CHANDIGARH UNIVERSITY

UNIVERSITY INSTITUTE OF NGINEERING

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Submitted By: Vivek Kumar(21BCS8129)	**Submitted To:** Mamta Punia(E12337)
Subject Name	Competitive Coding - I
Subject Code	20CSP-314
Branch	Computer Science and Engineering
Semester	5th

Experiment No. - 10

Student Name: Vivek Kumar
Branch: BE-CSE(LEET)
Semester: 5th
Subject Name: Competitive coding - I

UID: 21BCS8129
Section/Group: WM-20BCS-616/A
Date of Performance: 4/11/2022
Subject Code: 20CSP-314

1. Aim/Overview of the practical:

Branch and Bound, Greedy

Marc loves cupcakes, but he also likes to stay fit. Each cupcake has a calorie count, and Marc can walk a distance to expend those calories. If Marc has eaten cupcakes so far, after eating a cupcake with calories he must walk *at least* miles to maintain his weight.

https://www.hackerrank.com/challenges/marcs-cakewalk/problem?isFullScreen=true

2. Apparatus / Simulator Used:

- Windows 7 or above
- Google Chrome

3. Objective:

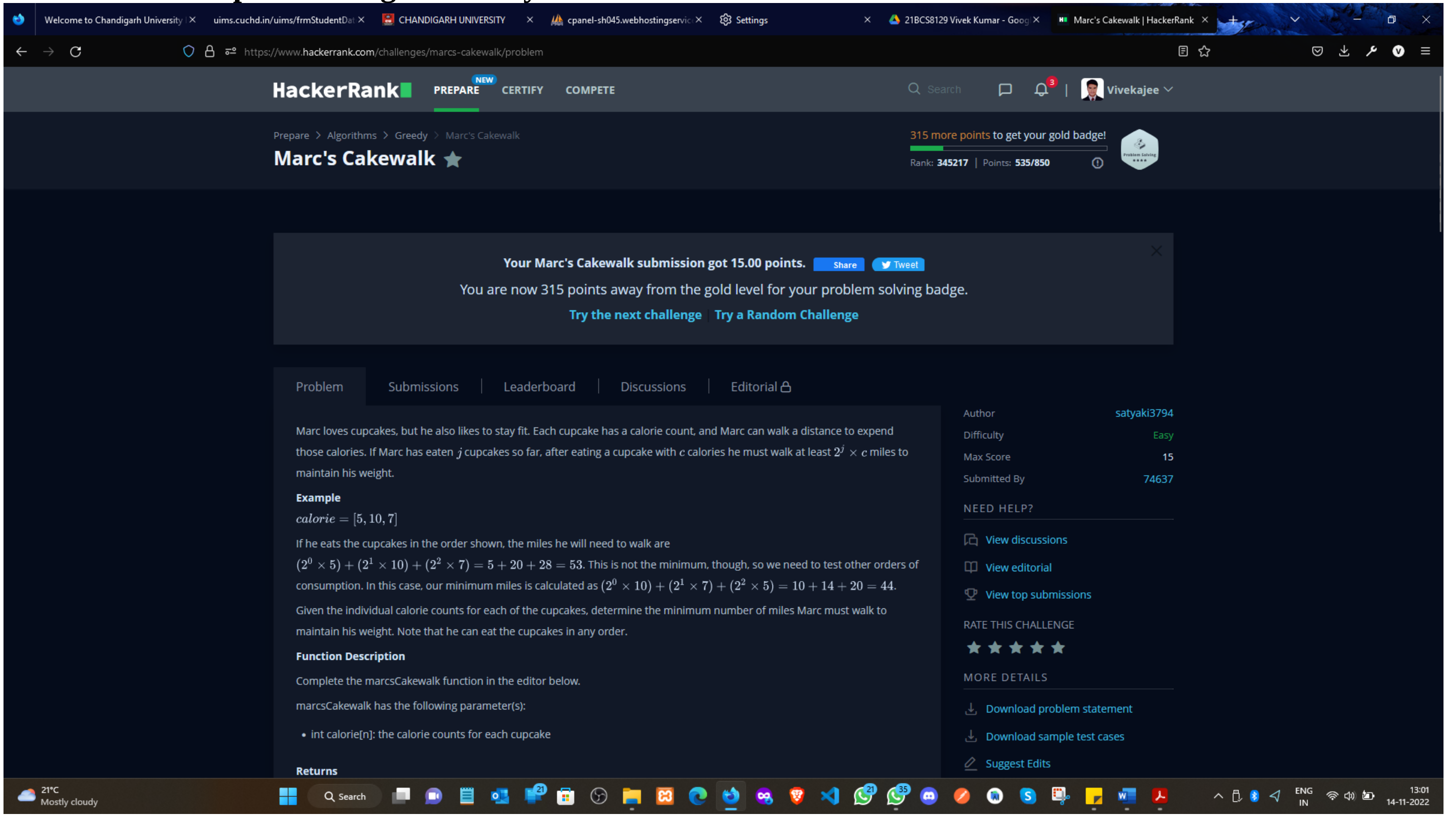
- To understand the concept of Branch and Bound.
- To implement the concept of Greedy.

