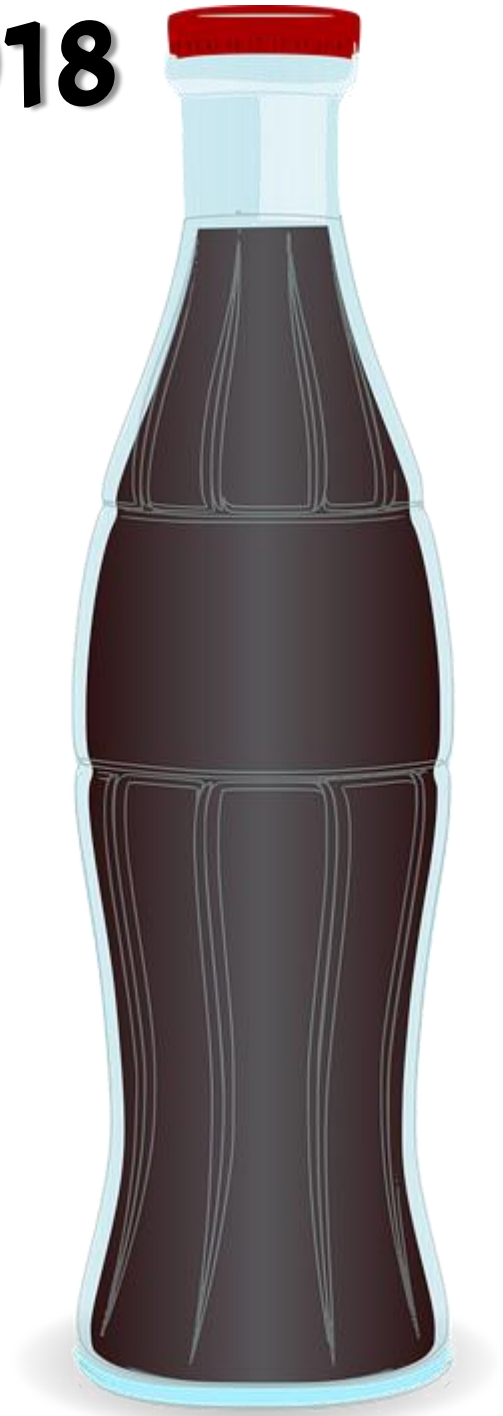
Tuesday, October 16, 2018

- Warm-up
  - A special promotion for soda has a printed message on the inside of each bottle cap. Some have "try again" while others have "you're a winner". 1 in 6 of the bottles wins a prize.
  - Roll your dice seven times to simulate the process of seven people buying a bottle of soda.
  - How many people "won" in your simulation?
- Random Numbers Table
- Simulations

