Proiect APD

Topic:**Quick Sort**
Limbaje de programare utilizate:**C++**
Sisteme si/sau framework-uri utilizate:**MPI,CUDA**

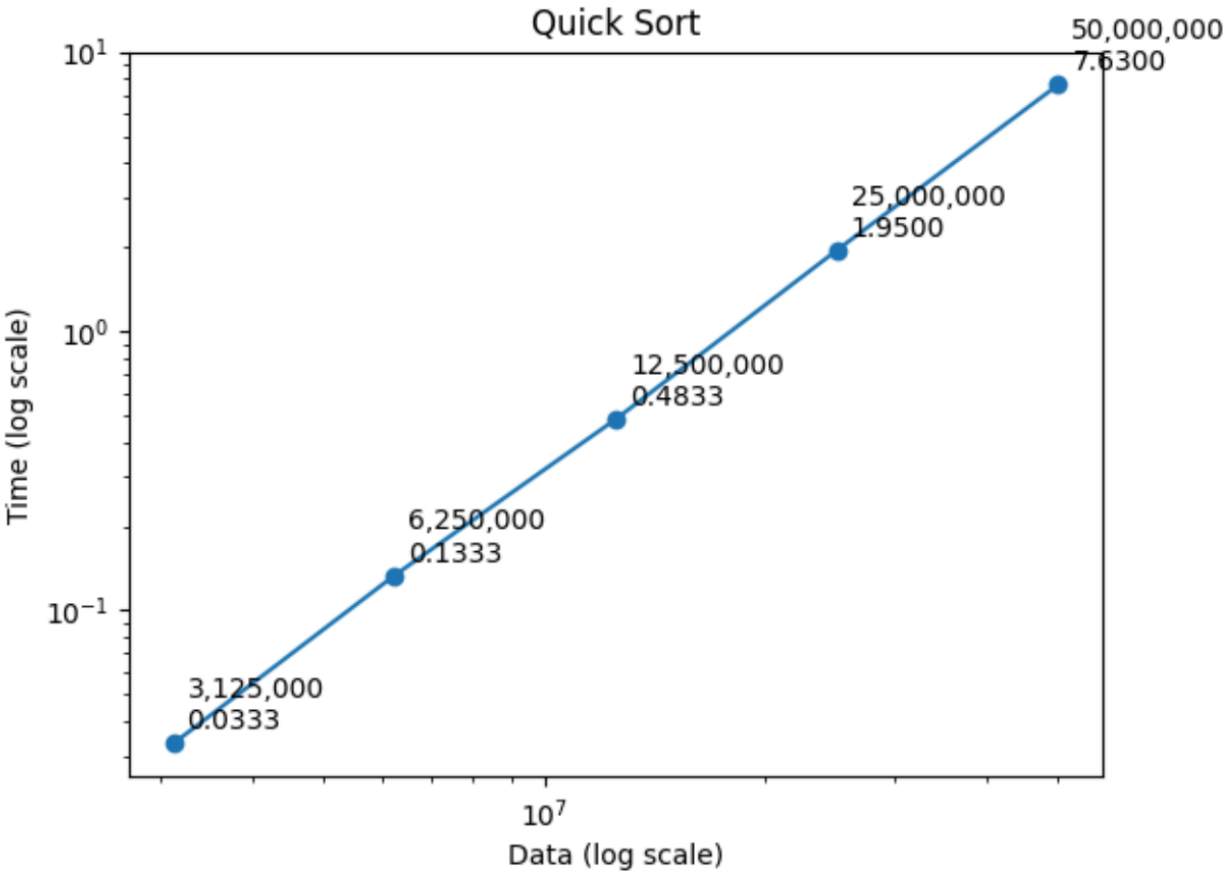
Pseudocod Quick Sort:

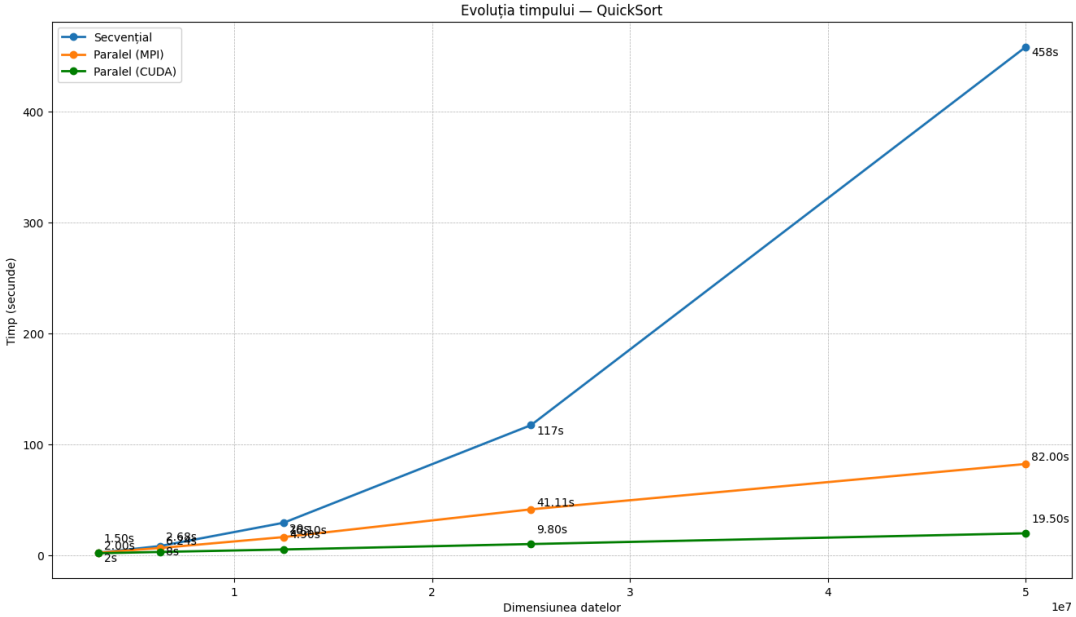
```
PARTITION(A, low, high)
   pivot = A[high]
   swapMarker = low - 1
   for curIndex = low to high - 1 do
      if A[curIndex] <= pivot then
         swapMarker = swapMarker + 1
         SWAP(A[swapMarker], A[curIndex])
   SWAP(A[swapMarker + 1], A[high])
   return swapMarker + 1

QUICK_SORT(A, low, high)
   if low < high then
      pivot = PARTITION(A, low, high)
      QUICK_SORT(A, low, pivot - 1)
      QUICK_SORT(A, pivot + 1, high)
```

Data size	Timp Secvential	Timp Paralel (MPI)	Timp Paralel(CUDA)
3 125 000	0.0333 min(2s)	2s	1.5s
6 250 000	0.1333 min(8s)	6.24s	2.68s
12 500 000	0.4833 min(29s)	16.1s	4.9s
25 000 000	1.95 min(117s)	41.112s	9.8s
50 000 000	7.63 min(458s)	82s	19.5s

Rezultate Experimentale:


Quick Sort
50,000,000
7.6300
25,000,000
1.9500
12,500,000
0.4833
6,250,000
0.1333
3,125,000
0.0333
Time (log scale)
Data (log scale)


Evoluția timpului — QuickSort
Secvențial
Paralel (MPI)
Paralel (CUDA)
458s
117s
82.00s
41.11s
19.50s
9.80s
Timp (secunde)
Dimensiunea datelor
1e7

Info Masini:

Processor:AMD Ryzen 7 6800HS(8C,16T)
OS:Windows 11 Home x64