INSTITUTE OF COMPUTER TECHNOLOGY

B-TECH COMPUTER SCIENCE ENGINEERING 2025-26

SUBJECT: ALGORITHM ANALYSIS & DESIGN

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BRANCH: CYBER SECURITY

BATCH: 52

PRACTICAL_1

1. There are 2 chefs, namely chef 1 and chef 2 in the MasterChef competition. The judge is going to judge on the basis of 3 categories: presentation, taste and hygiene to prepare the dishes. The marking is scaling from 1 to 100. The rating for chef 1 challenge is the triplet a = (a[0], a[1], a[2]), and the rating for Chef 2 challenge is the triplet b = (b[0], b[1], b[2]), where 0 index is presentation, 1 index is taste and 2 index is hygiene.

   The task is to find their comparison points by comparing a[0] with b[0], a[1] with b[1], and a[2] with b[2].

   ☐ If a[i] > b[i], then Chef 1 is awarded 1 point.

   ☐ If a[i] < b[i], then Chef 2 is awarded 1 point.

   ☐ If a[i] = b[i], then neither person receives a point.

Comparison points are the total points a person earned. Given a and b, determine their respective comparison points.

Design the algorithm for the same and implement using the programming language of your choice. Make comparative analysis for various use cases & input size.

#ALGORITHM :-

```
START
DECLARE chef_1 as empty list
DECLARE chef_2 as empty list
PRINT "Enter first chef's review {1. presentation, 2. taste, 3. hygiene}"
FOR j FROM 0 TO 2 DO
    PRINT "--<j+1>-- "
    READ input
    APPEND input TO chef_1
END FOR
PRINT "Enter second chef's review {1. presentation, 2. taste, 3. hygiene}"
FOR j FROM 0 TO 2 DO
    PRINT "--<j+1>-- "
    READ input
    APPEND input TO chef_2
END FOR
CALL competition FUNCTION WITH chef_1, chef_2
STORE result IN chef1_point, chef2_point
FUNCTION competition(chef_1, chef_2)
    SET chef1_point TO 0
    SET chef2_point TO 0
    FOR i FROM 0 TO 2 DO
        IF chef_1[i] > chef_2[i] THEN
            INCREMENT chef1_point
        ELSE IF chef_2[i] > chef_1[i] THEN
            INCREMENT chef2_point
        END IF
    END FOR
    RETURN chef1_point, chef2_point
END FUNCTION
PRINT "Points of Chef 1 = ", chef1_point
PRINT "Points of Chef 2 = ", chef2_point
END
```

#CODE :-

```python
"""*******************************************************BEST CHEF COMPITITION*************
def competition(chef_1, chef_2):
    chef1_point = 0
    chef2_point = 0
    for i in range(0, 3):
        if chef_1[i] > chef_2[i]:
            chef1_point += 1
        elif chef_2[i] > chef_1[i]:
            chef2_point += 1
    return chef1_point, chef2_point


chef_1 = []
chef_2 = []

print("enter first chef's review{1.presentation,2.taste,3.hygiene}")
for j in range(0, 3):
    chef_1.append(int(input(f"--<{j+1}>-- ")))
print("enter second chef's review{1.presentation,2.taste,3.hygiene}")
for j in range(0, 3):
    chef_2.append(int(input(f"--<{j+1}>-- ")))

chef1_point, chef2_point = competition(chef_1, chef_2)
print(f"point of chef_1={chef1_point}\npoint of chef_2={chef2_point}")
```

#OUTPUT :-

```
PS C:\Users\Hp\OneDrive\Desktop\SEM_05\Algorithm Analysis & Design> python .\Practical1_1.py
enter first chef's review{1.presentation,2.taste,3.hygiene}
--<1>-- 27
--<2>-- 48
--<3>-- 70
enter second chef's review{1.presentation,2.taste,3.hygiene}
--<1>-- 89
--<2>-- 26
--<3>-- 7
point of chef_1=2
point of chef_2=1
```

2. Let us suppose that you are having an array containing both positive and negative numbers.Given the numbers you are supposed to find 2 such elements such that the sum of those numbers is closest to zero.

Sample Input 1

15, 5, –20, 30, –45

Sample Output 1

15, –20

#ALGORITHM :-

```
START
DECLARE arr AS empty list
REPEAT
    PROMPT user to "Enter number of elements: "
    READ n
    IF n < 2 THEN
        PRINT "Minimum 2 elements are mandatory."
    ELSE
        BREAK LOOP
END REPEAT
FOR i FROM 0 TO n-1 DO
    PROMPT user to "Enter element i+1: "
    READ value
    APPEND value TO arr
END FOR
CALL func(arr, n)
PRINT output
FUNCTION func(arr, n)
    SET min_num TO infinity
    DECLARE main AS empty list
    FOR i FROM 0 TO n-1 DO
        FOR j FROM i+1 TO n-1 DO
            SET num = arr[i] + arr[j]
            SET abs_val = ABSOLUTE VALUE of num
            IF abs_val == min_num THEN
                APPEND [arr[i], arr[j]] TO main
            ELSE IF abs_val < min_num THEN
                CLEAR main list
                SET min_num = abs_val
                SET main = [[arr[i], arr[j]]]
            END IF
        END FOR
    END FOR
    RETURN main
END FUNCTION
END
```

CODE :-

```python
def func(arr,n):
    min_num = float('inf')
    main = []
    for i in range(0, n):
        for j in range(i + 1, n):
            num = arr[i] + arr[j]
            abs_val = abs(num)
            if abs_val==min_num:
                main.append([arr[i], arr[j]])
            elif abs_val < min_num:
                main.clear()
                min_num = abs_val
                main = [[arr[i], arr[j]]]
    return main


arr = []
while True:
    n=int(input("enter number of elements: "))
    if n < 2:
        print("minimum 2 element is mandatory.")
    else:
        break
for i in range(0, n):
    arr.append(int(input(f"enter {i+1} element: ")))

print(f"output: {func(arr,n)}")
```

OUTPUT :-

```
PS C:\Users\Hp\OneDrive\Desktop\SEM_05\Algorithm Analysis & Design> python .\Practical1_2.py
enter number of elements: 5
enter 1 element: 15
enter 2 element: 5
enter 3 element: -20
enter 4 element: 30
enter 5 element: -45
output: [[15, -20]]
PS C:\Users\Hp\OneDrive\Desktop\SEM_05\Algorithm Analysis & Design> python .\Practical1_2.py
enter number of elements: 5
enter 1 element: 15
enter 2 element: 5
enter 3 element: -20
enter 4 element: 30
enter 5 element: -25
output: [[15, -20], [30, -25]]
```