Java with DSA

(1) flow - chart

(2) variable

(3) operator

(4) if - else block

(5) loop

(6) Basic Math

(7) date - typecasting

(8) Method - function

(9) Array → Searching
                    Sorting
                    two/pointer
                    prefix/suffix
   Subarray

Puzzle
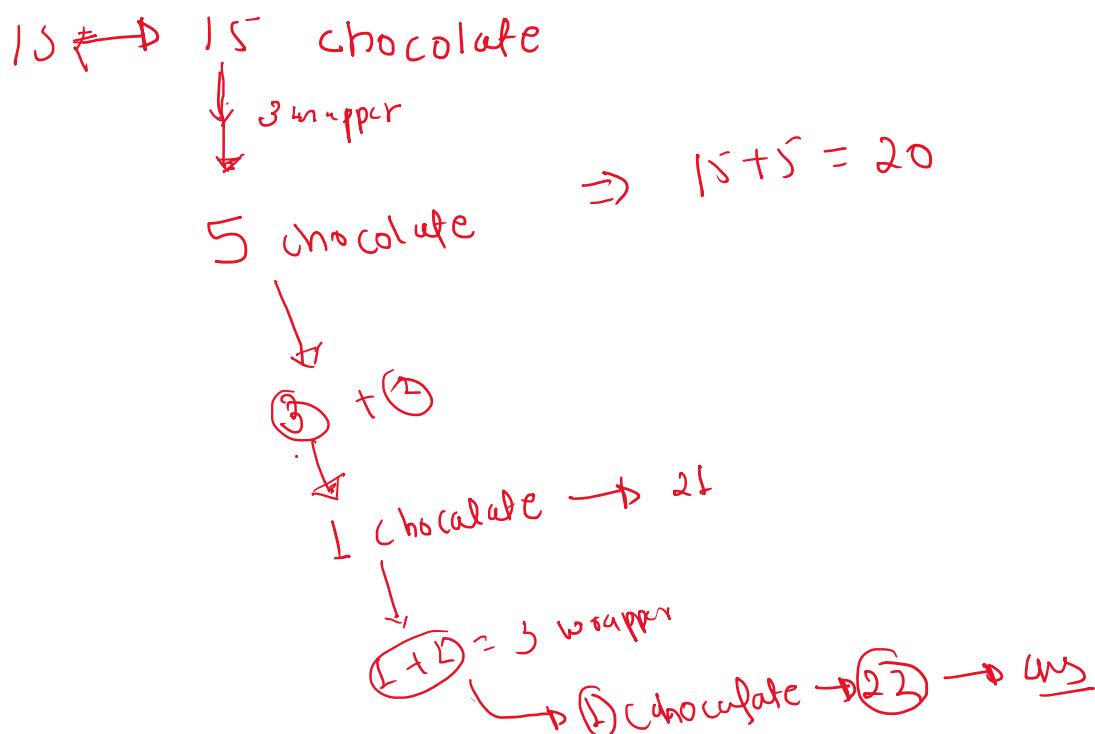
Q(1)

You have ₹15 and go to a shop where each chocolate costs ₹1. The shopkeeper also offers a deal: you can exchange 3 empty chocolate wrappers for 1 additional chocolate. So, how many chocolates can you eat at maximum?

**What is the maximum number of chocolates you can eat?**

You have ₹15 and go to a shop where each chocolate costs ₹1. The shopkeeper also offers a deal: you can exchange 3 empty chocolate wrappers for 1 additional chocolate. So, how many chocolates can you eat at maximum?

What is the maximum number of chocolates you can eat?

