

Study Guide

Week 9 March 14th, 2016 – March 20th, 2016

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Study Materials on Moodle

- *PowerPoint Slides*
 - Pipeline pattern
 - Sorting Algorithms
- *Video*
 - Lecture 15 video: 75-minute video of Lecture 15 in Fall 2014, divided into two parts):
 - Lecture 15-1 on the pipeline pattern
 - Lecture 15-2 beginning sorting algorithms.

(taking out the discussion on Assignment 5 in Fall 2015, which is on Paraguin and different to our Assignment 5)
 - Lecture 16 video: 75-minute video of Lecture 16 in Fall 2014 continues on sorting algorithms.
- *Sample Quiz Questions*
 - Pipeline quiz questions
 - Sorting quiz questions

Tasks

- **Mini-Quiz:** Answer the short posted quiz before 11:55 pm Sunday March 20th, 2016.
- **Complete Assignment 4** Second MPI Assignment - Monte Carlo π workpool
 - Assignment 4 Due: Sunday March 20th, 2016 (*Week 9*)
- **Assignment 5** Using Suzaku to create MPI Programs – Tutorial and N -body problem
 - Assignment 5 Instructions
 - Assignment 5 Due: *Sunday April 3rd, 2015 (Week 11)*

Moodle Saba meeting – Friday March 18th, 2016, 5pm

Pipeline pattern describes pipeline pattern and various applications (sorting, solving an upper triangular system of linear equations, and matrix-vector and matrix multiplication). You are expected to be able to derive the speedup factor with a pipeline.

Sorting algorithms describes several sorting algorithms and their parallelization. Many of these algorithms will have already seen in an algorithms class, such as Mergesort, Quicksort, Rank Sort and Counting Sort, but others are designed specifically for parallel implementation such as Batcher's Odd-even Merge Sort. You are expected to be able to describe how each of the presented sorting algorithms in implemented for parallel operation and derive their parallel time complexity. Note also generally you are expected to know all the materials in the slides even if not covered formally in the videos. Although mostly they do match, there is a case here where there are some additional materials in the slides not in the videos - Batcher's Bitonic Merge Sort. You will not get questions on Batcher's Bitonic Merge Sort.

Assignment 5 Instructions: This assignment is completely different to that in Fall 2014 (hopefully better and more interesting). You are to create MPI programs using Suzaku. The assignment write-up gives full details of the Suzaku routines and sample code. The sample code and the Suzaku files for this assignment are pre-installed in the VM. They are also posted under the heading Suzaku at the “Parallel Programming Software” link for download if you are not using the course VM. You are asked to implement the N -Body problem. The N -body problem was described in the Week 8 lectures. You have two weeks to do the assignment *but as with all assignments, it is highly recommended to start early. Note the Suzaku files are different to those used in Fall 2015.*