Homework 1

Required:

1. If you don't already have an account on Hyades, stop by ISB 331 to have your account set up.
2. Go to https://software.intel.com/en-us/qualify-for-free-software/student, download **Intel Parallel Studio XE Cluster Edition** (for Windows or Linux), or **Intel Parallel Studio XE Composer Edition** (for OS X), and install it on your own laptop/PC/workstation. The Intel tools are freely available to current students attending a higher education institution.
3. Pick a computer from the top500 list (http://top500.org/lists/2015/11/), and describe it. Specify at least:
    a. Name & Location
    b. Processor microarchitecture
    c. No. of nodes, no. of processors per node, total no. of processors
    d. FLOPS per processor and total FLOPS
    e. Memory per processor and total memory
    f. Architecture
    g. Interconnect
    h. Power consumption & cost
    i. Usage
    j. Anything special?

Bonus:

4. LINPACK is the benchmark chosen to rank the top 500 supercomputers in the world (http://www.top500.org/project/linpack/). Serial implementations of Linpack, in Fortran, C and Java, can be found at http://www.netlib.org/benchmark/; and a parallel implementation (HPL) and instruction on how to run it can be found at http://www.netlib.org/benchmark/hpl/. You can also find a lot of instructions online on how to run HPL over Intel MPI and Intel MKL. Run either the serial or parallel Linpack benchmark on your own laptop/PC/workstation. Describe in details your procedure and report your results.

5. Another benchmark for rating supercomputers is Graph 500, which is focused on data intensive loads. Reference implementations (serial, OpenMP and MPI) of Graph 500 can be found at http://www.graph500.org/referencecode. Run a Graph 500 benchmark on your own laptop/PC/workstation. Describe in details your procedure and report your results.