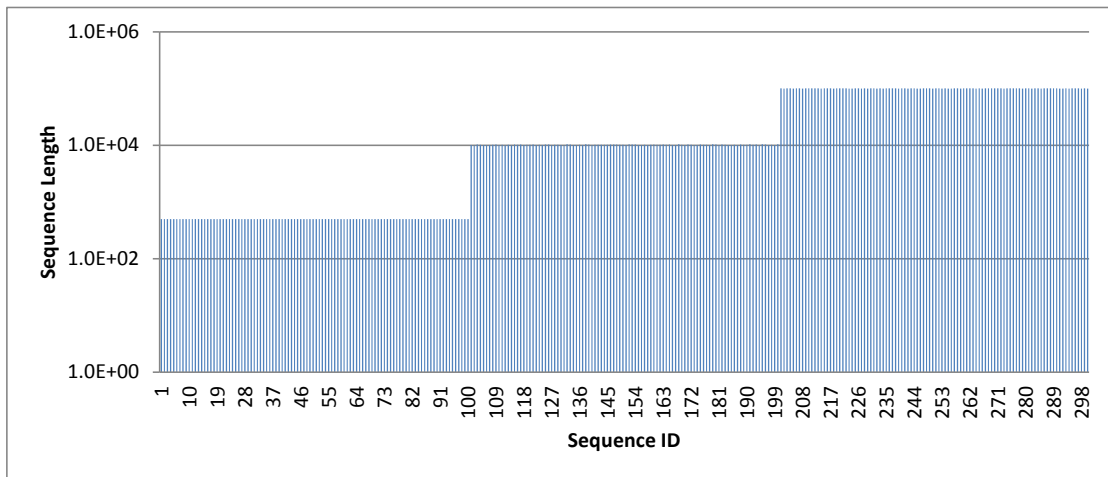
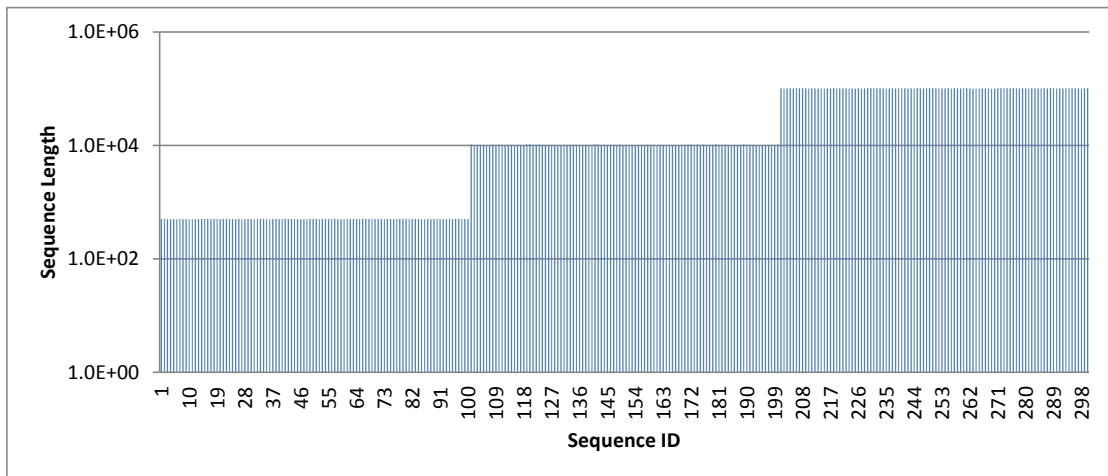


