

## Assignment 9 : CUDA: GPU basics

**Question:** Measure the run times of the codes with `make bench CPU` and `make bench GPU` for polynomial function of degree 1, 10, 100, 1000, and for  $n = 10^9$ .

**Answer:** The run times are calculated in the files `bench_cpu.sh.o74010` and `bench_gpu.sh.o74012`.

**Question:** Compare to the performance of the CPU implementation. You can compute a speedup table with `make table`. Which is faster in which configuration? Why do you think that is?

**Answer:** The computed table is stored in the file `resulttable.tex`. From the table we can see that for degree 100 and 1000 GPU runs faster than CPU, whereas if the value of degree is 1 and 10 for the same value of  $n$  then CPU runs faster than GPU. I think so this is the case because for higher degree values i.e. 100 and 1000, the computation becomes embarrassingly parallel and thus can be solved using GPU for better speedup. Whereas, when the value of degree is small i.e. 1 and 10, the overhead of allocating, copying and freeing the memory parameters for using GPU is high compared to the overall computation time on CPU. Thus, CPU runs faster for smaller values of degree.