Precious Stones and Greedy Bandits

There are ten bandits named as 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J' they stole some precious stones from a temple, and they decided to divide these stones equally among themselves. So they split the stones into ten parts, but the last bandit, 'J' got one stone less than other bandits. So the remaining nine bandits murder 'J'. They again decided to divide the stones into nine parts. But this time again, the last bandit 'I' got one less stone than other bandits. So again, the remaining 8 bandits murder 'I' and divide all stones between the remaining 8 bandits. But again, this time, 'H' got one less stone than the other. This process goes on until 1 bandit is left, i.e., 'A'. After that, 'A' takes all the stones and runs away. Now you have to guess the total number of stones.

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Answer: 2519

Explanation:
If there was 1 more stone in a first attempt, the stones could be easily divided among 10 bandits. And in the second attempt also the stones could be equally divided among 9 bandits and so on.
So let's just add one stone to the total number of stones. So the total stones become N+1.
Now this (N+1) should be divisible by 10. It should be divisible by 9, 8, 7, 6, 5, 4, 3, 2, 1.
So our answer should be LCM of (10, 9, 8, 7, 6, 5, 4, 3, 2, 1).
Total Number of stones = LCM of (10, 9, 8, 7, 6, 5, 4, 3, 2, 1) which is 2520.
Now we have to subtract 1 stone which we have added before, so the total number of stones is 2519.

The Diamond Bags

Max has 10 bags full of diamonds. Each bag contains 1000 diamonds. But one bag is full of forgeries, and he just can't recall which one. He does know that genuine diamonds weigh 1 gram, but forgeries weigh 1.1 grams. To hide the fact that he can't recall which bag contains forgeries, he needs your help. How can he identify the bag with the forgeries with just one weighing?

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Solution:

- **It is known that there is only one bag with forgeries. To identify that bag, Max can follow a simple procedure. He should take out 1 diamond from the 1st bag, 2 diamonds from the 2nd bag, 3 diamonds from the 3rd bag and similarly 10 diamonds from the 10th bag.**

- **Now he should simply weigh all these picked diamonds together. If there were no forgeries, then the total weight should be (1+2+3+ . . . +10) = 55 grams.**

- **Now, if the total weight comes out to be 55.3 then he can conclude that the 3rd bag contains forgeries. So, if the total weight is (55.n), then it is clear that the nth bag contains forgeries.**

Blind Man and The Pills

A blind man is alone in a house. He has two blue pills and two red pills. He must take exactly one red pill and one blue pill or he will die. How does he do it?

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Solution:

- **Firstly, break each of the pills in half**
- **As you do this, take one half in your mouth and lay the other half aside for tomorrow.**
- **When he's done this with all four pills he will have consumed one red pill and one blue pill. And have the same leftovers.**

The Burning Candles

Let's say there are 2 candles and each of them burns for 1 hour. In addition, let's have a box of matches. Measure 45 mins.

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Solution:

- **Let's burn candle A from both sides and candle B from one side.**
- **When candle A fully burns, it has been 30 minutes you will have 30 minutes of burn time left on candle B.**
- **Now light up the remaining candle B from the other side too (burn from both sides).**
- **When candle B fully burns, it has been 15 minutes.**
- **Total Burn Duration = 30 + 15 = 45 minutes.**

Pizza Splitting

There were 3 people who made a rectangular pizza. One of them cut a piece from the pizza because he was in a hurry. The piece could be less than the size of the pizza and rotation. Now the remaining two friends want to cut the pizza in two equal pieces using a single straight cut.

Note:
1. The single straight cut could pass through the cut-out portion.
2. They both need an equal piece of cheese and toppings

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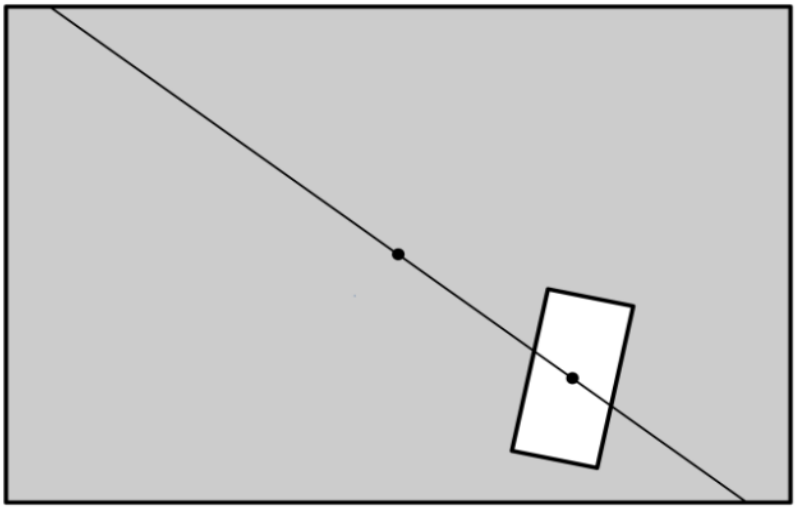
Solution:

- **To solve this they have to use the line connecting the centre of the rectangles to cut the pizza.**



- **Such a line would divide the pizza into two equal halves.**

The Four Card Puzzle

You have 4 cards, one side of each card is labelled with letters A, B, C and D. The other side of the cards are labelled with numbers 1, 2, 3 and 4. Now the challenge is "How many turns do you have to perform to show that a card that has a vowel on one side has an even number on the other side?"

