MA/CSSE 473 Day 16

Main ideas from today:

1. Relationship between Binary-reflective Gray Code and Hamiltonian cycles of hypercubes. See the first content slide.

2. List some divide-and-conquer algorithms from previous courses or earlier in this course.

3. In the divide-and-conquer algorithm for the closest points problem, what is the basis for the "divide" part?

4. Once we have found the minimum distance between two points in each half, what main task is left to do?

5. If we calculate the distance between every point in S_1 and every point in S_2; what is the total running time then?

6. Describe how we can reduce the "combining" work after the divide and conquer from $\Theta(N^2)$ or $\Theta(N \log N)$ to $\Theta(N)$.

7. What is the big-theta running time of the new closest points algorithm?

8. What is the definition of the convex hull of a set of 2-dimensional points?

9. Describe the brute force Convex Hull algorithm.

10. Describe the “divide” part of the QuickHull algorithm. (Include P_1, P_n, S_1, and S_2 in your description)

11. How do we construct the upper hull from the set S_1 and points P_1 and P_n?