```
/Users/zuzannafurtak/Library/Java/JavaVirtualMachines/
corretto-17.0.8/Contents/Home/bin/java -javaagent:/
Applications/IntelliJ IDEA.app/Contents/lib/idea_rt.
jar=57681:/Applications/IntelliJ IDEA.app/Contents/bin
 -Dfile.encoding=UTF-8 -classpath /Users/zuzannafurtak
/studia/las_palmas/big_data/big-data-tasks/assignment-
3/target/classes:/Users/zuzannafurtak/.m2/repository/
org/openjdk/jmh/jmh-core/1.32/jmh-core-1.32.jar:/Users
/zuzannafurtak/.m2/repository/net/sf/jopt-simple/jopt-
simple/4.6/jopt-simple-4.6.jar:/Users/zuzannafurtak/.
m2/repository/org/apache/commons/commons-math3/3.2/
commons-math3-3.2.jar:/Users/zuzannafurtak/.m2/
repository/org/openjdk/jmh/jmh-generator-annprocess/1.
32/jmh-generator-annprocess-1.32.jar com.matrix.
MultiplicationBenchmark
# JMH version: 1.32
# VM version: JDK 17.0.8, OpenJDK 64-Bit Server VM, 17
.0.8+7-LTS
# VM invoker: /Users/zuzannafurtak/Library/Java/
JavaVirtualMachines/corretto-17.0.8/Contents/Home/bin/
java
# VM options: -javaagent:/Applications/IntelliJ IDEA.
app/Contents/lib/idea_rt.jar=57681:/Applications/
IntelliJ IDEA.app/Contents/bin -Dfile.encoding=UTF-8
# Blackhole mode: full + dont-inline hint
# Warmup: 5 iterations, 1 s each
# Measurement: 10 iterations, 1 s each
# Timeout: 10 min per iteration
# Threads: 1 thread, will synchronize iterations
# Benchmark mode: Sampling time
# Benchmark: com.matrix.MultiplicationBenchmark.
multiplyVectorized
# Parameters: (n = 10)

# Run progress: 0.00% complete, ETA 00:02:15
# Fork: 1 of 1
# Warmup Iteration   1: 0.001 ±(99.9%) 0.001 ms/op
# Warmup Iteration   2: 0.001 ±(99.9%) 0.001 ms/op
# Warmup Iteration   3: 0.001 ±(99.9%) 0.001 ms/op
# Warmup Iteration   4: 0.001 ±(99.9%) 0.001 ms/op
# Warmup Iteration   5: 0.001 ±(99.9%) 0.001 ms/op
```

```
Iteration   1: 0.001 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.001 ms/
op
                 multiplyVectorized·p0.50:   0.001 ms/
op
                 multiplyVectorized·p0.90:   0.001 ms/
op
                 multiplyVectorized·p0.95:   0.001 ms/
op
                 multiplyVectorized·p0.99:   0.001 ms/
op
                 multiplyVectorized·p0.999:  0.006 ms/
op
                 multiplyVectorized·p0.9999: 0.035 ms/
op
                 multiplyVectorized·p1.00:   0.404 ms/
op

Iteration   2: 0.001 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.001 ms/
op
                 multiplyVectorized·p0.50:   0.001 ms/
op
                 multiplyVectorized·p0.90:   0.001 ms/
op
                 multiplyVectorized·p0.95:   0.001 ms/
op
                 multiplyVectorized·p0.99:   0.001 ms/
op
                 multiplyVectorized·p0.999:  0.007 ms/
op
                 multiplyVectorized·p0.9999: 0.014 ms/
op
                 multiplyVectorized·p1.00:   0.360 ms/
op

Iteration   3: 0.001 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.001 ms/
op
                 multiplyVectorized·p0.50:   0.001 ms/
op
```

```
                  multiplyVectorized·p0.90:   0.001 ms/
op
                  multiplyVectorized·p0.95:   0.001 ms/
op
                  multiplyVectorized·p0.99:   0.001 ms/
op
                  multiplyVectorized·p0.999:  0.007 ms/
op
                  multiplyVectorized·p0.9999: 0.052 ms/
op
                  multiplyVectorized·p1.00:   0.410 ms/
op

Iteration   4: 0.001 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.001 ms/
op
                  multiplyVectorized·p0.50:   0.001 ms/
op
                  multiplyVectorized·p0.90:   0.001 ms/
op
                  multiplyVectorized·p0.95:   0.001 ms/
op
                  multiplyVectorized·p0.99:   0.001 ms/
op
                  multiplyVectorized·p0.999:  0.006 ms/
op
                  multiplyVectorized·p0.9999: 0.296 ms/
op
                  multiplyVectorized·p1.00:   0.442 ms/
op

Iteration   5: 0.001 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.001 ms/
op
                  multiplyVectorized·p0.50:   0.001 ms/
op
                  multiplyVectorized·p0.90:   0.001 ms/
op
                  multiplyVectorized·p0.95:   0.001 ms/
op
                  multiplyVectorized·p0.99:   0.001 ms/
```

```
op
                 multiplyVectorized·p0.999:  0.008 ms/
op
                 multiplyVectorized·p0.9999: 0.016 ms/
op
                 multiplyVectorized·p1.00:   0.435 ms/
op

Iteration   6: 0.001 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.001 ms/
op
                 multiplyVectorized·p0.50:   0.001 ms/
op
                 multiplyVectorized·p0.90:   0.001 ms/
op
                 multiplyVectorized·p0.95:   0.001 ms/
op
                 multiplyVectorized·p0.99:   0.001 ms/
op
                 multiplyVectorized·p0.999:  0.007 ms/
op
                 multiplyVectorized·p0.9999: 0.279 ms/
op
                 multiplyVectorized·p1.00:   0.425 ms/
op

Iteration   7: 0.001 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.001 ms/
op
                 multiplyVectorized·p0.50:   0.001 ms/
op
                 multiplyVectorized·p0.90:   0.001 ms/
op
                 multiplyVectorized·p0.95:   0.001 ms/
op
                 multiplyVectorized·p0.99:   0.001 ms/
op
                 multiplyVectorized·p0.999:  0.009 ms/
op
                 multiplyVectorized·p0.9999: 0.014 ms/
op
```

```
                  multiplyVectorized·p1.00:   0.343 ms/
op

Iteration   8: 0.001 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.001 ms/
op
                  multiplyVectorized·p0.50:   0.001 ms/
op
                  multiplyVectorized·p0.90:   0.001 ms/
op
                  multiplyVectorized·p0.95:   0.001 ms/
op
                  multiplyVectorized·p0.99:   0.001 ms/
op
                  multiplyVectorized·p0.999:  0.006 ms/
op
                  multiplyVectorized·p0.9999: 0.022 ms/
op
                  multiplyVectorized·p1.00:   0.338 ms/
op

Iteration   9: 0.001 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.001 ms/
op
                  multiplyVectorized·p0.50:   0.001 ms/
op
                  multiplyVectorized·p0.90:   0.001 ms/
op
                  multiplyVectorized·p0.95:   0.001 ms/
op
                  multiplyVectorized·p0.99:   0.001 ms/
op
                  multiplyVectorized·p0.999:  0.006 ms/
op
                  multiplyVectorized·p0.9999: 0.013 ms/
op
                  multiplyVectorized·p1.00:   0.360 ms/
op

Iteration  10: 0.001 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.001 ms/
```

```
op
                  multiplyVectorized·p0.50:   0.001 ms/
op
                  multiplyVectorized·p0.90:   0.001 ms/
op
                  multiplyVectorized·p0.95:   0.001 ms/
op
                  multiplyVectorized·p0.99:   0.001 ms/
op
                  multiplyVectorized·p0.999:  0.004 ms/
op
                  multiplyVectorized·p0.9999: 0.014 ms/
op
                  multiplyVectorized·p1.00:   0.333 ms/
op



Result "com.matrix.MultiplicationBenchmark.
multiplyVectorized":
  N = 326319
  mean =      0.001 ±(99.9%) 0.001 ms/op

  Histogram, ms/op:
    [0.000, 0.050) = 326300
    [0.050, 0.100) = 1
    [0.100, 0.150) = 0
    [0.150, 0.200) = 0
    [0.200, 0.250) = 0
    [0.250, 0.300) = 1
    [0.300, 0.350) = 3
    [0.350, 0.400) = 8
    [0.400, 0.450) = 6

  Percentiles, ms/op:
      p(0.0000) =      0.001 ms/op
     p(50.0000) =      0.001 ms/op
     p(90.0000) =      0.001 ms/op
     p(95.0000) =      0.001 ms/op
     p(99.0000) =      0.001 ms/op
     p(99.9000) =      0.006 ms/op
```

```
     p(99.9900) =      0.014 ms/op
     p(99.9990) =      0.421 ms/op
     p(99.9999) =      0.442 ms/op
    p(100.0000) =      0.442 ms/op


