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Segregate Even and Odd numbers

Given an array A[], write a function that segregates even and odd numbers. The functions should put all even numbers first, and then odd numbers.

Example
Input = {12, 34, 45, 9, 8, 90, 3}
Output = {12, 34, 8, 90, 45, 9, 3}

In the output, order of numbers can be changed, i.e., in the above example 34 can come before 12 and 3 can come before 9.

The problem is very similar to our old post Segregate 0s and 1s in an array, and both of these problems are variation of famous Dutch national flag problem.

```
Algorithm: segregateEvenOdd()
1) Initialize two index variables left and right:
            left = 0,  right = size -1
2) Keep incrementing left index until we see an odd number.
3) Keep decrementing right index until we see an even number.
4) If lef < right then swap arr[left] and arr[right]
```

Implementation:

```
#include<stdio.h>

/* Function to swap *a and *b */
void swap(int *a, int *b);
```

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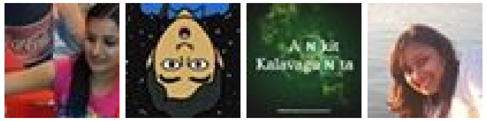

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```c
void segregateEvenOdd(int arr[], int size)
{
  /* Initialize left and right indexes */
  int left = 0, right = size-1;
  while(left < right)
  {
     /* Increment left index while we see 0 at left */
     while(arr[left]%2 == 0 && left < right)
        left++;

     /* Decrement right index while we see 1 at right */
     while(arr[right]%2 == 1 && left < right)
        right--;

     if(left < right)
     {
       /* Swap arr[left] and arr[right]*/
       swap(&arr[left], &arr[right]);
       left++;
       right--;
     }
  }
}

/* UTILITY FUNCTIONS */
void swap(int *a, int *b)
{
  int temp = *a;
  *a = *b;
  *b = temp;
}

/* driver program to test */
int main()
{
  int arr[] = {12, 34, 45, 9, 8, 90, 3};
  int arr_size = 7, i = 0;

  segregateEvenOdd(arr, arr_size);

  printf("array after segregation ");
  for(i = 0; i < arr_size; i++)
    printf("%d ", arr[i]);

  getchar();
  return 0;
}
```

Geometric Algorithms

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Time Complexity: O(n)

References:
http://www.csse.monash.edu.au/~lloyd/tildeAlgDS/Sort/Flag/

Please write comments if you find the above code/algorithm incorrect, or find better ways to solve the same problem.

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deep sutaria · 4 days ago

Does not work with n = 8 (or even number of elements)..Any inputs??

^ | ˅ • Reply • Share ›

Venu Gopal · 14 days ago

O(n) approach only but using 1 while only in place of 3 while loops and I thinks this is simpler too.
http://ideone.com/ClsVKq

^ | ˅ • Reply • Share ›

destroyer · 4 months ago

```
#include<stdio.h>

main()
{
int a[]={12,34,45,9,8,90,3};
int n=sizeof(a)/sizeof(a[0]);
cons(a,n);
getch();
```

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Aman Hi, Why arent we checking for conditions...

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newCoder3006 Code without using while loop. We can do it...

Find subarray with given sum · 1 hour ago

```
getch();
}

cons(int a[],int n)
{
int i,j,temp;
for(i=0;i<n;i++) {="" for(j="i+1;j&lt;n;j++)" {="" if(a[i]%2="=1" &="" a[j]%2!="1)" {
}="" }="" }="" for(i="0;i&lt;n;i++)" printf("%d="" ",a[i]);="" }="">
```

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shelly · 9 months ago

