PROBLEM SOLVING
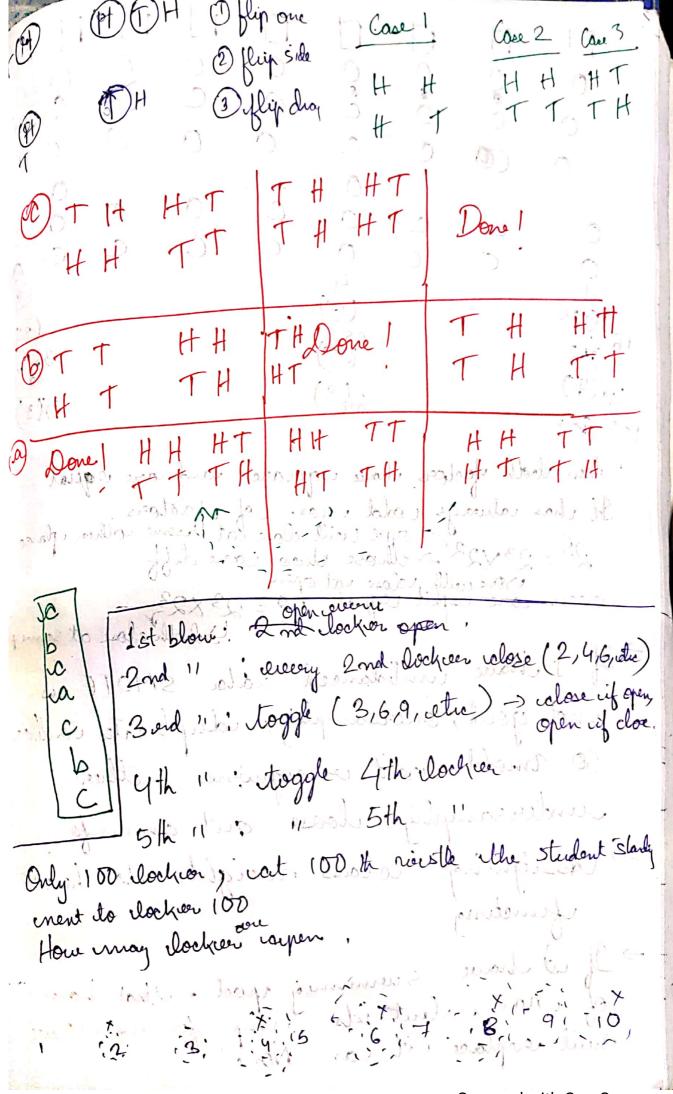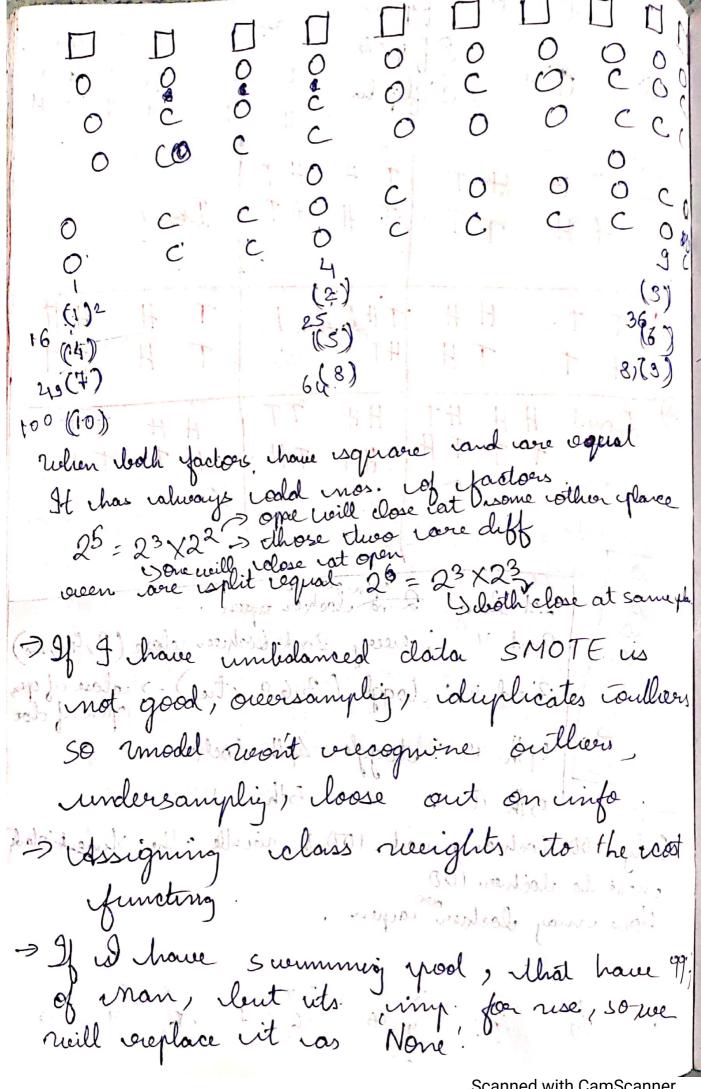
Think problem & try to solve it.

1) Expect a clear & well defined thorough process
2) Expect employees to question assumptions.
3) See things from novel perspectives,
4) Expect intelligence.

Prob 1: You have only 5 jars of pills.
All your in pills in one jar only, are
"contaminated"

The only way to tell which pills are conta... is by wt.

