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scored in CodePath TIP103: Unit 4 Assessment - Fall 2024 in 28 min 46 sec on 14 Oct 2024 05:53:12 PDT

Candidate Information

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Test CodePath TIP103: Unit 4 Assessment - Fall 2024

Candidate Packet View ♥

Taken on 14 Oct 2024 05:53:12 PDT

Time taken 28 min 46 sec/ 90 min

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Invited by CodePath

Skill Distribution

No.	Skill	Score

Candidate Report Page 1 of 23

1 Problem Solving Basic

100%

Tags Distribution			
Stacks	100%	Queues	100%
Arrays	100%	Data Structures	100%
Easy	100%		

Questions

Status	No.	Question	Time Taken	Skill	Score
⊗	1	Paintings On Display Multiple Choice	1 min 11 sec	-	5/5
⊗	2	Lookup Operations in a Hash Table Multiple Choice	15 sec	-	0/5
8	Number of Students Unable to Eat Superior Students Unable to Eat Coding		2 min 39 sec	-	50/50
8	4	Guess this Complexity Multiple Choice	29 sec	-	5/5

Candidate Report Page 2 of 23

8	5	Guess this Complexity Multiple Choice	20 sec	-	5/5
8	6	Find an item in a hash table containing n items Multiple Choice	51 sec	-	5/5
8	7	Given the head of a linked list, remove the nth node from the end of the list and return its head. Multiple Choice	7 min 9 sec	-	5/5
⊗	8	Two-dimensional array Multiple Choice	52 sec	-	5/5
8	9	True or False: Heap Multiple Choice	42 sec	-	0/5
8	10	What can be determined about the contents of the list array? Multiple Choice	2 min 9 sec	-	5/5
8	11	What is the FIRST and LAST output from this program segment? Multiple Choice	1 min 7 sec	-	5/5
8	12	Accessing Elements In An Array Multiple Choice	1 min 3 sec	-	5/5
⊗	13	Sorted Array Multiple Choice	3 min	Problem Solving (Basic)	5/5

Candidate Report Page 3 of 23

\otimes	14	Memoized Word Break Multiple Choice	3 min 51 - sec	5/5
Inserting an element into a binary 15 min heap Multiple Choice		min heap	30 <u>-</u> sec	5/5
⊗	16	Finding the maximum value in a binary min heap Multiple Choice	2 min 29 - sec	5/5

1. Paintings On Display

⊘ Correct

Multiple Choice

Question description

Suppose you were implementing a data structure to store information about the paintings on display at an art dealer's showroom. Of the following data structures, which one is the right one to use?

Candidate's Solution

Options: (Expected answer indicated with a tick)

Unordered array
Sorted array
Linked list

Candidate Report Page 4 of 23

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Heaps	
lt depends	8
① No comments.	
2. Lookup Operations in a Hash Table Multiple Choice	Incorrect
Question description There are several factors that affect the efficiency of lookup operations in a hash table. Which of following is not one of those factors?	the
Candidate's Solution Options: (Expected answer indicated with a tick)	
Number of elements stored in the hash table	
Size of elements stored in the hash table	\otimes
Number of buckets in the hash table	
Quality of the hash function	

Candidate Report Page 5 of 23



All of the above factors affect the efficiency of hash table lookups

No comments.

3. Number of Students Unable to Eat Lunch

⟨✓ Correct

Coding Stacks Queues

Question description

The school cafeteria offers circular and square sandwiches at lunch break, referred to by numbers 0 and 1 respectively. All students stand in a queue. Each student either prefers square or circular sandwiches.

The number of sandwiches in the cafeteria is equal to the number of students. The sandwiches are placed in a **stack**. At each step:

- If the student at the front of the queue **prefers** the sandwich on the top of the stack, they will **take it** and leave the queue.
- Otherwise, they will **leave it** and go to the queue's end.

This continues until none of the queue students want to take the top sandwich and are thus unable to eat.

You are given two integer arrays students and sandwiches where sandwiches[i] is the type of the i th sandwich in the stack (i = 0 is the top of the stack) and students[j] is the preference of the jth student in the initial gueue (j = 0 is the front of the gueue). Return the number of students that are unable to eat.