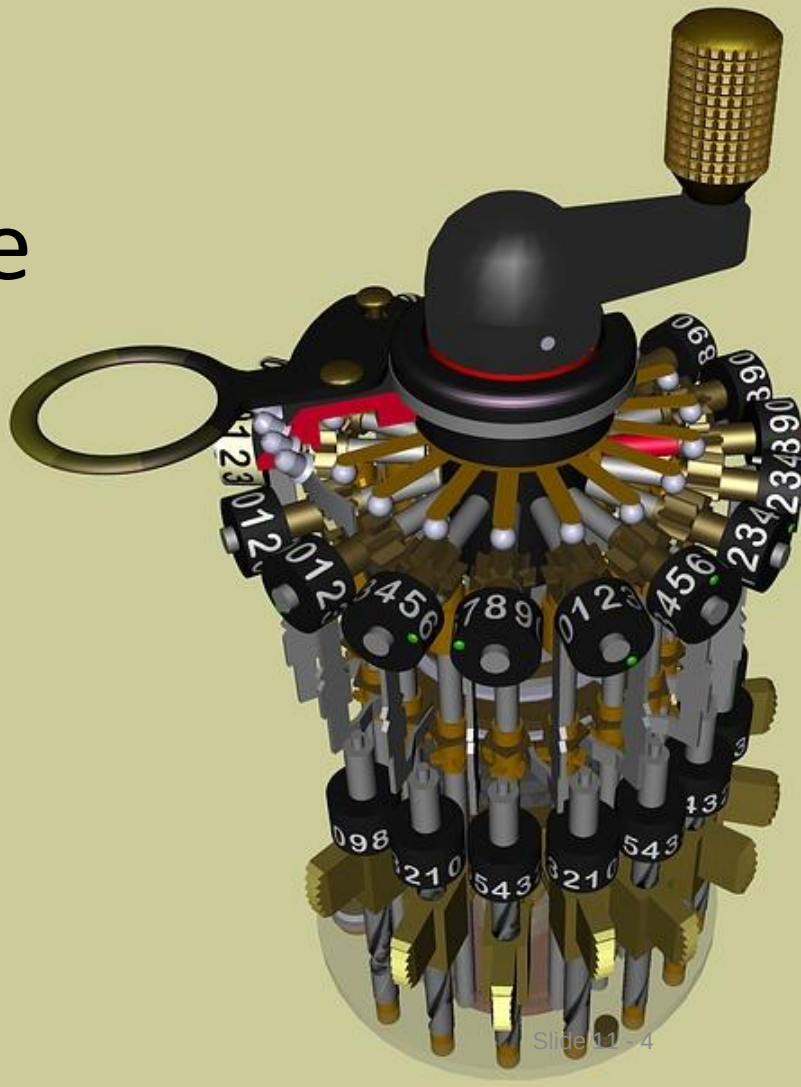


Objectives

- **Content Objective: I will discuss how and why random numbers are generated to simulate a situation.**
- **Social Objective: I will pay attention and not distract others.**
- **Language Objective: I will pay special attention to new vocabulary and write it in a way that I can remember and use.**

Practical Randomness

- We need an imitation of a real process so we can manipulate and control it.
- In short, we are going to simulate reality.

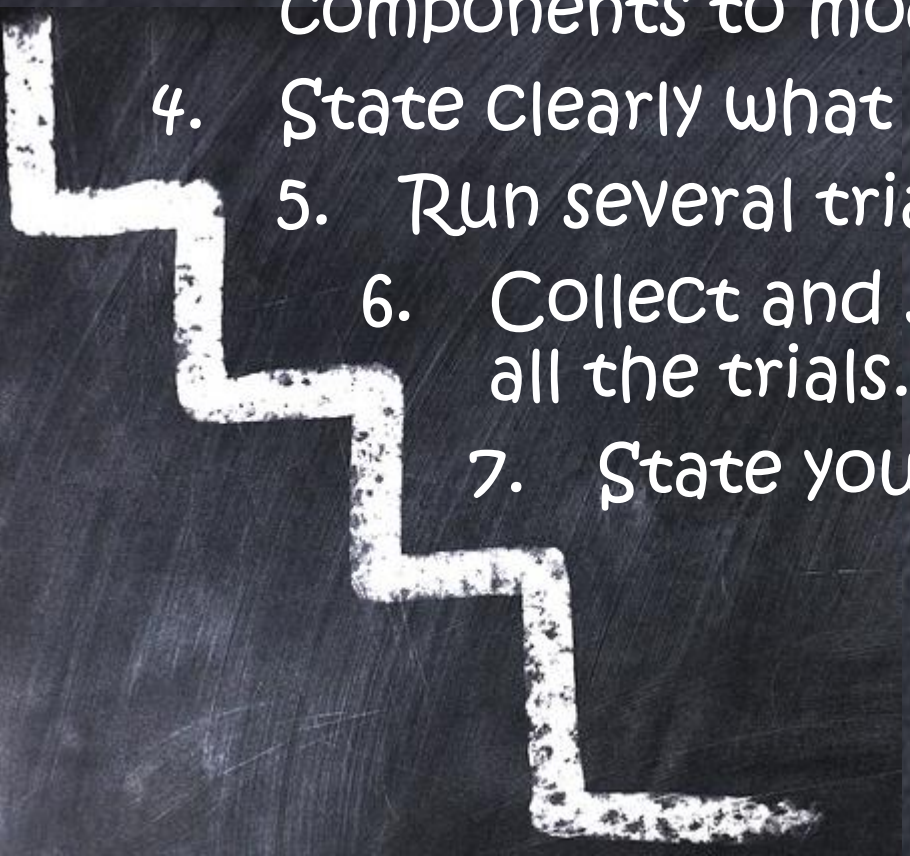


A Simulation

- The sequence of events we want to investigate is called a **trial**. → 7 checks for winner
- The basic building block of a simulation is called a **component**. each individual check - modeled by dice roll
  - Trials usually involve several components.
- After the trial, we record what happened—our **response variable.** → how many winners
- There are seven steps to a simulation…

Simulation Steps

1. Identify the component to be repeated.
2. Explain how you will model the component's outcome.
3. Explain how you will combine the components to model a trial.
4. State clearly what the response variable is.
5. Run several trials.
6. Collect and summarize the results of all the trials.
7. State your conclusion.



A Simulation

A special promotion for soda has a printed message on the inside of each bottle cap. Some have "try again" while others have "you're a winner". 1 in 6 of the bottle wins a prize. How many people out of a group of 7 should I expect to win?

