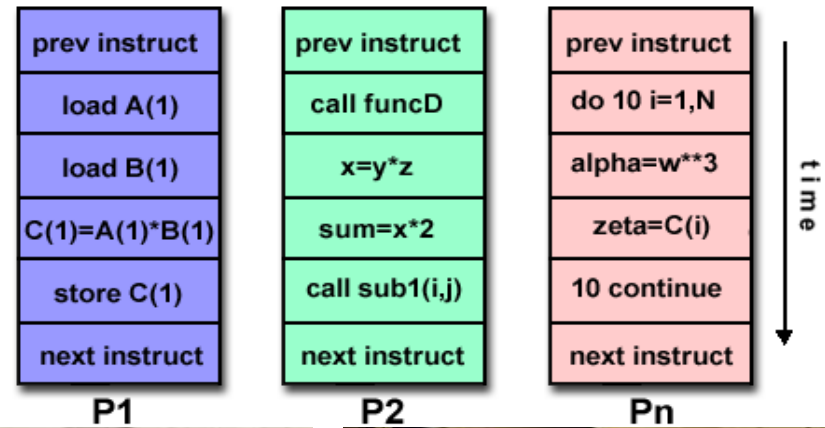


Thinking Machines CM-2

# Flynn's Taxonomy



- Multiple Instruction, Multiple Data (MIMD):



IBM POWER5



HP/Compaq Alphaserver

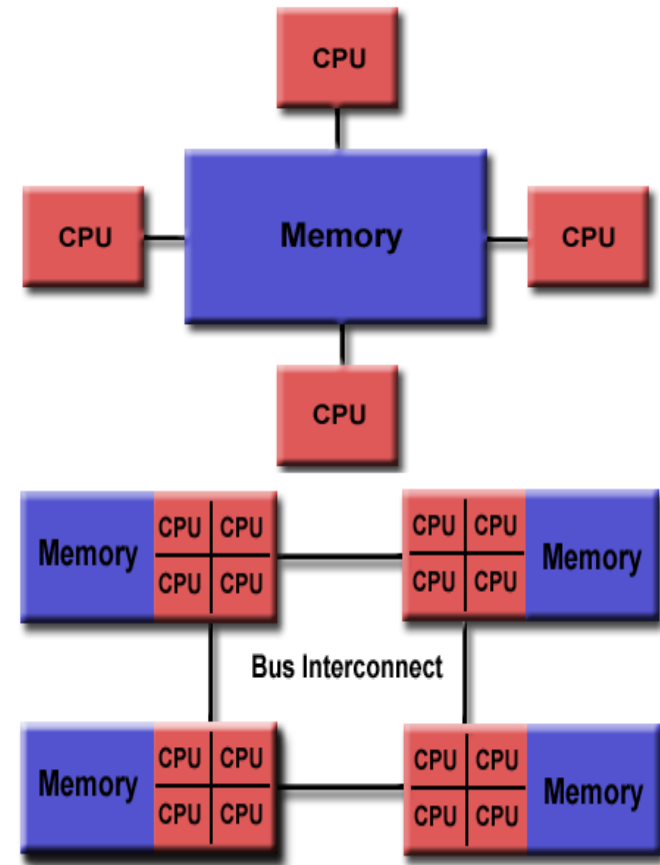


AMD Opteron



# Computer Memory Architectures

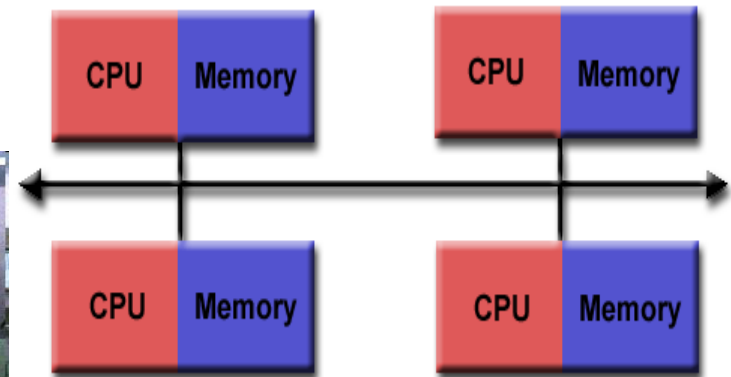
- Shared Memory



100 teraFLOPS supercomputer  
Shared-memory multiprocessors  
12,000 IBM POWER5 microprocessors

