CSC165 fall 2017

begin algorithm analysis

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Using Course notes: more Induction
How much time does this take?

```python
def f(list_):
    for i in list_:
        print(i)
```
assumptions, assumptions...

- “steps”
- ignore constant factors
- ignore “noise” for small input

We care about growth rate of time consumption
formalizing assumptions

- \( f \) absolutely dominates \( g \)
- \( f \) dominates \( g \) up to a constant factor
- \( f \) eventually dominates \( g \) up to a constant factor

What should domain and range of \( f, g \) be?
big-Oh, big-Omega, big-Theta
... and you’re started on the Greek alphabet...
big-Oh hierarchy

$\log_a n$ versus $\log_b n$ (logarithmic)

$n^a$ versus $n^b$ (polynomial)

$a^n$ versus $b^n$ (exponential)

$\log_a n$ versus $n^a$

$n^a$ versus $b^n$

explore!
properties

- reflexivity

- transitivity of big-Oh

- not symmetry (anti-symmetry...)
products and sums

- $af$
- $f \cdot g$
- $f + g$
Notes