Zach Luciano & Daniel Rao

September 24, 2020

Homework 2 Question 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Constant | Logarithmic | Linear | n-log-n | Quadratic | Cubic | Exponential | factorial |
| N | O(1) | O(log n) | O(n) | O(n log n) | O(n^2) | O(n^3) | O(2^n) | O(n!) |
| 1 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 1 |
| 2 | 1 | 0.301 | 2 | 0.602 | 4 | 8 | 4 | 2 |
| 4 | 1 | 0.602 | 4 | 2.408 | 16 | 64 | 16 | 24 |
| 8 | 1 | 0.903 | 8 | 7.225 | 64 | 512 | 256 | 40320 |
| 16 | 1 | 1.204 | 16 | 19.266 | 256 | 4096 | 65536 | 2.09228e13 |
| 32 | 1 | 1.505 | 32 | 48.165 | 1024 | 32768 | 4,294,967,296 | 2.63131e35 |
| 64 | 1 | 1.806 | 64 | 115.596 | 4096 | 262144 | 1.84467441e19 | 1.26887e89 |

b) n-log-n will take 0.07 seconds

quadratic will take 100,000 seconds, or about 27.78 hours

cubic will take 1,000,000,000,000 seconds or about 31,709.792 years