You are taking "Recruitment Test" as a timed test. The timer on the right shows the time remaining in the test. To receive credit for problems, you must select "Submit" for each problem before you select "End Test".

End Test 0:50:33

Test Questions

Searching in a BST

Suppose that we have numbers between 1 and 100 in a binary search tree and we want to search for the number 10. Which of the following sequences could not be the sequence of nodes examined ?

- [92, 59, 16, 2, 12, 5, 10]
- [77, 9, 35, 22, 10]
- [27, 53, 6, 72, 2, 19, 70, 84, 10]
- [3, 12, 6, 7, 8, 9, 11, 10]

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Inheritance

What should be the result of running the following pseudocode snippet?

```
class Class1:
    function function_1(self):
         print("a")

    function function_2(self):
         print("b")


class Class2:
    function function_1(self):
         print("c")

    function function_3(self):
         print("d")


class Class3:
    function function_2(self):
         print("e")

    function function_3(self):
         print("f")


class ClassA(Class3, Class1):
    function function_3(self):
         print("h")


class ClassB(Class2):
    function function_2(self):
         print("i")

    function function_3(self):
         print("j")


class ClassC(Class1):
    function function_2(self):
         print("k")

    function function_3(self):
         print("l")


ClassC().function_3()
ClassA().function_1()
ClassC().function_3()
```

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System Safe State

A system has 18 magnetic tape drives and 5 processes : P1, P2, P3, P4, P5. The allocation of resources and the need for the resources by the processes are described in the table. Which of the following is possible **safe state** of the system?

Hint: A system is in a **safe state** if there is a sequence in which all the processes can be executed without getting into a **deadlock**.

processes	Need	Allocated
P1	10	2
P2	10	3
P3	18	2
P4	11	3
P5	13	0

- [5, 1, 4, 3, 2]
- [1, 2, 4, 3, 5]
- [3, 4, 5, 2, 1]
- [5, 4, 1, 3, 2]

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Not a topper

You are provided with a tables **"Students"** with their "name", "score" and respective **"country"** in a database.

Students

ID	name	score	country
1	Aisha	295	US
2	Nabeel	273	CA
3	Wadood	295	CA
4	Maryam	303	US
5	Sohaib	266	CA
6	Noor	331	US

What names will the following query return?

SELECT name FROM Students WHERE score IN (SELECT max(score) FROM Students GROUP BY country);

- Aisha,Maryam,Noor
- Aisha,Noor,Wadood
- Aisha,Noor,Sohaib
- Nabeel,Noor,Sohaib

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Make it a palindrome

How many iterations of characters are required to make **exhyyiggejcs** a palindrome string? Consider alphabets to be a circular list, A comes next to Z

- 59
- 121
- 35
- 97

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Identical Stacks

Each row below are the stacks of water bottles with their respective heights(n)

1. | 3 | 4 | 2 | 4 |

2. | 3 | 2 | 1 | 4 | 2 | 2 |

3. | 3 | 5 | 4 | 1 | 5 | 2 | 1 | 1 |

The rightmost element shows the top of the stack. Adding up the heights of the bottles on a stack will give you the overall height of the stack. You can pop the bottles from each stack any number of times to change the height of the stack.

Determine the maximum height of each stack where all of the three stacks are equal in terms of height.

- 11
- 3
- 8
- 20

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Process Scheduling

A CPU scheduler executes processes in time quantum of 100ms and then calculates the next process to execute after each quantum.
3 processes are fed into our CPU's process scheduler with the following attributes

Process A
Arrival Time: 0
Execution Time Needed: 900msec

Process B
Arrival Time: 500msec
Execution Time Needed: 1800msec

Process C
Arrival Time: 400msec
Execution Time Needed: 2000msec

There are four main algorithms which our CPU uses to schedule processes:
FCFR: First Come First Serve
SJF: Shortest Job First
SRTF: Shortest Remaining Time First
RR: Round Robin

If the scheduler is using the RR algorithm to schedule processes, which processes would have been completed after 4000 ms?

