1)Utilization = $1-P^{N}$ = 89.99%

2 &3) average wait time in chart 1: 2.8 units || context switches in chart 2 = 19

P1	P1	P	2	P1	Р3	P4	Р3	Р3	P1	P5	P5	P5		P5	P5		P1		P1							
	0	1	2		3 4	!	5 6	7	8	9		10	11	1	2	13	14			23						
				tie																						
P1	P1	P	2	P1	P3	P1	P4	P3	P1	P3	P5	P1		P5	P1		P5	P1	P5	F	21	P5	P1	P1	P1	
	0	1	2	:	3 4	! !	5 6	7	8	9	1	10	11	1	2	13	14	15	5	16	17	18	19) 2	0	21
				tie		tie				tie																

6)

Test file: medium.txt			
#threads	Observed timing	Observed speedup compared to origina	Expected speedup
original	32.073	1	1
1	32.566	0.984861512	1
2	17.156	1.869491723	2
3	12.446	2.576972521	3
4	9.442	3.396843889	4
8	7.7	4.165324675	8
16	5.036	6.368745036	16
Test file: hard.txt			
#threads		Observed speedup compared to origina	Expected speedu
original	10.951	1	1
1		1.007915324	1
2		1.009867208	2
3	10.965	0.99872321	3
4	10.838	1.010426278	4
8	10.907	1.004034107	8
16	10.911	1.003666025	16
Test file: hard2.txt			
#threads	Observed timing	Observed speedup compared to origina	Expected speedu
original	10.883	1	1
1	10.918	0.996794285	1
2		0.98355174	2
3	11.042	0.985600435	3
4	10.88	1.000275735	4
8	10.809	1.006846147	8
16	10.888	0.999540779	16

As threads are added, the actual time deviates more from the expected speedup. This is because of bottlenecks caused by I/O and other program components also the number of threads eventually exceeds the number of actual CPU cores

The hard and hard2 files both contained very large numbers which meant that the program was bottlenecked by the primality test algorithm. Multithreading therefore does not improve speed.