**PROGRAM STRUCTURE AND ALGORITHMS**

**ASSIGNMENT 5 – PARALLEL SORT**

**INSTRUCTED BY PROF: ROBIN HILLYARD**

**SUBMITTED BY: Venkata Nitin Reddy Byreddy NUID: 002191804**

TASK:

A cutoff (defaults to, say, 1000) which you will update according to the first argument in the command line when running. It's your job to experiment and come up with a good value for this cutoff. If there are fewer elements to sort than the cutoff, then you should use the system sort instead.

Recursion depth or the number of available threads. Using this determination, you might decide on an ideal number (*t*) of separate threads (stick to powers of 2) and arrange for that number of partitions to be parallelized (by preventing recursion after the depth of *lg t* is reached).

An appropriate combination of these.

OUTPUT GRAPHS:

A screenshot of a computer

Description automatically generated with medium confidence

OBSERVATIONS:

* Form the above observations, I feel that around all the threads show same pattern.
* I would say degree 5 or 6 would be an ideal degree as it took least time. So, it is the efficient and optimal solution for parallel sort.
* I run the output of array size 100,10000,1000000.

OUTPUT OF ARRAY SIZE 100,10000,1000000:

1000000 510000 10times Time: 1319 1024

1000000 520000 10times Time: 592 1024

1000000 530000 10times Time: 573 1024

1000000 540000 10times Time: 560 1024

1000000 550000 10times Time: 575 1024

1000000 560000 10times Time: 560 1024

1000000 570000 10times Time: 549 1024

1000000 580000 10times Time: 561 1024

1000000 590000 10times Time: 540 1024

1000000 600000 10times Time: 560 1024

1000000 610000 10times Time: 574 1024

1000000 620000 10times Time: 557 1024

1000000 630000 10times Time: 547 1024

1000000 640000 10times Time: 577 1024

1000000 650000 10times Time: 604 1024

1000000 660000 10times Time: 583 1024

1000000 670000 10times Time: 589 1024

1000000 680000 10times Time: 551 1024

1000000 690000 10times Time: 572 1024

1000000 700000 10times Time: 577 1024

1000000 710000 10times Time: 573 1024

1000000 720000 10times Time: 616 1024

1000000 730000 10times Time: 640 1024

1000000 740000 10times Time: 574 1024

1000000 750000 10times Time: 639 1024

1000000 760000 10times Time: 672 1024

1000000 770000 10times Time: 572 1024

1000000 780000 10times Time: 599 1024

1000000 790000 10times Time: 576 1024

1000000 800000 10times Time: 579 1024

1000000 810000 10times Time: 568 1024

1000000 820000 10times Time: 566 1024

1000000 830000 10times Time: 572 1024

1000000 840000 10times Time: 584 1024

1000000 850000 10times Time: 562 1024

1000000 860000 10times Time: 578 1024

1000000 870000 10times Time: 561 1024

1000000 880000 10times Time: 578 1024

1000000 890000 10times Time: 573 1024

1000000 900000 10times Time: 577 1024

1000000 910000 10times Time: 563 1024

1000000 920000 10times Time: 561 1024

1000000 930000 10times Time: 808 1024

1000000 940000 10times Time: 788 1024

1000000 950000 10times Time: 679 1024

1000000 960000 10times Time: 776 1024

1000000 970000 10times Time: 605 1024

1000000 980000 10times Time: 576 1024

1000000 990000 10times Time: 716 1024

1000000 1000000 10times Time: 651 1024

10000 5100 10times Time: 8 1024

10000 5200 10times Time: 9 1024

10000 5300 10times Time: 8 1024

10000 5400 10times Time: 0 1024

10000 5500 10times Time: 12 1024

10000 5600 10times Time: 0 1024

10000 5700 10times Time: 16 1024

10000 5800 10times Time: 14 1024

10000 5900 10times Time: 0 1024

10000 6000 10times Time: 15 1024

10000 6100 10times Time: 16 1024

10000 6200 10times Time: 0 1024

10000 6300 10times Time: 19 1024

10000 6400 10times Time: 6 1024

10000 6500 10times Time: 7 1024

10000 6600 10times Time: 16 1024

10000 6700 10times Time: 0 1024

10000 6800 10times Time: 16 1024

10000 6900 10times Time: 0 1024

10000 7000 10times Time: 15 1024

10000 7100 10times Time: 16 1024

10000 7200 10times Time: 0 1024

10000 7300 10times Time: 15 1024

10000 7400 10times Time: 0 1024

10000 7500 10times Time: 17 1024

10000 7600 10times Time: 16 1024

10000 7700 10times Time: 6 1024

10000 7800 10times Time: 0 1024

10000 7900 10times Time: 17 1024

10000 8000 10times Time: 10 1024

10000 8100 10times Time: 11 1024

10000 8200 10times Time: 9 1024

10000 8300 10times Time: 0 1024

10000 8400 10times Time: 16 1024

10000 8500 10times Time: 6 1024

10000 8600 10times Time: 10 1024

10000 8700 10times Time: 2 1024

10000 8800 10times Time: 0 1024

10000 8900 10times Time: 16 1024

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10000 9500 10times Time: 0 2

10000 9600 10times Time: 0 2

10000 9700 10times Time: 21 2

10000 9800 10times Time: 0 2

10000 9900 10times Time: 0 2

10000 10000 10times Time: 0 2

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