

Solutions to the exercices in CLRS

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

sorting : order lines of a table relative to a specific column

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

memory usage

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

array

strength : easy random access (we can get an element by its index) limitation : fixed length

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

shortest-path and traveling-salesman problems given above are similar according to the fact that they both involve reducing the length of the path to be traversed.

They are different as the shortest path has a unique destination and traveling-salesman has multiple destinations to be visited.

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 enough.

surgery

video streaming

1.2-1

finding route followed by buses in the urban area of Antananarivo

extrapolate route used by buses relative to coordinates sent by users

4.1-1 What does FIND-MAXIMUM-SUBARRAY return when all elements of A are negative?

The biggest number (nearest to 0).

4.1-2 Write pseudocode for the brute-force method of solving the maximum-subarray problem. Your procedure should run in $\theta(n^2)$ time.

```
procedure MAX_SUBARRAY_QUAD(A)  
  for  $i \leftarrow 1, A.size$  do  
    for  $j \leftarrow A.size, i$  do  
      for  $k \leftarrow i, j$  do  
         $sum \leftarrow sum + A[k]$   
      end for  
      if  $sum > max\_sum$  then  
         $max\_sum \leftarrow sum$   
      end if  
    end for  
  end for  
end procedure
```
