CSCI-UA.0480-051: Parallel Computing
Practice Exam (Jun 27, 2025)
Total: 100 points

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 gra

de both your solutions and your assumptions.

- This exam is take-home.
- This exam has 3 problems totaling 100 points.
- Your answers must be very focused. You may be penaliz

ed for wrong answers and for putting irrelevant information in your answers.

- You must upload a pdf file.
- Your answer sheet must have a cover page and one problem answer per pag

e (e.g. problem 1 in separate page, problem 2 in another separate page, etc.).

Honor code (copy and paste to the first page of your exam)

- You may use the textbook, slides, and any notes you have. But you may not us

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swer and you will earn an immediate grade of 0.

- Anyone found sharing answers or communicating with another stud

ent during the exam period will earn an immediate grade of 0.

- **"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."

1. Describe the challenges associated with debugging parallel programs, contrasting them with the challenges of debugging sequential programs. Consider issues such as race conditions, deadlocks, and non-deterministic behavior in your explanation. [25 points]

2. Explain the difference between data parallelism and task parallelism, providing a concrete example of a problem that is well-suited to each approach. Discuss how the choice of parallelization strategy affects the overall performance and scalability of the solution. [35 points]

3. Compare and contrast two different parallel programming models (e.g., message passing using MPI and shared memory using OpenMP). Discuss their strengths and weaknesses in terms of ease of programming, scalability, and performance across different hardware architectures. [40 points]