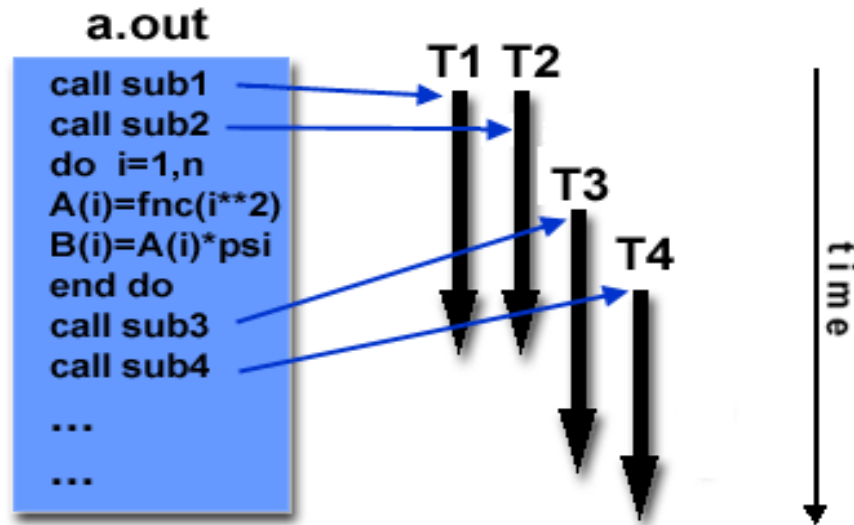
# Computer Memory Architectures

- Distributed Memory



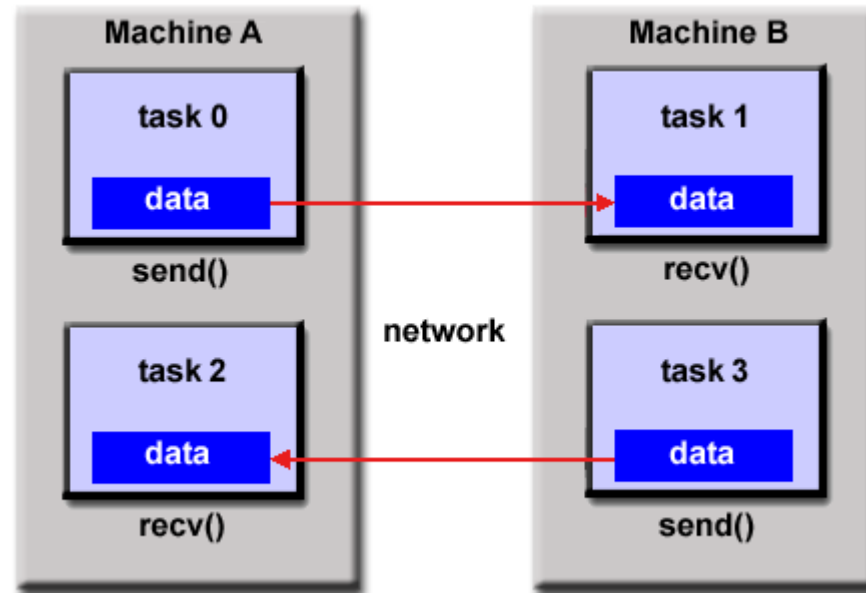
