Abstract

With the goal of further understanding arrays in Python compared to those of other languages, this experiment will focus on the performance of the sorting algorithm binary search with varying input sizes

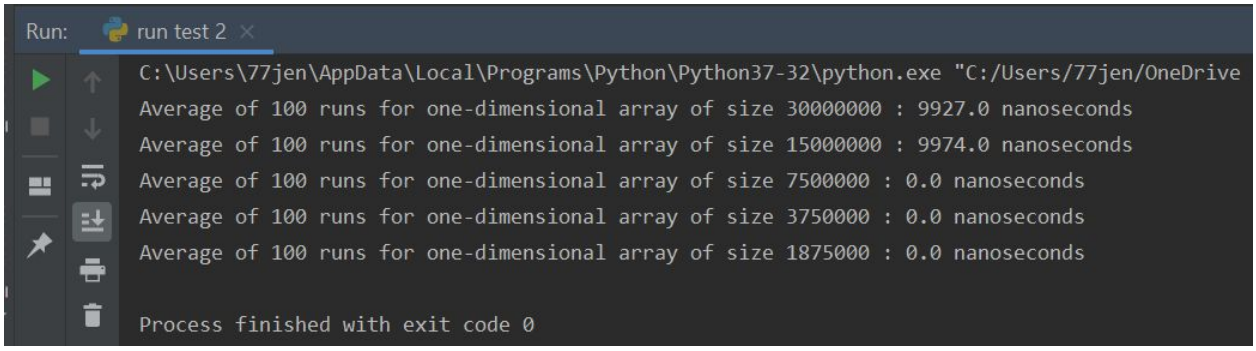
Experiments

*Note: for easy comparison the same tests were done in languages: Python, Java, JavaScript, and C++

- Package used
    - `time` package used in order to measure how long the specific test took to run in nanoseconds
- One dimensional array
    - Array input sizes:
        - 1,875,000
        - 3,000,000
        - 3,750,000
        - 7,500,000
        - 15,000,000
    - Binary Search value
        - 500
    - Array content
        - Contains only index+1
            - Arr[0] = 1
            - Arr[127] = 128 ...etc.

A one dimensional array will be created and populated based on the input size given. The time it took for each array to complete the binary search on the value 500 is recorded each time as data.

Results



Array input size	Time (nanoseconds)
1,875,000	0
3,750,000	0
7,500,000	0
15,000,000	9974
30,000,000	9927

Despite varying input sizes, the runs for binary search were a bit different from what was originally expected. I even changed the number of test runs for each case from 10 to 100 in order to get closer to the actual runtime of binary search.

Conclusion

Contrary to the input sizes provided for binary search the actual time in nanosecond for input sizes 15 million and 30 million were actually very close to each other despite 30 million being double the size of 15 million. Also input sizes below 15 million ran so quickly that the reported time was zero nanoseconds for the binary search. It seems that the threshold and input sizes should have been tested between 7,500,000 and 15,000,000 in order to achieve better results. Despite 30 million being bigger than 15 million the average runtime was higher for 15 million when compared to that of 30 million, perhaps 100 runs still wasn't big enough. The difference between the runtimes is 47 nanoseconds, and requires further study to see why this occurred.