/Library/Java/JavaVirtualMachines/jdk-13.0.1.jdk/Contents/Home/bin/java "-javaagent:/Applications/IntelliJ IDEA CE.app/Contents/lib/idea_rt.jar=51246:/Applications/IntelliJ IDEA CE.app/Contents/bin" -Dfile.encoding=UTF-8 -classpath /Users/lanshunfang/Documents/NEU-Classes-Courses/JAVA/alg-hw/out/production/alg-hw org.neu.alg.hw.hw4.duplicateN

duplicateN problem STARTS

----
   0   1   2
   1   1   1
O(n^2)Time O(1)Space Alg.   n = 3 CPU = 1.4829999999999999E-5 secs
O(n)Time O(n)Space Alg.   n = 3 CPU = 9.753E-6 secs
----
    duplicate {1,}

O(n)Time O(1)Space Alg.   n = 3 CPU = 0.004986134 secs

----
   0   1   2   3
   1   0   0   0
O(n^2)Time O(1)Space Alg.   n = 4 CPU = 4.531E-6 secs
O(n)Time O(n)Space Alg.   n = 4 CPU = 2.475E-6 secs
----
    duplicate {0,}

O(n)Time O(1)Space Alg.   n = 4 CPU = 4.93825E-4 secs

----
   0   1   2   3   4   5   6
   1   2   3   1   3   6   6
O(n^2)Time O(1)Space Alg.   n = 7 CPU = 7.041E-6 secs
O(n)Time O(n)Space Alg.   n = 7 CPU = 3.0530000000000002E-6 secs
----
    duplicate {1,3,6,}

O(n)Time O(1)Space Alg.   n = 7 CPU = 3.1481900000000004E-4 secs

----
   0   1   2   3   4   5   6
   1   2   3   1   3   0   0
O(n^2)Time O(1)Space Alg.   n = 7 CPU = 7.695E-6 secs
O(n)Time O(n)Space Alg.   n = 7 CPU = 2.9559999999999997E-6 secs
----
    duplicate {0,1,3,}

O(n)Time O(1)Space Alg.   n = 7 CPU = 1.99615E-4 secs

```
----------------------------
   0    1    2
   0    0    1
O(n^2)Time O(1)Space Alg.   n = 3 CPU = 4.132E-6 secs
O(n)Time O(n)Space Alg.     n = 3 CPU = 2.688E-6 secs
-----------------
     duplicate {0,}
-----------------
O(n)Time O(1)Space Alg.     n = 3 CPU = 1.8665200000000001E-4 secs
----------------------------
   0    1    2    3
   3    2    0    1
O(n^2)Time O(1)Space Alg.   n = 4 CPU = 4.244E-6 secs
O(n)Time O(n)Space Alg.     n = 4 CPU = 2.862E-6 secs
-----------------
     duplicate {}
-----------------
O(n)Time O(1)Space Alg.     n = 4 CPU = 1.0286099999999999E-4 secs
All simple tests passed
O(n^2)Time O(1)Space Alg.   n = 10000 CPU = 0.7787044580000001 secs
O(n)Time O(n)Space Alg.     n = 10000 CPU = 0.0013607439999999999 secs
O(n)Time O(1)Space Alg.     n = 10000 CPU = 0.008106872 secs
O(n^2)Time O(1)Space Alg.   n = 10000 CPU = 0.633656816 secs
O(n)Time O(n)Space Alg.     n = 10000 CPU = 7.24172E-4 secs
O(n)Time O(1)Space Alg.     n = 10000 CPU = 0.001824711 secs
O(n^2)Time O(1)Space Alg.   n = 20000 CPU = 0.917926228 secs
O(n)Time O(n)Space Alg.     n = 20000 CPU = 0.0026134369999999997 secs
O(n)Time O(1)Space Alg.     n = 20000 CPU = 0.0018851130000000001 secs
O(n^2)Time O(1)Space Alg.   n = 20000 CPU = 0.715802437 secs