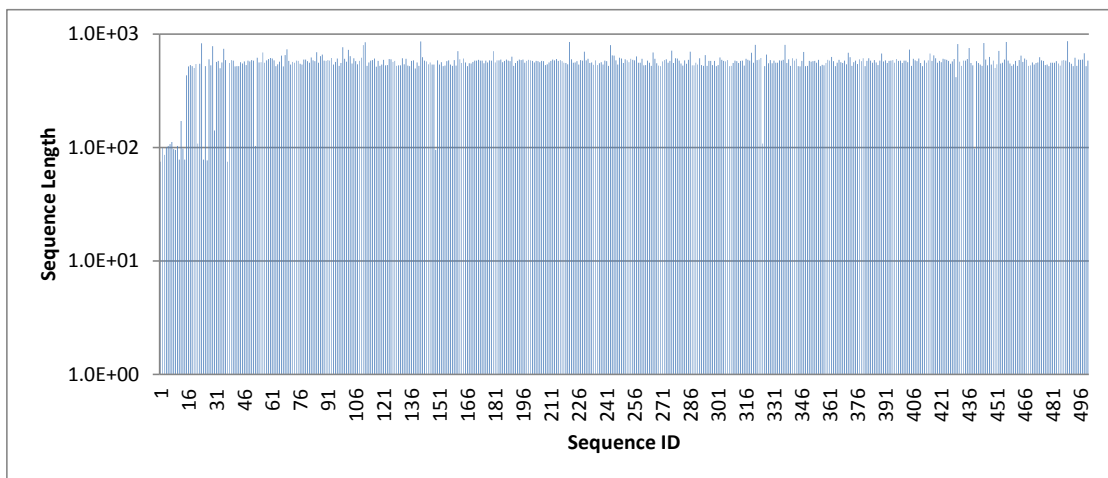
Supplementary



(a) Human Query Sequences

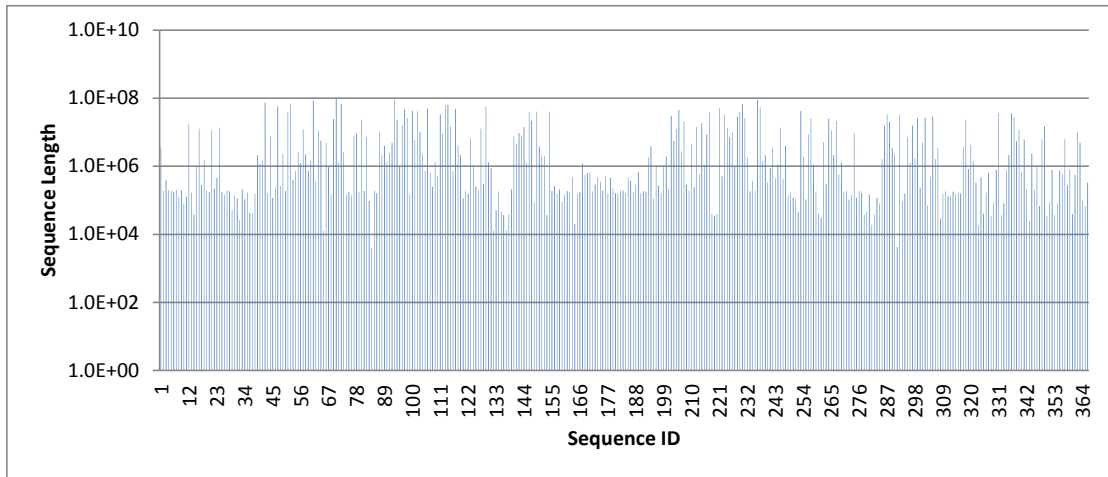


(b) Mouse Query Sequences

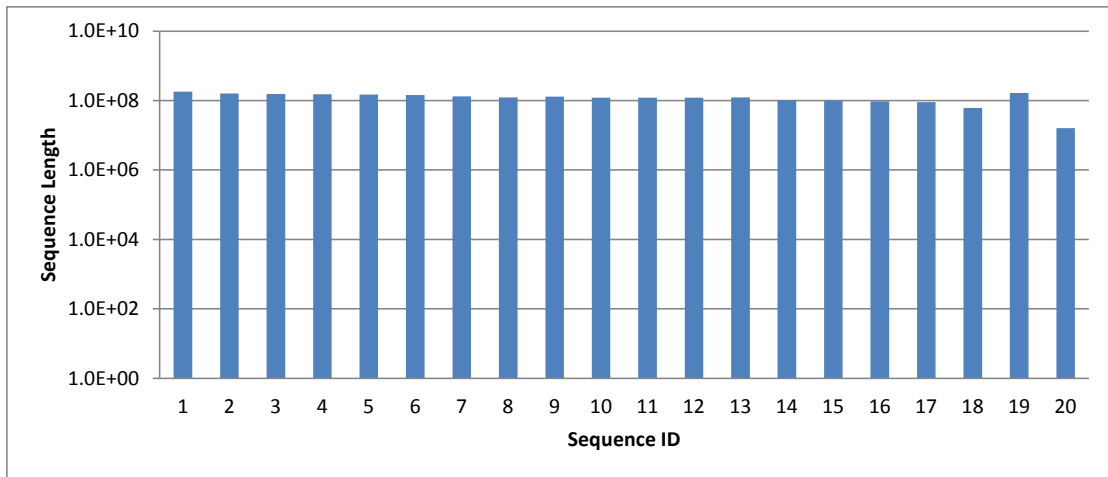


(c) Qbac Query Sequences

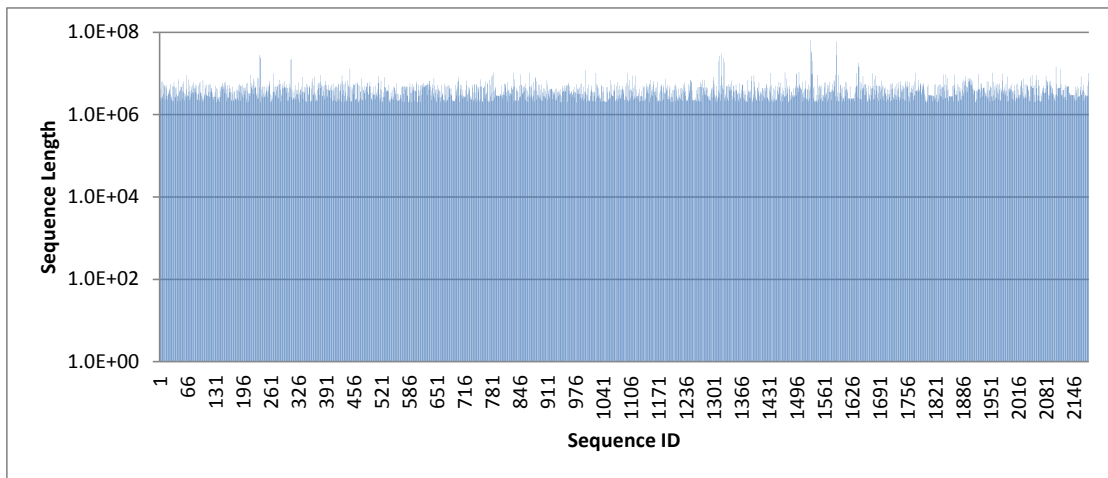
Figure S1: Lengths of query sequences



(a) Human Build 36

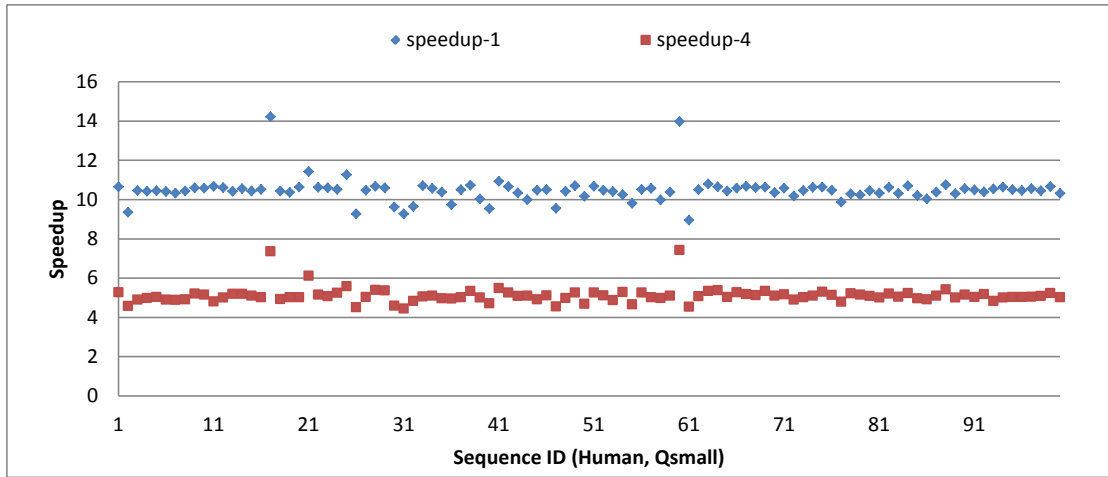


(b) Mouse Build 36

