

Parallel Computing

Practice Exam

Difficulty: medium

CSCI-UA.0480-051: Parallel Computing

Practice Exam

Important Notes- READ BEFORE SOLVING THE EXAM

- * If you perceive any ambiguity in any of the questions, state your assumptions clearly and solve the problem based on your assumptions. We will grade both your solutions and your assumptions.
- * This exam is take-home.
- * You have a limited time to complete this exam (Time will be specified by your instructor).
- * You are allowed only one submission.
- * Your answers must be very focused. You may be penalized for wrong answers and for putting irrelevant information in your answers.
- * Your answer sheet must have a cover page (as indicated below) and one problem answer per page.

The very first page of your answer is the cover page and must ONLY contain:

- * Your Last Name
- * Your First Name
- * Your NetID
- * Honor code (copy and paste to the first page of your exam)

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"I understand the ground rules and agree to abide by them. I will not share answers or assist another student during this exam, nor will I seek assistance from another student or attempt to view their answers."

Problem 1: Scheduling and Performance (30 points)

a. [15 points] Consider a system with four cores and a task graph represented as follows:

Task | Dependencies | Execution Time (cycles)

----- | ----- | -----

A | None | 10

B | A | 5

C | A | 12

D | B, C | 8

E | D | 6

- Draw the task graph visually.
- Determine the critical path(s) and the minimum execution time. Show your work.

b. [15 points] Assume each core can execute one task at a time. Propose a scheduling strategy to minimize execution time. Show the schedule (e.g., using a Gantt chart) and calculate the total execution time. How efficient is your schedule compared to the theoretical minimum? Justify your approach.

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