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Solution Review: Maximum Sum Sublist

This review discusses the solution of the Maximum Sublist Sum Challenge in detail.

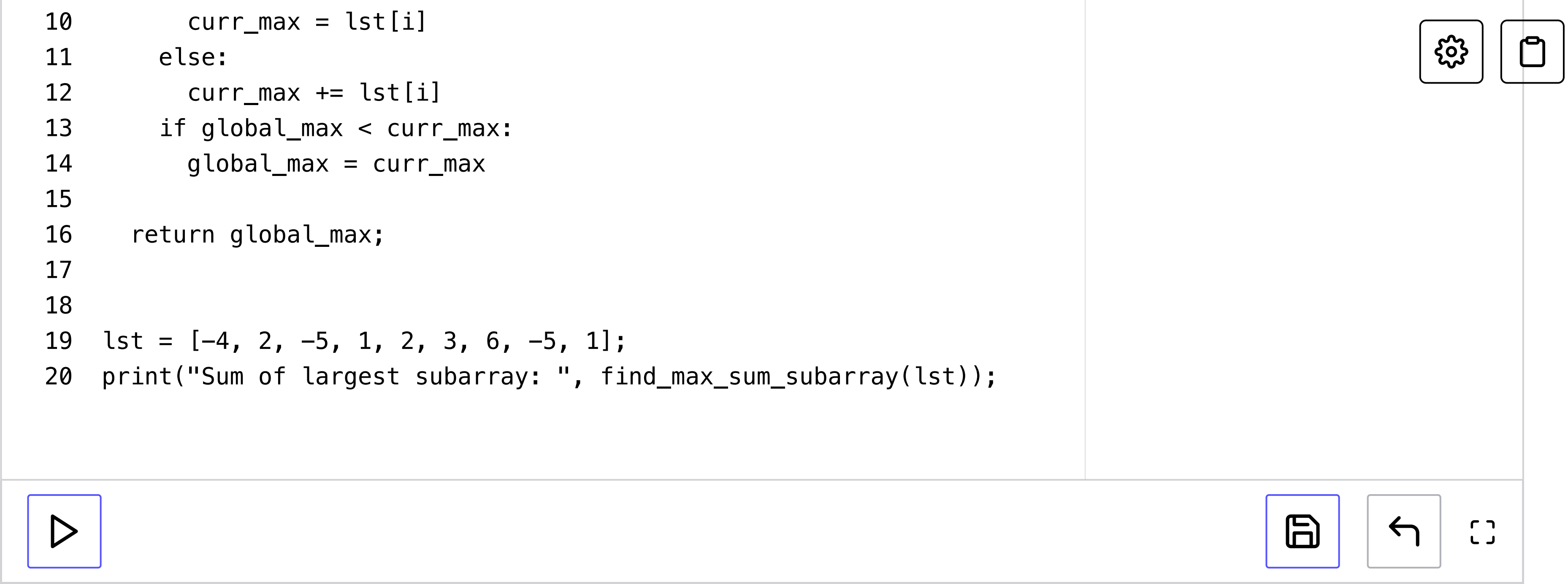
We'll cover the following

Solution (Kadane's Algorithm)

This algorithm takes a **dynamic programming** approach to solve the maximum sublist sum problem. Let's have a look at the algorithm.

```
def find_max_sum_subarray(lst):
  if (len(lst) < 1):
    return 0;

  curr_max = lst[0];
  global_max = lst[0];
  length_array = len(lst);
  for i in range(1, length_array):
    if curr_max < 0:
```



```
      curr_max = lst[i]
    else:
      curr_max += lst[i]
    if global_max < curr_max:
      global_max = curr_max

  return global_max;


lst = [-4, 2, -5, 1, 2, 3, 6, -5, 1];
print("Sum of largest subarray: ", find_max_sum_subarray(lst));
```

The basic idea of **Kadane's algorithm** is to scan the entire list and at each position find the maximum sum of the sublist ending there. This is achieved by keeping a `current_max` for the current list index and a `global_max`. The algorithm is as follows:

```
current_max = A[0]
global_max = A[0]
for i = 1 -> size of A
    if current_max is less than 0
        then current_max = A[i]
    otherwise
        current_max = current_max + A[i]
    if global_max is less than current_max
        then global_max = current_max
```

> The solution above only finds the **maximum contiguous sum** in the list; however, it can easily be modified to track the starting and ending indexes of this sublist.