# Parallel and Distributed Models

- Threads Model



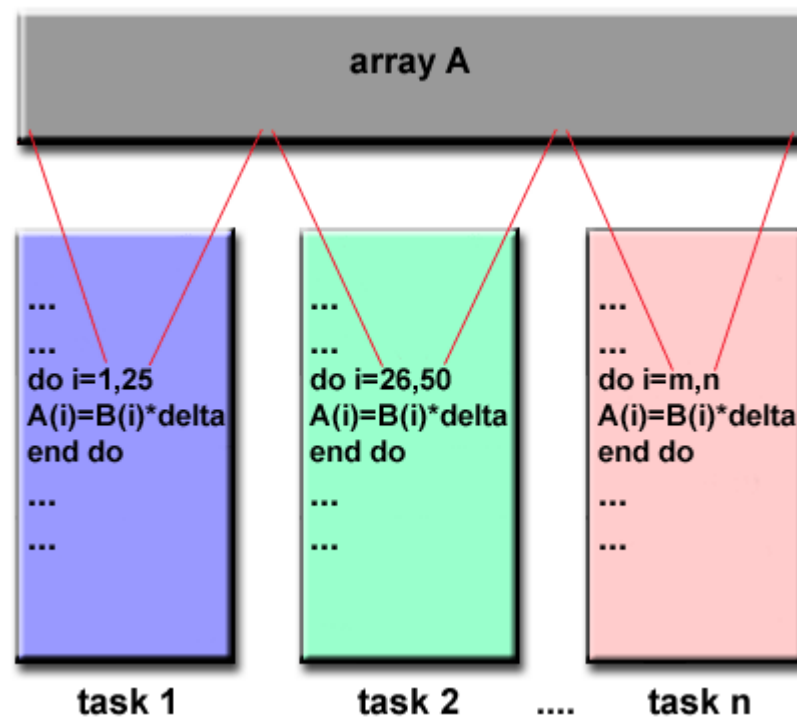
# Parallel and Distributed Models

- Message Passing Model



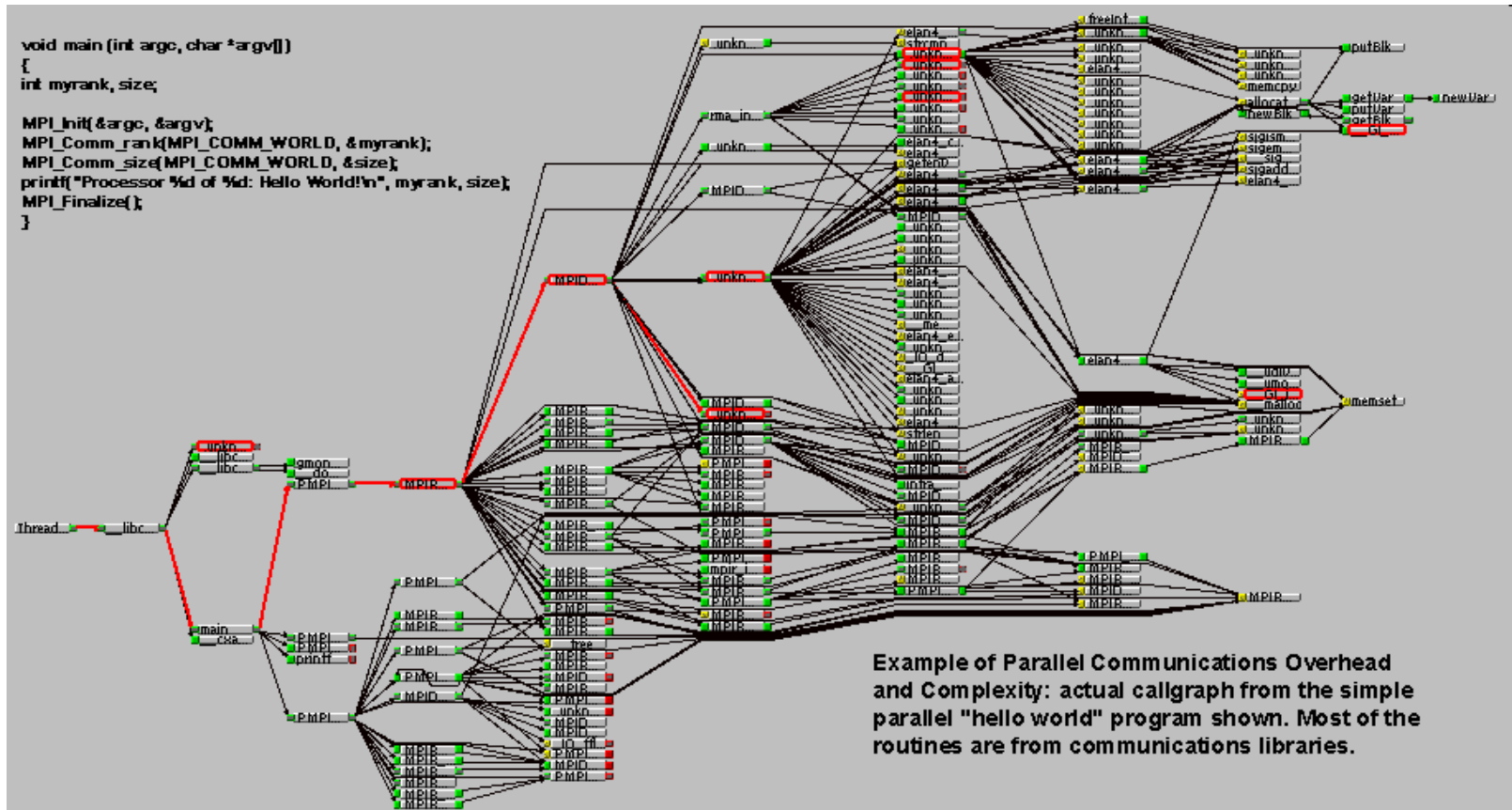