Example 1:

Input: students = [1,1,0,0], sandwiches = [0,1,0,1]

Output: 0

Explanation:

- Front student leaves the top sandwich and returns to the end of the line making students = [1,0,0,
- Front student leaves the top sandwich and returns to the end of the line making students = [0,0,1,
- Front student takes the top sandwich and leaves the line making students = [0,1,1] and sandwiche s = [1,0,1].
- Front student leaves the top sandwich and returns to the end of the line making students = [1,1,0].

Candidate Report Page 6 of 23

Language used: Python 3

- Front student takes the top sandwich and leaves the line making students = [1,0] and sandwiches = [0,1].
- Front student leaves the top sandwich and returns to the end of the line making students = [0,1].
- Front student takes the top sandwich and leaves the line making students = [1] and sandwiches = [1].
- Front student takes the top sandwich and leaves the line making students = [] and sandwiches = []. Hence all students are able to eat.

Example 2:

```
Input: students = [1,1,1,0,0,1], sandwiches = [1,0,0,0,1,1]
Output: 3
```

Candidate's Solution

```
1 #!/bin/python3
 2
 3 import math
4 import os
 5 import random
 6 import re
7
   import sys
8
9
10
11
   #
12 # Complete the 'countStudents' function below.
13
14 # The function is expected to return an INTEGER.
15 # The function accepts following parameters:
16 #
      1. INTEGER ARRAY students
17 #
      2. INTEGER ARRAY sandwiches
18
   #
19
20 def countStudents(students, sandwiches):
21
       # Write your code here
22
       i = 0
23
       n = len(students)
24
       while True:
25
           i = 0
           while i < len(students) and students[i] != sandwiches[j]:</pre>
26
27
                i += 1
```

Candidate Report Page 7 of 23

```
28
29
            if i == len(students):
30
                break
31
32
            students = students[i + 1:] + students[:i]
33
            i += 1
34
35
            if j == n:
36
                break
37
38
        return n - j
39
   if name == ' main ':
40
41
        fptr = open(os.environ['OUTPUT PATH'], 'w')
42
43
        students count = int(input().strip())
44
45
        students = []
46
47
        for _ in range(students_count):
48
            students item = int(input().strip())
            students.append(students item)
49
50
51
        sandwiches_count = int(input().strip())
52
53
        sandwiches = []
54
55
        for _ in range(sandwiches_count):
56
            sandwiches item = int(input().strip())
57
            sandwiches.append(sandwiches item)
58
        result = countStudents(students, sandwiches)
59
60
61
        fptr.write(str(result) + '\n')
62
        fptr.close()
63
64
```

TESTCASE	DIFFICULTY	TYPE	STATUS	SCORE	TIME TAKEN	MEMORY USED
Testcase 0	Easy	Sample	Success	10	0.0884 sec	14.6 KB

Candidate Report Page 8 of 23

Testcase 1	Easy	Sample	Success	10	0.0856 sec	14.6 KB
Testcase 2	Easy	Hidden	Success	10	0.0895 sec	14.7 KB
Testcase 3	Easy	Hidden	Success	10	0.087 sec	14.6 KB
Testcase 4	Easy	Hidden	Success	10	0.0837 sec	14.6 KB

! No comments.

4. Guess this Complexity

⊘ Correct

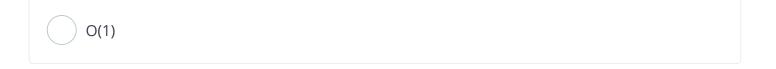
Multiple Choice

Question description

What is the time complexity to count the number of elements in the linked list?

