

# DAILY REPORT

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INNOTECH VIET NAM COROPORATION

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<https://www.overleaf.com/project/604824593ac22e2b302d2c0d>

## 1 Setting up

### 1.1 Install BLIS

We need install BLASE-like Library Instantiation Software (BLIS) The following steps will install BLIS if you are using the Linux OS :

In a terminal session, in your home directory, enter

- clone <https://github.com/flame/blis.git>

```
root@cms-Standard-PC-i440FX-PIIX-1996:/home/cms/blis# git clone https://github.com/flame/blis.git
Cloning into 'blis'...
remote: Enumerating objects: 149, done.
remote: Counting objects: 100% (149/149), done.
remote: Compressing objects: 100% (108/108), done.
remote: Total 42539 (delta 74), reused 73 (delta 41), pack-reused 42390
Receiving objects: 100% (42539/42539), 40.89 MiB | 10.93 MiB/s, done.
Resolving deltas: 100% (34573/34573), done.
root@cms-Standard-PC-i440FX-PIIX-1996:/home/cms/blis# ls
```

Indicate a specific version of BLIS so that we all are using the same release

- git checkout pfhp

```
cms@cms-Standard-PC-i440FX-PIIX-1996:~/blis$ git checkout pfhp
Already on 'pfhp'
Your branch is up to date with 'origin/pfhpc'.  
_
```

Configure, build, and install with OpenMP turned on.

- ./configure -t openmp -p /blis auto
- make -j8
- check -j8
- make install

### 1.2 Cloning the LAFF-On-PfHP repository

Because all materials of the course on GitHub. On the computer where you intend to work, in a terminal session on the command line in the directory where you would like to place the materials, execute

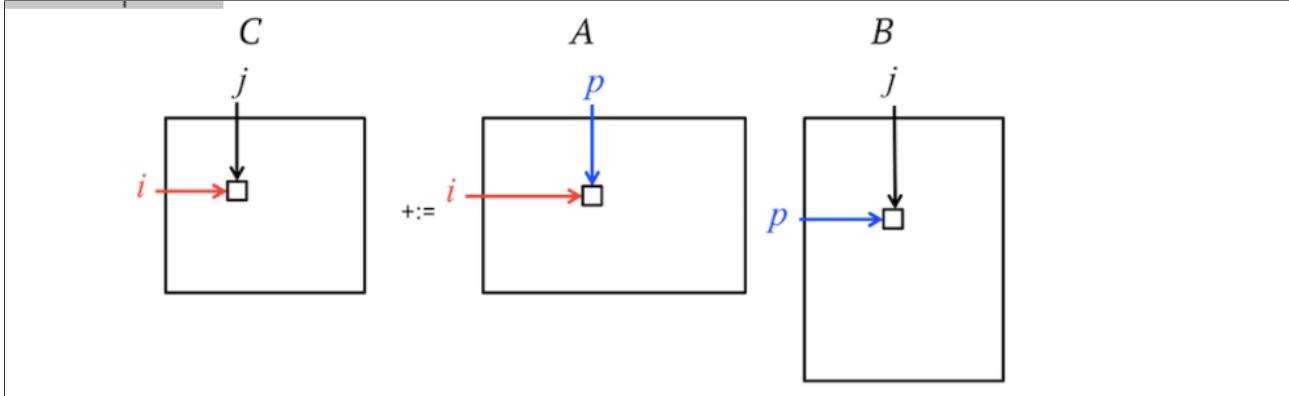
- git clone <https://github.com/ULAFF/LAFF-On-PfHP.git>

```
root@cms-Standard-PC-i440FX-PIIX-1996:/home/cms/blis# git clone https://github.com/ULAFF/LAFF-On-PfHP.git
Cloning into 'LAFF-On-PfHP'...
remote: Enumerating objects: 6, done.
remote: Counting objects: 100% (6/6), done.
remote: Compressing objects: 100% (5/5), done.
remote: Total 448 (delta 0), reused 2 (delta 0), pack-reused 442
Receiving objects: 100% (448/448), 1.63 MiB | 9.34 MiB/s, done.
Resolving deltas: 100% (229/229), done.
root@cms-Standard-PC-i440FX-PIIX-1996:/home/cms/blis# ls -l
```

## 2 Loop Orderings

### 2.1 A convention regarding the letters used for the loop index

When we talk about loops for matrix-matrix multiplication, it helps to keep in mind the picture



which illustrates which loop index (variable name) is used for what row or column of the matrices.

Consider again a simple algorithm for computing  $\mathbf{C} := \mathbf{AB} + \mathbf{C}$

```

for  $i := 0, \dots, m - 1$ 
  for  $j := 0, \dots, n - 1$ 
    for  $p := 0, \dots, k - 1$ 
       $\gamma_{i,j} := \alpha_{i,p}\beta_{p,j} + \gamma_{i,j}$ 
    end
  end
end

```

we can call this the IJP ordering of the loops around the assignment statement. Different orders in which the elements of C are updated, and the order in which terms of:

$$\alpha_{i,0}\beta_{0,j} + \cdots + \alpha_{i,k-1}\beta_{k-1,j}$$

After getting how to mapping matrices to memory. The course show us how the loop-performance get changeby ordering index.

<pre> for i := 0, ..., m - 1   for j := 0, ..., n - 1     for p := 0, ..., k - 1       <math>\gamma_{i,j} := \alpha_{i,p}\beta_{p,j} + \gamma_{i,j}</math>     end   end end </pre>		
<pre> for i := 0, ..., m - 1   for p := 0, ..., k - 1     for j := 0, ..., n - 1       <math>\gamma_{i,j} := \alpha_{i,p}\beta_{p,j} + \gamma_{i,j}</math>     end   end end </pre>		
<pre> for j := 0, ..., n - 1   for i := 0, ..., m - 1     for p := 0, ..., k - 1       <math>\gamma_{i,j} := \alpha_{i,p}\beta_{p,j} + \gamma_{i,j}</math>     end   end end </pre>		
<pre> for j := 0, ..., n - 1   for p := 0, ..., k - 1     for i := 0, ..., m - 1       <math>\gamma_{i,j} := \alpha_{i,p}\beta_{p,j} + \gamma_{i,j}</math>     end   end end </pre>		
<pre> for p := 0, ..., k - 1   for i := 0, ..., m - 1     for j := 0, ..., n - 1       <math>\gamma_{i,j} := \alpha_{i,p}\beta_{p,j} + \gamma_{i,j}</math>     end   end end </pre>		