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How to execute:

dotnet fsi --langversion:preview filename N k

Example: dotnet fsi --langversion:preview proj1.fsx 1000000 4

1.

For a given input N=1000000 and k=4

Number of workers = N/ Number of sub-problems

|  |  |  |  |
| --- | --- | --- | --- |
| Work Size | Real Time | CPU TIme | Ratio |
| 1000000 | 0.267 | 0.296 | 1.11 |
| 100000 | 0.189 | 0.437 | 2.31 |
| 10000 | 0.205 | 0.500 | 2.44 |
| 1000 | 0.110 | 0.515 | 4.68 |
| 100 | 0.167 | 0.578 | 3.46 |
| 10 | 0.497 | 0.796 | 1.60 |
| 1 | 0.773 | 1.105 | 1.43 |

After executing for various work unit sizes as mentioned in the table above, I calculated the ratio of CPU time to Real time, the best utilization (number of cores used) comes for work size around 1000. Program is run in a for loop iterated over number of threads in multiples of 10. For question 3 loop in the program was removed and executed for only the best case of 10000 threads.

2.

A screen shot of a social media post

Description automatically generated

3. CPU time: 0.515

Real time: 0.11

Number of cores = CPU time/ Real time = 4.68

4.

A picture containing photo, large, screen, sitting

Description automatically generated

A picture containing food

Description automatically generated

A close up of a logo

Description automatically generated