What does 'Space Complexity' mean?

Space Complexity:
The term Space Complexity is misused for Auxiliary Space at many places. Following are the correct definitions of Auxiliary Space and Space Complexity.

Auxiliary Space is the extra space or temporary space used by an algorithm.

Space Complexity of an algorithm is total space taken by the algorithm with respect to the input size. Space complexity includes both Auxiliary space and space used by input.

For example, if we want to compare standard sorting algorithms on the basis of space, then Auxiliary Space would be a better criteria than Space Complexity. Merge Sort uses O(n) auxiliary space, Insertion sort and Heap Sort use O(1) auxiliary space. Space complexity of all these sorting algorithms is O(n) though.

Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above.

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Krishna Vedulla • 19 days ago

i think auxiliary space of merge sort should be O(nlogn)
can anyone please explain this auxiliary space in detail..
like how auxiliary space of merge sort will be O(n) ??

jitendrak Krishna Vedulla • 2 days ago

stack!

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jitendrak ▸▸ Krishna Vedula • 2 days ago

trace the hand run of a merge sort (using tree) and you will see only n (auxiliary space) space is required.

Siddhartha • 19 days ago

There are two types to compute the space complexity.
1. Fixed part
2. Variable part.
So can you tell me about that.
Thanks

thyagu • 7 months ago

can you cheat worst case running time of an algorithm

3

csmajor ➦ thyagu • 19 days ago

To make it slower or faster than its worst-case? Typically, an algorithm case running time. Worst-case is the limit of how slow it can be, not ho worst-case, I don't see how that would be possible without "artificial" m explicit additions to the code that would pause it or make it wait for thin

sawan • a year ago

can we directly exit from recursion and return to the calling fn.
like in case of recursive version of linear search.

```
#include
int i;
int linear_search(int arr[], int x, int n) {
```

```
if(arr[i]==x)
return i;
if(i>=n)
return -1;
i++ ;
return linear_search(arr,x,n);
}
int main()
{
int arr[]={2,12,43,12,3,23,14,23,43,56,68,4,13};
int size=sizeof(arr)/sizeof(int);
int x=52;
printf("%d is presnt in array at index %d",x,linear_search(arr,x,size));
return 0;
}
```

here in function linear_search....after getting the index, is there any way to dire

Sen • a year ago

Could you please have one tutorial on the 3 notations used for complexity anal
Whats exact difference between these and which to use when ?

```
/* Paste your code here (You may delete these lines if not writing c
```

kartikaditya • 2 years ago

In recursive algo's like merge sort, the compiler may end up eating space for s

705

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programming point of view.

How do I classify such external space?

2 ^ | v •

lp • 3 years ago

Is there any sorting algorithm whose Space Complexity is not O(n)?

^ | v •

kartik ➚ lp • 3 years ago

Space complexity of almost all standard sorting algorithms is at least O

External Sorting.

^ | v •

Jagat ➚ kartik • a year ago

I wouldn't worry about the "in-memory" space used by the exter
considered to be the whole RAM size per basic chunk, for optin
Having said that, external merge process would still require O(r
place merge is only of theoretical interest and anything more th

^ | v •

lp • 3 years ago

How much auxiliary space is needed for Quick Sort?

^ | v •

Jagat ➚ lp • a year ago

Quick sort requires no "explicit" auxiliary space since all the sorting hap
the recursive calls, which can go upto a depth of O(n) in the worst cas
auxiliary space required by the system stack can be considered to be O

1 ^ | v •

kartik ➚ lp • 3 years ago

Quick Sort needs O(n) extra space in worst case and O(Logn) in avera
all elements are sorted.

ibn ↗ kartik • 5 months ago

Not sure I see it clear. If Quick sort take O(n) aux space, what v
n aux space + 2n recursive call (assume complete binary tree)

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