Merge sort

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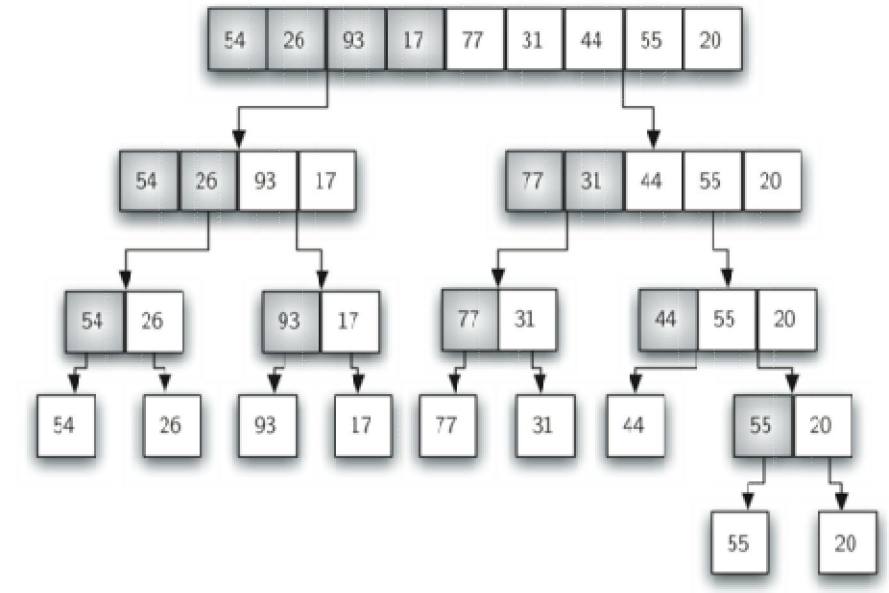
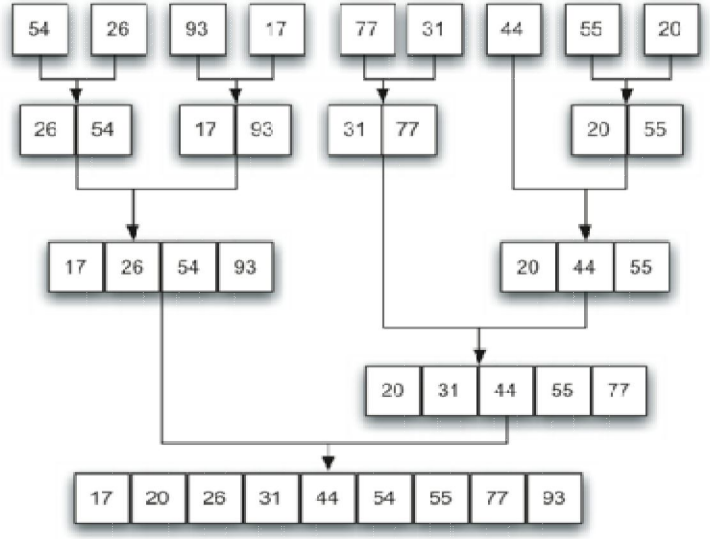
AP/IT

- Merge sort is a recursive algorithm that continually splits a list in half
- If the list is empty or has one item, it is sorted by definition (the base case)
- If the list has more than one item, we split the list and recursively invoke a merge sort on both halves





Program

```
def merge_sort(nst):
    if len(nst)>1:
        mid=len(nst)//2
        left=nst[:mid]
        right=nst[mid:]
        merge_sort(left)
        merge_sort(right)
        i=0
        j=0
        k=0
while i<len(left) and j<len(right):
            if left[i] < right[j]:
                nst[k]=left[i]
                i=i+1
        else:
                    nst[k]=right[j]
                    j=j+1
                    k=k+1
```

```
while i<len(left):
                    nst[k]=left[i]
                    i=i+1
                    k=k+1
      while j<len(right):
                        nst[k]=right[j]
                        j=j+1
                        k=k+1
size=int(input("enter the number of elements:"))
nst=[]
print("enter the elements:")
for i in range(0,size):
   nst.append(int(input()))
print("The unsorted numbers are:",nst)
print("the sorted elements are:",merge_sort(nst))
```

OutPut

```
enter the number of elements:5
enter the elements:
2
1
5
3
8
The unsorted numbers are: [2, 1, 5, 3, 8]
```

Thank You