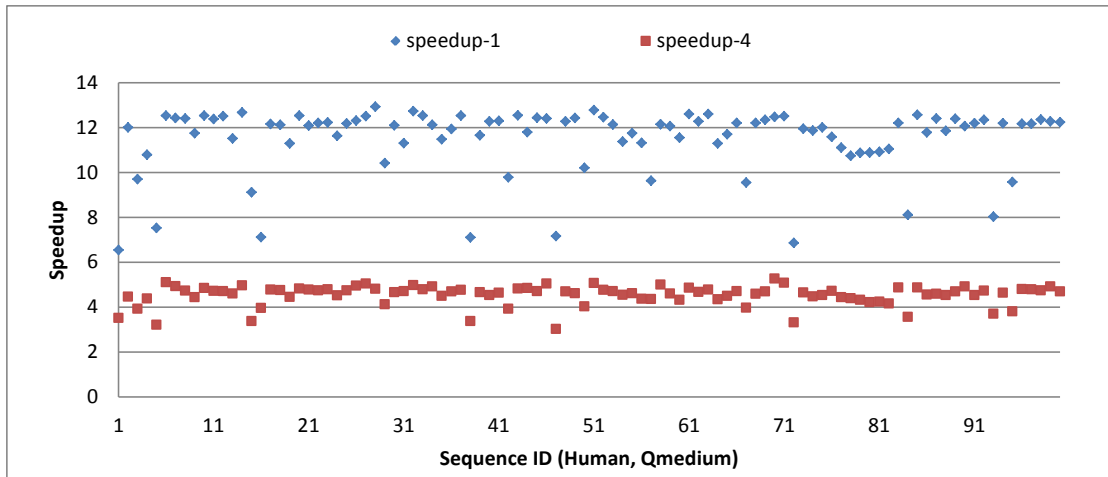


(c) The longest 2181 sequences from NCBI non-redundant nucleotide database

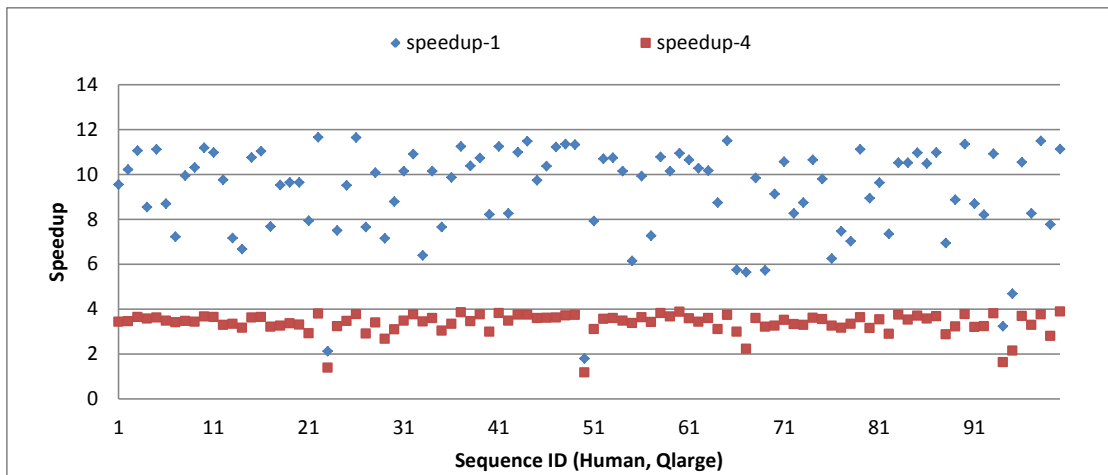
Figure S2: Lengths of database sequences



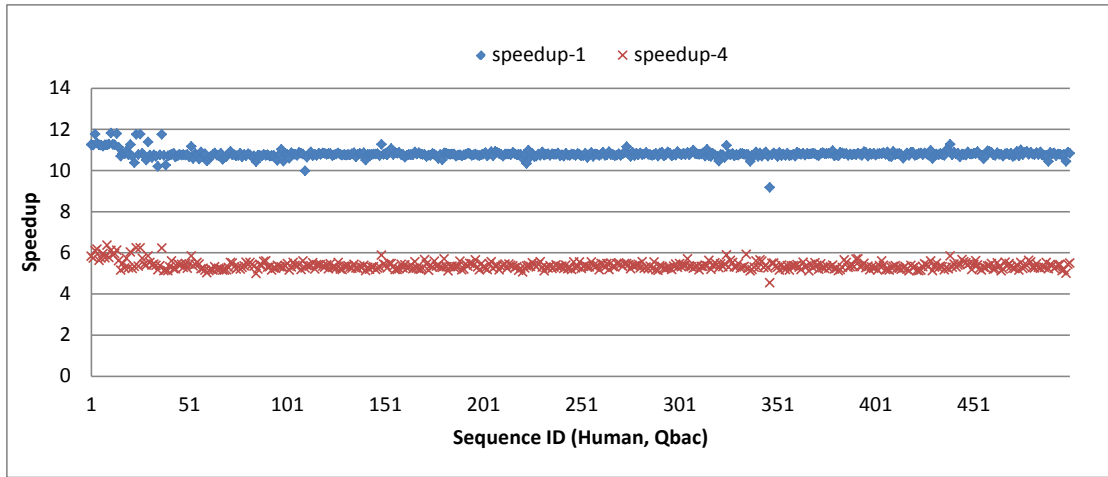
(a) speedup of Qsmall queries on human genome database



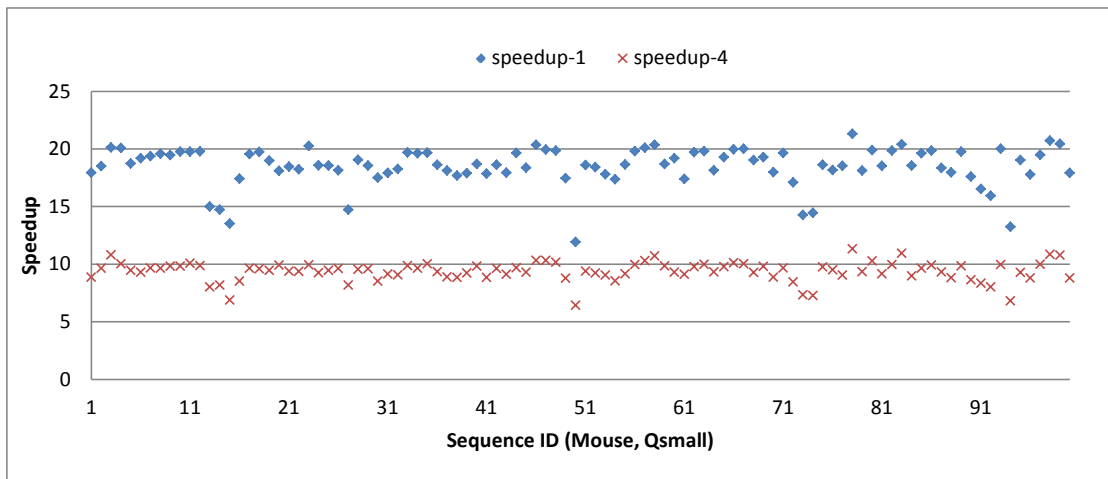
(b) speedup of Qmedium queries on human genome database



