Algorithmic Complexity

Warm-Up

(a) What does the following code do?

Reports True if all the items of the list are even

(b) What is runtime?

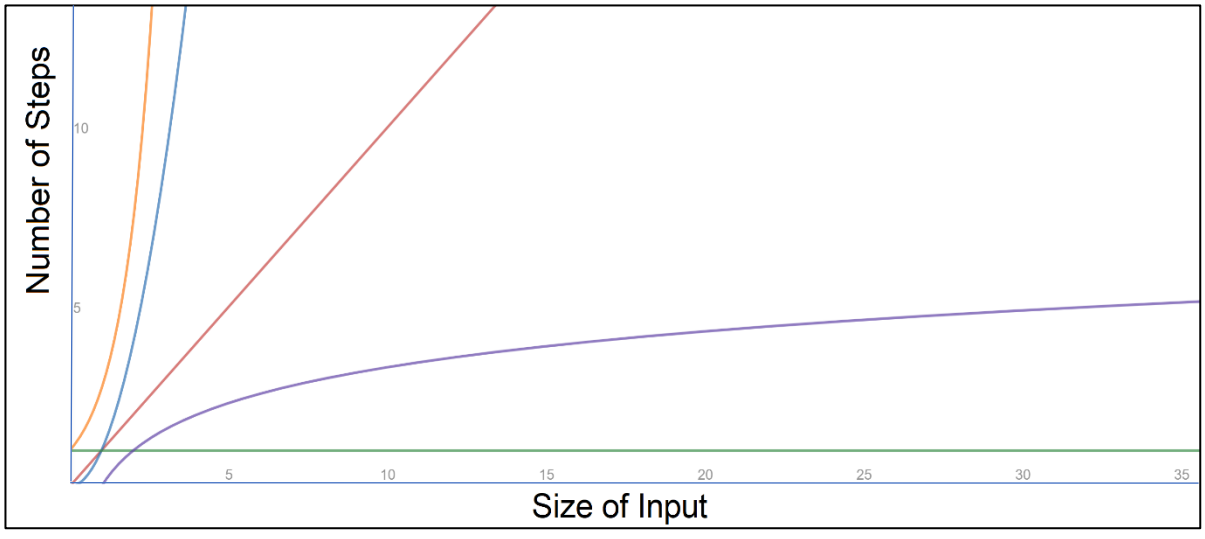
Runtime is used to measure the efficiency of an algorithm.

(c) If a function runs in $O(n)$ time, that means that it runs…

● in linear time at worst ○ in linear time on average ○ in linear time at best

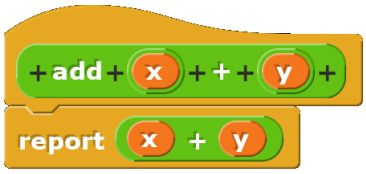
Understanding Runtimes

Runtime	Notation (where input=n)	as input…	# of steps…
constant	$O(1)$	+1	remains constant
logarithmic	$O(\log(n))$	x2	increases by 1
linear	$O(n)$	+1	increases by 1
quadratic	$O(n^2)$	x2	increase by x4
exponential		+1	increase by x2

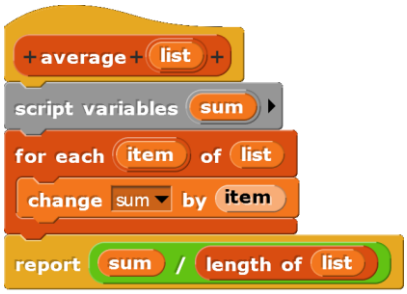


What are the runtimes of the following blocks?

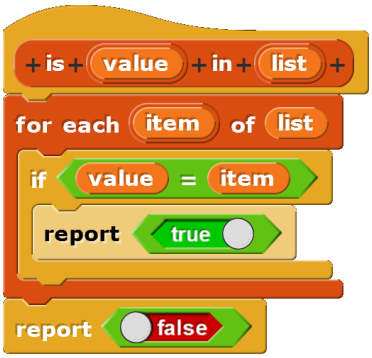
1. Constant



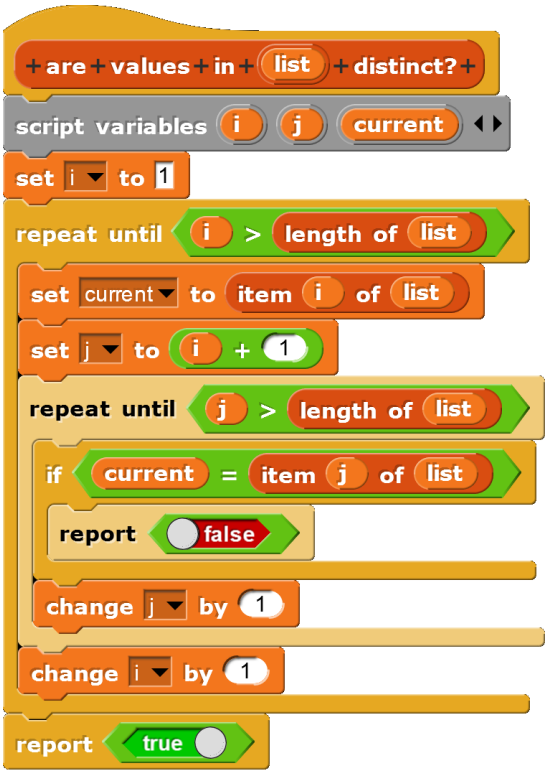
2. Linear



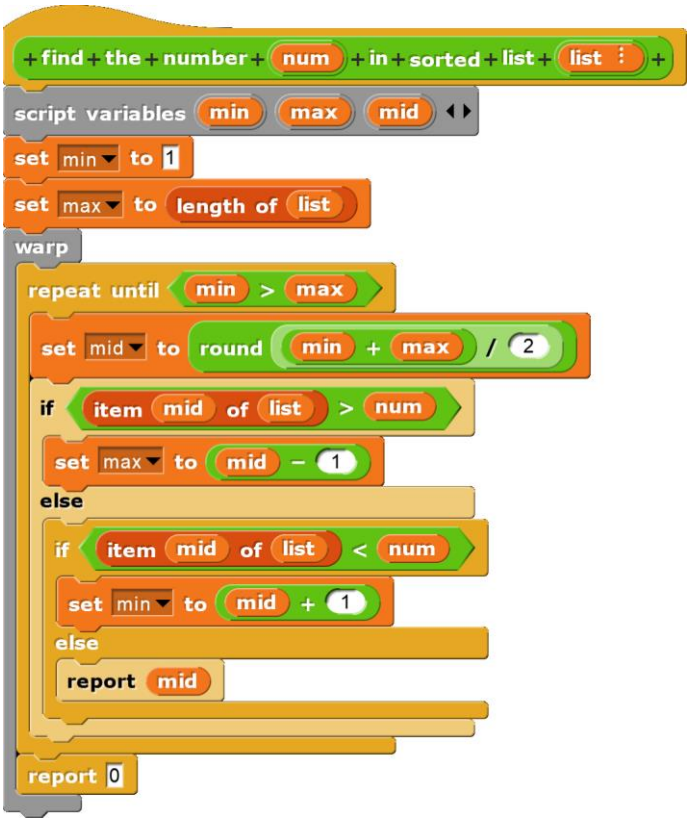
3. Linear



4. Quadratic



5. Logarithmic



Challenge Problem

(a) What is the runtime of the block to the left?

n log n