# JMH version: 1.32
# VM version: JDK 17.0.8, OpenJDK 64-Bit Server VM, 17
.0.8+7-LTS
# VM invoker: /Users/zuzannafurtak/Library/Java/
JavaVirtualMachines/corretto-17.0.8/Contents/Home/bin/
java
# VM options: -javaagent:/Applications/IntelliJ IDEA.
app/Contents/lib/idea_rt.jar=57681:/Applications/
IntelliJ IDEA.app/Contents/bin -Dfile.encoding=UTF-8
# Blackhole mode: full + dont-inline hint
# Warmup: 5 iterations, 1 s each
# Measurement: 10 iterations, 1 s each
# Timeout: 10 min per iteration
# Threads: 1 thread, will synchronize iterations
# Benchmark mode: Sampling time
# Benchmark: com.matrix.MultiplicationBenchmark.
multiplyVectorized
# Parameters: (n = 20)

# Run progress: 11.11% complete, ETA 00:02:05
# Fork: 1 of 1
# Warmup Iteration   1: 0.006 ±(99.9%) 0.001 ms/op
# Warmup Iteration   2: 0.006 ±(99.9%) 0.001 ms/op
# Warmup Iteration   3: 0.006 ±(99.9%) 0.001 ms/op
# Warmup Iteration   4: 0.006 ±(99.9%) 0.001 ms/op
# Warmup Iteration   5: 0.006 ±(99.9%) 0.001 ms/op
Iteration   1: 0.006 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.005 ms/
op
                 multiplyVectorized·p0.50:   0.006 ms/
op
                 multiplyVectorized·p0.90:   0.006 ms/
op
                 multiplyVectorized·p0.95:   0.007 ms/
op
```

```
                  multiplyVectorized·p0.99:   0.008 ms/
op
                  multiplyVectorized·p0.999:  0.017 ms/
op
                  multiplyVectorized·p0.9999: 0.390 ms/
op
                  multiplyVectorized·p1.00:   0.508 ms/
op

Iteration   2: 0.006 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.005 ms/
op
                  multiplyVectorized·p0.50:   0.006 ms/
op
                  multiplyVectorized·p0.90:   0.006 ms/
op
                  multiplyVectorized·p0.95:   0.007 ms/
op
                  multiplyVectorized·p0.99:   0.008 ms/
op
                  multiplyVectorized·p0.999:  0.019 ms/
op
                  multiplyVectorized·p0.9999: 0.412 ms/
op
                  multiplyVectorized·p1.00:   0.486 ms/
op

Iteration   3: 0.006 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.005 ms/
op
                  multiplyVectorized·p0.50:   0.006 ms/
op
                  multiplyVectorized·p0.90:   0.006 ms/
op
                  multiplyVectorized·p0.95:   0.006 ms/
op
                  multiplyVectorized·p0.99:   0.008 ms/
op
                  multiplyVectorized·p0.999:  0.015 ms/
op
                  multiplyVectorized·p0.9999: 0.393 ms/
```

```
op
                 multiplyVectorized·p1.00:   0.446 ms/
op

Iteration   4: 0.006 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.005 ms/
op
                 multiplyVectorized·p0.50:   0.006 ms/
op
                 multiplyVectorized·p0.90:   0.006 ms/
op
                 multiplyVectorized·p0.95:   0.007 ms/
op
                 multiplyVectorized·p0.99:   0.008 ms/
op
                 multiplyVectorized·p0.999:  0.018 ms/
op
                 multiplyVectorized·p0.9999: 0.406 ms/
op
                 multiplyVectorized·p1.00:   0.447 ms/
op

Iteration   5: 0.006 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.005 ms/
op
                 multiplyVectorized·p0.50:   0.006 ms/
op
                 multiplyVectorized·p0.90:   0.006 ms/
op
                 multiplyVectorized·p0.95:   0.007 ms/
op
                 multiplyVectorized·p0.99:   0.008 ms/
op
                 multiplyVectorized·p0.999:  0.018 ms/
op
                 multiplyVectorized·p0.9999: 0.427 ms/
op
                 multiplyVectorized·p1.00:   0.471 ms/
op

Iteration   6: 0.006 ±(99.9%) 0.001 ms/op
```

```
                  multiplyVectorized·p0.00:   0.005 ms/
op
                  multiplyVectorized·p0.50:   0.006 ms/
op
                  multiplyVectorized·p0.90:   0.006 ms/
op
                  multiplyVectorized·p0.95:   0.007 ms/
op
                  multiplyVectorized·p0.99:   0.008 ms/
op
                  multiplyVectorized·p0.999:  0.025 ms/
op
                  multiplyVectorized·p0.9999: 0.416 ms/
op
                  multiplyVectorized·p1.00:   0.426 ms/
op

Iteration   7: 0.006 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.005 ms/
op
                  multiplyVectorized·p0.50:   0.006 ms/
op
                  multiplyVectorized·p0.90:   0.006 ms/
op
                  multiplyVectorized·p0.95:   0.006 ms/
op
                  multiplyVectorized·p0.99:   0.008 ms/
op
                  multiplyVectorized·p0.999:  0.018 ms/
op
                  multiplyVectorized·p0.9999: 0.411 ms/
op
                  multiplyVectorized·p1.00:   0.458 ms/
op

Iteration   8: 0.006 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.005 ms/
op
                  multiplyVectorized·p0.50:   0.006 ms/
op
                  multiplyVectorized·p0.90:   0.006 ms/
```

```
op
                 multiplyVectorized·p0.95:   0.006 ms/
op
                 multiplyVectorized·p0.99:   0.008 ms/
op
                 multiplyVectorized·p0.999:  0.026 ms/
op
                 multiplyVectorized·p0.9999: 0.428 ms/
op
                 multiplyVectorized·p1.00:   0.442 ms/
op

Iteration   9: 0.006 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.005 ms/
op
                 multiplyVectorized·p0.50:   0.006 ms/
op
                 multiplyVectorized·p0.90:   0.006 ms/
op
                 multiplyVectorized·p0.95:   0.006 ms/
op
                 multiplyVectorized·p0.99:   0.007 ms/
op
                 multiplyVectorized·p0.999:  0.016 ms/
op
                 multiplyVectorized·p0.9999: 0.434 ms/
op
                 multiplyVectorized·p1.00:   0.463 ms/
op

Iteration  10: 0.006 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.005 ms/
op
                 multiplyVectorized·p0.50:   0.006 ms/
op
                 multiplyVectorized·p0.90:   0.006 ms/
op
                 multiplyVectorized·p0.95:   0.006 ms/
op
                 multiplyVectorized·p0.99:   0.008 ms/
op
```

```
                  multiplyVectorized·p0.999:  0.017 ms/
op
                  multiplyVectorized·p0.9999: 0.388 ms/
op
                  multiplyVectorized·p1.00:   0.404 ms/
op



Result "com.matrix.MultiplicationBenchmark.
multiplyVectorized":
  N = 214199
  mean =      0.006 ±(99.9%) 0.001 ms/op

  Histogram, ms/op:
    [0.000, 0.050) = 214108
    [0.050, 0.100) = 6
    [0.100, 0.150) = 0
    [0.150, 0.200) = 0
    [0.200, 0.250) = 0
    [0.250, 0.300) = 2
    [0.300, 0.350) = 20
    [0.350, 0.400) = 37
    [0.400, 0.450) = 21
    [0.450, 0.500) = 4
    [0.500, 0.550) = 1
    [0.550, 0.600) = 0

  Percentiles, ms/op:
      p(0.0000) =      0.005 ms/op
     p(50.0000) =      0.006 ms/op
     p(90.0000) =      0.006 ms/op
     p(95.0000) =      0.006 ms/op
     p(99.0000) =      0.008 ms/op
     p(99.9000) =      0.018 ms/op
     p(99.9900) =      0.405 ms/op
     p(99.9990) =      0.484 ms/op
     p(99.9999) =      0.508 ms/op
    p(100.0000) =      0.508 ms/op
```