1. looking at a bottle cap
2. It will be modeled by a die roll.
3. I will roll 7 times to model the 7 bottle caps. The winning roll will be a 4.
4. I will count how many winners (4's)
5.

1	2	1
2	1	2
4	4	3
5	4	4
2	5	5
3	2	6
6	5	1

6. 2 times - no winners
   4 times - 1 winner
   2 times - 2 winners
   2 time - 3 winners
7. Usually expect about 1 to 2 winners

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Random Digit Table

1 in 6 chance
Use 1-6, winner = 4
7 numbers
1 winner
0 winners
1 winner
2 winners

101	18223	95034	05756	28513	96409	12531	42544	82853
102	73676	47150	99400	01927	27754	42648	82425	36290
103	45467	71709	77558	00095	32863	29485	82226	90056
104	52711	38889	93074	60227	40011	85848	48767	52573
105	95592	94007	69971	91481	60779	53791	17297	59335
106	68417	35013	15529	72765	85089	57067	50211	47487
107	82739	57890	20807	47511	81676	55300	94383	14893
108 →	60940	72024	17868	24943	61790	90656	87964	18883
109	36009	19365	15412	39638	85453	46816	83485	41979
110	38448	48789	18338	24697	39364	42006	76688	08708
111	81486	69487	60513	09297	00412	71238	27649	39950
112	59636	88804	04634	71197	19352	73089	84898	45785
113	62568	70206	40325	03699	71080	22553	11486	11776
114	45149	32992	75730	66280	03819	56202	02938	70915
115	61041	77684	94322	24709	73698	14526	31893	32592
116	14459	26056	31424	80371	65103	62253	50490	61181
117	38167	98532	62183	70632	23417	26185	41448	75532
118	73190	32533	04470	29669	84407	90785	65956	86382
119	95857	07118	87664	92099	58806	66979	98624	84826
120	35476	55972	39421	65850	04266	35435	43742	11937
121	71487	09984	29077	14863	61683	47052	62224	51025

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Using a Random Digit Table

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Try One in Your Group

2012

The probability of choosing a family at random from this school that has an internet connection is 80%. Create a simulation that will tell us how many people out of a class of 30 should have an internet connection.

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112	59636	88804	04634	71197	19352	73089	84898	45785
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1. Select a student - check for internet.
2. Using a random digit table to simulate choosing a student, I will look at digits 0-9, 1-8 means yes, 0 & 9 means no.
3. Repeat 30 times for 1 trial.
4. Count how many.

6/30 no

8/30 no

001 - 100

00 - 99 01 - 80

1 - 10

0 - 9 → 1-8 = yes, 0, 9 = no

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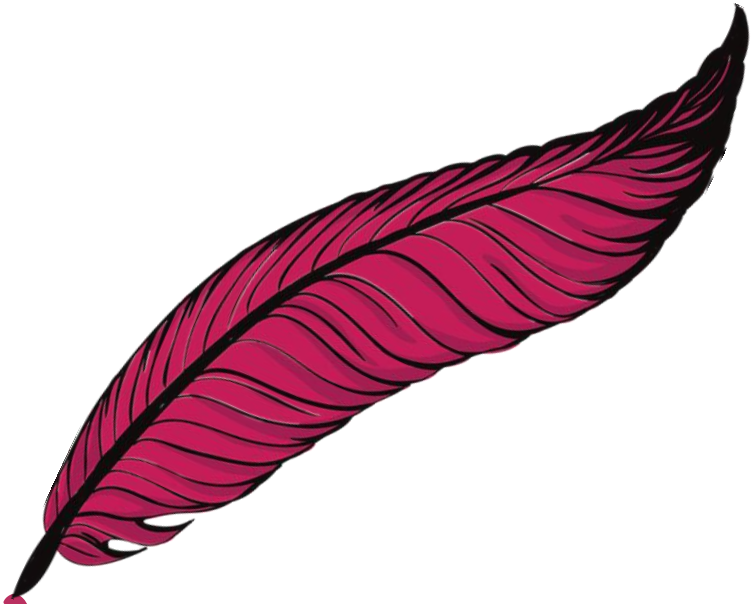
What Can Go Wrong?

- **Don't overstate your case.**
  - Beware of confusing what really happens with what a simulation suggests might happen.
- **Model outcome chances accurately.**
  - A common mistake in constructing a simulation is to adopt a strategy that may appear to produce the right kind of results.
- **Run enough trials.**
  - Simulation is cheap and fairly easy to do.

Homework



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