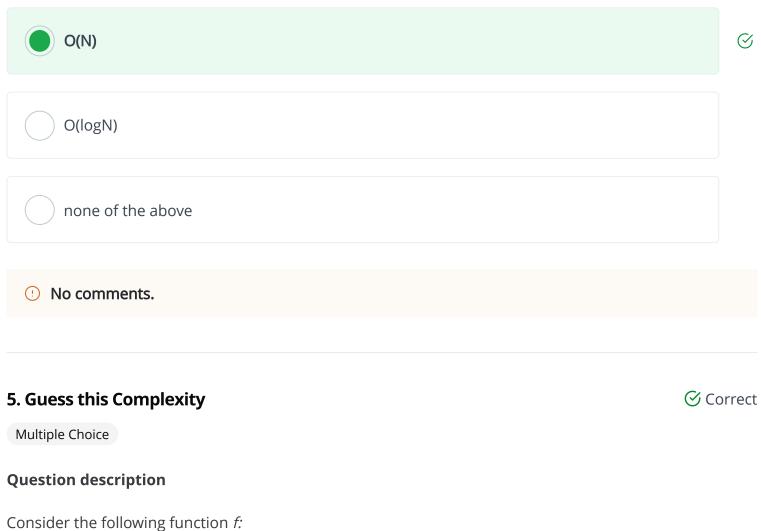
Candidate's Solution

Options: (Expected answer indicated with a tick)



Candidate Report Page 9 of 23

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```
int f(int n){
int s = 0;
while(n > 1){
 n = n/2;
 s++;
return s;
}
```

What is the complexity of *f* in terms of n?

Candidate's Solution

Page 10 of 23 Candidate Report

Options: (Expected answer indicated with a tick)	
O(N log N)	
O(N)	
O(N^2)	
O(log N)	\otimes
O(1)	
① No comments.	
6. Find an item in a hash table containing n items Multiple Choice	ジ Correct
Question description	
Assuming that the hash function for a table works well, and the size of the hash table is reasonal compared to the number of items in the table, the expected (average) time needed to find an ite hash table containing n items is	
Candidate's Solution	
Options: (Expected answer indicated with a tick)	

Candidate Report Page 11 of 23

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7. Given the head of a linked list, remove the nth node from the end of the list and Scorrect return its head.

Multiple Choice

Question description

In the following code, we are given the head of a linked list. What is the missing piece of code needed to remove the nth node from the end of the list and return its head?

```
/**
* Definition for singly-linked list.
* public class ListNode {
*
    int val;
*
     ListNode next;
    ListNode() {}
    ListNode(int val) { this.val = val; }
     ListNode(int val, ListNode next) { this.val = val; this.next = next; }
* }
*/
```

Page 12 of 23 Candidate Report

```
class Solution {
  public ListNode removeNthFromEnd(ListNode head, int n) {
    int count = 1;
    ListNode c = head;
    while(c.next!=null){
      count++;
      c=c.next;
    }
    if(n == count){
      head = head.next;
      return head;
    }
    ListNode In = head;
    int i = 0;
    while(++i<count-n){
      In = In.next;
    // insert code here
    return head;
  }
}
```

Candidate's Solution

Options: (Expected answer indicated with a tick)

```
In.next = In.head.next;

In.head = In.next.next;

head = head.next;
```

Candidate Report Page 13 of 23

In.next = In.next.next;	\otimes
① No comments.	
8. Two-dimensional array	⊘ Correct
Multiple Choice	
Question description	
Consider the following two-dimensional array declaration.	
int[][] matrix = new int[4][5];	
Which of the following statements will assign the correct size to colSize?	
Candidate's Solution	
Options: (Expected answer indicated with a tick)	
int colSize = matrix[0].length;	
int colSize = matrix[1].length;	
int colSize = matrix[2].length;	

Candidate Report Page 14 of 23

int colSize = matrix[3].length;	
all of the above	\otimes
No comments.	
9. True or False: Heap Multiple Choice	⊗ Incorrect
Question description	
Building a heap from an array of N items requires O(n log n)	
Candidate's Solution	
Options: (Expected answer indicated with a tick)	
True	
False	\otimes
No comments.	
10. What can be determined about the contents of the list array? Multiple Choice	⊘ Correct

Candidate Report Page 15 of 23

Question description

What can be determined about the contents of the list array?

