Distributed Operating Systems (COP 5615)

Project 1

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I. Instructions for Execution

- cd Proj1
- dotnet build \\To build the project
- dotnet fsi proj1.fsx N k \\To run the project by passing the values of N & k

II. Size of the work unit VS Performance:

Size of work unit	Actors	Real Time	CPU Time	Ratio
1	12	1.390	12.109	8.71
10	12	0.300	1.218	4.06
50	12	0.350	0.765	2.18
100	12	0.258	0.796	3.08
1000	12	0.214	0.250	1.16
10000	12	0.200	0.218	1.09

From the above results we can see that by taking the number of actors to be equal to the No.of processors and testing the problems, we get the best performance for a work unit of size 1000.

III. Result of running the Program :

```
PS E:\DOS\DOS-COP5612\Proj1> dotnet fsi proj1.fsx 1000000 4
Real: 00:00:00.258, CPU: 00:00:00.796, GC gen0: 55, gen1: 1, gen2: 0
PS E:\DOS\DOS-COP5612\Proj1>
```

IV. Running time for the given case:

- Real Time : 258milliseconds , CPU Time : 796milliseconds
- Ratio : 796/258 = 3.08

V. Largest problem we managed to solve:

- The largest problem we could solve is for N = 10^9 and k=12

```
PS E:\DOS\DOS-COP5612\Proj1> dotnet fsi proj1.fsx 1000000000 4
Real: 00:01:01.091, CPU: 00:05:33.546, GC gen0: 54783, gen1: 1364, gen2: 3
PS E:\DOS\DOS-COP5612\Proj1> dotnet fsi proj1.fsx 1000000000 12
Real: 00:02:01.520, CPU: 00:09:26.796, GC gen0: 109248, gen1: 4227, gen2: 4
PS E:\DOS\DOS-COP5612\Proj1>
```

- Result for N = 10^8 & k = 24.

```
PS E:\DOS\DOS-COP5612\Proj1> dotnet fsi proj1.fsx 100000000 24
304
1
9
856
20
25
353
44
121
76
540
2053
197
1301
3112
3597
5448
8576
20425
12981
30908
35709
54032
84996
128601
202289
306060
353585
534964
841476
1273121
2002557
3029784
3500233
5295700
8329856
12602701
19823373
29991872
34648837
52422128
82457176
Real: 00:00:19.698, CPU: 00:01:44.531, GC gen0: 19095, gen1: 158, gen2: 1
PS E:\DOS\DOS-COP5612\Proj1>
```

WorkUnit: 100 with CPU/Real time ratio: 5.3

NOTE : The machine being used to test the project and generate the screenshots is MSI gs65, with Intel Core i7 @2.20GHz and 6 cores.