**10000**

List A

|  |  |
| --- | --- |
| Algorithm | Time |
| Bubble Sort | 3.926844138999968 |
| Selection Sort | 4.4549694649999765 |
| Insertion Sort | 0.0032218219998867426 |
| Heap Sort | 0.06571355500000209 |
| Python Sort | 0.00010416200029794709 |
| Quick Sort | 0.03271617599966703 |

List B

|  |  |
| --- | --- |
| Algorithm | Time |
| Bubble Sort | 9.762771602000157 |
| Selection Sort | 4.530188583000381 |
| Insertion Sort | 9.051573805000316 |
| Heap Sort | 0.043050508000305854 |
| Python Sort | 0.00013995599965710426 |
| Quick Sort | 0.032811620000302355 |

List C

|  |  |  |
| --- | --- | --- |
| Algorithm | Mean | Median |
| bubble\_sort | 4.307395553142842 | 4.331828506999955 |
| selection\_sort | 4.5092792260000225 | 4.486620278000373 |
| insertion\_sort | 0.5830789694285895 | 0.5893935629997031 |
| heapsort | 0.0523604519999892 | 0.05277178999995158 |
| python\_sort | 0.0008294940952336695 | 0.0008081820001279993 |
| quick\_sort | 0.03054271695236821 | 0.02963035199991282 |

List D

|  |  |  |
| --- | --- | --- |
| Algorithm | Mean | Median |
| bubble\_sort | 8.561624813000023 | 8.790725508999913 |
| selection\_sort | 4.450264712238095 | 4.422559585999807 |
| insertion\_sort | 7.430931821523852 | 7.423506653999993 |
| heapsort | 0.04253409004760605 | 0.04242131299997709 |
| python\_sort | 0.0015588445713720354 | 0.0014756840000700322 |
| quick\_sort | 0.030312408428601754 | 0.030533417999777157 |

List E

|  |  |  |
| --- | --- | --- |
| Algorithm | Mean | Median |
| bubble\_sort | 6.929495057523842 | 7.046431402000053 |
| selection\_sort | 4.483353299714292 | 4.499791663999986 |
| insertion\_sort | 4.645054704238148 | 4.616063669000141 |
| heapsort | 0.044864225381128824 | 0.04457860100046673 |
| python\_sort | 0.0020931800475279616 | 0.0020599890003722976 |
| quick\_sort | 0.030389691809432406 | 0.030475696999928914 |

\_\_\_\_\_ = Worst Cast

\_\_\_\_\_ = Best Case

For list E, most had a fairly close mean and median, meaning that the algorithm is fairly consistent and doesn’t produce large outliers. However bubbly sort had 0.12 seconds between its between its mean and median, meaning it ran sorted once and dragged down the mean.

**1000**

**For list a :**

|  |  |
| --- | --- |
| bubble\_sort | 0.3261409511303072 |
| selection\_sort | 0.33955536633033595 |
| insertion\_sort | 0.0014880967647616927 |
| heapsort | 0.027026832934079592 |
| python\_sort | 5.7451512462391996e-05 |
| quick\_sort | 0.016062314372624287 |

**For list b :**

|  |  |
| --- | --- |
| bubble\_sort | 0.7365668617624278 |
| selection\_sort | 0.4076492585164173 |
| insertion\_sort | 0.9067515786341929 |
| heapsort | 0.02470671515847922 |
| python\_sort | 5.5399672731493155e-05 |
| quick\_sort | 0.032088721549959676 |

**For list c :**

|  |  |  |
| --- | --- | --- |
|  | Mean | Median |
| bubble\_sort | 0.2439093213857637 | 0.2407823664893538 |
| selection\_sort | 0.3131573734204195 | 0.31724314813769894 |
| insertion\_sort | 0.03793785710255303 | 0.034318045417473186 |
| heapsort | 0.022444171028658203 | 0.02184747649361185 |
| python\_sort | 0.0003405321153223726 | 0.00036266267241913397 |
| quick\_sort | 0.01509272239316867 | 0.0148763510082226 |

**For list d :**

|  |  |  |
| --- | --- | --- |
|  | Mean | Median |
| bubble\_sort | 0.5337139496033965 | 0.5043083504747443 |
| selection\_sort | 0.31268290990933556 | 0.296300020005436 |
| insertion\_sort | 0.4848839257165631 | 0.48853585846409686 |
| heapsort | 0.019433267210355137 | 0.01658450758411334 |
| python\_sort | 0.0005869727229894227 | 0.000570924405096207 |
| quick\_sort | 0.017458322616135325 | 0.016434210323829745 |

**For list e :**

|  |  |  |
| --- | --- | --- |
|  | Mean | Median |
| bubble\_sort | 0.4302209367283464 | 0.4465931766069744 |
| selection\_sort | 0.3309451872999917 | 0.332660671874919 |
| insertion\_sort | 0.2844550912128246 | 0.27988119847958615 |
| heapsort | 0.01821755216985821 | 0.0175842664929462 |
| python\_sort | 0.0005886093094399517 | 0.0005463023283311941 |
| quick\_sort | 0.015922007617700865 | 0.01746782458822338 |