O(n)Time O(n)Space Alg.     n = 20000 CPU = 7.904510000000001E-4 secs
O(n)Time O(1)Space Alg.     n = 20000 CPU = 0.003619704 secs
O(n^2)Time O(1)Space Alg.   n = 30000 CPU = 0.881921941 secs
O(n)Time O(n)Space Alg.     n = 30000 CPU = 3.2692500000000005E-4 secs
O(n)Time O(1)Space Alg.     n = 30000 CPU = 7.758270000000001E-4 secs
O(n^2)Time O(1)Space Alg.   n = 30000 CPU = 1.097778998 secs
O(n)Time O(n)Space Alg.     n = 30000 CPU = 3.4846700000000004E-4 secs
O(n)Time O(1)Space Alg.     n = 30000 CPU = 7.73832E-4 secs
O(n^2)Time O(1)Space Alg.   n = 40000 CPU = 1.695580252 secs
O(n)Time O(n)Space Alg.     n = 40000 CPU = 2.0260900000000002E-4 secs
O(n)Time O(1)Space Alg.     n = 40000 CPU = 7.9851E-5 secs
O(n^2)Time O(1)Space Alg.   n = 40000 CPU = 1.522838559 secs
```

O(n)Time O(n)Space Alg.   n = 40000 CPU = 3.34135E-4 secs
O(n)Time O(1)Space Alg.   n = 40000 CPU = 6.22073E-4 secs
O(n^2)Time O(1)Space Alg.   n = 50000 CPU = 2.454101497 secs
O(n)Time O(n)Space Alg.   n = 50000 CPU = 2.87122E-4 secs
O(n)Time O(1)Space Alg.   n = 50000 CPU = 1.13867E-4 secs
O(n^2)Time O(1)Space Alg.   n = 50000 CPU = 2.4373229889999997 secs
O(n)Time O(n)Space Alg.   n = 50000 CPU = 3.38242E-4 secs
O(n)Time O(1)Space Alg.   n = 50000 CPU = 7.43715E-4 secs
O(n^2)Time O(1)Space Alg.   n = 60000 CPU = 3.201583078 secs
O(n)Time O(n)Space Alg.   n = 60000 CPU = 2.23284E-4 secs
O(n)Time O(1)Space Alg.   n = 60000 CPU = 9.6995E-5 secs
O(n^2)Time O(1)Space Alg.   n = 60000 CPU = 3.335352227 secs
O(n)Time O(n)Space Alg.   n = 60000 CPU = 3.54845E-4 secs
O(n)Time O(1)Space Alg.   n = 60000 CPU = 7.4777E-4 secs
O(n^2)Time O(1)Space Alg.   n = 70000 CPU = 4.176004412 secs
O(n)Time O(n)Space Alg.   n = 70000 CPU = 2.8089900000000004E-4 secs
O(n)Time O(1)Space Alg.   n = 70000 CPU = 1.11141E-4 secs
O(n^2)Time O(1)Space Alg.   n = 70000 CPU = 5.263036099 secs
O(n)Time O(n)Space Alg.   n = 70000 CPU = 4.1146300000000004E-4 secs
O(n)Time O(1)Space Alg.   n = 70000 CPU = 7.89401E-4 secs
O(n^2)Time O(1)Space Alg.   n = 80000 CPU = 5.906888777 secs
O(n)Time O(n)Space Alg.   n = 80000 CPU = 3.0397299999999997E-4 secs
O(n)Time O(1)Space Alg.   n = 80000 CPU = 1.26524E-4 secs
O(n^2)Time O(1)Space Alg.   n = 80000 CPU = 7.068851928 secs
O(n)Time O(n)Space Alg.   n = 80000 CPU = 6.86126E-4 secs
O(n)Time O(1)Space Alg.   n = 80000 CPU = 0.0012953490000000001 secs
O(n^2)Time O(1)Space Alg.   n = 90000 CPU = 7.519626291 secs
O(n)Time O(n)Space Alg.   n = 90000 CPU = 3.09621E-4 secs
O(n)Time O(1)Space Alg.   n = 90000 CPU = 1.2917799999999998E-4 secs
O(n^2)Time O(1)Space Alg.   n = 90000 CPU = 7.702737302 secs
