CSD101: Introduction to computing and programming (ICP)

Quicksort Alg. - example of Divide-Conquer paradigm

```
seq - sequence to be sorted, n - size of sequence p - pivot

Algorithm quicksort(seq, n)
    //n size of sequence seq
    if (n<2) return seq;//already sorted if seq has
    p = choose pivot;
    lseq = elements in seq < p;
    rseq = elements in seq >= pivot;
    lseq = quicksort(lseq, len(lseq));
    rseq = quicksort(rseq, len(rseq));
    return concatenate(lseq, [pivot], rseq)
```

Quicksort example

```
Original sequence = [4 9 7 3 2 1 -5 6]
lseq=[3 2 1 -5] pivot=4 rseq=[9 7 6]
lseq=[2 1 -5] pivot=3 rseq=[]
lseq=[1 -5] pivot=2 rseq=[]
lseq=[-5] pivot=1 rseq=[]
[-5 1]
[-5 1 2]
[-5 1 2 3]
lseq=[7 6] pivot=9 rseq=[]
lseq=[6] pivot=7 rseq=[]
[6 7]
[6 7 9]
[-5 1 2 3 4 6 7 9]
Sorted sequence = [-5 1 2 3 4 6 7 9]
```

Mergesort - another recursive sorting alg.

```
seq - sequence to be sorted, n - size of sequence

Algorithm mergesort(seq, n)
    if (n<2) return seq;
    //splits seq seq into two equal parts
    lseq = split seq from 1 to n/2;
    rseq = seq from (n/2+1) till n;
    lseq = mergesort(lseq,n/2);
    rseq = mergesort(rseq,n-n/2);
    seq = merge(lseq,rseq);
    return seq;
```