HPC Project Report

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OpenMP

Functions:

All these functions are written for variants like AB, ABT, ATB, and ATBT.

- par - parallel version using “omp for”.
- junroll_par - par + unroll on j loop by 4.
- alltile16_par - par + tiling on all loops with a tile size 16.
- permute_ikj_par - par + loop permutation from ijk to ikj.
- permute_kij_par - par + loop permutation from ijk to kij.
- junroll_permute_ikj_par - par + unroll on j loop by 4 + loop permutation from ijk to ikj.
- kunroll_permute_ikj_par - par + unroll on k loop by 4 + loop permutation from ijk to ikj.
- junrollby2_par - par + unroll on j loop by 2.

Best Cases:

- For AB:

  J inner loop gives better performance overall. Every input test gives GFLOPS above 100 leaving out cases like 16 16 4194304 and 37 37 728271.

  - 1024 1024 1024 - (ikj permutation, k unroll with ikj permutation)
  - 4096 4096 64 - (ikj permutation, k unroll with ikj permutation)
  - 8192 8192 16 - (ikj permutation, k unroll with ikj permutation)
  - 16 16 4194304 - (k unroll with ikj permutation)
  - 333 333 8991 - (ikj permutation)
  - 37 37 728271 - (ikj permutation, k unroll with ikj permutation)
  - 999 999 999 - (ikj permutation, k unroll with ikj permutation)
  - 2997 2997 111 - (ikj permutation)

- For ABT:

  J unroll works best for this overall. The GFLOPs are above 30-40.
  - 1024 1024 1024 - (j unroll)
  - 4096 4096 64 - (j unroll, j unroll by 2)
  - 8192 8192 16 - (j unroll, j unroll by 2)
  - 16 16 4194304 - (j unroll by 2)
  - 333 333 8991 - (j unroll)
  - 37 37 728271 - (j unroll)
  - 999 999 999 - (j unroll)
  - 2997 2997 111 - (j unroll)

- For ATB:

  Works best with unrolling k and having a permutation of ijk. This gives GFLOPs over 100, leaving out cases with 16 16 4194304, 37 37 728271 and 333 333 8991.

  - 1024 1024 1024 - (kij permutation, k unroll by 4 with ikj permutation)
  - 4096 4096 64 - (k unroll by 4 with ikj permutation)
  - 8192 8192 16 - (k unroll by 4 with ikj permutation)
  - 16 16 4194304 - (k unroll by 4 with ikj permutation)
  - 333 333 8991 - (k unroll by 4 with ikj permutation)
  - 37 37 728271 - (k unroll by 4 with ikj permutation)
  - 999 999 999 - (k unroll by 4 with ikj permutation)
  - 2997 2997 111 - (k unroll by 4 with ikj permutation)

- For ATBT:

  Works best with k unroll by 4 with ikj permutation and all loops tiling using tile size 16, giving GFLOPs around 30.

  - 1024 1024 1024 - (all loop tiling by 16)
  - 4096 4096 64 - (k unroll by 4 with ikj permutation)
  - 8192 8192 16 - (k unroll by 4 with ikj permutation)
  - 16 16 4194304 - (j unroll by 4)
  - 333 333 8991 - (k unroll by 4 with ikj permutation)
  - 37 37 728271 - (ikj permutation)
  - 999 999 999 - (all loop tiling by 16)
  - 2997 2997 111 - (all loop tiling by 16)

Outputs:

- For AB:
  - Lonepeak
    - 1024 1024 1024

```
[u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6197295.log
*** Assigned Lonepeak Node:  lp245

Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for AB (in GFLOPS) Min: 0.84; Max: 0.84
Performance (Best & Worst) of parallel version for ab_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.57 8.45 10.01
Worst Performance (GFLOPS): 0.57 4.97 9.76
Reference sequential code performance for AB (in GFLOPS) Min: 0.83; Max: 0.84
Performance (Best & Worst) of parallel version for ab_junroll_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.94 13.86 15.88
Worst Performance (GFLOPS): 0.94 13.84 15.65
Reference sequential code performance for AB (in GFLOPS) Min: 0.83; Max: 0.84
Performance (Best & Worst) of parallel version for ab_kunroll_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.57 8.44 10.09
Worst Performance (GFLOPS): 0.57 8.43 9.96
Reference sequential code performance for AB (in GFLOPS) Min: 0.83; Max: 0.84
Performance (Best & Worst) of parallel version for ab_alltile16_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.73 9.38 11.19
Worst Performance (GFLOPS): 0.73 9.37 11.17
Reference sequential code performance for AB (in GFLOPS) Min: 0.83; Max: 0.84
Performance (Best & Worst) of parallel version for ab_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 9.45 139.46 161.10
Worst Performance (GFLOPS): 9.45 137.37 94.56
Reference sequential code performance for AB (in GFLOPS) Min: 0.83; Max: 0.84
Performance (Best & Worst) of parallel version for ab_permute_kij_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 2.23 32.08 32.73
Worst Performance (GFLOPS): 2.23 32.00 32.45
Reference sequential code performance for AB (in GFLOPS) Min: 0.83; Max: 0.84
Performance (Best & Worst) of parallel version for ab_paralellonj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.57 8.38 9.85
Worst Performance (GFLOPS): 0.57 8.38 9.76
Reference sequential code performance for AB (in GFLOPS) Min: 0.83; Max: 0.84
Performance (Best & Worst) of parallel version for ab_paralellonj_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 7.76 0.86 0.69
Worst Performance (GFLOPS): 7.75 0.86 0.67
Reference sequential code performance for AB (in GFLOPS) Min: 0.83; Max: 0.84
Performance (Best & Worst) of parallel version for ab_junroll_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 1.83 27.14 28.30
Worst Performance (GFLOPS): 1.83 27.10 28.24
Reference sequential code performance for AB (in GFLOPS) Min: 0.83; Max: 0.84
Performance (Best & Worst) of parallel version for ab_kunroll_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 8.60 127.15 126.78
Worst Performance (GFLOPS): 8.60 122.13 125.20
```

    - 4096 4096 64

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[u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6197300.log
*** Assigned Lonepeak Node:  lp251

Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for AB (in GFLOPS) Min: 1.04; Max: 1.04
Performance (Best & Worst) of parallel version for ab_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.60 8.88 12.88
Worst Performance (GFLOPS): 0.60 6.25 10.85
Reference sequential code performance for AB (in GFLOPS) Min: 1.03; Max: 1.04
Performance (Best & Worst) of parallel version for ab_junroll_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 1.05 15.62 19.65
Worst Performance (GFLOPS): 1.05 15.60 19.20
Reference sequential code performance for AB (in GFLOPS) Min: 1.03; Max: 1.04
Performance (Best & Worst) of parallel version for ab_kunroll_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.57 8.50 12.03
Worst Performance (GFLOPS): 0.57 8.47 11.67
Reference sequential code performance for AB (in GFLOPS) Min: 1.03; Max: 1.04
Performance (Best & Worst) of parallel version for ab_alltile16_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.73 10.37 13.74
Worst Performance (GFLOPS): 0.73 10.36 13.70
Reference sequential code performance for AB (in GFLOPS) Min: 1.03; Max: 1.04
Performance (Best & Worst) of parallel version for ab_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 9.52 139.44 130.67
Worst Performance (GFLOPS): 9.52 137.01 82.36
Reference sequential code performance for AB (in GFLOPS) Min: 1.03; Max: 1.04
Performance (Best & Worst) of parallel version for ab_permute_kij_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 2.18 9.51 8.83
Worst Performance (GFLOPS): 2.18 9.49 8.76
Reference sequential code performance for AB (in GFLOPS) Min: 1.03; Max: 1.04
Performance (Best & Worst) of parallel version for ab_paralellonj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.59 8.41 11.97
Worst Performance (GFLOPS): 0.59 8.39 11.70
Reference sequential code performance for AB (in GFLOPS) Min: 1.03; Max: 1.04
Performance (Best & Worst) of parallel version for ab_paralellonj_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 8.91 3.18 2.47
Worst Performance (GFLOPS): 8.87 3.18 2.40
Reference sequential code performance for AB (in GFLOPS) Min: 1.03; Max: 1.04
Performance (Best & Worst) of parallel version for ab_junroll_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 1.79 26.67 28.45
Worst Performance (GFLOPS): 1.78 26.61 28.37
Reference sequential code performance for AB (in GFLOPS) Min: 1.03; Max: 1.04
Performance (Best & Worst) of parallel version for ab_kunroll_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 8.26 121.83 126.29
Worst Performance (GFLOPS): 8.25 120.86 125.68
```

- 8192 8192 16

```
[u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6197298.log
*** Assigned Lonepeak Node:  lp245

Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for AB (in GFLOPS) Min: 1.77; Max: 1.81
Performance (Best & Worst) of parallel version for ab_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.80 11.91 15.30
Worst Performance (GFLOPS): 0.80 8.02 11.78
Reference sequential code performance for AB (in GFLOPS) Min: 1.77; Max: 1.81
Performance (Best & Worst) of parallel version for ab_junroll_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 1.31 19.60 26.24
Worst Performance (GFLOPS): 1.31 19.53 25.77
Reference sequential code performance for AB (in GFLOPS) Min: 1.77; Max: 1.81
Performance (Best & Worst) of parallel version for ab_kunroll_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.62 9.24 13.27
Worst Performance (GFLOPS): 0.62 9.23 13.20
Reference sequential code performance for AB (in GFLOPS) Min: 1.77; Max: 1.81
Performance (Best & Worst) of parallel version for ab_alltile16_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.70 10.15 13.70
Worst Performance (GFLOPS): 0.70 10.14 13.68
Reference sequential code performance for AB (in GFLOPS) Min: 1.77; Max: 1.81
Performance (Best & Worst) of parallel version for ab_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 7.17 99.18 111.66
Worst Performance (GFLOPS): 7.16 98.38 108.15
Reference sequential code performance for AB (in GFLOPS) Min: 1.77; Max: 1.81
Performance (Best & Worst) of parallel version for ab_permute_kij_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 2.20 8.77 8.36
Worst Performance (GFLOPS): 2.20 8.75 8.34
Reference sequential code performance for AB (in GFLOPS) Min: 1.77; Max: 1.81
Performance (Best & Worst) of parallel version for ab_paralellonj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 0.80 10.62 12.61
Worst Performance (GFLOPS): 0.80 10.59 12.56
Reference sequential code performance for AB (in GFLOPS) Min: 1.77; Max: 1.81
Performance (Best & Worst) of parallel version for ab_paralellonj_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 6.96 5.81 4.37
Worst Performance (GFLOPS): 6.95 5.80 4.06
Reference sequential code performance for AB (in GFLOPS) Min: 1.77; Max: 1.81
Performance (Best & Worst) of parallel version for ab_junroll_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 1.78 26.67 28.40
Worst Performance (GFLOPS): 1.78 26.62 28.38
Reference sequential code performance for AB (in GFLOPS) Min: 1.77; Max: 1.81
Performance (Best & Worst) of parallel version for ab_kunroll_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 8.06 109.96 117.57
Worst Performance (GFLOPS): 8.06 109.30 115.29
```

- 999 999 999

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[[u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6197310.log
*** Assigned Lonepeak Node:  lp245

Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for AB (in GFLOPS) Min: 1.52; Max: 1.53
Performance (Best & Worst) of parallel version for ab_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 1.35 20.05 14.03
Worst Performance (GFLOPS): 1.35 18.56 13.85
Reference sequential code performance for AB (in GFLOPS) Min: 1.45; Max: 1.53
Performance (Best & Worst) of parallel version for ab_junroll_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 1.56 23.20 20.15
Worst Performance (GFLOPS): 1.56 23.09 18.73
Reference sequential code performance for AB (in GFLOPS) Min: 1.45; Max: 1.53
Performance (Best & Worst) of parallel version for ab_kunroll_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 1.35 19.99 14.06
Worst Performance (GFLOPS): 1.35 19.87 13.78
Reference sequential code performance for AB (in GFLOPS) Min: 1.45; Max: 1.53
Performance (Best & Worst) of parallel version for ab_alltile16_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 2.00 24.93 23.94
Worst Performance (GFLOPS): 2.00 24.89 23.90
Reference sequential code performance for AB (in GFLOPS) Min: 1.45; Max: 1.53
Performance (Best & Worst) of parallel version for ab_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 7.98 117.29 132.25
Worst Performance (GFLOPS): 7.98 116.48 131.77
Reference sequential code performance for AB (in GFLOPS) Min: 1.45; Max: 1.53
Performance (Best & Worst) of parallel version for ab_permute_kij_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 2.23 31.89 32.61
Worst Performance (GFLOPS): 2.22 31.79 32.47
Reference sequential code performance for AB (in GFLOPS) Min: 1.45; Max: 1.53
Performance (Best & Worst) of parallel version for ab_paralellonj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 1.35 19.55 12.84
Worst Performance (GFLOPS): 1.34 19.48 12.65
Reference sequential code performance for AB (in GFLOPS) Min: 1.45; Max: 1.53
Performance (Best & Worst) of parallel version for ab_paralellonj_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 6.67 0.88 0.59
Worst Performance (GFLOPS): 6.67 0.88 0.59
Reference sequential code performance for AB (in GFLOPS) Min: 1.45; Max: 1.53
Performance (Best & Worst) of parallel version for ab_junroll_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 1.78 26.35 28.17
Worst Performance (GFLOPS): 1.78 26.26 28.11
Reference sequential code performance for AB (in GFLOPS) Min: 1.45; Max: 1.53
Performance (Best & Worst) of parallel version for ab_kunroll_permute_ikj_par (in GFLOPS)1/15/31/ using 31 threads
Best Performance (GFLOPS): 8.81 130.17 141.92
Worst Performance (GFLOPS): 8.81 128.47 141.31
```

- Cade
  - 1024 1024 1024

```
For AB for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for AB (in GFLOPS) Min: 1.54;
Max: 1.55
Performance (Best & Worst) of parallel version for ab_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 11.05
Worst Performance (GFLOPS): 10.84
Reference sequential code performance for AB (in GFLOPS) Min: 1.53;
Max: 1.55
Performance (Best & Worst) of parallel version for ab_junroll_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 17.87
```

