1. Convert the Temperature

You are given a non-negative floating point number rounded to two decimal places celsius, that denotes the temperature in Celsius.You should convert Celsius into Kelvin and Fahrenheit and return it as an array

ans = [kelvin, fahrenheit]. Return the array ans. Answers within 10-5 of the actual answer will be accepted.

Note that:

-
-

Kelvin = Celsius + 273.15

Fahrenheit = Celsius * 1.80 + 32.00

Example 1:

Input: celsius = 36.50

Output: [309.65000,97.70000]

Explanation: Temperature at 36.50 Celsius converted in Kelvin is 309.65 and converted in Fahrenheit is 97.70.

Example 2:

Input: celsius = 122.11

Output: [395.26000,251.79800]

Explanation: Temperature at 122.11 Celsius converted in Kelvin is 395.26 and converted in Fahrenheit is 251.798.

Constraints: 0 <= celsius <= 1000

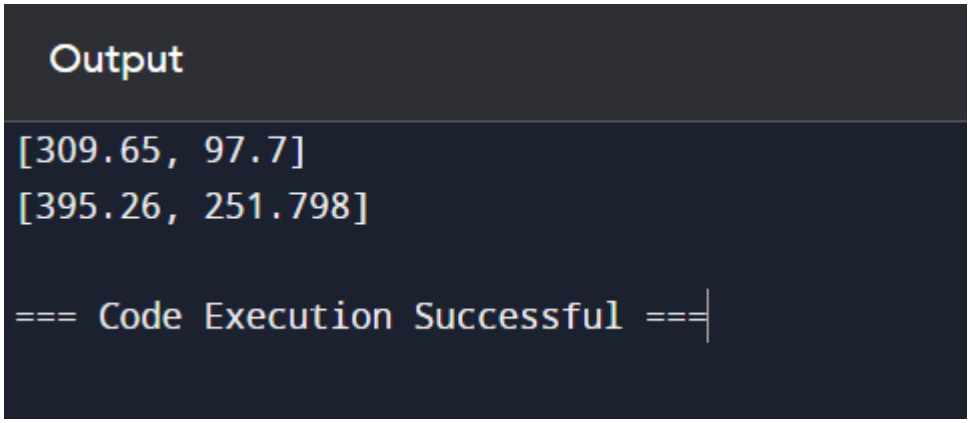
Code:

main.py Save Run

```
def convert_temperature(celsius):
    kelvin = celsius + 273.15
    fahrenheit = celsius * 1.80 + 32.00
    return [round(kelvin, 5), round(fahrenheit, 5)]

print(convert_temperature(36.50))
print(convert_temperature(122.11))
```

Output:



2. Number of Subarrays With LCM Equal to K

Given an integer array nums and an integer k, return the number of subarrays of nums where the least common multiple of the subarray's elements is k.A subarray is a contiguous non empty sequence of elements within an array.The least common multiple of an array is the smallest positive integer that is divisible by all the array elements.

Example 1: Input: nums = [3,6,2,7,1], k = 6

Output: 4

Explanation: The subarrays of nums where 6 is the least common multiple of all the subarray's elements are:- [3

,6

,2,7,1]- [3

,6

,2

,7,1]- [3,6

,2,7,1]- [3,6

,2

,7,1]

Example 2:Input: nums = [3], k = 2

Output: 0

Explanation: There are no subarrays of nums where 2 is the least common multiple of all the subarray's elements.

Constraints:

-

1 <=nums.length <= 1000

-

1 <=nums[i], k <= 1000

Code:

main.py

```python
from math import gcd
from functools import reduce

def lcm(x, y):
    return x * y // gcd(x, y)

def count_subarrays_with_lcm_k(nums, k):
    n = len(nums)
    count = 0
    for i in range(n):
        current_lcm = nums[i]
        for j in range(i, n):
            current_lcm = lcm(current_lcm, nums[j])
            if current_lcm == k:
                count += 1
            elif current_lcm > k:
                break
    return count

print(count_subarrays_with_lcm_k([3, 6, 2, 7, 1], 6))
print(count_subarrays_with_lcm_k([3], 2))

