Algorithm PA1

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1. Compare runtime ( running local )

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Input Size | IS | | MS | | QS | | HS | |
|  | CPU time(ms) | Memory(kb) | CPU time(ms) | Memory(kb) | CPU time(ms) | Memory(kb) | CPU time(ms) | Memory(kb) |
| 4000.case2 | 0.018 | 5904 | 0.631 | 6048 | 0.095 | 5904 | 0.127 | 5904 |
| 4000.case3 | 11.508 | 5904 | 0.633 | 6048 | 0.103 | 5904 | 0.142 | 5904 |
| 4000.case1 | 7.281 | 5904 | 1.036 | 6048 | 0.255 | 5904 | 0.178 | 5904 |
| 16000.case2 | 0.019 | 6056 | 2.445 | 6216 | 0.369 | 6056 | 0.576 | 6056 |
| 16000.case3 | 179.511 | 6056 | 2.441 | 6216 | 0.393 | 6056 | 0.588 | 6056 |
| 16000.case1 | 92.014 | 6056 | 3.406 | 6216 | 0.736 | 6056 | 0.709 | 6056 |
| 32000.case2 | 0.039 | 6188 | 4.928 | 6256 | 0.726 | 6188 | 1.269 | 6188 |
| 32000.case3 | 728.202 | 6188 | 4.908 | 6256 | 0.777 | 6188 | 1.243 | 6188 |
| 32000.case1 | 358.516 | 6188 | 6.99 | 6256 | 1.423 | 6188 | 1.43 | 6188 |
| 100000.case2 | 0.509 | 12144 | 154.462 | 18288 | 23.949 | 12144 | 53.291 | 12144 |
| 100000.case3 | 711958 | 12144 | 161.09 | 18288 | 26.358 | 12144 | 54.274 | 12144 |
| 100000.case1 | 355824 | 12144 | 226.657 | 18288 | 58.754 | 12144 | 85.263 | 12144 |

1. Trend line

The plots are in the next page.

Basically, the tendency is the same as the one shown in pa1.pdf, although the lines are not that linear.

(I think it is because I ran it local, there must be some hardware limitation)

Case1: We can observe that the time complexity of IS is and the others are

Case2: We can observe that the time complexity of IS is and the others are

Case3: IS is of and the others are . QS should be too, but since we use randomized QS here, it is of