

# CS 3 Homework 1

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## 1

- a.  $f(n) = O(g(n))$
- b.  $f(n) = \Omega(g(n))$
- c.  $f(n) = O(g(n))$
- d.  $f(n) = O(g(n))$
- e.  $f(n) = \Omega(g(n))$

## 2

- a.  $f(n) = O(n)$
- b.  $f(n) = O(n^2)$
- c.  $f(n) = O(n^2)$
- d.  $f(n) = O(n)$
- e.  $f(n) = O(n^2)$

## 3

$$f(n) = O(n)$$

## 4

- a. 

```
for(n in Array){
  IndexOfMinValue = n
  for(i > n in the array){
    if Array[i] > Array [IndexOfMinValue]
      IndexOfMinValue = i
  }
  swap (Array[n], Array[IndexOfMinValue])
}
```
- b. The worst-case scenario is  $O(n^2)$
- c. The best-case scenario is  $O(n^2)$

## 5

Submitted separately on canvas

## 6

Submitted separately on canvas

## 7

1 century  $\approx 3.154 \cdot 10^9$  seconds

a.  $2^{100} \approx 1.267 \cdot 10^{30}$   
 $\frac{1.267 \cdot 10^{30}}{1} \cdot \frac{1}{1.223 \cdot 10^{17}} \cdot \frac{1}{3.154 \cdot 10^9} \approx 3284$  centuries

b.  $2^{1000} \approx 1.071 \cdot 10^{301}$   
 $\frac{1.071 \cdot 10^{301}}{1} \cdot \frac{1}{1.223 \cdot 10^{17}} \cdot \frac{1}{3.154 \cdot 10^9} \approx 2.776 \cdot 10^{274}$  centuries