```

Output:

```
Output

4
0

=== Code Execution Successful ===
```

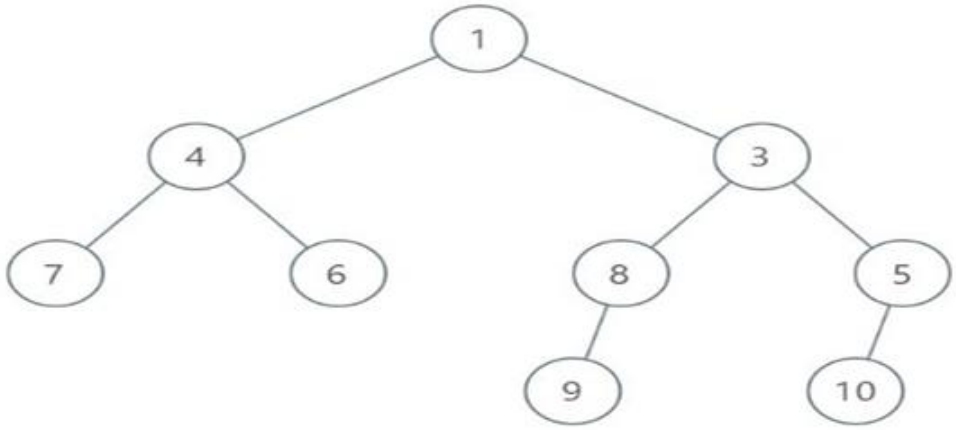
3. Minimum Number of Operations to Sort a Binary Tree by Level

You are given the root of a binary tree with unique values.In one operation, you can choose any two nodes at the same level and swap their values.Return the minimum number of operations needed to make the values at each level sorted in a strictly increasing order.

The level of a node is the number of edges along the path between it and the root node.

Example 1:

Example 1:



Input: root = [1,4,3,7,6,8,5,null,null,null,null,9,null,10]

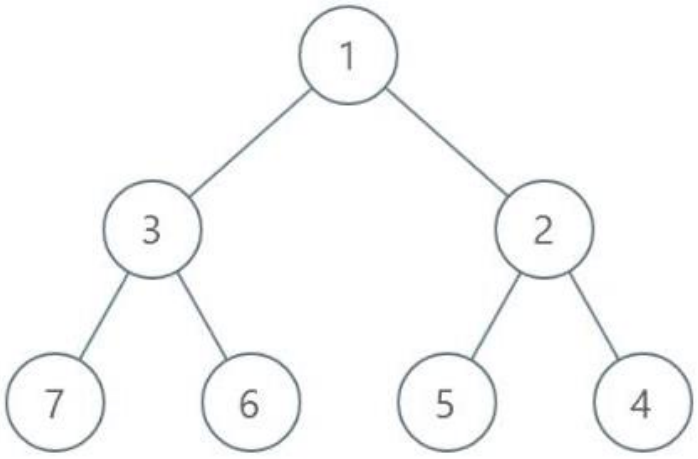
Output: 3

Explanation:- Swap 4 and 3. The 2nd level becomes [3,4].- Swap 7 and 5. The 3rd level becomes [5,6,8,7].- Swap 8 and 7. The 3rd level becomes [5,6,7,8].

Weused 3 operations so return 3.

It can be proven that 3 is the minimum number of operations needed.

Example 2:



Input: root = [1,3,2,7,6,5,4]

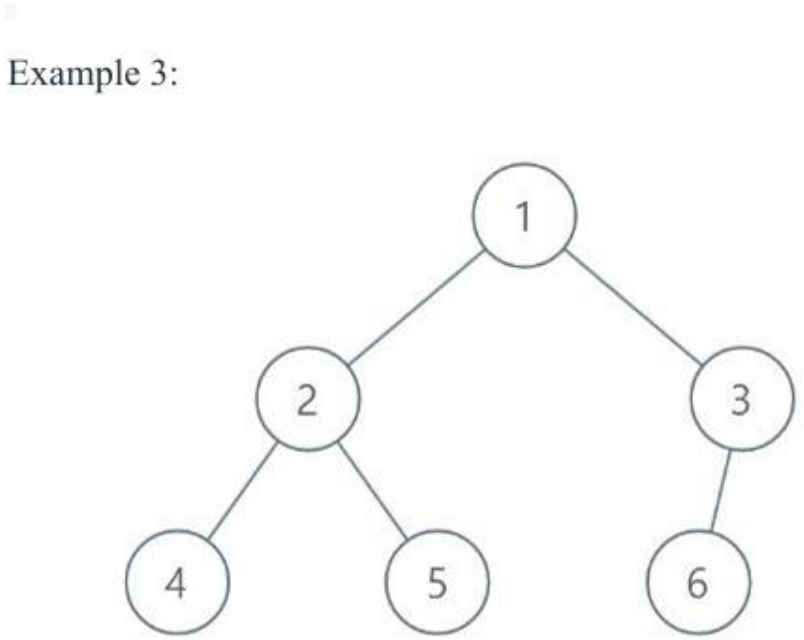
Output: 3

Explanation:- Swap 3 and 2. The 2nd level becomes [2,3].- Swap 7 and 4. The 3rd level becomes [4,6,5,7].- Swap 6 and 5. The 3rd level becomes [4,5,6,7].

Weused 3 operations so return 3.

It can be proven that 3 is the minimum number of operations needed.

