

Linear recurrences

1. Consider the following algorithm:

```
Value(n):  
    if n = 0:  
        return 0  
    if n = 1:  
        return 1  
    x = Value(n - 1)  
    y = Value(n - 2)  
    return 4*x - 4*y
```

- (a) Compute $\text{Value}(2)$, $\text{Value}(3)$, and $\text{Value}(4)$.
- (b) Write a recurrence to describe the *number* calculated by the function, while I'll denote by $V(n)$.
- (c) Write a recurrent to describe the *running time* of the function, which I'll denote by $T(n)$.
(Note: this is not the same as the last part, since I want you here to count number of operations done, but not the value computed.)
- (d) Solve both recurrences, giving a closed form and big-O bound. You do not need to solve for the constants, since I just want big-O.