1 pill → 10 grams., Contaminated → 9gm.

Digital scale → make one measurement,

How do you tell which jar is contaminated

Figure out assumption.

$$1 \times 9 = 9$$
$$2 \times 9 = 18$$
$$3 \times 9 = 27$$
$$4 \times 9 = 36$$
$$5 \times 9 = 45$$

Prob 2: Nos. of petrol pumps in India

Prob 3: Ping pong balls in Boeing 737?

Length & breadth of mass of seats ; Better estimation
"Cylinder" Premium volume. 200 → 5
"Copies started" 700 → 6
  750 → 7 cups
  250 → 6 cups
AB testing Concept 800 → 7
  3000 → 8

Q. 25 horses, top 3 fastest
only 5 horses can go
at a time. Find fastest
in min nos. of races?

Top 5 times

winner is 1st 7 races

2nds group 2 candidate
3 rds 1 candidate

1 2 3 4 5
5 6 7 8 9
10 11 12 13
13 14 15 16 17
17 18 19 20 21
21 22 23 24 25

3 A5
5 B 25
5
250   1st : 9min
2 125   234 5
5 125   5 1, 6,5 10
25 25 25 15
25 20
25 2
12 12 6 6 25
15 15 15 15 15
15 15 15
15 15
15

1. Given 3 similar type of eggs which are super-strong & a finite 10,000 floor building, find min. nos. of throws req. to find least floor at which these eggs would break.

12

4   8   (12)

[simplify this ques]

$$5 \to 23 \quad \Big\} \text{ eggs} \quad \text{Ans. } 10 \ (19 \text{ is an})$$
$$20 \to 23 \quad \Big\}$$

2 eggs

$$10 \to 14 \quad \Big\} \text{ 3 eggs}$$
$$10 \to 13$$

11 optm

$$200 \to 27 \ 32 \text{ eggs}$$
$$200 \to 18 \quad 3.3 \text{ eggs}$$
$$300 \to 23 \quad 321 \text{ eggs}$$

Sum is the minimum, so we will get optima

Multiply 3 nos. = Nos, 3 nos. are closer to each other, so that sum is min.

$$100 = 4 \times 5 \times 5 = 14$$
$$(4 + 5 + 5)$$

$$\sqrt[3]{10000} = 22 \quad 22 + 21 + 22 = \underline{65 \text{ ans}}$$

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1) tSNE is non-parametric, we cannot estimate the compounds.
2) Not deterministic → Run on same dataset it will give diff result
3) Slow

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① Cold start: effected from item side, not from user side. Popularity based recomm.

② Content based: don't rely on cold start.

③ Hybrid   "   "   "   "   "   "

④ User   more likely

⑤ IBCB   less likely

1) Deep learning are bad at,
    ① Sparse data (lot of zeros) ⎫ overfitting
    ② Less training data   ⎭

                          ⎛ PCA   ⎛ tSNE

① Most of them depend on **variance** or **distance**.
   So both of these effected by scaling.
   So its imp. to do scaling while applying PCA & tSNE

② K-Means - look at distance.
   → Impacted by multi-coll.
   →   "   " outliers
   → Non-deterministic

③ Ward is centroid linkage

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① 4 cards on the table. Each card has a letter on
one side & a nos. on another side. Naturally,
you can only see the side that's face up.
Let's say you have seen 'A', 'F', '2', '7'. Identify
which card(s) you need to turn over in
order to test the rule, if there is vowel on
one side of the card, there is an even nos.
on other side

                                    A & 7

Q. Min

(4)   (H) (T) H   ① flip one   Case 1   Case 2   Case 3
                    ② flip side   H   H   H H   H T
       (T) H   ③ flip dia   H   T   T T   T H
(P)
1

(C) T H   H T | T H   H T
     H H   T T | T H   H T   Done!

(b) T T   H H | T H Done!   T   H   H T
     H T   T H | H T   T   H   T T

(a) Done! H H   H T | H H   T T   H H   T T
            T T   T H | H T   T H   H T   T H

┌─ a
│ b
│ c   1st blow : open every   2nd locker open .
│ c   2nd " : every 2nd locker close (2,4,6,etc)
│ a   3rd " : toggle (3,6,9, etc) → close if open,
│ c   open if close.
│ b   4th " : toggle 4th locker ...
│ c   5th " : " 5th "

Only 100 locker , at 100 th rustle the student slowly
ment to locker 100
How may locker open .

    1   2   3   4   5   6   7   8   9   10

$(1)^2$
16 (4)
49 (7)
100 ((10))

4
(2)
25
(5)
64 (8)

(3)
36 (6)
81 (9)

when both factors have square and are equal
It has always odd nos. of factors

$25 = 2^3 \times 2^2$ → one will close at some other place, those two are diff

→ one will close at open, even are split equal $\quad 2^6 = 2^3 \times 2^3$

→ both close at same place

→ If I have unbalanced data SMOTE is not good, oversampling, duplicates outliers so model won't recognize outliers, undersampling, loose out on info.

→ Assigning class weights to the cost function.

→ If I have swimming pool, that have 99% of nan, but its imp for use, so we will replace it as "None".

SVM, NB → high dimension features
Rand Forest → Noisy labels
Imbalanced → XGBoost, AdaBoost.
class
Model Interpretable → RF & LgR, D.T.