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Full Name: Syed Shah Email: ammar789ali@gmail.com Test Name: TeamApt Back-End Developer Hiring Test 29 Sep 2022 05:23:03 CDT Taken On: Time Taken: 40 min 32 sec/ 90 min Work Experience: > 5 years Invited by: Perpetual Invited on: 27 Sep 2022 11:51:51 CDT Skills Score: Problem Solving (Basic) 50/50 REST API (Intermediate) 63/75 SQL (Intermediate) 75/75 Tags Score: Aggregation 75/75 Algorithms 65/65 Binary Search 5/5 Binary Trees 0/5 C 5/5 C++ 5/5 Core CS 25/30 Data Structures 60/65 Databases 75/75 Dynamic Programming 50/50 Easy 75/80 Interviewer Guidelines 125/125 5/5 Java Lists 5/5 Medium 138/150 Problem Solving 50/50 REST API 63/75 SQL 75/75 Simple Joins 75/75 Sub-queries 75/75 Trees 5/10

92.6% scored in TeamApt Back-End
Developer Hiring Test in 40 min
32 sec on 29 Sep 2022 05:23:03
CDT

Candidate Feedback:

Auto import feature should be added, like if I right URL then it should ask weather to import Java.net or not. It will help us te decrease time

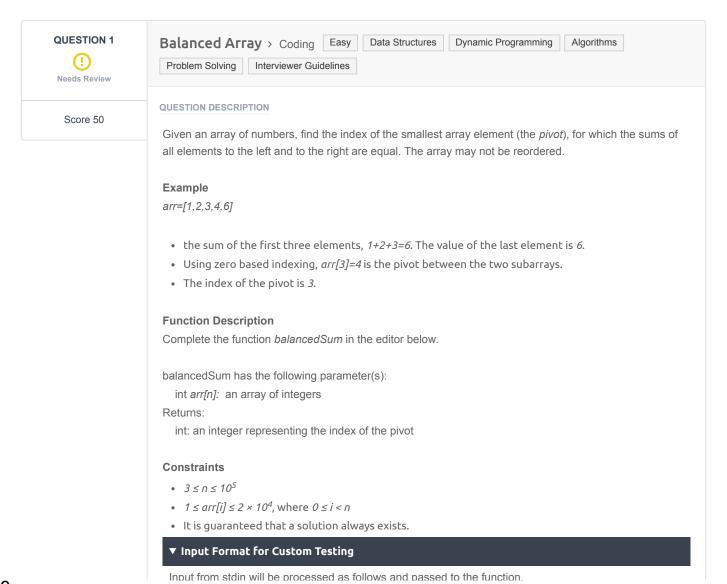
Recruiter/Team Comments:

No Comments.

Plagiarism flagged

We have marked questions with suspected plagiarism below. Please review.

	Question Description	Time Taken	Score	Status
Q1	Balanced Array > Coding	56 sec	50/ 50	(!)
Q2	Goals Scored by Countries > DbRank	16 min 44 sec	75/ 75	Ø
Q3	REST API: Discounted Price > Coding	19 min 4 sec	63/75	⊘
Q4	Count Leaves in a 3-ary Tree > Multiple Choice	25 sec	5/ 5	Ø
Q5	XOR Linked List > Multiple Choice	14 sec	5/ 5	⊘
Q6	Nodes in a Binary Tree > Multiple Choice	22 sec	0/5	8
Q7	Binary Search > Multiple Choice	8 sec	5/ 5	Ø
Q8	Meaning of Space Complexity > Multiple Choice	13 sec	5/ 5	Ø
Q9	How Many Comparisons in a Merge Sort? > Multiple Choice	21 sec	5/ 5	⊘



The first line contains an integer *n*, the size of the array *arr*.

Each of the next *n* lines contains an integer, arr[i], where $0 \le i < n$.

▼ Sample Case 0

Sample Input 0

```
STDIN Function Parameters

-----

4  → arr[] size n = 4

1  → arr = [1, 2, 3, 3]

2

3

3
```

Sample Output 0

2

Explanation 0

- The sum of the first two elements, 1+2=3. The value of the last element is 3.
- Using zero based indexing, arr[2]=3 is the pivot between the two subarrays.
- The index of the pivot is 2.

▼ Sample Case 1

Sample Input 1

```
STDIN Function Parameters
-----

3 → arr[] size n = 3

1 → arr = [1, 2, 1]

2

1
```

Sample Output 1

1

Explanation 1

- The first and last elements are equal to 1.
- Using zero based indexing, *arr[1]=2* is the pivot between the two subarrays.
- The index of the pivot is 1.