4. Code:

```
#!/bin/python3

import math
import os
import random
import re
import sys

#
# Complete the 'marcsCakewalk' function below.
#
# The function is expected to return a LONG_INTEGER.
# The function accepts INTEGER_ARRAY calorie as parameter.
#
```

```
def marcsCakewalk(calorie):
    calorie.sort(reverse=True)
    total = 0
    for index, value in enumerate(calorie):
        total += pow(2, index) * value
    return total

if __name__ == '__main__':
    fptr = open(os.environ['OUTPUT_PATH'], 'w')

    n = int(input().strip())

    calorie = list(map(int, input().rstrip().split()))

    result = marcsCakewalk(calorie)

    fptr.write(str(result) + '\n')

    fptr.close()
```

5. Result/Output/Writing Summary:


Welcome to Chandigarh University
uims.cuchd.in/uims/frmStudentDat
CHANDIGARH UNIVERSITY
cpanel-sh045.webhostingservic
Settings
21BCS8129 Vivek Kumar - Goog
Marc's Cakewalk | HackerRank
https://www.hackerrank.com/challenges/marcs-cakewalk/problem
HackerRank
NEW
PREPARE
CERTIFY
COMPETE
Search
3
Vivekajee
Prepare > Algorithms > Greedy > Marc's Cakewalk
Problem Solving
Share
Tweet
Problem
Submissions
Leaderboard
Discussions
Editorial
21°C
Mostly cloudy
Search
ENG
IN
13:01
14-11-2022

Marc's Cakewalk

315 more points to get your gold badge!

Rank: 345217 | Points: 535/850

Your Marc's Cakewalk submission got 15.00 points.

You are now 315 points away from the gold level for your problem solving badge.

Try the next challenge | Try a Random Challenge

Marc loves cupcakes, but he also likes to stay fit. Each cupcake has a calorie count, and Marc can walk a distance to expend those calories. If Marc has eaten j cupcakes so far, after eating a cupcake with c calories he must walk at least $2^j \times c$ miles to maintain his weight.

Example

$calorie = [5, 10, 7]$

If he eats the cupcakes in the order shown, the miles he will need to walk are $(2^0 \times 5) + (2^1 \times 10) + (2^2 \times 7) = 5 + 20 + 28 = 53$. This is not the minimum, though, so we need to test other orders of consumption. In this case, our minimum miles is calculated as $(2^0 \times 10) + (2^1 \times 7) + (2^2 \times 5) = 10 + 14 + 20 = 44$.

Given the individual calorie counts for each of the cupcakes, determine the minimum number of miles Marc must walk to maintain his weight. Note that he can eat the cupcakes in any order.

Function Description

Complete the marcsCakewalk function in the editor below.

marcsCakewalk has the following parameter(s):

- int calorie[n]: the calorie counts for each cupcake

Returns

Author	satyaki3794
Difficulty	Easy
Max Score	15
Submitted By	74637

NEED HELP?