```
void segregateEvenAndOdd( int A[], int N ) {
    int countOfEven = -1, i = 0;
    while ( i < N ) {
        if ( !( A[i] & 1 ) )
            swap ( A[i], A[++countOfEven] );
        i++;
    }
}
```

PS: ordering is also maintained.

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Vinodhini ➦ shelly · 7 months ago

doesn't work for this case : 1 3 4 2 5 12 19 10 .
Can you check?

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vivek · 9 months ago

here the order of numbers are not maintained ,
input-{12,34,45,9,8,90,3}
output-{12,34,90,8,9,45,3}

output {12,34,90,8,9,45,3}
expected -{12,34,8,90,45,9,3}
how can we maintain the order?

1 ^ | ⌄ • Reply • Share ›

me.abhinav • 11 months ago

Yet another solution with O(n) time and O(1) space is as follows:

1) Initialize a variable 'toSwap' = index of first odd number.
2) Traverse the array from there onwards upto end. If current element (i.e. arr[
or else if current element (i.e. arr[i]) is even then SWAP(arr[i], arr[toSwap]) an

```
 #include <iostream>
//#define SIZ 100
//#define MAX(a, b) (a>b)?a:b

using namespace std;

void swap(int *a, int *b){
        int temp = *a;
        *a = *b;
        *b = temp;
}

int main()
```

see more

^ | ⌄ • Reply • Share ›

akshat gupta • a year ago

Analogous to the partition subroutine of quicksort..

except for, instead of comparing '>' or '<' with pivot,
we partion for even and odd..

˄ | ˅ • Reply • Share ›

Sandeep • a year ago

```
void segOddEven(int arr[], int n){
int start = 0;
int end = n-1;
while(start < end){
if(arr[start]%2 == 1 && arr[end]%2 == 0){
int temp = arr[start];
arr[start] = arr[end];
arr[end] = temp;
start++;
end--;
}
else if(arr[start]%2 == 1){
end--;
}
else{
start++;
}
}
}
```

˄ | ˅ • Reply • Share ›

AKSHAT • 2 years ago

how to maintain the relative ordering(stable ordering) for even's and odd's in c

1 ˄ | ˅ • Reply • Share ›

Balasubramanian.N • 2 years ago

This approach is similar to the Partition algorithm given in CLRS for QuickSort
This avoids the extra checks that are needed in the normal approach.

```
 void segregate(int* a,int len)
{
        int i=-1;
        for(int j=0;j<len;++j)
        {
                if(a[j]%2==0)
                {
                        ++i;
                        int temp=a[i];
                        a[i]=a[j];
                        a[j]=temp;
                }
        }
}

Please comment, if you find anything wrong.

Thanks,
Balasubramanian.N
```

• Reply • Share ›

crazy • 2 years ago

how to do above problem if we want to maintain the order of the sequence....

i/p {12, 34, 45, 9, 8, 90, 3}

o/p {12, 34, 8, 90, 45, 9, 3}

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Nikin Kumar Jain • 2 years ago

Java Source Code

```
 package com.defaults;

public class MyFirst {



        public static void main(String[] args) {
                int a[] = {12,34,45,9,8,90,3};

                int i=0, j=a.length-1;

                while(i<j)
                {
                        while(a[i]%2==0)
                                i++;
                        while(a[j]%2!=0)
                                j--;
```

see more

^ | ⌄ • Reply • Share ›

Anuj Bansal • 2 years ago

```
#include<stdio.h>
#include<math.h>
#define MAX 12
void swap(int *a, int *b) {
        int temp;
        temp = *a;
        *a = *b;
        *b = temp;
}
void segregate(int a[MAX]) {
```

```
void segregate(int a[MAX]) {
        int i,j;
        i=0;j=MAX-1;
        while(i < MAX) {
                if(a[i]%2 == 0) {
                        while(a[j]%2 == 0)
                                j--;
                swap(&a[i],&a[j]);
```

see more

^ | ⌄ • Reply • Share ›

vikram • 3 years ago

while loop inside a while loop ... complexity is 0(n2) right???

^ | ⌄ • Reply • Share ›

dev ➜ vikram • 2 years ago

exactly what I thought initially that it is O(n^2)......but look carefully each time left index is incremented if it contains even number and right index number...and swap happens if odd number is in "left" index and even n swapping again left is incremented and right is decremented..so no inc

^ | ⌄ • Reply • Share ›

Deborshi • 3 years ago