# Parallel and Distributed Models

- Data Parallel Model



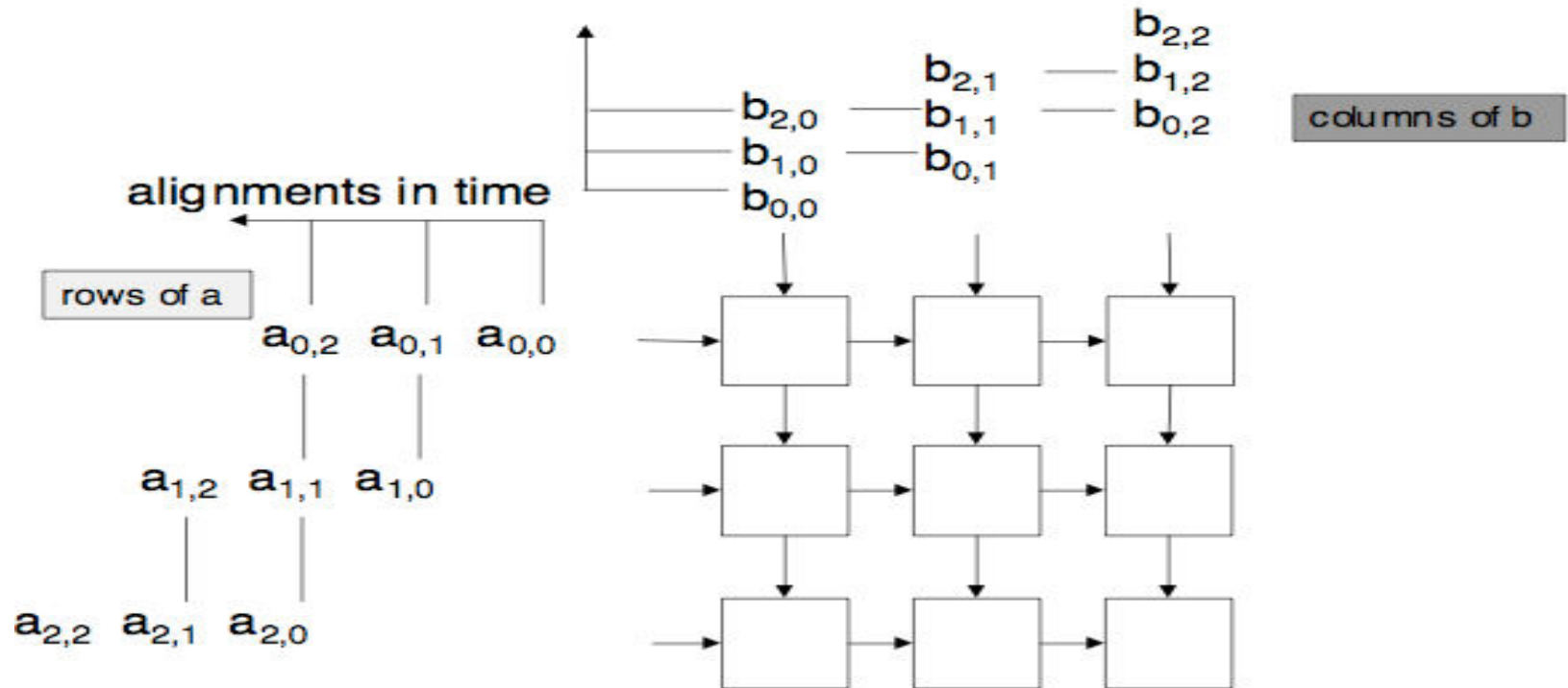
# Designing Parallel and Distributed Programs

