



# Preface

# Why are you here?

# Parallel Computing Basics



## What is a Parallel Computer?

### Characterization

A parallel computer is a

- collection of processing elements
- communicating and
- cooperating

for the fast solution of a large problem.

# Parallel Computing Basics

## Basic Types of Parallelism



- Pseudo Parallelism, or Multitasking



modern operating systems simulate parallel execution by time slicing

# Parallel Computing Basics

## Basic Types of Parallelism



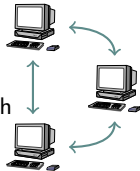
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- Distributed Memory

Computations executed on single unit with exclusive memory each



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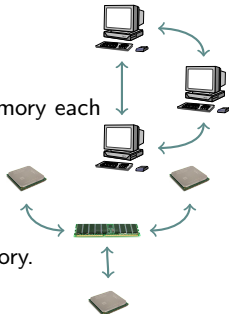
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- Shared memory

Several computational units share a common main memory.

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## Common Pitfalls in Parallel Computing



Most errors and misunderstandings in parallel computing are related to one of the following issues:

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- data interdependence,

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- race conditions,
- execution order based accuracy issues,
- deadlocks,
- data interdependence,
- blocking problems on hardware level.