```
# JMH version: 1.32
# VM version: JDK 17.0.8, OpenJDK 64-Bit Server VM, 17
.0.8+7-LTS
# VM invoker: /Users/zuzannafurtak/Library/Java/
JavaVirtualMachines/corretto-17.0.8/Contents/Home/bin/
java
# VM options: -javaagent:/Applications/IntelliJ IDEA.
app/Contents/lib/idea_rt.jar=57681:/Applications/
IntelliJ IDEA.app/Contents/bin -Dfile.encoding=UTF-8
# Blackhole mode: full + dont-inline hint
# Warmup: 5 iterations, 1 s each
# Measurement: 10 iterations, 1 s each
# Timeout: 10 min per iteration
# Threads: 1 thread, will synchronize iterations
# Benchmark mode: Sampling time
# Benchmark: com.matrix.MultiplicationBenchmark.
multiplyVectorized
# Parameters: (n = 50)

# Run progress: 22.22% complete, ETA 00:01:49
# Fork: 1 of 1
# Warmup Iteration   1: 0.077 ±(99.9%) 0.001 ms/op
# Warmup Iteration   2: 0.073 ±(99.9%) 0.001 ms/op
# Warmup Iteration   3: 0.070 ±(99.9%) 0.001 ms/op
# Warmup Iteration   4: 0.068 ±(99.9%) 0.001 ms/op
# Warmup Iteration   5: 0.076 ±(99.9%) 0.001 ms/op
Iteration   1: 0.074 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.066 ms/
op
                 multiplyVectorized·p0.50:   0.072 ms/
op
                 multiplyVectorized·p0.90:   0.077 ms/
op
                 multiplyVectorized·p0.95:   0.082 ms/
op
                 multiplyVectorized·p0.99:   0.093 ms/
op
                 multiplyVectorized·p0.999:  0.463 ms/
op
                 multiplyVectorized·p0.9999: 0.763 ms/
op
```

```
                  multiplyVectorized·p1.00:   0.862 ms/
op

Iteration   2: 0.083 ±(99.9%) 0.004 ms/op
                  multiplyVectorized·p0.00:   0.066 ms/
op
                  multiplyVectorized·p0.50:   0.074 ms/
op
                  multiplyVectorized·p0.90:   0.083 ms/
op
                  multiplyVectorized·p0.95:   0.102 ms/
op
                  multiplyVectorized·p0.99:   0.238 ms/
op
                  multiplyVectorized·p0.999:  0.800 ms/
op
                  multiplyVectorized·p0.9999: 10.652 ms
/op
                  multiplyVectorized·p1.00:   12.370 ms
/op

Iteration   3: 0.078 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.065 ms/
op
                  multiplyVectorized·p0.50:   0.072 ms/
op
                  multiplyVectorized·p0.90:   0.079 ms/
op
                  multiplyVectorized·p0.95:   0.087 ms/
op
                  multiplyVectorized·p0.99:   0.222 ms/
op
                  multiplyVectorized·p0.999:  0.591 ms/
op
                  multiplyVectorized·p0.9999: 1.608 ms/
op
                  multiplyVectorized·p1.00:   1.788 ms/
op

Iteration   4: 0.081 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.066 ms/
```

```
op
                 multiplyVectorized·p0.50:   0.074 ms/
op
                 multiplyVectorized·p0.90:   0.084 ms/
op
                 multiplyVectorized·p0.95:   0.105 ms/
op
                 multiplyVectorized·p0.99:   0.248 ms/
op
                 multiplyVectorized·p0.999:  0.542 ms/
op
                 multiplyVectorized·p0.9999: 0.699 ms/
op
                 multiplyVectorized·p1.00:   0.703 ms/
op

Iteration   5: 0.081 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.066 ms/
op
                 multiplyVectorized·p0.50:   0.074 ms/
op
                 multiplyVectorized·p0.90:   0.083 ms/
op
                 multiplyVectorized·p0.95:   0.096 ms/
op
                 multiplyVectorized·p0.99:   0.228 ms/
op
                 multiplyVectorized·p0.999:  0.665 ms/
op
                 multiplyVectorized·p0.9999: 1.669 ms/
op
                 multiplyVectorized·p1.00:   1.761 ms/
op

Iteration   6: 0.077 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.065 ms/
op
                 multiplyVectorized·p0.50:   0.073 ms/
op
                 multiplyVectorized·p0.90:   0.080 ms/
op
```

```
                  multiplyVectorized·p0.95:   0.086 ms/
op
                  multiplyVectorized·p0.99:   0.172 ms/
op
                  multiplyVectorized·p0.999:  0.508 ms/
op
                  multiplyVectorized·p0.9999: 0.723 ms/
op
                  multiplyVectorized·p1.00:   0.729 ms/
op

Iteration   7: 0.074 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.066 ms/
op
                  multiplyVectorized·p0.50:   0.072 ms/
op
                  multiplyVectorized·p0.90:   0.077 ms/
op
                  multiplyVectorized·p0.95:   0.080 ms/
op
                  multiplyVectorized·p0.99:   0.091 ms/
op
                  multiplyVectorized·p0.999:  0.531 ms/
op
                  multiplyVectorized·p0.9999: 2.462 ms/
op
                  multiplyVectorized·p1.00:   2.650 ms/
op

Iteration   8: 0.073 ±(99.9%) 0.001 ms/op
                  multiplyVectorized·p0.00:   0.065 ms/
op
                  multiplyVectorized·p0.50:   0.071 ms/
op
                  multiplyVectorized·p0.90:   0.074 ms/
op
                  multiplyVectorized·p0.95:   0.076 ms/
op
                  multiplyVectorized·p0.99:   0.085 ms/
op
                  multiplyVectorized·p0.999:  0.421 ms/
```

```
op
                 multiplyVectorized·p0.9999: 0.544 ms/
op
                 multiplyVectorized·p1.00:   0.557 ms/
op

Iteration   9: 0.072 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.065 ms/
op
                 multiplyVectorized·p0.50:   0.071 ms/
op
                 multiplyVectorized·p0.90:   0.074 ms/
op
                 multiplyVectorized·p0.95:   0.076 ms/
op
                 multiplyVectorized·p0.99:   0.084 ms/
op
                 multiplyVectorized·p0.999:  0.407 ms/
op
                 multiplyVectorized·p0.9999: 0.536 ms/
op
                 multiplyVectorized·p1.00:   0.579 ms/
op

Iteration  10: 0.072 ±(99.9%) 0.001 ms/op
                 multiplyVectorized·p0.00:   0.066 ms/
op
                 multiplyVectorized·p0.50:   0.071 ms/
op
                 multiplyVectorized·p0.90:   0.073 ms/
op
                 multiplyVectorized·p0.95:   0.076 ms/
op
                 multiplyVectorized·p0.99:   0.085 ms/
op
                 multiplyVectorized·p0.999:  0.416 ms/
op
                 multiplyVectorized·p0.9999: 0.453 ms/
op
                 multiplyVectorized·p1.00:   0.456 ms/
op
```

```
Result "com.matrix.MultiplicationBenchmark.
multiplyVectorized":
  N = 131161
  mean =      0.076 ±(99.9%) 0.001 ms/op

  Histogram, ms/op:
    [ 0.000,  1.250) = 131149
    [ 1.250,  2.500) = 8
    [ 2.500,  3.750) = 2
    [ 3.750,  5.000) = 1
    [ 5.000,  6.250) = 0
    [ 6.250,  7.500) = 0
    [ 7.500,  8.750) = 0
    [ 8.750, 10.000) = 0
    [10.000, 11.250) = 0
    [11.250, 12.500) = 1
    [12.500, 13.750) = 0
    [13.750, 15.000) = 0
    [15.000, 16.250) = 0
    [16.250, 17.500) = 0
    [17.500, 18.750) = 0

  Percentiles, ms/op:
      p(0.0000) =      0.065 ms/op
     p(50.0000) =      0.072 ms/op
     p(90.0000) =      0.078 ms/op
     p(95.0000) =      0.084 ms/op
     p(99.0000) =      0.164 ms/op
     p(99.9000) =      0.530 ms/op
     p(99.9900) =      1.208 ms/op
     p(99.9990) =      9.775 ms/op
     p(99.9999) =     12.370 ms/op
    p(100.0000) =     12.370 ms/op


# JMH version: 1.32
# VM version: JDK 17.0.8, OpenJDK 64-Bit Server VM, 17
.0.8+7-LTS
```

```
# VM invoker: /Users/zuzannafurtak/Library/Java/
JavaVirtualMachines/corretto-17.0.8/Contents/Home/bin/
java
# VM options: -javaagent:/Applications/IntelliJ IDEA.
app/Contents/lib/idea_rt.jar=57681:/Applications/
IntelliJ IDEA.app/Contents/bin -Dfile.encoding=UTF-8
# Blackhole mode: full + dont-inline hint
# Warmup: 5 iterations, 1 s each
# Measurement: 10 iterations, 1 s each
# Timeout: 10 min per iteration
# Threads: 1 thread, will synchronize iterations
# Benchmark mode: Sampling time
# Benchmark: com.matrix.MultiplicationBenchmark.
multiplyVectorized
# Parameters: (n = 100)

# Run progress: 33.33% complete, ETA 00:01:33
# Fork: 1 of 1
# Warmup Iteration   1: 0.544 ±(99.9%) 0.010 ms/op
# Warmup Iteration   2: 0.522 ±(99.9%) 0.003 ms/op
# Warmup Iteration   3: 0.523 ±(99.9%) 0.003 ms/op
# Warmup Iteration   4: 0.530 ±(99.9%) 0.003 ms/op
# Warmup Iteration   5: 0.531 ±(99.9%) 0.003 ms/op
Iteration   1: 0.541 ±(99.9%) 0.009 ms/op
                 multiplyVectorized·p0.00:   0.489 ms/
op
                 multiplyVectorized·p0.50:   0.524 ms/
op
                 multiplyVectorized·p0.90:   0.540 ms/
op
                 multiplyVectorized·p0.95:   0.554 ms/
op
                 multiplyVectorized·p0.99:   0.902 ms/
op
                 multiplyVectorized·p0.999:  2.380 ms/
op
                 multiplyVectorized·p0.9999: 2.433 ms/
op
                 multiplyVectorized·p1.00:   2.433 ms/
op
```

```
Iteration   2: 0.531 ±(99.9%) 0.003 ms/op
                 multiplyVectorized·p0.00:   0.501 ms/
op
                 multiplyVectorized·p0.50:   0.524 ms/
op
                 multiplyVectorized·p0.90:   0.537 ms/
op
                 multiplyVectorized·p0.95:   0.550 ms/
op
                 multiplyVectorized·p0.99:   0.833 ms/
op
                 multiplyVectorized·p0.999:  0.946 ms/
op
                 multiplyVectorized·p0.9999: 1.039 ms/
op
                 multiplyVectorized·p1.00:   1.039 ms/
op

Iteration   3: 0.531 ±(99.9%) 0.003 ms/op
                 multiplyVectorized·p0.00:   0.489 ms/
op
                 multiplyVectorized·p0.50:   0.524 ms/
op
                 multiplyVectorized·p0.90:   0.538 ms/
op
                 multiplyVectorized·p0.95:   0.552 ms/
op
                 multiplyVectorized·p0.99:   0.827 ms/
op
                 multiplyVectorized·p0.999:  0.955 ms/
op
                 multiplyVectorized·p0.9999: 1.071 ms/
op
                 multiplyVectorized·p1.00:   1.071 ms/
op

Iteration   4: 0.530 ±(99.9%) 0.003 ms/op
                 multiplyVectorized·p0.00:   0.508 ms/
op
                 multiplyVectorized·p0.50:   0.524 ms/
op
```

```
                  multiplyVectorized·p0.90:   0.536 ms/
op
                  multiplyVectorized·p0.95:   0.550 ms/
op
                  multiplyVectorized·p0.99:   0.812 ms/
op
                  multiplyVectorized·p0.999:  0.957 ms/
op
                  multiplyVectorized·p0.9999: 0.968 ms/
op
                  multiplyVectorized·p1.00:   0.968 ms/
op

Iteration   5: 0.531 ±(99.9%) 0.003 ms/op
                  multiplyVectorized·p0.00:   0.486 ms/
op
                  multiplyVectorized·p0.50:   0.524 ms/
op
                  multiplyVectorized·p0.90:   0.539 ms/
op
                  multiplyVectorized·p0.95:   0.552 ms/
op
                  multiplyVectorized·p0.99:   0.829 ms/
op
                  multiplyVectorized·p0.999:  0.924 ms/
op
                  multiplyVectorized·p0.9999: 0.981 ms/
op
                  multiplyVectorized·p1.00:   0.981 ms/
op

Iteration   6: 0.530 ±(99.9%) 0.003 ms/op
                  multiplyVectorized·p0.00:   0.499 ms/
op
                  multiplyVectorized·p0.50:   0.524 ms/
op
                  multiplyVectorized·p0.90:   0.535 ms/
op
                  multiplyVectorized·p0.95:   0.550 ms/
op
                  multiplyVectorized·p0.99:   0.820 ms/
```

```
op
                 multiplyVectorized·p0.999:  0.947 ms/
op
                 multiplyVectorized·p0.9999: 0.949 ms/
op
                 multiplyVectorized·p1.00:   0.949 ms/
op

Iteration   7: 0.531 ±(99.9%) 0.003 ms/op
                 multiplyVectorized·p0.00:   0.501 ms/
op
                 multiplyVectorized·p0.50:   0.524 ms/
op
                 multiplyVectorized·p0.90:   0.537 ms/
op
                 multiplyVectorized·p0.95:   0.551 ms/
op
                 multiplyVectorized·p0.99:   0.831 ms/
op
                 multiplyVectorized·p0.999:  0.923 ms/
op
                 multiplyVectorized·p0.9999: 0.932 ms/
op
                 multiplyVectorized·p1.00:   0.932 ms/
op

Iteration   8: 0.531 ±(99.9%) 0.003 ms/op
                 multiplyVectorized·p0.00:   0.497 ms/
op
                 multiplyVectorized·p0.50:   0.524 ms/
op
                 multiplyVectorized·p0.90:   0.536 ms/
op
                 multiplyVectorized·p0.95:   0.550 ms/
op
                 multiplyVectorized·p0.99:   0.821 ms/
op
                 multiplyVectorized·p0.999:  0.920 ms/
op
                 multiplyVectorized·p0.9999: 0.979 ms/
op
```

```
                  multiplyVectorized·p1.00:   0.979 ms/
op

Iteration   9: 0.530 ±(99.9%) 0.003 ms/op
                  multiplyVectorized·p0.00:   0.493 ms/
op
                  multiplyVectorized·p0.50:   0.524 ms/
op
                  multiplyVectorized·p0.90:   0.536 ms/
op
                  multiplyVectorized·p0.95:   0.551 ms/
op
                  multiplyVectorized·p0.99:   0.822 ms/
op
                  multiplyVectorized·p0.999:  0.919 ms/
op
                  multiplyVectorized·p0.9999: 1.020 ms/
op
                  multiplyVectorized·p1.00:   1.020 ms/
op

Iteration  10: 0.532 ±(99.9%) 0.003 ms/op
                  multiplyVectorized·p0.00:   0.486 ms/
op
                  multiplyVectorized·p0.50:   0.524 ms/
op
                  multiplyVectorized·p0.90:   0.546 ms/
op
                  multiplyVectorized·p0.95:   0.555 ms/
op
                  multiplyVectorized·p0.99:   0.846 ms/
op
                  multiplyVectorized·p0.999:  0.924 ms/
op
                  multiplyVectorized·p0.9999: 0.943 ms/
op
                  multiplyVectorized·p1.00:   0.943 ms/
op
```

```
Result "com.matrix.MultiplicationBenchmark.
