**Assignment 2**

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1. Order the functions by growth rate as follows

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| No. | Big-Oh |  |  | Multiples |
| (1) | O(N) | 0.109 (N=10000000) | 0.234 (N=20000000) | 2.147 |
| (2) | O() | 1.078 (N=10000) | 4.203 (N=2000) | 3.899 |
| (3) | O() | 20.624 (N=1000) | 174.192 (N=2000) | 8.446 |
| (4) | O() | 0.578 (N=1000) | 2.125 (N=2000) | 3.676 |
| (5) | O() | 9.991 (N=100) | 326.651 (N=200) | 32.685 |
| (6) | O() | 0.140 (N=100) | 2.157 (N=200) | 15.4 |

c) To make the analysis between different programs comparable, I choose to analyze the running time of two different N that satisfies =2\*. Then I compute the value of MULTIPLES as the quotient when the running time with N2 is divided by N1.

As big-oh reveals, Expectation of MUPTIPLES (1)=2. Respectively, the expectation for multiples (2)~(6) is 4, 8, 4, 32, 16. The actual multiples is close to the value of their expectations. But there are still some variations. I think it might be because N is not big enough.