View discussions

View editorial

View top submissions

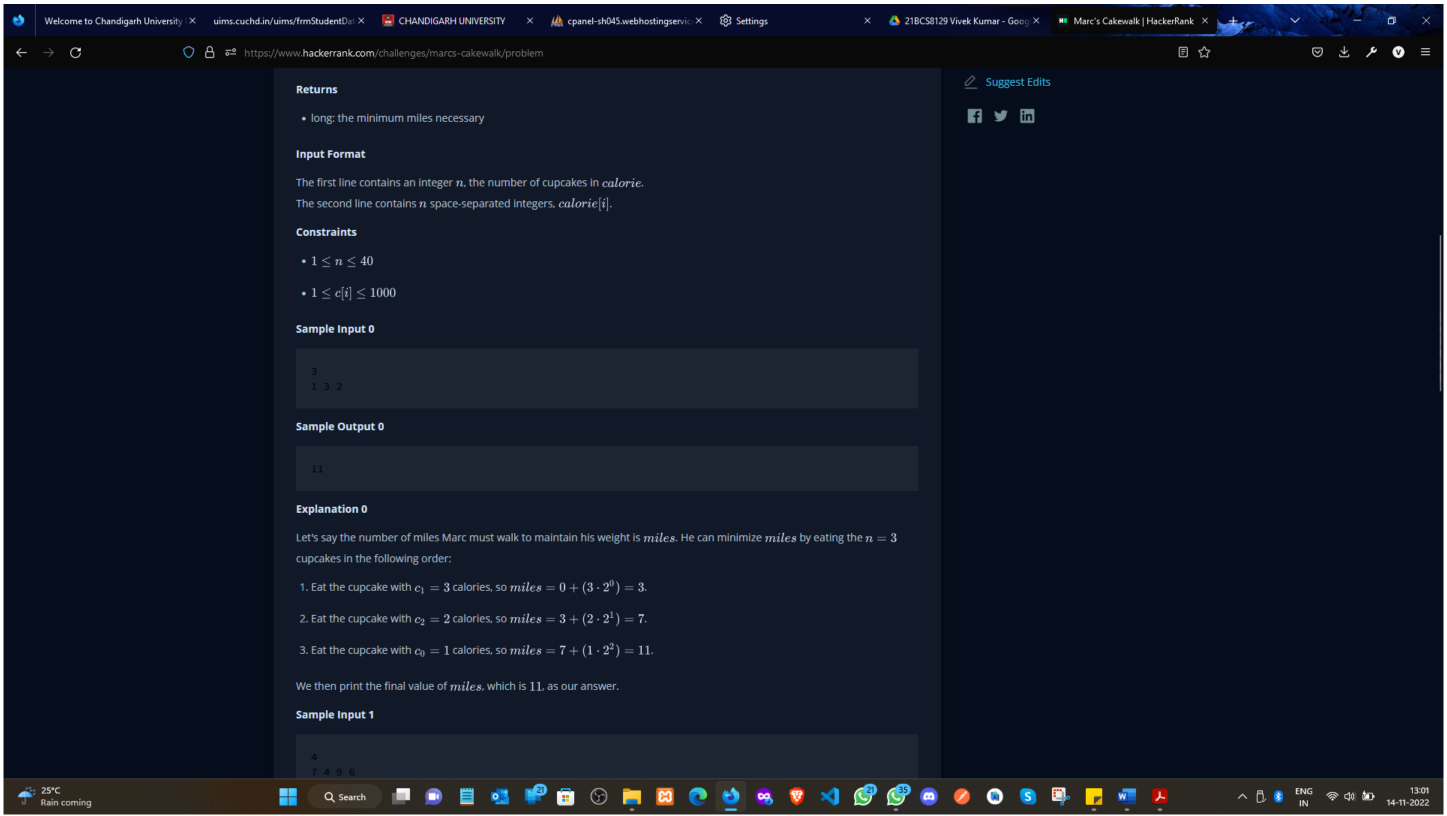
RATE THIS CHALLENGE

MORE DETAILS

Download problem statement

Download sample test cases

Suggest Edits


Welcome to Chandigarh University
uims.cuchd.in/uims/frmStudentDat
CHANDIGARH UNIVERSITY
cpanel-sh045.webhostingservic
Settings
21BCS8129 Vivek Kumar - Goog
Marc's Cakewalk | HackerRank
https://www.hackerrank.com/challenges/marcs-cakewalk/problem
Suggest Edits
25°C
Rain coming
Search
ENG
IN
13:01
14-11-2022

Returns

- long: the minimum miles necessary

Input Format

The first line contains an integer n, the number of cupcakes in $calorie$.
The second line contains n space-separated integers, $calorie[i]$.

Constraints

- $1 \leq n \leq 40$
- $1 \leq c[i] \leq 1000$

Sample Input 0

```
3
1 3 2
```

Sample Output 0

```
11
```

Explanation 0

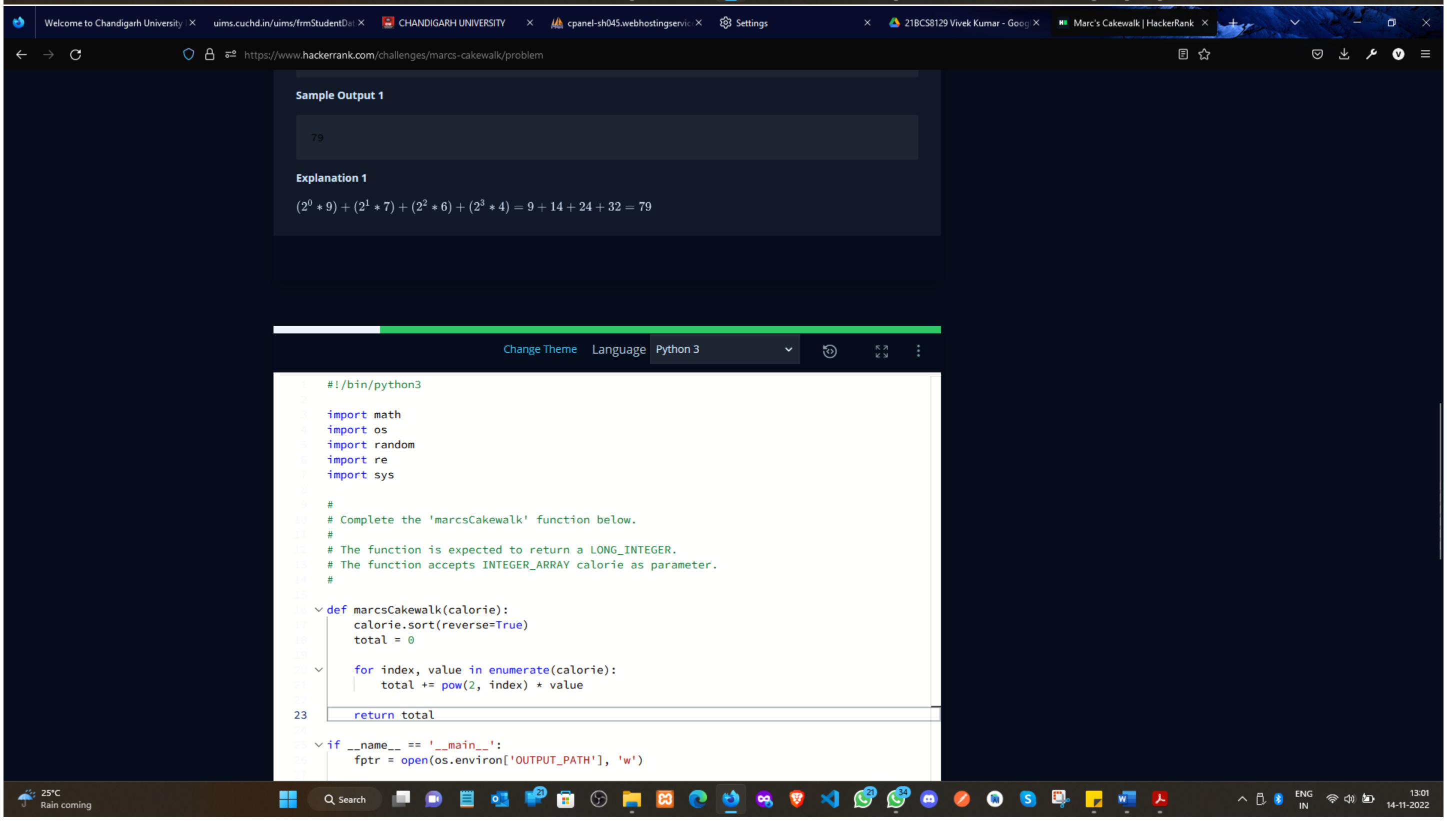
Let's say the number of miles Marc must walk to maintain his weight is $miles$. He can minimize $miles$ by eating the $n = 3$ cupcakes in the following order:

1. Eat the cupcake with $c_1 = 3$ calories, so $miles = 0 + (3 \cdot 2^0) = 3$.
2. Eat the cupcake with $c_2 = 2$ calories, so $miles = 3 + (2 \cdot 2^1) = 7$.
3. Eat the cupcake with $c_0 = 1$ calories, so $miles = 7 + (1 \cdot 2^2) = 11$.

We then print the final value of $miles$, which is 11, as our answer.

