Distributed Operating System Project

Sanjay Reddy Banda – 58782239

Deepthi Byneedi – 36871955
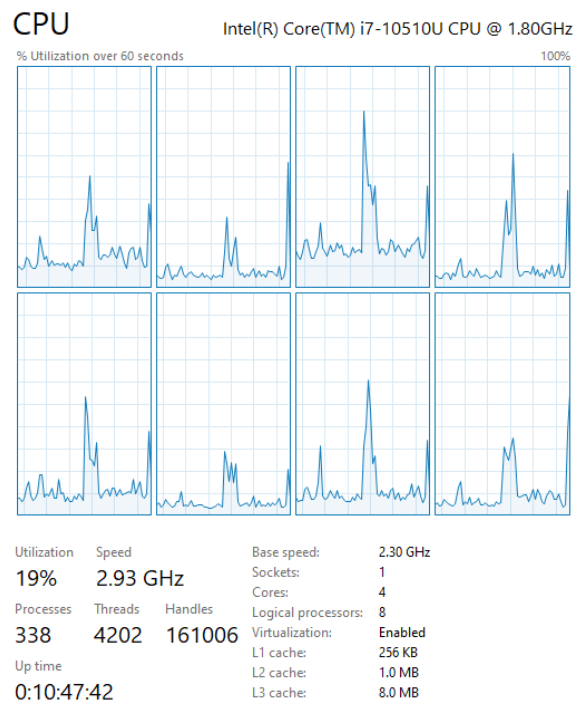
Steps to run:

1. The name of project is *LucasPyramid_FSharp_Akka*

2. To run the project, type- *dotnet fsi –langversion:preview proj1.fsx <N> <k>*

Observations:

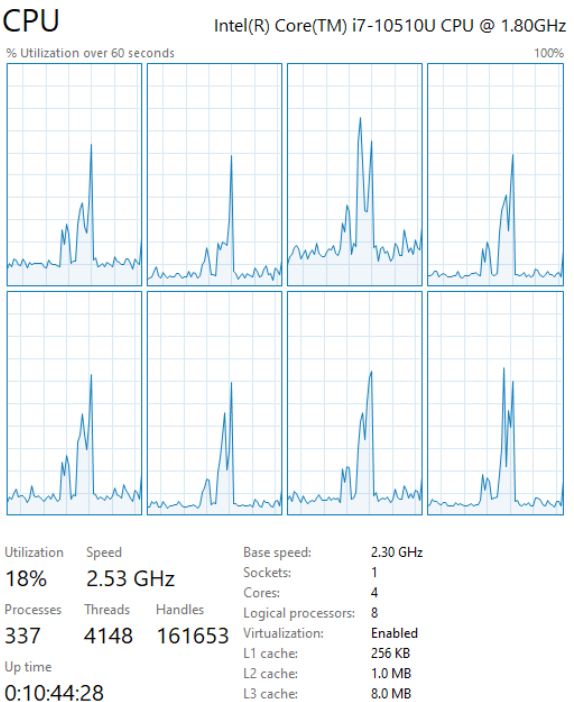1. We have made 8 workers. Work is equally divided among these workers such that each worker gets N/8 unit of the work from the boss actor. Cases with 8(system cores), 16, 32, 64, 128, 256, 512, 1024 workers have been run, but the maximum ratio of CPU to real time ratio of 6.36829 was achieved when using 8 workers for input $(10^8, 24)$. Each worker gets a work unit of approximately 10^7

2. Result of *dotnet fsi –langversion:preview proj1.fsx 10^6 4* is null and doesn't return any value.

3. Result of *dotnet fsi –langversion:preview proj1.fsx 10^6 4* is:
   a. Real - 0.276s
   b. CPU – 0.375s
   c. Ratio – 1.35
4. We have solved following problems (d) is the biggest problem :
   a. input-$(10^6,24)$
      i. Real- 0.356s
      ii. CPU- 0.562s
      iii. Ratio= 1.578
   b. input-$(10^7,24)$
      i. Real- 0.846 s
      ii. CPU- 3.312 s
      iii. Ratio= 3.914
   c. input-$(10^8,24)$
      i. Real- 5.475s
      ii. CPU- 34.578s
      iii. Ratio= 6.315
   d. input-$(10^9,24)$
      i. Real- 54.791s
      ii. CPU- 344.156s
      iii. Ratio= 6.281

