CR TP 1 Méthodes Numériques

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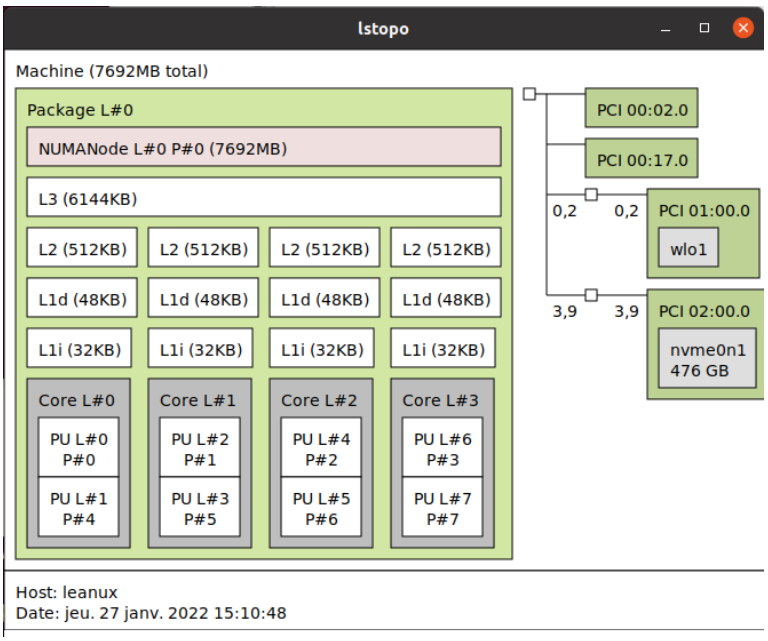
Partie 1 :

Léa

Processeur i5-1035G1
Prix : 297$
Date de lancement : 3e quadrimestre de 2019
Puissance de Dissipation Thermique : 15W



puissance théorique :
P = (1 x 10^9) * 4 * 16 = 64 GFLOP/s

```
lea@leanux:~/Desktop/3AS2/MN/TP1$ cat /proc/cpuinfo
processor       : 0
vendor_id       : GenuineIntel
cpu family      : 6
model           : 126
model name      : Intel(R) Core(TM) i5-1035G1 CPU @ 1.00GHz
stepping        : 5
microcode       : 0xa6
cpu MHz         : 1000.267
cache size      : 6144 KB
physical id     : 0
siblings        : 8
core id         : 0
cpu cores       : 4
apicid          : 0
initial apicid  : 0
fpu             : yes
fpu_exception   : yes
cpuid level     : 27
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs b
ts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_ti
mer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single ssbd ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep b
mi2 erms invpcid avx512f avx512dq rdseed adx smap avx512ifma clflushopt intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves split_lock_detect dtherm ida arat pln pts hwp hwp_notify
hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg avx512_vpopcntdq rdpid fsrm md_clear flush_l1d arch_capabilities
vmx flags       : vnmi preemption_timer posted_intr invvpid ept_x_only ept_ad ept_1gb flexpriority apicv tsc_offset vtpr mtf vapic ept vpid unrestricted_guest vapic_reg vid ple pml ept_mode_based_exec ts
c_scaling
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs itlb_multihit
bogomips        : 2380.80
clflush size    : 64
cache_alignment : 64
address sizes   : 39 bits physical, 48 bits virtual
power management:
```

*** rq : impossible d'utiliser likwid pour Ali et moi (non supporté par nos processeurs),** seules données : temps d'exécution approximatif

```
lea@leanux:~/Desktop/3AS1/MN/TP1$ sudo likwid-perfctr -g ENERGY python matrice.p
y
Cannot access directory /usr/share/likwid/perfgroups/ICL
--------------------------------------------------------------------------------
CPU name:       Intel(R) Core(TM) i5-1035G1 CPU @ 1.00GHz
CPU type:       Intel Icelake processor
CPU clock:      1.19 GHz
ERROR - [./src/perfmon.c:perfmon_init_maps:1095] Unsupported Processor
ERROR - [./src/perfmon.c:perfmon_init_funcs:1526] Unsupported Processor
Segmentation fault
```