Sample Input 1

```
4
7 4 9 6
```


Welcome to Chandigarh University
uims.cuchd.in/uims/frmStudentDat
CHANDIGARH UNIVERSITY
cpanel-sh045.webhostingservic
Settings
21BCS8129 Vivek Kumar - Goog
Marc's Cakewalk | HackerRank
https://www.hackerrank.com/challenges/marcs-cakewalk/problem
Change Theme
Language
Python 3
25°C
Rain coming
Search
ENG
IN
13:01
14-11-2022

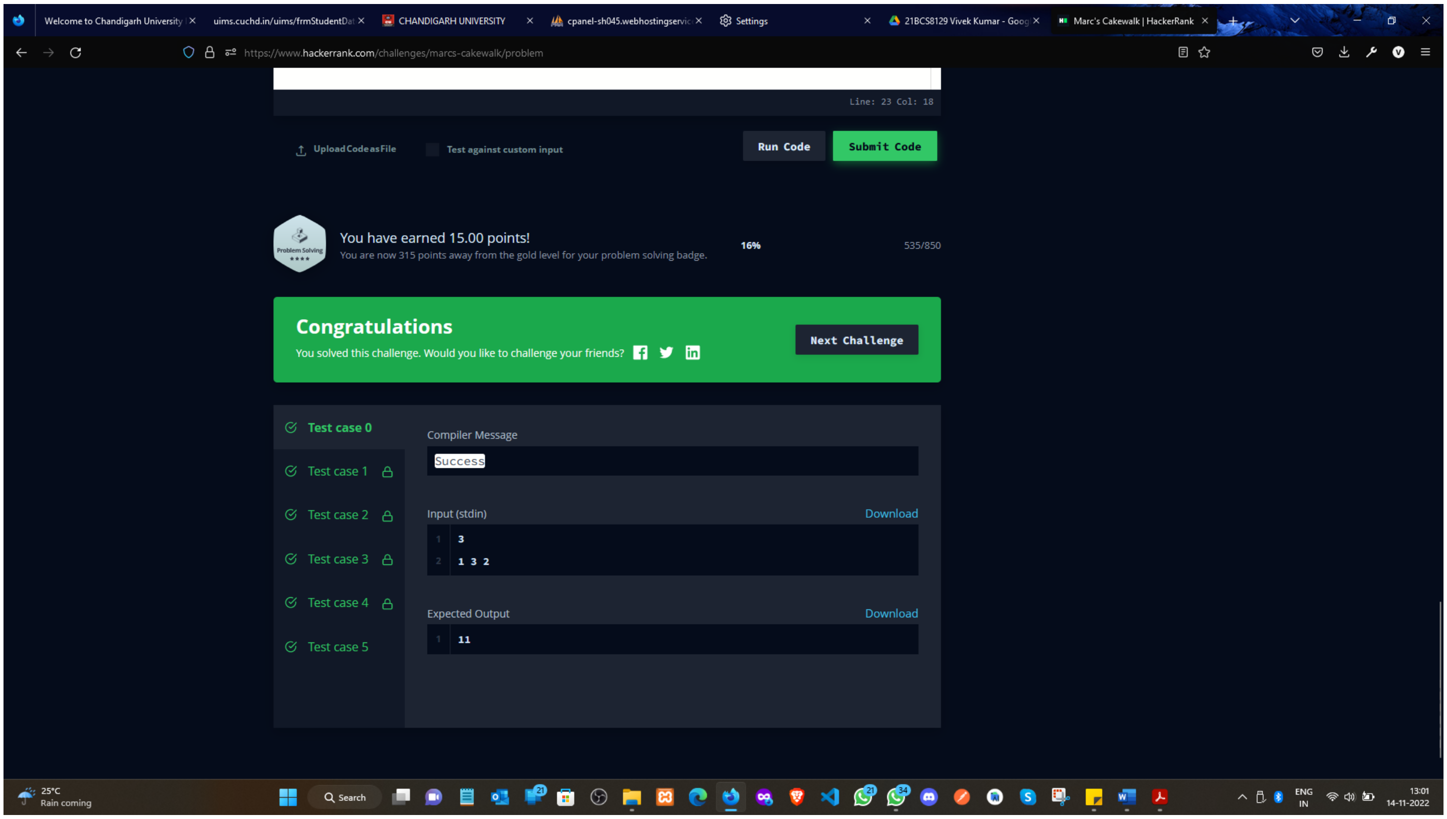
Sample Output 1

```
79
```

Explanation 1

$$(2^0 * 9) + (2^1 * 7) + (2^2 * 6) + (2^3 * 4) = 9 + 14 + 24 + 32 = 79$$

```python
#!/bin/python3

import math
import os
import random
import re
import sys

#
# Complete the 'marcsCakewalk' function below.
#
# The function is expected to return a LONG_INTEGER.
# The function accepts INTEGER_ARRAY calorie as parameter.
#

def marcsCakewalk(calorie):
    calorie.sort(reverse=True)
    total = 0

    for index, value in enumerate(calorie):
        total += pow(2, index) * value

    return total

if __name__ == '__main__':
    fptr = open(os.environ['OUTPUT_PATH'], 'w')
```


Welcome to Chandigarh University
uims.cuchd.in/uims/frmStudentDa
CHANDIGARH UNIVERSITY
cpanel-sh045.webhostingservic
Settings
21BCS8129 Vivek Kumar - Goog
Marc's Cakewalk | HackerRank
https://www.hackerrank.com/challenges/marcs-cakewalk/problem
Line: 23 Col: 18
Upload Code as File
Test against custom input
Run Code
Submit Code
Problem Solving
Next Challenge
25°C
Rain coming
Search
ENG
IN
13:01
14-11-2022

You have earned 15.00 points!
You are now 315 points away from the gold level for your problem solving badge.
16%
535/850

Congratulations
You solved this challenge. Would you like to challenge your friends?

