

```

1 /Users/Aashay/Library/Java/JavaVirtualMachines/
  openjdk-19.0.2/Contents/Home/bin/java -javaagent:/
  Applications/IntelliJ IDEA CE.app/Contents/lib/
  idea_rt.jar=64651:/Applications/IntelliJ IDEA CE.
  app/Contents/bin -Dfile.encoding=UTF-8 -Dsun.stdout
  .encoding=UTF-8 -Dsun.stderr.encoding=UTF-8 -
  classpath /Users/Aashay/Desktop/Spring2023/PSA/
  INF06205/target/classes:/Users/Aashay/.m2/
  repository/com/phasmidsoftware/args_2.13/1.0.3/
  args_2.13-1.0.3.jar:/Users/Aashay/.m2/repository/
  org/scala-lang/scala-library/2.13.7/scala-library-2
  .13.7.jar:/Users/Aashay/.m2/repository/org/scala-
  lang/modules/scala-parser-combinators_2.13/1.1.2/
  scala-parser-combinators_2.13-1.1.2.jar:/Users/
  Aashay/.m2/repository/org/apache/logging/log4j/
  log4j-api/2.19.0/log4j-api-2.19.0.jar:/Users/Aashay
  /.m2/repository/log4j/log4j/1.2.17/log4j-1.2.17.jar
  :/Users/Aashay/.m2/repository/com/google/guava/
  guava/31.1-jre/guava-31.1-jre.jar:/Users/Aashay/.m2
  /repository/com/google/guava/failureaccess/1.0.1/
  failureaccess-1.0.1.jar:/Users/Aashay/.m2/
  repository/com/google/guava/listenablefuture/9999.0
  -empty-to-avoid-conflict-with-guava/
  listenablefuture-9999.0-empty-to-avoid-conflict-
  with-guava.jar:/Users/Aashay/.m2/repository/com/
  google/code/findbugs/jsr305/3.0.2/jsr305-3.0.2.jar
  :/Users/Aashay/.m2/repository/org/checkerframework/
  checker-qual/3.12.0/checker-qual-3.12.0.jar:/Users/
  Aashay/.m2/repository/com/google/errorprone/
  error_prone_annotations/2.11.0/
  error_prone_annotations-2.11.0.jar:/Users/Aashay/.
  m2/repository/com/google/j2objc/j2objc-annotations/
  1.3/j2objc-annotations-1.3.jar:/Users/Aashay/.m2/
  repository/org/ini4j/ini4j/0.5.4/ini4j-0.5.4.jar
  edu.neu.coe.info6205.sort.linearithmic.
  QuickSort_DualPivot
2 2023-03-12 19:12:15 INFO Benchmark_Timer - Begin
  run: Sorting with 20 runs
3 2023-03-12 19:12:15 INFO Benchmark_Timer - Begin
  run: Sorting with 20 runs
4 2023-03-12 19:12:15 INFO Benchmark_Timer - Begin

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4 run: Sorting with 20 runs
5 When array size is: 1000
6 Compares: 3946346
7 Swaps: 25361
8 Hits: 4079680
9 Time: 1.3648687499999999
10
11 For references: 1000      3946346 25361    4079680 1.
    3648687499999999
12
13 2023-03-12 19:12:15 INFO  Benchmark_Timer - Begin
    run: Sorting with 20 runs
14 2023-03-12 19:12:15 INFO  Benchmark_Timer - Begin
    run: Sorting with 20 runs
15 2023-03-12 19:12:15 INFO  Benchmark_Timer - Begin
    run: Sorting with 20 runs
16 When array size is: 2000
17 Compares: 16705940
18 Swaps: 51380
19 Hits: 16975474
20 Time: 6.9749270999999995
21
22 For references: 2000      16705940    51380
    16975474    6.9749270999999995
23
24 2023-03-12 19:12:15 INFO  Benchmark_Timer - Begin
    run: Sorting with 20 runs
25 2023-03-12 19:12:15 INFO  Benchmark_Timer - Begin
    run: Sorting with 20 runs
26 2023-03-12 19:12:15 INFO  Benchmark_Timer - Begin
    run: Sorting with 20 runs
27 When array size is: 4000
28 Compares: 68624884
29 Swaps: 105060
30 Hits: 69173423
31 Time: 7.481618749999999
32
33 For references: 4000      68624884    105060
    69173423    7.481618749999999
34
35 2023-03-12 19:12:16 INFO  Benchmark_Timer - Begin
```

```
35 run: Sorting with 20 runs
36 2023-03-12 19:12:16 INFO Benchmark_Timer - Begin
   run: Sorting with 20 runs
37 2023-03-12 19:12:16 INFO Benchmark_Timer - Begin
   run: Sorting with 20 runs
38 When array size is: 8000
39 Compares: 242872534
40 Swaps: 212901
41 Hits: 243980825
42 Time: 15.663264599999998
43
44 For references: 8000      242872534      212901
   243980825      15.663264599999998
45
46 2023-03-12 19:12:16 INFO Benchmark_Timer - Begin
   run: Sorting with 20 runs
47 2023-03-12 19:12:18 INFO Benchmark_Timer - Begin
   run: Sorting with 20 runs
48 2023-03-12 19:12:18 INFO Benchmark_Timer - Begin
   run: Sorting with 20 runs
49 When array size is: 16000
50 Compares: 1433900579
51 Swaps: 451702
52 Hits: 1436220951
53 Time: 96.044697899999999
54
55 For references: 16000      1433900579      451702
   1436220951      96.044697899999999
56
57 2023-03-12 19:12:19 INFO Benchmark_Timer - Begin
   run: Sorting with 20 runs
58 2023-03-12 19:12:19 INFO Benchmark_Timer - Begin
   run: Sorting with 20 runs
59 2023-03-12 19:12:22 INFO Benchmark_Timer - Begin
   run: Sorting with 20 runs
60 When array size is: 32000
61 Compares: 847856347
62 Swaps: 883260
63 Hits: 852416978
64 Time: 304.543900005
65
```

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66 For references: 32000 847856347 883260
    852416978 304.54390005
67
68 2023-03-12 19:12:28 INFO Benchmark_Timer - Begin
    run: Sorting with 20 runs
69 2023-03-12 19:12:30 INFO Benchmark_Timer - Begin
    run: Sorting with 20 runs
70 2023-03-12 19:12:57 INFO Benchmark_Timer - Begin
    run: Sorting with 20 runs
71 When array size is: 64000
72 Compares: 1370958447
73 Swaps: 1812041
74 Hits: 1380262089
75 Time: 1293.2507479
76
77 For references: 64000 1370958447 1812041
    1380262089 1293.2507479
78
79
80 Process finished with exit code 0
81
```