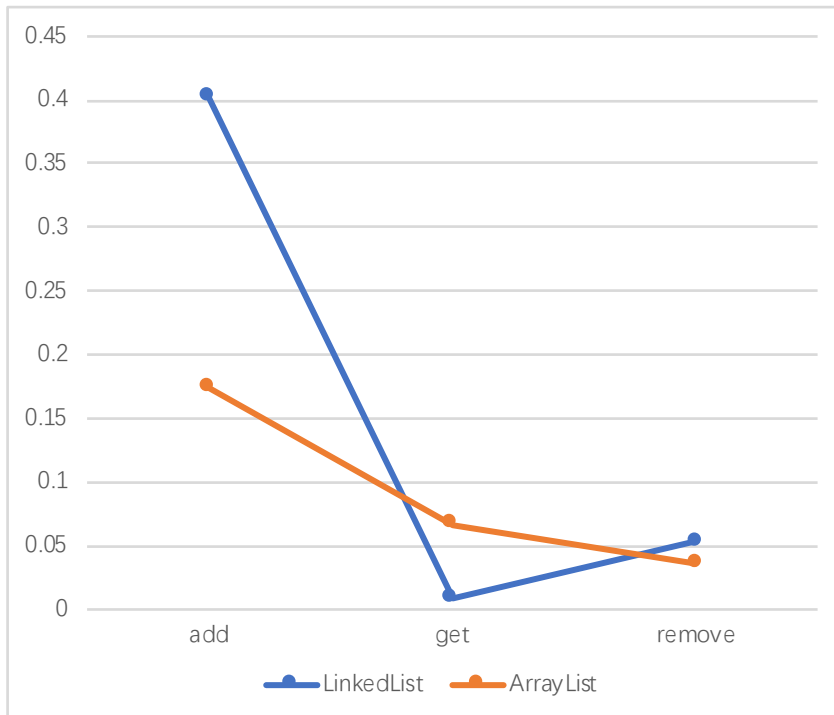


Result:

```
chengaoxiangdeMacBook-Pro:HW3 chengaoxiang$ java HW3
ArrayList add: 0.174322606s
LinkedList add: 0.402240048s
ArrayList get(Iterator): 0.067197278s
ArrayList get: 0.047370396s
LinkedList get(Iterator): 0.008677800s
LinkedList get: 1617.206622422s
ArrayList remove(front to end): 188.490113088
ArrayList remove(end to front): 0.036161386s
LinkedList remove(front to end): 0.041012206
LinkedList remove(end to frond)) : 0.053243621s
```



As what I think, when the spend of those operations depend on the direction.

For arraylist, when add/remove element from front to end, it will move all the array, so it cost tons of time, $O(n)$. While linkedlist is faster, $O(1)$.

For linkedlist, when get element without using iterator, since it will search element from front to end, it will cost tons of time, $O(n^2)$. While get function in arraylist is much faster, $O(1)$.

When using iterator, linkedlist get is faster than arraylist, when from end to frond, arraylist remove is faster than linkedlist.