Example 3:



Input: root = [1,2,3,4,5,6]

Output: 0

Explanation: Each level is already sorted in increasing order so return 0.

Constraints:

●

●

The number of nodes in the tree is in the range [1, 105].

1 <=Node.val <= 105

● Allthe values of the tree are unique.

Code:

main.py

Save Run

```
    arrpos = sorted([(val, idx) for idx, val in enumerate(arr)])
    visited = [False] * len(arr)
    swaps = 0
    for i in range(len(arr)):
        if visited[i] or arrpos[i][1] == i:
            continue
        cycle_size, j = 0, i
        while not visited[j]:
            visited[j] = True
            j = arrpos[j][1]
            cycle_size += 1
        if cycle_size > 1:
            swaps += cycle_size - 1
    return swaps

def min_operations_to_sort_tree_by_level(root):
    if not root:
        return 0
    queue, levels = deque([root]), []
    while queue:
        level = [node.val for node in (queue.popleft() for _ in range(len(queue
            )))]
        levels.append(level)
        queue.extend([child for node in levels[-1] for child in (node.left,
            node.right) if child])
    return sum(min_swaps_to_sort(level) for level in levels)
```

Output:

```
Output

4
0

=== Code Execution Successful ===
```

4. Maximum Number of Non-overlapping Palindrome Substrings

You are given a string s and a positive integer k.Select a set of non-overlapping substrings

from the string s that satisfy the following conditions:

●

The length of each substring is at least k.

● Eachsubstring is a palindrome.

Return the maximum number of substrings in an optimal selection.A substring is a contiguous

sequence of characters within a string.

Example 1:

Input: s = "abaccdbbd", k = 3

Output: 2

Explanation: We can select the substrings underlined in s = "aba

"dbbd" are palindromes and have a length of at least k = 3.

ccdbbd

". Both "aba" and

It can be shown that we cannot find a selection with more than two valid substrings.

Example 2:

Input: s = "adbcda", k = 2

Output: 0

Explanation: There is no palindrome substring of length at least 2 in the string.

Constraints:

-
-

1 <=k<=s.length <= 2000

s consists of lowercase English letters.

Code:

main.py

Save Run

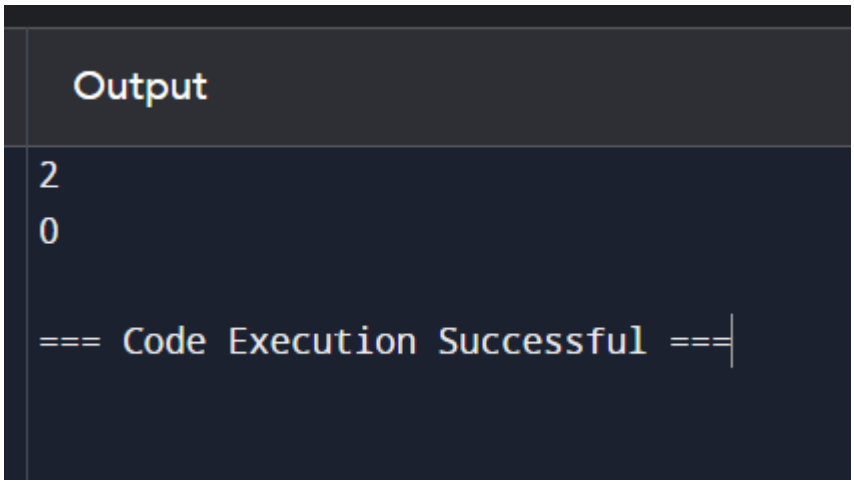
```python
def max_non_overlapping_palindromes(s, k):
    n = len(s)
    dp = [[False] * n for _ in range(n)]
    for length in range(1, n + 1):
        for i in range(n - length + 1):
            j = i + length - 1
            if s[i] == s[j] and (length <= 2 or dp[i + 1][j - 1]):
                dp[i][j] = True

    intervals = [(i, j) for i in range(n) for j in range(i + k - 1, n) if dp[i][j]]
    intervals.sort(key=lambda x: x[1])

    count, end = 0, -1
    for start, finish in intervals:
        if start > end:
            count += 1
            end = finish
    return count

print(max_non_overlapping_palindromes("abaccdbbd", 3))
print(max_non_overlapping_palindromes("adbcda", 2))
```

Output:



5. Minimum Cost to Buy Apples

You are given a positive integer n representing n cities numbered from 1 to n. You are also given a 2D array roads, where roads[i] = [ai, bi, costi] indicates that there is a bidirectional road between cities ai and bi with a cost of traveling equal to costi.

