Conditional Probability

Honest Liars

Problem Set-up

- Through accounting procedures, it is known that 10% of the employees of a store are stealing.
- This classroom will act as employees and two managers.

The managers

First, we need two managers.

```
students <- 1:26
sample(students, size = 2)
```

```
## [1]  8 16
```

The rest of you are the employees.

The employees

You will need two random digits.

- Digit 1: Last digit of your Reed ID #
- Digit 2: 5th digit of your phone num (excluding area code)

Please write these on a sheet of paper.

Honest or thief?

To simulate 10% of retail employees being thieves, we will use your first random digit:

- If your first digit = 0, write "thief" above your first number.
- Otherwise, write "honest" above your first number.

Pass or fail?

Your manager now administers a lie detector test that is 80% accurate; there is an 80% chance that thieves will fail the test and an 80% chance that honest folk will pass the test.

Using your second random digit,

Thieves

- If your digit = 0 or 1, write "pass" above that digit.
- Otherwise, write "fail" above that digit.

Honest folk

- If your digit = 0 or 1, write "fail" above that digit.
- Otherwise, write "pass" above that digit.

Moment of truth

Who wrote "fail" on their piece of paper? Raise your hands.

Managers: What percentage of these employees do you think are thieves?

Those that raised their hands/failed the test, state whether you are honest or a thief.

What happened here?

The well-known fallacy of reversing the conditional probability!