python : 44 min
C : 2 min
java : 1min

compilation et exécution du code source fourni dans l'archive POLY.tar.gz :

```
lea@leanux:~/Desktop/3AS2/MN/TP1/poly$ ./test_poly p1 p2
2.000000 + 0.000000 x + 3.000000 X^2 + 4.000000 X^3
0.000000 + 0.000000 x + 1.000000 X^2 + 2.000000 X^3 + 3.000000 X^4 + 4.000000 X^5 + 5.000000 X^6
lea@leanux:~/Desktop/3AS2/MN/TP1/poly$ ./perf_poly p1 p2
p1 = 2.000000 + 0.000000 x + 3.000000 X^2 + 4.000000 X^3
p2 = 0.000000 + 0.000000 x + 1.000000 X^2 + 2.000000 X^3 + 3.000000 X^4 + 4.000000 X^5 + 5.000000 X^6
p3 = 2.000000 + 0.000000 x + 4.000000 X^2 + 6.000000 X^3 + 3.000000 X^4 + 4.000000 X^5 + 5.000000 X^6
addition 1525 cycles
p1+p2 4 operations 0.006820 GFLOP/s
addition 11987 cycles
p4+p5 1025 operations 0.222324 GFLOP/s
```

William

https://www.intel.fr/content/www/fr/fr/products/sku/191075/intel-core-i59300h-processor-8m-cache-up-to-4-10-ghz/specifications.html

Processeur i5-9300H
Prix : $250
Date de lancement : 2e quadrimestre de 2019
Puissance de Dissipation Thermique : 45W

puissance théorique :
P = (2.4 x 10^9) * 4 * 16 = 153.6 GFLOP/s

Mesures réalisées avec likwid-perfctr -g ENERGY:

Résultats en python:

temps d’execution : 1919.373729 sec

Metric	Sum	Min	Max	Avg
Runtime (RDTSC) [s] STAT	15366.8608	1920.8576	1920.8576	1920.8576
Runtime unhalted [s] STAT	0	0	0	0
Clock [MHz] STAT	0	inf	0	0
CPI STAT	0	inf	0	0
Temperature [C] STAT	589	68	84	73.6250
Energy [J] STAT	33757.2511	0	33757.2511	4219.6564
Power [W] STAT	17.5741	0	17.5741	2.1968
Energy PP0 [J] STAT	25735.9305	0	25735.9305	3216.9913
Power PP0 [W] STAT	13.3981	0	13.3981	1.6748
Energy PP1 [J] STAT	1.3435	0	1.3435	0.1679
Power PP1 [W] STAT	0.0007	0	0.0007	0.0001
Energy DRAM [J] STAT	1297.2718	0	1297.2718	162.1590
Power DRAM [W] STAT	0.6754	0	0.6754	0.0844

Résultats en C:

temps d’execution : 147.544785 sec

Metric	Sum	Min	Max	Avg
Runtime (RDTSC) [s] STAT	1181.6216	147.7027	147.7027	147.7027
Runtime unhalted [s] STAT	0	0	0	0
Clock [MHz] STAT	0	inf	0	0
CPI STAT	0	inf	0	0
Temperature [C] STAT	602	69	86	75.2500
Energy [J] STAT	2157.9005	0	2157.9005	269.7376
Power [W] STAT	14.6098	0	14.6098	1.8262
Energy PP0 [J] STAT	1488.7728	0	1488.7728	186.0966
Power PP0 [W] STAT	10.0795	0	10.0795	1.2599
Energy PP1 [J] STAT	0.1044	0	0.1044	0.0131
Power PP1 [W] STAT	0.0007	0	0.0007	0.0001
Energy DRAM [J] STAT	218.5183	0	218.5183	27.3148
Power DRAM [W] STAT	1.4794	0	1.4794	0.1849

Résultats en java:

temps d’execution : 66.932466969 sec

Metric	Sum	Min	Max	Avg
Runtime (RDTSC) [s] STAT	537.4688	67.1836	67.1836	67.1836
Runtime unhalted [s] STAT	0	0	0	0
Clock [MHz] STAT	0	inf	0	0
CPI STAT	0	inf	0	0
Temperature [C] STAT	616	72	87	77
Energy [J] STAT	1319.2548	0	1319.2548	164.9068
Power [W] STAT	19.6366	0	19.6366	2.4546
Energy PP0 [J] STAT	1016.7531	0	1016.7531	127.0941
Power PP0 [W] STAT	15.1339	0	15.1339	1.8917
Energy PP1 [J] STAT	11.9060	0	11.9060	1.4883
Power PP1 [W] STAT	0.1772	0	0.1772	0.0221
Energy DRAM [J] STAT	67.5848	0	67.5848	8.4481
Power DRAM [W] STAT	1.0060	0	1.0060	0.1258

Partie 2 :

voir code