INTERVIEWER GUIDELINES

▼ Hint 1

For each index, find the sum to its left and right and check if they are equal. This index which satisfies the condition will be distinct.

▼ Hint 2

Use prefix sum to calculate the sum till each index.

▼ Solution

Concepts Covered: Basic Programming Skills, Loops, Arrays, Problem Solving. The problem tests the candidate's ability to use loops and array handling. It requires the candidate to come up with an algorithm to find the pivot point where the sum of prefix and suffix till that point is equal in a

constrained time and anace complexity

constrained time and space complexity.

Optimal Solution: Let's take the prefix sum of the array denoted by pf[]. pf[i] denotes the sum of all array elements in the range [0, i].

So for each index i, we just need to check if pf[i - 1] = tot_sum - pf[i], where tot_sum is the sum of all array elements in the array.

Time Complexity: O(N)

```
def balancedSum(arr):
    # Write your code here
    sum = 0
    pf = [0] * len(arr)
    # store the prefix sums for each index
    # while calculating the overall array sum
    for i in range(len(arr)):
        sum += arr[i]
        pf[i] = sum
    # pf[i-1] is the prefix sum up to the current index
    # sum - pf[i] is the sum of elements from the current index to the
end

for i in range(1, len(arr)):
    if(pf[i - 1] == sum - pf[i]):
        return i
```

Brute Force Approach: For each index i, find the sum of all the element values in the range [1, i-1] and the sum in the range [i+1, n]. If both these sums are equal that point is the pivot. Time Complexity: $O(N^2)$

Error Handling:

1. It's important to omit the index which is considered as the current pivot in the left sum and right sum. If you consider prefix sum, then pf[i - 1] should only be the left sum and not pf[i]. Similarly, (tot_sum - pf[i]) should be the right sum and not (tot_sum - pf[i - 1]).

▼ Complexity Analysis

Time Complexity - O(n).

Space Complexity - O(n) - The prefix sum array pf[]

▼ Follow up Question

How about if you are asked to optimize the space complexity?

Let pf_sum be the sum of all elements from [0, i] till any index i. Then the condition for any index i to be a pivot :

```
sum - pf_sum = pf_sum - arr[i]. (sum = total sum of arr)
```

Psuedo Code -

```
def balancedSum(arr):
    # Write your code here
    sum = 0
    for i in range(len(arr)):
        sum += arr[i]
    pf_sum = 0
    for i in range(0, len(arr)):
        pf_sum += arr[i]
        if(sum - pf_sum == pf_sum - arr[i]):
            return i
```

▼ Follow up Question

Latte aumana we can modify the arrow to shook if each index i is a nivet or not

Let's suppose we can modify the array to check it each index its a pivot of not.

The array can be modified as:

For an index i to be a pivot:

Increase the value of any element to the right and decrease the value of any element to the right of index i, or

Decrease the value of any element to the right and increase the value of any element to the right of index i.

This can be solved by just checking if (tot_sum - arr[i]) is divisible by 2.

Psuedo Code -

```
def balancedSum(arr):
    # Write your code here
    tot_sum = 0
    for i in range(len(arr)):
        tot_sum += arr[i]
    for i in range(1, len(arr) - 1):
        if((tot_sum - arr[i]) % 2 == 0):
            return i
```

CANDIDATE ANSWER

Language used: Java 15

```
1 class Result {
        * Complete the 'balancedSum' function below.
 4
 6
        * The function is expected to return an INTEGER.
        * The function accepts INTEGER_ARRAY arr as parameter.
8
        */
     public static int balancedSum(List<Integer> arr) {
        int leftptr = 0;
         int rightptr = arr.size()-1;
          int left sum = arr.get(leftptr);
         int right sum = arr.get(rightptr);
          while(rightptr - leftptr != 2)
              if(left_sum <= right_sum) {</pre>
                  leftptr++;
                  left sum = left sum + arr.get(leftptr);
              else{
                  rightptr--;
                  right_sum = right_sum + arr.get(rightptr);
24
              }
           }
          if(left sum == right sum)
             return (leftptr+1);
           else
             return -1;
       }
32 }
```