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Worst Performance (GFLOPS): 17.72
Reference sequential code performance for AB (in GFLOPS) Min: 1.54;
Max: 1.55
Performance (Best & Worst) of parallel version for ab_alltile16_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 12.58
Worst Performance (GFLOPS): 12.33
Reference sequential code performance for AB (in GFLOPS) Min: 1.54;
Max: 1.55
Performance (Best & Worst) of parallel version for ab_permute_ikj_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 151.27
Worst Performance (GFLOPS): 146.88
Reference sequential code performance for AB (in GFLOPS) Min: 1.54;
Max: 1.56
Performance (Best & Worst) of parallel version for ab_permute_kij_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 33.22
Worst Performance (GFLOPS): 33.16
Reference sequential code performance for AB (in GFLOPS) Min: 1.53;
Max: 1.55
Performance (Best & Worst) of parallel version for
ab_junroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 29.58
Worst Performance (GFLOPS): 29.56
Reference sequential code performance for AB (in GFLOPS) Min: 1.54;
Max: 1.55
Performance (Best & Worst) of parallel version for
ab_kunroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 136.33
Worst Performance (GFLOPS): 134.75
```

- 4096 4096 64

```
For AB for trial: 1
Max Threads (from omp_get_max_threads) = 16
```

```
Reference sequential code performance for AB (in GFLOPS) Min: 1.81;
Max: 1.83
Performance (Best & Worst) of parallel version for ab_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 12.51
Worst Performance (GFLOPS): 12.34
Reference sequential code performance for AB (in GFLOPS) Min: 1.81;
Max: 1.84
Performance (Best & Worst) of parallel version for ab_junroll_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 20.23
Worst Performance (GFLOPS): 18.75
Reference sequential code performance for AB (in GFLOPS) Min: 1.80;
Max: 1.84
Performance (Best & Worst) of parallel version for ab_alltile16_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 13.03
Worst Performance (GFLOPS): 12.89
Reference sequential code performance for AB (in GFLOPS) Min: 1.80;
Max: 1.84
Performance (Best & Worst) of parallel version for ab_permute_ikj_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 133.87
Worst Performance (GFLOPS): 130.57
Reference sequential code performance for AB (in GFLOPS) Min: 1.81;
Max: 1.84
Performance (Best & Worst) of parallel version for ab_permute_kij_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 9.35
Worst Performance (GFLOPS): 9.23
Reference sequential code performance for AB (in GFLOPS) Min: 1.81;
Max: 1.84
Performance (Best & Worst) of parallel version for
ab_junroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 29.68
```

```
Worst Performance (GFLOPS): 29.65
Reference sequential code performance for AB (in GFLOPS) Min: 1.79;
Max: 1.84
Performance (Best & Worst) of parallel version for
ab_kunroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 88.48
Worst Performance (GFLOPS): 87.61
```

- 8192 8192 16

```
For AB for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for AB (in GFLOPS) Min: 3.33;
Max: 3.43
Performance (Best & Worst) of parallel version for ab_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 15.43
Worst Performance (GFLOPS): 15.28
Reference sequential code performance for AB (in GFLOPS) Min: 3.23;
Max: 3.45
Performance (Best & Worst) of parallel version for ab_junroll_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 24.20
Worst Performance (GFLOPS): 23.37
Reference sequential code performance for AB (in GFLOPS) Min: 3.20;
Max: 3.43
Performance (Best & Worst) of parallel version for ab_alltile16_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 13.81
Worst Performance (GFLOPS): 13.69
Reference sequential code performance for AB (in GFLOPS) Min: 3.20;
Max: 3.41
Performance (Best & Worst) of parallel version for ab_permute_ikj_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 114.39
Worst Performance (GFLOPS): 111.20
```

```
Reference sequential code performance for AB (in GFLOPS) Min: 3.20;
Max: 3.41
Performance (Best & Worst) of parallel version for ab_permute_kij_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 8.13
Worst Performance (GFLOPS): 8.04
Reference sequential code performance for AB (in GFLOPS) Min: 3.20;
Max: 3.41
Performance (Best & Worst) of parallel version for
ab_junroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 29.60
Worst Performance (GFLOPS): 29.54
Reference sequential code performance for AB (in GFLOPS) Min: 3.19;
Max: 3.41
Performance (Best & Worst) of parallel version for
ab_kunroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 116.99
Worst Performance (GFLOPS): 115.14
```

- 16 16 4194304

```
For AB for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for AB (in GFLOPS) Min: 0.65;
Max: 0.67
Performance (Best & Worst) of parallel version for ab_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 2.66
Worst Performance (GFLOPS): 1.02
Reference sequential code performance for AB (in GFLOPS) Min: 0.51;
Max: 0.69
Performance (Best & Worst) of parallel version for ab_junroll_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 9.82
Worst Performance (GFLOPS): 6.83
```

```
Reference sequential code performance for AB (in GFLOPS) Min: 0.61;
Max: 0.66
Performance (Best & Worst) of parallel version for ab_alltile16_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 3.33
Worst Performance (GFLOPS): 3.28
Reference sequential code performance for AB (in GFLOPS) Min: 0.37;
Max: 0.64
Performance (Best & Worst) of parallel version for ab_permute_ikj_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 13.45
Worst Performance (GFLOPS): 12.69
Reference sequential code performance for AB (in GFLOPS) Min: 0.52;
Max: 0.66
Performance (Best & Worst) of parallel version for ab_permute_kij_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 0.67
Worst Performance (GFLOPS): 0.06
Reference sequential code performance for AB (in GFLOPS) Min: 0.68;
Max: 0.70
Performance (Best & Worst) of parallel version for
ab_junroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 8.47
Worst Performance (GFLOPS): 7.17
Reference sequential code performance for AB (in GFLOPS) Min: 0.60;
Max: 0.69
Performance (Best & Worst) of parallel version for
ab_kunroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 22.54
Worst Performance (GFLOPS): 20.90
```

- 37 37 728271

```
For AB for trial: 1
Max Threads (from omp_get_max_threads) = 16
```

```
Reference sequential code performance for AB (in GFLOPS) Min: 0.38;
Max: 0.44
Performance (Best & Worst) of parallel version for ab_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 3.35
Worst Performance (GFLOPS): 2.85
Reference sequential code performance for AB (in GFLOPS) Min: 0.40;
Max: 0.44
Performance (Best & Worst) of parallel version for ab_junroll_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 10.36
Worst Performance (GFLOPS): 9.33
Reference sequential code performance for AB (in GFLOPS) Min: 0.36;
Max: 0.44
Performance (Best & Worst) of parallel version for ab_alltile16_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 6.56
Worst Performance (GFLOPS): 5.30
Reference sequential code performance for AB (in GFLOPS) Min: 0.35;
Max: 0.37
Performance (Best & Worst) of parallel version for ab_permute_ikj_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 45.89
Worst Performance (GFLOPS): 44.83
Reference sequential code performance for AB (in GFLOPS) Min: 0.35;
Max: 0.44
Performance (Best & Worst) of parallel version for ab_permute_kij_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 3.41
Worst Performance (GFLOPS): 3.20
Reference sequential code performance for AB (in GFLOPS) Min: 0.44;
Max: 0.44
Performance (Best & Worst) of parallel version for
ab_junroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 25.29
```

```
Worst Performance (GFLOPS): 25.19
Reference sequential code performance for AB (in GFLOPS) Min: 0.44;
Max: 0.44
Performance (Best & Worst) of parallel version for
ab_kunroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 60.41
Worst Performance (GFLOPS): 33.45
```

- 999 999 999

```
For AB for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for AB (in GFLOPS) Min: 2.26;
Max: 2.27
Performance (Best & Worst) of parallel version for ab_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 19.32
Worst Performance (GFLOPS): 18.71
Reference sequential code performance for AB (in GFLOPS) Min: 2.20;
Max: 2.27
Performance (Best & Worst) of parallel version for ab_junroll_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 23.19
Worst Performance (GFLOPS): 22.12
Reference sequential code performance for AB (in GFLOPS) Min: 2.19;
Max: 2.27
Performance (Best & Worst) of parallel version for ab_alltile16_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 29.85
Worst Performance (GFLOPS): 29.79
Reference sequential code performance for AB (in GFLOPS) Min: 2.20;
Max: 2.27
Performance (Best & Worst) of parallel version for ab_permute_ikj_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 131.50
Worst Performance (GFLOPS): 129.21
```

```
Reference sequential code performance for AB (in GFLOPS) Min: 2.20;
Max: 2.27
Performance (Best & Worst) of parallel version for ab_permute_kij_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 33.14
Worst Performance (GFLOPS): 33.01
Reference sequential code performance for AB (in GFLOPS) Min: 2.21;
Max: 2.28
Performance (Best & Worst) of parallel version for
ab_junroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 29.67
Worst Performance (GFLOPS): 29.64
Reference sequential code performance for AB (in GFLOPS) Min: 2.20;
Max: 2.27
Performance (Best & Worst) of parallel version for
ab_kunroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 155.18
Worst Performance (GFLOPS): 150.18
```

- 2997 2997 111

```
For AB for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for AB (in GFLOPS) Min: 2.61;
Max: 2.65
Performance (Best & Worst) of parallel version for ab_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 22.80
Worst Performance (GFLOPS): 22.52
Reference sequential code performance for AB (in GFLOPS) Min: 2.45;
Max: 2.67
Performance (Best & Worst) of parallel version for ab_junroll_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 28.59
Worst Performance (GFLOPS): 26.93
```

```
Reference sequential code performance for AB (in GFLOPS) Min: 2.56;
Max: 2.69
Performance (Best & Worst) of parallel version for ab_alltile16_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 32.76
Worst Performance (GFLOPS): 16.03
Reference sequential code performance for AB (in GFLOPS) Min: 2.12;
Max: 2.69
Performance (Best & Worst) of parallel version for ab_permute_ikj_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 123.16
Worst Performance (GFLOPS): 119.18
Reference sequential code performance for AB (in GFLOPS) Min: 2.33;
Max: 2.69
Performance (Best & Worst) of parallel version for ab_permute_kij_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 9.57
Worst Performance (GFLOPS): 8.39
Reference sequential code performance for AB (in GFLOPS) Min: 2.56;
Max: 2.69
Performance (Best & Worst) of parallel version for
ab_junroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 29.65
Worst Performance (GFLOPS): 29.55
Reference sequential code performance for AB (in GFLOPS) Min: 2.50;
Max: 2.68
Performance (Best & Worst) of parallel version for
ab_kunroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 75.51
Worst Performance (GFLOPS): 73.09
```

- 333 333 8991

```
For AB for trial: 1
Max Threads (from omp_get_max_threads) = 16
```

```
Reference sequential code performance for AB (in GFLOPS) Min: 1.32;
Max: 1.36
Performance (Best & Worst) of parallel version for ab_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 12.88
Worst Performance (GFLOPS): 10.55
Reference sequential code performance for AB (in GFLOPS) Min: 1.32;
Max: 1.34
Performance (Best & Worst) of parallel version for ab_junroll_par (in
GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 22.78
Worst Performance (GFLOPS): 21.23
Reference sequential code performance for AB (in GFLOPS) Min: 1.31;
Max: 1.35
Performance (Best & Worst) of parallel version for ab_alltile16_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 24.54
Worst Performance (GFLOPS): 24.52
Reference sequential code performance for AB (in GFLOPS) Min: 1.36;
Max: 1.49
Performance (Best & Worst) of parallel version for ab_permute_ikj_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 120.37
Worst Performance (GFLOPS): 117.18
Reference sequential code performance for AB (in GFLOPS) Min: 1.42;
Max: 1.48
Performance (Best & Worst) of parallel version for ab_permute_kij_par
(in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 29.79
Worst Performance (GFLOPS): 4.65
Reference sequential code performance for AB (in GFLOPS) Min: 1.40;
Max: 1.48
Performance (Best & Worst) of parallel version for
ab_junroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 30.20
```

```
Worst Performance (GFLOPS): 30.17
Reference sequential code performance for AB (in GFLOPS) Min: 0.88;
Max: 1.48
Performance (Best & Worst) of parallel version for
ab_kunroll_permute_ikj_par (in GFLOPS)15/ using 15 threads
Best Performance (GFLOPS): 76.13
Worst Performance (GFLOPS): 63.61
```

- For ABT:
  - Lonepeak
    - 1024 1024 1024

```
[u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6197311.log
*** Assigned Lonepeak Node:  lp245

Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.56
Performance (Best & Worst) of parallel version for abt_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.54 22.86 41.58
Worst Performance (GFLOPS): 1.54 19.77 35.65
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.55
Performance (Best & Worst) of parallel version for abt_junroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 3.00 44.32 45.14
Worst Performance (GFLOPS): 3.00 44.18 44.95
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.55
Performance (Best & Worst) of parallel version for abt_kunroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.54 22.86 42.86
Worst Performance (GFLOPS): 1.54 22.82 42.17
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.55
Performance (Best & Worst) of parallel version for abt_alltile16_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.04 25.97 25.77
Worst Performance (GFLOPS): 2.04 25.68 25.68
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.55
Performance (Best & Worst) of parallel version for abt_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.82 11.67 10.95
Worst Performance (GFLOPS): 0.82 11.66 10.92
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.55
Performance (Best & Worst) of parallel version for abt_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.77 10.86 10.47
Worst Performance (GFLOPS): 0.77 10.82 10.44
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.55
Performance (Best & Worst) of parallel version for abt_paralellonj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.54 22.41 39.65
Worst Performance (GFLOPS): 1.54 22.37 39.47
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.55
Performance (Best & Worst) of parallel version for abt_paralellonj_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.81 0.89 0.67
Worst Performance (GFLOPS): 0.81 0.89 0.66
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.55
Performance (Best & Worst) of parallel version for abt_junroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.82 11.67 11.02
Worst Performance (GFLOPS): 0.82 11.64 10.95
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.55
Performance (Best & Worst) of parallel version for abt_kunroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.25 18.22 17.07
Worst Performance (GFLOPS): 1.25 18.13 14.89
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.55
Performance (Best & Worst) of parallel version for abt_junrollby8 (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.91 42.95 43.20
Worst Performance (GFLOPS): 2.90 42.81 42.95
```

    - 4096 4096 64

```
For ABT for trial: 1
[u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6197324.log
*** Assigned Lonepeak Node:  lp245

Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for ABT (in GFLOPS) Min: 2.26; Max: 2.27
Performance (Best & Worst) of parallel version for abt_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.99 29.79 42.21
Worst Performance (GFLOPS): 1.99 20.18 35.01
Reference sequential code performance for ABT (in GFLOPS) Min: 2.18; Max: 2.27
Performance (Best & Worst) of parallel version for abt_junroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.84 42.34 44.25
Worst Performance (GFLOPS): 2.84 42.25 44.06
Reference sequential code performance for ABT (in GFLOPS) Min: 2.17; Max: 2.27
Performance (Best & Worst) of parallel version for abt_kunroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.04 30.48 42.91
Worst Performance (GFLOPS): 2.04 30.42 42.10
Reference sequential code performance for ABT (in GFLOPS) Min: 2.17; Max: 2.27
Performance (Best & Worst) of parallel version for abt_alltile16_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.28 32.52 36.40
Worst Performance (GFLOPS): 2.28 32.45 36.20
Reference sequential code performance for ABT (in GFLOPS) Min: 2.18; Max: 2.27
Performance (Best & Worst) of parallel version for abt_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.74 8.92 12.49
Worst Performance (GFLOPS): 0.74 8.91 11.08
Reference sequential code performance for ABT (in GFLOPS) Min: 2.18; Max: 2.27
Performance (Best & Worst) of parallel version for abt_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.68 7.67 7.92
Worst Performance (GFLOPS): 0.68 7.65 7.88
Reference sequential code performance for ABT (in GFLOPS) Min: 2.18; Max: 2.27
Performance (Best & Worst) of parallel version for abt_paralellonj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.99 25.50 33.30
Worst Performance (GFLOPS): 1.99 25.40 23.39
Reference sequential code performance for ABT (in GFLOPS) Min: 2.18; Max: 2.27
Performance (Best & Worst) of parallel version for abt_paralellonj_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.74 3.09 2.30
Worst Performance (GFLOPS): 0.74 3.09 2.30
Reference sequential code performance for ABT (in GFLOPS) Min: 2.17; Max: 2.27
Performance (Best & Worst) of parallel version for abt_junroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.74 8.94 13.32
Worst Performance (GFLOPS): 0.74 8.93 10.54
Reference sequential code performance for ABT (in GFLOPS) Min: 2.18; Max: 2.27
Performance (Best & Worst) of parallel version for abt_kunroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.38 19.05 24.14
Worst Performance (GFLOPS): 1.38 19.02 24.05
Reference sequential code performance for ABT (in GFLOPS) Min: 2.17; Max: 2.27
Performance (Best & Worst) of parallel version for abt_junrollby8 (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.67 39.81 42.10
Worst Performance (GFLOPS): 2.67 39.44 41.87
```

- 8192 8192 16

```
[u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6197323.log
*** Assigned Lonepeak Node:  lp245

Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for ABT (in GFLOPS) Min: 2.71; Max: 3.15
Performance (Best & Worst) of parallel version for abt_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.52 37.68 41.70
Worst Performance (GFLOPS): 2.52 18.83 30.39
Reference sequential code performance for ABT (in GFLOPS) Min: 2.71; Max: 3.13
Performance (Best & Worst) of parallel version for abt_junroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.83 42.19 43.08
Worst Performance (GFLOPS): 2.83 42.10 42.88
Reference sequential code performance for ABT (in GFLOPS) Min: 2.71; Max: 3.13
Performance (Best & Worst) of parallel version for abt_kunroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.63 39.31 42.52
Worst Performance (GFLOPS): 2.63 38.86 42.49
Reference sequential code performance for ABT (in GFLOPS) Min: 2.71; Max: 3.13
Performance (Best & Worst) of parallel version for abt_alltile16_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.23 32.92 37.57
Worst Performance (GFLOPS): 2.23 32.51 37.52
Reference sequential code performance for ABT (in GFLOPS) Min: 2.71; Max: 3.13
Performance (Best & Worst) of parallel version for abt_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.85 12.50 22.02
Worst Performance (GFLOPS): 0.85 12.49 21.71
Reference sequential code performance for ABT (in GFLOPS) Min: 2.71; Max: 3.13
Performance (Best & Worst) of parallel version for abt_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.82 8.48 8.46
Worst Performance (GFLOPS): 0.82 8.47 8.43
Reference sequential code performance for ABT (in GFLOPS) Min: 2.71; Max: 3.13
Performance (Best & Worst) of parallel version for abt_paralellonj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.52 28.36 27.23
Worst Performance (GFLOPS): 2.52 28.04 27.10
Reference sequential code performance for ABT (in GFLOPS) Min: 2.71; Max: 3.13
Performance (Best & Worst) of parallel version for abt_paralellonj_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.85 5.05 3.87
Worst Performance (GFLOPS): 0.85 5.04 3.84
Reference sequential code performance for ABT (in GFLOPS) Min: 2.71; Max: 3.13
Performance (Best & Worst) of parallel version for abt_junroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.85 12.49 21.89
Worst Performance (GFLOPS): 0.85 12.48 21.77
Reference sequential code performance for ABT (in GFLOPS) Min: 2.71; Max: 3.13
Performance (Best & Worst) of parallel version for abt_kunroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.34 34.62 37.88
Worst Performance (GFLOPS): 2.34 34.31 37.83
Reference sequential code performance for ABT (in GFLOPS) Min: 2.71; Max: 3.13
Performance (Best & Worst) of parallel version for abt_junrollby8 (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.86 42.63 43.97
Worst Performance (GFLOPS): 2.86 42.55 43.89
```

- 999 999 999

```
[u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6197325.log
*** Assigned Lonepeak Node:  lp251

Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for ABT (in GFLOPS) Min: 1.56; Max: 1.56
Performance (Best & Worst) of parallel version for abt_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.54 20.14 40.95
Worst Performance (GFLOPS): 1.54 18.55 32.36
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.56
Performance (Best & Worst) of parallel version for abt_junroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 3.00 44.59 45.53
Worst Performance (GFLOPS): 3.00 22.27 43.17
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.56
Performance (Best & Worst) of parallel version for abt_kunroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.54 23.00 42.35
Worst Performance (GFLOPS): 1.54 22.93 30.27
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.56
Performance (Best & Worst) of parallel version for abt_alltile16_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.30 28.71 27.37
Worst Performance (GFLOPS): 2.30 28.65 27.27
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.56
Performance (Best & Worst) of parallel version for abt_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.39 20.65 14.15
Worst Performance (GFLOPS): 1.39 20.61 13.99
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.56
Performance (Best & Worst) of parallel version for abt_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.40 20.45 14.19
Worst Performance (GFLOPS): 1.40 20.31 14.12
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.56
Performance (Best & Worst) of parallel version for abt_paralellonj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.54 22.39 39.25
Worst Performance (GFLOPS): 1.54 22.30 39.07
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.56
Performance (Best & Worst) of parallel version for abt_paralellonj_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.34 0.90 0.63
Worst Performance (GFLOPS): 1.33 0.89 0.62
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.56
Performance (Best & Worst) of parallel version for abt_junroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.39 20.61 14.09
Worst Performance (GFLOPS): 1.39 20.29 14.06
Reference sequential code performance for ABT (in GFLOPS) Min: 1.55; Max: 1.56
Performance (Best & Worst) of parallel version for abt_kunroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.83 27.24 22.21
Worst Performance (GFLOPS): 1.83 26.97 20.96
```

- Cade
  - 1024 1024 1024

```
For ABT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ABT (in GFLOPS) Min: 2.32;
Max: 2.34
Performance (Best & Worst) of parallel version for abt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 33.59
Worst Performance (GFLOPS): 33.23
Reference sequential code performance for ABT (in GFLOPS) Min: 2.33;
Max: 2.35
Performance (Best & Worst) of parallel version for abt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 45.14
Worst Performance (GFLOPS): 45.09
Reference sequential code performance for ABT (in GFLOPS) Min: 2.32;
Max: 2.34
Performance (Best & Worst) of parallel version for abt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 31.78
Worst Performance (GFLOPS): 31.72
Reference sequential code performance for ABT (in GFLOPS) Min: 2.32;
Max: 2.33
Performance (Best & Worst) of parallel version for
abt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 12.62
Worst Performance (GFLOPS): 12.13
Reference sequential code performance for ABT (in GFLOPS) Min: 2.33;
Max: 2.35
Performance (Best & Worst) of parallel version for
abt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 12.27
Worst Performance (GFLOPS): 12.14
```

```
Reference sequential code performance for ABT (in GFLOPS) Min: 2.32;
Max: 2.34
Performance (Best & Worst) of parallel version for
abt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 12.24
Worst Performance (GFLOPS): 11.89
Reference sequential code performance for ABT (in GFLOPS) Min: 2.32;
Max: 2.34
Performance (Best & Worst) of parallel version for
abt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 20.02
Worst Performance (GFLOPS): 19.47
Reference sequential code performance for ABT (in GFLOPS) Min: 2.32;
Max: 2.34
Performance (Best & Worst) of parallel version for abt_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 44.90
Worst Performance (GFLOPS): 44.85
```

- 4096 4096 64

```
For ABT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ABT (in GFLOPS) Min: 3.62;
Max: 3.69
Performance (Best & Worst) of parallel version for abt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 29.86
Worst Performance (GFLOPS): 29.45
Reference sequential code performance for ABT (in GFLOPS) Min: 3.38;
Max: 3.68
Performance (Best & Worst) of parallel version for abt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 44.69
Worst Performance (GFLOPS): 36.35
```

```
Reference sequential code performance for ABT (in GFLOPS) Min: 3.68;
Max: 3.72
Performance (Best & Worst) of parallel version for abt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 38.22
Worst Performance (GFLOPS): 38.05
Reference sequential code performance for ABT (in GFLOPS) Min: 3.68;
Max: 3.75
Performance (Best & Worst) of parallel version for
abt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 9.98
Worst Performance (GFLOPS): 8.90
Reference sequential code performance for ABT (in GFLOPS) Min: 3.39;
Max: 3.72
Performance (Best & Worst) of parallel version for
abt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 8.25
Worst Performance (GFLOPS): 8.08
Reference sequential code performance for ABT (in GFLOPS) Min: 3.21;
Max: 3.72
Performance (Best & Worst) of parallel version for
abt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 8.84
Worst Performance (GFLOPS): 8.32
Reference sequential code performance for ABT (in GFLOPS) Min: 3.41;
Max: 3.70
Performance (Best & Worst) of parallel version for
abt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 19.08
Worst Performance (GFLOPS): 18.22
Reference sequential code performance for ABT (in GFLOPS) Min: 3.40;
Max: 3.69
Performance (Best & Worst) of parallel version for abt_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 39.53
```

```
Worst Performance (GFLOPS): 38.30
```

- 8192 8192 16

```
For ABT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ABT (in GFLOPS) Min: 4.70;
Max: 5.00
Performance (Best & Worst) of parallel version for abt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 41.98
Worst Performance (GFLOPS): 41.22
Reference sequential code performance for ABT (in GFLOPS) Min: 4.53;
Max: 5.02
Performance (Best & Worst) of parallel version for abt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 43.92
Worst Performance (GFLOPS): 43.19
Reference sequential code performance for ABT (in GFLOPS) Min: 4.47;
Max: 5.00
Performance (Best & Worst) of parallel version for abt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 37.87
Worst Performance (GFLOPS): 37.62
Reference sequential code performance for ABT (in GFLOPS) Min: 4.54;
Max: 4.98
Performance (Best & Worst) of parallel version for
abt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 16.12
Worst Performance (GFLOPS): 15.08
Reference sequential code performance for ABT (in GFLOPS) Min: 4.47;
Max: 4.97
Performance (Best & Worst) of parallel version for
abt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 7.90
Worst Performance (GFLOPS): 7.71
```

```
Reference sequential code performance for ABT (in GFLOPS) Min: 4.57;
Max: 5.01
Performance (Best & Worst) of parallel version for
abt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 16.41
Worst Performance (GFLOPS): 16.32
Reference sequential code performance for ABT (in GFLOPS) Min: 4.56;
Max: 5.01
Performance (Best & Worst) of parallel version for
abt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 37.13
Worst Performance (GFLOPS): 37.08
Reference sequential code performance for ABT (in GFLOPS) Min: 4.55;
Max: 4.99
Performance (Best & Worst) of parallel version for abt_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 43.48
Worst Performance (GFLOPS): 41.71
```

- 16 16 4194304

```
For ABT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ABT (in GFLOPS) Min: 1.89;
Max: 2.11
Performance (Best & Worst) of parallel version for abt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 10.31
Worst Performance (GFLOPS): 9.65
Reference sequential code performance for ABT (in GFLOPS) Min: 2.00;
Max: 2.11
Performance (Best & Worst) of parallel version for abt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 12.91
Worst Performance (GFLOPS): 11.91
```

```
Reference sequential code performance for ABT (in GFLOPS) Min: 2.10;
Max: 2.12
Performance (Best & Worst) of parallel version for abt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 2.29
Worst Performance (GFLOPS): 1.95
Reference sequential code performance for ABT (in GFLOPS) Min: 2.08;
Max: 2.12
Performance (Best & Worst) of parallel version for
abt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 4.76
Worst Performance (GFLOPS): 4.67
Reference sequential code performance for ABT (in GFLOPS) Min: 2.10;
Max: 2.11
Performance (Best & Worst) of parallel version for
abt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 0.74
Worst Performance (GFLOPS): 0.34
Reference sequential code performance for ABT (in GFLOPS) Min: 2.05;
Max: 2.11
Performance (Best & Worst) of parallel version for
abt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 4.62
Worst Performance (GFLOPS): 4.58
Reference sequential code performance for ABT (in GFLOPS) Min: 1.98;
Max: 2.12
Performance (Best & Worst) of parallel version for
abt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 8.24
Worst Performance (GFLOPS): 7.78
Reference sequential code performance for ABT (in GFLOPS) Min: 2.12;
Max: 2.13
Performance (Best & Worst) of parallel version for abt_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 19.10
```

```
Worst Performance (GFLOPS): 19.01
```

- 37 37 728271

```
For ABT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ABT (in GFLOPS) Min: 2.14;
Max: 2.15
Performance (Best & Worst) of parallel version for abt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 15.91
Worst Performance (GFLOPS): 13.54
Reference sequential code performance for ABT (in GFLOPS) Min: 2.12;
Max: 2.15
Performance (Best & Worst) of parallel version for abt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 33.32
Worst Performance (GFLOPS): 13.70
Reference sequential code performance for ABT (in GFLOPS) Min: 2.13;
Max: 2.15
Performance (Best & Worst) of parallel version for abt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 7.46
Worst Performance (GFLOPS): 7.45
Reference sequential code performance for ABT (in GFLOPS) Min: 2.13;
Max: 2.15
Performance (Best & Worst) of parallel version for
abt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 7.77
Worst Performance (GFLOPS): 6.54
Reference sequential code performance for ABT (in GFLOPS) Min: 2.14;
Max: 2.16
Performance (Best & Worst) of parallel version for
abt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 3.32
Worst Performance (GFLOPS): 3.20
```