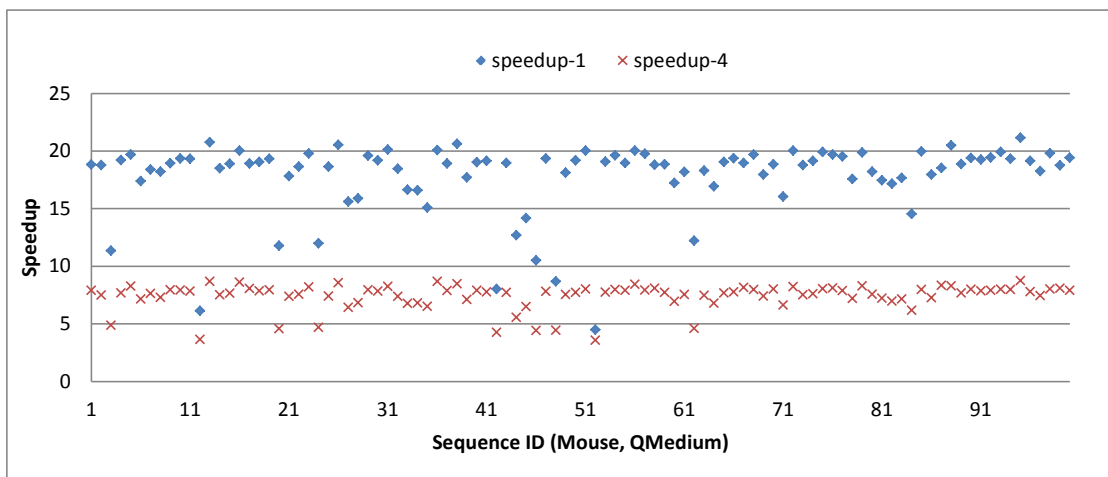
(c) speedup of Qlarge queries on human genome database



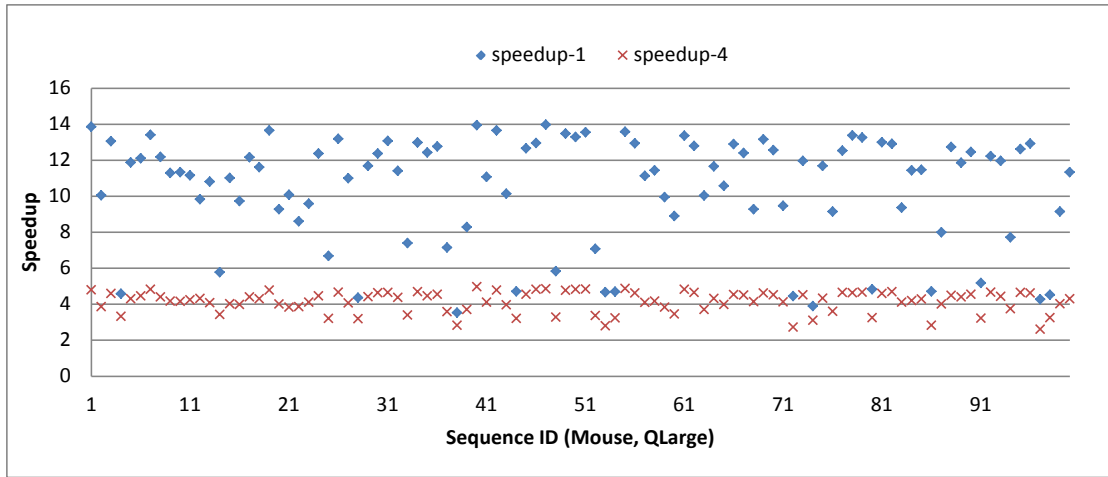
(d) speedup of Qbac queries on human genome database



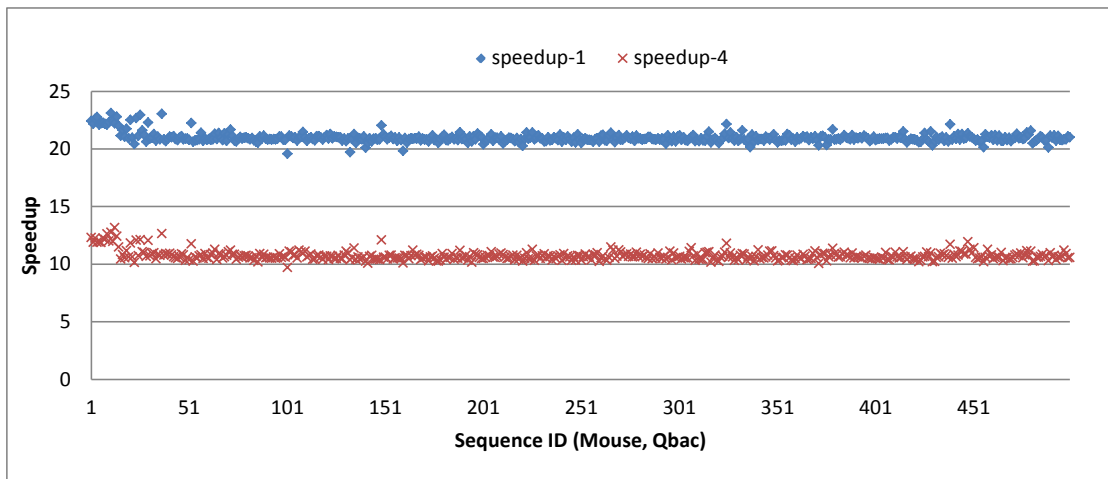
(e) speedup of Qsmall queries on mouse genome database



