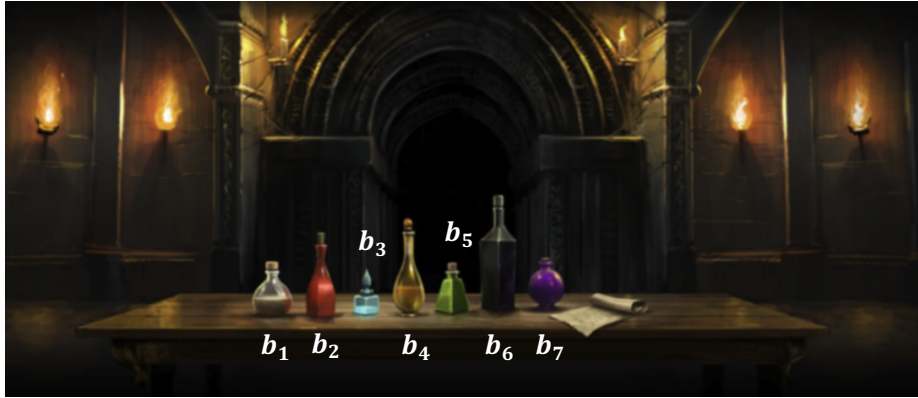


Pb.4: Dungeon & Potions Riddle

Solⁿ: Label bottle ordering on image:



Definitions & Inferences:

From Label Ordering: $B = \{b_1, b_2, b_3, b_4, b_5, b_6, b_7\}$ where B is the universal set of bottles
 so, the number of bottles as $n(B) = 7$
 From Line 3: $G = \{b_g \in B \mid g \in [1, 7]\}$, where G is the set of 1 bottle bringing you back (target bottle 1)
 From Line 2, 3: $F = \{b_f \in B \mid f \in [1, 7]\}$ where F be the set of 1 bottle moving you forward (target bottle 2)
 From Line 4: $N = \{b_n, b_m \in B \mid n, m \in [1, 7]\}$ where N is the set of **nettle** wine bottles
 From Line 5: $P = \{b_p, b_q, b_r \in B \mid p, q, r \in [1, 7]\}$ where P is the set of **poisonous** bottles
 From Line 6: G, F, N, P are all *disjoint* sets.

Solve for the ordering of: f, g

- (1) From Clue 1: $\exists p \in P, \exists n \in N, p = b_i, n = b_{i+1}$
- (2) From Clue 2: either b_1 or $b_7 \in G$
- (3) From Clue 3: $b_{largest}, b_{smallest} \in P'$
 As seen in the image: $b_3, b_6 \in P'$
 $b_3, b_6 \in G \cup F \cup N$
- (4) From Clue 4: b_2, b_6 are from the same set where $n = 2$. The only set that has 2 elements is N .
 By Simplification (Logic): Hence, $N = \{b_2, b_6\}$
- (4.1) $b_4 \in G \cup P \cup F$
 Remaining uncertain elements = $7-2 = \underline{5}$
- (4.2) (3) and (4): $b_3 \in G \cup F$
- (4.3) (1) and (4): $b_1, b_5 \in P$
 Remaining uncertain elements = $5-2 = \underline{3 (1P, 1F, 1G) \text{ and } (3, 4, 7)}$
- (5) (2) and (4.3): $b_7 \in G$
 Remaining uncertain elements = $3-1 = \underline{2 (1P, 1F) \text{ and } (3, 4)}$
- (6) (5) and (4.2) and (4.1): $b_3 \in F, b_4 \in P$

Answer: b_3 คือขวดที่กินแล้ววาร์ปไปข้างหน้าและ b_7 คือขวดที่กินแล้ววาร์ปกลับบ้าน