

Week 3 Practice Problems!

For each of these problems state whether or not they are $O(1)$, $O(n)$, $O(n^2)$, $O(\log n)$, $O(a^n)$

```
* ex. 1
(define (prob1 n)
  (if (= n 0)
      1
      (+ 1 (prob1 (- n 1)) ) ) )
```

```
* ex. 2
(define (prob2 n)
  (if (< n 1)
      1
      (+ 1 (prob2 (/ n 2)) ) ) )
```

```
* ex. 3
(define (prob3 n)
  (cond ((= n 0) 1)
        (> n 100) (prob3 100))
        (else (+ 1 (prob3 (- n 1)) ) ) ) )
```

```
* ex. 4
(define (prob4 n)
  (if (= n 0)
      1
      (+ 1 (prob4 (- n 1)) (prob4 (- n 1)) ) ) )
```

```
* ex. 5
(define (prob5 n)
  (if (< n 1)
      1
      (+ 1 (prob5 (/ n 2)) (prob5 (/ n 2)) ) ) )
```

```
* ex. 6
(define (prob6 n)
  (cond ((= n 0) 0)
        ((> n 100) (prob6 100))
        (else (+ 1 (prob6 (- n 1))
                  (prob6 (- n 1)) ) ) ) )
```

```
* ex. 7
(define (prob7 n)
  (looper n n) )

(define (looper n k)
  (define (inner-loop n)
    (if (= n 0)
        1
        (+ 1 (inner-loop (- n 1)) ) ) )
  (if (= n 1)
      (inner-loop k)
      (+ (inner-loop k) (looper (- n 1) k)) ) )
```