Test case 0
Test case 1
Test case 2
Test case 3
Test case 4
Test case 5

Compiler Message

```
Success
```

Input (stdin) Download

```
3
1 3 2
```

Expected Output Download

```
11
```

Experiment 10.2

1. Aim/Overview of the practical:

Branch and Bound, Greedy

Given a square grid of characters in the range ascii[a-z], rearrange elements of each row alphabetically, ascending. Determine if the columns are also in ascending alphabetical order, top to bottom. Return YES if they are or NO if they are not.
https://www.hackerrank.com/challenges/grid-challenge/problem?isFullScreen=true

2. Apparatus / Simulator Used:

- Windows 7 or above
- Google Chrome

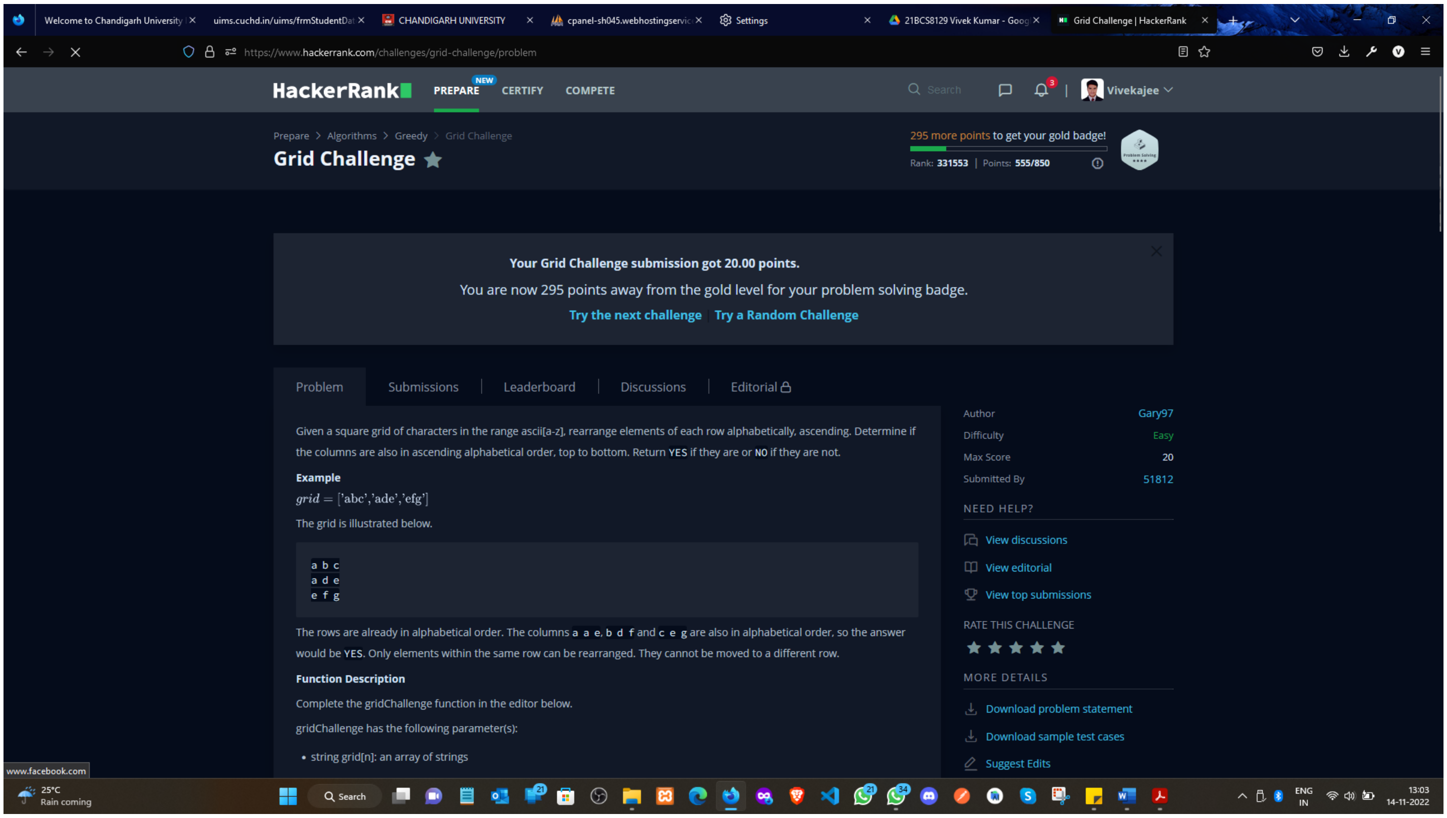
3. Objective:

- To understand the concept of Branch and Bound.
- To implement the concept of Greedy.

4. **Code:**

```
#!/bin/python3
import math
import os
import random
import re
import sys

#
# Complete the 'gridChallenge' function below.
#
# The function is expected to return a STRING.
# The function accepts STRING_ARRAY grid as parameter.
#

def gridChallenge(grid):
    sorted_grid = [sorted(row) for row in grid]
    for column in range(len(grid[0])):
        last = sorted_grid[0][column]
        for row in range(1, len(grid)):
            if sorted_grid[row][column] < last:
                return 'NO'
    return 'YES'


if __name__ == '__main__':
    fptr = open(os.environ['OUTPUT_PATH'], 'w')

    t = int(input().strip())

    for t_itr in range(t):
        n = int(input().strip())
        grid = []
        for _ in range(n):
            grid_item = input()
            grid.append(grid_item)

        result = gridChallenge(grid)
        fptr.write(result + '\n')
    fptr.close()
```

5. Result/Output/Writing Summary:


Welcome to Chandigarh University
uims.cuchd.in/uims/frmStudentDat
CHANDIGARH UNIVERSITY
cpanel-sh045.webhostingservic
Settings
21BCS8129 Vivek Kumar - Goog
Grid Challenge | HackerRank
https://www.hackerrank.com/challenges/grid-challenge/problem
HackerRank
PREPARE NEW
CERTIFY
COMPETE
Search
Vivekajee
Prepare > Algorithms > Greedy > Grid Challenge

Grid Challenge

295 more points to get your gold badge!

