|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | y | x | y |  |  |  |  |  |  |  |  |  |  |  |  |
| 8 | 4 | 8 | 4.128534 |  |  |  | | | | | | | | | |
| 200 | 10 | 200 | 12.06726 |  |  |
| 400 | 12 | 400 | 13.77677 |  |  |
| 600 | 12 | 600 | 14.77677 |  |  |
| 800 | 13 | 800 | 15.48628 |  |  |
| 1000 | 14 | 1000 | 16.03662 |  |  |
| 1200 | 14 | 1200 | 16.48628 |  |  |
| 1400 | 14 | 1400 | 16.86646 |  |  |
| 1600 | 15 | 1600 | 17.19579 |  |  |
| 1800 | 15 | 1800 | 17.48628 |  |  |
| 2000 | 15 | 2000 | 17.74613 |  |  |
| 2200 | 15 | 2200 | 17.9812 |  |  |
| 2400 | 15 | 2400 | 18.19579 |  |  |
| 2600 | 16 | 2600 | 18.3932 |  |  |
| 2800 | 16 | 2800 | 18.57597 |  |  |
| 3000 | 16 | 3000 | 18.74613 |  |  |

Yes, the output w always below

the worst-case function.

|  |  |  |
| --- | --- | --- |
|  |  |  |

For this function, the estimated runtime is

T(n) = (n)\*(n\**log3/22n/3) (*Assuming log3/22n/3 is the worst case performance for gcd() function and the second iteration run from j = 1 to n and the first case run from 1 instead of 8)

T(n) = n^2 \* *log3/22n/3*

So, T(n) is O (n^2 \* log(n) )

F(n) = n^2 \* log(n)

We have T(n) / F(n) = *log3/22n/3 \* (*n^2 ) / ( n^2 \* log(n)

At n >=2300, T(n) / F(n) nearly become constant

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| n | T(n) | F(n) | T(n) / F(n) | |
| 8 | 1 | 0.000192 | 5208.333 |  |
| 100 | 11 | 0.0664386 | 165.5665 |  |
| 200 | 24 | 0.3057542 | 78.49441 |  |
| 300 | 36 | 0.7405937 | 48.60965 |  |
| 400 | 54 | 1.383017 | 39.04507 |  |
| 500 | 67 | 2.2414461 | 29.89142 |  |
| 600 | 74 | 3.3223747 | 22.27323 |  |
| 700 | 84 | 4.6310934 | 18.13826 |  |
| 800 | 95 | 6.172068 | 15.39192 |  |
| 900 | 102 | 7.9491628 | 12.83154 |  |
| 1000 | 114 | 9.9657843 | 11.43914 |  |
| 1100 | 120 | 12.224978 | 9.815968 |  |
| 1200 | 123 | 14.729499 | 8.35059 |  |
| 1300 | 137 | 17.48186 | 7.836695 |  |
| 1400 | 155 | 20.484374 | 7.566743 |  |
| 1500 | 137 | 23.73918 | 5.77105 |  |
| 1600 | 165 | 27.248272 | 6.05543 |  |
| 1700 | 149 | 31.013512 | 4.804358 |  |
| 1800 | 146 | 35.036651 | 4.167065 |  |
| 1900 | 157 | 39.319339 | 3.992946 |  |
| 2000 | 159 | 43.863137 | 3.624912 |  |
| 2100 | 153 | 48.669526 | 3.143651 |  |
| 2200 | 163 | 53.739913 | 3.033127 |  |
| 2300 | 176 | 59.075642 | 2.979231 |  |
| 2400 | 176 | 64.677996 | 2.721173 |  |
| 2500 | 196 | 70.548202 | 2.778242 |  |
| 2600 | 199 | 76.68744 | 2.594949 |  |
| 2700 | 199 | 83.096842 | 2.394796 |  |
| 2800 | 238 | 89.777495 | 2.650998 |  |
| 2900 | 229 | 96.730451 | 2.367403 |  |
| 3000 | 225 | 103.95672 | 2.164362 |  |
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