O(n)Time O(n)Space Alg.   n = 90000 CPU = 3.64412E-4 secs
O(n)Time O(1)Space Alg.   n = 90000 CPU = 0.001068776 secs
O(n^2)Time O(1)Space Alg.   n = 100000 CPU = 8.573147860999999 secs
O(n)Time O(n)Space Alg.   n = 100000 CPU = 2.78922E-4 secs
O(n)Time O(1)Space Alg.   n = 100000 CPU = 1.67077E-4 secs
O(n^2)Time O(1)Space Alg.   n = 100000 CPU = 10.024570261000001 secs
O(n)Time O(n)Space Alg.   n = 100000 CPU = 5.58469E-4 secs
O(n)Time O(1)Space Alg.   n = 100000 CPU = 0.001411175 secs
O(n^2)Time O(1)Space Alg.   n = 110000 CPU = 11.165233923 secs
O(n)Time O(n)Space Alg.   n = 110000 CPU = 6.69502E-4 secs
O(n)Time O(1)Space Alg.   n = 110000 CPU = 2.3879400000000002E-4 secs

O(n^2)Time O(1)Space Alg.   n = 110000 CPU = 11.319610462 secs
O(n)Time O(n)Space Alg.   n = 110000 CPU = 5.09586E-4 secs
O(n)Time O(1)Space Alg.   n = 110000 CPU = 0.0014495819999999998 secs
O(n^2)Time O(1)Space Alg.   n = 120000 CPU = 11.682978906 secs
O(n)Time O(n)Space Alg.   n = 120000 CPU = 2.78281E-4 secs
O(n)Time O(1)Space Alg.   n = 120000 CPU = 2.1985199999999998E-4 secs
O(n^2)Time O(1)Space Alg.   n = 120000 CPU = 13.467373584 secs
O(n)Time O(n)Space Alg.   n = 120000 CPU = 7.524039999999999E-4 secs
O(n)Time O(1)Space Alg.   n = 120000 CPU = 0.0015639780000000002 secs
O(n^2)Time O(1)Space Alg.   n = 130000 CPU = 15.412866260000001 secs
O(n)Time O(n)Space Alg.   n = 130000 CPU = 2.64001E-4 secs
O(n)Time O(1)Space Alg.   n = 130000 CPU = 1.80057E-4 secs
O(n^2)Time O(1)Space Alg.   n = 130000 CPU = 19.565431361999998 secs
O(n)Time O(n)Space Alg.   n = 130000 CPU = 6.380289999999999E-4 secs
O(n)Time O(1)Space Alg.   n = 130000 CPU = 0.001840022 secs
O(n^2)Time O(1)Space Alg.   n = 140000 CPU = 19.750154229 secs
O(n)Time O(n)Space Alg.   n = 140000 CPU = 6.77651E-4 secs
O(n)Time O(1)Space Alg.   n = 140000 CPU = 2.1398900000000001E-4 secs
O(n^2)Time O(1)Space Alg.   n = 140000 CPU = 17.009138422 secs
O(n)Time O(n)Space Alg.   n = 140000 CPU = 7.71179E-4 secs
O(n)Time O(1)Space Alg.   n = 140000 CPU = 0.001615432 secs
O(n^2)Time O(1)Space Alg.   n = 150000 CPU = 18.468677297 secs
O(n)Time O(n)Space Alg.   n = 150000 CPU = 5.17677E-4 secs
O(n)Time O(1)Space Alg.   n = 150000 CPU = 2.3370499999999999E-4 secs
O(n^2)Time O(1)Space Alg.   n = 150000 CPU = 21.267876484000002 secs
O(n)Time O(n)Space Alg.   n = 150000 CPU = 0.0014864 secs
O(n)Time O(1)Space Alg.   n = 150000 CPU = 0.0019915510000000003 secs
O(n^2)Time O(1)Space Alg.   n = 160000 CPU = 20.472195959 secs
O(n)Time O(n)Space Alg.   n = 160000 CPU = 5.616950000000001E-4 secs
O(n)Time O(1)Space Alg.   n = 160000 CPU = 2.2136E-4 secs