15 ₹ ⟶ 15 chocolate
↓ 3 wrapper

5 chocolate   ⟹ 15 + 5 = 20

↓

③ + ①

↓

1 chocolate ⟶ 2↓

↓

(1 + 2) = 3 wrapper

⟶ ① chocolate ⟶ 22 ⟶ ans
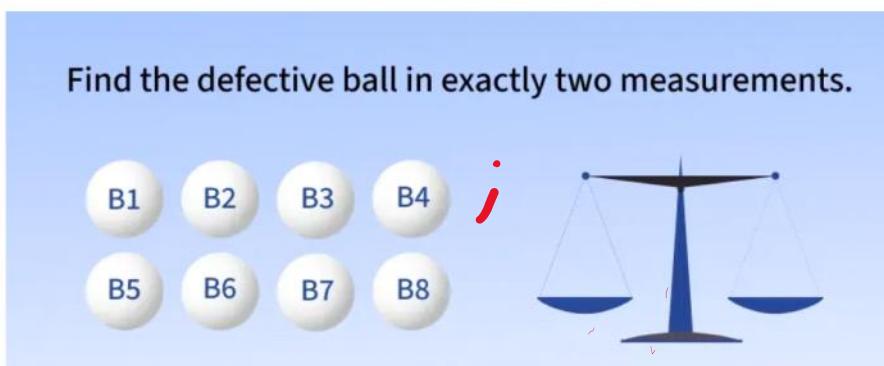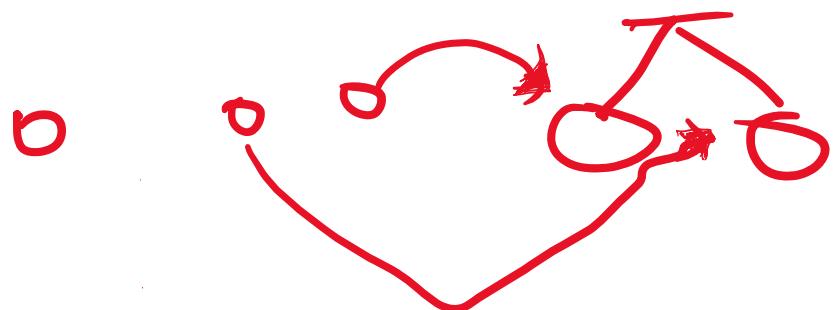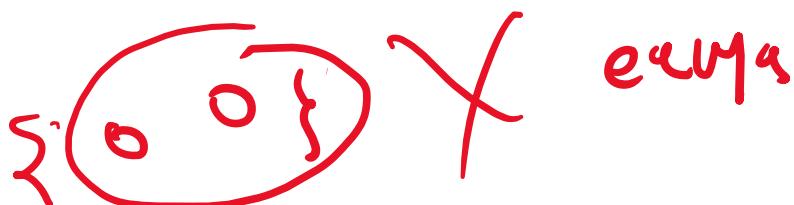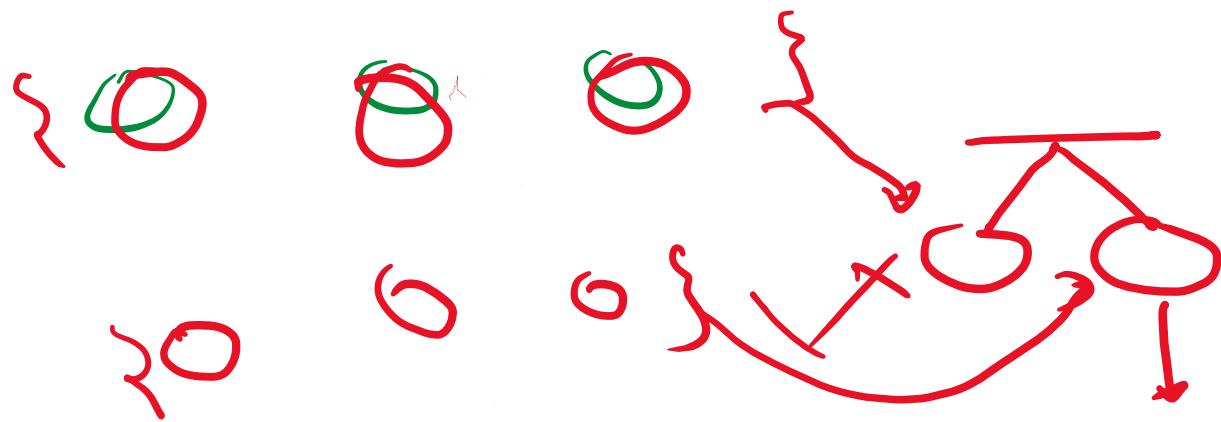
You are provided with 8 identical balls and a measuring instrument. 7 of the eight balls are equal in weight, and one of the eight given balls is defective and weighs less. The task is to find the defective ball in exactly two measurements.

Find the defective ball in exactly two measurements.

B1 B2 B3 B4

B5 B6 B7 B8

extra

Q3

You hire a worker for 5 days and agree to pay them 1 unit of gold at the end of each day. However, you only have a single 5-unit gold bar.