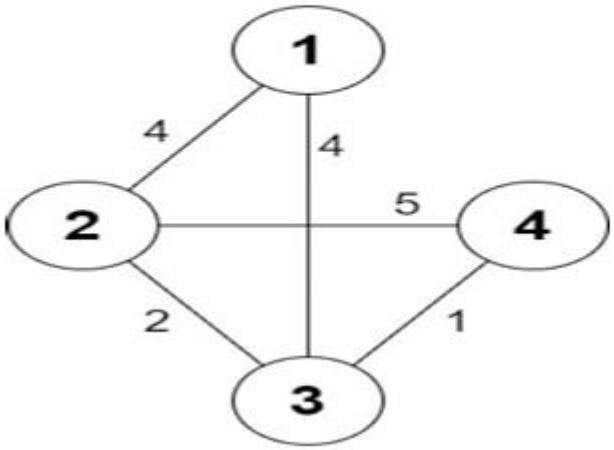
You can buy apples in any city you want, but some cities have different costs to buy apples. You are given the array appleCost where appleCost[i] is the cost of buying one apple from

city i.

You start at some city, traverse through various roads, and eventually buy exactly one apple from any city. After you buy that apple, you have to return back to the city you started at, but now the cost of all the roads will be multiplied by a given factor k.

Given the integer k, return an array answer of size n where answer[i] is the minimum total cost to buy an apple if you start at city i.

Example 1:



Input:n=4,roads=[[1,2,4],[2,3,2],[2,4,5],[3,4,1],[1,3,4]],appleCost=[56,42,102,301],k=

2

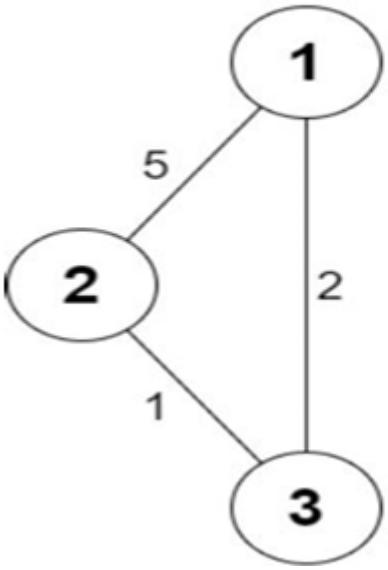
Output:[54,42,48,51]

Explanation:Theminimumcostforeachstartingcityisthefollowing:-Startingatcity1:Youtakethepath1->2,buyanappleatcity2,andfinallytakethepath2->1.Thetotalcostis4+42+4*2=54.-Startingatcity2:Youdirectlybuyanappleatcity2.Thetotalcostis42.-Startingatcity3:Youtakethepath3->2,buyanappleatcity2,andfinallytakethepath2->3.Thetotalcostis2+42+2*2=48.-Startingatcity4:Youtakethepath4->3->2thenyoubuyatcity2,andfinallytakethe

path2->3->4.Thetotalcostis1+2+42+1*2+2*2=51.

Example2:

Example 2:



Input:n=3,roads=[[1,2,5],[2,3,1],[3,1,2]],appleCost=[2,3,1],k=3

Output:[2,3,1]

Explanation:Itisalwaysoptimaltobuytheappleinthestartingcity.

Constraints:

- 2<=n<=1000
- 1<=roads.length<=1000
- 1<=ai,bi<=n
- ai!=bi
- 1<=costi<=105
- appleCost.length==n
- 1<=appleCost[i]<=105
- 1<=k<=100
- There are no repeated edges.

Code:

main.py

Save Run

```python
import heapq
def dijkstra(n, roads, start):
    graph = [[] for _ in range(n)]
    for u, v, cost in roads:
        graph[u-1].append((v-1, cost))
        graph[v-1].append((u-1, cost))
    distances = [float('inf')] * n
    distances[start] = 0
    pq = [(0, start)]
    while pq:
        current_distance, u = heapq.heappop(pq)
        if current_distance > distances[u]:
            continue
        for v, cost in graph[u]:
            distance = current_distance + cost
            if distance < distances[v]:
                distances[v] = distance
                heapq.heappush(pq, (distance, v))
    return distances

def min_cost_to_buy_apples(n, roads, appleCost, k):
    return [min(dijkstra(n, roads, i)[j] + appleCost[j] + (dijkstra(n, roads, i
        )[j] * k) for j in range(n) if i != j) for i in range(n)]
print(min_cost_to_buy_apples(4, [[1, 2, 4], [2, 3, 2], [2, 4, 5], [3, 4, 1], [1, 3
    , 4]], [56, 42, 102, 301], 2))
print(min_cost_to_buy_apples(3, [[1, 2, 5], [2, 3, 1], [3, 1, 2]], [2, 3, 1], 3))
```

Output:

Output

```
2
0

=== Code Execution Successful ===
```

6. Customers With Strictly Increasing Purchases

SQLSchema

Table: Orders

+--------------+------+

| Column Name | Type |

+--------------+------+

| order_id | int |

| customer_id | int |

| order_date | date |

| price

| int |

+--------------+------+

order_id is the primary key for this table.