O(n^2)Time O(1)Space Alg.   n = 160000 CPU = 24.274183292999997 secs
O(n)Time O(n)Space Alg.   n = 160000 CPU = 9.26473E-4 secs
O(n)Time O(1)Space Alg.   n = 160000 CPU = 0.002106289 secs
O(n^2)Time O(1)Space Alg.   n = 170000 CPU = 23.004085944 secs
O(n)Time O(n)Space Alg.   n = 170000 CPU = 5.82554E-4 secs
O(n)Time O(1)Space Alg.   n = 170000 CPU = 2.4301E-4 secs
O(n^2)Time O(1)Space Alg.   n = 170000 CPU = 24.975760182000002 secs
O(n)Time O(n)Space Alg.   n = 170000 CPU = 0.001006458 secs
O(n)Time O(1)Space Alg.   n = 170000 CPU = 0.002078332 secs
O(n^2)Time O(1)Space Alg.   n = 180000 CPU = 27.847755184 secs
O(n)Time O(n)Space Alg.   n = 180000 CPU = 6.18545E-4 secs

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O(n)Time O(1)Space Alg.      n = 180000 CPU = 2.48601E-4 secs
O(n^2)Time O(1)Space Alg.    n = 180000 CPU = 27.763415733000002 secs
O(n)Time O(n)Space Alg.      n = 180000 CPU = 0.001563145 secs
O(n)Time O(1)Space Alg.      n = 180000 CPU = 0.002671696 secs
O(n^2)Time O(1)Space Alg.    n = 190000 CPU = 28.220727115000003 secs
O(n)Time O(n)Space Alg.      n = 190000 CPU = 6.96546E-4 secs
O(n)Time O(1)Space Alg.      n = 190000 CPU = 3.55412E-4 secs
O(n^2)Time O(1)Space Alg.    n = 190000 CPU = 31.250662186000003 secs
O(n)Time O(n)Space Alg.      n = 190000 CPU = 0.0013168070000000001 secs
O(n)Time O(1)Space Alg.      n = 190000 CPU = 0.002168031 secs
O(n^2)Time O(1)Space Alg.    n = 200000 CPU = 30.522160148999998 secs
O(n)Time O(n)Space Alg.      n = 200000 CPU = 7.8032E-4 secs
O(n)Time O(1)Space Alg.      n = 200000 CPU = 3.1481799999999997E-4 secs
O(n^2)Time O(1)Space Alg.    n = 200000 CPU = 34.004959281000005 secs
O(n)Time O(n)Space Alg.      n = 200000 CPU = 0.0013965849999999999 secs
O(n)Time O(1)Space Alg.      n = 200000 CPU = 0.002289021 secs
O(n^2)Time O(1)Space Alg.    n = 210000 CPU = 33.573231866 secs
O(n)Time O(n)Space Alg.      n = 210000 CPU = 7.597869999999999E-4 secs
O(n)Time O(1)Space Alg.      n = 210000 CPU = 2.90334E-4 secs
O(n^2)Time O(1)Space Alg.    n = 210000 CPU = 40.070538099 secs
O(n)Time O(n)Space Alg.      n = 210000 CPU = 0.001358909 secs
O(n)Time O(1)Space Alg.      n = 210000 CPU = 0.002403794 secs
O(n^2)Time O(1)Space Alg.    n = 220000 CPU = 37.437572776 secs
O(n)Time O(n)Space Alg.      n = 220000 CPU = 7.71122E-4 secs
O(n)Time O(1)Space Alg.      n = 220000 CPU = 3.03311E-4 secs
O(n^2)Time O(1)Space Alg.    n = 220000 CPU = 41.553394311 secs
O(n)Time O(n)Space Alg.      n = 220000 CPU = 0.0015589850000000001 secs
O(n)Time O(1)Space Alg.      n = 220000 CPU = 0.002861038 secs
