Assignment 1

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Section 1: theoretical model

We want to study parallel algorithm (sum of N numbers), the final model is:

$T_p= T_{comp}*(P -1 + n/P) + T_{read} + 2(P-1)*T_{comm}$

with:

$T_{comp} =2*10^{-9}$

$T_{read}= 1*10^{-4}$

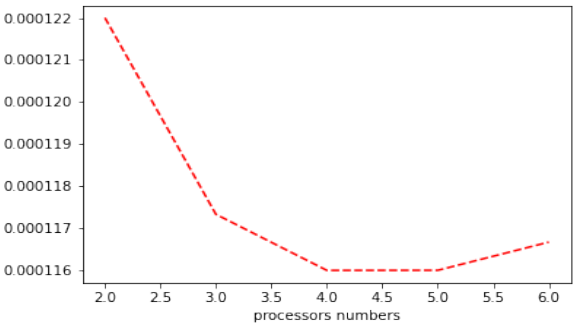
$T_{comm}= 1*10^{-6}$

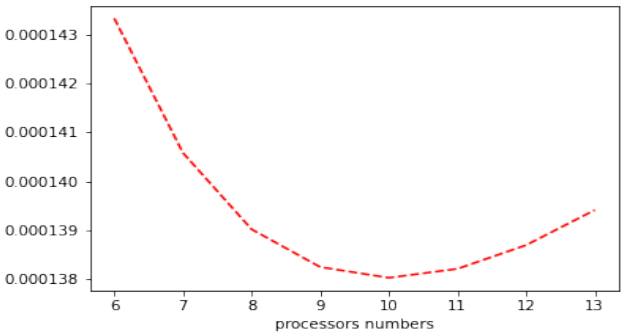
For which values of N do you see the algorithm scaling ? For N>>1000

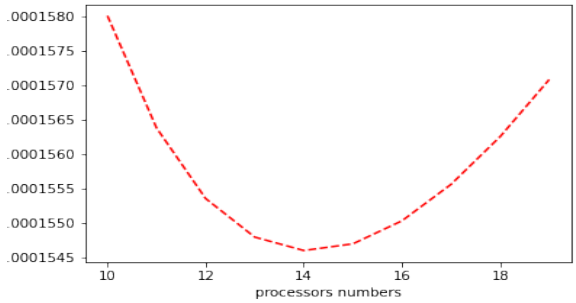
For which values of P does the algorithm produce the best results ?

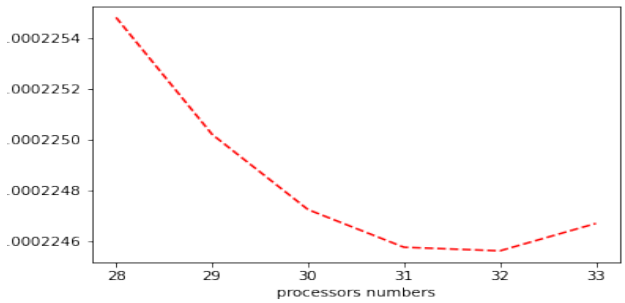
In the following plots you find the values of P that work to the best

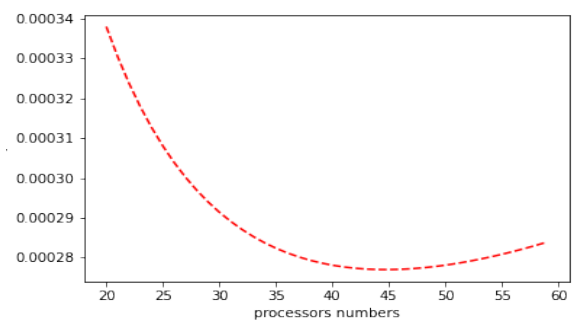
Nel file performance-model.csv there are the values of the plots.











