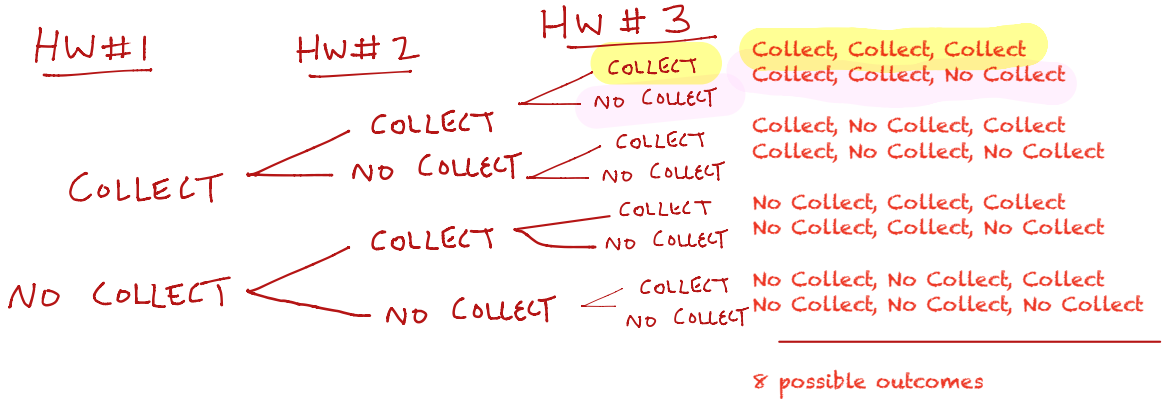
Practice

Janice has a teacher that only collects the homework 50% of the time. Janice gets 3 homework assignments every week. Janice wonders how many homework assignments his teacher will collect this week?

1. List all possible outcomes like "collect, no collect, collect". You can use a tree diagram to represent them!



2. What is the theoretical probability that Janice's teacher will collect all 3 assignments?

$P(3\ C's) = \frac{1}{8}$

3. Find P(collect, collect, no collect).

$P(C, C, \text{No } C) = \frac{1}{8}$

Janice decides to simulate her teacher's homework collection by tossing a coin three times. Heads means her teacher collects the homework, tails means her teacher does not collect the homework. She records her result below.

HEADS = COLLECT
TAILS = NO COLLECT

Simulation 1 = H H T
Simulation 2 = T H T
Simulation 3 = T T T

4. According to simulation #1, how many times would Janice's teacher collect her homework?

2 times (the first two)

5. According to simulation #2, how many times would Janice's teacher collect her homework?

1 time (the second HW assignment)

Janice runs his simulation 500 times. 64 times Janice's teacher would collect the homework all three days.

6. Use this simulation to predict how many weeks his teacher would collect the homework all three days in 28 weeks.

$\frac{\text{ALL 3 DAYS}}{\text{TOTAL}}$

$\frac{64}{500} = \frac{x}{28}$

$\frac{500x}{500} = \frac{1729}{500}$

$x = 3.584$ times

ABOUT 3.6 times

7. Set up a simulation using a six-sided number cube for Janice's teacher homework collection. Explain in detail how your simulation would work!

For a number cube, we have to let 50% of the outcomes represent "collect HW". I would let rolling a 1, 2 or 3 represent "collect HW" and rolling a 4, 5, 6 represent "No Collect." (You also could do others, like let even #s represent "collect", odd #s represent "NO collect").

Then, roll the dice. If a number 1, 2 or 3 is rolled, that represents the teacher collected the HW. If a 4, 5 or 6 is rolled, it represents the teacher did not collect the HW. I would roll the number cube 3 times to represent 3 HW assignments and record the results. Then, repeat for the number of weeks you want to simulate.

Probability

8. 45% of people that go to the movies buy popcorn. If there are 160 people at the new Star Wars movie, how many will have popcorn?

$100x = 7200$

Buy popcorn / Total movie goers $\quad \frac{45}{100} = \frac{x}{160}$

$x = 72$ people

9. The Bengals win 9 out of 16 games played. How many games will they win out of 80 games?

Win / Played $\quad \frac{9}{16} = \frac{x}{80}$ $\quad \frac{16x}{16} = \frac{720}{16}$

$x = 45$ games won

10. You sit at the food court and count red headed people. You see 2 red heads out of 50 people. If there are 400 people at the mall, how many would be red headed?

Red heads / Total $\quad \frac{2}{50} = \frac{x}{400}$ $\quad \frac{50x}{50} = \frac{800}{50}$

$x = 16$ RED Heads

Josh Allen thinks that you are equally likely to have brown, blue, green or hazel colored eyes. He creates a simulation using a deck of cards. Each suite represents an eye color. Bob draws a card and then replaces it. Use his results to answer the following.

Hearts (Brown Eyes)	𝍸 ||
Diamonds (Blue Eyes)	𝍸 ||||
Spades (Green Eyes)	𝍸 𝍸 |
Clubs (Hazel Eyes)	|||

11. Find P(Blue Eyes).

$P(\text{BLUE}) = \frac{9}{30} = \frac{3}{10}$

12. Out of 350 people, how many would you expect to have blue eyes based on your simulation?

$\frac{\text{BLUE}}{\text{TOTAL}} \quad \frac{9}{30} = \frac{x}{350}$ $\quad 30x = 3150$

$x = 105$ BLUE EYED Peeps

13. Find P(Green Eyes).

$P(\text{GREEN}) = \frac{11}{30}$

14. Out of 350 people, how many would you expect to have green eyes based on your simulation?

$\frac{11}{30} = \frac{x}{350}$ $\quad 30x = 3850$

$x = 128.3$ Green eyed peeps

15. Turns out, only 17% of people have blue eyes. Out of 350 people, how many would you expect to have blue eyes based on the theoretical probability?

$\frac{17}{100} = \frac{x}{350}$ $\quad 100x = 5950$

$x = 59.5$

ABOUT 59.5 PPl