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## Question Sheet Quiz 3 for Nov 17, 2020

Which is the correct answer?

### Question 1:

What data structure(s) is/are particularly helpful for carrying out Graham's Scan?

- A sorted list
- A stack
- Both

### Question 2:

What is the most expensive phase in Graham's Scan in terms of the runtime?

- Finding the point  $p$  with lowest  $y$ -coordinate
- Sorting all points by polar angle with respect to  $p$
- Carrying out the scan and deleting right-hand turns

**Question 3:**

How many of the following algorithms have an arguably better time complexity than Graham's Scan?

(A) Jarvis' March (B) Quickhull (C) Preparata/Hong (D) Kirkpatrick/Seidel (E) Chan

- 0
- 1
- 2
- 3
- 4
- 5

**Question 4:**

Chan's algorithm is based on combining the ideas of which two algorithms in a really clever way?

- Preparata/Hong and Graham's Scan
- Graham's Scan and Jarvis' March
- Quickhull and Preparata/Hong
- Jarvis' March and Quickhull

**Question 5:**

Which of the following steps is *not* part of Chan's algorithm?

- Find an extremal point.
- Partition the point set into subsets of size  $m$ .
- Use Jarvis' March to compute the convex hulls of the subsets.
- Find  $H$  points along the joint convex hull.
- Use binary search for identifying tangents.

**Question 6:**

How do we determine the critical parameter  $H$  in Chan's algorithm?

- By setting  $m = H$ .
- By enumerating possible choices.
- By performing an exponential search.
- By performing a doubly exponential search.

**Question 7:**

Consider a set of  $n$  line segments in the plane. What is the best runtime for computing the  $h$  line segments that form the lower envelope?

- $O(n)$
- $O(h \log h)$
- $O(n\alpha(n))$
- $O(n \log h)$
- $O(n \log n)$
- $O(nh)$