

## Coins Problem #1

You have 24 coins that look alike. With the exception of one counterfeit, they are all made of gold and weigh exactly the same. The “bad” coin is either heavier or lighter than the others, you do not know which. You also have available an old-fashioned balance scale. What is the minimum number of weighings you must make in order to locate the bad coin?

## Coins Problem #2

You are given 10 stacks of what should be 10 gold pieces each. Each gold piece weighs two ounces. Unfortunately, one stack contains 10 counterfeits, each coin weighing only one ounce. You have a bathroom-type scale that reads out the weight of what is put on it. The problem: Determine the counterfeit stack with a single weighing.

## Analysis of Trends and Patterns

- The goal is to identify the trend or pattern precisely
  - Don't stop at simply identifying the "next step".
  - Explicitly state what the pattern is that defined the next element in the series.

## Sample Problems

- A B A C A D A E \_ \_ \_
- 3 4 6 7 9 10 12 13 15 16 \_ \_ \_
- 2 7 4 9 6 11 8 13 \_ \_ \_
- 1 z 3 w 9 t 27 q 81 \_ \_ \_
- JKLMNO JKLMON JKLOMN JKOLMN \_ \_

## Jars Problem

A	B	C	Goal
11	9	4	6
21	127	4	98
15	90	4	67
14	163	25	99
18	43	10	5
9	43	6	22
20	59	4	31
14	36	8	6
23	49	3	20
7	20	4	5
28	76	3	25

## Don't be Blind

- For most problems, people use a relevant strategy from habit.
  - There's an excellent reason for this: It usually works!!
- Sometimes, the habit strategy is a bad match for the problem.
- In this case, people can act like they are "blind" to the solution.
- Example: Water jar problem.

## Einstellung

- “Einstellung” is the state of being “blind” or “set” in something.
- “Functional Fixedness”: People often fail to see alternate uses to an object once they assign it a role.
- People are fairly predictable in their susceptibility to functional blindness.
- Awareness of the problem helps to avoid it.
- This is real issue for students and in “real life”
  - Example: Debugging, algorithm design

## Lateral Thinking

- “Vertical Thinking” is sticking with the current approach, being rigid.
- “Lateral Thinking” is coming at a problem from a different (perhaps non-standard) direction.
- Often, just realizing that this should be done is enough to find a good solution (getting out of the old approach).
- Of course, it can be hard to tell when you are in the trap! It helps to have a “flexible” mindset.