The conditions are:

- The worker must be paid **exactly 1 unit per day**.
- You are allowed to **cut the gold bar into pieces**.
- After cutting, you can use those pieces to make exact
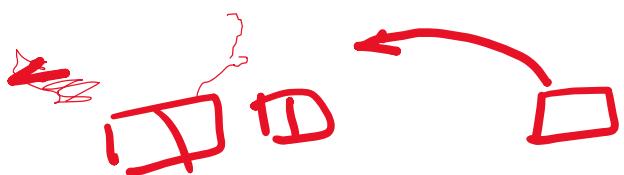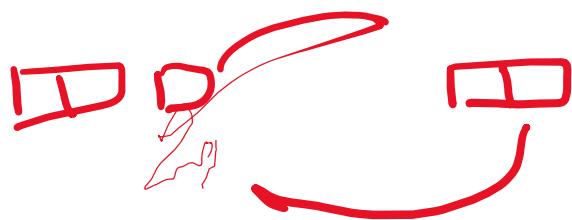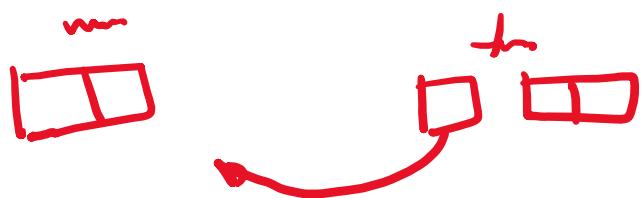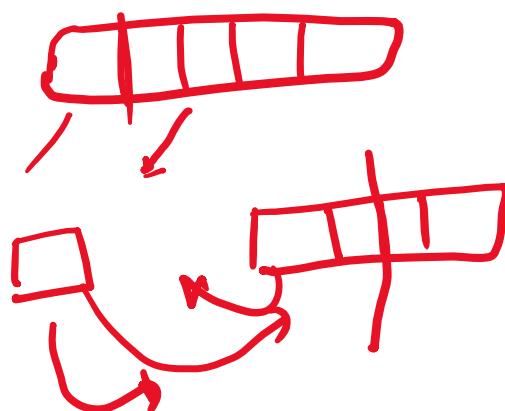
You hire a worker for 5 days and agree to pay them 1 unit of gold at the end of each day. However, you only have a single 5-unit gold bar.

The conditions are:

- The worker must be paid **exactly 1 unit per day**.
- You are allowed to **cut the gold bar into pieces**.
- After cutting, you can use those pieces to make exact payments each day.

What is the minimum number of cuts required to split the gold bar so that you can pay the worker correctly for all 5 days?
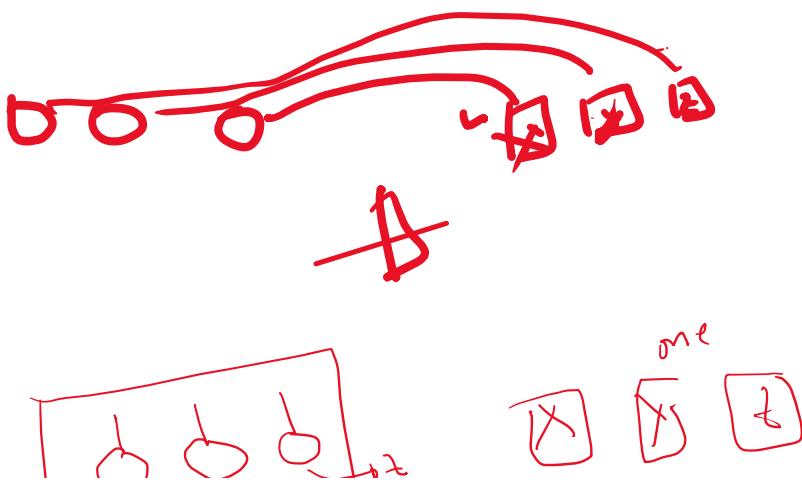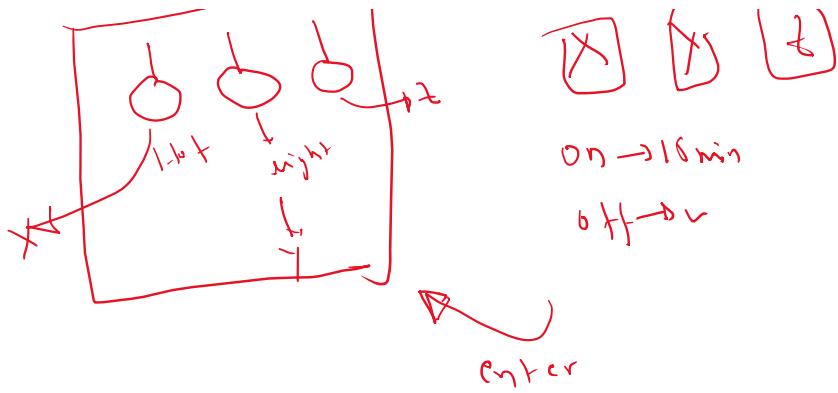
There is a closed room with three light bulbs inside.