TESTCASE	DIFFICULTY	TYPE	STATUS	SCORE	TIME TAKEN	MEMORY USED
TestCase 0	Easy	Sample case	Success	1	0.0895 sec	32.8 KB
TestCase 1	Easy	Sample case	Success	1	0.0924 sec	32.5 KB
TestCase 2	Easy	Sample case	Success	4	0.0865 sec	32.3 KB
TestCase 3	Easy	Sample case	Success	4	0.1459 sec	44.8 KB
TestCase 4	Easy	Hidden case	Success	4	0.1798 sec	49.5 KB
TestCase 5	Easy	Hidden case	Success	3	0.1738 sec	52.1 KB
TestCase 6	Easy	Hidden case	Success	3	0.2321 sec	55.5 KB
TestCase 7	Easy	Hidden case	Success	5	0.2227 sec	55.1 KB
TestCase 8	Easy	Hidden case	Success	5	0.2477 sec	57 KB
TestCase 9	Easy	Hidden case	Success	5	0.249 sec	57.1 KB
TestCase 10	Easy	Hidden case	Success	5	0.2373 sec	62.2 KB
TestCase 11	Easy	Hidden case	Success	5	0.3163 sec	60.3 KB
TestCase 12	Easy	Hidden case	Success	5	0.3516 sec	61.5 KB

No Comments



Score 75



Databases Medium

Aggregation

Simple Joins

Sub-queries Interviewer Guidelines SQL

QUESTION DESCRIPTION

Given the database of a football tournament, sort the countries by the number of goals scored by that country, descending.

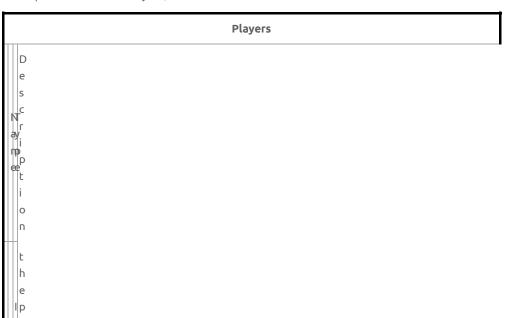
The number of goals scored by a country is the sum of the goals scored by its players.

If two or more countries have the same number of goals scored, order them ascending by *countries.id*.

The output should be in the format of: countries.name, goals scored

▼ Schema

You are provided 3 tables: Players, Countries and Goals.



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n a m 0 u n t Goals D e 0 n t h рe Uр alVr yTi eEm rCa _Er iRy d k e У h e С 0 u n t t 0 W 0 I U

n a m e n ▼ Sample Data Tables Players n ia фm e C n 1 0 R 0 n a d 0 0 n е M е S S 0 n 3K 0 0 s

0 Countries ia фm e a n 0 t 2 u g а g e Goals



Expected Output

France	15
Germany	11
Argentina	10
Portugal	9

INTERVIEWER GUIDELINES

▼ Solution

Aggregate goals per country as table alias *r*. Join *r* with the *countries* table to get country names.

MySQL solution

CANDIDATE ANSWER

Language used: MySQL

```
1 /*
2 Enter your query below.
3 Please append a semicolon ";" at the end of the query
4 */
```

Select c.name as countriesName, sum(g.goals) as goalsScored from Countries c inner join Goals g on c.id=g.country_id group by c.name, c.id order by goalsScored desc, c.id asc;

Time taken: 0.03 sec

No Comments

QUESTION 3

Correct Answer

Score 63

REST API: Discounted Price > Coding

REST API

Medium

QUESTION DESCRIPTION

Given a *barcode*, query the API at https://jsonmock.hackerrank.com/api/inventory?barcode=*barcode* and return the item's discounted price.

The response is a JSON object with 5 fields. The essential field is data:

- data: Either an empty array or an array with a single object that contains the item's record.
- In the data array, the item has the following schema:
 - barcode the barcode for the product (String)
 - price the gross selling price (Number)
 - o discount: the discount percent to apply (Number).
 - Some fields that are not of interest.

page, per_page, total, total_pages, etc. are not required for this task.

If the barcode is found, the *data* array contains exactly 1 element. If not, it is empty and the function should return '-1'.

An example of the product record from https://jsonmock.hackerrank.com/api/inventory?barcode=74001755 is:

```
"barcode": "74001755",
"item": "Ball Gown",
"category": "Full Body Outfits",
"price": 785,
"discount": 7,
"available": 1
}
```

Use the "discount" and the "price" properties to calculate the discounted price rounded to the nearest integer.

```
discountedPrice = price - ((discount / 100) * price)
```

Function Description

Complete the *getDiscountedPrice* function in the editor.

getDiscountedPrice has the following parameters: string barcode: the item to query

Returns

int: the discounted price rounded to the nearest integer or -1

Constraints

• There will be either 1 or 0 records in data.