(f) speedup of Qmedium queries on mouse genome database

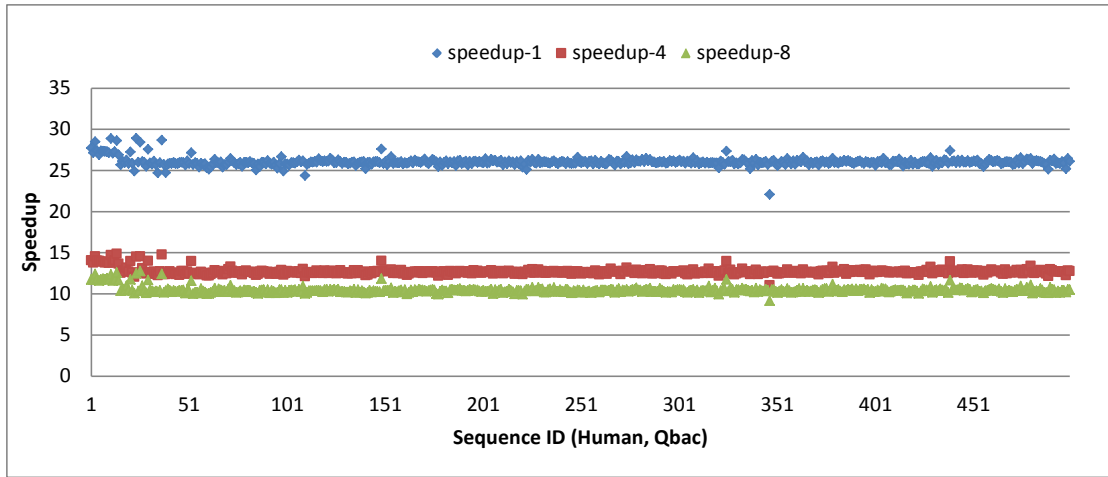


(g) speedup of Qlarge queries on mouse genome database

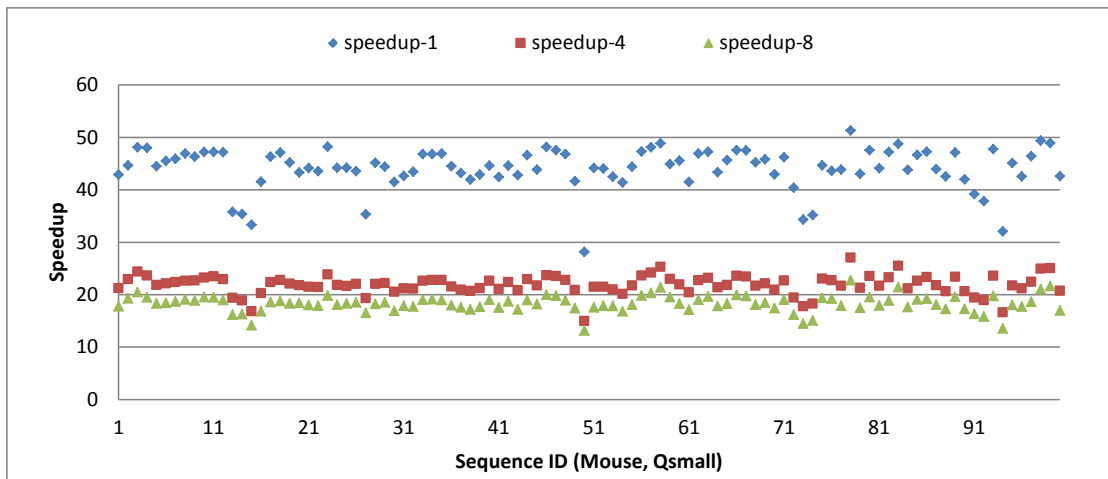


(h) speedup of Qbac queries on mouse genome database

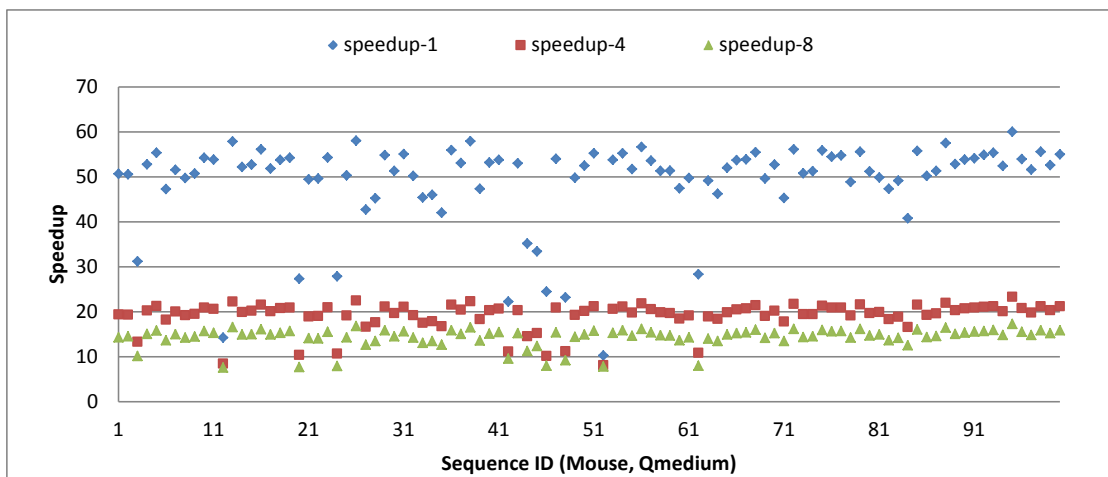
Figure S3: speedup of **megablast** mode (G780 vs. i7-3820; speedup-1 is for 1 CPU core, speedup-4 is for 4 CPU cores)



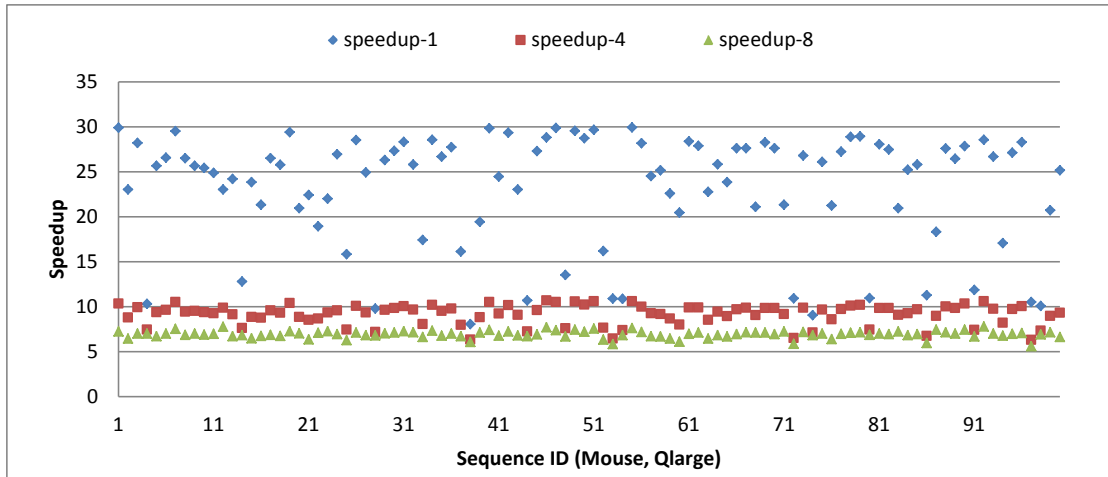
(a) speedup of Qbac queries on human genome database