```
Reference sequential code performance for ABT (in GFLOPS) Min: 2.14;
Max: 2.17
Performance (Best & Worst) of parallel version for
abt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.81
Worst Performance (GFLOPS): 6.10
Reference sequential code performance for ABT (in GFLOPS) Min: 2.13;
Max: 2.15
Performance (Best & Worst) of parallel version for
abt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 21.04
Worst Performance (GFLOPS): 17.40
Reference sequential code performance for ABT (in GFLOPS) Min: 2.14;
Max: 2.16
Performance (Best & Worst) of parallel version for abt_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 22.97
Worst Performance (GFLOPS): 17.10
```

- 999 999 999

```
For ABT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ABT (in GFLOPS) Min: 2.34;
Max: 2.35
Performance (Best & Worst) of parallel version for abt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 33.17
Worst Performance (GFLOPS): 32.77
Reference sequential code performance for ABT (in GFLOPS) Min: 2.33;
Max: 2.35
Performance (Best & Worst) of parallel version for abt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 45.03
Worst Performance (GFLOPS): 44.91
```

```
Reference sequential code performance for ABT (in GFLOPS) Min: 2.34;
Max: 2.34
Performance (Best & Worst) of parallel version for abt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 33.97
Worst Performance (GFLOPS): 33.90
Reference sequential code performance for ABT (in GFLOPS) Min: 2.33;
Max: 2.35
Performance (Best & Worst) of parallel version for
abt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 12.33
Worst Performance (GFLOPS): 12.23
Reference sequential code performance for ABT (in GFLOPS) Min: 2.33;
Max: 2.35
Performance (Best & Worst) of parallel version for
abt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 12.08
Worst Performance (GFLOPS): 11.86
Reference sequential code performance for ABT (in GFLOPS) Min: 2.33;
Max: 2.35
Performance (Best & Worst) of parallel version for
abt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 19.45
Worst Performance (GFLOPS): 18.72
Reference sequential code performance for ABT (in GFLOPS) Min: 2.34;
Max: 2.35
Performance (Best & Worst) of parallel version for
abt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 25.05
Worst Performance (GFLOPS): 23.38
Reference sequential code performance for ABT (in GFLOPS) Min: 2.34;
Max: 2.34
Performance (Best & Worst) of parallel version for abt_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 44.66
```

```
Worst Performance (GFLOPS): 44.56
```

- 2997 2997 111

```
For ABT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ABT (in GFLOPS) Min: 2.54;
Max: 2.98
Performance (Best & Worst) of parallel version for abt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 24.90
Worst Performance (GFLOPS): 11.79
Reference sequential code performance for ABT (in GFLOPS) Min: 2.83;
Max: 3.01
Performance (Best & Worst) of parallel version for abt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 27.37
Worst Performance (GFLOPS): 25.37
Reference sequential code performance for ABT (in GFLOPS) Min: 2.56;
Max: 3.01
Performance (Best & Worst) of parallel version for abt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 24.97
Worst Performance (GFLOPS): 20.95
Reference sequential code performance for ABT (in GFLOPS) Min: 1.33;
Max: 2.97
Performance (Best & Worst) of parallel version for
abt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 5.18
Worst Performance (GFLOPS): 3.00
Reference sequential code performance for ABT (in GFLOPS) Min: 1.86;
Max: 2.98
Performance (Best & Worst) of parallel version for
abt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 5.55
Worst Performance (GFLOPS): 4.16
```

```
Reference sequential code performance for ABT (in GFLOPS) Min: 2.45;
Max: 3.01
Performance (Best & Worst) of parallel version for
abt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 4.35
Worst Performance (GFLOPS): 3.46
Reference sequential code performance for ABT (in GFLOPS) Min: 2.20;
Max: 3.00
Performance (Best & Worst) of parallel version for
abt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 10.83
Worst Performance (GFLOPS): 10.05
Reference sequential code performance for ABT (in GFLOPS) Min: 2.32;
Max: 2.82
Performance (Best & Worst) of parallel version for abt_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 26.99
Worst Performance (GFLOPS): 24.97
```

- 333 333 8991

```
For ABT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ABT (in GFLOPS) Min: 2.11;
Max: 2.17
Performance (Best & Worst) of parallel version for abt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 20.22
Worst Performance (GFLOPS): 15.90
Reference sequential code performance for ABT (in GFLOPS) Min: 1.64;
Max: 2.19
Performance (Best & Worst) of parallel version for abt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 29.61
Worst Performance (GFLOPS): 26.27
```

```
Reference sequential code performance for ABT (in GFLOPS) Min: 2.11;
Max: 2.18
Performance (Best & Worst) of parallel version for abt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 27.81
Worst Performance (GFLOPS): 14.66
Reference sequential code performance for ABT (in GFLOPS) Min: 0.68;
Max: 2.17
Performance (Best & Worst) of parallel version for
abt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 11.41
Worst Performance (GFLOPS): 8.58
Reference sequential code performance for ABT (in GFLOPS) Min: 1.38;
Max: 2.18
Performance (Best & Worst) of parallel version for
abt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.62
Worst Performance (GFLOPS): 0.86
Reference sequential code performance for ABT (in GFLOPS) Min: 2.08;
Max: 2.17
Performance (Best & Worst) of parallel version for
abt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 11.03
Worst Performance (GFLOPS): 8.76
Reference sequential code performance for ABT (in GFLOPS) Min: 1.72;
Max: 2.16
Performance (Best & Worst) of parallel version for
abt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 17.91
Worst Performance (GFLOPS): 16.34
Reference sequential code performance for ABT (in GFLOPS) Min: 1.97;
Max: 2.17
Performance (Best & Worst) of parallel version for abt_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 27.88
```

```
Worst Performance (GFLOPS): 24.56
```

- For ATB:
  - Lonepeak
    - 8192 8192 16

```
[u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6197332.log
*** Assigned Lonepeak Node:  lp251

Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.67 9.77 12.04
Worst Performance (GFLOPS): 0.67 8.64 11.79
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_junroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.18 17.52 21.57
Worst Performance (GFLOPS): 1.18 17.49 21.46
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_kunroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.54 8.09 10.84
Worst Performance (GFLOPS): 0.54 8.08 10.82
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_alltile16_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.59 8.65 10.76
Worst Performance (GFLOPS): 0.59 8.64 10.72
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.28 33.93 34.55
Worst Performance (GFLOPS): 2.28 33.65 34.49
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 4.00 8.85 8.51
Worst Performance (GFLOPS): 3.99 8.83 8.50
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_paralellonj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.58 8.05 10.14
Worst Performance (GFLOPS): 0.58 8.04 9.41
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_paralellonj_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 6.98 5.62 4.38
Worst Performance (GFLOPS): 6.98 5.61 4.35
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_junroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.27 33.86 34.98
Worst Performance (GFLOPS): 2.27 33.65 34.89
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_kunroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 8.01 109.46 117.52
Worst Performance (GFLOPS): 8.01 106.32 115.82
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_junrollby8 (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.85 12.71 16.77
Worst Performance (GFLOPS): 0.85 12.70 16.70
Reference sequential code performance for ATB (in GFLOPS) Min: 1.10; Max: 1.10
Performance (Best & Worst) of parallel version for atb_kunroll_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 7.88 35.70 34.40
Worst Performance (GFLOPS): 7.87 35.57 34.31
```

  - Cade
    - 1024 1024 1024

```
For ATB for trial: 1
```

```
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATB (in GFLOPS) Min: 0.83;
Max: 0.84
Performance (Best & Worst) of parallel version for atb_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 4.33
Worst Performance (GFLOPS): 4.22
Reference sequential code performance for ATB (in GFLOPS) Min: 0.84;
Max: 0.84
Performance (Best & Worst) of parallel version for atb_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 12.36
Worst Performance (GFLOPS): 12.28
Reference sequential code performance for ATB (in GFLOPS) Min: 0.84;
Max: 0.85
Performance (Best & Worst) of parallel version for atb_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 10.88
Worst Performance (GFLOPS): 10.80
Reference sequential code performance for ATB (in GFLOPS) Min: 0.84;
Max: 0.85
Performance (Best & Worst) of parallel version for
atb_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 33.88
Worst Performance (GFLOPS): 33.71
Reference sequential code performance for ATB (in GFLOPS) Min: 0.84;
Max: 0.85
Performance (Best & Worst) of parallel version for
atb_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 105.35
Worst Performance (GFLOPS): 104.59
Reference sequential code performance for ATB (in GFLOPS) Min: 0.84;
Max: 0.85
Performance (Best & Worst) of parallel version for
atb_junroll_permute_ikj_par (in GFLOPS) using 15 threads
```

```
Best Performance (GFLOPS): 33.87
Worst Performance (GFLOPS): 33.77
Reference sequential code performance for ATB (in GFLOPS) Min: 0.84;
Max: 0.85
Performance (Best & Worst) of parallel version for
atb_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 134.07
Worst Performance (GFLOPS): 128.29
Reference sequential code performance for ATB (in GFLOPS) Min: 0.84;
Max: 0.85
Performance (Best & Worst) of parallel version for atb_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 7.13
Worst Performance (GFLOPS): 7.09
```

- 4096 4096 64

```
For ATB for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATB (in GFLOPS) Min: 1.30;
Max: 1.32
Performance (Best & Worst) of parallel version for atb_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 9.72
Worst Performance (GFLOPS): 9.19
Reference sequential code performance for ATB (in GFLOPS) Min: 1.31;
Max: 1.32
Performance (Best & Worst) of parallel version for atb_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 17.10
Worst Performance (GFLOPS): 16.60
Reference sequential code performance for ATB (in GFLOPS) Min: 1.30;
Max: 1.31
Performance (Best & Worst) of parallel version for atb_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 11.50
```

```
Worst Performance (GFLOPS): 11.27
Reference sequential code performance for ATB (in GFLOPS) Min: 1.30;
Max: 1.32
Performance (Best & Worst) of parallel version for
atb_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 34.12
Worst Performance (GFLOPS): 34.07
Reference sequential code performance for ATB (in GFLOPS) Min: 1.30;
Max: 1.32
Performance (Best & Worst) of parallel version for
atb_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 9.38
Worst Performance (GFLOPS): 9.32
Reference sequential code performance for ATB (in GFLOPS) Min: 1.30;
Max: 1.31
Performance (Best & Worst) of parallel version for
atb_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 34.10
Worst Performance (GFLOPS): 33.96
Reference sequential code performance for ATB (in GFLOPS) Min: 1.29;
Max: 1.32
Performance (Best & Worst) of parallel version for
atb_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 134.01
Worst Performance (GFLOPS): 130.47
Reference sequential code performance for ATB (in GFLOPS) Min: 1.31;
Max: 1.32
Performance (Best & Worst) of parallel version for atb_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 13.54
Worst Performance (GFLOPS): 13.48
```

- 8192 8192 16

```
For ATB for trial: 1
Max Threads (from omp_get_max_threads) = 16
```

```
Reference sequential code performance for ATB (in GFLOPS) Min: 2.27;
Max: 2.28
Performance (Best & Worst) of parallel version for atb_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 12.73
Worst Performance (GFLOPS): 12.44
Reference sequential code performance for ATB (in GFLOPS) Min: 2.23;
Max: 2.28
Performance (Best & Worst) of parallel version for atb_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 22.02
Worst Performance (GFLOPS): 21.96
Reference sequential code performance for ATB (in GFLOPS) Min: 2.23;
Max: 2.31
Performance (Best & Worst) of parallel version for atb_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 11.55
Worst Performance (GFLOPS): 11.51
Reference sequential code performance for ATB (in GFLOPS) Min: 2.22;
Max: 2.28
Performance (Best & Worst) of parallel version for
atb_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 33.98
Worst Performance (GFLOPS): 33.93
Reference sequential code performance for ATB (in GFLOPS) Min: 2.21;
Max: 2.28
Performance (Best & Worst) of parallel version for
atb_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 8.10
Worst Performance (GFLOPS): 8.07
Reference sequential code performance for ATB (in GFLOPS) Min: 2.21;
Max: 2.28
Performance (Best & Worst) of parallel version for
atb_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 33.95
```

```
Worst Performance (GFLOPS): 31.69
Reference sequential code performance for ATB (in GFLOPS) Min: 2.22;
Max: 2.30
Performance (Best & Worst) of parallel version for
atb_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 116.21
Worst Performance (GFLOPS): 113.39
Reference sequential code performance for ATB (in GFLOPS) Min: 2.22;
Max: 2.29
Performance (Best & Worst) of parallel version for atb_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 16.93
Worst Performance (GFLOPS): 16.80
```

- 16 16 4194304

```
For ATB for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATB (in GFLOPS) Min: 0.38;
Max: 0.38
Performance (Best & Worst) of parallel version for atb_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 2.29
Worst Performance (GFLOPS): 1.95
Reference sequential code performance for ATB (in GFLOPS) Min: 0.38;
Max: 0.38
Performance (Best & Worst) of parallel version for atb_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 8.52
Worst Performance (GFLOPS): 7.98
Reference sequential code performance for ATB (in GFLOPS) Min: 0.38;
Max: 0.38
Performance (Best & Worst) of parallel version for atb_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 3.16
Worst Performance (GFLOPS): 3.15
```