▼ Input Format For Custom Testing

In the first and only line, there is a barcode.

▼ Sample Case 0

Sample Input For Custom Testing

```
74002314
```

Sample Output

```
2964
```

Explanation

First, a call is made to API https://jsonmock.hackerrank.com/api/inventory?barcode=74002314. The price = 3705 and discount = 20.

▼ Sample Case 1

Sample Input For Custom Testing

```
74005364
```

Sample Output

```
-1
```

Explanation

An API call is made to https://jsonmock.hackerrank.com/api/inventory?barcode=74005364. The *data* field contains an empty array, so the item was not found.

CANDIDATE ANSWER

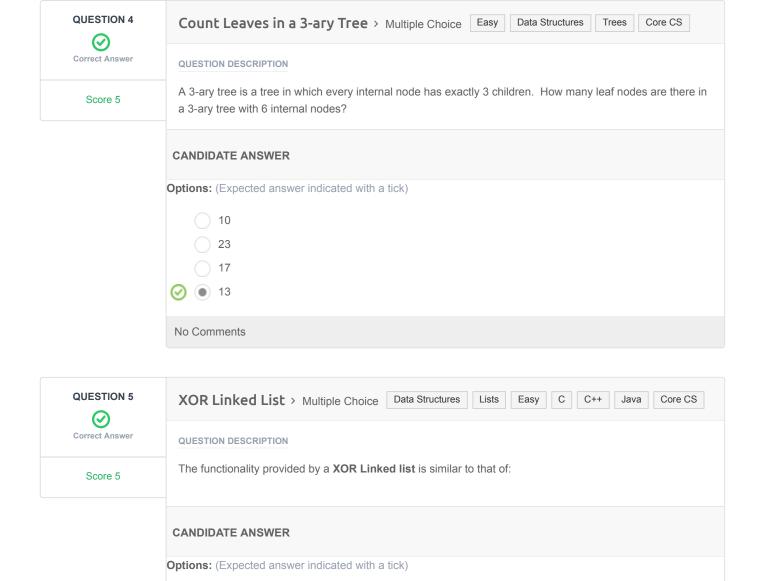
Language used: Java 8

```
1 import java.net.*;
 2 import com.google.gson.Gson;
 3 import com.google.gson.JsonArray;
 4 import com.google.gson.JsonElement;
 5 import com.google.gson.JsonObject;
7 class Result {
       private static final String URL =
"https://jsonmock.hackerrank.com/api/inventory?barcode=";
       * Complete the 'getDiscountedPrice' function below.
       * The function is expected to return an INTEGER.
       * The function accepts INTEGER barcode as parameter.
        * API URL: https://jsonmock.hackerrank.com/api/inventory?barcode=
18 <barcode>
       */
      public static int getDiscountedPrice(int barcode) throws IOException {
          URL obj = new URL(URL + barcode);
           HttpURLConnection con = (HttpURLConnection) obj.openConnection();
           con.setRequestMethod("GET");
```

```
BufferedReader in = new BufferedReader(new
28 InputStreamReader(con.getInputStream()));
           String response;
          while ((response = in.readLine()) != null) {
              JsonObject jsonResponse = new Gson().fromJson(response,
33 JsonObject.class);
               JsonArray data = jsonResponse.getAsJsonArray("data");
              for (JsonElement e : data) {
                   String discount =
39 e.getAsJsonObject().get("discount").getAsString();
                  String price =
41 e.getAsJsonObject().get("price").getAsString();
                  Integer discountP = Math.round((Float.valueOf(price) *
43 Float.valueOf(discount)) / 100f);
                  Integer discountedPrice = Integer.valueOf(price) - discountP;
45
                  return discountedPrice;
              }
          return -1;
```

TESTCASE	DIFFICULTY	TYPE	STATUS	SCORE	TIME TAKEN	MEMORY USED
Testcase 0	Easy	Sample case	Success	1	0.8347 sec	56.2 KB
Testcase 1	Easy	Sample case	Success	1	0.8534 sec	56.2 KB
Testcase 2	Easy	Sample case	Success	1	0.7712 sec	57 KB
Testcase 3	Easy	Hidden case	Wrong Answer	0	0.694 sec	57 KB
Testcase 4	Easy	Hidden case	Success	12	0.8632 sec	57.8 KB
Testcase 5	Easy	Hidden case	Success	12	0.7275 sec	57.1 KB
Testcase 6	Easy	Hidden case	Success	18	0.8556 sec	56 KB
Testcase 7	Easy	Hidden case	Success	18	0.9964 sec	57.2 KB

