Assignment 1 : Minmax using DAC

* Aim : Write a program to find minimum & maximum element in an array using divide and conquer strategy & verify the time complexity.

* Theory : Divide & conquer algorithm operates in 3 steps :
  i) Divide
  ii) Solve
  iii) Combine

i) Divide : Recursively divide the problem into smaller problems

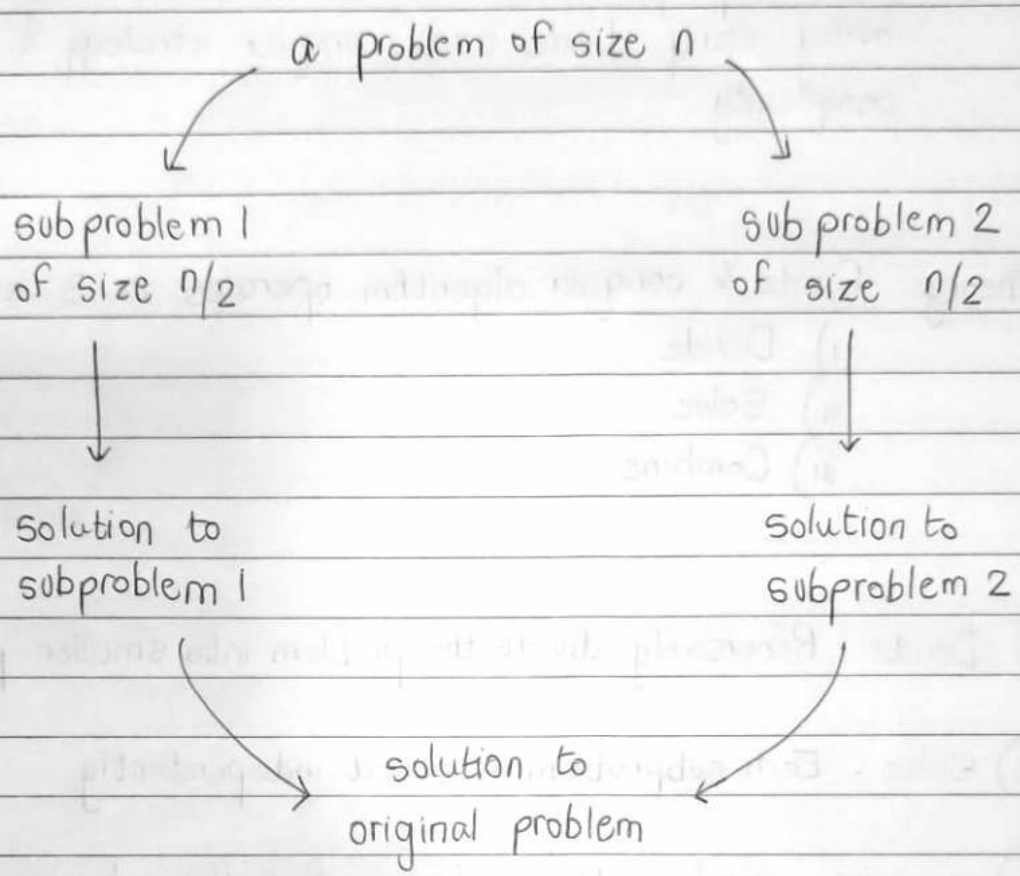
ii) Solve : Each subproblem is solved independently

iii) Combine : Combine the solutions of all the subproblems in order to derive the solution of original big problem.

- When the subproblem hits the smallest possible size, it is solved & the results are recursively combined to generate a solution of the original bigger problem.

- Divide & conquer is a multi-branched, top-down recursive approach. Each branch indicates one sub-problem and it calls itself with

smaller argument. Understanding & designing of divide & conquer algorithm needs skill & good reasoning



* Algorithm :

```
DAC ( P)
{
    if small (P) return S(P) ;
```

```
else
{
    divide P into smaller instances P1, P2 ... PR , R >= 1
    Apply DAC to each subproblem ;
    return combine ( DAC(P1), DAC(P2) ... DAC( PR)) ;
}
}
```

* Test Cases :

i) If array is empty, ie, length (array) = 0, appropriate message must be displayed.

ii) If array consists of single element, then that element must be returned both as min & max

* Conclusion : Concept of divde & conquer algorithm has been understood & has been implemented.