Tradeoffs

What makes the circular queue implementation different from the linked list implementation? In what ways is one more desirable than the other?

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Example

What is the worst case number of simple operations for this piece of code?
Let `A` have n entries.

Linear search

```
int linearSearch(int[] A, int target){
  for(int i = 0; i < A.length; i++){
    if(A[i] == target)
      return i;
  }
  return -1;
}
```

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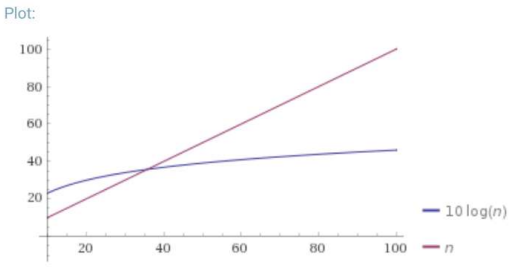
Why is that the definition?

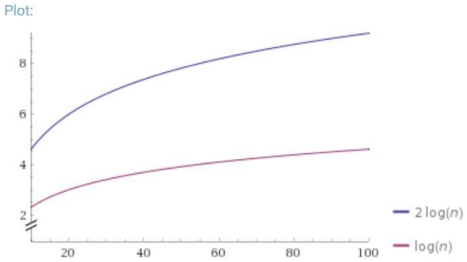
Big-O

$f(n)$ is $O(g(n))$ if there exist positive constants c, n_0 such that for all $n \geq n_0$, $f(n) \leq c \cdot g(n)$

Why n_0?



Why c?



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O, Omega, Theta [oh my?]

Big-O is an **upper bound**

- My code uses at most this many resources (e.g. runs in at most this much time)

Big-Omega is a lower bound

Big-Omega

$f(n)$ is $\Omega(g(n))$ if there exist positive constants c, n_0 such that for all $n \geq n_0$, $f(n) \geq c \cdot g(n)$

Big Theta is "equal to"

Big-Theta

$f(n)$ is $\Theta(g(n))$ if $f(n)$ is $O(g(n))$ and $f(n)$ is $\Omega(g(n))$.

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