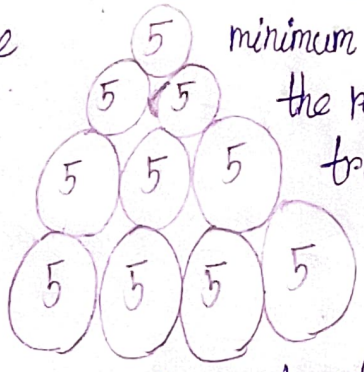
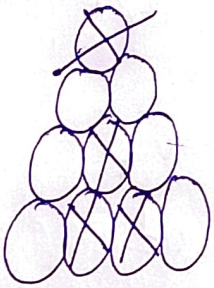
Chap 0, Prob 25) What is the minimum number of coins we must remove so that no three of the remaining coins lie on the vertices of an equilateral triangle?



Ans: **Observation:** Each coin lie on the vertex of three distinct equilateral triangles. There are 10 eq triangles. Its intuitive that we would need atleast 4 coins to be removed to break out all the equilateral triangles. These 4 coins must lie on distinct eq triangles' vertices.



Chap 0, Prob 4) There are 24 pounds of nails in a sack. Can you measure out 9 pounds of nails using only a balance with two pans?

Ans: Step 1: Balance out 12 pounds equally on two pans. Leave aside one heap of 12 pounds.

Step 2: Balance out the remaining 12 pounds as 6-6 on two pans equally. Leave aside one heap of 6 pounds.

Step 3: Balance out the remaining 6 pounds equally. Take one pile of 3 pounds and the prev left aside 6 pounds and combine them.

Chap 0, Prob 19) Distribute 127 $1 bills among 7 wallets so that any integer sum from 1 through 127 dollars can be paid without opening the wallets.

Ans) Any integer from 1 to 127 can be represented in binary using 7 bits.

127: 1111111
64 32 16 8 4 2 1

Wallet 1: $64 Wallet 2: $32 Wallet 3: $16
Wallet 4: $8 Wallet 5: $4 Wallet 6: $2
Wallet 7: $1