# Exercises

## 1.1-1 Give a real-world example that requires sorting or real-world example that requires computing a convex hull.

We have a list of botanic plants and we want to sort them in alphabetical order.

## 1.1-2 Other than speed, what other measures of efficiency might one use in real-world setting?

Maintainability, Understanding, Simplicity, Correctness, Easy for implementation

## 1.1-3 Select a data structure that you have seen previously, and discuss its strengths and limitations.

**Linked List**  
*Advantages:*  
- It’s not necessary to know in advance the number of elements to be stored in the list and therefore, need not to allocate d as and when necessary.  
- In a linked list, insertions and deletions can be handled efficiently without fixing the size of the memory.  
- An important advantage of linked lists over arrays is the they uses exactly as much memory as needed.

*Disadvantages:*  
- The traversal is sequential

## 1.1-4 How are the shortest-path and traveling-salesman problems given above similar? How are they different?

The Shortest path problem solves how we can find the shortest path from point A to point B while the Travelling-salesman solves the problem how to find the shortest path between multiple points and to back at the starting position in the end. In other words, Travelling-salesman is a multuple appyings of the Shortest-path solution. The difference between those two problems is that while Shortest-path ends and starts points are not the same, in Travelling-salesman they are equal. In other words, Travelling-salesman is using circularity, and one last – the Travelling-salesman is a NP-complete which means that there’s still doesn’t exist efficient solution for this problem.

## 1.1-5 Come up with a real-world problem in which only the best solution will do. Then come up with one in which a solution that is “approximately” the best is good enought.

Imagine if we have a Global Positioning System for car. Our user wants to find the shortest way to head from point A to point B. The best solution is the only one that is the shortest.  
We have a satelite that receive a sginal from a mobile device and his job is to locate him on the map. So he is using the derivative geometric viewpoint principle to calculate the distance between himself landed and the device. It’s not 100% accurately but it’s good enough to be the best method.