O(n^2)Time O(1)Space Alg.    n = 230000 CPU = 40.766834802999995 secs
O(n)Time O(n)Space Alg.      n = 230000 CPU = 5.94164E-4 secs
O(n)Time O(1)Space Alg.      n = 230000 CPU = 3.45676E-4 secs
O(n^2)Time O(1)Space Alg.    n = 230000 CPU = 45.123941958 secs
O(n)Time O(n)Space Alg.      n = 230000 CPU = 0.001341261 secs
O(n)Time O(1)Space Alg.      n = 230000 CPU = 0.002835992 secs
O(n^2)Time O(1)Space Alg.    n = 240000 CPU = 44.930866179999995 secs
O(n)Time O(n)Space Alg.      n = 240000 CPU = 4.93107E-4 secs
O(n)Time O(1)Space Alg.      n = 240000 CPU = 3.72714E-4 secs
O(n^2)Time O(1)Space Alg.    n = 240000 CPU = 50.164954371 secs
O(n)Time O(n)Space Alg.      n = 240000 CPU = 0.0018761049999999999 secs
O(n)Time O(1)Space Alg.      n = 240000 CPU = 0.004296588 secs
O(n^2)Time O(1)Space Alg.    n = 250000 CPU = 50.905515863 secs
```

O(n)Time O(n)Space Alg.	n = 250000 CPU = 0.001087267 secs
O(n)Time O(1)Space Alg.	n = 250000 CPU = 4.1109E-4 secs
O(n^2)Time O(1)Space Alg.	n = 250000 CPU = 54.917225294000005 secs
O(n)Time O(n)Space Alg.	n = 250000 CPU = 0.002102414 secs
O(n)Time O(1)Space Alg.	n = 250000 CPU = 0.004082255 secs
O(n^2)Time O(1)Space Alg.	n = 260000 CPU = 52.549723932 secs
O(n)Time O(n)Space Alg.	n = 260000 CPU = 0.001180407 secs
O(n)Time O(1)Space Alg.	n = 260000 CPU = 4.09105E-4 secs
O(n^2)Time O(1)Space Alg.	n = 260000 CPU = 57.976513691 secs
O(n)Time O(n)Space Alg.	n = 260000 CPU = 0.001848568 secs
O(n)Time O(1)Space Alg.	n = 260000 CPU = 0.004164314 secs
O(n^2)Time O(1)Space Alg.	n = 270000 CPU = 57.486305271 secs
O(n)Time O(n)Space Alg.	n = 270000 CPU = 0.001070144 secs
O(n)Time O(1)Space Alg.	n = 270000 CPU = 4.26932E-4 secs
O(n^2)Time O(1)Space Alg.	n = 270000 CPU = 63.242358754 secs
O(n)Time O(n)Space Alg.	n = 270000 CPU = 0.002670962 secs
O(n)Time O(1)Space Alg.	n = 270000 CPU = 0.0034619909999999998 secs
O(n^2)Time O(1)Space Alg.	n = 280000 CPU = 61.032634518 secs
O(n)Time O(n)Space Alg.	n = 280000 CPU = 0.001113779 secs
O(n)Time O(1)Space Alg.	n = 280000 CPU = 4.4210500000000004E-4 secs
O(n^2)Time O(1)Space Alg.	n = 280000 CPU = 68.99738877 secs
O(n)Time O(n)Space Alg.	n = 280000 CPU = 0.002762384 secs
O(n)Time O(1)Space Alg.	n = 280000 CPU = 0.004765556 secs
O(n^2)Time O(1)Space Alg.	n = 290000 CPU = 65.636770998 secs
O(n)Time O(n)Space Alg.	n = 290000 CPU = 0.0021972380000000002 secs
O(n)Time O(1)Space Alg.	n = 290000 CPU = 4.6077499999999996E-4 secs
O(n^2)Time O(1)Space Alg.	n = 290000 CPU = 74.133696211 secs
O(n)Time O(n)Space Alg.	n = 290000 CPU = 0.002681147 secs
O(n)Time O(1)Space Alg.	n = 290000 CPU = 0.004604821 secs
