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Assignment: Analysis of Algo
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MSCS
1st Semester
Section B

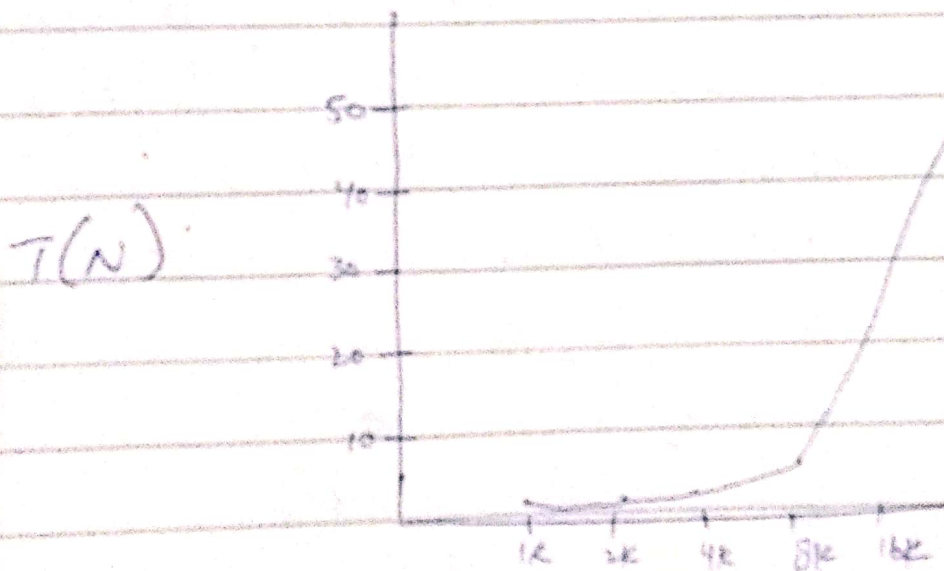
3-Sum

Brute-force Algorithm

Empirical Analysis

N	Time(s)
1000	0.282
2000	2.25
4000	17.811
8000	159.657
16000	1181.009

Data Analysis



$$b = \frac{\log(T_2) - \log(T_1)}{\log(N_2) - \log(N_1)}$$

$$b = \frac{-0.32192 + 3.32192}{10.965784 - 9.965784}$$

$$b = 3/1 \Rightarrow 3$$

$$\log(T) = 3 \log N + C$$

$$\text{For } N = 8000$$

$$\log(51.1) = 3 \log(8000) + C$$

$$5.67525 = 3(12.965784) + C$$

$$5.67525 = 38.897352 + C$$

$$-33.222127 = C$$

So we have

$$b = 3 \quad \text{and}$$

$$C = -33.222127$$

Let's find the value of a

$$a = 2^C$$

$$a = 2^{-33.222127}$$

$$a = 9.98029 \times 10^{-1}$$

$$T = aN^3$$

let say our $N = 16000$

$$T = 9.98029 \times (16000)^3$$

$$T = 408.7927$$

For

$$N = 1000000 \text{ (1 million)}$$

$$T = 9.98029 \times (1000000)^3$$

$$T = 99802921.2243 \text{ Sec.}$$