Answer as a comma separated list e.g. A,B or B,C,A

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Hash Clash

*An array is used here to represent a Hash Table. Array index starts from **0** and ends at **size_of_array - 1***
Which slot would the number 29 hash to, in the following Hash Table?

	41	50		23			29			43

size_of_table = 11

The hash function is :

\(hash(number) : number \) % \(size_of_table \)

For collision resolution use the following rehash function:

\(new_hash_value : rehash(old_hash_value) \)
\(rehash(position) :(position + 2) \) % \(size_of_table \)

Enter slot number

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Secret Key

```
INT mySecretKey(INT num)
[
    print<<num
    IF num < 14
    [
        mySecretKey( mySecretKey( mySecretKey( ++num ) ) )
    ]
    return (num)
]
```

The above pseudocode can generate a secret key for you. What would be the output secret key of the function mySecretKey(12)?

- The secret key is 13141414141414
- The secret key is 1213141414141414
- The secret key is 121314141414
- The secret key is 12131414141414

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Die roll probability

A **6** sided die is rolled **5** times. What is the probability of getting all outcomes as unique?

- 0.09
- 0.82
- 0.64
- 0.85
- 0.56

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Binary search steps counter

How many iterations of binary search are required to find **347** in **[92, 107, 118, 122, 139, 153, 248, 347, 414, 467, 497, 500, 672, 692, 701, 728, 884]**?

- 2
- 5
- 7
- 9

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Valid Binary Search Tree

Suppose that we have numbers between 1 and 100 in a binary search tree and we want to search for the number 67. Which of the following sequences could not be the sequence of nodes examined ?

- [81, 2, 25, 99, 40, 76, 99, 67]
- [56, 79, 74, 63, 64, 73, 70, 67]
- [51, 68, 53, 58, 61, 63, 66, 67]
- [10, 24, 60, 94, 76, 68, 63, 65, 66, 67]

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Character Analogies

C is to ___ what **F** is to **O**?

You can select only one option.

- W
- L
- T
- N

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Round robin scheduling

Round Robin is a CPU scheduling technique in which each process is assigned a fixed time slot(quantum) in a cyclic way consider the processes
p0, p1, p2, p3, p4
having arrival times
0, 4, 4, 1, 3

and burst times
10, 10, 8, 8, 12
respectively.

Suppose the time quantum = 2

Process will complete in sequence with

- p3,p0,p4,p1,p2
- p3,p0,p2,p1,p4
- p3,p0,p1,p2,p4
- p3,p0,p2,p4,p1

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Customer orders

Find out the Customers (CustomerName, City) who have placed less than 61 orders.

Customers		**Orders**
CustomerID		OrderID
CustomerName		CustomerID
Address		ShipperID
City		OrderDate
PostalCode		

There is one correct option

- SELECT Customers.CustomerName, Customers.City, Orders.OrderID AS NumberOfOrders FROM Orders, Customers WHERE Orders.CustomerID = Customers.CustomerID GROUP BY CustomerName ORDER BY NumberOfOrders asc HAVING COUNT(Orders.OrderID) < 61;

- SELECT Customers.CustomerName, Customers.City, COUNT(Orders.OrderID) AS NumberOfOrders FROM Orders INNER JOIN Customers ON Orders.CustomerID = Customers.CustomerID GROUP BY CustomerName HAVING COUNT(Orders.OrderID) < 61 ORDER BY NumberOfOrders asc;

- SELECT Customers.CustomerName, Customers.City, COUNT(Orders.OrderID) AS NumberOfOrders FROM Orders INNER JOIN Customers ON Orders.CustomerID = Customers.CustomerID GROUP BY CustomerName ORDER BY NumberOfOrders asc HAVING COUNT(Orders.OrderID) > 61;