O(n^2)Time O(1)Space Alg.	n = 300000 CPU = 71.139938019 secs
O(n)Time O(n)Space Alg.	n = 300000 CPU = 0.001538147 secs
O(n)Time O(1)Space Alg.	n = 300000 CPU = 6.01572E-4 secs
O(n^2)Time O(1)Space Alg.	n = 300000 CPU = 76.824506249 secs
O(n)Time O(n)Space Alg.	n = 300000 CPU = 0.002252809 secs
O(n)Time O(1)Space Alg.	n = 300000 CPU = 0.004083086 secs
O(n^2)Time O(1)Space Alg.	n = 310000 CPU = 74.601902346 secs
O(n)Time O(n)Space Alg.	n = 310000 CPU = 0.001520123 secs
O(n)Time O(1)Space Alg.	n = 310000 CPU = 5.26156E-4 secs
O(n^2)Time O(1)Space Alg.	n = 310000 CPU = 81.98718808000001 secs
O(n)Time O(n)Space Alg.	n = 310000 CPU = 0.002201555 secs
O(n)Time O(1)Space Alg.	n = 310000 CPU = 0.0038845869999999997 secs

O(n^2)Time O(1)Space Alg.   n = 320000 CPU = 79.24068345100001 secs
O(n)Time O(n)Space Alg.   n = 320000 CPU = 0.001272431 secs
O(n)Time O(1)Space Alg.   n = 320000 CPU = 5.06163E-4 secs
O(n^2)Time O(1)Space Alg.   n = 320000 CPU = 86.240943063 secs
O(n)Time O(n)Space Alg.   n = 320000 CPU = 0.0024413160000000002 secs
O(n)Time O(1)Space Alg.   n = 320000 CPU = 0.0041337760000000005 secs
O(n^2)Time O(1)Space Alg.   n = 330000 CPU = 82.727745244 secs
O(n)Time O(n)Space Alg.   n = 330000 CPU = 0.001300532 secs
O(n)Time O(1)Space Alg.   n = 330000 CPU = 5.52975E-4 secs
O(n^2)Time O(1)Space Alg.   n = 330000 CPU = 92.821422262 secs
O(n)Time O(n)Space Alg.   n = 330000 CPU = 0.002763089 secs
O(n)Time O(1)Space Alg.   n = 330000 CPU = 0.004161037 secs
O(n^2)Time O(1)Space Alg.   n = 340000 CPU = 87.46790941399999 secs
O(n)Time O(n)Space Alg.   n = 340000 CPU = 0.0013410429999999999 secs
O(n)Time O(1)Space Alg.   n = 340000 CPU = 5.38954E-4 secs
O(n^2)Time O(1)Space Alg.   n = 340000 CPU = 103.92683693400001 secs
O(n)Time O(n)Space Alg.   n = 340000 CPU = 0.0035594610000000003 secs
O(n)Time O(1)Space Alg.   n = 340000 CPU = 0.006373578 secs
O(n^2)Time O(1)Space Alg.   n = 350000 CPU = 100.16395792600001 secs
O(n)Time O(n)Space Alg.   n = 350000 CPU = 0.0030598390000000004 secs
O(n)Time O(1)Space Alg.   n = 350000 CPU = 0.0010345740000000001 secs
O(n^2)Time O(1)Space Alg.   n = 350000 CPU = 102.188387953 secs
O(n)Time O(n)Space Alg.   n = 350000 CPU = 0.002803634 secs
O(n)Time O(1)Space Alg.   n = 350000 CPU = 0.004522407 secs
O(n^2)Time O(1)Space Alg.   n = 360000 CPU = 98.400584137 secs
O(n)Time O(n)Space Alg.   n = 360000 CPU = 0.0014700310000000001 secs
O(n)Time O(1)Space Alg.   n = 360000 CPU = 0.001027947 secs
O(n^2)Time O(1)Space Alg.   n = 360000 CPU = 110.017958033 secs
O(n)Time O(n)Space Alg.   n = 360000 CPU = 0.0027063 secs
O(n)Time O(1)Space Alg.   n = 360000 CPU = 0.004456748 secs