Rank: 331553 | Points: 555/850

Your Grid Challenge submission got 20.00 points.

You are now 295 points away from the gold level for your problem solving badge.

Try the next challenge   Try a Random Challenge

Problem
Submissions
Leaderboard
Discussions
Editorial

Given a square grid of characters in the range ascii[a-z], rearrange elements of each row alphabetically, ascending. Determine if the columns are also in ascending alphabetical order, top to bottom. Return YES if they are or NO if they are not.

Example

$grid = ['abc','ade','efg']$

The grid is illustrated below.

```
a b c
a d e
e f g
```

The rows are already in alphabetical order. The columns a a e, b d f and c e g are also in alphabetical order, so the answer would be YES. Only elements within the same row can be rearranged. They cannot be moved to a different row.

Function Description

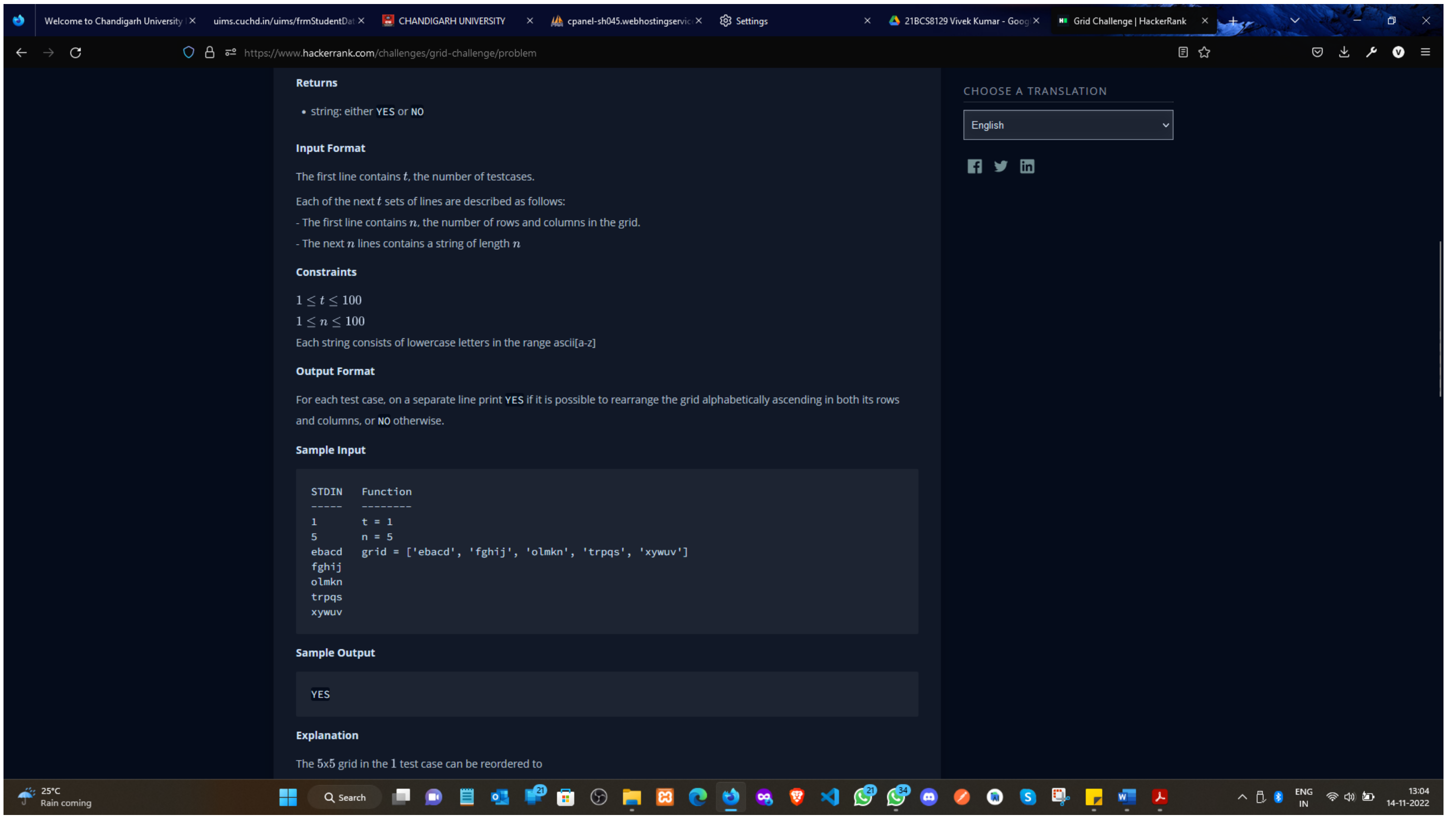
Complete the gridChallenge function in the editor below.

gridChallenge has the following parameter(s):

- string grid[n]: an array of strings

Author	Gary97
Difficulty	Easy
Max Score	20
Submitted By	51812

NEED HELP?
View discussions
View editorial
View top submissions
RATE THIS CHALLENGE
MORE DETAILS
Download problem statement
Download sample test cases
Suggest Edits
www.facebook.com
25°C
Rain coming
Search
ENG
IN
13:03
14-11-2022


Welcome to Chandigarh University
uims.cuchd.in/uims/frmStudentDat
CHANDIGARH UNIVERSITY
cpanel-sh045.webhostingservic
Settings
21BCS8129 Vivek Kumar - Goog
Grid Challenge | HackerRank
https://www.hackerrank.com/challenges/grid-challenge/problem

Returns

- string: either YES or NO

Input Format

The first line contains t, the number of testcases.

Each of the next t sets of lines are described as follows:

- The first line contains n, the number of rows and columns in the grid.

- The next n lines contains a string of length n

Constraints

$1 \le t \le 100$

$1 \le n \le 100$

Each string consists of lowercase letters in the range ascii[a-z]

Output Format

For each test case, on a separate line print YES if it is possible to rearrange the grid alphabetically ascending in both its rows and columns, or NO otherwise.

Sample Input

```
STDIN   Function
-----   --------
1       t = 1
5       n = 5
ebacd   grid = ['ebacd', 'fghij', 'olmkn', 'trpqs', 'xywuv']
fghij
olmkn
trpqs
xywuv
```

Sample Output

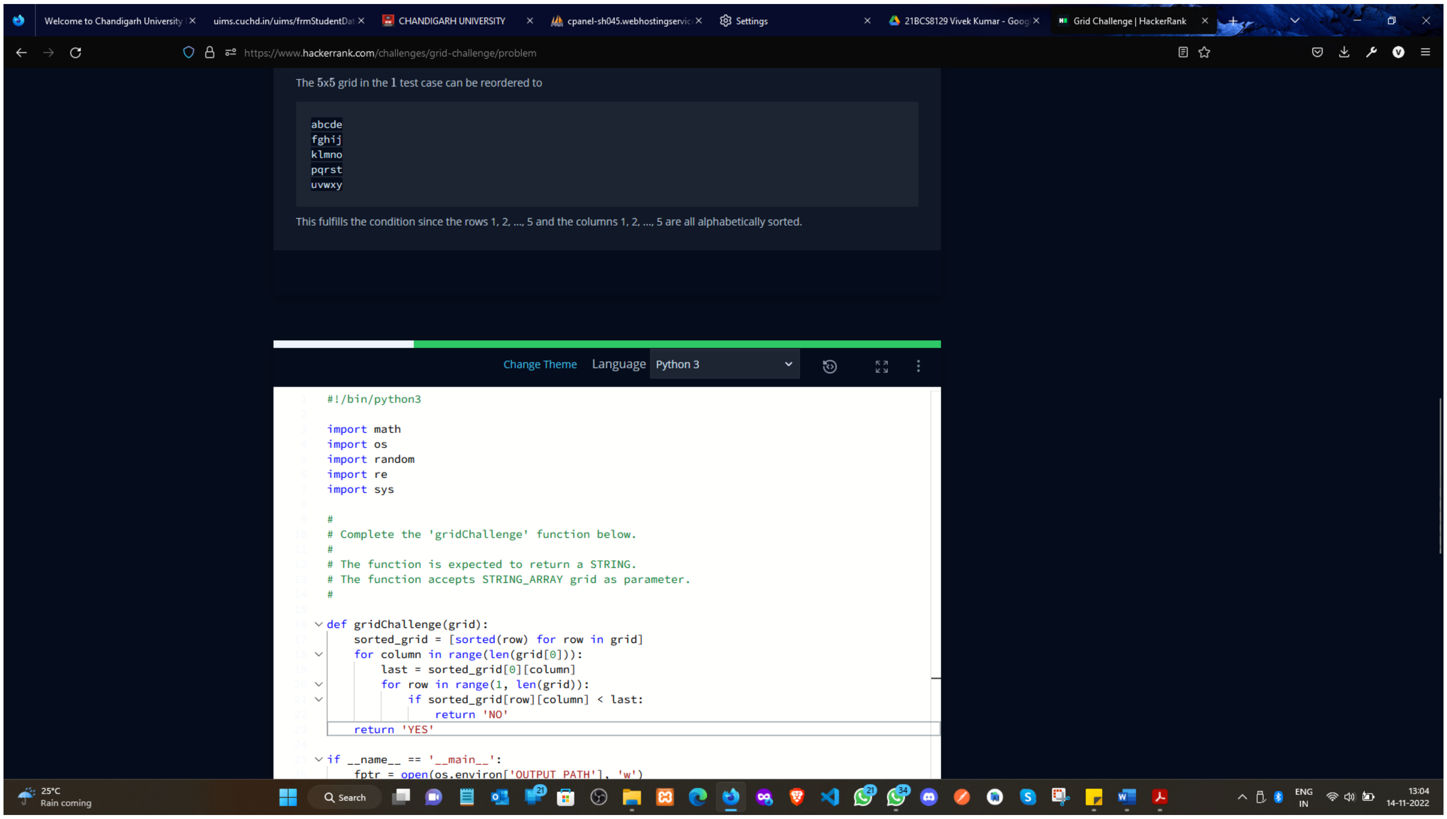
```
YES
```

Explanation

The 5x5 grid in the 1 test case can be reordered to

CHOOSE A TRANSLATION

English

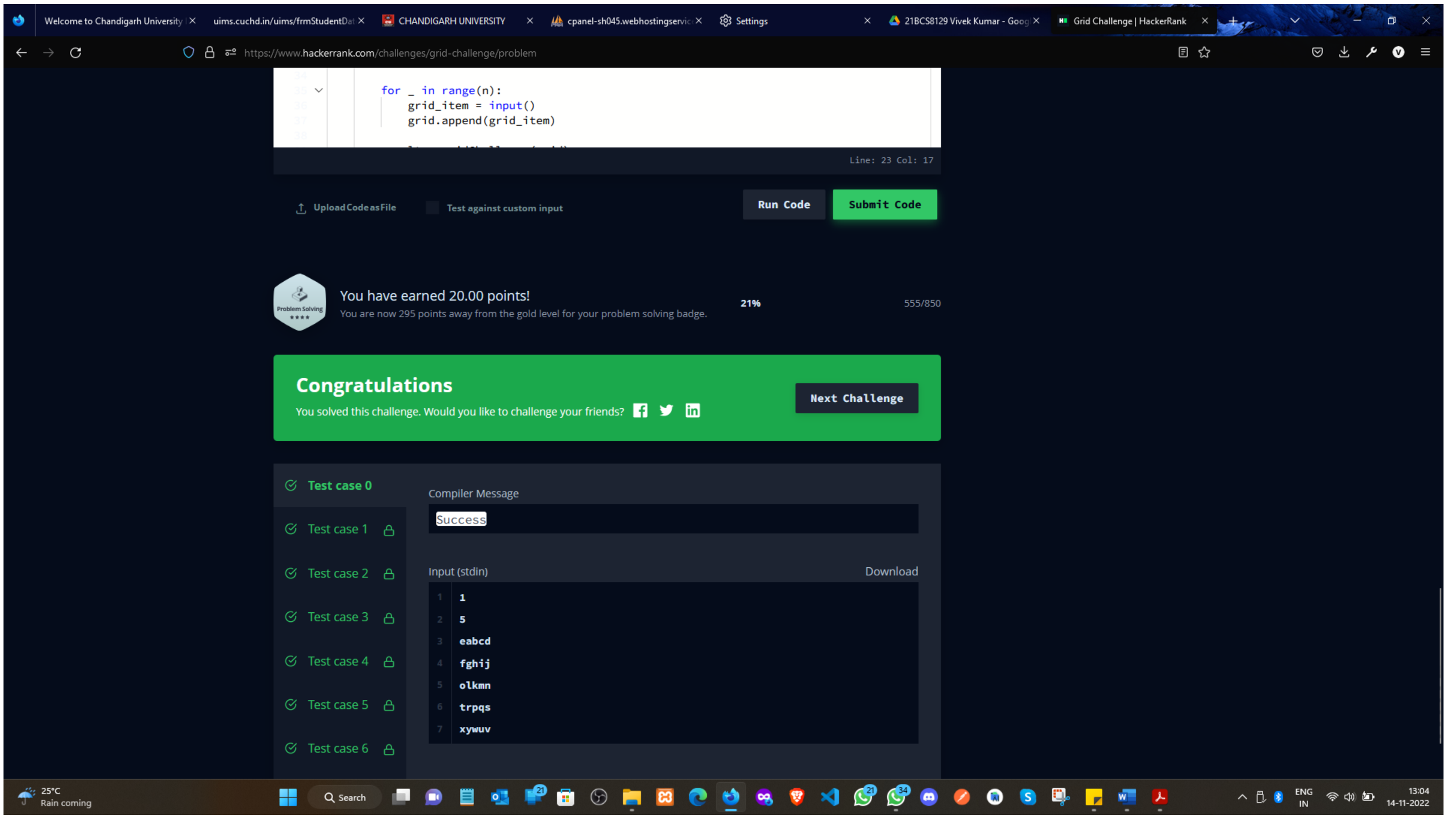

Welcome to Chandigarh University
uims.cuchd.in/uims/frmStudentDat
CHANDIGARH UNIVERSITY
cpanel-sh045.webhostingservic
Settings
21BCS8129 Vivek Kumar - Goog
Grid Challenge | HackerRank
https://www.hackerrank.com/challenges/grid-challenge/problem
Change Theme
Language
Python 3
25°C
Rain coming
Search
ENG
IN
13:04
14-11-2022

The 5x5 grid in the 1 test case can be reordered to

```
abcde
fghij
klmno
pqrst
uvwxy
```

This fulfills the condition since the rows 1, 2, ..., 5 and the columns 1, 2, ..., 5 are all alphabetically sorted.

```python
#!/bin/python3

import math
import os
import random
import re
import sys

#
# Complete the 'gridChallenge' function below.
#
# The function is expected to return a STRING.
# The function accepts STRING_ARRAY grid as parameter.
#

def gridChallenge(grid):
    sorted_grid = [sorted(row) for row in grid]
    for column in range(len(grid[0])):
