

Fall 2022
Midterm I
Thursday, September 29

**DO NOT OPEN THIS EXAM UNTIL YOU ARE
INSTRUCTED TO DO SO**

Name: _____ . Student ID No. _____

Student UB E-Mail Address _____

1. **NO TALKING UNTIL YOU LEAVE THE EXAM ROOM, PERIOD. Not now. Not when you are done. Not when you are collecting your things. Not when you are getting ready for the exam. NO TALKING!** Doing so will earn you an F on the exam, at a minimum.
 2. You May **NOT ASK ANY QUESTIONS DURING THE EXAM.** Do your best and note any concerns on your page.
 3. **Write only on the front of each page.** Anything written on the back of a page will not be graded.
- **Plagiarism** will earn you an F in the course and a recommendation of expulsion from the university.
 - a. You may not refer to any material outside of this exam.
 - b. That is, you may **not** refer to notes, books, papers, calculators, phones, classmates, classmates' exams, and so forth.
 - c. **Do not talk to fellow students at any time while in the exam room.**
 - Answer all questions on these pages. No code or pseudo-code is necessary – just a precise and concise explanation and justification.
 - *Unsupported work will receive no credit.*

No exam questions on this page – Feel free to scribble/doodle on this page

Q1 (4 pts) Given a RAM with n pieces of data in a list, what is the running time of Quicksort? Justify your answer.

Q2 (4 pts) Given a RAM with n values in an array, give an asymptotically optimal algorithm to find the minimum of these values. Justify your answer.

Q3 (4 pts) Given a CREW PRAM of size n , give an efficient algorithm to determine the minimum of n values. Efficiency counts. Justify your solution.

Q4 (4 pts) Given an EREW PRAM with n processors, where every processor has a piece of data, give a cost-optimal algorithm with minimal running time to determine the summation of these data values. Justify your answer.

Q5 (4 pts) Given n pieces of data distributed one per processor on a Linear Array of size n , give an asymptotically optimal algorithm to determine the sum of the values. Justify your answer.

Extra Page that will be viewed.

