Min Max Salaries

Input: array of salaries

Output: min, max salary

~~min_val, max_val = float("inf"), #to~~

min_val <— ∞
max_val <— -∞

for each entry of salary:

do if entry > max_val then

max_val <— entry

if entry < min_val then

min_val <— entry

return min_val, max_val

The running time complexity is O(n)

∵ We visit each value of array
time complexity is O(n).

Min Max using divide & conquer

Input: array of salaries

Output: min and max values.

~~#~~
~~merge~~

divide (~~left, right~~):

if len(~~length (left)~~) == 1

divide (array):
mid = length of array // 2
if len(arr) == 1 then

return arr[0], arr[0]

left, right = arr[: mid], arr[mid:]
min_1, max_1 = divide (left)
min_2, max_2 = divide (right)
min_val ← ∞ max_val ← -∞
if min_1 < min_2 then

min_val ← min_1

else

min_val ← min_2

if max_1 < max_2 then

max_val <- max_2

else

max_val <- max_1

return min_val, max_val.

Time complexity: O(n)

write detailed

$T(n) = 2T(n/2) + O(1)$

2T(n/2): left and right half

O(1): simple comparison

$\therefore a=2, b=2, d=0$

$\therefore$ by master theorem,

$a=2, b^d = 2^0 = 1$

$\therefore a > b$

$\therefore \Theta(n^{\log_2 2}) = O(n)$

$\therefore$ The time complexity is O(n).

The code is written in PEP 8 coding style.

Output:

```
C:\Users\Krish\Python\Test\.venv\Scripts\python.exe C:\Users\Krish\Python\Test\Daa.py
TestCase 1:
Max Salary: ID: 1193, Name: Thomas Horne, Gross: 2363688803.67, Net: 2085996492.47
Min Salary: ID: 789, Name: Brittany Glover, Gross: 14215701.5, Net: 12545405.1
Empty Cells: 168, Non Positive Salaries: 215, Invalid Datatypes: 0

TestCase 2:
The file does not contain valid data!!
Empty Cells: 0, Non Positive Salaries: 0, Invalid Datatypes: 0

TestCase 3:
The file does not contain valid data!!
Empty Cells: 168, Non Positive Salaries: 0, Invalid Datatypes: 1832

TestCase 4:
Max Salary: ID: 158, Name: Ricky Hull, Gross: 1729257720.67, Net: 1526099970.27
Min Salary: ID: 16, Name: Gregory Beck, Gross: 105381633.5, Net: 93000933.9
Empty Cells: 110, Non Positive Salaries: 1750, Invalid Datatypes: 0

TestCase 5:
Min Salary: ID: 1080, Name: Bianca Robinson, Gross: 75656485.67, Net: 66767971.27
Max Salary: ID: 155, Name: Ashley Duarte, Gross: 2319984929.17, Net: 2047427059.17
Empty Cells: 110, Non Positive Salaries: 410, Invalid Datatypes: 0
```

Conclusion:

In this practical, we setup visual studio code in the local computer and got acquainted with it. Concepts of coupling and cohesion was learnt and used in the program for the practical. The program uses data coupling as only the list containing the employee details is passed around the functions and uses sequential cohesion as the output of one function is fed to another for further processing. Also, to find the mix and max salary of the employees, two approaches were used one was linear and another divide and conquer approach. Both the approaches yielded time complexity of O(n).