```
Reference sequential code performance for ATB (in GFLOPS) Min: 0.38;
Max: 0.38
Performance (Best & Worst) of parallel version for
atb_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.59
Worst Performance (GFLOPS): 6.03
Reference sequential code performance for ATB (in GFLOPS) Min: 0.38;
Max: 0.38
Performance (Best & Worst) of parallel version for
atb_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 0.76
Worst Performance (GFLOPS): 0.73
Reference sequential code performance for ATB (in GFLOPS) Min: 0.38;
Max: 0.38
Performance (Best & Worst) of parallel version for
atb_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.26
Worst Performance (GFLOPS): 5.77
Reference sequential code performance for ATB (in GFLOPS) Min: 0.38;
Max: 0.38
Performance (Best & Worst) of parallel version for
atb_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 13.59
Worst Performance (GFLOPS): 13.02
Reference sequential code performance for ATB (in GFLOPS) Min: 0.38;
Max: 0.38
Performance (Best & Worst) of parallel version for atb_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 5.03
Worst Performance (GFLOPS): 4.15
```

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```
For ATB for trial: 1
Max Threads (from omp_get_max_threads) = 16
```

```
Reference sequential code performance for ATB (in GFLOPS) Min: 0.15;
Max: 0.19
Performance (Best & Worst) of parallel version for atb_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 1.64
Worst Performance (GFLOPS): 1.18
Reference sequential code performance for ATB (in GFLOPS) Min: 0.15;
Max: 0.19
Performance (Best & Worst) of parallel version for atb_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.32
Worst Performance (GFLOPS): 5.67
Reference sequential code performance for ATB (in GFLOPS) Min: 0.16;
Max: 0.19
Performance (Best & Worst) of parallel version for atb_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 5.94
Worst Performance (GFLOPS): 5.90
Reference sequential code performance for ATB (in GFLOPS) Min: 0.19;
Max: 0.19
Performance (Best & Worst) of parallel version for
atb_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 20.87
Worst Performance (GFLOPS): 18.96
Reference sequential code performance for ATB (in GFLOPS) Min: 0.19;
Max: 0.19
Performance (Best & Worst) of parallel version for
atb_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 3.62
Worst Performance (GFLOPS): 3.53
Reference sequential code performance for ATB (in GFLOPS) Min: 0.19;
Max: 0.19
Performance (Best & Worst) of parallel version for
atb_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 21.28
```

```
Worst Performance (GFLOPS): 17.22
Reference sequential code performance for ATB (in GFLOPS) Min: 0.19;
Max: 0.20
Performance (Best & Worst) of parallel version for
atb_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 38.23
Worst Performance (GFLOPS): 35.55
Reference sequential code performance for ATB (in GFLOPS) Min: 0.20;
Max: 0.20
Performance (Best & Worst) of parallel version for atb_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 3.99
Worst Performance (GFLOPS): 3.82
```

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```
For ATB for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATB (in GFLOPS) Min: 1.38;
Max: 1.39
Performance (Best & Worst) of parallel version for atb_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 3.91
Worst Performance (GFLOPS): 3.84
Reference sequential code performance for ATB (in GFLOPS) Min: 1.39;
Max: 1.50
Performance (Best & Worst) of parallel version for atb_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 12.54
Worst Performance (GFLOPS): 12.10
Reference sequential code performance for ATB (in GFLOPS) Min: 1.49;
Max: 1.50
Performance (Best & Worst) of parallel version for atb_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 25.75
Worst Performance (GFLOPS): 25.71
```

```
Reference sequential code performance for ATB (in GFLOPS) Min: 1.49;
Max: 1.49
Performance (Best & Worst) of parallel version for
atb_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 30.98
Worst Performance (GFLOPS): 30.50
Reference sequential code performance for ATB (in GFLOPS) Min: 1.48;
Max: 1.50
Performance (Best & Worst) of parallel version for
atb_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 99.94
Worst Performance (GFLOPS): 99.27
Reference sequential code performance for ATB (in GFLOPS) Min: 1.49;
Max: 1.49
Performance (Best & Worst) of parallel version for
atb_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 33.63
Worst Performance (GFLOPS): 33.58
Reference sequential code performance for ATB (in GFLOPS) Min: 1.48;
Max: 1.49
Performance (Best & Worst) of parallel version for
atb_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 147.12
Worst Performance (GFLOPS): 117.19
Reference sequential code performance for ATB (in GFLOPS) Min: 1.48;
Max: 1.50
Performance (Best & Worst) of parallel version for atb_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 7.51
Worst Performance (GFLOPS): 7.29
```

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```
For ATB for trial: 1
Max Threads (from omp_get_max_threads) = 16
```

```
Reference sequential code performance for ATB (in GFLOPS) Min: 2.08;
Max: 2.58
Performance (Best & Worst) of parallel version for atb_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 14.54
Worst Performance (GFLOPS): 9.61
Reference sequential code performance for ATB (in GFLOPS) Min: 2.33;
Max: 2.58
Performance (Best & Worst) of parallel version for atb_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 16.91
Worst Performance (GFLOPS): 14.09
Reference sequential code performance for ATB (in GFLOPS) Min: 2.33;
Max: 2.57
Performance (Best & Worst) of parallel version for atb_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 16.79
Worst Performance (GFLOPS): 15.33
Reference sequential code performance for ATB (in GFLOPS) Min: 2.37;
Max: 2.45
Performance (Best & Worst) of parallel version for
atb_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 22.39
Worst Performance (GFLOPS): 13.78
Reference sequential code performance for ATB (in GFLOPS) Min: 1.61;
Max: 2.58
Performance (Best & Worst) of parallel version for
atb_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.90
Worst Performance (GFLOPS): 1.85
Reference sequential code performance for ATB (in GFLOPS) Min: 2.43;
Max: 2.59
Performance (Best & Worst) of parallel version for
atb_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 22.28
```

```
Worst Performance (GFLOPS): 13.45
Reference sequential code performance for ATB (in GFLOPS) Min: 2.42;
Max: 2.56
Performance (Best & Worst) of parallel version for
atb_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 110.66
Worst Performance (GFLOPS): 72.82
Reference sequential code performance for ATB (in GFLOPS) Min: 2.03;
Max: 2.56
Performance (Best & Worst) of parallel version for atb_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 15.13
Worst Performance (GFLOPS): 8.35
```

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```
For ATB for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATB (in GFLOPS) Min: 0.65;
Max: 0.69
Performance (Best & Worst) of parallel version for atb_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 3.88
Worst Performance (GFLOPS): 2.49
Reference sequential code performance for ATB (in GFLOPS) Min: 0.62;
Max: 0.80
Performance (Best & Worst) of parallel version for atb_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 7.79
Worst Performance (GFLOPS): 5.17
Reference sequential code performance for ATB (in GFLOPS) Min: 0.72;
Max: 0.84
Performance (Best & Worst) of parallel version for atb_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 20.93
Worst Performance (GFLOPS): 18.48
```

```
Reference sequential code performance for ATB (in GFLOPS) Min: 0.44;
Max: 0.82
Performance (Best & Worst) of parallel version for
atb_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 17.81
Worst Performance (GFLOPS): 14.42
Reference sequential code performance for ATB (in GFLOPS) Min: 0.44;
Max: 0.83
Performance (Best & Worst) of parallel version for
atb_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 3.45
Worst Performance (GFLOPS): 3.16
Reference sequential code performance for ATB (in GFLOPS) Min: 0.81;
Max: 0.83
Performance (Best & Worst) of parallel version for
atb_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 18.89
Worst Performance (GFLOPS): 14.26
Reference sequential code performance for ATB (in GFLOPS) Min: 0.75;
Max: 0.76
Performance (Best & Worst) of parallel version for
atb_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 48.64
Worst Performance (GFLOPS): 47.92
Reference sequential code performance for ATB (in GFLOPS) Min: 0.67;
Max: 0.75
Performance (Best & Worst) of parallel version for atb_junrollby2 (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.28
Worst Performance (GFLOPS): 6.11
```

- For ATBT:
    - Lonepeak

- 4096 4096 64

```
[u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6197339.log
*** Assigned Lonepeak Node:  lp245

Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.06; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.05 14.95 16.00
Worst Performance (GFLOPS): 1.05 12.24 13.78
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_junroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.32 19.22 21.78
Worst Performance (GFLOPS): 1.32 19.19 21.69
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_kunroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.05 14.95 16.02
Worst Performance (GFLOPS): 1.05 14.94 15.99
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_alltile16_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.66 22.52 23.68
Worst Performance (GFLOPS): 1.66 22.47 23.64
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.74 8.92 11.86
Worst Performance (GFLOPS): 0.74 8.91 11.02
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.68 7.68 8.05
Worst Performance (GFLOPS): 0.68 7.67 7.95
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_paralellonj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.05 13.94 17.67
Worst Performance (GFLOPS): 1.05 13.90 17.38
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_paralellonj_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.74 2.86 2.44
Worst Performance (GFLOPS): 0.74 2.86 2.43
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_junroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.74 8.94 13.27
Worst Performance (GFLOPS): 0.74 8.93 10.33
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_kunroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.38 19.05 24.11
Worst Performance (GFLOPS): 1.38 19.02 24.01
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_junrollby8 (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.27 18.52 20.39
Worst Performance (GFLOPS): 1.27 18.49 20.34
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05; Max: 1.07
Performance (Best & Worst) of parallel version for atbt_kunroll_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.38 18.48 23.58
Worst Performance (GFLOPS): 1.38 18.46 23.54
```

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```
[u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6197338.log
*** Assigned Lonepeak Node:  lp245

Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.59 22.47 21.62
Worst Performance (GFLOPS): 1.59 22.20 20.59
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_junroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.54 22.95 28.09
Worst Performance (GFLOPS): 1.54 22.89 24.76
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_kunroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.60 23.14 22.51
Worst Performance (GFLOPS): 1.60 23.11 22.48
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_alltile16_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.37 18.84 19.31
Worst Performance (GFLOPS): 1.37 18.81 19.26
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.85 12.49 21.97
Worst Performance (GFLOPS): 0.85 12.47 21.34
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.82 8.15 8.34
Worst Performance (GFLOPS): 0.82 8.14 8.32
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_paralellonj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.51 17.93 17.65
Worst Performance (GFLOPS): 1.51 17.88 17.59
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_paralellonj_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.85 5.28 3.51
Worst Performance (GFLOPS): 0.85 5.27 3.51
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_junroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 0.85 12.48 21.90
Worst Performance (GFLOPS): 0.85 12.46 21.80
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_kunroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.34 34.55 37.99
Worst Performance (GFLOPS): 2.34 34.45 37.83
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_junrollby8 (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.54 22.76 25.46
Worst Performance (GFLOPS): 1.54 22.72 25.41
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.59; Max: 1.95
Performance (Best & Worst) of parallel version for atbt_kunroll_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.32 31.16 31.91
Worst Performance (GFLOPS): 2.32 30.94 31.69
```

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```
Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.51; Max: 1.51
Performance (Best & Worst) of parallel version for atbt_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.47 21.77 15.02
Worst Performance (GFLOPS): 1.46 7.25 11.80
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.46; Max: 1.51
Performance (Best & Worst) of parallel version for atbt_junroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.56 23.19 18.35
Worst Performance (GFLOPS): 1.56 23.05 18.28
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.47; Max: 1.51
Performance (Best & Worst) of parallel version for atbt_kunroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.46 21.65 15.01
Worst Performance (GFLOPS): 1.46 21.62 14.99
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.47; Max: 1.51
Performance (Best & Worst) of parallel version for atbt_alltile16_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.97 24.59 23.46
Worst Performance (GFLOPS): 1.97 24.52 23.44
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.47; Max: 1.51
Performance (Best & Worst) of parallel version for atbt_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.39 20.55 14.33
Worst Performance (GFLOPS): 1.39 20.34 14.13
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.47; Max: 1.51
Performance (Best & Worst) of parallel version for atbt_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.44 20.86 14.64
Worst Performance (GFLOPS): 1.44 20.71 14.35
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.47; Max: 1.51
Performance (Best & Worst) of parallel version for atbt_paralellonj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.46 21.20 14.33
Worst Performance (GFLOPS): 1.46 21.04 14.26
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.46; Max: 1.51
Performance (Best & Worst) of parallel version for atbt_paralellonj_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.33 0.83 0.61
Worst Performance (GFLOPS): 1.33 0.83 0.60
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.47; Max: 1.51
Performance (Best & Worst) of parallel version for atbt_junroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.39 20.54 14.28
Worst Performance (GFLOPS): 1.39 14.16 14.14
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.46; Max: 1.51
Performance (Best & Worst) of parallel version for atbt_kunroll_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
```

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```
Par-No-UNR
Max Threads (from omp_get_max_threads) = 32
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.80; Max: 1.80
Performance (Best & Worst) of parallel version for atbt_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.61 24.09 32.58
Worst Performance (GFLOPS): 1.61 15.65 28.30
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.74; Max: 1.80
Performance (Best & Worst) of parallel version for atbt_junroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 2.21 32.94 36.62
Worst Performance (GFLOPS): 2.20 32.75 36.04
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.74; Max: 1.80
Performance (Best & Worst) of parallel version for atbt_kunroll_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.57 23.02 32.26
Worst Performance (GFLOPS): 1.57 22.95 32.18
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.74; Max: 1.80
Performance (Best & Worst) of parallel version for atbt_alltile16_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.97 28.29 30.34
Worst Performance (GFLOPS): 1.97 28.22 29.65
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.74; Max: 1.80
Performance (Best & Worst) of parallel version for atbt_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.33 19.51 16.85
Worst Performance (GFLOPS): 1.32 19.44 13.43
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.74; Max: 1.80
Performance (Best & Worst) of parallel version for atbt_permute_kij_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.11 16.22 15.60
Worst Performance (GFLOPS): 1.11 16.14 15.46
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.74; Max: 1.80
Performance (Best & Worst) of parallel version for atbt_paralellonj_par (in GFLOPS)1/15/ using 31 threads
Best Performance (GFLOPS): 1.57 21.49 28.16
Worst Performance (GFLOPS): 1.57 21.42 27.97
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.74; Max: 1.80
Performance (Best & Worst) of parallel version for atbt_paralellonj_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
```

- 333 333 8991

```
u1414463@lonepeak2:Openmp]$ cat lonepeak_sym.6198440.log
** Assigned Lonepeak Node:  lp248

ar-No-UNR
ax Threads (from omp_get_max_threads) = 32
eference sequential code performance for ATBT (in GFLOPS) Min: 0.73; Max: 0.73
erformance (Best & Worst) of parallel version for atbt_par (in GFLOPS)1/15/ using 31 threads
est Performance (GFLOPS): 0.69 8.96 10.24
orst Performance (GFLOPS): 0.69 8.90 8.91
eference sequential code performance for ATBT (in GFLOPS) Min: 0.72; Max: 0.73
erformance (Best & Worst) of parallel version for atbt_junroll_par (in GFLOPS)1/15/ using 31 threads
est Performance (GFLOPS): 1.10 15.39 16.85
orst Performance (GFLOPS): 1.10 15.38 16.55
eference sequential code performance for ATBT (in GFLOPS) Min: 0.72; Max: 0.73
erformance (Best & Worst) of parallel version for atbt_kunroll_par (in GFLOPS)1/15/ using 31 threads
est Performance (GFLOPS): 0.69 8.92 10.29
orst Performance (GFLOPS): 0.69 8.90 9.31
eference sequential code performance for ATBT (in GFLOPS) Min: 0.72; Max: 0.73
erformance (Best & Worst) of parallel version for atbt_alltile16_par (in GFLOPS)1/15/ using 31 threads
est Performance (GFLOPS): 1.79 18.91 22.17
orst Performance (GFLOPS): 1.79 18.73 22.00
eference sequential code performance for ATBT (in GFLOPS) Min: 0.72; Max: 0.73
erformance (Best & Worst) of parallel version for atbt_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
est Performance (GFLOPS): 1.26 10.44 9.91
orst Performance (GFLOPS): 1.26 10.25 9.81
eference sequential code performance for ATBT (in GFLOPS) Min: 0.72; Max: 0.73
erformance (Best & Worst) of parallel version for atbt_permute_kij_par (in GFLOPS)1/15/ using 31 threads
est Performance (GFLOPS): 1.99 21.56 19.40
orst Performance (GFLOPS): 1.98 21.48 19.17
eference sequential code performance for ATBT (in GFLOPS) Min: 0.73; Max: 0.73
erformance (Best & Worst) of parallel version for atbt_paralellonj_par (in GFLOPS)1/15/ using 31 threads
est Performance (GFLOPS): 0.69 9.66 12.10
orst Performance (GFLOPS): 0.69 9.54 11.94
eference sequential code performance for ATBT (in GFLOPS) Min: 0.72; Max: 0.73
erformance (Best & Worst) of parallel version for atbt_paralellonj_permute_ikj_par (in GFLOPS)1/15/ using 31 threads
est Performance (GFLOPS): 1.16 0.29 0.20
orst Performance (GFLOPS): 1.16 0.29 0.20
```