- SELECT Customers.CustomerName, Customers.City, COUNT(Orders.OrderID) AS NumberOfOrders FROM Orders WHERE Orders.CustomerID = Customers.CustomerID GROUP BY CustomerName HAVING NumberOfOrders < 61 ORDER BY NumberOfOrders asc;

- SELECT Customers.CustomerName, Customers.City, COUNT(Orders.OrderID) AS NumberOfOrders FROM Orders INNER JOIN Customers ON Orders.CustomerID = Customers.CustomerID GROUP BY CustomerName WHERE COUNT(Orders.OrderID) < 61 ORDER BY NumberOfOrders asc;

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Min Heap

A **min-heap** is a heap where the value of each internal node is smaller than or equal to the values of its children. Consider a binary **min-heap** implemented using an array as follows: The root is stored in the first location, **a[0]**, nodes in the next level, from left to right, is stored from **a[1]** to **a[2]**. The nodes from the second level of the tree from left to right are stored from **a[3]** location onward... Which one of the following array represents a binary min-heap?

There is one correct option

- 10, 15, 21, 24, 17, 174, 31, 43, 175, 81, 119, 48, 177, 76, 110

- 10, 15, 21, 24, 17, 174, 81, 48, 31, 175, 177, 119, 43, 76, 110

- 10, 15, 21, 17, 24, 81, 31, 119, 177, 174, 175, 48, 43, 76, 110

- 10, 15, 21, 24, 17, 31, 48, 81, 174, 175, 177, 119, 43, 76, 110

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Another Linked List

Let's assume we have a singly linked lists: **Q->Z->R->T->E->S->O->M->N**. What would be the output and resultant list after running **func(list.head, 6)**. NOTE: This function is written in some hypothetical language and you can assume it's syntactically correct.

```
function List func(head, i) {
    if (i == 0) {
            temp = head.next;
            return temp;
    }


    head.next = func(head.next, i-1)
    print head.data
}
```

- **Output:** SETRZQ **List:** N->M->S->E->T->R->Z->Q
- **Output:** QZRTES **List:** Q->Z->R->T->E->S->M->N
- **Output:** SETRZQ **List:** Q->Z->R->T->E->S->O->M->N
- **Output:** SETRZQ **List:** Q->Z->R->T->E->S->M->N

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XOR and XNOR

Let **A : "01101111"** , **B=?**, If **{ A (Ex-nor) B }** is a resultant string of **HALF ZEROES AND HALF ONES [00001111]** then:

- 11011111
- 11111111

- 01111111

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Stacks and Queues

There are two storage systems present, one is a stack and the other queue. The content of the stack is **[9, 8, 6, 12]** and the content of the queue is **[17, 21, 23, 22, 26, 29, 20, 15, 28, 24]** (the first item in both represent the first item stored). The number on each item represent the ID of item.

We have to balance these storage systems (move items between storages so that there are equal number of items in both). Keeping in mind the functionalities of stacks and queues, we have to balance them!

STACK STORAGE: *oldest* **[9, 8, 6, 12]** *newest*

QUEUE STORAGE: *oldest* **[17, 21, 23, 22, 26, 29, 20, 15, 28, 24]** *newest*

What is the oldest item in queue storage after balancing the storages?
You can select only one option.

- 29
- 12
- 17
- 22

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Employee salaries

Table: employee_age

emp_id	age
101	24
103	29
102	37
100	32

Table: employee_salary

emp_id	salary
103	75000
106	54000
104	45000
102	60000

With given tables what would be output of following SQL query:

```
SELECT
    MIN(eSal.salary)
FROM
    employee_age as eAge INNER JOIN employee_salary as eSal
ON
    eAge.emp_id = eSal.emp_id

    WHERE eAge.age > 24
GROUP BY eAge.emp_id
    HAVING MIN(eSal.salary) > 45000
```

- ○ 45000
- ○ 60000
- ○ 54000
- ○ 75000

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Inheritance Code Snippet

What will be the output of this code snippet? (__init__ is constructor of class)

```
class A:
    def __init__(self):
        self.calc_i(751)

    def calc_i(self, i):
        self.i = 78 * i;

class B(A):
    def __init__(self):
        super().__init__()
        print("i from B is", self.i)

    def calc_i(self, i):
        self.i = 36 * i;

b = B()
```

You can select only one option.