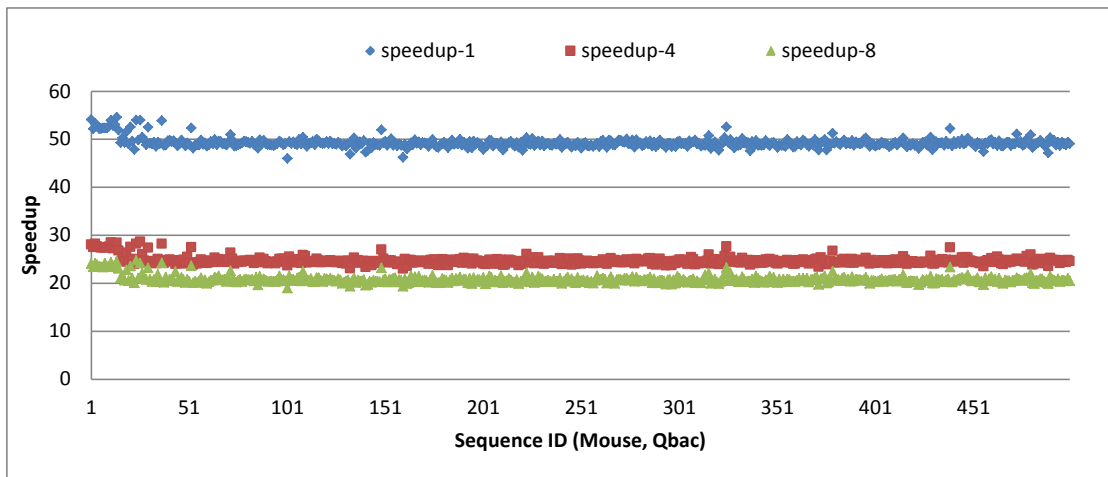
(b) speedup of Qsmall queries on mouse genome database



