Homework – Introduction

1. Do you have a smart phone? (If not, simply pick one and go on)
   Please search the internet and find out
   a. How many processors does it have? How many cores?
   b. How much main memory?
   c. What kind of GPU does it have?
   d. What are the FLOPS for the smart phone? And based on the information, would it have made it into the fastest machine in which year the latest?

2. Suppose we have two computers A and B. Computer A has a clock cycle of 1 ns and performs 2 instructions per cycle. Computer B, instead, has a clock cycle of 600 ps and performs 1.25 instructions per cycle. Assuming a program requires the execution of the same number of instructions in both computers:
   a. Which computer is faster for this program?
   b. What if Computer B required a 10% more instructions than Computer A?

3. Consider a computer that has a peak performance of 8 GFlops/s. An application running on this computer executes 15 TFlops, and takes 1 hour to computer.
   a. How many GFlops/s did the application attain?
   b. Which efficiency did it achieve?

4. Given the following table, use your favorite plotting tool to plot
   a. The scalability of the program (speedup vs number of processors)
   b. The parallel efficiency attained (parallel efficiency vs number of processors). Please see http://www.netlib.org/scalapack/slug/node112.html for the definition of the parallel efficiency.

# Processors	1	2	4	8	16
# GFlops/s	4.0	7.6	14.9	23.1	35.6