O(n^2)Time O(1)Space Alg.   n = 370000 CPU = 104.585422423 secs
O(n)Time O(n)Space Alg.   n = 370000 CPU = 0.001583295 secs
O(n)Time O(1)Space Alg.   n = 370000 CPU = 8.15712E-4 secs
O(n^2)Time O(1)Space Alg.   n = 370000 CPU = 116.035243076 secs
O(n)Time O(n)Space Alg.   n = 370000 CPU = 0.015432251000000001 secs
O(n)Time O(1)Space Alg.   n = 370000 CPU = 0.008853956999999999 secs
O(n^2)Time O(1)Space Alg.   n = 380000 CPU = 114.367145674 secs
O(n)Time O(n)Space Alg.   n = 380000 CPU = 0.001464873 secs
O(n)Time O(1)Space Alg.   n = 380000 CPU = 9.6801E-4 secs
O(n^2)Time O(1)Space Alg.   n = 380000 CPU = 122.42822114100001 secs
O(n)Time O(n)Space Alg.   n = 380000 CPU = 0.003102622 secs

O(n)Time O(1)Space Alg.   n = 380000 CPU = 0.004710356 secs
O(n^2)Time O(1)Space Alg.   n = 390000 CPU = 115.67113552500001 secs
O(n)Time O(n)Space Alg.   n = 390000 CPU = 0.001538079 secs
O(n)Time O(1)Space Alg.   n = 390000 CPU = 6.655029999999999E-4 secs
O(n^2)Time O(1)Space Alg.   n = 390000 CPU = 133.801008336 secs
O(n)Time O(n)Space Alg.   n = 390000 CPU = 0.0034840110000000004 secs
O(n)Time O(1)Space Alg.   n = 390000 CPU = 0.005710668 secs
O(n^2)Time O(1)Space Alg.   n = 400000 CPU = 120.30408455899999 secs
O(n)Time O(n)Space Alg.   n = 400000 CPU = 0.002022227 secs
O(n)Time O(1)Space Alg.   n = 400000 CPU = 6.3681E-4 secs
O(n^2)Time O(1)Space Alg.   n = 400000 CPU = 138.334627022 secs
O(n)Time O(n)Space Alg.   n = 400000 CPU = 0.002661067 secs
O(n)Time O(1)Space Alg.   n = 400000 CPU = 0.005152606 secs
O(n^2)Time O(1)Space Alg.   n = 410000 CPU = 132.907822679 secs
O(n)Time O(n)Space Alg.   n = 410000 CPU = 0.002388201 secs
O(n)Time O(1)Space Alg.   n = 410000 CPU = 7.058370000000001E-4 secs
O(n^2)Time O(1)Space Alg.   n = 410000 CPU = 141.80543405 secs
O(n)Time O(n)Space Alg.   n = 410000 CPU = 0.002770397 secs
O(n)Time O(1)Space Alg.   n = 410000 CPU = 0.005238831 secs
O(n^2)Time O(1)Space Alg.   n = 420000 CPU = 141.68061802600002 secs
O(n)Time O(n)Space Alg.   n = 420000 CPU = 0.0027456909999999998 secs
O(n)Time O(1)Space Alg.   n = 420000 CPU = 6.673940000000001E-4 secs
O(n^2)Time O(1)Space Alg.   n = 420000 CPU = 149.097275854 secs
O(n)Time O(n)Space Alg.   n = 420000 CPU = 0.0030679970000000003 secs
O(n)Time O(1)Space Alg.   n = 420000 CPU = 0.005359827 secs
O(n^2)Time O(1)Space Alg.   n = 430000 CPU = 148.35402994999998 secs
O(n)Time O(n)Space Alg.   n = 430000 CPU = 0.005130199 secs
O(n)Time O(1)Space Alg.   n = 430000 CPU = 7.099729999999999E-4 secs
O(n^2)Time O(1)Space Alg.   n = 430000 CPU = 162.72220151899998 secs
O(n)Time O(n)Space Alg.   n = 430000 CPU = 0.003729746 secs