(c) speedup of Qmedium queries on mouse genome database

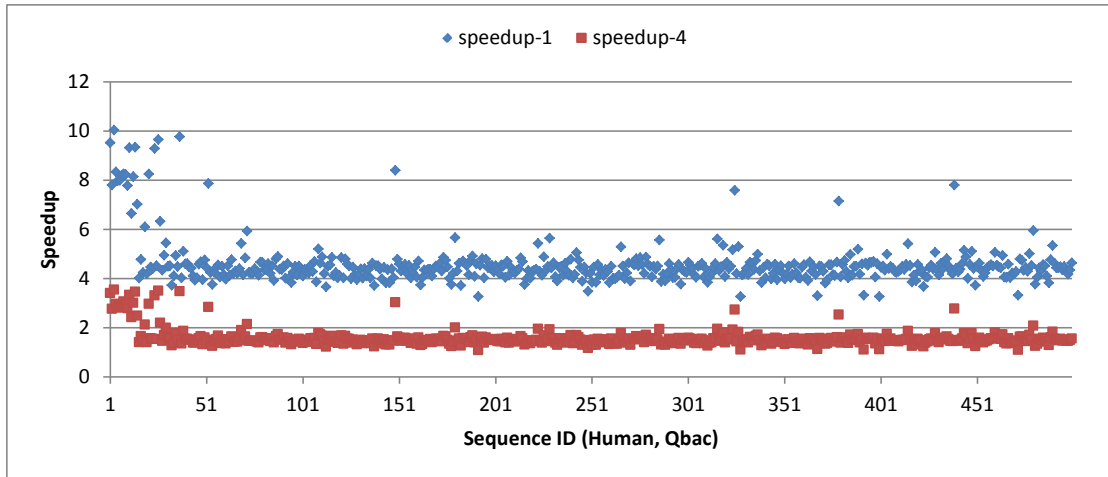


(d) speedup of Qlarge queries on mouse genome database

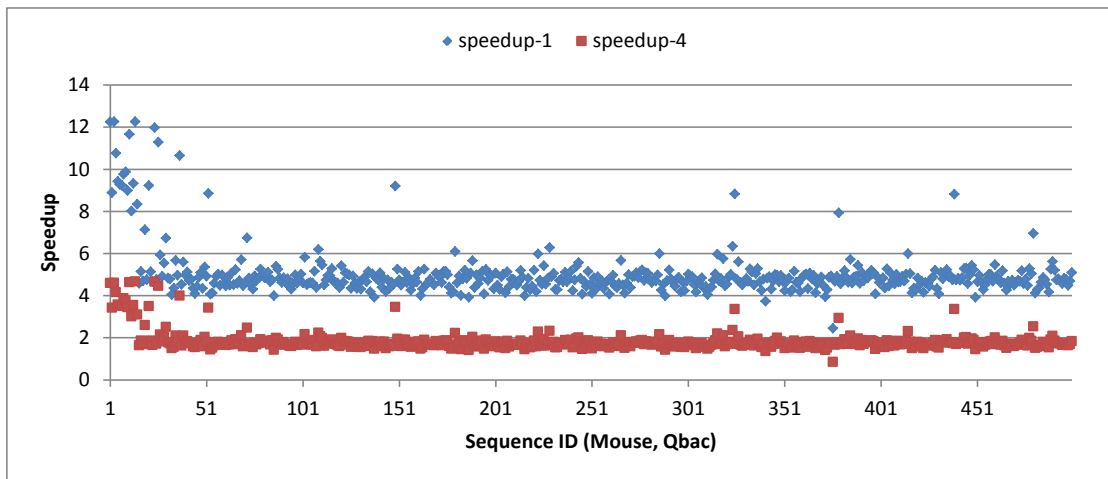


(e) speedup of Qbac queries on mouse genome database

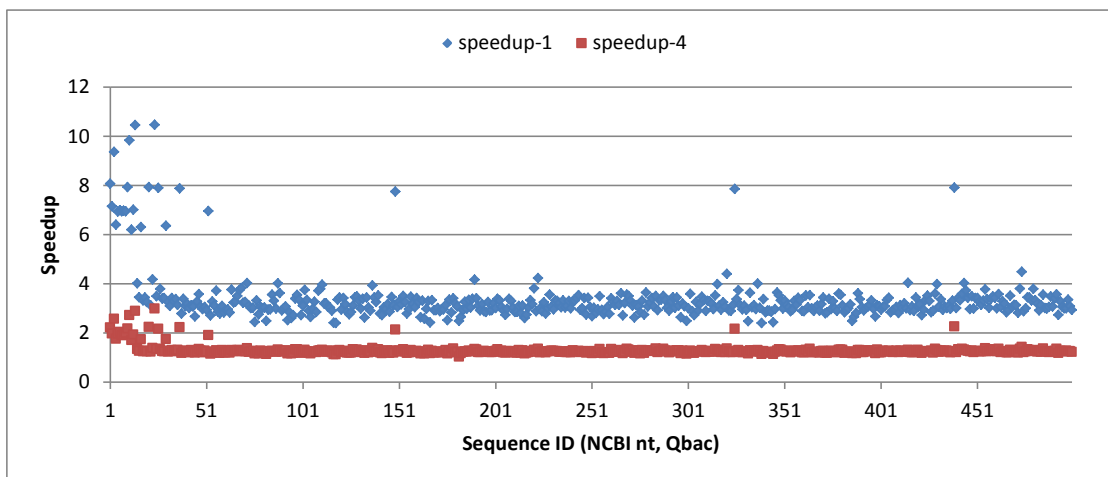
Figure S4: speedup of **megablast** mode (G780 vs. E5620; speedup-1 is for 1 CPU core, speedup-4 is for 4 CPU cores, speedup-8 is for 8 CPU cores)



(a) speedup of Qbac on human genome database

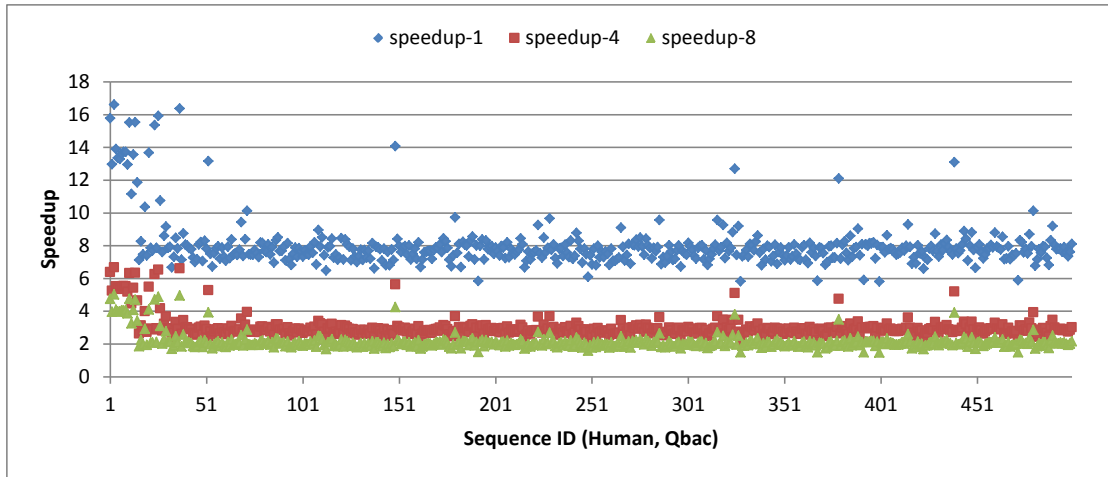


(b) speedup of Qbac on mouse genome database

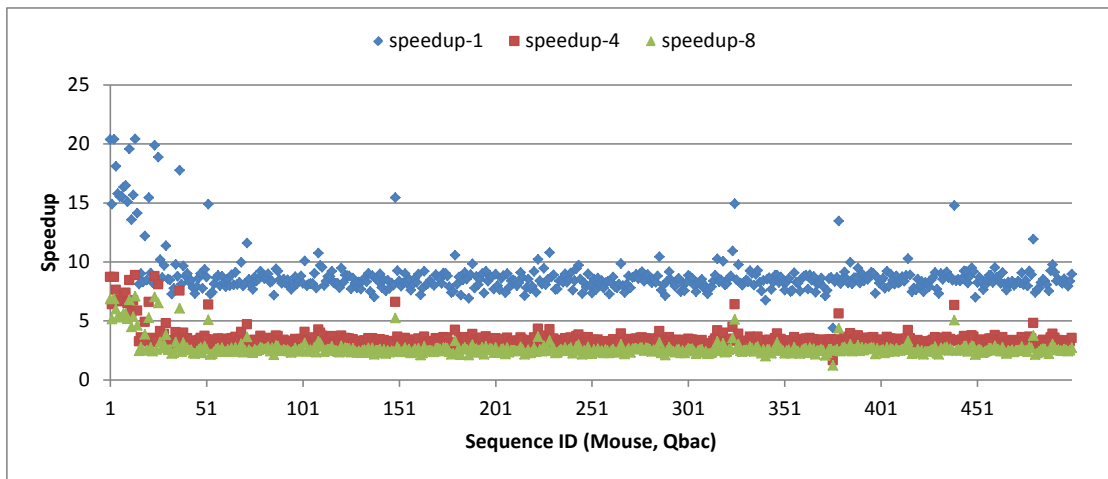


(c) speedup of Qbac on NCBI nt genome database

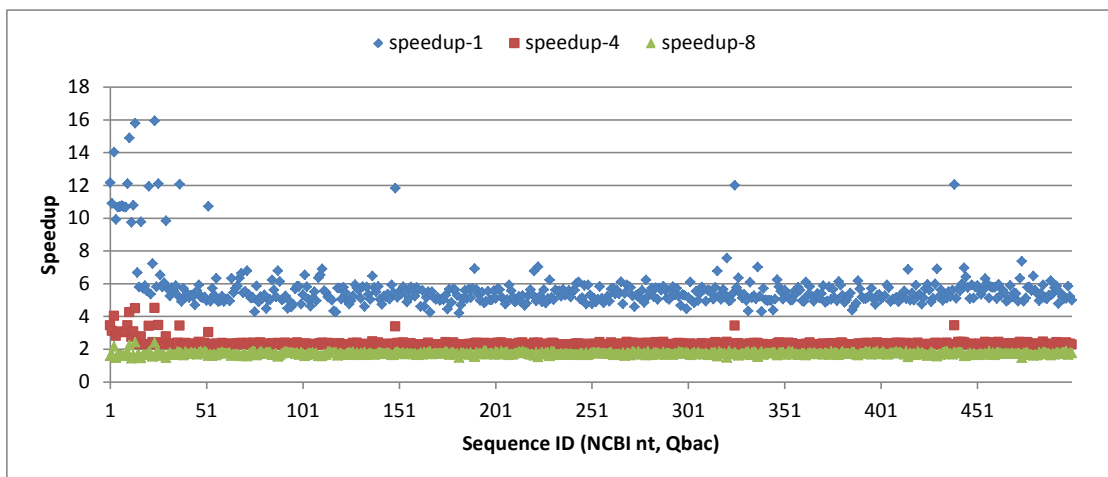
Figure S5: speedups of **blastn** mode (G780 vs. i7-3820; speedup-1 is for 1 CPU core, speedup-4 is for 4 CPU cores)