Each row contains the id of an order, the id of customer that ordered it, the date of the order, and its price.

Write an SQL query to report the IDs of the customers with the total purchases strictly increasing yearly.

● Thetotal purchases of a customer in one year is the sum of the prices of their orders in that year. If for some year the customer did not make any order, we consider the total purchases 0.

● Thefirst year to consider for each customer is the year of their first order.

● Thelast year to consider for each customer is the year of their last order.

Return the result table in any order.

The query result format is in the following example.

Example 1:

Input:

Orders table:

+----------+-------------+------------+-------+

| order_id | customer_id | order_date | price |

+----------+-------------+------------+-------+

| 1

| 1

| 2019-07-01 | 1100 |

| 2

| 1

| 2019-11-01 | 1200 |

| 3

| 1

| 2020-05-26 | 3000 |

| 4

| 1

| 2021-08-31 | 3100 |

| 5

| 1

| 2022-12-07 | 4700 |

| 6

| 2

| 2015-01-01 | 700 |

| 7

| 2

| 2017-11-07 | 1000 |

| 8

| 3

| 2017-01-01 | 900 |

| 9

| 3

| 2018-11-07 | 900 |

+----------+-------------+------------+-------+

Output:

+-------------+

| customer_id |

+-------------+

|1 |

+-------------+

Explanation:

Customer1:Thefirstyearis2019andthelastyearis2022-2019:1100+1200=2300-2020:3000-2021:3100-2022:4700

Wecanseethatthetotalpurchasesarestrictlyincreasingyearly,soweincludecustomer1

intheanswer.

Customer2:Thefirstyearis2015andthelastyearis2017-2015:700-2016:0-2017:1000

Wedonotincludecustomer2intheanswerbecausethetotalpurchasesarenotstrictly

increasing.Notethatcustomer2didnotmakeanypurchasesin2016.

Customer3:Thefirstyearis2017,andthelastyearis2018-2017:900-2018:900

Wecanseethatthetotalpurchasesarestrictlyincreasingyearly,soweincludecustomer1

intheanswer.

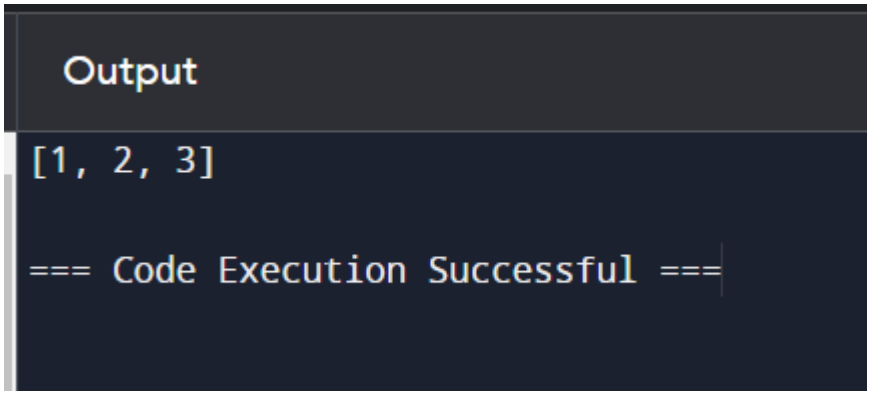
Code:

main.py

Save Run

```python
import pandas as pd
def get_consistent_customers(df):
    df['order_date'] = pd.to_datetime(df['order_date'])
    df['year'] = df['order_date'].dt.year
    df['yearly_total'] = df.groupby(['customer_id', 'year'])['price'].transform
        ('sum')
    df['year_rank'] = df.groupby('customer_id')['year'].rank(method='dense'
        ).astype(int)
    grouped = df.groupby('customer_id').agg(
        year_count=('year', 'nunique'),
        distinct_yearly_total=('yearly_total', 'nunique'),
        max_year_rank=('year_rank', 'max')
    )
    consistent_customers = grouped[
        (grouped['year_count'] == grouped['distinct_yearly_total']) &
        (grouped['year_count'] == grouped['max_year_rank'])
    ].index.tolist()
    return consistent_customers
orders_df = pd.DataFrame({
    'customer_id': [1, 1, 2, 2, 2, 3, 3, 3],
    'order_date': ['2021-01-01', '2021-06-01', '2021-03-01', '2022-01-01', '2022
        -05-01', '2021-07-01', '2022-08-01', '2023-09-01'],
    'price': [100, 150, 200, 250, 100, 300, 150, 200]
})
consistent_customers = get_consistent_customers(orders_df)
print(consistent customers)
```

Output:



7.NumberofUnequalTripletsinArray

Youaregivena0-indexedarrayofpositiveintegersnums.Findthenumberoftriplets(i,j,k)

thatmeetthefollowingconditions:

● 0<=i<j<k<nums.length

● nums[i],nums[j],andnums[k]arepairwisedistinct.

