Parallel Computing Practical Assignment #1:

In this assignment you will implement and benchmark classical matrix multiplication algorithm. This assignment should be done in C or C++.

1) Check the memory hierarchy specification of your computer, as well as the reported machine-peak. Enclose your findings in your report.
2) Verify your actual machine peak by implementing a simple loop that does not access the memory (Think how!).
3) Code, test and benchmark the following algorithms:
    a. Classical 3 nested-loops algorithm for matrix multiplication.
    b. Recursive algorithm.
    c. 6 nested-loops algorithm for matrix multiplication (blocked algorithm). Run your code on varying block sizes, while keeping n constant. Choose n such that the algorithm takes a few seconds on your machine. (try n~10,000).
4) Create a graph: The X-axis should note the block size, and the Y-axis will represent the performance (FLOPS/sec or running time). The graph should contain the following lines:
    a) Reported machine peak (according to the manufacturer).
    b) Actual machine peak (that you verified).
    c) The performance of your 3 nested-loops algorithm for the n you chose to work with.
    d) The performance of your Recursive algorithm.
    e) The performance of your 6 nested-loops algorithm with varying block sizes.
5) Explain your results in terms of the memories of your machine (one or two paragraphs).

Submit the graph as well as your 6 nested-loops code and answers to the above questions. Your submission should not exceed two pages.

Good luck!