Leaders in an array

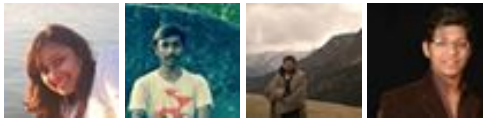
Write a program to print all the LEADERS in the array. An element is leader if it is greater than all the elements to its right side. And the rightmost element is always a leader. For example int the array {16, 17, 4, 3, 5, 2}, leaders are 17, 5 and 2.

Let the input array be arr[] and size of the array be *size*.

Method 1 (Simple)
Use two loops. The outer loop runs from 0 to size – 1 and one by one picks all elements from left to right. The inner loop compares the picked element to all the elements to its right side. If the picked element is greater than all the elements to its right side, then the picked element is the leader.

```
/*Function to print leaders in an array */
void printLeaders(int arr[], int size)
{
  int i, j;

  for (i = 0; i < size; i++)
  {
    for (j = i+1; j < size; j++)
    {
        if(arr[i] <= arr[j])
          break;
    }
    if(j == size) // the loop didn't break
    {
        printf("%d ", arr[i]);
    }
  }
}
```

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```
/*Driver program to test above function*/
int main()
{
  int arr[] = {16, 17, 4, 3, 5, 2};
  printLeaders(arr, 6);
  getchar();
}
// Output:  17 5 2
```

Time Complexity: O(n*n)

Method 2 (Scan from right)
Scan all the elements from right to left in array and keep track of maximum till now. When maximum changes it's value, print it.

```
/*Function to print leaders in an array */
void printLeaders(int arr[], int size)
{
  int max_from_right =  arr[size-1];
  int i;

  /* Rightmost element is always leader */
  printf("%d ", max_from_right);

  for(i = size-2; i >= 0; i--)
  {
    if(max_from_right < arr[i])
    {
       printf("%d ", arr[i]);
       max_from_right = arr[i];
    }
  }
}

/*Driver program to test above function*/
int main()
{
  int arr[] = {16, 17, 4, 3, 5, 2};
  printLeaders(arr, 6);
  getchar();
}
// Output:  2 5 17
```

Geometric Algorithms

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Time Complexity: O(n)

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

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wrestler • 4 days ago

def printLeadingElement(arr):

max=-999

for x in arr[::-1]:

if x>max:

print(x,end=" ")

max=x

print()

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HRISHIKESH • 2 months ago

//another method (using recursion)

#include <iostream>
using namespace std;

int printLeader (int arr[],int str ,int end) {
if (str==end) {

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```
if (str==end) {
cout<< arr[str] <<" ";
return arr[str];
}
int temp =printLeader( arr,str+1,end);
if (arr[str]>temp ) {
cout<< arr [str]<< " ";
return arr[str];
}
else return temp;
}
int main() {
int arr[] = {4,3,7,12,6,67,5,45,34,35,2,8};
printLeader(arr,0,11);
return 0;
}
```

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dark_night • 9 months ago

We can use stack for left to right pass..

For each element .. before pushing it pop all the elements that are less than it left in it

3 • Reply • Share ›

bharath reddy dark_night • 7 months ago

But this takes O(n) extra space

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geekyboy • a year ago

@geeksforgeeks
in the first method shouldn't it be

if(arr[i] <= arr[j])
break;

rather than
if(arr[i] < arr[j])
break;

because the condition says a leader must be greater than all the elements to i
condtion is violated.

If I am wrong do inform.
Any help and suggestions are welcomed

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geekyboy ➚ geekyboy • a year ago

for eg
{12,10,12,8,7,6}

answer should be 12 8 7 6
rather than 12 12 8 7 6

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GeeksforGeeks ➚ geekyboy • a year ago

Thanks for pointing this out. We have updated the post. Keep it

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VD • 2 years ago

{
This can be also done will the help of stack.
push the first element in the stack // s-> 16
push another element,
if (upcoming element is smaller then the element of the top of the stack)
Push(element);

else
pop() till you find element bigger then the upcoming element.
}
left over elements in the stack will be leaders !!! :)
ex:
s-> 16 //pop 16 push 17
s-> 17 //push 4
s->17 ,4. // push 3
s->17 ,4,3, // pop till you element bigger than 5 then push
s-> 17,5// push 2
s->17,5,2
all elements left in the stack are leaders :)

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shek8034 ➦ VD • 11 months ago
Good logic... Never thought about it :P
But space complexity is more.

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Mayautobot ➦ VD • 2 years ago
Nice one!
But space complexity is more.

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kg1020 • 2 years ago
a function in C++.

```
 void leaders(int ar[],int n)
{
    cout<<"\nLeaders : ";
    int lastLeader = ar[n-1];
    cout<<lastLeader<<'\t';
```

```
    for(int i=n-2; i>=0; i--)
    {
        if(ar[i] > lastLeader)
        {
            lastLeader = ar[i];
            cout<<lastLeader<<'\t';
        }
    }
}
```

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Amol Agarwal • 3 years ago

This will print 2,2,5,17. an extra 2.

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GeeksforGeeks • 4 years ago

@Rajeev & kp101090:

Thanks for pointing this optimization. We have made the suggested changes.

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kp101090 • 4 years ago

Agree with Rajeev...
for loop should be
for(i=size-2;i>=0;--i)

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Rajeev • 4 years ago

In the for loop inspite of size-1, we can start from size-2. I think the first compa

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ravikant • 4 years ago

int i;

is missing :P

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GeeksforGeeks ravikant • 4 years ago

@ravikant: Thanks for pointing this out. We have added the line.

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