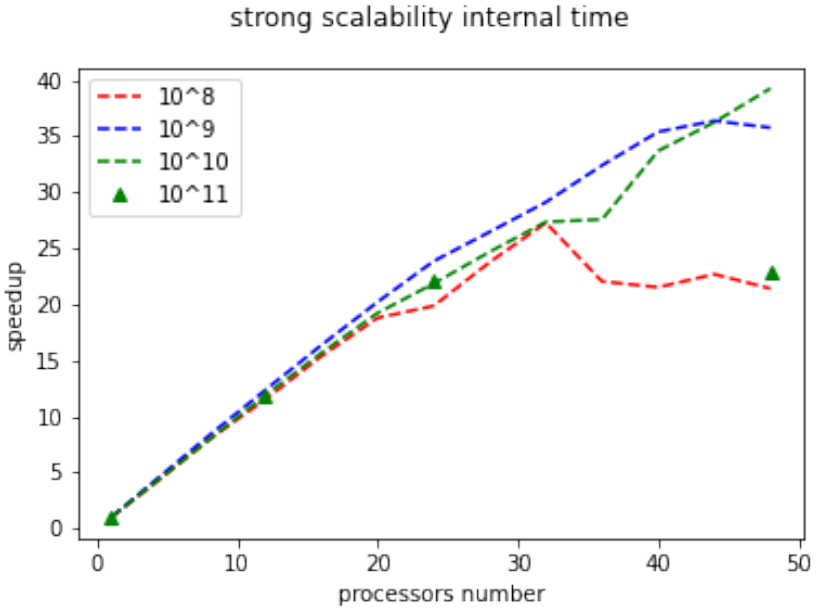
Section 2 : play with MPI program

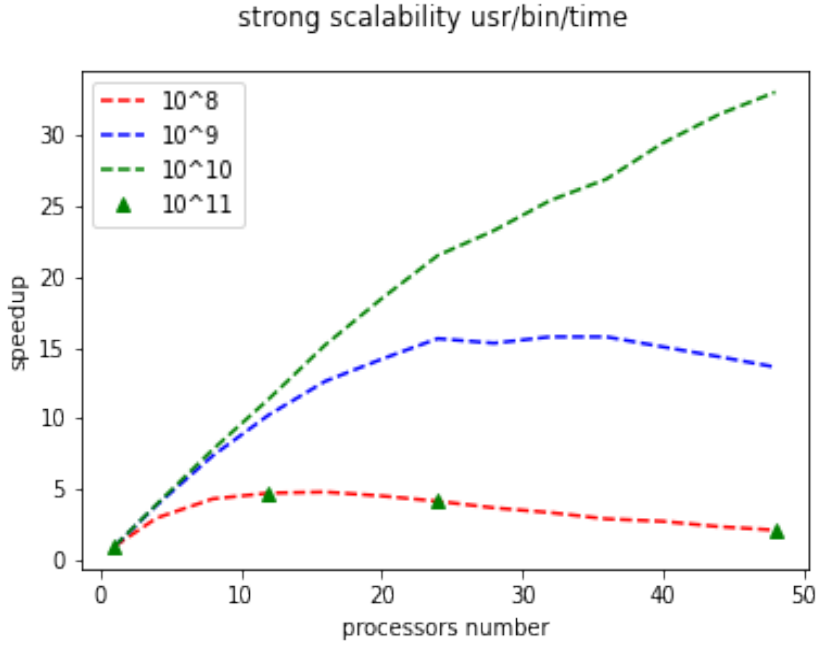
2.1: compute strong scalability of a mpi_pi.c program

Report and discuss if there are difference in performance betwen the two codes on one single core: on a core the serial time is less than that of the parallel one as could be expected since there is less communication time.

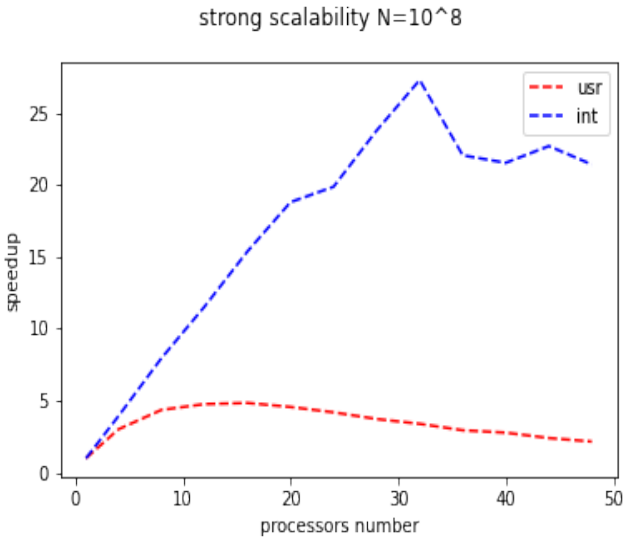
Which of these times do you want to consider to estimate the parallel time ?
The average across all processors

