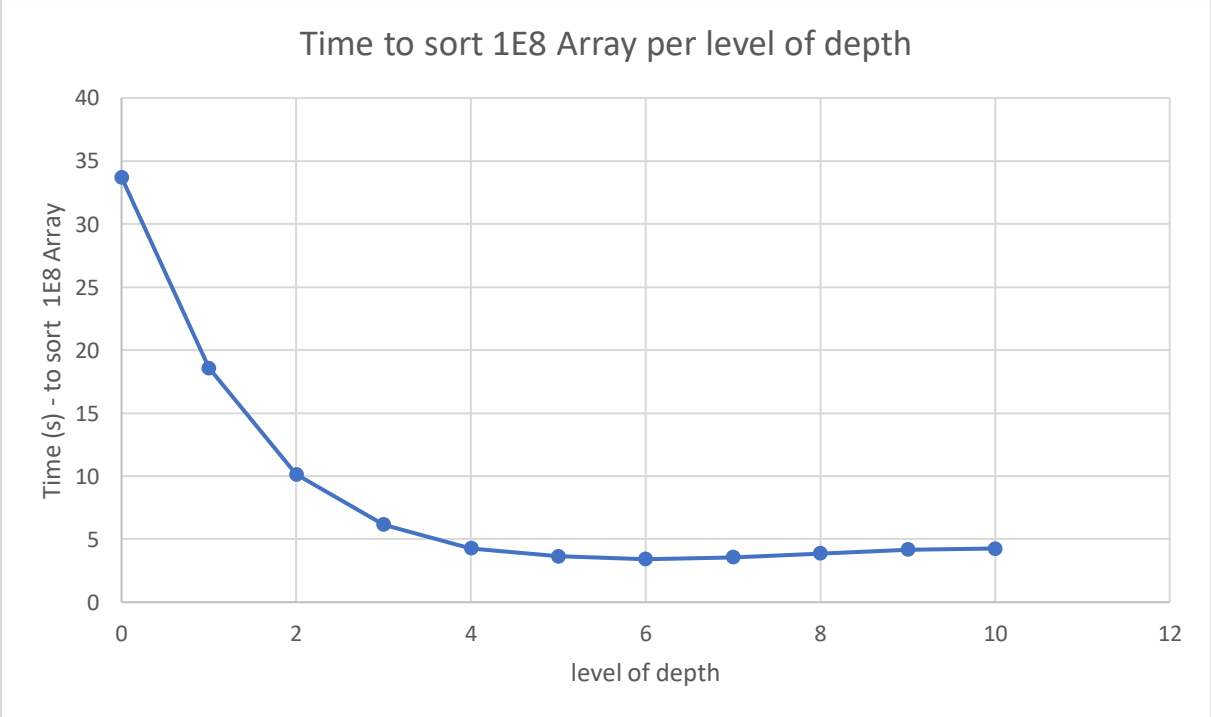
Mergesort Multithreads – Data Analysis

In the data below we can see the level of depth we use as input in the program to sort a 1^e8 array, to illustrate more the graphics will be using the level of depth and not the number of threads , but you can see below the correpsonding number of threads by level of depth (number of threads = 2^(level of depth).

Depth level	number of threads	time	Speed
0	0	33,71	1
1	2	18,56	1,82
2	4	10,13	3,33
3	8	6,16	5,47
4	16	4,28	7,88
5	32	3,63	9,29
6	64	3,41	9,89
7	128	3,55	9,50
8	256	3,87	8,71
9	512	4,17	8,08
10	1024	4,24	7,95

The initial time with only one thread to sort a 1^E8 array was 33.71 seconds, we can see in the graphics below this time decreasing with the level of depth increasing up to 6.

After a level od depth of 6, the solving time slighty increasing, we reach a floor value with a solving time around 4 seconds .



In the grahic below, we will take 1 as a speed reference to solve with a level of depth of 0 so only 1 thread to solve a 1^E8 array.

As the level of depth increase up to 6, we can see the speed decreasing with a peak at 6 threads where the speed is almost 10 times faster than the initial speed. After, the speed will start decreasing to reach 8 times faster as a level of depth of 10.