CSCI 351 — Principles of Parallel Computing

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logistics

- instructor(s)
  - Jeremy Iverson (`jiverson002@csbsju.edu`)
  - PENGL 213, (320) 363-3083
  - office hours: MW 12:45 - 13:45
    T 11:30 - 12:30
- textbook
  - *An Introduction to Parallel Programming*, 1st Edition, Pacheco
- website
  - `https://csbsju.instructure.com/courses/7664`

I prefer to be called Jeremy
Encourage questions right away
Emphasize the importance of the Canvas site for finding information about the class

course objectives

- understand common parallel architectures
- design and analyze parallel algorithms
- write efficient parallel programs

course content

- parallel architectures
- C programming
- Pthreads
- OpenMP
- MPI
- performance analysis
- parallel algorithm design
- collective communication operations
- matrix algorithms
- sorting algorithms
- graph algorithms

Ask students to point out some of the topics that they many have seen before and explain what they are

Point out that each of these bullets corresponds to one of the “modules” on Canvas (except the last three, which are under advanced topics)

assignments

- four (4) assignments (serial, Pthreads/OpenMP, MPI, ???)
  - all assignments are to be written in C or C++
- do your own work
- use each other as resources only
- due dates are strict (no partial credit for late assignments)

Should be student's own work, may work together but must individual solutions

Want to encourage using each other as resources, but do not want some students to rely on other students for answers

exams

- two (2) in-class exams (closed book / note)
- one (1) in-class final exam (closed book / open note) [cumulative]

Make-up exams are possible under certain circumstances

grading

- point distribution
  - assignments: 12.5% each (??%total)
  - exams: 15% each
  - final: 20%

scholastic conduct

- Work must be completed in a manner consistent with the College of Saint Benedict's & Saint John's University's codes for academic honesty (read that `here` → Academic Catalog → Academic Policies and Regulations → Rights and Responsibilities).
- Copying another's work, allowing (even negligently) others to copy your work, relying heavily on information that you found on the web, is cheating and grounds for penalties in accordance with the institutional policies.
- There will be an absolutely zero tolerance policy. Any copying issues that will arise will be automatically reported to the institution.

office hours

- stop by anytime
- my calendar

Mention outlook calendar & my home page
For those unfamiliar with Outlook meetings, then they should schedule another way and we will go over this in meeting
Mention not generally availability in the afternoons

teaching philosophy

Your job is to empower those you teach; when you do for them what they should be doing for themselves, you create dependency rather than empowerment.

It is easy to give in to the frustration that results from seeing amazing possibilities for the people you are teaching, and you want it more for them than they want it for themselves.

Don't give in to that frustration!

- Based on passage from "Resisting Happiness" by Matthew Kelly

In other words, don't expect me to give you answers. My job is to help you discover the answers for yourself.

expectations

- prepare for class (do the reading!)
- participate in class
- be respectful

- Don't just read, by try your best to make sense of the material
- Emphasize that students are not just recipients of my knowledge — they can shape the direction of the course
- Encourage students to stop and think before replying.
- Don't be discouraged if comprehension is not apparent right away, but don't be complacent
- Seek help (TAs and me)
- Students can expect the same things from me.

serial algorithms

- some algorithms that will be relevant to this course:
  - finding min/max values in array
  - matrix-vector and matrix-matrix multiplication
  - Gaussian elimination
  - depth-first, breadth-first, and best-first traversals
  - minimum spanning tree
  - single source shortest path
  - quicksort, radix sort, bucket sort, counting sort, sample sort
  - A* and IDA* heuristic search

- You do not need to know them all now, but it is a good idea to have them on your radar
- Wikipedia is a good resource in this case

questions?

notecards

- given name
- preferred name and pronunciation
- anything you would like me to know about you
- at least one of the following:
  - reason for taking the class
  - what you are hoping to learn from the class

activity

- stand up
- think of the number 1
- repeat while there is at least one other person standing
  - find another (just one) person standing
  - whoever is thinking of a higher number, adds the other persons number to theirs
  - whoever is thinking of a lower number, sits down
  - in the event of a tie, the taller of the two people sits down

- How many people did you talk to?
- What is the maximum number of people that you talked to as a function of the result?