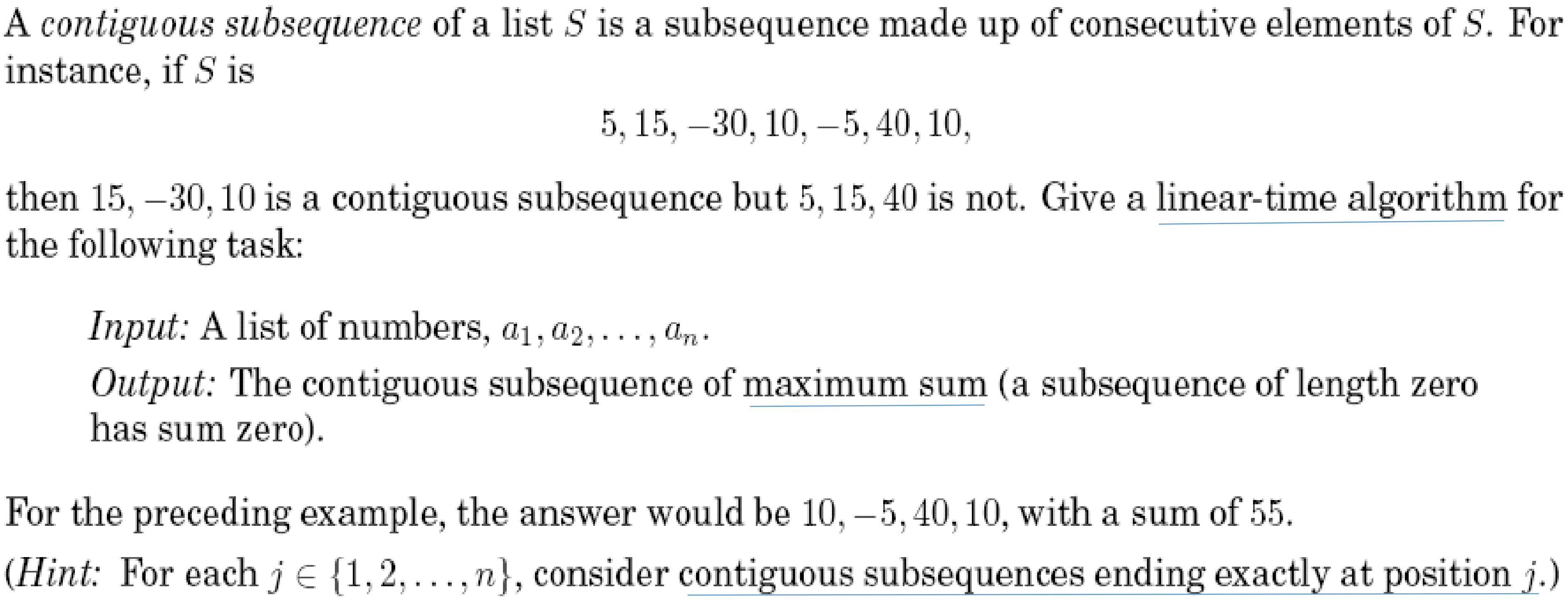
HW2-1



A *contiguous subsequence* of a list S is a subsequence made up of consecutive elements of S. For instance, if S is

$$5, 15, -30, 10, -5, 40, 10,$$

then $15, -30, 10$ is a contiguous subsequence but $5, 15, 40$ is not. Give a linear-time algorithm for the following task:

> *Input:* A list of numbers, $a_1, a_2, \ldots, a_n$.
>
> *Output:* The contiguous subsequence of maximum sum (a subsequence of length zero has sum zero).

For the preceding example, the answer would be $10, -5, 40, 10$, with a sum of 55.

(*Hint:* For each $j \in \{1, 2, \ldots, n\}$, consider contiguous subsequences ending exactly at position j.)

HW2-2

Assume $aa=ab=bb=b$, $ac=bc=ca=a$, $ba=cb=cc=c$ on the set $A=\{a, b, c\}$. Given a string $x = x_1x_2\ldots x_n$, design a dynamic programming algorithm to check whether there is a computational order such that the final result is a.

For example,

$x=bbbba \Rightarrow$ Yes. $(b(bb))(ba) = (bb)(ba) = b(ba) = bc = a$

$x=bca \Rightarrow$ No. $(bc)a = aa = b, b(ca) = ba = c$