- You have a closed room containing three light bulbs.
- Outside the room, there are three switches, each connected to exactly one bulb (but you don't know the mapping).
- You can toggle the switches (on/off) in any way before entering the room.
- You may open the door and enter the room only once.
- Once inside, you cannot touch the switches again — you can only observe the bulbs.
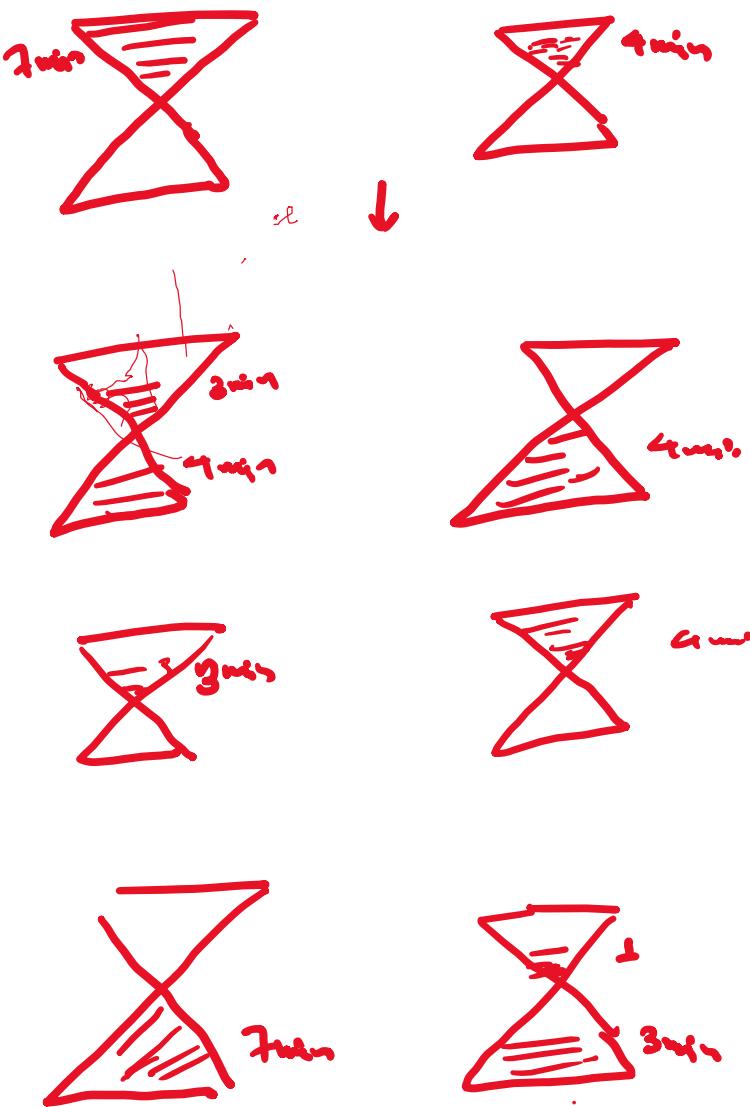
How can you determine which switch controls which bulb in a single visit?
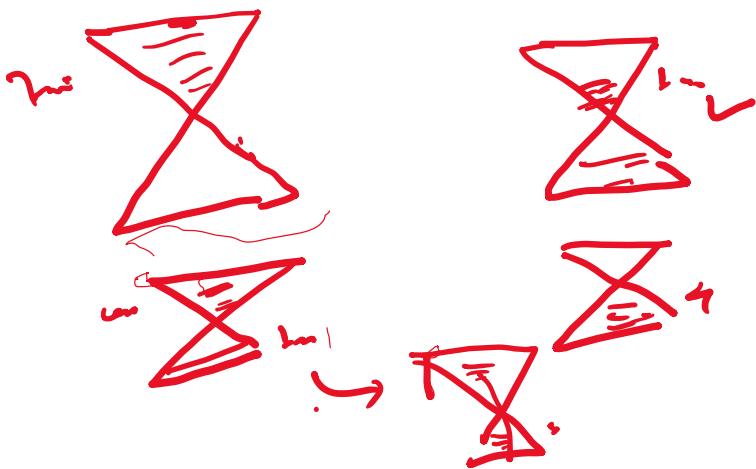
Given two hourglasses of 4 minutes and 7 minutes, the task is to measure 9 minutes.

Q6 Four people — A, B, C, and D — need to cross a bridge at night.
They have only one torch, and the bridge is too dangerous to cross without it.
At most two people can cross at a time, and when two people cross together, they must move at the slower person's speed.