- 45730
- 27036
- 38556
- 39803

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Mode, mean, median

M = [99, 7, 26, 26, 'N']

What is the value of N if the mode, mean and median of the list M are equal to each other? Express your answer to the nearest whole number.

Note:

- The mode of a set of data values is the value that appears most often.
- The mean is the average of the numbers: a calculated "central" value of a set of numbers.
- Median is the middle number in a sorted list of numbers.

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Novel Arrangement

Anaya has three Urdu novels **(C, E, G)** and Four English novels **(A, B, D, F)**. She wants to arrange her novels in a way that following conditions must be met:

- No english novel can be placed immediate after another english novel.

- G must be placed earlier than D.

- B and D must be separated from each other by at least one novel.

- B must be placed immediately before or after C.

- C must be placed immediately after A, but not if E is placed earlier than A.

Choose the best sequence of novels:

- F, E, A, G, B, C, D
- D, C, B, G, F, E, A
- A, G, F, E, B, C, D
- E, G, B, F, D, C, A

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Round and round

We have come upon a 'longRunning' method in our code. In order to check its lengthy execution time, we are calculating its iterations it against different inputs.

Can you figure out the number of iterations it will take to execute the following input:

[19, 20, 16, 1, 3]

```
      function longRunningFunction(array) {
  for ( i = 0; i < length(array); i++ ) {
      idx = i
      for ( j = i + 1; j < length(array); j++ ) {
      if ( array[idx] > array[j] ) {
      idx = j
      }
      }
      swap( array[i], array[idx] )
  }
}
```

- 0
- 1
- 5
- 4

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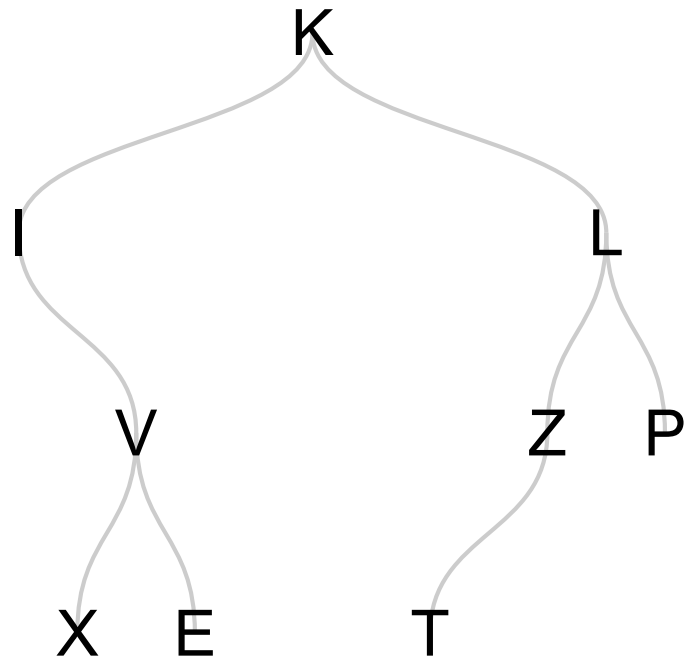
Binary Tree Traversal

What is the pre-order traversal of the following binary tree?