- Cade
  - 1024 1024 1024

```
For ATBT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.55;
Max: 1.56
Performance (Best & Worst) of parallel version for atbt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 10.85
Worst Performance (GFLOPS): 10.36
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.52;
Max: 1.57
Performance (Best & Worst) of parallel version for atbt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 19.10
Worst Performance (GFLOPS): 19.01
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.53;
Max: 1.57
```

```
Performance (Best & Worst) of parallel version for atbt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 22.68
Worst Performance (GFLOPS): 17.54
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.55;
Max: 1.56
Performance (Best & Worst) of parallel version for
atbt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 13.56
Worst Performance (GFLOPS): 11.50
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.54;
Max: 1.56
Performance (Best & Worst) of parallel version for
atbt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 13.60
Worst Performance (GFLOPS): 13.33
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.53;
Max: 1.56
Performance (Best & Worst) of parallel version for
atbt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 13.08
Worst Performance (GFLOPS): 11.59
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.54;
Max: 1.56
Performance (Best & Worst) of parallel version for
atbt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 20.38
Worst Performance (GFLOPS): 19.67
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.54;
Max: 1.56
Performance (Best & Worst) of parallel version for atbt_junrollby2
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 16.24
Worst Performance (GFLOPS): 16.07
```

- 4096 4096 64

```
For ATBT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.80;
Max: 1.85
Performance (Best & Worst) of parallel version for atbt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 9.84
Worst Performance (GFLOPS): 9.78
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.79;
Max: 1.84
Performance (Best & Worst) of parallel version for atbt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 13.69
Worst Performance (GFLOPS): 13.69
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.79;
Max: 1.83
Performance (Best & Worst) of parallel version for atbt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 11.49
Worst Performance (GFLOPS): 11.33
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.79;
Max: 1.84
Performance (Best & Worst) of parallel version for
atbt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.62
Worst Performance (GFLOPS): 5.43
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.79;
Max: 1.86
Performance (Best & Worst) of parallel version for
atbt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 8.34
Worst Performance (GFLOPS): 8.22
```

```
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.80;
Max: 1.85
Performance (Best & Worst) of parallel version for
atbt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 8.73
Worst Performance (GFLOPS): 8.10
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.81;
Max: 1.86
Performance (Best & Worst) of parallel version for
atbt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 20.92
Worst Performance (GFLOPS): 20.30
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.80;
Max: 1.86
Performance (Best & Worst) of parallel version for atbt_junrollby2
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 20.01
Worst Performance (GFLOPS): 19.69
```

- 8192 8192 16

```
For ATBT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.89;
Max: 3.56
Performance (Best & Worst) of parallel version for atbt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 22.23
Worst Performance (GFLOPS): 21.58
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.79;
Max: 3.56
Performance (Best & Worst) of parallel version for atbt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 29.59
Worst Performance (GFLOPS): 28.53
```

```
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.79;
Max: 3.56
Performance (Best & Worst) of parallel version for atbt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 19.52
Worst Performance (GFLOPS): 19.51
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.79;
Max: 3.56
Performance (Best & Worst) of parallel version for
atbt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 16.20
Worst Performance (GFLOPS): 16.13
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.79;
Max: 3.56
Performance (Best & Worst) of parallel version for
atbt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 7.96
Worst Performance (GFLOPS): 7.94
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.79;
Max: 3.57
Performance (Best & Worst) of parallel version for
atbt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 16.22
Worst Performance (GFLOPS): 15.71
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.79;
Max: 3.56
Performance (Best & Worst) of parallel version for
atbt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 36.64
Worst Performance (GFLOPS): 36.40
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.79;
Max: 3.57
Performance (Best & Worst) of parallel version for atbt_junrollby2
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 26.10
```

```
Worst Performance (GFLOPS): 25.89
```

- 16 16 4194304

```
For ATBT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.71;
Max: 0.71
Performance (Best & Worst) of parallel version for atbt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 4.60
Worst Performance (GFLOPS): 4.43
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.70;
Max: 0.71
Performance (Best & Worst) of parallel version for atbt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 14.92
Worst Performance (GFLOPS): 14.72
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.70;
Max: 0.70
Performance (Best & Worst) of parallel version for atbt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 2.24
Worst Performance (GFLOPS): 2.20
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.70;
Max: 0.71
Performance (Best & Worst) of parallel version for
atbt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 5.07
Worst Performance (GFLOPS): 5.00
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.70;
Max: 0.71
Performance (Best & Worst) of parallel version for
atbt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 0.74
Worst Performance (GFLOPS): 0.72
```

```
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.70;
Max: 0.71
Performance (Best & Worst) of parallel version for
atbt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 4.89
Worst Performance (GFLOPS): 4.83
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.70;
Max: 0.71
Performance (Best & Worst) of parallel version for
atbt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.72
Worst Performance (GFLOPS): 6.65
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.70;
Max: 0.71
Performance (Best & Worst) of parallel version for atbt_junrollby2
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 8.94
Worst Performance (GFLOPS): 8.55
```

- 37 37 728271

```
For ATBT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.46;
Max: 0.46
Performance (Best & Worst) of parallel version for atbt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 4.85
Worst Performance (GFLOPS): 2.41
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.46;
Max: 0.46
Performance (Best & Worst) of parallel version for atbt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 9.71
Worst Performance (GFLOPS): 7.62
```

```
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.46;
Max: 0.46
Performance (Best & Worst) of parallel version for atbt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.69
Worst Performance (GFLOPS): 6.67
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.46;
Max: 0.46
Performance (Best & Worst) of parallel version for
atbt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 21.58
Worst Performance (GFLOPS): 7.63
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.46;
Max: 0.46
Performance (Best & Worst) of parallel version for
atbt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 3.24
Worst Performance (GFLOPS): 3.15
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.46;
Max: 0.46
Performance (Best & Worst) of parallel version for
atbt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 9.09
Worst Performance (GFLOPS): 6.02
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.46;
Max: 0.46
Performance (Best & Worst) of parallel version for
atbt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 20.41
Worst Performance (GFLOPS): 13.74
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.46;
Max: 0.46
Performance (Best & Worst) of parallel version for atbt_junrollby2
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.83
```

```
Worst Performance (GFLOPS): 6.46
```

- 999 999 999

```
For ATBT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.27;
Max: 2.29
Performance (Best & Worst) of parallel version for atbt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 15.27
Worst Performance (GFLOPS): 14.76
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.22;
Max: 2.29
Performance (Best & Worst) of parallel version for atbt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 21.59
Worst Performance (GFLOPS): 20.14
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.22;
Max: 2.29
Performance (Best & Worst) of parallel version for atbt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 29.19
Worst Performance (GFLOPS): 29.06
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.28;
Max: 2.29
Performance (Best & Worst) of parallel version for
atbt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 19.35
Worst Performance (GFLOPS): 18.50
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.27;
Max: 2.29
Performance (Best & Worst) of parallel version for
atbt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 19.56
Worst Performance (GFLOPS): 19.46
```

```
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.22;
Max: 2.29
Performance (Best & Worst) of parallel version for
atbt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 19.35
Worst Performance (GFLOPS): 18.54
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.22;
Max: 2.29
Performance (Best & Worst) of parallel version for
atbt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 24.31
Worst Performance (GFLOPS): 22.31
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.23;
Max: 2.29
Performance (Best & Worst) of parallel version for atbt_junrollby2
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 19.61
Worst Performance (GFLOPS): 19.49
```

- 2997 2997 111

```
For ATBT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.74;
Max: 2.84
Performance (Best & Worst) of parallel version for atbt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 19.24
Worst Performance (GFLOPS): 16.70
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.72;
Max: 2.86
Performance (Best & Worst) of parallel version for atbt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 21.56
Worst Performance (GFLOPS): 16.99
```

```
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.72;
Max: 2.85
Performance (Best & Worst) of parallel version for atbt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 23.21
Worst Performance (GFLOPS): 16.48
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.95;
Max: 2.85
Performance (Best & Worst) of parallel version for
atbt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 4.49
Worst Performance (GFLOPS): 4.35
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.16;
Max: 2.39
Performance (Best & Worst) of parallel version for
atbt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 3.40
Worst Performance (GFLOPS): 3.22
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.61;
Max: 2.39
Performance (Best & Worst) of parallel version for
atbt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 3.91
Worst Performance (GFLOPS): 3.41
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.17;
Max: 2.39
Performance (Best & Worst) of parallel version for
atbt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 9.07
Worst Performance (GFLOPS): 7.70
Reference sequential code performance for ATBT (in GFLOPS) Min: 2.05;
Max: 2.39
Performance (Best & Worst) of parallel version for atbt_junrollby2
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 18.83
```

```
Worst Performance (GFLOPS): 16.93
```

- 333 333 8991

```
For ATBT for trial: 1
Max Threads (from omp_get_max_threads) = 16
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.13;
Max: 1.26
Performance (Best & Worst) of parallel version for atbt_par (in
GFLOPS) using 15 threads
Best Performance (GFLOPS): 6.99
Worst Performance (GFLOPS): 6.64
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.95;
Max: 1.30
Performance (Best & Worst) of parallel version for atbt_junroll_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 16.87
Worst Performance (GFLOPS): 16.40
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.05;
Max: 1.31
Performance (Best & Worst) of parallel version for atbt_alltile16_par
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 23.99
Worst Performance (GFLOPS): 12.96
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.25;
Max: 1.60
Performance (Best & Worst) of parallel version for
atbt_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 21.48
Worst Performance (GFLOPS): 21.31
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.76;
Max: 1.60
Performance (Best & Worst) of parallel version for
atbt_permute_kij_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 3.02
Worst Performance (GFLOPS): 2.63
```

```
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.23;
Max: 1.32
Performance (Best & Worst) of parallel version for
atbt_junroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 11.66
Worst Performance (GFLOPS): 11.10
Reference sequential code performance for ATBT (in GFLOPS) Min: 1.27;
Max: 1.37
Performance (Best & Worst) of parallel version for
atbt_kunroll_permute_ikj_par (in GFLOPS) using 15 threads
Best Performance (GFLOPS): 33.47
Worst Performance (GFLOPS): 30.91
Reference sequential code performance for ATBT (in GFLOPS) Min: 0.96;
Max: 1.42
Performance (Best & Worst) of parallel version for atbt_junrollby2
(in GFLOPS) using 15 threads
Best Performance (GFLOPS): 12.40
Worst Performance (GFLOPS): 11.65
```

CUDA

Functions:

All these functions are written for variants like AB, ABT, ATB, and ATBT.

- par - base version
- junroll_par - par + unroll on j loop by 4.
- kunroll_par - par + unroll on k loop by 4.
- iunroll_par - par + unroll on i loop by 4.
- junroll8_par - par + unroll on j loop by 8.
- ijunroll_par - par + unroll on i and j loop by 4.

Best Cases:

- For AB:

  Unrolling i and j both by 4 gives GFLOPs around 4000.

  - 1024 1024 1024 - Unroll on i and j both by 4
  - 4096 4096 64 - Unroll on i and j both by 4
  - 8192 8192 16 - Unroll on i and j both by 4
  - 16 16 4194304 - Unroll on k by 4
  - 333 333 8991 - Unroll j by 8
  - 37 37 728271 - Unroll k by 4
  - 999 999 999 - Unroll i and j both by 4
  - 2997 2997 111 - Unroll i and j both by 4

- For ABT:

  Unrolling i and j both by 4 gives GFLOPs above 1000-4000.

  - 1024 1024 1024 - Unroll i and j both by 4
  - 4096 4096 64 - Unroll i and j both by 4
  - 8192 8192 16 - Unroll i and j both by 4
  - 16 16 4194304 - Unroll k by 4
  - 333 333 8991 - Unroll i and j both by 4
  - 37 37 728271 - Unroll k by 4
  - 999 999 999 - Unroll i and j both by 4
  - 2997 2997 111 - Unroll i and j both by 4

- For ATB:

  Unrolling i and j both by 4 gives GFLOPs about 2000-6000

  - 1024 1024 1024 - Unroll i and j both by 4
  - 4096 4096 64 - Unroll i and j both by 4
  - 8192 8192 16 - Unroll i and j both by 4
  - 16 16 4194304 - Unroll k by 4
  - 333 333 8991 - Unroll j by 4

- 37 37 728271 - Unroll k by 4
- 999 999 999 - Unroll i and j both by 4
- 2997 2997 111 - Unroll i and j both by 4

- For ATBT:

  Unrolling i and j both by 4 gives GFLOPs around 2000-7000.

