

Asymptotics again (again)

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Asymptotics are meant to "order" functions
"order" as in greater, less, or equal

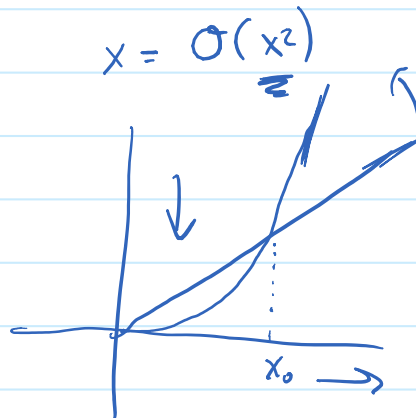
$$'O(g(x))' \approx '\leq g(x)'$$

$$'Ω(g(x))' \approx '\geq g(x)'$$

$$'Θ(g(x))' \approx '= g(x)'$$

$f(x) = O(g(x))$ means $\downarrow$
 $\exists x_0, c$ s.t. $\forall x > x_0, f(x) \leq cg(x)$

" $\exists$ " exists
" $\forall$ " for all



Sorting over ArrayLists (least $\rightarrow$ greatest)

2 1 5 3 4 7 6

Insertion Sort (somewhat optimized)

2 1 5 3 4 7 6

→
 ↻
 1 2 | 5 3 4 7 6

→
 ↻
 1 2 3 | 5 4 7 6

list = ...

→

for (int i=0; i < list.size(); i++) {

int j = i

while (j > 0 && list.get(j) > list.get(j-1)) {

swap(list, j, j-1);

j--;

}

}

$O(n^2)$