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<u>REPORT ON DIFFERENT COMBINATIONS OF MATRIX MULTIPLICATION:</u>

- Analysis of the cache usuage by both sequential and parralel version of the Matrix Multiplication using command *perf.*

• Command : perf stat -B -e cache-references,cache-misses,cycles,instructions,branches,faults ./Matrix_Mul <input.txt

• Performance behaviour of various serial matrix multiplications:

<u>1. Performance counter stats for './ijk':</u>

```
      42,829     cache-references
       5,768     cache-misses            #   13.468 % of all cache refs
   33,22,979     cycles
   45,01,212     instructions            #    1.35  insns per cycle
    8,44,705     branches
          63     faults
 0.003604199     seconds time elapsed
```

<u>2.Performance counter stats for './ikj':</u>

```
      17,932     cache-references
       4,597     cache-misses            #   25.636 % of all cache refs
    8,41,155     cycles
    6,30,472     instructions            #    0.75  insns per cycle
    1,25,325     branches
          57     faults

   9.701099550 seconds time elapsed
```

<u>3.Performance counter stats for './jik':</u>

```
      16,629     cache-references
       4,486     cache-misses            #   26.977 % of all cache refs
    8,18,911     cycles
    6,27,563     instructions            #    0.77  insns per cycle
    1,24,915     branches
```

```
          57      faults

      2.218779679 seconds time elapsed
```

4.Performance counter stats for './jki':

```
        15,846      cache-references
         4,712     cache-misses             #   29.736 % of all cache refs
      8,25,587      cycles
      6,27,592      instructions            #    0.76  insns per cycle
      1,24,142      branches
          57      faults

      5.582936280 seconds time elapsed
```

5.Performance counter stats for './kij':

```
        17,559      cache-references
         3,297     cache-misses             #   18.777 % of all cache refs
      8,18,154      cycles
      6,09,137      instructions            #    0.74  insns per cycle
      1,21,294      branches
          56      faults

      2.978831897 seconds time elapsed
```

6. Performance counter stats for './kji':

```
        17,101      cache-references
         3,340     cache-misses             #   19.531 % of all cache refs
      8,17,388      cycles
      6,32,892      instructions            #    0.77  insns per cycle
      1,25,196      branches
          57      faults

      2.475549817 seconds time elapsed
```

Performance behaviour of various Parallel Matrix Multiplications

1. Performance counter stats for './ijk':

```
        49,006      cache-references
         7,141     cache-misses             #   14.572 % of all cache refs
    1,69,15,754      cycles
```

```
      85,95,985      instructions              #    0.51  insns per cycle
      23,48,016      branches
             79      faults

    0.004000773 seconds time elapsed
```

2.Performance counter stats for './ikj':

```
         51,474      cache-references
          7,911      cache-misses              #   15.369 % of all cache refs
    3,51,80,044      cycles
    1,73,59,922      instructions              #    0.49  insns per cycle
      48,49,526      branches
             78      faults

    0.010586715 seconds time elapsed
```

3. Performance counter stats for './jik':

```
         49,139      cache-references
          7,414      cache-misses              #   15.088 % of all cache refs
    1,54,78,243      cycles
      78,62,784      instructions              #    0.51  insns per cycle
      21,37,215      branches
             79      faults

    0.004259166 seconds time elapsed
```

4. Performance counter stats for './jki':

```
         51,538      cache-references
         11,467      cache-misses              #   22.250 % of all cache refs
    3,22,51,102      cycles
    1,60,89,355      instructions              #    0.50  insns per cycle
      44,80,496      branches
             80      faults

    0.013560489 seconds time elapsed
```

5 . Performance counter stats for './kij':

```
         45,819      cache-references
          9,395      cache-misses              #   20.505 % of all cache refs
    1,53,70,895      cycles
      77,85,176      instructions              #    0.51  insns per cycle
      21,22,355      branches
```

```
            80      faults

       0.007121015 seconds time elapsed
```

6 . Performance counter stats for './kji':

```
        36,128      cache-references
         6,769      cache-misses              #   18.736 % of all cache refs
   1,58,19,080      cycles
     80,72,070      instructions              #    0.51  insns per cycle
     22,07,927      branches
            79      faults

       0.0005593 seconds time elapsed
```

Note:

As we can observe that the parallel version of the matrix multplication is taking less time than the sequential part.