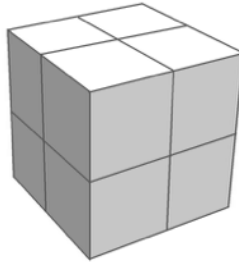# Algorithmic Complexity

Complexity Analysis
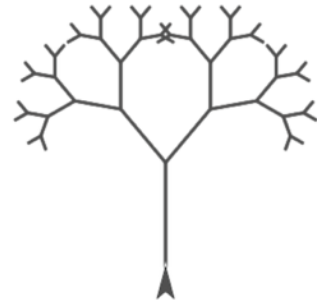
(a) Determine the order of growth of the following situations in terms of n.

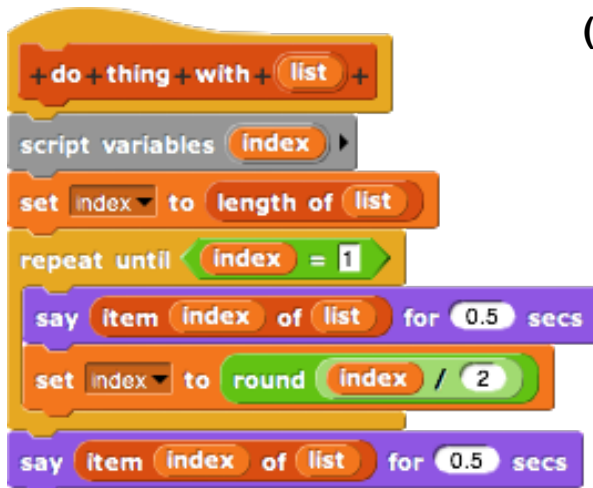How long it takes to clean each window of a building with **n** floors and 20 windows per floor.

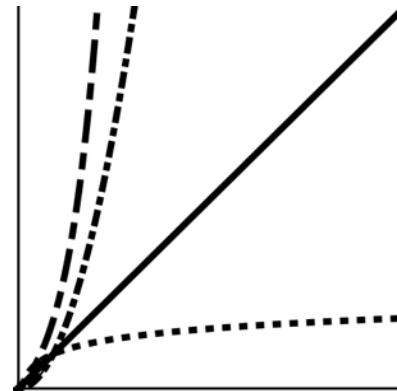How long it takes to build a large cube with side lengths **n** using unit cubes.

How many left/right decisions it takes to climb a doubly-branching tree with **n** leaves.

(b) Determine the runtimes of the following blocks in terms of the size of their inputs. Use Big-O notation.

(c) Label the graph of number of steps vs. time from the following choices:

```
+ do + thing + with + (list) +
  script variables (index) ▶
  set [index ▼] to (length of (list))
  repeat until ((index) = 1)
    say (item (index) of (list)) for (0.5) secs
    set [index ▼] to (round ((index) / 2))
  say (item (index) of (list)) for (0.5) secs
```

Linear

Quadratic

Exponential

Logarithmic

More HOFs

(a) Write the following block using higher order functions.

```
Start and end with vowel? (list (meow) (omega) (america) ◀▶)
```

```
1  omega  -
2  america  -

⊕  length: 2
```

_____

_____

_____

(b) Determine the functionality of the following block.

```
+ Mystery + Function + (list ⋮) +
  report
    keep items such that
      (length of ▢ =
       combine with (min of ▢ and ▢) ▶ items of
       map (length of ▢) ▶ over (list) ◀▶)
    from
  list
```