Trial 1:

SIZE: 10

METHOD: shuffle

Swaps: 6 Comps: 14 Total: 20

METHOD: miniShuffle

Swaps: 4 Comps: 13 Total: 17

METHOD: reverse

Swaps: 9 Comps: 17 Total: 26

SIZE: 30

METHOD: shuffle

Swaps: 28 Comps: 56 Total: 84

METHOD: miniShuffle

Swaps: 27 Comps: 56 Total: 83

METHOD: reverse

Swaps: 29 Comps: 57 Total: 86

SIZE: 50

METHOD: shuffle

Swaps: 42 Comps: 91 Total: 133

METHOD: miniShuffle

Swaps: 37 Comps: 86 Total: 123

METHOD: reverse

Swaps: 49 Comps: 97 Total: 146

SIZE: 70

METHOD: shuffle

Swaps: 63 Comps: 132 Total: 195

METHOD: miniShuffle

Swaps: 61 Comps: 130 Total: 191

METHOD: reverse

Swaps: 69 Comps: 137 Total: 206

SIZE: 90

METHOD: shuffle

Swaps: 84 Comps: 172 Total: 256

METHOD: miniShuffle

Swaps: 81 Comps: 169 Total: 250

METHOD: reverse

Swaps: 89 Comps: 177 Total: 266

SIZE: 110

METHOD: shuffle

Swaps: 104 Comps: 212 Total: 316

METHOD: miniShuffle

Swaps: 99 Comps: 208 Total: 307

METHOD: reverse

Swaps: 109 Comps: 217 Total: 326

SIZE: 130

METHOD: shuffle

Swaps: 124 Comps: 252 Total: 376

METHOD: miniShuffle

Swaps: 121 Comps: 249 Total: 370

METHOD: reverse

Swaps: 129 Comps: 257 Total: 386

SIZE: 150

METHOD: shuffle

Swaps: 145 Comps: 294 Total: 439

METHOD: miniShuffle

Swaps: 145 Comps: 293 Total: 438

METHOD: reverse

Swaps: 149 Comps: 297 Total: 446

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Trial 2:

SIZE: 10

METHOD: shuffle

Swaps: 6 Comps: 14 Total: 20

METHOD: miniShuffle

Swaps: 6 Comps: 15 Total: 21

METHOD: reverse

Swaps: 9 Comps: 17 Total: 26

SIZE: 30

METHOD: shuffle

Swaps: 23 Comps: 52 Total: 75

METHOD: miniShuffle

Swaps: 22 Comps: 51 Total: 73

METHOD: reverse

Swaps: 29 Comps: 57 Total: 86

SIZE: 50

METHOD: shuffle

Swaps: 45 Comps: 93 Total: 138

METHOD: miniShuffle

Swaps: 43 Comps: 92 Total: 135

METHOD: reverse

Swaps: 49 Comps: 97 Total: 146

SIZE: 70

METHOD: shuffle

Swaps: 67 Comps: 135 Total: 202

METHOD: miniShuffle

Swaps: 63 Comps: 131 Total: 194

METHOD: reverse

Swaps: 69 Comps: 137 Total: 206

SIZE: 90

METHOD: shuffle

Swaps: 87 Comps: 175 Total: 262

METHOD: miniShuffle

Swaps: 83 Comps: 172 Total: 255

METHOD: reverse

Swaps: 89 Comps: 177 Total: 266

SIZE: 110

METHOD: shuffle

Swaps: 108 Comps: 216 Total: 324

METHOD: miniShuffle

Swaps: 103 Comps: 211 Total: 314

METHOD: reverse

Swaps: 109 Comps: 217 Total: 326

SIZE: 130

METHOD: shuffle

Swaps: 126 Comps: 254 Total: 380

METHOD: miniShuffle

Swaps: 120 Comps: 249 Total: 369

METHOD: reverse

Swaps: 129 Comps: 257 Total: 386

SIZE: 150

METHOD: shuffle

Swaps: 142 Comps: 290 Total: 432

METHOD: miniShuffle

Swaps: 141 Comps: 289 Total: 430

METHOD: reverse

Swaps: 149 Comps: 297 Total: 446

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Trial 3:

