

## Big Oh-my!

You have been asked to choose one of two possible algorithms, **A** or **B**, to implement. Their asymptotic running times are:

$$T_A(n) = O(n^{1.1})$$

$$T_B(n) = O(n \log_2 n)$$

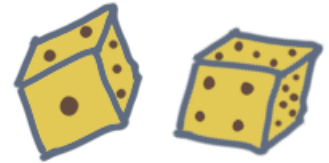
Suppose the most important factor is that  $n$  will be truly gigantic. Which would you choose?

## Odd Men Out

uniformly random outcomes

Suppose you roll two, fair, six-sided dice.

What is the probability that their sum is even?



## Gamma, Gamma, Go Gamma...

Consider the function,

$$\Gamma(a) \equiv \int_0^{\infty} t^{a-1} e^{-t} dt.$$

Show that

$$\Gamma(a) = (a-1) \Gamma(a-1).$$

### Own this Problem

Determine the values of  $\lambda_1$  &  $\lambda_2$  that satisfy this matrix equation:

$$\begin{bmatrix} 2 & 3 \\ 3 & 2 \end{bmatrix} = \frac{1}{4} \begin{bmatrix} -\sqrt{2} & \sqrt{2} \\ \sqrt{2} & \sqrt{2} \end{bmatrix} \begin{bmatrix} \lambda_1 & 0 \\ 0 & \lambda_2 \end{bmatrix} \begin{bmatrix} -\sqrt{2} & \sqrt{2} \\ \sqrt{2} & \sqrt{2} \end{bmatrix}.$$

## Bipartite Delight

Let  $G = (V, E)$  be an undirected graph. Give an algorithm to check whether  $G$  is bipartite.

↙ Recall definition:

I.e., (a)  $V = V_1 \cup V_2$ , where

$$V_1 \cap V_2 = \emptyset \text{ (disjoint)}$$

(b) All edges go between

$V_1$  and  $V_2$ , never within.