(a) speedup of Qbac on human genome database

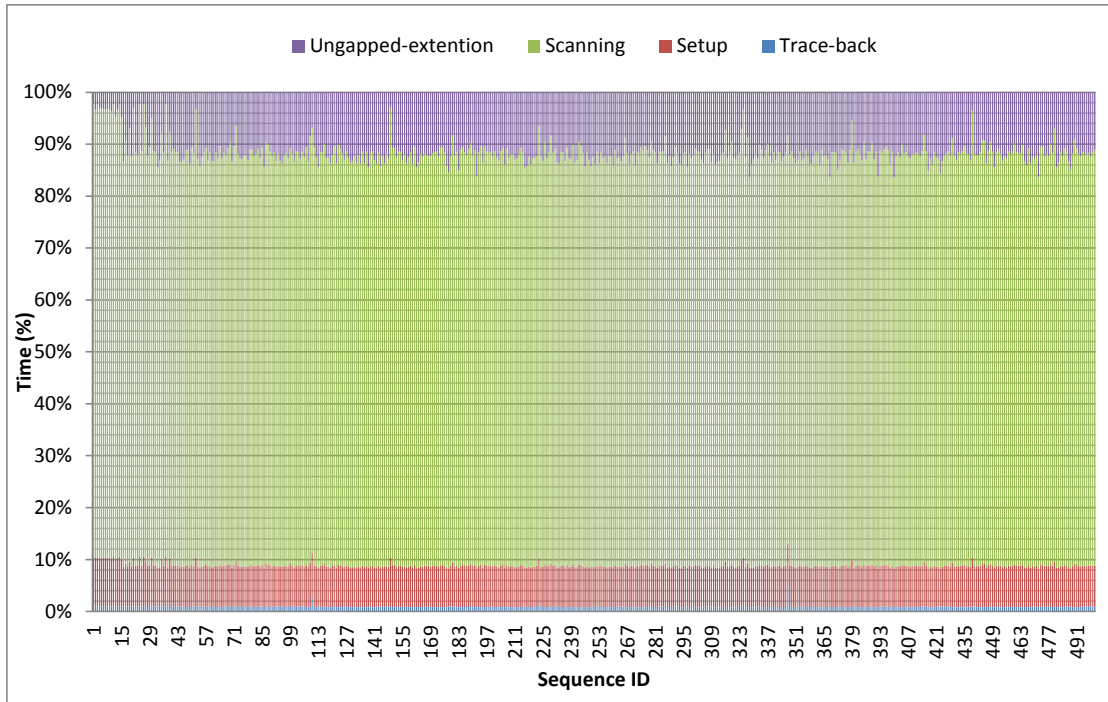


(b) speedup of Qbac on mouse genome database

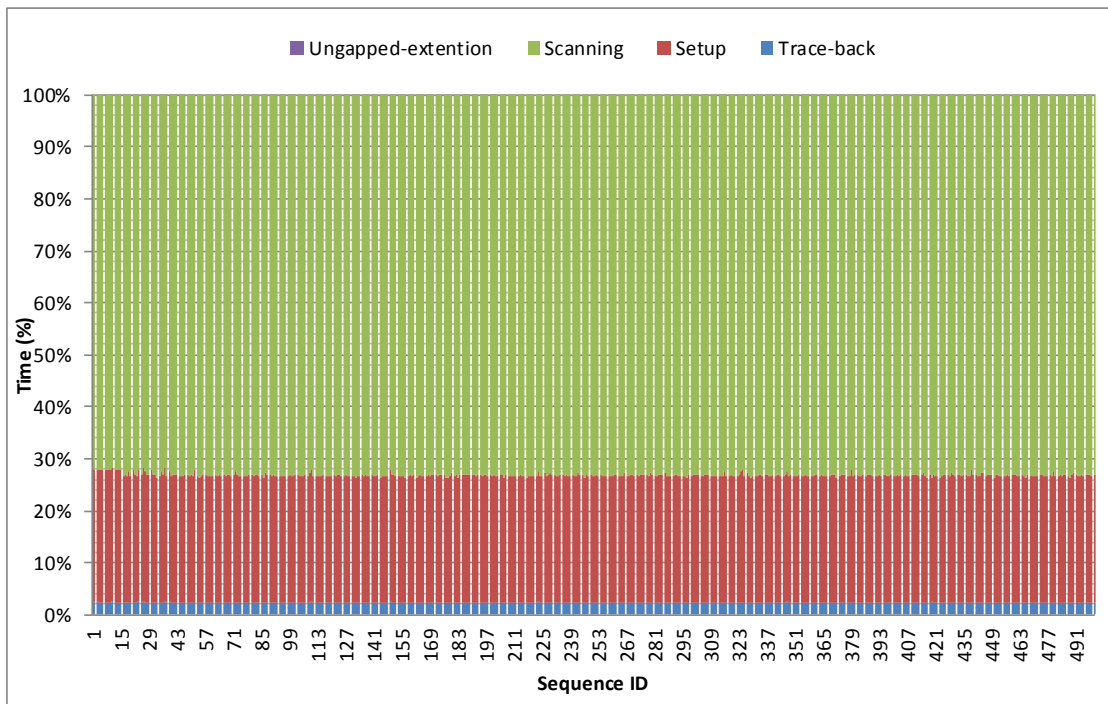


(c) speedup of Qbac on NCBI nt genome database

Figure S6: speedups of **blastn** mode (G780 vs. E5620; speedup-1 is for 1 CPU core, speedup-4 is for 4 CPU cores, speedup-8 is for 8 CPU cores)



(a) **blastn** mode, Qbac on Human



(b) **megablast** mode, Qbac on Human

Figure S7: the time distribution of Qbac on Human genome database. Remark: In (b), the time of ungapped extension is too short to be noticeable.