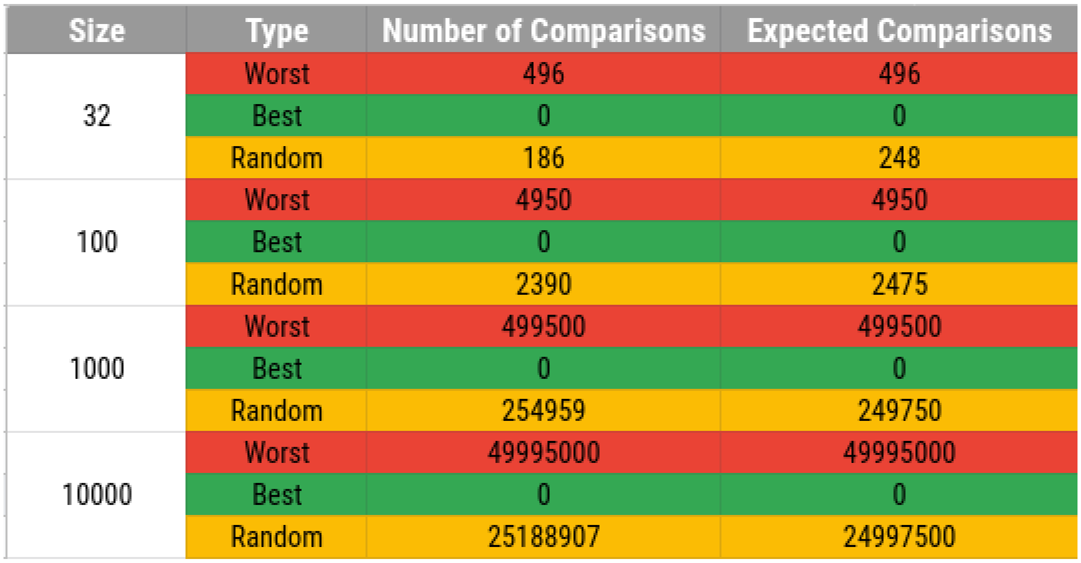
Insertion Sort Results

The results from running insertion sort are as follows:



Size	Type	Number of Comparisons	Expected Comparisons
32	Worst	496	496
	Best	0	0
	Random	186	248
100	Worst	4950	4950
	Best	0	0
	Random	2390	2475
1000	Worst	499500	499500
	Best	0	0
	Random	254959	249750
10000	Worst	49995000	49995000
	Best	0	0
	Random	25188907	24997500

The results show that the worst and best case both produce the expected result. The random case does not provide the expected result, but because the generated numbers are random this makes sense. Because the random result is very close to the expected random result in every trial it is safe to say the algorithm performed as expected. The table also shows that insertion sort has O(n^2), we can verify this by looking at the comparison results from the 100 and 1,000 array size. The array size of 100 used 4,950 comparisons in the worst case while the array size of 1,000 used 499,500 in the worst case. $\frac{499,500}{4,950} = \sim 100$. These results also stand when comparing 1,000 against 10,000. The array size becomes 10x bigger but the number of comparisons increases 100x proving the O(n^2) complexity of insertion sort.