

problem 1

In [1]: `#Problem 1`In [2]: `%matplotlib notebook
from time import time
from random import random
import matplotlib.pyplot as plt`In [3]: `L = [1,3,6,8,10,3,4,6,7]`

```
In [7]: n = []
t1 = []
t2 = []
t3 = []
for N in [2**k for k in range(12, 16)]:
    L = [random() for i in range(N)]
    start_time = time()
    A1 = L.sort()
    end_time = time()
    enlapsed_time1 = end_time - start_time

    start_time = time()
    A2 = L.reverse()
    end_time = time()
    enlapsed_time2 = end_time - start_time

    start_time = time()
    A3 = len(L)
    end_time = time()
    enlapsed_time3 = end_time - start_time

    n.append(N)
    t1.append(enlapsed_time1)
    t2.append(enlapsed_time2)
    t3.append(enlapsed_time3)
    print(N, enlapsed_time1, enlapsed_time2, enlapsed_time3)
plt.plot(n, t1, 'x-')
plt.plot(n, t2, 'o-')
plt.plot(n, t3, 'x-')
```

```
4096 0.0005621910095214844 3.0994415283203125e-06 1.9073486328125e-06
8192 0.0012192726135253906 5.9604644775390625e-06 1.9073486328125e-06
16384 0.0027382373809814453 1.4066696166992188e-05 2.1457672119140625e-06
32768 0.007982015609741211 2.47955322265625e-05 2.1457672119140625e-06
```

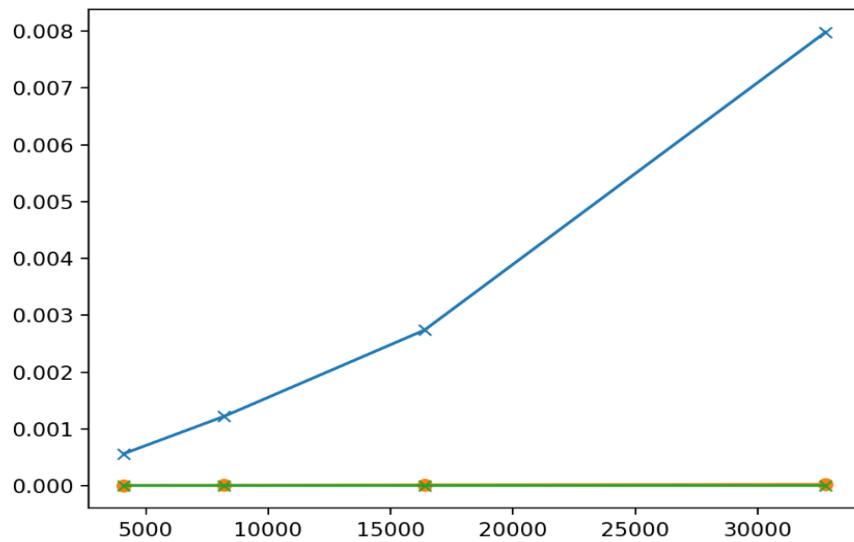
Figure 1



nlog n -> sort의 상한,
length 혹은 reverse는 보통 n이다.

```
4096 0.0005621910095214844 3.0994415283203125e-06 1.9073486328125e-06
8192 0.0012192726135253906 5.9604644775390625e-06 1.9073486328125e-06
16384 0.0027382373809814453 1.4066696166992188e-05 2.1457672119140625e-06
32768 0.007982015609741211 2.47955322265625e-05 2.1457672119140625e-06
```

Figure 1



Stop Interaction

t[7]: [<matplotlib.lines.Line2D at 0x1235f94a8>]

problem 2

2^n , $n^2 + 10n$, $4n \log n + 2n$, $2^{\log n}$, $\log n^{10000}$, 2^{10}

problem 3

$O(n^3)$

problem 4

$O(\cancel{n^2})$ nlog n이다. 스밤...