Readme File

1. Group members

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2. Contents

(1) Size of the work unit

In our project, we create 13 child actors, each actor is a worker. And we create one parent actor, defined as boss. We send one subproblem to each work on the assumption that each worker will finish their work in roughly the same time. Hence, the size of the work unit is 1, which means that each worker gets one task from the boss at a time. Since our goal is to find all k consecutive numbers starting at 1 and up to N, for 13 workers, each of them was given a total of N/13 tasks.

To achieve best performance, we need to make the best use of our 6-core processor. And we could distribute about 2 threads to each core, so the number of actors is 13 in our program.

(2) The result of running your program for dotnet fsi proj1.fsx 1000000 4

```
prince@ZixundeMacBook-Pro Project_1 % dotnet fsi --langversion:preview proj1.fsx 1000000 4
Real: 00:00:00.000, CPU: 00:00:00.000, GC gen0: 0, gen1: 0, gen2: 0
Real: 00:00:03.256, CPU: 00:00:15.961, GC gen0: 461, gen1: 1, gen2: 0
```

We need to use the command “dotnet fsi –langversion:preview proj1.fsx 1000000 4” rather than “dotnet fsi proj1.fsx 1000000 4” to run the program.

We run the program on a 6-core processor and the CPU time is 15.961s, the Real time is 3.256s. And the ratio of CPU time to REAL TIME is 4.9.

(3) Running time of the program

The largest problem we manage to solve was N = 100,000,000 with a sequence length of k = 24.

Here is the time and ratio of CPU time to REAL to some problems:

When k =24, let N = 100000,1000000,10000000,100000000:

N	CPU time(s)	Real time(s)	Ratio
100000	4.300	0.760	5.65
1000000	21.952	3.268	6.72
10000000	145.658	20.269	7.19
100000000	1573.012	200.255	7.85

The largest problem:

Let k =24, N = 100000000:

```
prince@ZixundeMacBook-Pro Project_1 % dotnet fsi --langversion:preview proj1.fsx 100000000 24
Real: 00:00:00.000, CPU: 00:00:00.000, GC gen0: 0, gen1: 0, gen2: 0
9 1 20 25 44 76 121 197 304 353 540 856 1301 2053 3112 3597 5448 8576 12981 20425 30908 35709 54032 84996 128601 202289 306060 353585
534964 841476 1273121 2002557 3029784 3500233 5295700 8329856 12602701 19823373 29991872 34648837 52422128 82457176 Real: 00:03:20.255
, CPU: 00:26:13.012, GC gen0: 152686, gen1: 444, gen2: 2
[INFO][09/21/2020 15:23:16][Thread 0023][CoordinatedShutdown (akka://MySystem)] Starting coordinated shutdown from CLR termination hoo
k.
```

CPU time: 1573.012 s Real time: 200.255 s Ratio: 7.855