



# HUST

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HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

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# Applied Algorithm Lab

Max even sub-sequence

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# Max even sub-sequence

- Given a sequence of  $n$  integers  $a_1, \dots, a_n$ .
- A subsequence of  $a$  consists of continuous elements of  $a$  (for example,  $a_i, a_{i+1}, \dots, a_j$ ).
- The weight of a subsequence is defined to be the sum of its elements. A subsequence is called even-subsequence if its weight is even.
- Find the even-subsequence of  $a$  having largest weight.

**Input**

8

4 -5 2 4 -8 2 3 1|

**Output**

6



- Idea to solve: dynamic programming
- Construct a cumulative array  $S$ , where  $S[i]$  is sum of from  $a[1]$  to  $a[i]$ .
  - Let  $f[i][0]$  be minimal  $S[j]$  with  $1 \leq j \leq i$  and  $j$  is even.
  - Let  $f[i][1]$  be minimal  $S[j]$  with  $1 \leq j \leq i$  and  $j$  is odd.
  - Formula:
    - $f[i][0] = \min(S[i], f[i-2][0])$ , with  $i$  is even;
    - $f[i][1] = \min(S[i], f[i-2][1])$ , with  $i$  is odd;
- Return:

$$\max_{i:1 \rightarrow n} (S[i] - f[i][i \% 2])$$

- Complexity:  $O(n)$ .

A large graphic on the left side of the slide. It features a dark blue background with a circular pattern of red dots of varying sizes, creating a sense of depth and movement. The word "HUST" is centered within this graphic in a white, bold, sans-serif font.

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# THANK YOU !