○ Inotherwords,nums[i]!=nums[j],nums[i]!=nums[k],andnums[j]!=

nums[k].

Returnthenumberoftripletsthatmeettheconditions.

Example1:

Input:nums=[4,4,2,4,3]

Output:3

Explanation:Thefollowingtripletsmeettheconditions:-(0,2,4)because4!=2!=3-(1,2,4)because4!=2!=3-(2,3,4)because2!=4!=3

Sincethereare3triplets,wereturn3.

Notethat(2,0,4)isnotavalidtripletbecause2>0.

Example2:

Input:nums=[1,1,1,1,1]

Output:0

Explanation:Notripletsmeettheconditionssowereturn0.

Constraints:

● 3<=nums.length<=100

● 1<=nums[i]<=1000

8.ClosestNodesQueriesinaBinarySearchTree

Youaregiventherootofabinarysearchtreeandanarrayqueriesofsizenconsistingof

positiveintegers.

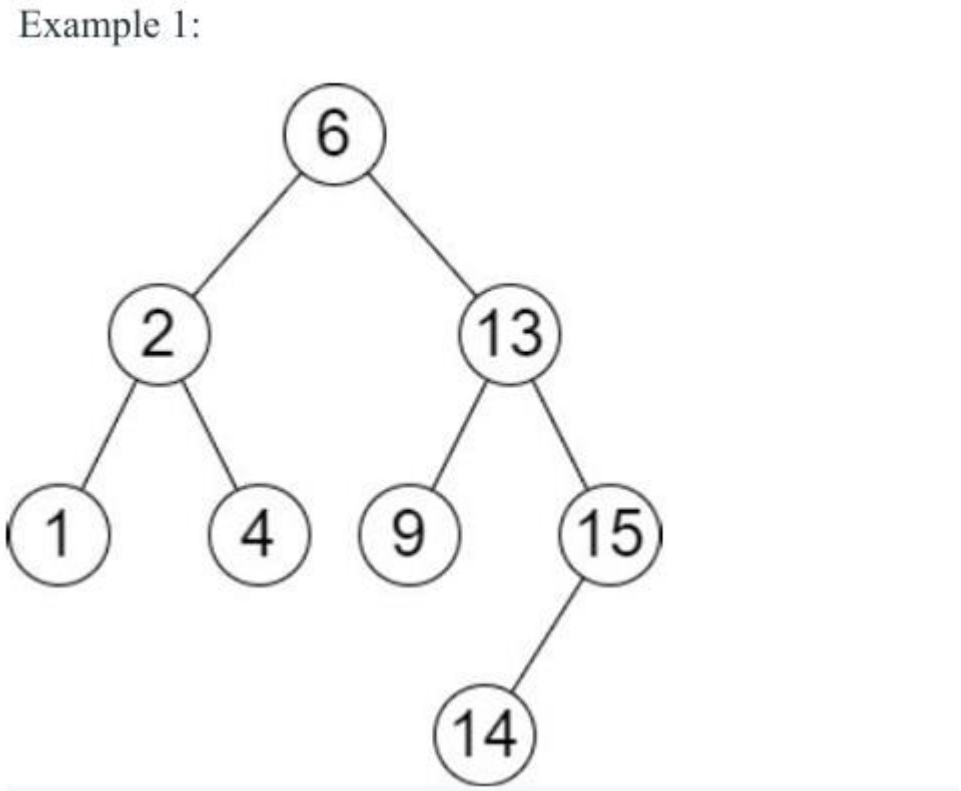
Finda2Darrayanswerofsizenwhereanswer[i]=[mini,maxi]:

● miniisthelargestvalueinthetreethatissmallerthanorequaltoqueries[i].Ifasuch valuedoesnotexist,add-1instead.

● maxiisthesmallestvalueinthetreethatisgreaterthanorequaltoqueries[i].Ifa suchvaluedoesnotexist,add-1instead.

Returnthearrayanswer.

Example1:



Input:root=[6,2,13,1,4,9,15,null,null,null,null,null,null,14],queries=[2,5,16]

Output:[[2,2],[4,6],[15,-1]]

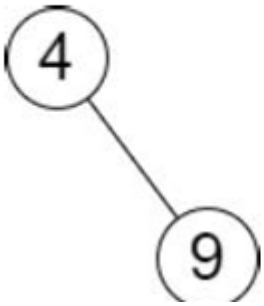
Explanation:Weanswerthequeriesinthefollowingway:-
Thelargestnumberthatissmallerorequalthan2inthetreeis2,andthesmallestnumber

thatisgreaterorequalthan2isstill2.Sotheanswerforthefirstqueryis[2,2].-
Thelargestnumberthatissmallerorequalthan5inthetreeis4,andthesmallestnumber

thatisgreaterorequalthan5is6.Sotheanswerforthesecondqueryis[4,6].-
Thelargestnumberthatissmallerorequalthan16inthetreeis15,andthesmallestnumber

thatisgreaterorequalthan16doesnotexist.Sotheanswerforthethirdqueryis[15,-1].