- Factors to Consider:



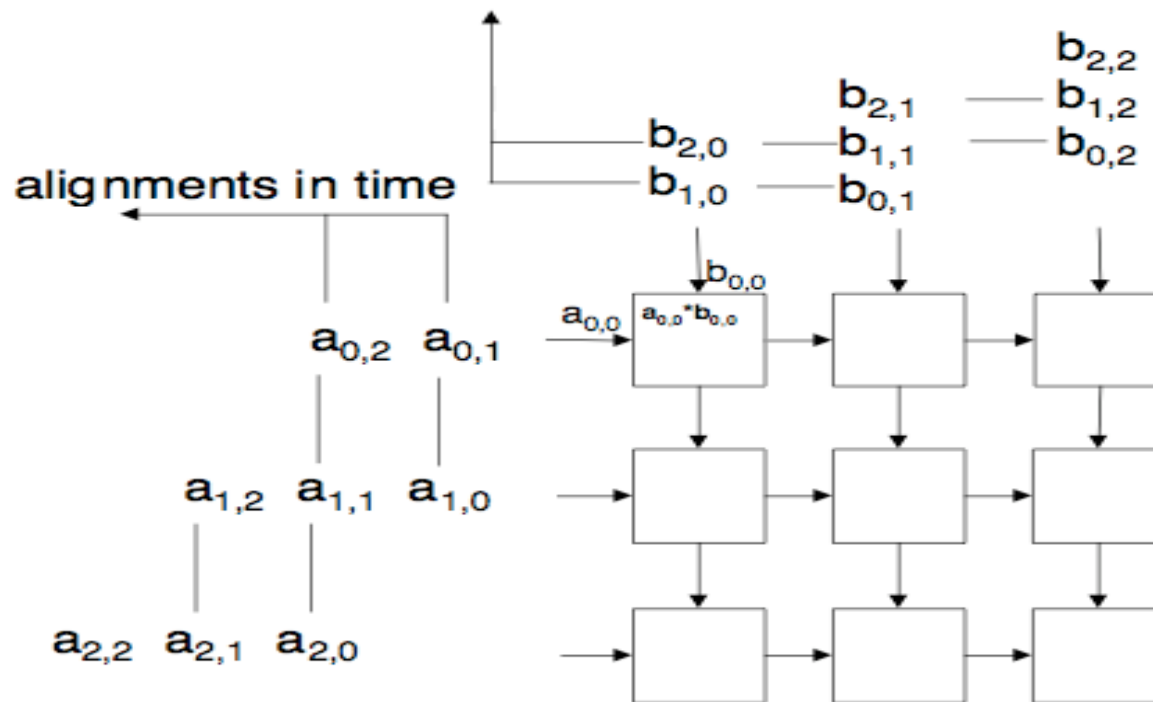
# Parallel Examples

## Systolic Matrix Multiplication Illustrated with two 3x3 matrices



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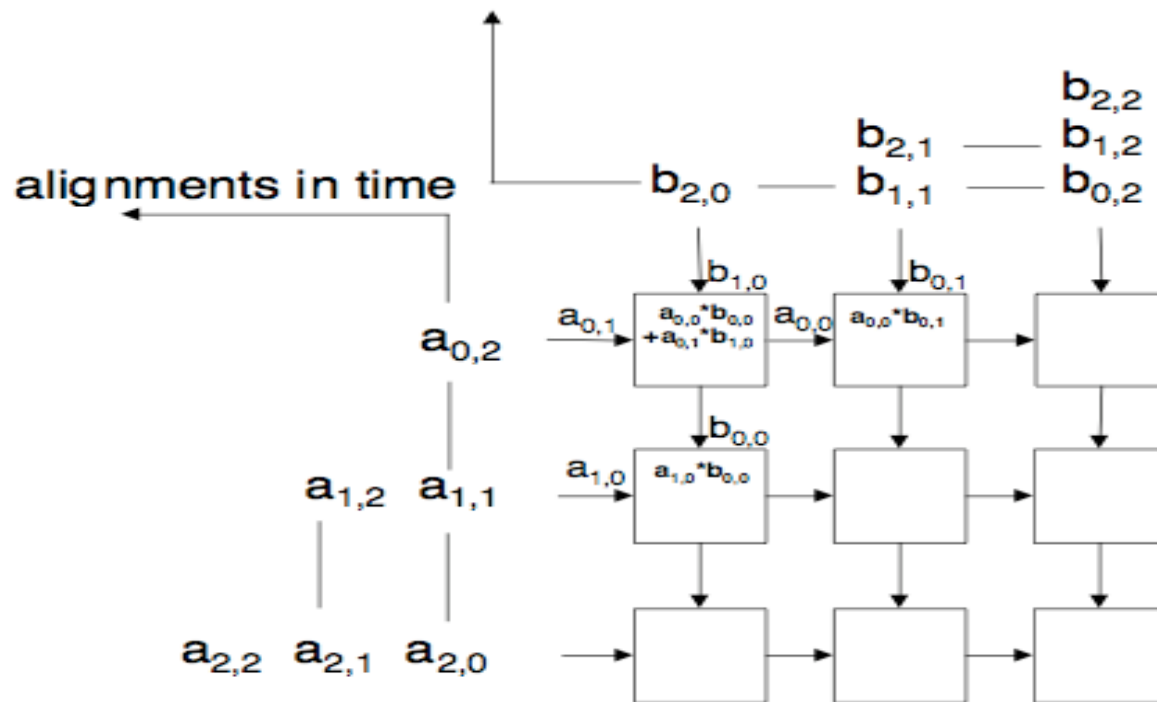
## Systolic Matrix Multiplication Illustrated with two 3x3 matrices