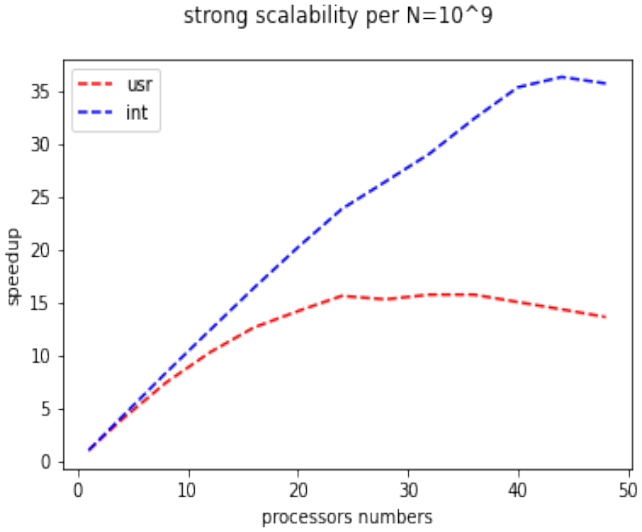
In the following there are the graphs of the strong scalability as a function of the number of processors for the 4 values of M required. One for internal time and one for usr / bin / time:

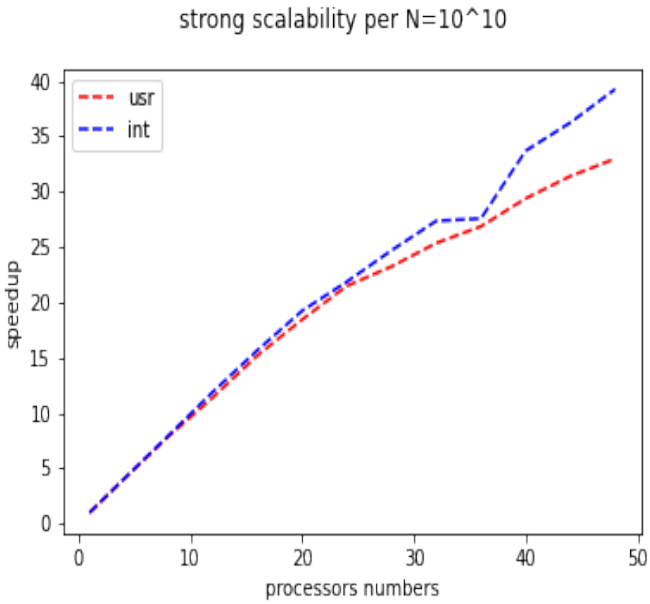


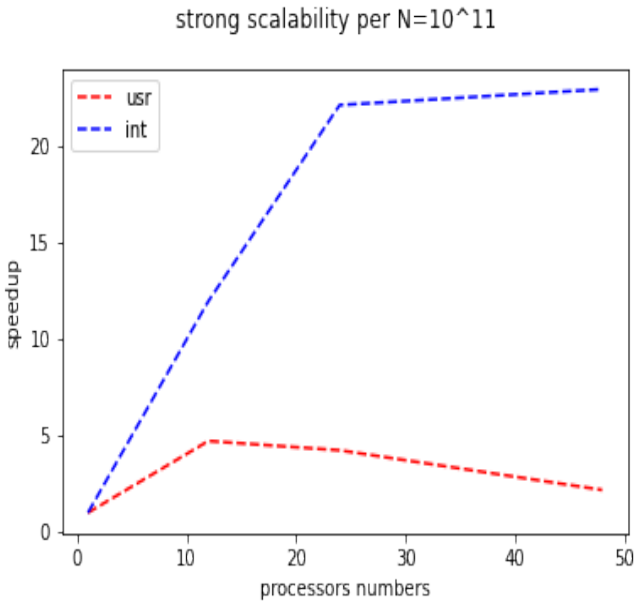


2.2: identify a model for the parallel overhead









2.3: weak scaling

In the following the same plots as before in the case of weak scalability (but for 10 ^ 10 I have a smaller number of simulations because being the running time very long it exceeded the walltime and when I realized it was late):