  - 1024 1024 1024 - Unroll i and j both by 4
  - 4096 4096 64 - Unroll i and j both by 4
  - 8192 8192 16 - Unroll i and j both by 4
  - 16 16 4194304 - Unroll k by 4
  - 333 333 8991 - Unroll j by 4
  - 37 37 728271 - base version
  - 999 999 999 - Unroll i and j both by 4
  - 2997 2997 111 - Unroll i and j both by 4

Outputs:

- For AB:
  - Lonepeak
    - 1024 1024 1024

```
[u1414463@lonepeak2:cudaab]$ cat lonepeak_mm_gpu.6197240.log
*** Assigned Lonepeak Node:  lp243

Trial 0: AB GFLOPS: 262.60
Trial 0: AB K Unroll GFLOPS: 263.14
Trial 0: AB J Unroll GFLOPS: 2088.15
Trial 0: AB I Unroll GFLOPS: 948.84
Trial 0: AB J Unroll by 8 GFLOPS: 5891.91
Trial 0: AB IJ Unroll by 4 GFLOPS: 6268.93
```

    - 4096 4096 64

```
[u1414463@lonepeak2:cudaab]$ cat lonepeak_mm_gpu.6197241.log
*** Assigned Lonepeak Node:  lp243

Trial 0: AB GFLOPS: 264.55
Trial 0: AB K Unroll GFLOPS: 264.86
Trial 0: AB J Unroll GFLOPS: 2302.03
Trial 0: AB I Unroll GFLOPS: 1175.55
Trial 0: AB J Unroll by 8 GFLOPS: 5280.84
Trial 0: AB IJ Unroll by 4 GFLOPS: 11977.31
```

    - 8192 8192 16

```
[u1414463@lonepeak2:cudaab]$ cat lonepeak_mm_gpu.6197242.log
*** Assigned Lonepeak Node:  lp243

Trial 0: AB GFLOPS: 264.42
Trial 0: AB K Unroll GFLOPS: 264.49
Trial 0: AB J Unroll GFLOPS: 1723.75
Trial 0: AB I Unroll GFLOPS: 1187.87
Trial 0: AB J Unroll by 8 GFLOPS: 3030.98
Trial 0: AB IJ Unroll by 4 GFLOPS: 7739.46
```

- 16 16 4194304

```
[u1414463@lonepeak2:cudaab]$ cat lonepeak_mm_gpu.6197243.log
*** Assigned Lonepeak Node:  lp243

Trial 0: AB GFLOPS: 11.58
Trial 0: AB K Unroll GFLOPS: 11.64
Trial 0: AB J Unroll GFLOPS: 2.90
```

- 37 37 728271

```
[u1414463@lonepeak2:cudaab]$ cat lonepeak_mm_gpu.6197238.log
*** Assigned Lonepeak Node:  lp243

Trial 0: AB GFLOPS: 62.87
Trial 0: AB K Unroll GFLOPS: 64.28
Trial 0: AB J Unroll GFLOPS: 9.89
Trial 0: AB I Unroll GFLOPS: 4.02
Trial 0: AB J Unroll by 8 GFLOPS: 15.08
Trial 0: AB IJ Unroll by 4 GFLOPS: 10.14
```

- 999 999 999

```
[u1414463@lonepeak2:cudaab]$ cat lonepeak_mm_gpu.6197239.log
*** Assigned Lonepeak Node:  lp243

Trial 0: AB GFLOPS: 401.81
Trial 0: AB K Unroll GFLOPS: 403.55
Trial 0: AB J Unroll GFLOPS: 2723.10
Trial 0: AB I Unroll GFLOPS: 1611.27
Trial 0: AB J Unroll by 8 GFLOPS: 6629.01
Trial 0: AB IJ Unroll by 4 GFLOPS: 6966.20
```

- Cade
  - 1024 1024 1024

```
[u1414463@lab1-29 cudaab]$ ./a.out 1024 1024 1024
Trial 0: AB GFLOPS: 90.34
Trial 0: AB K Unroll GFLOPS: 90.71
Trial 0: AB J Unroll GFLOPS: 742.95
Trial 0: AB I Unroll GFLOPS: 354.32
Trial 0: AB J Unroll by 8 GFLOPS: 2228.27
Trial 0: AB IJ Unroll by 4 GFLOPS: 3983.19
```

- 4096 4096 64

```
[u1414463@lab1-29 cudaab]$ ./a.out 4096 4096 64
Trial 0: AB GFLOPS: 91.23
Trial 0: AB K Unroll GFLOPS: 91.33
Trial 0: AB J Unroll GFLOPS: 848.79
Trial 0: AB I Unroll GFLOPS: 414.86
Trial 0: AB J Unroll by 8 GFLOPS: 2004.57
Trial 0: AB IJ Unroll by 4 GFLOPS: 4462.92
```

- 8192 8192 16

```
[u1414463@lab1-29 cudaab]$ ./a.out 8192 8192 16
Trial 0: AB GFLOPS: 90.79
Trial 0: AB K Unroll GFLOPS: 90.98
Trial 0: AB J Unroll GFLOPS: 719.84
Trial 0: AB I Unroll GFLOPS: 408.48
Trial 0: AB J Unroll by 8 GFLOPS: 1296.06
Trial 0: AB IJ Unroll by 4 GFLOPS: 3345.07
```

- 16 16 4194304

```
[u1414463@lab1-29 cudaab]$ ./a.out 16 16 4194304
Trial 0: AB GFLOPS: 9.17
Trial 0: AB K Unroll GFLOPS: 10.52
Trial 0: AB J Unroll GFLOPS: 2.66
Trial 0: AB I Unroll GFLOPS: 1.07
Trial 0: AB J Unroll by 8 GFLOPS: 2.43
Trial 0: AB IJ Unroll by 4 GFLOPS: 1.53
```

- 37 37 728271

```
[u1414463@lab1-29 cudaab]$ ./a.out 37 37 728271
Trial 0: AB GFLOPS: 50.36
Trial 0: AB K Unroll GFLOPS: 51.79
Trial 0: AB J Unroll GFLOPS: 8.17
Trial 0: AB I Unroll GFLOPS: 3.41
Trial 0: AB J Unroll by 8 GFLOPS: 11.59
Trial 0: AB IJ Unroll by 4 GFLOPS: 7.56
```

        - 999 999 999

```
[u1414463@lab1-29 cudaab]$ ./a.out 999 999 999
Trial 0: AB GFLOPS: 127.25
Trial 0: AB K Unroll GFLOPS: 126.64
Trial 0: AB J Unroll GFLOPS: 936.79
Trial 0: AB I Unroll GFLOPS: 538.77
Trial 0: AB J Unroll by 8 GFLOPS: 2414.10
Trial 0: AB IJ Unroll by 4 GFLOPS: 4567.37
```

        - 2997 2997 111

```
[u1414463@lab1-29 cudaab]$ ./a.out 2997 2997 111
Trial 0: AB GFLOPS: 128.47
Trial 0: AB K Unroll GFLOPS: 128.83
Trial 0: AB J Unroll GFLOPS: 980.73
Trial 0: AB I Unroll GFLOPS: 597.28
Trial 0: AB J Unroll by 8 GFLOPS: 2168.60
Trial 0: AB IJ Unroll by 4 GFLOPS: 4845.84
```

        - 333 333 8991

```
[u1414463@lab1-29 cudaab]$ ./a.out 333 333 8991
Trial 0: AB GFLOPS: 88.32
Trial 0: AB K Unroll GFLOPS: 92.19
Trial 0: AB J Unroll GFLOPS: 623.98
Trial 0: AB I Unroll GFLOPS: 250.00
Trial 0: AB J Unroll by 8 GFLOPS: 745.96
Trial 0: AB IJ Unroll by 4 GFLOPS: 579.70
```

- For ABT:
    - Lonepeak
        - 1024 1024 1024

```
[u1414463@lonepeak2:cudaabt]$ cat lonepeak_mm_gpu.6197258.log
*** Assigned Lonepeak Node:  lp243

Trial 0: ABT GFLOPS: 185.20
Trial 0: ABT K Unroll GFLOPS: 185.30
Trial 0: ABT J Unroll GFLOPS: 1451.47
Trial 0: ABT I Unroll GFLOPS: 621.49
Trial 0: ABT J Unroll by 8 GFLOPS: 3552.61
Trial 0: ABT IJ Unroll by 4 GFLOPS: 5133.00
```

- 4096 4096 64

```
[u1414463@lonepeak2:cudaabt]$ cat lonepeak_mm_gpu.6197259.log
*** Assigned Lonepeak Node:  lp243

Trial 0: ABT GFLOPS: 147.39
Trial 0: ABT K Unroll GFLOPS: 147.46
Trial 0: ABT J Unroll GFLOPS: 1553.09
Trial 0: ABT I Unroll GFLOPS: 606.59
Trial 0: ABT J Unroll by 8 GFLOPS: 3633.00
Trial 0: ABT IJ Unroll by 4 GFLOPS: 5580.78
```

- 8192 8192 16

```
[u1414463@lonepeak2:cudaabt]$ cat lonepeak_mm_gpu.6197260.log
*** Assigned Lonepeak Node:  lp243

Trial 0: ABT GFLOPS: 147.42
Trial 0: ABT K Unroll GFLOPS: 147.45
Trial 0: ABT J Unroll GFLOPS: 1213.98
Trial 0: ABT I Unroll GFLOPS: 606.94
Trial 0: ABT J Unroll by 8 GFLOPS: 2651.06
Trial 0: ABT IJ Unroll by 4 GFLOPS: 5042.75
```

- 16 16 4194304

```
[u1414463@lonepeak2:cudaabt]$ cat lonepeak_mm_gpu.6197261.log
*** Assigned Lonepeak Node:  lp243

Trial 0: ABT GFLOPS: 9.85
Trial 0: ABT K Unroll GFLOPS: 9.71
Trial 0: ABT J Unroll GFLOPS: 2.96
```

- 37 37 728271

```
[u1414463@lonepeak2:cudaabt]$ cat lonepeak_mm_gpu.6197256.log
*** Assigned Lonepeak Node:  lp243

Trial 0: ABT GFLOPS: 56.04
Trial 0: ABT K Unroll GFLOPS: 55.88
Trial 0: ABT J Unroll GFLOPS: 13.95
```

- 999 999 999

```
Trial 0: ABT I Unroll [u1414463@lonepeak2:cudaabt]$ cat lonepeak_mm_gpu.6197257.log
*** Assigned Lonepeak Node:  lp243

Trial 0: ABT GFLOPS: 331.84
Trial 0: ABT K Unroll GFLOPS: 330.13
Trial 0: ABT J Unroll GFLOPS: 1697.34
Trial 0: ABT I Unroll GFLOPS: 710.25
Trial 0: ABT J Unroll by 8 GFLOPS: 4024.07
Trial 0: ABT IJ Unroll by 4 GFLOPS: 9813.02
```

- Cade
  - 1024 1024 1024

```
[u1414463@lab1-29 cudaabt]$ ./a.out 1024 1024 1024
Trial 0: ABT GFLOPS: 50.61
Trial 0: ABT K Unroll GFLOPS: 50.67
Trial 0: ABT J Unroll GFLOPS: 495.90
Trial 0: ABT I Unroll GFLOPS: 182.57
Trial 0: ABT J Unroll by 8 GFLOPS: 1551.87
Trial 0: ABT IJ Unroll by 4 GFLOPS: 1768.30
```

  - 4096 4096 64

```
[u1414463@lab1-29 cudaabt]$ ./a.out 4096 4096 64
Trial 0: ABT GFLOPS: 50.96
Trial 0: ABT K Unroll GFLOPS: 50.99
Trial 0: ABT J Unroll GFLOPS: 553.11
Trial 0: ABT I Unroll GFLOPS: 215.95
Trial 0: ABT J Unroll by 8 GFLOPS: 1366.31
Trial 0: ABT IJ Unroll by 4 GFLOPS: 2476.80
```

  - 8192 8192 16

```
[u1414463@lab1-29 cudaabt]$ ./a.out 8192 8192 16
Trial 0: ABT GFLOPS: 50.85
Trial 0: ABT K Unroll GFLOPS: 50.91
Trial 0: ABT J Unroll GFLOPS: 443.26
Trial 0: ABT I Unroll GFLOPS: 213.69
Trial 0: ABT J Unroll by 8 GFLOPS: 973.64
Trial 0: ABT IJ Unroll by 4 GFLOPS: 1839.51
```

  - 16 16 4194304

```
[u1414463@lab1-29 cudaabt]$ ./a.out 16 16 4194304
Trial 0: ABT GFLOPS: 4.37
```

```
Trial 0: ABT K Unroll GFLOPS: 4.59
Trial 0: ABT J Unroll GFLOPS: 3.59
```

- 37 37 728271

```
[u1414463@lab1-29 cudaabt]$ ./a.out 37 37 728271
Trial 0: ABT GFLOPS: 35.48
Trial 0: ABT K Unroll GFLOPS: 35.71
Trial 0: ABT J Unroll GFLOPS: 10.06
Trial 0: ABT I Unroll GFLOPS: 4.26
Trial 0: ABT J Unroll by 8 GFLOPS: 5.50
Trial 0: ABT IJ Unroll by 4 GFLOPS: 12.46
```

- 999 999 999

```
[u1414463@lab1-29 cudaabt]$ ./a.out 999 999 999
Trial 0: ABT GFLOPS: 90.68
Trial 0: ABT K Unroll GFLOPS: 90.86
Trial 0: ABT J Unroll GFLOPS: 713.41
Trial 0: ABT I Unroll GFLOPS: 242.81
Trial 0: ABT J Unroll by 8 GFLOPS: 1883.58
Trial 0: ABT IJ Unroll by 4 GFLOPS: 3234.17
```

- 2997 2997 111

```
[u1414463@lab1-29 cudaabt]$ ./a.out 2997 2997 111
Trial 0: ABT GFLOPS: 102.35
Trial 0: ABT K Unroll GFLOPS: 102.44
Trial 0: ABT J Unroll GFLOPS: 900.78
Trial 0: ABT I Unroll GFLOPS: 304.91
Trial 0: ABT J Unroll by 8 GFLOPS: 2006.14
Trial 0: ABT IJ Unroll by 4 GFLOPS: 4304.55
```

- 333 333 8991

```
[u1414463@lab1-29 cudaabt]$ ./a.out 333 333 8991
Trial 0: ABT GFLOPS: 48.68
Trial 0: ABT K Unroll GFLOPS: 46.77
Trial 0: ABT J Unroll GFLOPS: 746.03
```

```
Trial 0: ABT I Unroll GFLOPS: 232.19
Trial 0: ABT J Unroll by 8 GFLOPS: 399.65
Trial 0: ABT IJ Unroll by 4 GFLOPS: 800.51
```

- For ATB:
    - Lonepeak
        - 1024 1024 1024

```
[u1414463@lonepeak2:cudaatb]$ cat lonepeak_mm_gpu.6197275.log
*** Assigned Lonepeak Node:  lp245

Trial 0: ATB GFLOPS: 557.41
Trial 0: ATB K Unroll GFLOPS: 527.64
Trial 0: ATB J Unroll GFLOPS: 2563.07
Trial 0: ATB I Unroll GFLOPS: 1467.21
Trial 0: ATB J Unroll by 8 GFLOPS: 6113.03
Trial 0: ATB IJ Unroll by 4 GFLOPS: 4240.15
```

