

NextClass-3: Chapter 1 Short Answer

CS173: Intermediate Computer Science
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Spring 2014
Due 2013-01-29

1. What is a side-effect of a function/method?
2. If you need to repeatedly search a random list of 20 items for different values that are input by the user, what search method should you use? Should you create another list that contains the same items but is sorted and search it? Why or why not?
3. If you need to repeatedly search a random list of 2,000,000 items for different values that are input by the user, what search method should you use? Should you create another list that contains the same items but is sorted and search it? Why or why not?
4. If a computer is capable of performing one billion (10^9) operations per second, how long would it take to execute an algorithm that requires 2^n operations for an input of $n = 100$ elements?
5. If a computer is capable of performing one billion (10^9) operations per second, how long would it take to execute an algorithm that requires n^2 operations for an input of $n = 1,000,000$ elements? How long would it take if the algorithm requires n^3 operations?

6. Give a theta analysis of the time efficiency of the following code fragments.

```
(a) n = int(input('enter n: '))
    for i in range(n)
        x = 2 * n
        while x > 1:
            x = x / 2
```

```
(b) n = int(input('enter n: '))
    total = 0
    for i in range(n)
        for j in range(10000):
            total += j
    print(total)
```

```
(c) n = int(input('enter n: '))
    total = 0
    for i in range(2 * n)
        for j in range(i, n):
            total += j
    for j in range(n):
        total += j
    print(total)
```