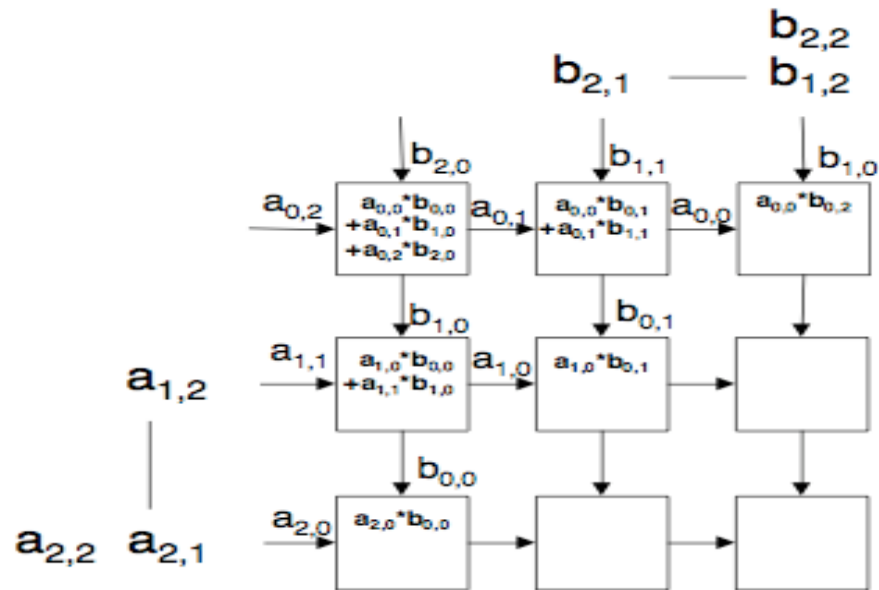
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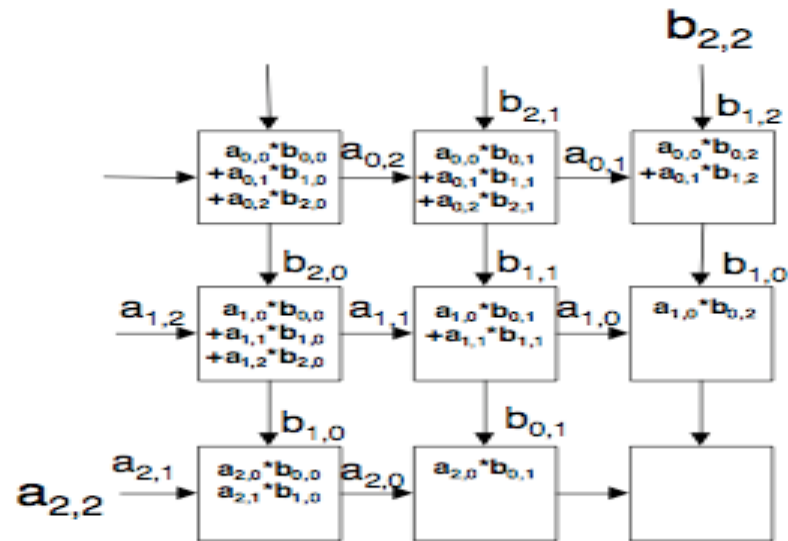
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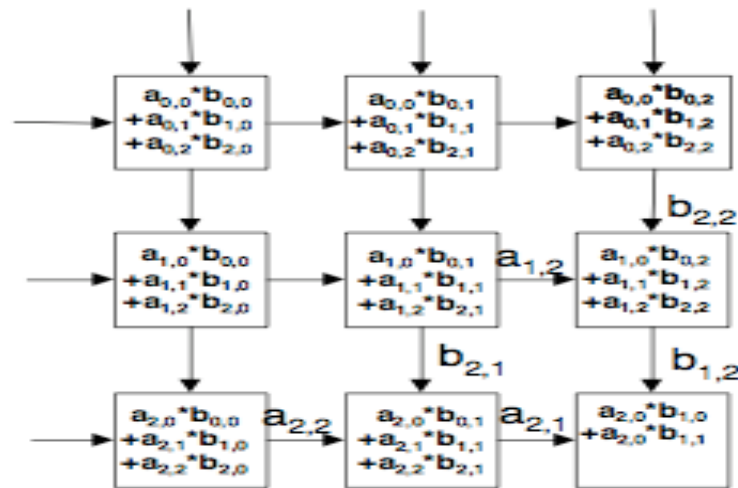