```
import java.util.Random;

public class Program{
  public static void main(String args[]){
    int list[] = {0,1,2,3,4,5,6,7,8,9};
    Random r = new Random();
    for (int k = 0; k <= 5; k++)
        list[k] = r.nextInt(10);
        System.out.println();
    }
}</pre>
```

Candidate's Solution

Options: (Expected answer indicated with a tick)

The original list array contains {0,1,2,3,4,5,6,7,8,9} and then every element of the list array
is changed randomly to a value in the [09] range.

	The original list array contains {0,1,2,3,4,5,6,7,8,9} and then random elements of the list
	array are changed to the current value of k.

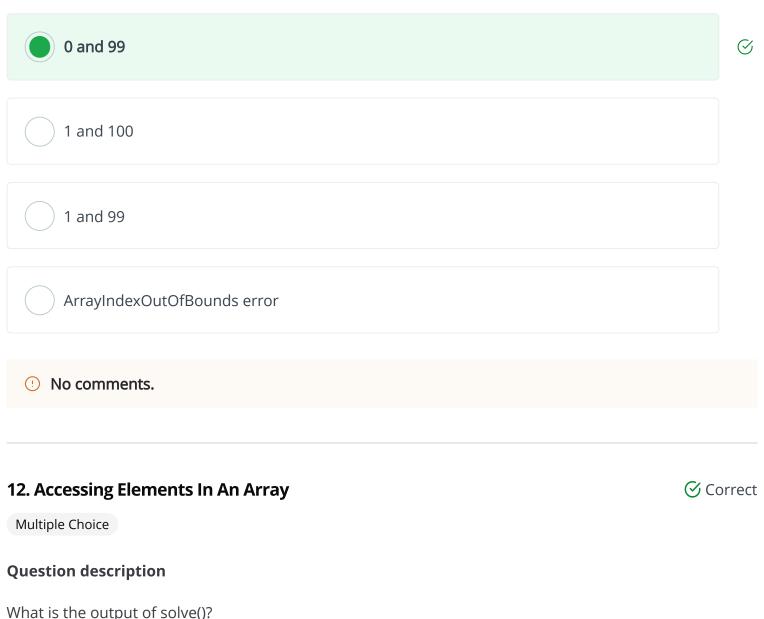
The original list array contains {0,1,2,3,4,5,6,7,8,9} and stays unchanged throughout the program execution.

Candidate Report Page 16 of 23

The original list array contains {0,1,2,3,4,5,6,7,8,9} and then the first five elements of the list array are changed to random values.	
The last four elements of the list array remain unchanged with values 6,7,8,9.	8
! No comments.	
11. What is the FIRST and LAST output from this program segment? Multiple Choice	♂ Correct
Question description	
What is the FIRST and LAST output from this program segment?	
<pre>int IntNum[] = new int[100]; int J; for (J=0; J<100; J++) IntNum[J] = J; for (J=0; J<100; J++) System.out.println(IntNum[J]);</pre>	
Candidate's Solution Options: (Expected answer indicated with a tick)	
0 and 100	

Candidate Report Page 17 of 23

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What is the output of solve()?

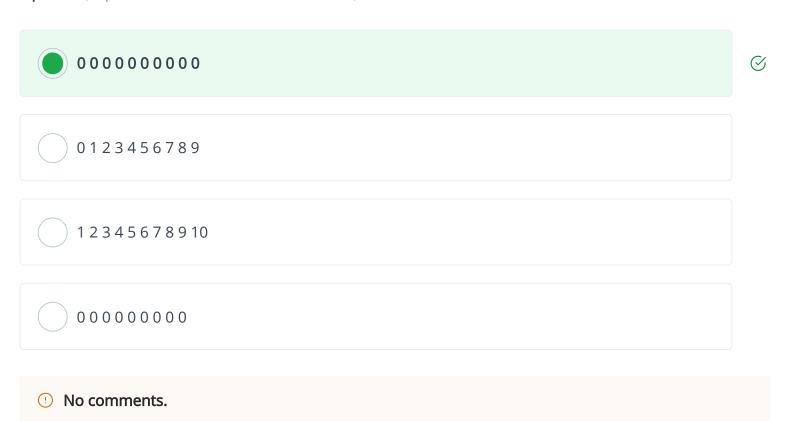
```
public static solve(){
 int list[];
 list = new int[10];
 for (int k = 0; k < 10; k++)
  list[k] = 0;
 for (int k = 0; k < 10; k++)
  System.out.print(list[k] + " ");
  System.out.println();
}
```

Candidate Report Page 18 of 23

Trung Ngo

Candidate's Solution

Options: (Expected answer indicated with a tick)



13. Sorted Array

Multiple Choice Arrays Data Structures Easy

Question description

Given an array, arr[0, 2, 3, 5, 4], and an integer x = 1, sort the array using the method below.

Each operation is: Choose a number i such that arr[i] > x. Swap the values of a[i] and x.

What is the minimum number of operations required to sort the array in ascending order?

Interviewer guidelines

array $a[5] = \{0,2,3,5,4\}$ and X = 1 (initial values)

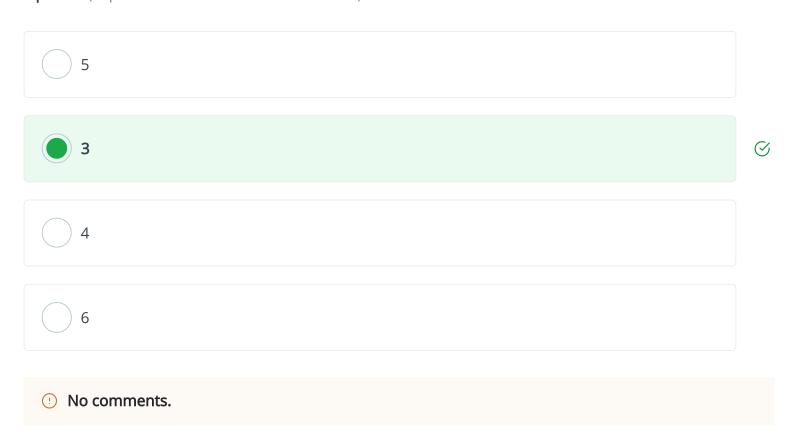
- Choose i = 2, as $a_i > X$, swap a_i and X updated array a[5] = {0,1,3,5,4} X = 2
- Choose i = 3, as $a_i > X$, swap a_i and X updated array a[5] = $\{0,1,2,5,4\} X = 3$

Candidate Report Page 19 of 23

• Choose i = 4, as $a_i > X$, swap a_i and X updated array $a[5] = \{0,1,2,3,4\} X = 5$ After 3 steps the initial array is sorted.

Candidate's Solution

Options: (Expected answer indicated with a tick)



14. Memoized Word Break

Multiple Choice

Question description

Given a string s and a dictionary of strings wordDict, what is the missing line of memoization code in order to return true if s can be segmented into a space-separated sequence of one or more dictionary words?

class Solution:
 def wordBreak(self, s: str, wordDict: List[str]) -> bool:

Candidate Report Page 20 of 23