multiplyVectorized":
  N = 18876
  mean =      0.532 ±(99.9%) 0.001 ms/op

  Histogram, ms/op:
    [0.000, 0.250) = 0
    [0.250, 0.500) = 13
    [0.500, 0.750) = 18637
    [0.750, 1.000) = 209
    [1.000, 1.250) = 5
    [1.250, 1.500) = 2
    [1.500, 1.750) = 3
    [1.750, 2.000) = 1
    [2.000, 2.250) = 4
    [2.250, 2.500) = 2
    [2.500, 2.750) = 0

  Percentiles, ms/op:
      p(0.0000) =      0.486 ms/op
     p(50.0000) =      0.524 ms/op
     p(90.0000) =      0.538 ms/op
     p(95.0000) =      0.552 ms/op
     p(99.0000) =      0.833 ms/op
     p(99.9000) =      0.979 ms/op
     p(99.9900) =      2.378 ms/op
     p(99.9990) =      2.433 ms/op
     p(99.9999) =      2.433 ms/op
    p(100.0000) =      2.433 ms/op


# JMH version: 1.32
# VM version: JDK 17.0.8, OpenJDK 64-Bit Server VM, 17
.0.8+7-LTS
# VM invoker: /Users/zuzannafurtak/Library/Java/
JavaVirtualMachines/corretto-17.0.8/Contents/Home/bin/
java
# VM options: -javaagent:/Applications/IntelliJ IDEA.
app/Contents/lib/idea_rt.jar=57681:/Applications/
IntelliJ IDEA.app/Contents/bin -Dfile.encoding=UTF-8
# Blackhole mode: full + dont-inline hint
```

```
# Warmup: 5 iterations, 1 s each
# Measurement: 10 iterations, 1 s each
# Timeout: 10 min per iteration
# Threads: 1 thread, will synchronize iterations
# Benchmark mode: Sampling time
# Benchmark: com.matrix.MultiplicationBenchmark.
multiplyVectorized
# Parameters: (n = 200)

# Run progress: 44.44% complete, ETA 00:01:18
# Fork: 1 of 1
# Warmup Iteration   1: 4.135 ±(99.9%) 0.135 ms/op
# Warmup Iteration   2: 3.951 ±(99.9%) 0.024 ms/op
# Warmup Iteration   3: 3.942 ±(99.9%) 0.024 ms/op
# Warmup Iteration   4: 3.946 ±(99.9%) 0.023 ms/op
# Warmup Iteration   5: 3.941 ±(99.9%) 0.022 ms/op
Iteration   1: 3.947 ±(99.9%) 0.024 ms/op
                 multiplyVectorized·p0.00:   3.850 ms/
op
                 multiplyVectorized·p0.50:   3.908 ms/
op
                 multiplyVectorized·p0.90:   4.206 ms/
op
                 multiplyVectorized·p0.95:   4.270 ms/
op
                 multiplyVectorized·p0.99:   4.360 ms/
op
                 multiplyVectorized·p0.999:  4.448 ms/
op
                 multiplyVectorized·p0.9999: 4.448 ms/
op
                 multiplyVectorized·p1.00:   4.448 ms/
op

Iteration   2: 3.956 ±(99.9%) 0.026 ms/op
                 multiplyVectorized·p0.00:   3.850 ms/
op
                 multiplyVectorized·p0.50:   3.908 ms/
op
                 multiplyVectorized·p0.90:   4.131 ms/
op
```

```
                  multiplyVectorized·p0.95:   4.286 ms/
op
                  multiplyVectorized·p0.99:   4.464 ms/
op
                  multiplyVectorized·p0.999:  4.628 ms/
op
                  multiplyVectorized·p0.9999: 4.628 ms/
op
                  multiplyVectorized·p1.00:   4.628 ms/
op

Iteration   3: 3.960 ±(99.9%) 0.027 ms/op
                  multiplyVectorized·p0.00:   3.863 ms/
op
                  multiplyVectorized·p0.50:   3.912 ms/
op
                  multiplyVectorized·p0.90:   4.155 ms/
op
                  multiplyVectorized·p0.95:   4.284 ms/
op
                  multiplyVectorized·p0.99:   4.497 ms/
op
                  multiplyVectorized·p0.999:  4.653 ms/
op
                  multiplyVectorized·p0.9999: 4.653 ms/
op
                  multiplyVectorized·p1.00:   4.653 ms/
op

Iteration   4: 3.953 ±(99.9%) 0.024 ms/op
                  multiplyVectorized·p0.00:   3.858 ms/
op
                  multiplyVectorized·p0.50:   3.912 ms/
op
                  multiplyVectorized·p0.90:   4.070 ms/
op
                  multiplyVectorized·p0.95:   4.268 ms/
op
                  multiplyVectorized·p0.99:   4.391 ms/
op
                  multiplyVectorized·p0.999:  4.481 ms/
```

```
op
                 multiplyVectorized·p0.9999: 4.481 ms/
op
                 multiplyVectorized·p1.00:   4.481 ms/
op

Iteration   5: 3.972 ±(99.9%) 0.028 ms/op
                 multiplyVectorized·p0.00:   3.838 ms/
op
                 multiplyVectorized·p0.50:   3.916 ms/
op
                 multiplyVectorized·p0.90:   4.235 ms/
op
                 multiplyVectorized·p0.95:   4.311 ms/
op
                 multiplyVectorized·p0.99:   4.434 ms/
op
                 multiplyVectorized·p0.999:  4.612 ms/
op
                 multiplyVectorized·p0.9999: 4.612 ms/
op
                 multiplyVectorized·p1.00:   4.612 ms/
op

Iteration   6: 3.958 ±(99.9%) 0.024 ms/op
                 multiplyVectorized·p0.00:   3.822 ms/
op
                 multiplyVectorized·p0.50:   3.916 ms/
op
                 multiplyVectorized·p0.90:   4.088 ms/
op
                 multiplyVectorized·p0.95:   4.284 ms/
op
                 multiplyVectorized·p0.99:   4.390 ms/
op
                 multiplyVectorized·p0.999:  4.407 ms/
op
                 multiplyVectorized·p0.9999: 4.407 ms/
op
                 multiplyVectorized·p1.00:   4.407 ms/
op
```

```
Iteration   7: 3.956 ±(99.9%) 0.024 ms/op
                 multiplyVectorized·p0.00:   3.887 ms/
op
                 multiplyVectorized·p0.50:   3.912 ms/
op
                 multiplyVectorized·p0.90:   4.073 ms/
op
                 multiplyVectorized·p0.95:   4.278 ms/
op
                 multiplyVectorized·p0.99:   4.431 ms/
op
                 multiplyVectorized·p0.999:  4.522 ms/
op
                 multiplyVectorized·p0.9999: 4.522 ms/
op
                 multiplyVectorized·p1.00:   4.522 ms/
op

Iteration   8: 3.952 ±(99.9%) 0.024 ms/op
                 multiplyVectorized·p0.00:   3.879 ms/
op
                 multiplyVectorized·p0.50:   3.908 ms/
op
                 multiplyVectorized·p0.90:   4.127 ms/
op
                 multiplyVectorized·p0.95:   4.270 ms/
op
                 multiplyVectorized·p0.99:   4.369 ms/
op
                 multiplyVectorized·p0.999:  4.448 ms/
op
                 multiplyVectorized·p0.9999: 4.448 ms/
op
                 multiplyVectorized·p1.00:   4.448 ms/
op

Iteration   9: 3.960 ±(99.9%) 0.027 ms/op
                 multiplyVectorized·p0.00:   3.883 ms/
op
                 multiplyVectorized·p0.50:   3.912 ms/
```

```
op
                 multiplyVectorized·p0.90:   4.061 ms/
op
                 multiplyVectorized·p0.95:   4.284 ms/
op
                 multiplyVectorized·p0.99:   4.607 ms/
op
                 multiplyVectorized·p0.999:  4.833 ms/
op
                 multiplyVectorized·p0.9999: 4.833 ms/
op
                 multiplyVectorized·p1.00:   4.833 ms/
op

Iteration  10: 3.965 ±(99.9%) 0.027 ms/op
                 multiplyVectorized·p0.00:   3.842 ms/
op
                 multiplyVectorized·p0.50:   3.916 ms/
op
                 multiplyVectorized·p0.90:   4.139 ms/
op
                 multiplyVectorized·p0.95:   4.301 ms/
op
                 multiplyVectorized·p0.99:   4.530 ms/
op
                 multiplyVectorized·p0.999:  4.588 ms/
op
                 multiplyVectorized·p0.9999: 4.588 ms/
op
                 multiplyVectorized·p1.00:   4.588 ms/
op



Result "com.matrix.MultiplicationBenchmark.