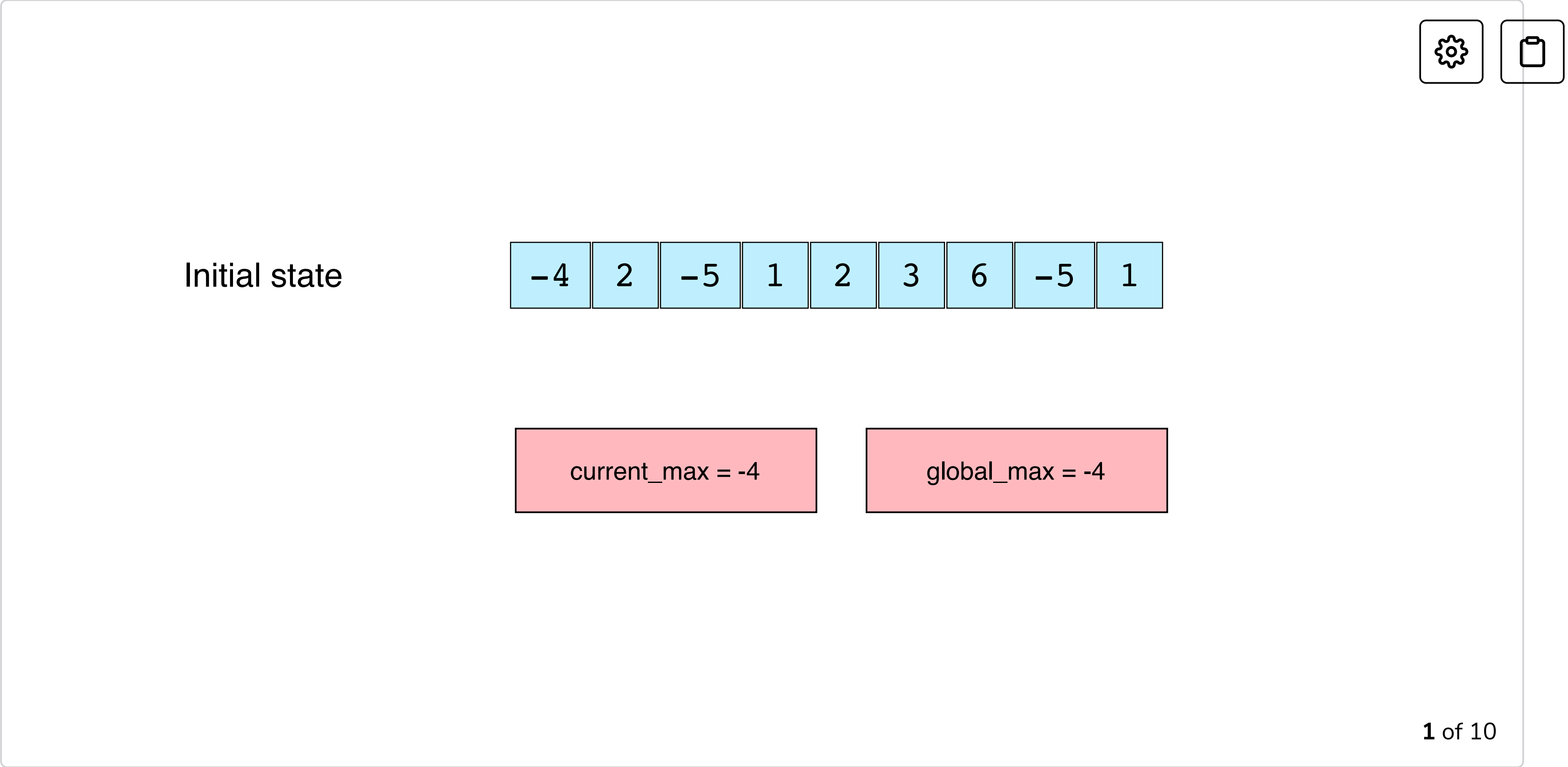
Runtime complexity

The runtime complexity of this solution is *linear*, $O(n)$.

Space complexity

The memory complexity of this solution is *constant*, $O(1)$.

Let’s run through an example to understand how it works. Initially, the `current_max` and `global_max` are both set to the value at `A[0]` , that is, `-4` :



Initial state

−4	2	−5	1	2	3	6	−5	1

current_max = -4

global_max = -4

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