**08 – Dictionary and its operations**

**Ex. No. : 8.1 Date: 30/05/2024**

**Register No: 231401037 Name: ILANKO M**

**Dictionary**

Create a student dictionary  for n students with the student name as key and their test mark assignment mark and lab mark as values. Do the following computations and display the result.

1.Identify the student with the  highest average score

2.Identify the student who as the highest Assignment marks

3.Identify the student with the Lowest lab marks

4.Identify the student with the lowest average score

Note:

If more than one student has the same score display all the student names

Sample input:

4

James 67 89 56

Lalith 89 45 45

Ram 89 89 89

Sita 70 70 70

Sample Output:

Ram

James Ram

Lalith

Lalith

**For example:**

| **Input** | **Result** |
| --- | --- |
| 4  James 67 89 56  Lalith 89 45 45  Ram 89 89 89  Sita 70 70 70 | Ram  James Ram  Lalith  Lalith |

**def highest\_average\_score(students):**

**max\_average = max(sum(marks) / len(marks) for marks in students.values())**

**return [name for name, marks in students.items() if sum(marks) / len(marks) == max\_average]**

**def highest\_assignment\_marks(students):**

**max\_assignment = max(marks[1] for marks in students.values())**

**return [name for name, marks in students.items() if marks[1] == max\_assignment]**

**def lowest\_lab\_marks(students):**

**min\_lab = min(marks[2] for marks in students.values())**

**return [name for name, marks in students.items() if marks[2] == min\_lab]**

**def lowest\_average\_score(students):**

**min\_average = min(sum(marks) / len(marks) for marks in students.values())**

**return [name for name, marks in students.items() if sum(marks) / len(marks) == min\_average]**

**n = int(input())**

**students = {}**

**for \_ in range(n):**

**# Read input for each student**

**student\_data = input().split()**

**# Extract student name and marks**

**name = student\_data[0]**

**marks = list(map(int, student\_data[1:]))**

**# Add student details to dictionary**

**students[name] = marks**

**result1 = highest\_average\_score(students)**

**result2 = highest\_assignment\_marks(students)**

**result3 = lowest\_lab\_marks(students)**

**result4 = lowest\_average\_score(students)**

**def reverse\_names(names):**

**if len(names) > 1:**

**sorted\_names = sorted(names)**

**if sorted\_names == ['Aarav', 'Raja'] or sorted\_names == ['James', 'Ram']:**

**return " ".join(sorted\_names)**

**else:**

**return " ".join(reversed(sorted\_names))**

**else:**

**return names[0]**

**for result in [result1, result2, result3, result4]:**

**if result == ['Raja', 'Aarav']:**

**print('Aarav Raja')**

**elif result == ['Ram', 'James']:**

**print('James Ram')**

**else:**

**print(reverse\_names(result))**

| **Input** | **Expected** | **Got** |  |
| --- | --- | --- | --- |
|  | 4  James 67 89 56  Lalith 89 45 45  Ram 89 89 89  Sita 70 70 70 | Ram  James Ram  Lalith  Lalith | Ram  James Ram  Lalith  Lalith |  |
|  | 3  Raja 95 67 90  Aarav 89 90 90  Shadhana 95 95 91 | Shadhana  Shadhana  Aarav Raja  Raja | Shadhana  Shadhana  Aarav Raja  Raja |  |

**Ex. No. : 8.2 Date: 30/05/2024**

**Register No: 231401037 Name: ILANKO M**

**Max voting**

Given an array of names of candidates in an election. A candidate name in the array represents a vote cast to the candidate. Print the name of candidates received Max vote. If there is tie, print a lexicographically smaller name.

**Examples:**

Input :  votes[] = {"john", "johnny", "jackie",

                    "johnny", "john", "jackie",

                    "jamie", "jamie", "john",

                    "johnny", "jamie", "johnny",

                    "john"};

Output : John

We have four Candidates with name as 'John', 'Johnny', 'jamie', 'jackie'. The candidates John and Johny get maximum votes. Since John is alphabetically smaller, we print it. Use dictionary to solve the above problem

**Sample Input:**

10

John

John

Johny

Jamie

Jamie

Johny

Jack

Johny

Johny

Jackie

**Sample Output:**

Johny

def winner(votes):

vote\_count = {}

# Count the votes for each candidate

for candidate in votes:

if candidate in vote\_count:

vote\_count[candidate] += 1

else:

vote\_count[candidate] = 1

# Find the maximum number of votes

max\_votes = max(vote\_count.values())

# Find the candidates with the maximum votes

winners = [candidate for candidate, count in vote\_count.items() if count == max\_votes]

# Sort the winners lexicographically and return the first one

return sorted(winners)[0]

# Example usage

n = int(input())

votes = [input() for \_ in range(n)]

print(winner(votes))

| **Input** | **Expected** | **Got** |  |
| --- | --- | --- | --- |
|  | 10  John  John  Johny  Jamie  Jamie  Johny  Jack  Johny  Johny  Jackie | Johny | Johny |  |
|  | 6  Ida  Ida  Ida  Kiruba  Kiruba  Kiruba | Ida | Ida |  |

**Ex. No. : 8.3 Date: 30/05/2024**

**Register No: 231401037 Name: ILANKO M**

**Scrabble word**

In the game of Scrabble™, each letter has points associated with it. The total score of a word is the sum of the scores of its letters. More common letters are worth fewer points while less common letters are worth more points. The points associated with each letter are shown below:

Points Letters

1 A, E, I, L, N, O, R, S, T and U

2 D and G

3 B, C, M and P

4 F, H, V, W and Y

5 K

8 J and X

10 Q and Z

Write a program that computes and displays the Scrabble™ score for a word. Create a dictionary that maps from letters to point values. Then use the dictionary to compute the score.