        - 4096 4096 64

```
[u1414463@lonepeak2:cudaatb]$ cat lonepeak_mm_gpu.6197279.log
*** Assigned Lonepeak Node:  lp245

Trial 0: ATB GFLOPS: 587.94
Trial 0: ATB K Unroll GFLOPS: 588.83
Trial 0: ATB J Unroll GFLOPS: 2900.50
Trial 0: ATB I Unroll GFLOPS: 2076.32
Trial 0: ATB J Unroll by 8 GFLOPS: 5739.23
Trial 0: ATB IJ Unroll by 4 GFLOPS: 13989.76
```

        - 8192 8192 16

```
[u1414463@lonepeak2:cudaatb]$ cat lonepeak_mm_gpu.6197280.log
*** Assigned Lonepeak Node:  lp243

Trial 0: ATB GFLOPS: 490.74
Trial 0: ATB K Unroll GFLOPS: 503.36
Trial 0: ATB J Unroll GFLOPS: 1947.89
Trial 0: ATB I Unroll GFLOPS: 1679.74
Trial 0: ATB J Unroll by 8 GFLOPS: 3842.92
Trial 0: ATB IJ Unroll by 4 GFLOPS: 7761.84
```

        - 16 16 4194304

```
[u1414463@lonepeak2:cudaatb]$ cat lonepeak_mm_gpu.6197282.log
*** Assigned Lonepeak Node:  lp245

Trial 0: ATB GFLOPS: 8.43
Trial 0: ATB K Unroll GFLOPS: 10.06
Trial 0: ATB J Unroll GFLOPS: 2.29
Trial 0: ATB I Unroll GFLOPS: 1.05
Trial 0: ATB J Unroll by 8 GFLOPS: 3.25
Trial 0: ATB IJ Unroll by 4 GFLOPS: 1.36
```

- 37 37 728271

```
[u1414463@lonepeak2:cudaatb]$ cat lonepeak_mm_gpu.6197262.log
*** Assigned Lonepeak Node:  lp243

Trial 0: ATB GFLOPS: 49.04
Trial 0: ATB K Unroll GFLOPS: 58.77
Trial 0: ATB J Unroll GFLOPS: 12.07
Trial 0: ATB I Unroll GFLOPS: 4.60
Trial 0: ATB J Unroll by 8 GFLOPS: 14.56
Trial 0: ATB IJ Unroll by 4 GFLOPS: 6.31
```

- 999 999 999

```
[u1414463@lonepeak2:cudaatb]$ cat lonepeak_mm_gpu.6197268.log
*** Assigned Lonepeak Node:  lp245

Trial 0: ATB GFLOPS: 536.45
Trial 0: ATB K Unroll GFLOPS: 499.31
Trial 0: ATB J Unroll GFLOPS: 2470.37
Trial 0: ATB I Unroll GFLOPS: 1384.76
Trial 0: ATB J Unroll by 8 GFLOPS: 5791.14
Trial 0: ATB IJ Unroll by 4 GFLOPS: 4016.03
```

- Cade
  - 1024 1024 1024

```
[u1414463@lab1-29 cudaatb]$ ./a.out 1024 1024 1024
Trial 0: ATB GFLOPS: 200.58
Trial 0: ATB K Unroll GFLOPS: 200.59
Trial 0: ATB J Unroll GFLOPS: 1164.60
Trial 0: ATB I Unroll GFLOPS: 604.91
Trial 0: ATB J Unroll by 8 GFLOPS: 2853.27
Trial 0: ATB IJ Unroll by 4 GFLOPS: 3100.86
```

  - 4096 4096 64

```
[u1414463@lab1-29 cudaatb]$ ./a.out 4096 4096 64
Trial 0: ATB GFLOPS: 198.32
Trial 0: ATB K Unroll GFLOPS: 199.58
Trial 0: ATB J Unroll GFLOPS: 1040.95
```

```
Trial 0: ATB I Unroll GFLOPS: 780.72
Trial 0: ATB J Unroll by 8 GFLOPS: 2239.35
Trial 0: ATB IJ Unroll by 4 GFLOPS: 5928.87
```

- 8192 8192 16

```
[u1414463@lab1-29 cudaatb]$ ./a.out 8192 8192 16
Trial 0: ATB GFLOPS: 135.11
Trial 0: ATB K Unroll GFLOPS: 138.63
Trial 0: ATB J Unroll GFLOPS: 597.59
Trial 0: ATB I Unroll GFLOPS: 491.33
Trial 0: ATB J Unroll by 8 GFLOPS: 1243.59
Trial 0: ATB IJ Unroll by 4 GFLOPS: 2418.42
```

- 16 16 4194304

```
[u1414463@lab1-29 cudaatb]$ ./a.out 16 16 4194304
Trial 0: ATB GFLOPS: 7.03
Trial 0: ATB K Unroll GFLOPS: 9.38
Trial 0: ATB J Unroll GFLOPS: 2.13
Trial 0: ATB I Unroll GFLOPS: 0.87
Trial 0: ATB J Unroll by 8 GFLOPS: 2.36
Trial 0: ATB IJ Unroll by 4 GFLOPS: 1.05
```

- 37 37 728271

```
[u1414463@lab1-29 cudaatb]$ ./a.out 37 37 728271
Trial 0: ATB GFLOPS: 38.50
Trial 0: ATB K Unroll GFLOPS: 46.26
Trial 0: ATB J Unroll GFLOPS: 9.87
Trial 0: ATB I Unroll GFLOPS: 3.54
Trial 0: ATB J Unroll by 8 GFLOPS: 11.59
Trial 0: ATB IJ Unroll by 4 GFLOPS: 5.60
```

- 999 999 999

```
[u1414463@lab1-29 cudaatb]$ ./a.out 999 999 999
Trial 0: ATB GFLOPS: 195.82
Trial 0: ATB K Unroll GFLOPS: 193.10
```

```
Trial 0: ATB J Unroll GFLOPS: 1129.00
Trial 0: ATB I Unroll GFLOPS: 578.89
Trial 0: ATB J Unroll by 8 GFLOPS: 2708.66
Trial 0: ATB IJ Unroll by 4 GFLOPS: 3205.55
```

- 2997 2997 111

```
[u1414463@lab1-29 cudaatb]$ ./a.out 2997 2997 111
Trial 0: ATB GFLOPS: 193.10
Trial 0: ATB K Unroll GFLOPS: 194.76
Trial 0: ATB J Unroll GFLOPS: 1105.93
Trial 0: ATB I Unroll GFLOPS: 823.23
Trial 0: ATB J Unroll by 8 GFLOPS: 2314.31
Trial 0: ATB IJ Unroll by 4 GFLOPS: 6042.74
```

- 333 333 8991

```
[u1414463@lab1-29 cudaatb]$ ./a.out 333 333 8991
Trial 0: ATB GFLOPS: 187.08
Trial 0: ATB K Unroll GFLOPS: 104.42
Trial 0: ATB J Unroll GFLOPS: 702.34
Trial 0: ATB I Unroll GFLOPS: 258.81
Trial 0: ATB J Unroll by 8 GFLOPS: 807.88
Trial 0: ATB IJ Unroll by 4 GFLOPS: 388.31
```

- For ATBT:
  - Lonepeak
    - 1024 1024 1024

```
[[u1414463@lonepeak2:cudaatbt]$ cat lonepeak_mm_gpu.6197286.log
*** Assigned Lonepeak Node:  lp245

Trial 0: ABT GFLOPS: 622.25
Trial 0: ATBT K Unroll GFLOPS: 612.35
Trial 0: ATBT J Unroll GFLOPS: 3319.43
Trial 0: ATBT I Unroll GFLOPS: 1498.13
Trial 0: ATBT J Unroll by 8 GFLOPS: 3750.15
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 5370.86
```

- 4096 4096 64

```
[[u1414463@lonepeak2:cudaatbt]$ cat lonepeak_mm_gpu.6197287.log
*** Assigned Lonepeak Node:  lp245

Trial 0: ABT GFLOPS: 590.62
Trial 0: ATBT K Unroll GFLOPS: 591.06
Trial 0: ATBT J Unroll GFLOPS: 2880.33
Trial 0: ATBT I Unroll GFLOPS: 2117.47
Trial 0: ATBT J Unroll by 8 GFLOPS: 4822.77
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 13788.55
```

- 8192 8192 16

```
[[u1414463@lonepeak2:cudaatbt]$ cat lonepeak_mm_gpu.6197288.log
*** Assigned Lonepeak Node:  lp243

Trial 0: ABT GFLOPS: 528.40
Trial 0: ATBT K Unroll GFLOPS: 530.30
Trial 0: ATBT J Unroll GFLOPS: 1968.98
Trial 0: ATBT I Unroll GFLOPS: 1752.33
Trial 0: ATBT J Unroll by 8 GFLOPS: 3568.29
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 8307.61
```

- 16 16 4194304

```
[[u1414463@lonepeak2:cudaatbt]$ cat lonepeak_mm_gpu.6197289.log
*** Assigned Lonepeak Node:  lp245

Trial 0: ABT GFLOPS: 12.31
Trial 0: ATBT K Unroll GFLOPS: 11.98
Trial 0: ATBT J Unroll GFLOPS: 1.83
Trial 0: ATBT I Unroll GFLOPS: 1.26
Trial 0: ATBT J Unroll by 8 GFLOPS: 1.14
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 1.87
```

- 37 37 728271

```
[[u1414463@lonepeak2:cudaatbt]$ cat lonepeak_mm_gpu.6197284.log
*** Assigned Lonepeak Node:  lp243

Trial 0: ABT GFLOPS: 66.62
Trial 0: ATBT K Unroll GFLOPS: 65.14
Trial 0: ATBT J Unroll GFLOPS: 9.91
Trial 0: ATBT I Unroll GFLOPS: 4.79
Trial 0: ATBT J Unroll by 8 GFLOPS: 5.56
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 9.52
```

- 999 999 999

```
[u1414463@lonepeak2:cudaatbt]$ cat lonepeak_mm_gpu.6197285.log
*** Assigned Lonepeak Node:  lp245

Trial 0: ABT GFLOPS: 593.32
Trial 0: ATBT K Unroll GFLOPS: 584.29
Trial 0: ATBT J Unroll GFLOPS: 3064.16
Trial 0: ATBT I Unroll GFLOPS: 1466.39
Trial 0: ATBT J Unroll by 8 GFLOPS: 4034.75
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 6036.88
```

- Cade
  - 1024 1024 1024

```
[u1414463@lab1-29 cudaatbt]$ ./a.out 1024 1024 1024
Trial 0: ATBT GFLOPS: 201.31
Trial 0: ATBT K Unroll GFLOPS: 202.35
Trial 0: ATBT J Unroll GFLOPS: 1107.59
Trial 0: ATBT I Unroll GFLOPS: 549.15
Trial 0: ATBT J Unroll by 8 GFLOPS: 2292.13
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 4289.20
```

  - 4096 4096 64

```
[u1414463@lab1-29 cudaatbt]$ ./a.out 4096 4096 64
Trial 0: ATBT GFLOPS: 199.74
Trial 0: ATBT K Unroll GFLOPS: 200.41
Trial 0: ATBT J Unroll GFLOPS: 1021.20
Trial 0: ATBT I Unroll GFLOPS: 795.12
Trial 0: ATBT J Unroll by 8 GFLOPS: 1883.28
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 5710.42
```

  - 8192 8192 16

```
[u1414463@lab1-29 cudaatbt]$ ./a.out 8192 8192 16
Trial 0: ATBT GFLOPS: 138.20
Trial 0: ATBT K Unroll GFLOPS: 138.63
Trial 0: ATBT J Unroll GFLOPS: 549.15
Trial 0: ATBT I Unroll GFLOPS: 474.05
Trial 0: ATBT J Unroll by 8 GFLOPS: 1072.54
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 2561.70
```

- 16 16 4194304

```
[u1414463@lab1-29 cudaatbt]$ ./a.out 16 16 4194304
Trial 0: ATBT GFLOPS: 10.10
Trial 0: ATBT K Unroll GFLOPS: 10.68
Trial 0: ATBT J Unroll GFLOPS: 1.64
Trial 0: ATBT I Unroll GFLOPS: 1.09
Trial 0: ATBT J Unroll by 8 GFLOPS: 0.97
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 1.41
```

- 37 37 728271

```
[u1414463@lab1-29 cudaatbt]$ ./a.out 37 37 728271
Trial 0: ATBT GFLOPS: 54.20
Trial 0: ATBT K Unroll GFLOPS: 53.60
Trial 0: ATBT J Unroll GFLOPS: 7.88
Trial 0: ATBT I Unroll GFLOPS: 3.82
Trial 0: ATBT J Unroll by 8 GFLOPS: 4.75
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 7.32
```

- 999 999 999

```
[u1414463@lab1-29 cudaatbt]$ ./a.out 999 999 999
Trial 0: ATBT GFLOPS: 193.73
Trial 0: ATBT K Unroll GFLOPS: 195.02
Trial 0: ATBT J Unroll GFLOPS: 1094.30
Trial 0: ATBT I Unroll GFLOPS: 524.69
Trial 0: ATBT J Unroll by 8 GFLOPS: 2180.98
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 4110.06
```

- 2997 2997 111

```
[u1414463@lab1-29 cudaatbt]$ ./a.out 2997 2997 111
Trial 0: ATBT GFLOPS: 196.29
Trial 0: ATBT K Unroll GFLOPS: 196.79
Trial 0: ATBT J Unroll GFLOPS: 1097.05
Trial 0: ATBT I Unroll GFLOPS: 814.07
Trial 0: ATBT J Unroll by 8 GFLOPS: 2002.85
```

```
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 6919.79
```

- 333 333 8991

```
[u1414463@lab1-29 cudaatbt]$ ./a.out 333 333 8991
Trial 0: ATBT GFLOPS: 136.89
Trial 0: ATBT K Unroll GFLOPS: 134.98
Trial 0: ATBT J Unroll GFLOPS: 617.95
Trial 0: ATBT I Unroll GFLOPS: 235.73
Trial 0: ATBT J Unroll by 8 GFLOPS: 334.80
Trial 0: ATBT IJ Unroll by 4 GFLOPS: 539.94
```

GitHub repo link

Below is the GitHub link for my project. This contains all the code files and a ReadMe with all the necessary steps. This repo was made public after the deadline of the project ended.
HPC_Project