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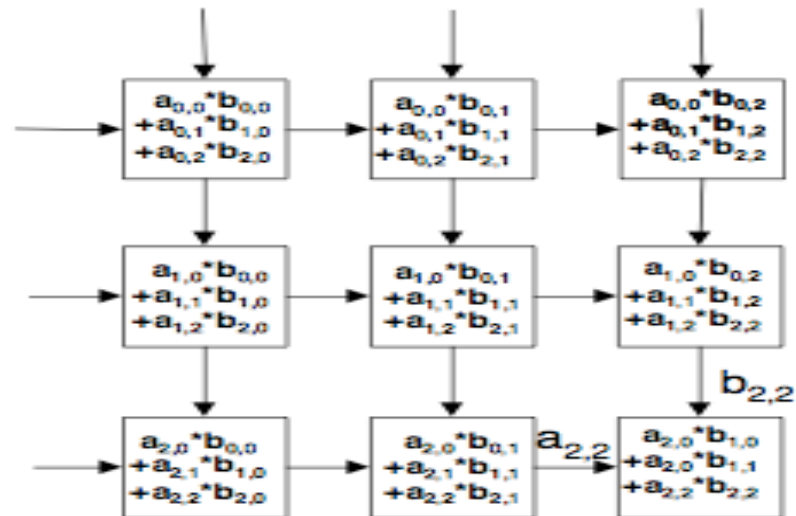
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# References

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- Parallel and Distributed Models