O(n)Time O(1)Space Alg.   n = 430000 CPU = 0.005994326 secs
O(n^2)Time O(1)Space Alg.   n = 440000 CPU = 146.90023222500002 secs
O(n)Time O(n)Space Alg.   n = 440000 CPU = 0.001630811 secs
O(n)Time O(1)Space Alg.   n = 440000 CPU = 7.03788E-4 secs
O(n^2)Time O(1)Space Alg.   n = 440000 CPU = 165.05488536 secs
O(n)Time O(n)Space Alg.   n = 440000 CPU = 0.0033430309999999998 secs
O(n)Time O(1)Space Alg.   n = 440000 CPU = 0.005896083 secs
O(n^2)Time O(1)Space Alg.   n = 450000 CPU = 152.148788943 secs
O(n)Time O(n)Space Alg.   n = 450000 CPU = 0.002705838 secs
O(n)Time O(1)Space Alg.   n = 450000 CPU = 7.176719999999999E-4 secs
O(n^2)Time O(1)Space Alg.   n = 450000 CPU = 170.06240192500002 secs

O(n)Time O(n)Space Alg.	n = 450000	CPU = 0.003564503 secs	
O(n)Time O(1)Space Alg.	n = 450000	CPU = 0.006638908 secs	
O(n^2)Time O(1)Space Alg.	n = 460000	CPU = 161.039321765 secs	
O(n)Time O(n)Space Alg.	n = 460000	CPU = 0.001714957 secs	
O(n)Time O(1)Space Alg.	n = 460000	CPU = 7.37411E-4 secs	
O(n^2)Time O(1)Space Alg.	n = 460000	CPU = 187.016526151 secs	
O(n)Time O(n)Space Alg.	n = 460000	CPU = 0.0028047270000000003 secs	
O(n)Time O(1)Space Alg.	n = 460000	CPU = 0.006665226 secs	
O(n^2)Time O(1)Space Alg.	n = 470000	CPU = 170.72067109399998 secs	
O(n)Time O(n)Space Alg.	n = 470000	CPU = 0.0020839789999999997 secs	
O(n)Time O(1)Space Alg.	n = 470000	CPU = 0.001087963 secs	
O(n^2)Time O(1)Space Alg.	n = 470000	CPU = 186.672553881 secs	
O(n)Time O(n)Space Alg.	n = 470000	CPU = 0.003815707 secs	
O(n)Time O(1)Space Alg.	n = 470000	CPU = 0.006275244 secs	
O(n^2)Time O(1)Space Alg.	n = 480000	CPU = 182.848928845 secs	
O(n)Time O(n)Space Alg.	n = 480000	CPU = 0.0019359569999999999 secs	
O(n)Time O(1)Space Alg.	n = 480000	CPU = 7.83058E-4 secs	
O(n^2)Time O(1)Space Alg.	n = 480000	CPU = 195.479584628 secs	
O(n)Time O(n)Space Alg.	n = 480000	CPU = 0.004550168 secs	
O(n)Time O(1)Space Alg.	n = 480000	CPU = 0.00627676 secs	
O(n^2)Time O(1)Space Alg.	n = 490000	CPU = 184.688735778 secs	
O(n)Time O(n)Space Alg.	n = 490000	CPU = 0.002282274 secs	
O(n)Time O(1)Space Alg.	n = 490000	CPU = 7.82084E-4 secs	
O(n^2)Time O(1)Space Alg.	n = 490000	CPU = 202.31900896899998 secs	
O(n)Time O(n)Space Alg.	n = 490000	CPU = 0.002561264 secs	
O(n)Time O(1)Space Alg.	n = 490000	CPU = 0.006650379 secs	

500000 Random tests passed

All test cases passed. You will get full grade now

Include only duplicateN.java and the output of this program for FULL grade

You now understand why we should reduce O(n^2) algorithm to O(n) algorithm

duplicateN problem ENDS

Process finished with exit code 0