TDDC78 Lesson Questions

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1. BLAS: Which level is mostly likely to have efficient parallel implementation even where interprocessor communication is expensive?
2. In Gaussian Elimination, if row-block-wise and column-block-wise distribution of the system matrix A are used, why load is unbalanced? Solution?
3. Describe one problem from the TDDC78 labs, that 2D-mesh would be more efficient than its 1D equivalent.
4. Parallelize the following loops in Listing 1 and 2.

```
for ( i =0; i <N; i++)
    a [ i ] = 2.0 * a [ i +1]/ b [ i ] + c [ i ] ;
```

Listing 1: Loop 1

```
for ( i =0; i <N; i++)
    a [ i +1] = 2.0 * a [ i ]/ b [ i ] + c [ i ] ;
```

Listing 2: Loop 2

5. OpenMP: Characterize the kinds of loops that perform best with static scheduling.
6. Why the code in Listing 3 is not correct? Suggest a solution without scalability problem.

```
s =0.0;
#progma omp parallel for shared ( s )
for ( i =0; i <N; i++)
    s=s+A [ i ] ;
```

Listing 3: A wrong OpenMP code

7. Explain 2D-torus, and give its maximum degree, maximum distance between any two nodes, maximum aggregated bandwidth(number of links in the topology)