multiplyVectorized":
  N = 2542
  mean =      3.958 ±(99.9%) 0.008 ms/op

  Histogram, ms/op:
    [3.000, 3.125) = 0
```

```
    [3.125, 3.250) = 0
    [3.250, 3.375) = 0
    [3.375, 3.500) = 0
    [3.500, 3.625) = 0
    [3.625, 3.750) = 0
    [3.750, 3.875) = 12
    [3.875, 4.000) = 2121
    [4.000, 4.125) = 155
    [4.125, 4.250) = 62
    [4.250, 4.375) = 158
    [4.375, 4.500) = 25
    [4.500, 4.625) = 5
    [4.625, 4.750) = 2
    [4.750, 4.875) = 2

  Percentiles, ms/op:
      p(0.0000) =      3.822 ms/op
     p(50.0000) =      3.912 ms/op
     p(90.0000) =      4.130 ms/op
     p(95.0000) =      4.276 ms/op
     p(99.0000) =      4.404 ms/op
     p(99.9000) =      4.720 ms/op
     p(99.9900) =      4.833 ms/op
     p(99.9990) =      4.833 ms/op
     p(99.9999) =      4.833 ms/op
    p(100.0000) =      4.833 ms/op


# JMH version: 1.32
# VM version: JDK 17.0.8, OpenJDK 64-Bit Server VM, 17
.0.8+7-LTS
# VM invoker: /Users/zuzannafurtak/Library/Java/
JavaVirtualMachines/corretto-17.0.8/Contents/Home/bin/
java
# VM options: -javaagent:/Applications/IntelliJ IDEA.
app/Contents/lib/idea_rt.jar=57681:/Applications/
IntelliJ IDEA.app/Contents/bin -Dfile.encoding=UTF-8
# Blackhole mode: full + dont-inline hint
# Warmup: 5 iterations, 1 s each
# Measurement: 10 iterations, 1 s each
# Timeout: 10 min per iteration
```

```
# Threads: 1 thread, will synchronize iterations
# Benchmark mode: Sampling time
# Benchmark: com.matrix.MultiplicationBenchmark.
multiplyVectorized
# Parameters: (n = 500)

# Run progress: 55.56% complete, ETA 00:01:02
# Fork: 1 of 1
# Warmup Iteration   1: 79.762 ±(99.9%) 4.798 ms/op
# Warmup Iteration   2: 78.573 ±(99.9%) 1.796 ms/op
# Warmup Iteration   3: 77.806 ±(99.9%) 0.382 ms/op
# Warmup Iteration   4: 78.179 ±(99.9%) 0.958 ms/op
# Warmup Iteration   5: 77.867 ±(99.9%) 0.575 ms/op
Iteration   1: 80.085 ±(99.9%) 7.162 ms/op
                 multiplyVectorized·p0.00:   77.464 ms
/op
                 multiplyVectorized·p0.50:   78.643 ms
/op
                 multiplyVectorized·p0.90:   91.593 ms
/op
                 multiplyVectorized·p0.95:   99.877 ms
/op
                 multiplyVectorized·p0.99:   99.877 ms
/op
                 multiplyVectorized·p0.999:  99.877 ms
/op
                 multiplyVectorized·p0.9999: 99.877 ms
/op
                 multiplyVectorized·p1.00:   99.877 ms
/op

Iteration   2: 78.310 ±(99.9%) 0.945 ms/op
                 multiplyVectorized·p0.00:   77.595 ms
/op
                 multiplyVectorized·p0.50:   77.857 ms
/op
                 multiplyVectorized·p0.90:   79.849 ms
/op
                 multiplyVectorized·p0.95:   79.954 ms
/op
                 multiplyVectorized·p0.99:   79.954 ms
```

```
/op
                 multiplyVectorized·p0.999:  79.954 ms
/op
                 multiplyVectorized·p0.9999: 79.954 ms
/op
                 multiplyVectorized·p1.00:   79.954 ms
/op

Iteration   3: 82.172 ±(99.9%) 11.057 ms/op
                 multiplyVectorized·p0.00:   77.595 ms
/op
                 multiplyVectorized·p0.50:   78.512 ms
/op
                 multiplyVectorized·p0.90:   103.416
ms/op
                 multiplyVectorized·p0.95:   107.086
ms/op
                 multiplyVectorized·p0.99:   107.086
ms/op
                 multiplyVectorized·p0.999:  107.086
ms/op
                 multiplyVectorized·p0.9999: 107.086
ms/op
                 multiplyVectorized·p1.00:   107.086
ms/op

Iteration   4: 78.109 ±(99.9%) 0.498 ms/op
                 multiplyVectorized·p0.00:   77.595 ms
/op
                 multiplyVectorized·p0.50:   77.988 ms
/op
                 multiplyVectorized·p0.90:   78.800 ms
/op
                 multiplyVectorized·p0.95:   78.905 ms
/op
                 multiplyVectorized·p0.99:   78.905 ms
/op
                 multiplyVectorized·p0.999:  78.905 ms
/op
                 multiplyVectorized·p0.9999: 78.905 ms
/op
```

```
                  multiplyVectorized·p1.00:   78.905 ms
/op

Iteration   5: 77.816 ±(99.9%) 0.422 ms/op
                  multiplyVectorized·p0.00:   77.332 ms
/op
                  multiplyVectorized·p0.50:   77.857 ms
/op
                  multiplyVectorized·p0.90:   78.460 ms
/op
                  multiplyVectorized·p0.95:   78.512 ms
/op
                  multiplyVectorized·p0.99:   78.512 ms
/op
                  multiplyVectorized·p0.999:  78.512 ms
/op
                  multiplyVectorized·p0.9999: 78.512 ms
/op
                  multiplyVectorized·p1.00:   78.512 ms
/op

Iteration   6: 78.008 ±(99.9%) 0.313 ms/op
                  multiplyVectorized·p0.00:   77.595 ms
/op
                  multiplyVectorized·p0.50:   78.119 ms
/op
                  multiplyVectorized·p0.90:   78.329 ms
/op
                  multiplyVectorized·p0.95:   78.381 ms
/op
                  multiplyVectorized·p0.99:   78.381 ms
/op
                  multiplyVectorized·p0.999:  78.381 ms
/op
                  multiplyVectorized·p0.9999: 78.381 ms
/op
                  multiplyVectorized·p1.00:   78.381 ms
/op

Iteration   7: 78.079 ±(99.9%) 0.667 ms/op
                  multiplyVectorized·p0.00:   77.595 ms
```

```
/op
                 multiplyVectorized·p0.50:   77.988 ms
/op
                 multiplyVectorized·p0.90:   79.194 ms
/op
                 multiplyVectorized·p0.95:   79.823 ms
/op
                 multiplyVectorized·p0.99:   79.823 ms
/op
                 multiplyVectorized·p0.999:  79.823 ms
/op
                 multiplyVectorized·p0.9999: 79.823 ms
/op
                 multiplyVectorized·p1.00:   79.823 ms
/op

Iteration   8: 78.089 ±(99.9%) 0.396 ms/op
                 multiplyVectorized·p0.00:   77.726 ms
/op
                 multiplyVectorized·p0.50:   77.988 ms
/op
                 multiplyVectorized·p0.90:   78.669 ms
/op
                 multiplyVectorized·p0.95:   78.774 ms
/op
                 multiplyVectorized·p0.99:   78.774 ms
/op
                 multiplyVectorized·p0.999:  78.774 ms
/op
                 multiplyVectorized·p0.9999: 78.774 ms
/op
                 multiplyVectorized·p1.00:   78.774 ms
/op

Iteration   9: 78.280 ±(99.9%) 0.870 ms/op
                 multiplyVectorized·p0.00:   77.595 ms
/op
                 multiplyVectorized·p0.50:   77.988 ms
/op
                 multiplyVectorized·p0.90:   79.849 ms
/op
```

```
                  multiplyVectorized·p0.95:   80.216 ms
/op
                  multiplyVectorized·p0.99:   80.216 ms
/op
                  multiplyVectorized·p0.999:  80.216 ms
/op
                  multiplyVectorized·p0.9999: 80.216 ms
/op
                  multiplyVectorized·p1.00:   80.216 ms
/op

Iteration  10: 77.978 ±(99.9%) 0.330 ms/op
                  multiplyVectorized·p0.00:   77.595 ms
/op
                  multiplyVectorized·p0.50:   77.988 ms
/op
                  multiplyVectorized·p0.90:   78.407 ms
/op
                  multiplyVectorized·p0.95:   78.512 ms
/op
                  multiplyVectorized·p0.99:   78.512 ms
/op
                  multiplyVectorized·p0.999:  78.512 ms
/op
                  multiplyVectorized·p0.9999: 78.512 ms
/op
                  multiplyVectorized·p1.00:   78.512 ms
/op



Result "com.matrix.MultiplicationBenchmark.
