AP Stat **Chapter 5 – 5.1** **Name:**

Activity

Pretend that you are flipping a fair coin. Without actually flipping a coin, imagine the first toss. Write down what the result you see in your head is, heads (H) or tails (T).

Imagine a second coin flip. Write down the result.

Keep doing this until you have recorded the results to 50 imaginary flips. Write your results in groups of 5 to make them easier to read like this: THHTT

THHTT

A run is a repetition of the same result. In step 3, above, there is a run of 2 heads and then 2 tails in the first 10 coin flips. Read through your 50 imagined coin tosses and count the number of runs of size 2, 3, 4 and so on. Record the number of runs of each size in a table like the following:

Run length:	2	3	4	5	6	7	8
Frequency:							

Using a random number generator, generate a similar list of 50 coin tosses. Record the number of runs of size 2, 3, 4 and so on in the table below:

Run length:	2	3	4	5	6	7	8
Frequency:							

1-H
2-T

Compare the two results. Did you or your calculator have the longest run? How much longer?

Toss a coin 6 times and record heads (H) or tails (T) on each toss. Which of the following outcomes is more probable?

HTHTTH TTTHHH

Which one does not "look" random?

TTTHHH

Is there an equal shot of getting heads or tails on each throw? Does the coin remember what you threw the toss before?

yes No Independent

Why does TTTHHH seem unusual?

Uniform—perfectly lined up
Evenly split

What happens in the long run? Do things even out or do they keep staying unbalanced?

Even at → get closer to true probability

When you perform a simulation, follow these 4 steps

1) **State**: what is the question of interest about some chance process?
2) **Plan**: describe how to use a chance devise to imitate one repetition of the process. Explain clearly how to identify the outcomes of the chance process and what variable to measure
3) **Do**: perform many repetitions of this simulation
4) **Conclude**: use the results of your simulation to answer the question of interest

At a local high school, 95 students have permission to park on campus. Each month, the student council holds a "golden ticket parking lottery" at a school assembly. The two lucky winners are given reserved parking spots next to the school's main entrance. Last month, the winning tickets were drawn by a student council member from the AP Statistics class. When both golden tickets went to members of the same class, some people though the lottery had been rigged. There are 28 students in the AP Statistics class, all of whom are eligible to park on campus. Design and carry out a simulation to decide whether it's plausible that the lottery was carried out fairly.

State: Was the parking lottery for a parking spot set up fairly or not?

Plan: Label the 95 students from 01 to 95, where 01 to 28 are in AP Stat and 29 to 95 are not. Use a Random number generator to pick 2 numbers and see where they fall. We will repeat this simulation at least 20 times. Record the number of times that the numbers are AP stat students. Make sure there are no repeats inside of each trial.

Do: RandInt(1, 95, 2)

3/20	2/20	1/20	0/20	1/20
15%	10%	5%	0%	5%

Below or = 5% statis significant

Any > 5% not significant

Conclude: Based on my simulations of 20 trials, 15% of my trials showed that 2 ap stat students would be picked for the parking spot. There is convincing evidence that the lottery was set up incorrectly/unfairly and these two students were not picked by chance.

Based on my simulations of 20 trials, 5% of my trials showed that 2 AP Students would be picked for the parking spot. There is convincing evidence evidence that the lottery was set up fairly and the students were picked by chance.