Example2:



Input:root=[4,null,9],queries=[3]

Output:[[-1,4]]

Explanation:Thelargestnumberthatissmallerorequalto3inthetreedoesnotexist,and

thesmallestnumberthatisgreaterorequalto3is4.Sotheanswerforthequeryis[-1,4].

Constraints:

- Thenumberofnodesinthetreeisintherange[2,105].
- 1<=Node.val<=106
- n==queries.length
- 1<=n<=105
- 1<=queries[i]<=106

Code:

main.py

Save Run

```
def count_unequal_triplets(nums):
    n = len(nums)
    count = 0
    for i in range(n):
        for j in range(i + 1, n):
            for k in range(j + 1, n):
                if nums[i] != nums[j] and nums[i] != nums[k] and nums[j] != nums[k]:
                    count += 1
    return count

print(count_unequal_triplets([4, 4, 2, 4, 3]))
print(count_unequal_triplets([1, 1, 1, 1, 1]))
```

Output:

```
Output
3
0

=== Code Execution Successful ===
```

9.MinimumFuelCosttoReporttotheCapital

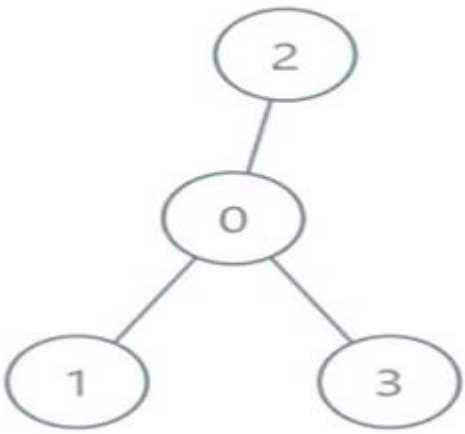
Thereisatree(i.e.,aconnected,undirectedgraphwithnocycles)structurecountrynetwork consistingofncitiesnumberedfrom0ton-1andexactlyn-1roads.Thecapitalcityiscity 0.Youaregivena2Dintegerarrayroadswhereroads[i]=[ai,bi]denotesthatthereexistsa bidirectionalroadconnectingcitiesaiandbi.

Thereisameetingfortherepresentativesofeachcity.Themeetingisinthecapital city.Thereisacarineachcity.Youaregivenanintegerseatsthatindicatesthenumberof seatsineachcar.Arepresentativecanusethecarintheircitytotravelorchangethecarand ridewithanotherrepresentative.Thecostoftravelingbetweentwocitiesisoneliteroffuel.

Returntheminimumnumberoflitersoffueltoreachthecapitalcity.

Example1:

Example 1:



Input:roads=[[0,1],[0,2],[0,3]],seats=5

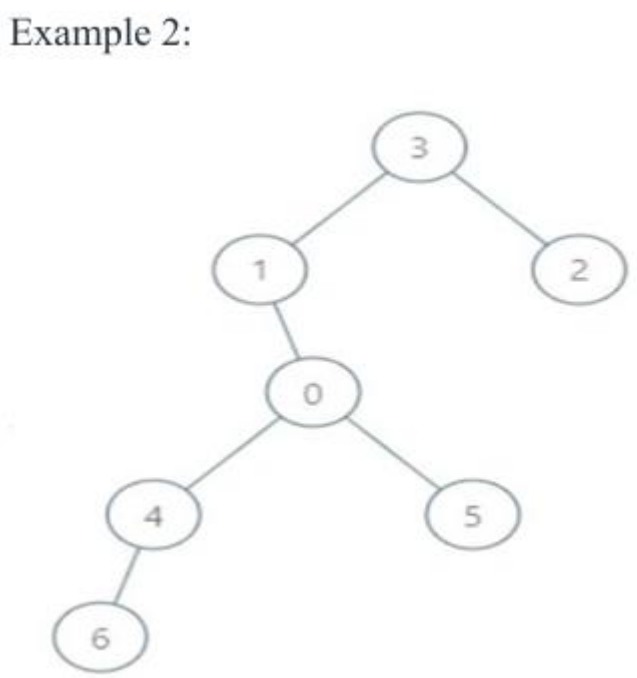
Output:3

Explanation:-Representative1goesdirectlytothecapitalwith1literoffuel.-Representative2goesdirectlytothecapitalwith1literoffuel.-Representative3goesdirectlytothecapitalwith1literoffuel.