```
void segregateEvenOdd2(int a[], int size){
int left=0;
int right = size-1;
while(left < right){
switch (a[left] % 2){
case 0: left++;
break;
case 1: a[left] ^= a[right];
a[right] ^= a[left];
a[left] ^=a[right];
right --;
break;
}
}
}
```

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Malathi • 3 years ago

can you post the code to segregate even and odd without changing its positior

Thanks

⌃ | ⌄ • Reply • Share ›

max • 3 years ago

can we do this question in O(n) if order has to be maintained

⌃ | ⌄ • Reply • Share ›

Pravesh • 3 years ago

my question is.......
a[]={2,4,1,5,6,8,7,5,11,12,18}
then out put should be

1 5 2 4 7 15 6 8 12 11 18

swap even number to odd or odd to even

⌃ | ⌄ • Reply • Share ›

vinit • 4 years ago

The solution provided by GeeksforGeeks will change the order of array

The solution provided by GeeksforGeeks will change the order of array.

Input = {12, 34, 45, 9, 8, 90, 3}

Output = {12, 34, 8, 90, 45, 9, 3}

output according to the given solution will come sth like
{ 12, 34, 90, 8, 9, 45, 3 }
which is not as expected.
Correct me if i m wrong.

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GeeksforGeeks → vinit • 4 years ago

@vinit: Take a closer look at the question. It says "In the output, order c
above example 34 can come before 12 and 3 can come before 9."

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vinit → GeeksforGeeks • 4 years ago

I didnt read the question properly, sorry for that.
But in expected output, they are maintaining the order of eleme
array :P

• Reply • Share ›

help please • 4 years ago

@kartik and justGautam

thanks guys for making me clear . i am a noob in optimization techniques.

• Reply • Share ›

help please • 4 years ago

```
  #include<iostream.h>



using namespace std;
```

```
int main()
{
    int t[7] = {12, 34, 45, 9, 8, 90, 3};
    int odd[100];    int eve[100],count=0,count1=0;
    for(int i=0;i<7;i++)
    {
            if(t[i]%2==0)
            {
            eve[count]=t[i];count++;
            }
            else
            {
            odd[count1]=t[i];count1++;
```

see more

^ | ⌄ • Reply • Share ›

justGautam ➦ help please • 4 years ago

Though the solution is technically correct, the solution provided by *gee*
the following two reasons:
1. Exact (not Asymptotic) Time complexity is more in your solution
2. Your solution needs extra space for storing EVEN and ODD elemen

^ | ⌄ • Reply • Share ›

kartik ➦ help please • 4 years ago

This is also fine, but the difference is of extra space that you use for ev

^ | ⌄ • Reply • Share ›

gokul • 4 years ago

really cool
good job
very useful

very useful

^ | ⌄ • Reply • Share ›

Saira Gul ➦ gokul • 4 years ago

how abt this one???

```
public void segregate(int a[]){


        int last = a.length-1;

        int elast = 0;

        for(int i=0; i<=last; i++){

                if( (a[i]%2) == 0){

                        int temp = a[i];
                        a[i]     = a[elast];
                        a[elast] = temp;
                        ++elast;

                } // end if

        }



}// end fun
```

^ | ⌄ • Reply • Share ›

Hari ↪ Saira Gul • 4 years ago

```
j = 1;
k = n;
while(j<k)
{
   if((a[j]%2)!=0)
     swap(a[j],k--);
   else
     j++;
}
```

is this works?

^ | ⌄ • Reply • Share ›

eclipse ↪ Hari • 4 years ago

Fine.........!!!

^ | ⌄ • Reply • Share ›

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