Answer (e.g. ARBISOFT)

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The queue and the stack

Consider a circular queue and a stack of size 5 and 7 respectively. Circular queue also performs following operations:

1. After Enqueue(x):
    - Push(x)

- Push(x mod 3)

2. After x = Dequeue():
   - y = Pop()
   - Push(x + y)

What will be the representation of stack after performing following operations:

enqueue(8)	enqueue(14)	dequeue()	enqueue(13)	enqueue(15)	enqueue(7)	dequeue()	dequeue()	enqueue(16)

- [8, 2, 14, 10, 13, 1, 42]
- None of the above
- [8, 5, 17, 13, 14, 2, 45]
- [8, 7, 19, 15, 15, 3, 47]
- [8, 14, 13, 15, 7, 16]

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John Wick's profession

John Wick has lost his memory in a car accident, sadly. But there is one help you can do for John Wick. Help him recall who he is.

Hint:

If you get more 1's than 0's, John Wick is a doctor.

If you get more 0's than 1's, John Wick is a plumber.

If you get equal number of 1's and 0's, John Wick is a carpenter.

function foo()
    print 1

function soo()
print 0

function zoo()
foo()
soo()

function koo()
foo()
soo()
soo()

function loo()
foo()
foo()
soo()

If the functions run in the following order, tell who is John Wick?

loo(), koo(), loo(), zoo(), loo(), soo(), loo(), soo(), soo()

- John Wick is a carpenter.
- John Wick is a plumber.
- I am unable to help John Wick.
- John Wick is a doctor.

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Max Heap

What will be the max heap of the following heap:
[28, 26, 23, 7, 9, 10, 44, 30, 50]

- [7, 26, 23, 9, 10, 50, 30, 44, 28]
- [50, 44, 30, 28, 26, 23, 10, 9, 7]
- [50, 30, 44, 28, 9, 10, 23, 26, 7]

- [50, 30, 44, 28, 7, 23, 26, 9, 10]

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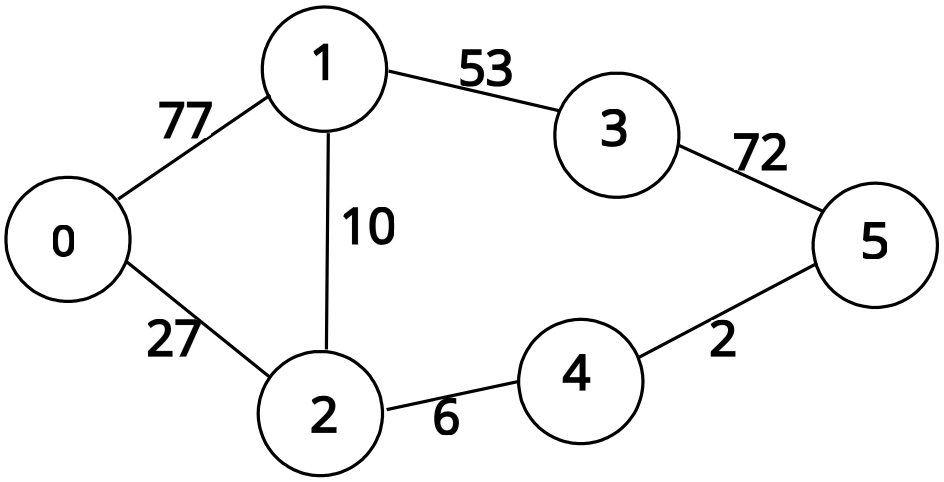
Graph adjacency

If we represent the following undirected graph in adjacency matrix **M** what would be the sum of **2nd** column of **M**.
NOTE: Counting starts from 0 as (0th, 1st, 2nd, 3rd, 4th, 5th ...)



- 140
- 125
- 43
- 8

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Profit Issues

A, **B** and **C** enter into a partnership with an investment in which **A's** contribution is **$7000**. if out of a total profit of **$1400**, A and B get **$400** and **$100** respectively, then what is **C's** capital?

- 16100.0
- 15750.0
- 15550.0
- 15800.0

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You have used 0 of 1 attempt

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