1 Introduction

1. Search on the Internet for the *top500* list.

   Fastest supercomputer in the world: Tianhe 2, China.

   - 16,000 compute nodes
     - 2 Intel Ivy Bridge processors, 12 cores each
     - 3 Intel Xeon Phis, 57 cores each
   - 3,120,000 cores
   - 1,024,000 GBs
   - 33.862,7 TFlop/s (54,902.4 TFlop/s)

   Fastest supercomputer in Europe: Piz Daint, Switzerland.

   - 5,272 compute nodes
     - 1 8-core Intel Sandy Bridge processor
     - 1 Nvidia K20X with 14 SMX cores
   - 115,984 cores
   - 168,704 GBs host memory
   - 6,271 TFlop/s (7,788 TFlop/s)

   Fastest supercomputer in Germany: JuQueen.

   - 28,672 compute nodes
     - 1 IBM PowerPC A2 processor with 16 cores
   - 458,752 cores
   - 458,752 GBs
   - 5,008.86 TFlop/s (5,872.03 TFlop/s)

2. Do you have a smart phone? (If you don't, simply pick one and go on :)

   Let's take as example the iPhone 5s. It is powered by an Apple A7 processor with two ARM cores running at 1.3-1.4 MHz, and a GPU (possibly a PowerVR G6430). It is equipped with 1GB of main memory [1,2].

   According to [3,4], the dual-core reaches 3.24 GFlops/s when running a matrix-matrix product (`DGEMM`), and the GPU has a peak performance of about 38.4 GFlops/s for double precision. In total, it makes roughly 40 GFlops/s. The iPhone 5s would have made it to the top500 list until the year 1999.

3. Search on the Internet for the terms *RWTH ITC primer*. This is the reference document to find information about RWTH's computing cluster and its usage. The IT Center (ITC) administers the cluster.

- Find one node/cluster of each type: large cluster (>1000 nodes), many-core CPUs (>= 32 cores), GPUs.
  - Large cluster: BULL MPI-S (1098 nodes)
  - Many-core node: BULL SMP-S (up to 128 cores)
  - GPUs: several 2-GPU nodes

[1] https://en.wikipedia.org/wiki/IPhone_5S#Hardware
[2] https://en.wikipedia.org/wiki/Apple_A7
[3] http://www.anandtech.com/show/7335/the-iphone-5s-review/4
[4] http://www.anandtech.com/show/7335/the-iphone-5s-review/7