QuickCheck 02: Algorithm Analysis

Due: 8:00 am on Thursday, Jan 16, 2020

QuickChecks must be scanned and submitted online via Gradescope. If you have a smartphone, you can follow these steps to scan using an app: https://www.gradescope.com/help#help-center-item-student-scanning. Otherwise, there are scanners located at various libraries on campus which can be found here: https://finance.uw.edu/c2/printing-copying/dawg-prints-copy-locations. Make sure that the gray border around the edge of this page is visible in your scanned document.

1. Algorithm Analysis

1.1. True or false?

Fill in the bubble to indicate True or False for the following statements.

(a) If a function is in Ω (n), then it could also be in O n^2 .



False

(b) If a function is in 0 (n), then it could also be in 0 n^2 .



False

(c) If a function is in Ω (n), then it is always in O (n).





1.2. Runtime Bounds

Give a tight asymptotic runtime bound for mystery as a function of N , the length of the array, in the best case, worst case, and overall. Give a 0 (·) bound if it exists. Otherwise, give both an O (·) and Ω (·) bound.

```
public static boolean mystery(int[] a, int target) {
int N = a.length;
for (int i = 0; i < N; i += 1) {
   if (a[i] == target) {
     return true;
   }
}
return false;</pre>
```

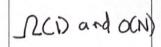
(a) Best case:



(b) Worst case:



(c) Overall:



QuickCheck 02: Algorithm Analysis

Due: 8:00 am on Thursday, Jan 16, 2020

QuickChecks must be scanned and submitted online via Gradescope. If you have a smartphone, you can follow these steps to scan using an app: https://www.gradescope.com/help#help-center-item-student-scanning. Otherwise, there are scanners located at various libraries on campus which can be found here: https://finance.uw.edu/c2/printing-copying/dawg-prints-copy-locations. Make sure that the gray border around the edge of this page is visible in your scanned document.

1. Algorithm Analysis

1.1. True or false?

Fill in the bubble to indicate True or False for the following statements.

(a) If a function is in Ω (n), then it could also be in O n^2 .



False

(b) If a function is in 0 (n), then it could also be in 0 n^2 .



False

False

(c) If a function is in Ω (n), then it is always in O (n).

True

1.2. Runtime Bounds

Give a tight asymptotic runtime bound for mystery as a function of N, the length of the array, in the best case, worst case, and overall. Give a θ (·) bound if it exists. Otherwise, give both an θ (·) and θ (·) bound.

```
public static boolean mystery(int[] a, int target) {
int N = a.length;
for (int i = 0; i < N; i += 1) {
   if (a[i] == target) {
     return true;
   }
}
return false;</pre>
```

(a) Best case:



(b) Worst case:



(c) Overall

ICD and OCN)