

# COSC 6374 Parallel Computation

## Parallel Design Patterns (II) - Algorithm structure and Supporting Structures

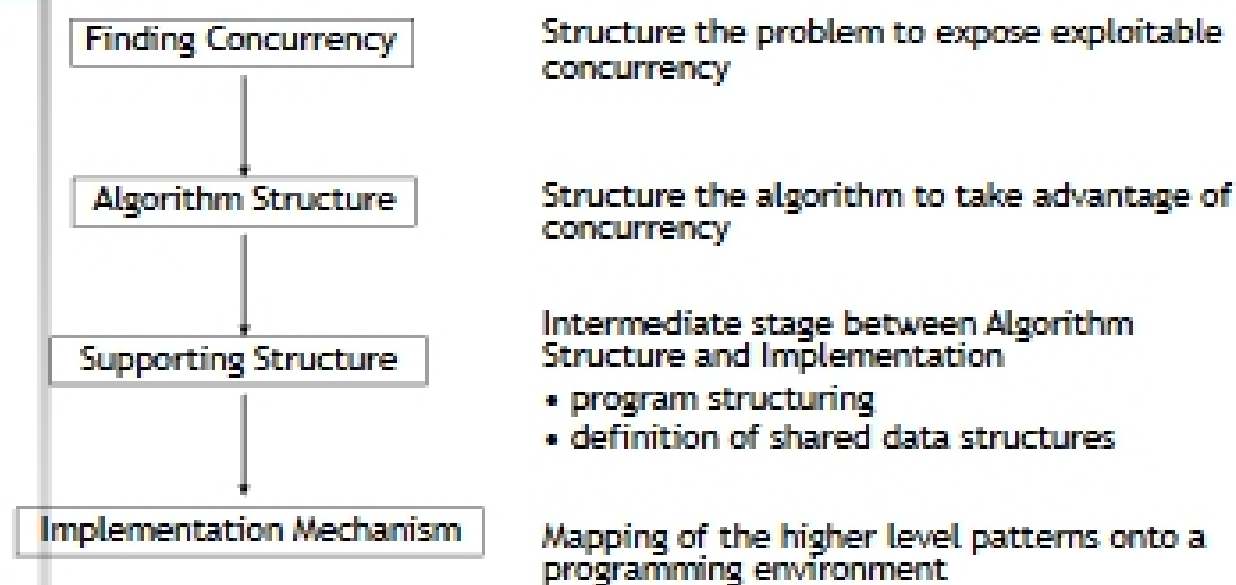
Edgar Gabriel  
Fall 2010



Edgar Gabriel



# Parallelization Strategy



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Edgar Gabriel

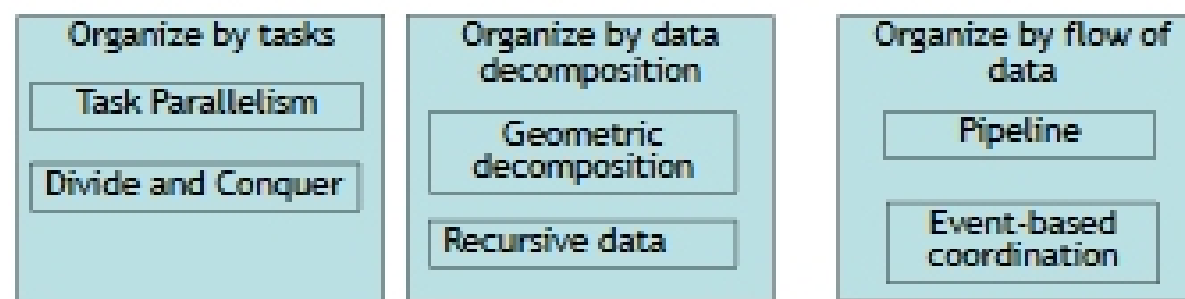


## Finding concurrency

- Result
  - A task decomposition that identifies tasks that can execute concurrently
  - A data decomposition that identifies data local to each task
  - A way of grouping tasks and ordering them according to temporal constraints



## Algorithm structure



## Task parallelism (I)

- Problem can be decomposed into a collection of tasks that can execute concurrently
- Tasks can be completely independent (embarrassingly parallel) or can have dependencies among them
- All tasks might be known at the beginning or might be generated dynamically



## Task parallelism (II)

- Tasks:
  - There should be at least as many tasks as UEs (typically many, many more)
  - Computation associated with each task should be large enough to offset the overhead associated with managing tasks and handling dependencies
- Dependencies:
  - Ordering constraints: sequential composition of task-parallel computations
  - Shared-data dependencies: several tasks have to access the same data structure