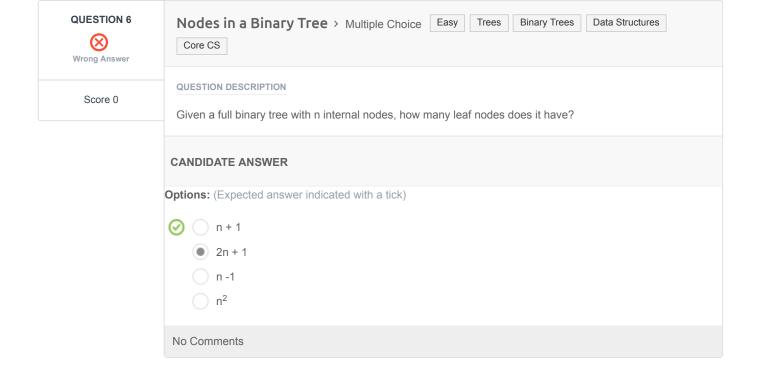
No Comments



A Singly Linked ListA Doubly Linked ListA Circular Linked List

No Comments

A combined stack-cum-queue data structure



QUESTION 7

Correct Answer

Score 5

Binary Search > Multiple Choice | Binary Search | Easy | Algorithms | Core CS

QUESTION DESCRIPTION

The following code should perform a binary search. Select the true statement about the snippet.

```
int binarySearch(int arr[], int l, int r, int x)

{
    if (r >= l) {
        int mid = l + (r - l) / 2;
        if (arr[mid] == x)
            return mid;
        if (arr[mid] > x)
            return binarySearch(arr, l, mid + l, x);

        return binarySearch(arr, mid + l, r, x);
}

return -1;
}
```

INTERVIEWER GUIDELINES

Suppose the size of the array 'arr' is 2 and at the first index 'x' is not present in 'arr'. This is one of the situations in which this code will execute an infinite number of times.

Instead of (mid + 1) in line 8, there should be (mid - 1).

CANDIDATE ANSWER

Options: (Expected answer indicated with a tick)

There is an error in line 4.

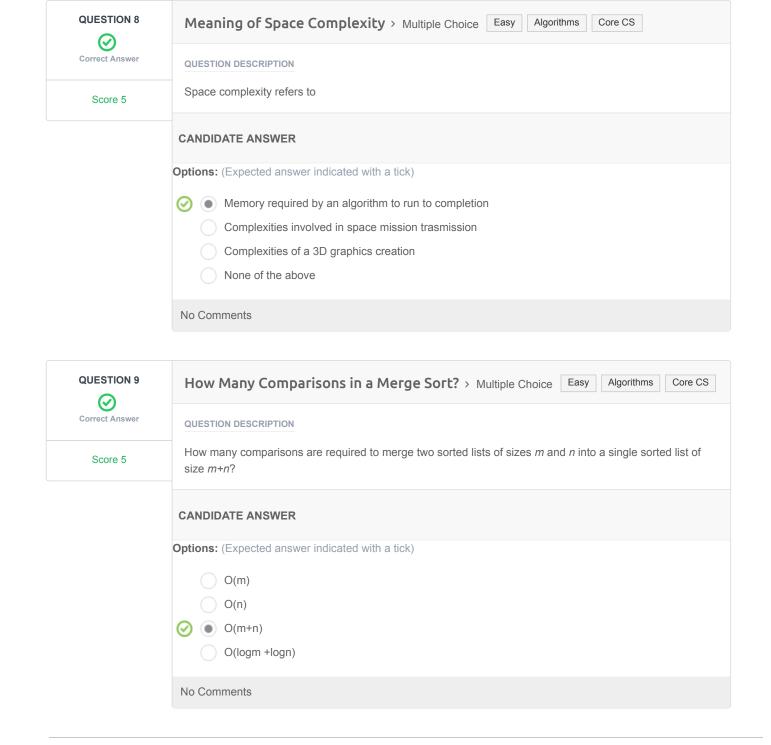
0

There is an error in line 8.

There is an error in line 10.

The code is correct.

No Comments



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