SIZE: 10

METHOD: shuffle

Swaps: 6 Comps: 15 Total: 21

METHOD: miniShuffle

Swaps: 4 Comps: 13 Total: 17

METHOD: reverse

Swaps: 9 Comps: 17 Total: 26

SIZE: 30

METHOD: shuffle

Swaps: 28 Comps: 56 Total: 84

METHOD: miniShuffle

Swaps: 25 Comps: 54 Total: 79

METHOD: reverse

Swaps: 29 Comps: 57 Total: 86

SIZE: 50

METHOD: shuffle

Swaps: 47 Comps: 95 Total: 142

METHOD: miniShuffle

Swaps: 45 Comps: 93 Total: 138

METHOD: reverse

Swaps: 49 Comps: 97 Total: 146

SIZE: 70

METHOD: shuffle

Swaps: 65 Comps: 134 Total: 199

METHOD: miniShuffle

Swaps: 61 Comps: 130 Total: 191

METHOD: reverse

Swaps: 69 Comps: 137 Total: 206

SIZE: 90

METHOD: shuffle

Swaps: 86 Comps: 174 Total: 260

METHOD: miniShuffle

Swaps: 81 Comps: 170 Total: 251

METHOD: reverse

Swaps: 89 Comps: 177 Total: 266

SIZE: 110

METHOD: shuffle

Swaps: 108 Comps: 216 Total: 324

METHOD: miniShuffle

Swaps: 104 Comps: 213 Total: 317

METHOD: reverse

Swaps: 109 Comps: 217 Total: 326

SIZE: 130

METHOD: shuffle

Swaps: 125 Comps: 253 Total: 378

METHOD: miniShuffle

Swaps: 121 Comps: 250 Total: 371

METHOD: reverse

Swaps: 129 Comps: 257 Total: 386

SIZE: 150

METHOD: shuffle

Swaps: 142 Comps: 291 Total: 433

METHOD: miniShuffle

Swaps: 141 Comps: 290 Total: 431

METHOD: reverse

Swaps: 149 Comps: 297 Total: 446

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Trial 4:

SIZE: 10

METHOD: shuffle

Swaps: 8 Comps: 17 Total: 25

METHOD: miniShuffle

Swaps: 7 Comps: 15 Total: 22

METHOD: reverse

Swaps: 9 Comps: 17 Total: 26

SIZE: 30

METHOD: shuffle

Swaps: 27 Comps: 55 Total: 82

METHOD: miniShuffle

Swaps: 23 Comps: 52 Total: 75

METHOD: reverse

Swaps: 29 Comps: 57 Total: 86

SIZE: 50

METHOD: shuffle

Swaps: 43 Comps: 92 Total: 135

METHOD: miniShuffle

Swaps: 43 Comps: 91 Total: 134

METHOD: reverse

Swaps: 49 Comps: 97 Total: 146

SIZE: 70

METHOD: shuffle

Swaps: 68 Comps: 136 Total: 204

METHOD: miniShuffle

Swaps: 65 Comps: 133 Total: 198

METHOD: reverse

Swaps: 69 Comps: 137 Total: 206

SIZE: 90

METHOD: shuffle

Swaps: 87 Comps: 175 Total: 262

METHOD: miniShuffle

Swaps: 83 Comps: 171 Total: 254

METHOD: reverse

Swaps: 89 Comps: 177 Total: 266

SIZE: 110

METHOD: shuffle

Swaps: 104 Comps: 212 Total: 316

METHOD: miniShuffle

Swaps: 101 Comps: 210 Total: 311

METHOD: reverse

Swaps: 109 Comps: 217 Total: 326

SIZE: 130

METHOD: shuffle

Swaps: 123 Comps: 252 Total: 375

METHOD: miniShuffle

Swaps: 121 Comps: 250 Total: 371

METHOD: reverse

Swaps: 129 Comps: 257 Total: 386

SIZE: 150

METHOD: shuffle

Swaps: 145 Comps: 293 Total: 438

METHOD: miniShuffle

Swaps: 141 Comps: 290 Total: 431

METHOD: reverse

Swaps: 149 Comps: 297 Total: 446

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Trial 5:

SIZE: 10

METHOD: shuffle

Swaps: 6 Comps: 15 Total: 21

METHOD: miniShuffle

Swaps: 5 Comps: 14 Total: 19

METHOD: reverse

Swaps: 9 Comps: 17 Total: 26

SIZE: 30

METHOD: shuffle

Swaps: 25 Comps: 53 Total: 78

METHOD: miniShuffle

Swaps: 26 Comps: 54 Total: 80

METHOD: reverse

Swaps: 29 Comps: 57 Total: 86

SIZE: 50

METHOD: shuffle

Swaps: 46 Comps: 94 Total: 140

METHOD: miniShuffle

Swaps: 41 Comps: 90 Total: 131

METHOD: reverse

Swaps: 49 Comps: 97 Total: 146

SIZE: 70

METHOD: shuffle

Swaps: 64 Comps: 132 Total: 196

METHOD: miniShuffle

Swaps: 62 Comps: 130 Total: 192

METHOD: reverse

Swaps: 69 Comps: 137 Total: 206

SIZE: 90

METHOD: shuffle

Swaps: 83 Comps: 172 Total: 255

METHOD: miniShuffle

Swaps: 79 Comps: 168 Total: 247

METHOD: reverse

Swaps: 89 Comps: 177 Total: 266

SIZE: 110

METHOD: shuffle

Swaps: 107 Comps: 216 Total: 323

METHOD: miniShuffle

Swaps: 103 Comps: 211 Total: 314

METHOD: reverse

Swaps: 109 Comps: 217 Total: 326

SIZE: 130

METHOD: shuffle

Swaps: 124 Comps: 253 Total: 377

METHOD: miniShuffle

Swaps: 119 Comps: 247 Total: 366

METHOD: reverse

Swaps: 129 Comps: 257 Total: 386

SIZE: 150

METHOD: shuffle

Swaps: 144 Comps: 293 Total: 437

METHOD: miniShuffle

Swaps: 142 Comps: 290 Total: 432

METHOD: reverse

Swaps: 149 Comps: 297 Total: 446

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While insertion sort runs in O(n) time in its best case, it runs in O(n^2) time in its worst and averages cases. In an optimal case scenario, the algorithm will traverse through the list and compare every pair of elements before swapping them if they're out of order. Its best-case scenario comes from when it's fed an array that is pre-sorted; only traversal of the array is needed and indeed performed by the algorithm, resulting in the O(n) time. Its space complexity is less if it's fully or partially sorted, meaning it's adaptive. The opposite being when the input array is prepared (or comes by happenstance) in decreasing order. We tested our algorithm 3 times for the sake of getting multiple readings and being confident in presenting an average time, swap number and comparison numbers. We processed an input size (n) of 151, incremented by 20, for the three methods of shuffle, miniShuffle, and reverse. The average swaps and comparisons for these respective methods are shown below:

TOTAL time of 3 trials = 0.02121429

average time of 3 trials = 0.00707143

for size in range(10, 151, 20): #showing starting, ending size limits with increment parameter set to 20

**Swaps:**

Trial 1 = 1803, Trial 2 = 1817, Trial 3 = 1821, **AVERAGE = 1813.67**

**Comparisons:**

Trial 1 = 3683, Trial 2 = 3695, Trial 3 = 3703, **AVERAGE = 3693.67**

\* Case at results at size = 150:

shuffle:

- average swaps = 143.6

- average comparisons = 292.2

miniShuffle:

- average swaps = 142

- average comparisons = 290.4

reverse:

- average swaps = 149

- average comparisons = 297