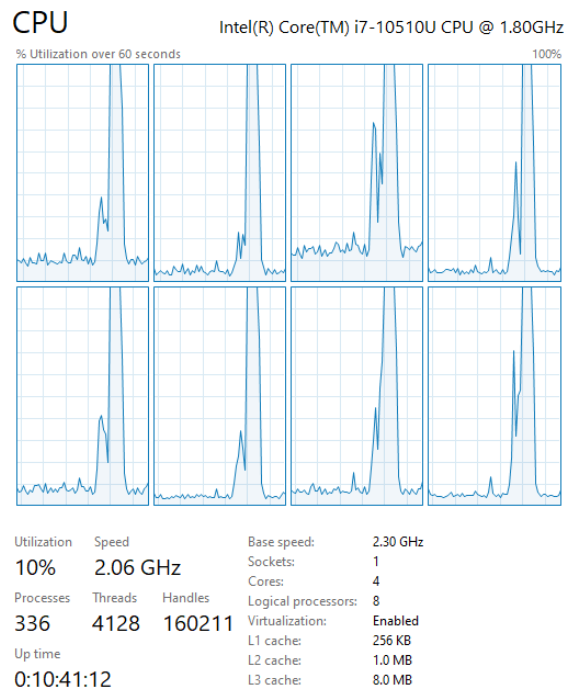**CPU Utilization on Various Inputs:**

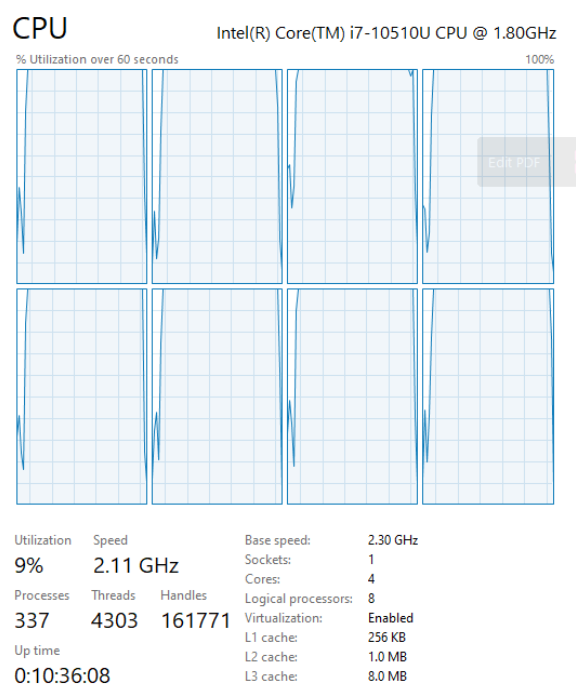1. N = 10^6, k = 24

Utilization	Speed		Base speed:	2.30 GHz
19%	2.93 GHz	Sockets:	1	
		Cores:	4	
Processes	Threads	Handles	Logical processors:	8
338	4202	161006	Virtualization:	Enabled
			L1 cache:	256 KB
Up time			L2 cache:	1.0 MB
0:10:47:42			L3 cache:	8.0 MB

2. N = 10^7, k = 24

Utilization	Speed		Base speed:	2.30 GHz
18%	2.53 GHz	Sockets:	1	
		Cores:	4	
Processes	Threads	Handles	Logical processors:	8
337	4148	161653	Virtualization:	Enabled
			L1 cache:	256 KB
Up time			L2 cache:	1.0 MB
0:10:44:28			L3 cache:	8.0 MB

3. N = 10^8, k =24

Utilization	Speed		Base speed:	2.30 GHz
10%	2.06 GHz	Sockets:	1	
		Cores:	4	
Processes	Threads	Handles	Logical processors:	8
336	4128	160211	Virtualization:	Enabled
			L1 cache:	256 KB
Up time			L2 cache:	1.0 MB
0:10:41:12			L3 cache:	8.0 MB

4. N = 10^9, k= 24

Utilization	Speed		Base speed:	2.30 GHz
9%	2.11 GHz	Sockets:	1	
		Cores:	4	
Processes	Threads	Handles	Logical processors:	8
337	4303	161771	Virtualization:	Enabled
			L1 cache:	256 KB
Up time			L2 cache:	1.0 MB
0:10:36:08			L3 cache:	8.0 MB

Thank you 😉