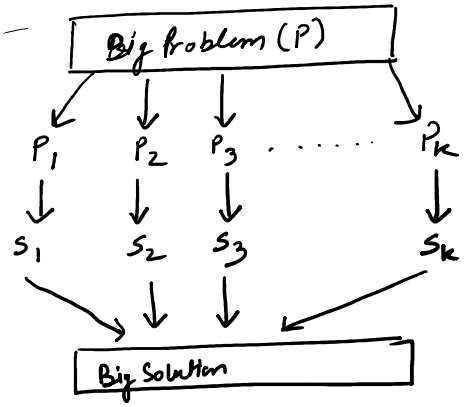
Divide & Conquer



Eg-

1+2+3+4

1+2 =3 3+4 =7

10

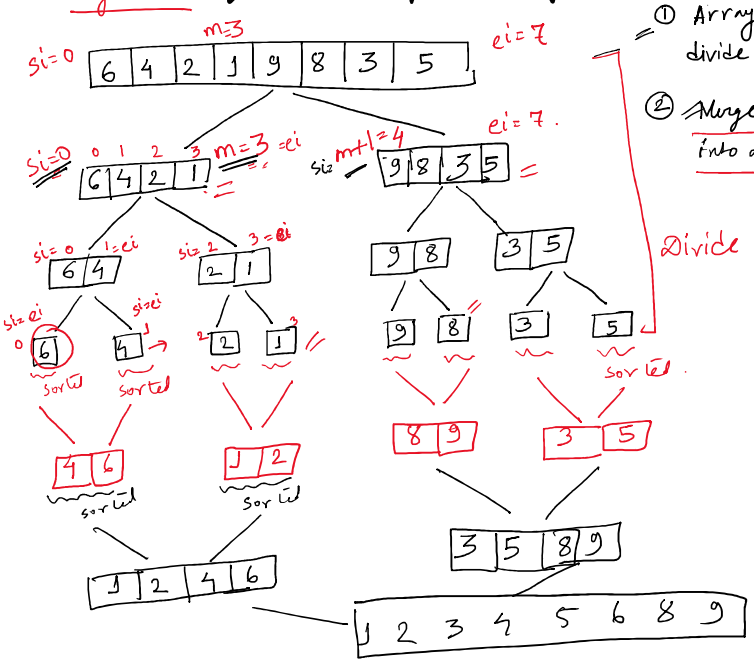
$m = \frac{(s+e)}{2}$

Merge Sort - Based on Divide & Conquer technique

Note-

① Array ko repeatedly divide into 2 equal parts.

② Merge 2 sorted arrays into one.

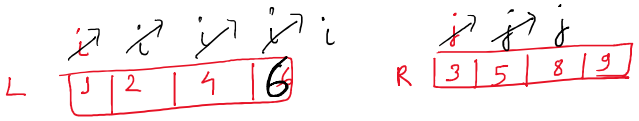


Pseudocode

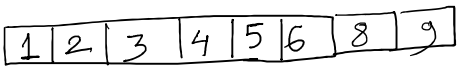
start-ind end-ind

```
divide (arr, si, ei) {
  if(si<ei)
  { int m = (si+ei)/2 ;
    divide (arr, si, m);
    divide (arr, m+1, ei);
    merge (arr, si, m, ei);
  }
}
main → divide (arr, 0, n-1);
```

L[i] R[j]

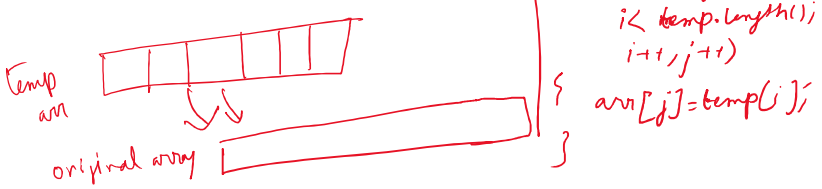


Temp arr




```
merge (arr, si, m, ei)
{
    int [ ] temp = new int[ei-si+1] ;
    int ind1 = si;
    int ind2 = mid+1;
    int x = 0;
    while (ind1 <= mid && ind2 <= ei)
           Left arry        right arry
    {   if(arr[ind1]<=arr[ind2]) {
            temp[x] = arr[ind1];
            x++;
```

```
            ind1++;
        }
        else {
            temp[x] = arr[ind2];
            x++;
            ind2++;
        }
    }
    while( ind1 <= mid) {   // Right array ka pointer is out of boundary.
        temp[x] = arr[ind1];
        x++;
        ind1++;
    }
    while (ind2 <= ei) {    // Left array is out of boundary.
        temp[x] = arr[ind2];
        x++;
        ind2++;
    }
```




```
for(int i=0,j=si; i< temp.length(); i++,j++)
{
    arr[j] = temp[i];
}
```