Part A

The CPU used in each is Intel core i7 4770S, which is 4C/8T CPU. The table below shows the speed up from imflipPM.c to imflipPMC.c. (The time recorded is got by repeat 101 times)

# Threads	imflipHM(ms)	imflipHMC(ms)	Speed up HM→HMC
1	33.2772	13.5954	2.45x
2	17.3366	7.2581	2.4x
3	13.4554	5.4362	2.48x
4	12.2277	6.0402	2.02x
5	13.4158	5.7927	2.32x
6	11.4653	4.6638	2.46x
7	11.3168	5.0995	2.2x
8	12.5248	5.0698	2.47x

Part B

The table below shows the speed up from MTFlipVM.c (initial) to MTFlipVM2.c to MTFlipVM3.c. (The time recorded is got by repeat 101 times)

# Threads	VM(ms)	VM2	VM3	Speed up VM→VM2	Speed up VM→VM3	Speed up VM2→VM3
1	3.8911	3.2871	3.5849	1.18x	1.09x	0.92x
2	2.7525	2.5545	2.6436	1.10x	1.04x	0.966x
3	2.4158	2.4356	2.4059	0.99x	1x	1.01x
4	2.5545	2.4554	2.4455	1.04x	1.05x	1x
5	2.5446	2.4158	2.4851	1.05x	1.024x	0.97x
6	2.7030	2.3960	2.4554	1.125x	1.1x	0.9758x
7	2.5050	2.3762	2.4455	1.05x	1.02x	0.97x
8	2.4653	2.5149	2.4851	0.98x	0.99x	1.011x

Part C & Part D

The table below shows the speed of function Rotate8 and Rotate9. It is clear the execution time of rotate9 decrease with increasing of the unmber of thread compared with rotate8.

# Thread	Rotate8	Rotate9
1	74.94	74.4356
2	39.1287	43.0594
3	29.4554	30.1287
4	30.2302	23.3861
5	27.297	21.8416
6	23.7129	20.6040
7	20.8218	19.5446
8	26.4458	19.4455