Applications of Parallel Computing

Implement, in Fortran, the six different ways to perform matrix multiplication by interchanging the loops. (Use 64-bit arithmetic.) Make each implementation a subroutine, like:

```
      subroutine ijk ( a,m,n,lda,b,k,ldb,c,ldc)

      subroutine ikj ( a,m,n,lda,b,k,ldb,c,ldc)

      ...
```

Construct a driver program to generate random matrices and calls each matrix multiply routine with square matrices of orders 50, 100, 150, 200, 250, and 300, timing the calls and computing the Mflops rate.
Include in your timing routine a call to the following system supplied routines:

```
         call dgemm('No', 'No', n, n, n, 1.0d0, a, lda, b, ldb,
     $                   1.0d0, c, ldc )
```

Writeup a description of the timing and describe why the routines perform as they do. Include in your writeup ideas on how to make the matrix multiplication even faster.
You can call routine SECOND to collect the execution time.