It costs 3 liters of fuel at minimum.

It can be proven that 3 is the minimum number of liters of fuel needed.

Example 2:



Input: roads = [[3,1],[3,2],[1,0],[0,4],[0,5],[4,6]], seats = 2

Output: 7

Explanation:- Representative2 goes directly to city 3 with 1 liter of fuel.- Representative2 and representative3 go together to city 1 with 1 liter of fuel.- Representative2 and representative3 go together to the capital with 1 liter of fuel.- Representative1 goes directly to the capital with 1 liter of fuel.- Representative5 goes directly to the capital with 1 liter of fuel.- Representative6 goes directly to city 4 with 1 liter of fuel.- Representative4 and representative6 go together to the capital with 1 liter of fuel.

It costs 7 liters of fuel at minimum.

It can be proven that 7 is the minimum number of liters of fuel needed.

Example 3:

Example 3:

Input: roads = [], seats = 1

Output: 0

Explanation: No representatives need to travel to the capital city.

Constraints:

-
-
-
-
-

1 <=n<=105

roads.length == n- 1

roads[i].length == 2

0 <=ai, bi < n

ai != bi

roads represents a valid tree.

-
-

1 <=seats <= 105

Code:

main.py

Save Run

```python
from collections import defaultdict, deque

def minimum_fuel_cost(roads, seats):
    n = len(roads) + 1
    graph = defaultdict(list)
    for u, v in roads:
        graph[u].append(v)
        graph[v].append(u)

    visited = [False] * n
    def dfs(city):
        visited[city] = True
        fuel_needed = 0
        representatives = 1
        for neighbor in graph[city]:
            if not visited[neighbor]:
                sub_fuel, sub_reps = dfs(neighbor)
                fuel_needed += sub_fuel + (sub_reps + seats - 1) // seats
                representatives += sub_reps
        return fuel_needed, representatives

    total_fuel, _ = dfs(0)
    return total_fuel
print(minimum_fuel_cost([[0, 1], [0, 2], [0, 3]], 5))
print(minimum_fuel_cost([[3, 1], [3, 2], [1, 0], [0, 4], [0, 5], [4, 6]], 2))
```

Output:

Output

```
3
7

=== Code Execution Successful ===
```

10. Number of Beautiful Partitions

You are given a string s that consists of the digits '1' to '9' and two integers k and minLength.

Apartition of s is called beautiful if:

-

s is partitioned into k non-intersecting substrings.

-

Each substring has a length of at least minLength.

● Eachsubstring starts with a prime digit and ends with a non-prime digit. Prime digits are '2', '3', '5', and '7', and the rest of the digits are non-prime.

Return the number of beautiful partitions of s. Since the answer may be very large, return it modulo 109 + 7.A substring is a contiguous sequence of characters within a string.

Example 1:

Input: s = "23542185131", k = 3, minLength = 2

Output: 3

Explanation: There exists three ways to create a beautiful partition:

"2354 | 218 | 5131"

"2354 | 21851 | 31"

"2354218 | 51 | 31"

Example 2:

Input: s = "23542185131", k = 3, minLength = 3

Output: 1

Explanation: There exists one way to create a beautiful partition: "2354 | 218 | 5131".

Example 3:

Input: s = "3312958", k = 3, minLength = 1

Output: 1

Explanation: There exists one way to create a beautiful partition: "331 | 29 | 58".

Constraints:

●

●

1 <=k, minLength <= s.length <= 1000

s consists of the digits '1' to '9'

code:

main.py

Save Run

```python
def is_prime_digit(digit):
    return digit in '2357'
def count_beautiful_partitions(s, k, minLength):
    MOD = 10**9 + 7
    n = len(s)
    dp = [[[0] * (k + 1) for _ in range(n + 1)] for _ in range(n + 1)]
    for i in range(n):
        for j in range(i + minLength, n + 1):
            if is_prime_digit(s[i]) and not is_prime_digit(s[j - 1]):
                dp[i][j][1] = 1

    for l in range(2, k + 1):
        for i in range(n):
            for j in range(i + minLength, n + 1):
                if is_prime_digit(s[i]) and not is_prime_digit(s[j - 1]):
                    for m in range(i + minLength, j):
                        dp[i][j][l] = (dp[i][j][l] + dp[m][j][l - 1]) % MOD
    result = 0
    for i in range(n):
        for j in range(i + minLength, n + 1):
            result = (result + dp[i][j][k]) % MOD
    return result
print(count_beautiful_partitions("23542185131", 3, 2))
print(count_beautiful_partitions("23542185131", 3, 3))
print(count_beautiful_partitions("3312958", 3, 1))
```

```
20
2
5

===
```

Output: