Rajalakshmi Engineering College

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NeoColab_REC_CS23221_Python Programming

REC_Python_Week 5_CY

Attempt : 1
Total Mark : 40
Marks Obtained : 40

Section 1 : Coding

1. Problem Statement

Alex is working with grayscale pixel intensities from an old photo that has been scanned in a single row. To detect edges in the image, Alex needs to calculate the differences between each pair of consecutive pixel intensities.

Your task is to write a program that performs this calculation and returns the result as a tuple of differences.

Input Format

The first line of input contains an integer n, representing the number of pixel intensities.

The second line contains n space-separated integers representing the pixel intensities.

Output Format

The output displays a tuple containing the absolute differences between consecutive pixel intensities.

Refer to the sample output for format specifications.

Sample Test Case

Input: 5
200 100 20 80 10
Output: (100, 80, 60, 70)

Answer

```
def edge_detection(n, pixel_values):

    pixel_values = list(map(int, pixel_values.split()))

    differences = tuple(abs(pixel_values[i] - pixel_values[i + 1]) for i in range(n - 1))

    print(differences)

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

edge_detection(n, pixel_values)
```

Status : Correct ***Marks : 10/10***

2. Problem Statement

Noah, a global analyst at a demographic research firm, has been tasked with identifying which country experienced the largest population growth over a two-year period. He has a dataset where each entry consists of a country code and its population figures for two consecutive years. Noah needs to determine which country had the highest increase in population and present the result in a specific format.

Help Noah by writing a program that outputs the country code with the largest population increase, along with the increase itself.

Input Format

The first line of input consists of an integer N, representing the number of countries.

Each of the following N blocks contains three lines:

1. The first line is a country code.
2. The second line is an integer representing the population of the country in the first year.
3. The third line is an integer representing the population of the country in the second year.

Output Format

The output displays the country code and the population increase in the format {code: difference}, where code is the country code and difference is the increase in population.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 3
01
1000
1500
02
2000
2430
03
1500
3000

Output: {03:1500}

Answer

```
def find_largest_population_increase(n, country_data):
    max_increase = 0
```

```
    max_country = ""

    for data in country_data:
        country_code = data[0]
        population_increase = data[2] - data[1]

        if population_increase > max_increase:
            max_increase = population_increase
            max_country = country_code

    print(f"{{{max_country}:{max_increase}}}")

n = int(input().strip())
country_data = [tuple(input().strip() for _ in range(3)) for _ in range(n)]

country_data = [(code, int(year1), int(year2)) for code, year1, year2 in
country_data]

find_largest_population_increase(n, country_data)
```

Status : Correct ***Marks : 10/10***

3. Problem Statement

Samantha is working on a text analysis tool that compares two words to find common and unique letters. She wants a program that reads two words, w1, and w2, and performs the following operations:

Print the letters common to both words, in alphabetical order.Print the letters that are unique to each word, in alphabetical order.Determine if the set of letters in the first word is a superset of the letters in the second word.Check if there are no common letters between the two words and print the result as a Boolean value.

Ensure the program ignores case differences and leading/trailing spaces in the input words.

Your task is to help Samantha in implementing the same.

Input Format

The first line of input consists of a string representing the first word, w1.

The second line consists of a string representing the second word, w2.

Output Format

The first line of output should display the sorted letters common to both words, printed as a list.

The second line should display the sorted letters that are unique to each word, printed as a list.

The third line should display a Boolean value indicating if the set of letters in w1 is a superset of the set of letters in w2.

The fourth line should display a Boolean value indicating if there are no common letters between w1 and w2.

Refer to the sample output for the formatting specifications.

Sample Test Case

Input: program
Peace
Output: ['a', 'p']
['c', 'e', 'g', 'm', 'o', 'r']
False
False

Answer

```
w1 = set(input().strip().lower())
w2 = set(input().strip().lower())

print(sorted(w1 & w2))
print(sorted(w1 ^ w2))
print(w1 >= w2)
print(w1.isdisjoint(w2))
```

Status : Correct ***Marks : 10/10***

4. Problem Statement

Alex is tasked with managing the membership lists of several exclusive clubs. Each club has its own list of members, and Alex needs to determine the unique members who are part of exactly one club when considering all clubs together.

Your goal is to help Alex by writing a program that calculates the symmetric difference of membership lists from multiple clubs and then finds the total number of unique members.

Input Format

The first line of input consists of an integer k, representing the number of clubs.

The next k lines each contain a space-separated list of integers, where each integer represents a member's ID.

Output Format

The first line of output displays the symmetric difference of the membership lists as a set.

The second line displays the sum of the elements in this symmetric difference.

Refer to the sample output for the formatting specifications.

Sample Test Case

Input: 3
1 2 3
2 3 4
5 6 7

Output: {1, 4, 5, 6, 7}
23

Answer

```
k = int(input())
clubs = [set(map(int, input().split())) for _ in range(k)]
```

```
symmetric_diff = set()
for club in clubs:
    symmetric_diff ^= club

print(symmetric_diff)
print(sum(symmetric_diff))
```

Status : Correct **Marks : 10/10**