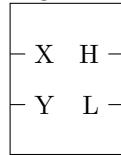


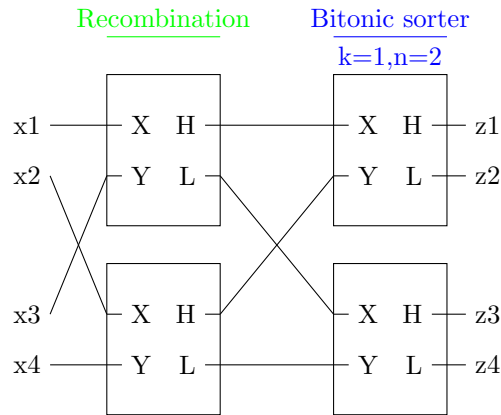
1 Bitonic Sorter

With a bitonic sorter only bitonic sequences can be used as inputs. In order to sort arbitrary input sequences a bitonic sorting network can be created from bitonic sorters. For bitonic sorting networks see the next chapter.

A bitonic sorter for $k=1$ ($n=2$) is trivially just a comparator. Which we illustrate by using the given box layout with X and Y being the inputs and H the higher output and L the lower output respectively.

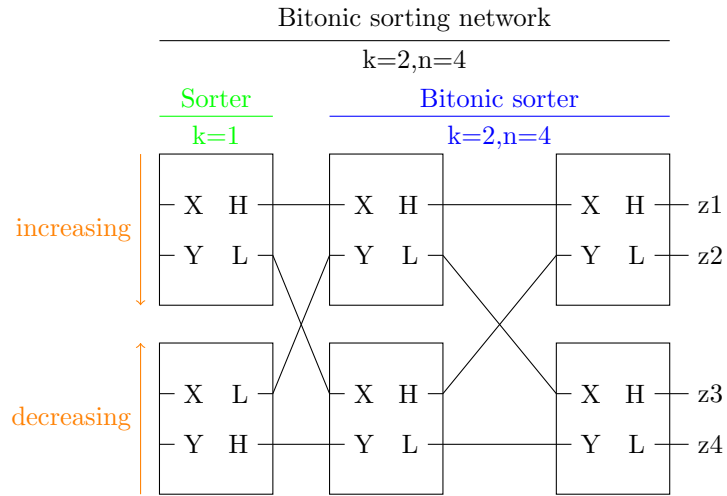


With the sorter for $k=1$ we can recursively create a sorter of higher order. For example consider the following $k=2$ ($n=4$) bitonic sorter.



2 Sorting network

A bitonic sorting network is created by using several bitonic sorter. These bitonic sorters are recursively used to create two monotonic one decreasing and one increasing sequence who are then put into the next stage. This creates a bitonic series for the next stage which can then use this bitonic series to be used as a monotonic series for the next stage. Consider the following example for a $n=4$ bitonic sort network.



The bitonic sorting network for $k=2$ can be created by using a $k=2$ bitonic sorter and two $k=k-1$ sorter. The two sorter create a decreasingly or increasingly sorted sequence in order to create a bitonic input for the bitonic sorter. Bitonic sorting networks of a lower order are mostly used for the two pre sorters, therefore a recursive definition of a bitonic sorting network from bitonic sorters can be described. In the above example the two bitonic sorting networks are $k=1$ networks hence they are just a comparator.