100

**100**

For list a :

|  |  |
| --- | --- |
| Algorithm | Time |
| bubble\_sort | 0.0022544589042149915 |
| selection\_sort | 0.0027776780355686422 |
| insertion\_sort | 0.000141063981492405 |
| heapsort | 0.001841526158391768 |
| python\_sort | 1.5901757913688863e-05 |
| quick\_sort | 0.0014008935762027663 |

For list b :

|  |  |
| --- | --- |
| Algorithm | Time |
| bubble\_sort | 0.00716758913961231 |
| selection\_sort | 0.0027576725981933448 |
| insertion\_sort | 0.006133461915289795 |
| heapsort | 0.0027489522793374688 |
| python\_sort | 1.5901757913688863e-05 |
| quick\_sort | 0.0012521351957198446 |

For list c :

|  |  |  |
| --- | --- | --- |
| Algorithm | Mean | Median |
| bubble\_sort | 0.0027161472703081404 | 0.0017158509748803619 |
| selection\_sort | 0.0023273480679852645 | 0.0023016512180233373 |
| insertion\_sort | 0.00031332081222564705 | 0.0003082889195525351 |
| heapsort | 0.0014624976214536417 | 0.0014706561270499408 |
| python\_sort | 2.965396944271908e-05 | 2.8212796298499043e-05 |
| quick\_sort | 0.0014300345857127912 | 0.001175191205814996 |

For list d :

|  |  |  |
| --- | --- | --- |
| Algorithm | Mean | Median |
| bubble\_sort | 0.0038464178420166482 | 0.0035825121699744056 |
| selection\_sort | 0.004896617810897087 | 0.004811564168722748 |
| insertion\_sort | 0.0058434929933337066 | 0.004569960040421206 |
| heapsort | 0.0024636732767660515 | 0.002157509476934605 |
| python\_sort | 7.796990977034948e-05 | 7.284031044330064e-05 |
| quick\_sort | 0.002466628903044927 | 0.0023847507271206325 |

For list e :

|  |  |  |
| --- | --- | --- |
| Algorithm | Mean | Median |
| bubble\_sort | 0.005190470572343585 | 0.004266800720195807 |
| selection\_sort | 0.002808895311472902 | 0.0029392604143689827 |
| insertion\_sort | 0.003379111343327256 | 0.0033398821218075803 |
| heapsort | 0.0011735790460264354 | 0.0010438734630437985 |
| python\_sort | 4.2575674414077215e-05 | 3.642015522165032e-05 |
| quick\_sort | 0.0012688674601912492 | 0.0012782961522874725 |

**10**

For list a :

|  |  |
| --- | --- |
| Algorithm | Time |
| bubble\_sort | 9.74623872129348e-05 |
| selection\_sort | 6.668479125095453e-05 |
| insertion\_sort | 3.2829435692778575e-05 |
| heapsort | 0.00016927677779088324 |
| python\_sort | 1.3336958250190212e-05 |
| quick\_sort | 0.00034573499463957935 |

For list b :

|  |  |
| --- | --- |
| Algorithm | Time |
| bubble\_sort | 0.00020415805321447045 |
| selection\_sort | 5.078303333727607e-05 |
| insertion\_sort | 8.053470943383823e-05 |
| heapsort | 9.746238721294875e-05 |
| python\_sort | 1.333695825020409e-05 |
| quick\_sort | 0.00015799165927149472 |

For list c :

|  |  |  |
| --- | --- | --- |
| Algorithm | Mean | Median |
| bubble\_sort | 4.242911443330137e-05 | 4.103679461597842e-05 |
| selection\_sort | 4.176959451982857e-05 | 3.4881275423614966e-05 |
| insertion\_sort | 2.059167729837978e-05 | 1.8466557577201392e-05 |
| heapsort | 0.00011285118519391952 | 8.617726869353248e-05 |
| python\_sort | 6.619625798176543e-06 | 3.0777595962372395e-06 |
| quick\_sort | 0.0004619326327277679 | 0.00012413630371332918 |

For list d :

|  |  |  |
| --- | --- | --- |
| Algorithm | Mean | Median |
| bubble\_sort | 7.772564313572396e-05 | 6.206815185660908e-05 |
| selection\_sort | 3.0191356038888367e-05 | 2.9751676096589907e-05 |
| insertion\_sort | 5.5985912654649405e-05 | 4.308863434676624e-05 |
| heapsort | 7.45257502222255e-05 | 7.23273505106592e-05 |
| python\_sort | 8.891305500130773e-06 | 4.103679461575638e-06 |
| quick\_sort | 0.000138841155117372 | 0.00012054558418439498 |

For list e :

|  |  |  |
| --- | --- | --- |
| Algorithm | Mean | Median |
| bubble\_sort | 5.20776465007467e-05 | 5.078303333727607e-05 |
| selection\_sort | 3.832543497169137e-05 | 4.308863434676624e-05 |
| insertion\_sort | 3.2292049096610277e-05 | 3.1803515827322215e-05 |
| heapsort | 9.729140056870454e-05 | 7.130143064526528e-05 |
| python\_sort | 3.93269281736711e-06 | 3.0777595961817283e-06 |
| quick\_sort | 0.00010339806643418148 | 0.00010720862593427416 |