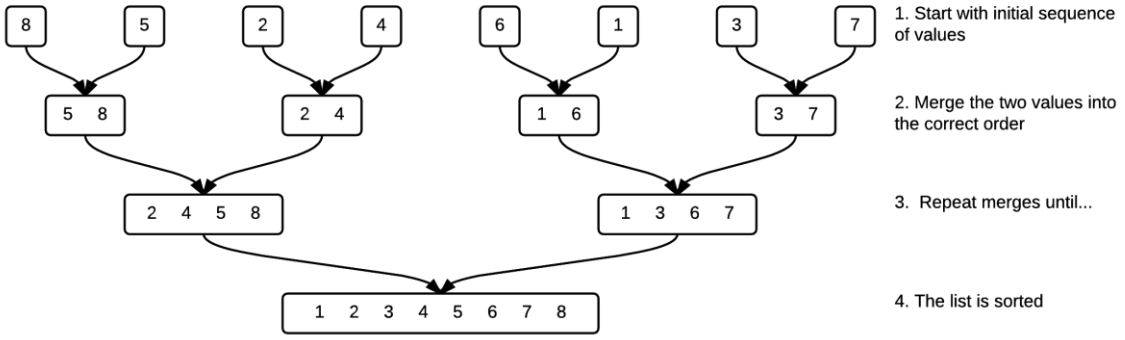
Sorting 2 – Merge Sort - Reading

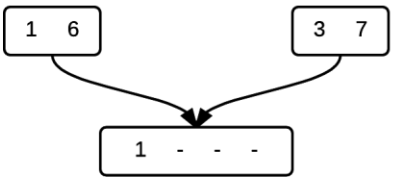
Merge Sort is a sorting **algorithm** created by John Von Neumann in 1945. The algorithm is very **efficient**, and the most efficient of the three algorithms (Bubble, Insertion and Merge Sort).

The algorithm works by the following method:

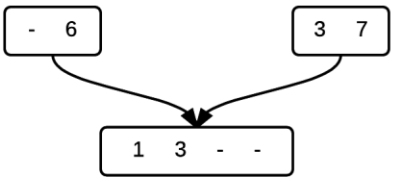
- Divide the initial unsorted list into sublists with one item in each
- Merge each pair of sublists together
- Now continue to merge each of the sublists together
- Until you have just one list.



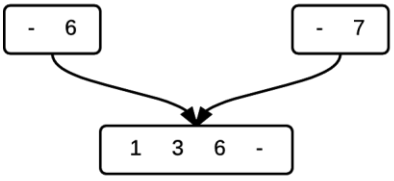
You will notice that at each stage, the numbers in each **sublist** are sorted. This makes it easy and efficient to merge with the second sublist as the numbers on the left of each sublist can be compared and then the smaller added to the merged list. This can be repeated for each item in the list. For example, to combine the sublists 1 6 and 3 7:



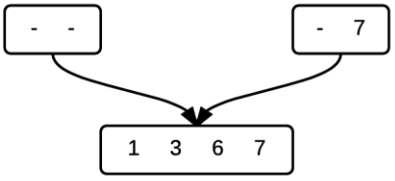
Step 1: Compare the left most items from each sublist. 1 < 3 so add 1 to the list



Step 2: Compare the left most items from each sublist. 3 < 6 so add 3 to the list



Step 3: Compare the left most items from each sublist. 6 < 7 so add 6 to the list



Step 4: Compare the left most items from each sublist. The only remaining number is 7, so add to the list

Merge Sort is a good algorithm for solving with **parallel processing**. Each pair of sublists can be merged together on a different **processor** or **core** of a processor.

It is also possible to sort **characters** or **strings** (letters or text) using sorting algorithms. As each letter has an **ASCII** character code associated with it, the algorithm can compare these in order to sort.