The time each person takes to cross the bridge is as follows:
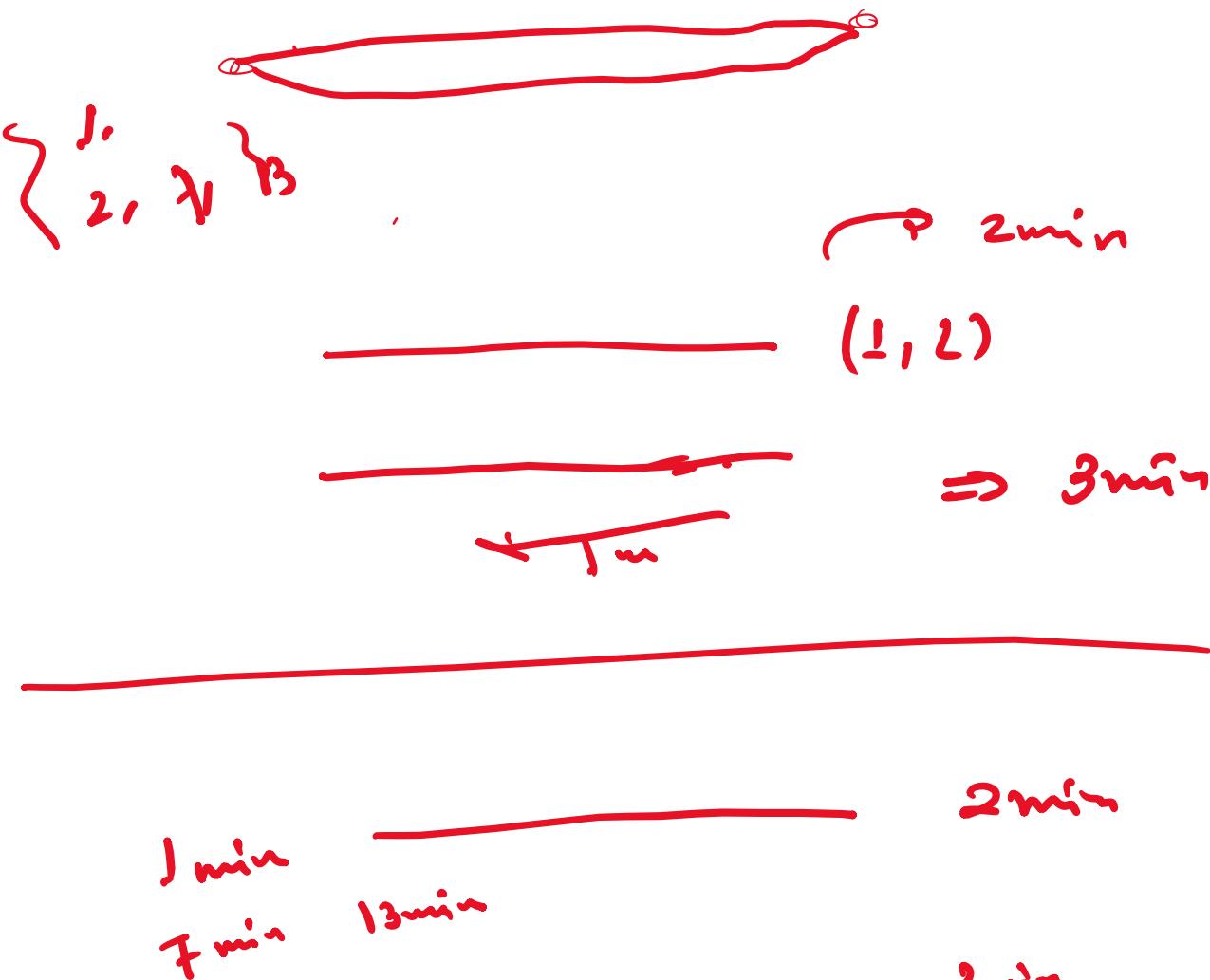
A → 1 minute

B → 2 minutes

C → 7 minutes

D → 13 minutes

You must determine the minimum total time required for all four people to cross the bridge safely, following the above rules.

7 min 13 min

$13 + 3 = 16\text{ min}$ 2 min (7 , 13)

2 min
1 B

(1 , 2)

26 min ✓

A → D 7 min

B → D 2 mn

C → ? 7 mr

D → D 13 min

(, , 7, 13) 2 mn

$(7, 2, 7, 13)$ ← $2\,$

3

$(7, 2)$

16

$(7 \quad 7, 13)$ →

18

→ $\{ 7, 13, 2 \}$

$(L, 7)$ → 2