Notebook Layout - Task 1

Lady Tasting Tea

1. Introduction

Give explanation of the experiment

2. Problem Statement

Write out the problem statement

3. Assumptions

What are the assumptions and why?

- No replacement
- Lady has no special powers

4. Code + Solution

Code the solution manually and explain the logic
→ Combination / Permutations

8/10/2024 LADY TASTING TEA

MY LOGIC

total number of cups: 12

number with milk in first = 6

number with tea in first = 6

probability of selecting 6 cups:

$12 \times 11 \times 10 \times 9 \times 8 \times 7$ = big number!

665 280

number of combinations for 6 cups:

$6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720$

⇒ 665 280 / 720 = 924

1 in 924 chance of selecting 6 cups with milk in first from 12 cups

APPLY TO 8 CUPS ? CORRECT

$8 \times 7 \times 6 \times 5 = 1680$

$4 \times 3 \times 2 \times 1 = 24$

1680 / 24 = 70

⇒ Tallies with Ian's lecture

My Own Code

Total no of cups = n

If n = 12 $\Rightarrow$ n! = 12 x 11 x 10 x 9 x 8 x 7 . . . . x 1

$\Rightarrow$ n! = n x (n-1) x (n-2) x (n-3) x (n-4) . . . .

```
factorial = 1
num = n
for i in range(1, num+1):
    factorial = factorial * i

= def fact(num):
    factorial = 1
    for i in range(1, num+1):
        factorial = factorial * i
    return factorial
```

Part 2

Ian's code -> reference

Use fivethirtyeight style

-> annotate graph

x-axis, y-axis, title

Also look on wikipedia

it gives another explanation

of getting 3/4 correct

Tie back into Type 1 + Type 2 errors

* look at articles found online

-> look up around null hypothesis

Null hypothesis: no special powers

Two errors at most: 28% chance

- If accept the null hypothesis with two errors then it is possible that you reject the null hypothesis (she has no ability) when she has no ability