multiplyVectorized":
  N = 130
  mean =     78.693 ±(99.9%) 1.072 ms/op

  Histogram, ms/op:
    [ 70.000,  72.500) = 0
    [ 72.500,  75.000) = 0
    [ 75.000,  77.500) = 5
    [ 77.500,  80.000) = 121
```

```
    [ 80.000,  82.500) = 1
    [ 82.500,  85.000) = 0
    [ 85.000,  87.500) = 0
    [ 87.500,  90.000) = 0
    [ 90.000,  92.500) = 0
    [ 92.500,  95.000) = 0
    [ 95.000,  97.500) = 0
    [ 97.500, 100.000) = 2
    [100.000, 102.500) = 0
    [102.500, 105.000) = 0
    [105.000, 107.500) = 1

  Percentiles, ms/op:
      p(0.0000) =     77.332 ms/op
     p(50.0000) =     77.988 ms/op
     p(90.0000) =     79.036 ms/op
     p(95.0000) =     79.823 ms/op
     p(99.0000) =    104.851 ms/op
     p(99.9000) =    107.086 ms/op
     p(99.9900) =    107.086 ms/op
     p(99.9990) =    107.086 ms/op
     p(99.9999) =    107.086 ms/op
    p(100.0000) =    107.086 ms/op


# JMH version: 1.32
# VM version: JDK 17.0.8, OpenJDK 64-Bit Server VM, 17
.0.8+7-LTS
# VM invoker: /Users/zuzannafurtak/Library/Java/
JavaVirtualMachines/corretto-17.0.8/Contents/Home/bin/
java
# VM options: -javaagent:/Applications/IntelliJ IDEA.
app/Contents/lib/idea_rt.jar=57681:/Applications/
IntelliJ IDEA.app/Contents/bin -Dfile.encoding=UTF-8
# Blackhole mode: full + dont-inline hint
# Warmup: 5 iterations, 1 s each
# Measurement: 10 iterations, 1 s each
# Timeout: 10 min per iteration
# Threads: 1 thread, will synchronize iterations
# Benchmark mode: Sampling time
# Benchmark: com.matrix.MultiplicationBenchmark.
```

```
multiplyVectorized
# Parameters: (n = 1000)

# Run progress: 66.67% complete, ETA 00:00:47
# Fork: 1 of 1
# Warmup Iteration   1: 834.142 ms/op
# Warmup Iteration   2: 862.978 ms/op
# Warmup Iteration   3: 860.357 ms/op
# Warmup Iteration   4: 862.978 ms/op
# Warmup Iteration   5: 862.454 ms/op
Iteration   1: 859.308 ms/op
                 multiplyVectorized·p0.00:   858.784
ms/op
                 multiplyVectorized·p0.50:   859.308
ms/op
                 multiplyVectorized·p0.90:   859.832
ms/op
                 multiplyVectorized·p0.95:   859.832
ms/op
                 multiplyVectorized·p0.99:   859.832
ms/op
                 multiplyVectorized·p0.999:  859.832
ms/op
                 multiplyVectorized·p0.9999: 859.832
ms/op
                 multiplyVectorized·p1.00:   859.832
ms/op

Iteration   2: 867.172 ms/op
                 multiplyVectorized·p0.00:   865.075
ms/op
                 multiplyVectorized·p0.50:   867.172
ms/op
                 multiplyVectorized·p0.90:   869.270
ms/op
                 multiplyVectorized·p0.95:   869.270
ms/op
                 multiplyVectorized·p0.99:   869.270
ms/op
                 multiplyVectorized·p0.999:  869.270
ms/op
```

```
                  multiplyVectorized·p0.9999: 869.270
ms/op
                  multiplyVectorized·p1.00:   869.270
ms/op

Iteration   3: 865.075 ms/op
                  multiplyVectorized·p0.00:   862.978
ms/op
                  multiplyVectorized·p0.50:   865.075
ms/op
                  multiplyVectorized·p0.90:   867.172
ms/op
                  multiplyVectorized·p0.95:   867.172
ms/op
                  multiplyVectorized·p0.99:   867.172
ms/op
                  multiplyVectorized·p0.999:  867.172
ms/op
                  multiplyVectorized·p0.9999: 867.172
ms/op
                  multiplyVectorized·p1.00:   867.172
ms/op

Iteration   4: 864.027 ms/op
                  multiplyVectorized·p0.00:   864.027
ms/op
                  multiplyVectorized·p0.50:   864.027
ms/op
                  multiplyVectorized·p0.90:   864.027
ms/op
                  multiplyVectorized·p0.95:   864.027
ms/op
                  multiplyVectorized·p0.99:   864.027
ms/op
                  multiplyVectorized·p0.999:  864.027
ms/op
                  multiplyVectorized·p0.9999: 864.027
ms/op
                  multiplyVectorized·p1.00:   864.027
ms/op
```

```
Iteration   5: 867.172 ms/op
                 multiplyVectorized·p0.00:   866.124
ms/op
                 multiplyVectorized·p0.50:   867.172
ms/op
                 multiplyVectorized·p0.90:   868.221
ms/op
                 multiplyVectorized·p0.95:   868.221
ms/op
                 multiplyVectorized·p0.99:   868.221
ms/op
                 multiplyVectorized·p0.999:  868.221
ms/op
                 multiplyVectorized·p0.9999: 868.221
ms/op
                 multiplyVectorized·p1.00:   868.221
ms/op

Iteration   6: 864.551 ms/op
                 multiplyVectorized·p0.00:   858.784
ms/op
                 multiplyVectorized·p0.50:   864.551
ms/op
                 multiplyVectorized·p0.90:   870.318
ms/op
                 multiplyVectorized·p0.95:   870.318
ms/op
                 multiplyVectorized·p0.99:   870.318
ms/op
                 multiplyVectorized·p0.999:  870.318
ms/op
                 multiplyVectorized·p0.9999: 870.318
ms/op
                 multiplyVectorized·p1.00:   870.318
ms/op

Iteration   7: 862.454 ms/op
                 multiplyVectorized·p0.00:   861.929
ms/op
                 multiplyVectorized·p0.50:   862.454
ms/op
```

```
                  multiplyVectorized·p0.90:   862.978
ms/op
                  multiplyVectorized·p0.95:   862.978
ms/op
                  multiplyVectorized·p0.99:   862.978
ms/op
                  multiplyVectorized·p0.999:  862.978
ms/op
                  multiplyVectorized·p0.9999: 862.978
ms/op
                  multiplyVectorized·p1.00:   862.978
ms/op

Iteration   8: 864.551 ms/op
                  multiplyVectorized·p0.00:   864.027
ms/op
                  multiplyVectorized·p0.50:   864.551
ms/op
                  multiplyVectorized·p0.90:   865.075
ms/op
                  multiplyVectorized·p0.95:   865.075
ms/op
                  multiplyVectorized·p0.99:   865.075
ms/op
                  multiplyVectorized·p0.999:  865.075
ms/op
                  multiplyVectorized·p0.9999: 865.075
ms/op
                  multiplyVectorized·p1.00:   865.075
ms/op

Iteration   9: 865.075 ms/op
                  multiplyVectorized·p0.00:   864.027
ms/op
                  multiplyVectorized·p0.50:   865.075
ms/op
                  multiplyVectorized·p0.90:   866.124
ms/op
                  multiplyVectorized·p0.95:   866.124
ms/op
                  multiplyVectorized·p0.99:   866.124
```

```
ms/op
                 multiplyVectorized·p0.999:  866.124
ms/op
                 multiplyVectorized·p0.9999: 866.124
ms/op
                 multiplyVectorized·p1.00:   866.124
ms/op

Iteration  10: 869.794 ms/op
                 multiplyVectorized·p0.00:   864.027
ms/op
                 multiplyVectorized·p0.50:   869.794
ms/op
                 multiplyVectorized·p0.90:   875.561
ms/op
                 multiplyVectorized·p0.95:   875.561
ms/op
                 multiplyVectorized·p0.99:   875.561
ms/op
                 multiplyVectorized·p0.999:  875.561
ms/op
                 multiplyVectorized·p0.9999: 875.561
ms/op
                 multiplyVectorized·p1.00:   875.561
ms/op



Result "com.matrix.MultiplicationBenchmark.
multiplyVectorized":
  N = 20
  mean =    864.918 ±(99.9%) 3.461 ms/op

  Histogram, ms/op:
    [850.000, 852.500) = 0
    [852.500, 855.000) = 0
    [855.000, 857.500) = 0
    [857.500, 860.000) = 3
    [860.000, 862.500) = 1
    [862.500, 865.000) = 7
    [865.000, 867.500) = 5
```

```
    [867.500, 870.000) = 2
    [870.000, 872.500) = 1
    [872.500, 875.000) = 0
    [875.000, 877.500) = 1

  Percentiles, ms/op:
      p(0.0000) =    858.784 ms/op
     p(50.0000) =    864.027 ms/op
     p(90.0000) =    870.213 ms/op
     p(95.0000) =    875.299 ms/op
     p(99.0000) =    875.561 ms/op
     p(99.9000) =    875.561 ms/op
     p(99.9900) =    875.561 ms/op
     p(99.9990) =    875.561 ms/op
     p(99.9999) =    875.561 ms/op
    p(100.0000) =    875.561 ms/op


