M5-03: Using scipy.stats for Distributions

Part of the "Polling, Confidence Intervals, and the Normal Distribution" Learning Badge

Video Walkthrough: *https://discovery.cs.illinois.edu/m5-03/*

Distributions in Python's scipy.stats Library

The scipy.stats library provides distributions for us to use for all common distributions -- and many uncommon distributions! Each distribution requires a specific import:

Distribution	Python Import
Normal Distribution	`from scipy.stats import norm`
Bernoulli Distribution	`from scipy.stats import bernoulli`
Binomial Distribution	`from scipy.stats import binom`

Once the distributions are imported, you can create an object that is a specific instance of the distribution. Specifically:

Distribution	Python Code

Normal Distribution	`D = norm()  # "standard" normal distribution`
	`  # with mean=0, sd=1`
	
	`D = norm(mean_value, sd_value)`
	`D = norm(6, 2)`
	`...`

Bernoulli Distribution	`D = bernoulli(p=0.6)`
	`D = bernoulli(p=0.2)`
	`...`

Binomial Distribution	`D = binom(p=0.4, n=10)`
	`D = binom(p=0.1, n=50)`
	`...`

Puzzle #1: Create a distribution of the number of "heads" when flipping a fair coin 3 times:

Python:	

Puzzle #2: Create a distribution of successfully picking a queen from a deck of 52 cards:

Python:	

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