DAA-LAB-3

1 ALGORITHM: LINEAR.

```
// This algo returns minimum and max values of salaries
// I/P: array of net-salaries
// O/P: minimum, maximum salary with employee name

def linear (net-sal[]):
        min, max = 0, 0
        for i in net-sal[]:
              If min > net_sal[i]:
                   min = net-sal[i]
              If max < netsal[i]:
                   max = net_sal[i]
     return min, max.
```

2 ALGORITHM: DIVIDE & CONQUER:

```
   def divide_and_conquer (net_sal[], left, right):

→        If left = right:
              return left, left
→        If        left+1 == right:
              if  netsal[left] < net_sal[right]
                      return left, right
              else
                      return right, left

→        mid = (left + right)//2
         minleft, maxleft = divide& conquer (net-sal, left, mid)
         minright, maxright = divide& conquer (net-sal, mid+1, right)
```

```
→ If netsal[minlett] < net_sal[minright]
      min = min_lett
  else
      min = min right

→ If netsal[maxlett] > netsal[maxright]
      max = maxlett
  else
      max = max right

→ return ~~max~~ min, max
```

⇒ FORMULA for Net_salary

```
Net_Salary = Gross_Salay – tax – pf
where:
tax = 0.2 * Gross_salary
pf = 0.1 * Gross_salary
```

TIME COMPLEXITY:

(1) LINEAR:

Let size of array be n

checking/comparision takes O(1) times.

at every index we check twice for min & max.

∴ Time complexity = T(n)

$$T(n) = \sum_{i=1}^{n} 2(O(1))$$

$$= 2(n-1+1)$$

$$= 2n$$

$$\therefore \boxed{T(n) = O(n)}$$

(2) DIVIDE AND CONQUER:

At every instant we divide the array into 2 parts. ~~Thus~~ we also make 2 comparis
with

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

$$\vdots$$

On applying master's theorem

$$a=2,\ b=2,\ c=0$$

$$\therefore T(n) = n^{\log_b a} = n^{\log_2 2} = n^1$$

$$\boxed{\therefore T(n) = O(n)}$$

Testcases:

- POSITIVE:

If all the values are present in the file and are non-negative numbers, the test case is considered as positive

⟹ DISPLAY employee with resp. salaries.

- NEGATIVE:

If filename of CSV is incorrect:

⟹ DISPLAY ERROR:

"Incorrect filename"

If negative value of Gross Salary:

→ Display ERROR:

"Value of Salary is Negative at row{i}"

If gross salary is missing:

→ Display ERROR:

"Value of Gross salary is missing"