# JMH version: 1.32
# VM version: JDK 17.0.8, OpenJDK 64-Bit Server VM, 17
.0.8+7-LTS
# VM invoker: /Users/zuzannafurtak/Library/Java/
JavaVirtualMachines/corretto-17.0.8/Contents/Home/bin/
java
# VM options: -javaagent:/Applications/IntelliJ IDEA.
app/Contents/lib/idea_rt.jar=57681:/Applications/
IntelliJ IDEA.app/Contents/bin -Dfile.encoding=UTF-8
# Blackhole mode: full + dont-inline hint
# Warmup: 5 iterations, 1 s each
# Measurement: 10 iterations, 1 s each
# Timeout: 10 min per iteration
# Threads: 1 thread, will synchronize iterations
# Benchmark mode: Sampling time
# Benchmark: com.matrix.MultiplicationBenchmark.
multiplyVectorized
# Parameters: (n = 1500)

# Run progress: 77.78% complete, ETA 00:00:34
# Fork: 1 of 1
# Warmup Iteration   1: 3670.016 ms/op
# Warmup Iteration   2: 3615.490 ms/op
```

```
# Warmup Iteration   3: 3716.153 ms/op
# Warmup Iteration   4: 3716.153 ms/op
# Warmup Iteration   5: 3737.125 ms/op
Iteration   1: 3699.376 ms/op
                 multiplyVectorized·p0.00:   3699.376
ms/op
                 multiplyVectorized·p0.50:   3699.376
ms/op
                 multiplyVectorized·p0.90:   3699.376
ms/op
                 multiplyVectorized·p0.95:   3699.376
ms/op
                 multiplyVectorized·p0.99:   3699.376
ms/op
                 multiplyVectorized·p0.999:  3699.376
ms/op
                 multiplyVectorized·p0.9999: 3699.376
ms/op
                 multiplyVectorized·p1.00:   3699.376
ms/op

Iteration   2: 3711.959 ms/op
                 multiplyVectorized·p0.00:   3711.959
ms/op
                 multiplyVectorized·p0.50:   3711.959
ms/op
                 multiplyVectorized·p0.90:   3711.959
ms/op
                 multiplyVectorized·p0.95:   3711.959
ms/op
                 multiplyVectorized·p0.99:   3711.959
ms/op
                 multiplyVectorized·p0.999:  3711.959
ms/op
                 multiplyVectorized·p0.9999: 3711.959
ms/op
                 multiplyVectorized·p1.00:   3711.959
ms/op

Iteration   3: 3711.959 ms/op
                 multiplyVectorized·p0.00:   3711.959
```

```
ms/op
                 multiplyVectorized·p0.50:   3711.959
ms/op
                 multiplyVectorized·p0.90:   3711.959
ms/op
                 multiplyVectorized·p0.95:   3711.959
ms/op
                 multiplyVectorized·p0.99:   3711.959
ms/op
                 multiplyVectorized·p0.999:  3711.959
ms/op
                 multiplyVectorized·p0.9999: 3711.959
ms/op
                 multiplyVectorized·p1.00:   3711.959
ms/op

Iteration   4: 3720.348 ms/op
                 multiplyVectorized·p0.00:   3720.348
ms/op
                 multiplyVectorized·p0.50:   3720.348
ms/op
                 multiplyVectorized·p0.90:   3720.348
ms/op
                 multiplyVectorized·p0.95:   3720.348
ms/op
                 multiplyVectorized·p0.99:   3720.348
ms/op
                 multiplyVectorized·p0.999:  3720.348
ms/op
                 multiplyVectorized·p0.9999: 3720.348
ms/op
                 multiplyVectorized·p1.00:   3720.348
ms/op

Iteration   5: 3711.959 ms/op
                 multiplyVectorized·p0.00:   3711.959
ms/op
                 multiplyVectorized·p0.50:   3711.959
ms/op
                 multiplyVectorized·p0.90:   3711.959
ms/op
```

```
                  multiplyVectorized·p0.95:   3711.959
ms/op
                  multiplyVectorized·p0.99:   3711.959
ms/op
                  multiplyVectorized·p0.999:  3711.959
ms/op
                  multiplyVectorized·p0.9999: 3711.959
ms/op
                  multiplyVectorized·p1.00:   3711.959
ms/op

Iteration   6: 3716.153 ms/op
                  multiplyVectorized·p0.00:   3716.153
ms/op
                  multiplyVectorized·p0.50:   3716.153
ms/op
                  multiplyVectorized·p0.90:   3716.153
ms/op
                  multiplyVectorized·p0.95:   3716.153
ms/op
                  multiplyVectorized·p0.99:   3716.153
ms/op
                  multiplyVectorized·p0.999:  3716.153
ms/op
                  multiplyVectorized·p0.9999: 3716.153
ms/op
                  multiplyVectorized·p1.00:   3716.153
ms/op

Iteration   7: 3749.708 ms/op
                  multiplyVectorized·p0.00:   3749.708
ms/op
                  multiplyVectorized·p0.50:   3749.708
ms/op
                  multiplyVectorized·p0.90:   3749.708
ms/op
                  multiplyVectorized·p0.95:   3749.708
ms/op
                  multiplyVectorized·p0.99:   3749.708
ms/op
                  multiplyVectorized·p0.999:  3749.708
```

```
ms/op
                 multiplyVectorized·p0.9999: 3749.708
ms/op
                 multiplyVectorized·p1.00:   3749.708
ms/op

Iteration   8: 3720.348 ms/op
                 multiplyVectorized·p0.00:   3720.348
ms/op
                 multiplyVectorized·p0.50:   3720.348
ms/op
                 multiplyVectorized·p0.90:   3720.348
ms/op
                 multiplyVectorized·p0.95:   3720.348
ms/op
                 multiplyVectorized·p0.99:   3720.348
ms/op
                 multiplyVectorized·p0.999:  3720.348
ms/op
                 multiplyVectorized·p0.9999: 3720.348
ms/op
                 multiplyVectorized·p1.00:   3720.348
ms/op

Iteration   9: 3728.736 ms/op
                 multiplyVectorized·p0.00:   3728.736
ms/op
                 multiplyVectorized·p0.50:   3728.736
ms/op
                 multiplyVectorized·p0.90:   3728.736
ms/op
                 multiplyVectorized·p0.95:   3728.736
ms/op
                 multiplyVectorized·p0.99:   3728.736
ms/op
                 multiplyVectorized·p0.999:  3728.736
ms/op
                 multiplyVectorized·p0.9999: 3728.736
ms/op
                 multiplyVectorized·p1.00:   3728.736
ms/op
```

```
Iteration  10: 3854.565 ms/op
                 multiplyVectorized·p0.00:   3854.565
ms/op
                 multiplyVectorized·p0.50:   3854.565
ms/op
                 multiplyVectorized·p0.90:   3854.565
ms/op
                 multiplyVectorized·p0.95:   3854.565
ms/op
                 multiplyVectorized·p0.99:   3854.565
ms/op
                 multiplyVectorized·p0.999:  3854.565
ms/op
                 multiplyVectorized·p0.9999: 3854.565
ms/op
                 multiplyVectorized·p1.00:   3854.565
ms/op



Result "com.matrix.MultiplicationBenchmark.
multiplyVectorized":
  N = 10
  mean =   3732.511 ±(99.9%) 67.867 ms/op

  Histogram, ms/op:
    [3600.000, 3625.000) = 0
    [3625.000, 3650.000) = 0
    [3650.000, 3675.000) = 0
    [3675.000, 3700.000) = 1
    [3700.000, 3725.000) = 6
    [3725.000, 3750.000) = 2
    [3750.000, 3775.000) = 0
    [3775.000, 3800.000) = 0
    [3800.000, 3825.000) = 0
    [3825.000, 3850.000) = 0
    [3850.000, 3875.000) = 1

  Percentiles, ms/op:
      p(0.0000) =   3699.376 ms/op
```

```
     p(50.0000) =   3718.250 ms/op
     p(90.0000) =   3844.080 ms/op
     p(95.0000) =   3854.565 ms/op
     p(99.0000) =   3854.565 ms/op
     p(99.9000) =   3854.565 ms/op
     p(99.9900) =   3854.565 ms/op
     p(99.9990) =   3854.565 ms/op
     p(99.9999) =   3854.565 ms/op
    p(100.0000) =   3854.565 ms/op


