LESSON 42 NOTES

"Big-Oh" Notation:

- ***DEFINITION:*** ***A theoretical measure of the execution of an algorithm, given an input size "n".***
- ***FORMAT:*** `O(g(x))` → ***"on order of*** `g(x)`***", where*** `g(x)` ***is some function***
- ***IS AN APPROXIMATION!!***

- ***Is used to illustrate:***
  - ***Time efficiency:*** ***Length of time it takes an algorithm to run completely.***
  - ***Space efficiency:*** ***Amount of space that an algorithm uses.***

Common Efficiency Rankings:

notation	name	n = 10	n = 100	n = 1000
$O(\log n)$	logarithmic	3.32	6.64	9.97
$O(n)$	linear	10	100	1,000
$O(n \log n)$	linearithmic	33.22	664.4	9,965.8
$O(n^2)$	quadratic	100	10,000	1,000,000
$O(n^c)$, $c > 1$	polynomial	1,000	1,000,000	1,000,000,000
$O(c^n)$	exponential	1,024	1.27×10^{30}	1.07×10^{301}

Efficiencies of Selection Sort and Insertion Sort:

- ***Time Efficiency:*** $O\left(n^2\right)$
- ***Space Efficiency:*** $O\left(n\right)$