        last = sorted_grid[0][column]
        for row in range(1, len(grid)):
            if sorted_grid[row][column] < last:
                return 'NO'
    return 'YES'

if __name__ == '__main__':
    fptr = open(os.environ['OUTPUT_PATH'], 'w')
```


Welcome to Chandigarh University
uims.cuchd.in/uims/frmStudentDat
CHANDIGARH UNIVERSITY
cpanel-sh045.webhostingservic
Settings
21BCS8129 Vivek Kumar - Goog
Grid Challenge | HackerRank
https://www.hackerrank.com/challenges/grid-challenge/problem
Line: 23 Col: 17
Upload Code as File
Test against custom input
Run Code
Submit Code
Problem Solving
Next Challenge
Download
25°C
Rain coming
Search
ENG
IN
13:04
14-11-2022

```python
        for _ in range(n):
            grid_item = input()
            grid.append(grid_item)
```

You have earned 20.00 points!

You are now 295 points away from the gold level for your problem solving badge.

21% 555/850

Congratulations

You solved this challenge. Would you like to challenge your friends?

✓ Test case 0
✓ Test case 1
✓ Test case 2
✓ Test case 3
✓ Test case 4
✓ Test case 5
✓ Test case 6

Compiler Message

```
Success
```

Input (stdin)

```
1
5
eabcd
fghij
olkmn
trpqs
xywuv
```

Learning outcomes (What I have learnt):

- Learned the concept of Branch and Bound.
- Learnt about Array in Greedy.

Evaluation Grid (To be created per the faculty's SOP and Assessment guidelines):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.	Worksheet completion including writing learning objectives/Outcomes. (To be submitted at the end of the day).		
2.	Post-Lab Quiz Result.		
3.	Student Engagement in Simulation/Demonstration/Performance and Controls/Pre-Lab Questions.		
	Signature of Faculty (with Date):	Total Marks Obtained:	