csci350: A computing perspective of GIS

Improving the I/O-bottleneck: I/O-efficient algorithms
Summary

- I/O model and I/O complexity
- I/O-analysis
  - mergesort, quicksort and heapsort
  - binary search tree access
  - flow
- Algorithms
  - I/O-efficient flow accumulation
  - I/O-efficient sorting
  - Blocking a binary tree
  - I/O-efficient priority queue
- Examples of algorithms that are $O(n)$ in memory, and are hard in the I/O-model
- Heuristics
  - tiling
  - storing data in the order given by a space-filling curve
- Programming I/O-efficient applications
  - fine tuning of $M$ and $B$
  - Aware versus oblivious
    - cache-aware algorithms
    - cache-oblivious algorithms