```
wordDict=set(wordDict)
memo={":True}

def word_break(s): #recursive helper function
  if s in memo: return memo[s]
    candidates=[s[len(prefix):] for prefix in wordDict if s.startswith(prefix)]
  // add missing line here
  return memo[s]

return word_break(s)
```

Candidate's Solution

Options: (Expected answer indicated with a tick)

memo[string] = False	
if selfword_break(string[len(word):], words, memo):	
memo[s]=any([word_break(suffix) for suffix in candidates])	@
memo[s] = any(s[:len(w)] == w and wb(s[len(w):]) for w in wordDict)	
① No comments	

15. Inserting an element into a binary min heap

⊘ Correct

Multiple Choice

Candidate Report Page 21 of 23

Question description

Inserting an element into a binary min heap (implemented using an array) containing N elements requires what runtime?

Candidate's Solution

Options: (Expected answer indicated with a tick)	
O(1)	
O(n)	
O(n log n)	
O(log n)	\otimes
none of the above	
① No comments.	
16. Finding the maximum value in a binary min heap	⊘ Correct

Question description

Multiple Choice

Candidate Report Page 22 of 23

Finding the maximum value in a binary min heap (implemented using an array) containing N elements requires what runtime?

Candidate's Solution

Options: (Expected answer indicated with a tick)	
O(1)	

O(n)			

O(n log n)			

O(log n)			
O(log n)			

none of the above			

① No comments.

Candidate Report Page 23 of 23