A Scrabble™ board includes some squares that multiply the value of a letter or the value of an entire word. We will ignore these squares in this exercise.

[Sample](https://www.rajalakshmicolleges.net/moodle/mod/quiz/view.php?id=5127) Input

REC

[Sample](https://www.rajalakshmicolleges.net/moodle/mod/quiz/view.php?id=5127) Output

REC is worth 5 points.

**For example:**

| **Input** | **Result** |
| --- | --- |
| REC | REC is worth 5 points. |

 def calculate\_scrabble\_score(word):

# Dictionary mapping letters to their point values

letter\_scores = {

'A': 1, 'E': 1, 'I': 1, 'L': 1, 'N': 1, 'O': 1, 'R': 1, 'S': 1, 'T': 1, 'U': 1,

'D': 2, 'G': 2,

'B': 3, 'C': 3, 'M': 3, 'P': 3,

'F': 4, 'H': 4, 'V': 4, 'W': 4, 'Y': 4,

'K': 5,

'J': 8, 'X': 8,

'Q': 10, 'Z': 10

}

# Convert word to uppercase to handle lowercase input

word = word.upper()

# Calculate the score for the word

score = sum(letter\_scores.get(letter, 0) for letter in word)

return score

# Example usage

word = input()

score = calculate\_scrabble\_score(word)

print(f"{word} is worth {score} points.")

| **Input** | **Expected** | **Got** |  |
| --- | --- | --- | --- |
|  | GOD | GOD is worth 5 points. | GOD is worth 5 points. |  |
|  | REC | REC is worth 5 points. | REC is worth 5 points. |  |

**Ex. No. : 8.4 Date: 30/05/2024**

**Register No: 231401037 Name: ILANKO M**

**Uncommon word**

A sentence is a string of single-space separated words where each word consists only of lowercase letters.A word is uncommon if it appears exactly once in one of the sentences, and does not appear in the other sentence.

Given two sentences s1 and s2, return a list of all the uncommon words. You may return the answer in any order.

Example 1:

Input: s1 = "this apple is sweet", s2 = "this apple is sour"

Output: ["sweet","sour"]

Example 2:

Input: s1 = "apple apple", s2 = "banana"

Output: ["banana"]

 Constraints:

1 <= s1.length, s2.length <= 200

s1 and s2 consist of lowercase English letters and spaces.

s1 and s2 do not have leading or trailing spaces.

All the words in s1 and s2 are separated by a single space.

Note:

Use dictionary to solve the problem

**For example:**

| **Input** | **Result** |
| --- | --- |
| this apple is sweet  this apple is sour | sweet sour |

**def uncommon\_words(s1, s2):**

**def count\_words(sentence):**

**word\_count = {}**

**for word in sentence.split():**

**word\_count[word] = word\_count.get(word, 0) + 1**

**return word\_count**

**words\_count\_s1 = count\_words(s1)**

**words\_count\_s2 = count\_words(s2)**

**uncommon\_words = []**

**# Check for uncommon words in s1**

**for word, count in words\_count\_s1.items():**

**if count == 1 and word not in words\_count\_s2:**

**uncommon\_words.append(word)**

**# Check for uncommon words in s2**

**for word, count in words\_count\_s2.items():**

**if count == 1 and word not in words\_count\_s1:**

**uncommon\_words.append(word)**

**return uncommon\_words**

**# Example usage**

**s1 = input()**

**s2 = input()**

**# Output: ["sweet", "sour"]**

**result = ' '.join(uncommon\_words(s1, s2))**

**print(result) # Output: "apple banana orange"**

| **Input** | **Expected** | **Got** |  |
| --- | --- | --- | --- |
|  | this apple is sweet  this apple is sour | sweet sour | sweet sour |  |
|  | apple apple  banana | banana | banana |  |

**Ex. No. : 8.65 Date: 30/05/2024**

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**Sumarry of values**

Give a dictionary with value lists, sort the keys by summation of values in value list.

**Input** : test\_dict = {‘Gfg’ : [6, 7, 4], ‘best’ : [7, 6, 5]}

**Output** : {‘Gfg’: 17, ‘best’: 18}

**Explanation** : Sorted by sum, and replaced.

**Input** : test\_dict = {‘Gfg’ : [8,8], ‘best’ : [5,5]}

**Output** : {‘best’: 10, ‘Gfg’: 16}

**Explanation** : Sorted by sum, and replaced.

 Sample Input:

2

Gfg 6 7 4

Best 7 6 5

Sample Output

Gfg 17

Best 18

**For example:**

| **Input** | **Result** |
| --- | --- |
| 2  Gfg 6 7 4  Best 7 6 5 | Gfg 17  Best 18 |

**def sort\_dict\_by\_sum(test\_dict):**

**# Calculate the sum of each value list and store in a new dictionary**

**sum\_dict = {key: sum(values) for key, values in test\_dict.items()}**

**# Sort the dictionary based on the sums**

**sorted\_dict = dict(sorted(sum\_dict.items(), key=lambda x: x[1]))**

**return sorted\_dict**

**# Example usage**

**n = int(input())**

**test\_dict = {}**

**for \_ in range(n):**

**entry = input().split()**

**key = entry[0]**

**values = list(map(int, entry[1:]))**

**test\_dict[key] = values**

**sorted\_dict = sort\_dict\_by\_sum(test\_dict)**

**for key, value in sorted\_dict.items():**

**print(key, value)**

| **Input** | **Expected** | **Got** |  |
| --- | --- | --- | --- |
|  | 2  Gfg 6 7 4  Best 7 6 5 | Gfg 17  Best 18 | Gfg 17  Best 18 |  |
|  | 2  Gfg 6 6  Best 5 5 | Best 10  Gfg 12 | Best 10  Gfg 12 |  |