# JMH version: 1.32
# VM version: JDK 17.0.8, OpenJDK 64-Bit Server VM, 17
.0.8+7-LTS
# VM invoker: /Users/zuzannafurtak/Library/Java/
JavaVirtualMachines/corretto-17.0.8/Contents/Home/bin/
java
# VM options: -javaagent:/Applications/IntelliJ IDEA.
app/Contents/lib/idea_rt.jar=57681:/Applications/
IntelliJ IDEA.app/Contents/bin -Dfile.encoding=UTF-8
# Blackhole mode: full + dont-inline hint
# Warmup: 5 iterations, 1 s each
# Measurement: 10 iterations, 1 s each
# Timeout: 10 min per iteration
# Threads: 1 thread, will synchronize iterations
# Benchmark mode: Sampling time
# Benchmark: com.matrix.MultiplicationBenchmark.
multiplyVectorized
# Parameters: (n = 2000)

# Run progress: 88.89% complete, ETA 00:00:22
# Fork: 1 of 1
# Warmup Iteration   1: 10015.998 ms/op
# Warmup Iteration   2: 10049.552 ms/op
# Warmup Iteration   3: 9764.340 ms/op
# Warmup Iteration   4: 10083.107 ms/op
# Warmup Iteration   5: 10250.879 ms/op
Iteration   1: 10552.869 ms/op
                 multiplyVectorized·p0.00:   10552.869
 ms/op
                 multiplyVectorized·p0.50:   10552.869
```

```
 ms/op
                 multiplyVectorized·p0.90:   10552.869
 ms/op
                 multiplyVectorized·p0.95:   10552.869
 ms/op
                 multiplyVectorized·p0.99:   10552.869
 ms/op
                 multiplyVectorized·p0.999:  10552.869
 ms/op
                 multiplyVectorized·p0.9999: 10552.869
 ms/op
                 multiplyVectorized·p1.00:   10552.869
 ms/op

Iteration   2: 10435.428 ms/op
                 multiplyVectorized·p0.00:   10435.428
 ms/op
                 multiplyVectorized·p0.50:   10435.428
 ms/op
                 multiplyVectorized·p0.90:   10435.428
 ms/op
                 multiplyVectorized·p0.95:   10435.428
 ms/op
                 multiplyVectorized·p0.99:   10435.428
 ms/op
                 multiplyVectorized·p0.999:  10435.428
 ms/op
                 multiplyVectorized·p0.9999: 10435.428
 ms/op
                 multiplyVectorized·p1.00:   10435.428
 ms/op

Iteration   3: 9747.562 ms/op
                 multiplyVectorized·p0.00:   9747.562
ms/op
                 multiplyVectorized·p0.50:   9747.562
ms/op
                 multiplyVectorized·p0.90:   9747.562
ms/op
                 multiplyVectorized·p0.95:   9747.562
ms/op
```

```
                  multiplyVectorized·p0.99:   9747.562
ms/op
                  multiplyVectorized·p0.999:  9747.562
ms/op
                  multiplyVectorized·p0.9999: 9747.562
ms/op
                  multiplyVectorized·p1.00:   9747.562
ms/op

Iteration   4: 9512.681 ms/op
                  multiplyVectorized·p0.00:   9512.681
ms/op
                  multiplyVectorized·p0.50:   9512.681
ms/op
                  multiplyVectorized·p0.90:   9512.681
ms/op
                  multiplyVectorized·p0.95:   9512.681
ms/op
                  multiplyVectorized·p0.99:   9512.681
ms/op
                  multiplyVectorized·p0.999:  9512.681
ms/op
                  multiplyVectorized·p0.9999: 9512.681
ms/op
                  multiplyVectorized·p1.00:   9512.681
ms/op

Iteration   5: 9563.013 ms/op
                  multiplyVectorized·p0.00:   9563.013
ms/op
                  multiplyVectorized·p0.50:   9563.013
ms/op
                  multiplyVectorized·p0.90:   9563.013
ms/op
                  multiplyVectorized·p0.95:   9563.013
ms/op
                  multiplyVectorized·p0.99:   9563.013
ms/op
                  multiplyVectorized·p0.999:  9563.013
ms/op
                  multiplyVectorized·p0.9999: 9563.013
```

```
ms/op
                 multiplyVectorized·p1.00:   9563.013
ms/op

Iteration   6: 10636.755 ms/op
                 multiplyVectorized·p0.00:   10636.755
 ms/op
                 multiplyVectorized·p0.50:   10636.755
 ms/op
                 multiplyVectorized·p0.90:   10636.755
 ms/op
                 multiplyVectorized·p0.95:   10636.755
 ms/op
                 multiplyVectorized·p0.99:   10636.755
 ms/op
                 multiplyVectorized·p0.999:  10636.755
 ms/op
                 multiplyVectorized·p0.9999: 10636.755
 ms/op
                 multiplyVectorized·p1.00:   10636.755
 ms/op

Iteration   7: 10032.775 ms/op
                 multiplyVectorized·p0.00:   10032.775
 ms/op
                 multiplyVectorized·p0.50:   10032.775
 ms/op
                 multiplyVectorized·p0.90:   10032.775
 ms/op
                 multiplyVectorized·p0.95:   10032.775
 ms/op
                 multiplyVectorized·p0.99:   10032.775
 ms/op
                 multiplyVectorized·p0.999:  10032.775
 ms/op
                 multiplyVectorized·p0.9999: 10032.775
 ms/op
                 multiplyVectorized·p1.00:   10032.775
 ms/op

Iteration   8: 9865.003 ms/op
```

```
                  multiplyVectorized·p0.00:   9865.003
ms/op
                  multiplyVectorized·p0.50:   9865.003
ms/op
                  multiplyVectorized·p0.90:   9865.003
ms/op
                  multiplyVectorized·p0.95:   9865.003
ms/op
                  multiplyVectorized·p0.99:   9865.003
ms/op
                  multiplyVectorized·p0.999:  9865.003
ms/op
                  multiplyVectorized·p0.9999: 9865.003
ms/op
                  multiplyVectorized·p1.00:   9865.003
ms/op

Iteration   9: 10217.325 ms/op
                  multiplyVectorized·p0.00:   10217.325
 ms/op
                  multiplyVectorized·p0.50:   10217.325
 ms/op
                  multiplyVectorized·p0.90:   10217.325
 ms/op
                  multiplyVectorized·p0.95:   10217.325
 ms/op
                  multiplyVectorized·p0.99:   10217.325
 ms/op
                  multiplyVectorized·p0.999:  10217.325
 ms/op
                  multiplyVectorized·p0.9999: 10217.325
 ms/op
                  multiplyVectorized·p1.00:   10217.325
 ms/op

Iteration  10: 10401.874 ms/op
                  multiplyVectorized·p0.00:   10401.874
 ms/op
                  multiplyVectorized·p0.50:   10401.874
 ms/op
                  multiplyVectorized·p0.90:   10401.874
```

```
 ms/op
                 multiplyVectorized·p0.95:   10401.874
 ms/op
                 multiplyVectorized·p0.99:   10401.874
 ms/op
                 multiplyVectorized·p0.999:  10401.874
 ms/op
                 multiplyVectorized·p0.9999: 10401.874
 ms/op
                 multiplyVectorized·p1.00:   10401.874
 ms/op



Result "com.matrix.MultiplicationBenchmark.
multiplyVectorized":
  N = 10
  mean =  10096.529 ±(99.9%) 622.893 ms/op

  Histogram, ms/op:
    [ 9000.000,  9125.000) = 0
    [ 9125.000,  9250.000) = 0
    [ 9250.000,  9375.000) = 0
    [ 9375.000,  9500.000) = 0
    [ 9500.000,  9625.000) = 2
    [ 9625.000,  9750.000) = 1
    [ 9750.000,  9875.000) = 1
    [ 9875.000, 10000.000) = 0
    [10000.000, 10125.000) = 1
    [10125.000, 10250.000) = 1
    [10250.000, 10375.000) = 0
    [10375.000, 10500.000) = 2
    [10500.000, 10625.000) = 1
    [10625.000, 10750.000) = 1
    [10750.000, 10875.000) = 0

  Percentiles, ms/op:
      p(0.0000) =   9512.681 ms/op
     p(50.0000) =  10125.050 ms/op
     p(90.0000) =  10628.366 ms/op
     p(95.0000) =  10636.755 ms/op
```

```
     p(99.0000) =  10636.755 ms/op
     p(99.9000) =  10636.755 ms/op
     p(99.9900) =  10636.755 ms/op
     p(99.9990) =  10636.755 ms/op
     p(99.9999) =  10636.755 ms/op
    p(100.0000) =  10636.755 ms/op


# Run complete. Total time: 00:05:29

REMEMBER: The numbers below are just data. To gain
reusable insights, you need to follow up on
why the numbers are the way they are. Use profilers (
see -prof, -lprof), design factorial
experiments, perform baseline and negative tests that
provide experimental control, make sure
the benchmarking environment is safe on JVM/OS/HW
level, ask for reviews from the domain experts.
Do not assume the numbers tell you what you want them
to tell.

Benchmark

         (n)    Mode     Cnt      Score     Error
Units
MultiplicationBenchmark.multiplyVectorized
                                 10  sample  326319
      0.001 ±   0.001  ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.00      10  sample
0.001            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.50      10  sample
0.001            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.90      10  sample
0.001            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.95      10  sample
0.001            ms/op
MultiplicationBenchmark.multiplyVectorized:
```

```
multiplyVectorized·p0.99      10  sample
0.001            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.999     10  sample
0.006            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.9999    10  sample
0.014            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p1.00      10  sample
0.442            ms/op
MultiplicationBenchmark.multiplyVectorized
                               20  sample  214199
      0.006 ±   0.001  ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.00      20  sample
0.005            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.50      20  sample
0.006            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.90      20  sample
0.006            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.95      20  sample
0.006            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.99      20  sample
0.008            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.999     20  sample
0.018            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.9999    20  sample
0.405            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p1.00      20  sample
0.508            ms/op
MultiplicationBenchmark.multiplyVectorized
                               50  sample  131161
      0.076 ±   0.001  ms/op
```

```
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.00      50  sample
0.065            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.50      50  sample
0.072            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.90      50  sample
0.078            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.95      50  sample
0.084            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.99      50  sample
0.164            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.999     50  sample
0.530            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.9999    50  sample
1.208            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p1.00      50  sample
12.370            ms/op
MultiplicationBenchmark.multiplyVectorized
                              100  sample   18876
      0.532 ±   0.001  ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.00     100  sample
0.486            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.50     100  sample
0.524            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.90     100  sample
0.538            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.95     100  sample
0.552            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.99     100  sample
```

```
0.833            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.999    100  sample
0.979            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.9999   100  sample
2.378            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p1.00     100  sample
2.433            ms/op
MultiplicationBenchmark.multiplyVectorized
                              200  sample    2542
      3.958 ±   0.008  ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.00     200  sample
3.822            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.50     200  sample
3.912            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.90     200  sample
4.130            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.95     200  sample
4.276            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.99     200  sample
4.404            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.999    200  sample
4.720            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.9999   200  sample
4.833            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p1.00     200  sample
4.833            ms/op
MultiplicationBenchmark.multiplyVectorized
                              500  sample     130
78.693 ±   1.072  ms/op
MultiplicationBenchmark.multiplyVectorized:
```

```
multiplyVectorized·p0.00     500  sample
77.332            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.50     500  sample
77.988            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.90     500  sample
79.036            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.95     500  sample
79.823            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.99     500  sample
104.851            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.999    500  sample
107.086            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.9999   500  sample
107.086            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p1.00     500  sample
107.086            ms/op
MultiplicationBenchmark.multiplyVectorized
                             1000  sample      20
864.918 ±   3.461  ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.00    1000  sample
858.784            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.50    1000  sample
864.027            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.90    1000  sample
870.213            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.95    1000  sample
875.299            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.99    1000  sample
875.561            ms/op
```

```
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.999   1000  sample
875.561            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.9999  1000  sample
875.561            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p1.00    1000  sample
875.561            ms/op
MultiplicationBenchmark.multiplyVectorized
                             1500  sample      10
3732.511 ±  67.867  ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.00    1500  sample
3699.376            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.50    1500  sample
3718.250            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.90    1500  sample
3844.080            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.95    1500  sample
3854.565            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.99    1500  sample
3854.565            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.999   1500  sample
3854.565            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.9999  1500  sample
3854.565            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p1.00    1500  sample
3854.565            ms/op
MultiplicationBenchmark.multiplyVectorized
                             2000  sample      10
10096.529 ± 622.893  ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.00    2000  sample
```

```
9512.681            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.50    2000  sample
10125.050            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.90    2000  sample
10628.366            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.95    2000  sample
10636.755            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.99    2000  sample
10636.755            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.999   2000  sample
10636.755            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p0.9999  2000  sample
10636.755            ms/op
MultiplicationBenchmark.multiplyVectorized:
multiplyVectorized·p1.00    2000  sample
10636.755            ms/op

Process finished with exit code 0
```