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Solution:

- **There are 4 cards labelled as A, B, C and D. The other side of the card have a number. It is known that a card with a vowel always has an even number on the other side. So there is only one vowel A. This means the number on the other side of A can be 2 or 4 because there are only 2 even numbers.**

- **The rule "A card with the vowel has an even number on the other side" can be proven to be true by turning two cards. The first card to be turned in will be A. because this is the only vowel card we have.**

- **If on the other side we have an even number then that is true. If there will be an odd number then we can say this rule is not valid. Now we have 3 cards to turn. We will turn in the 3rd card.**

- **If it is a vowel then this will prove that A vowel card has an even number on the other side. Turning only these two cards proves this rule to be true. We need not turn any more cards because the puzzle does not exclude the possibility of saying a consonant card having either an odd or an even number on the back.**

Help Kunal

Kunal is a heart patient who is on a strict medical regimen that requires taking two types of pills each day. He must take exactly one A pill and exactly one B pill simultaneously. The pills are very expensive, and he doesn't want to waste any. So he opens the bottle of A pills and taps one out into your hand. Then he opens the bottle of B pills and does the same thing – but he makes a mistake, and two B pills come out into his hand with the A pill. But the pills are all identical. There is no way to tell A pills apart from B pills. Help Kunal satisfy his regimen and take exactly one of each pill simultaneously, without wasting any pills?

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Solution:

Step 1: Cut each pill in half.

Step 2: Take one half from each pair and form two pairs, say Pair A and pair B.

Step 3: Take another pill from bottle A, cut it in half.

Step 4: Put each half into both pairs. Now, each pile contains two halves from each type of pill, so you just take one of the piles (and the other the next day).

Shepherd and Sons

A shepherd has 100 sheep numbered from 1 to 100. Every sheep gives wool according to their numbers, i.e., i'th sheep gives i kg wool. Shepherd has 10 sons, and he wants to divide his sheep among his 10 sons so that every son should get an equal amount of wool. The task is to help him know about these sheep's division among the sons.

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Solution:

As we know that the i'th sheep gives i kg wool. So first, let us count the total kg of wool obtained from these sheep. This can be solved by using the arithmetic progression sum.

We know that sum of n numbers starting from 1 is always, sum = n*(n+1)/2.

So the total quantity of wool obtained from 100 sheep is total wool = 100(100+1)/2=5050 kgs.

As the problem says, the division of the sheep should be done so that every son gets an equal amount of wool. So every son should get 5050/10 = 505 kgs of wool.

Our main problem is to divide 1 to 100 numbers so that every son should get 10 sheep who sum up to 505.

Let us reduce the complexity of this puzzle using the below example: Now let us suppose you have 10 numbers and you divide them into 5 people so that each one gets an equal sum of these numbers.

So these 10 numbers sum up to 55 now each of the 5 people will get 11 as a sum so it's obvious that every people will get two numbers whose sum is 11. so the division would be like this:
First_Person —> 1, 10

Second_Person —> 2, 9

Third_Person —> 3, 8

Fourth_Person —> 4, 7

Fifth_Person —> 5, 6

so each person will get 11.

Now coming back to the problem, we have 100 numbers we have to divide this into 10 groups so that each son get 505 kg of wool. So,
First_Son —> 1, 2, 3, 4, 5, 96, 97, 98, 99, 100

Second_Son —> 6, 7, 8, 9, 10, 91, 92, 93, 94, 95

Third_Son —> 11, 12, 13, 14, 15, 86, 87, 88, 89, 90

Fourth_Son —> 16, 17, 18, 19, 20, 81, 82, 83, 84, 85

Fifth_Son —> 21, 22, 23, 24, 25, 76, 77, 78, 79, 80

Sith_Son —> 26, 27, 28, 29, 30, 71, 72, 73, 74, 75

Seventh_Son —> 31, 32, 33, 34, 35, 66, 67, 68, 69, 70

Eighth_Son —> 36, 37, 38, 39, 40, 61, 62, 63, 64, 65

Ninth_Son —> 41, 42, 43, 44, 45, 56, 57, 58, 59, 60

Tenth_Son —> 46, 47, 48, 49, 50, 51, 52, 53, 54, 55

as the problem said each son should get an equal amount of wool.

Move to the Outside World

Once there was a planet in this universe, and a Master ruled it. The Master wanted to protect his planet from the outside world. So he made a rule that neither any citizen of the planet can go to the outer world nor anyone from outside can enter his planet. There was only a common bridge between the planet and the outside world. The guard was assigned to the gates of the planet, which was linked to the bridge. If anyone tries to go out of the planet, the guard will kill them. And if anyone tried to come inside the planet, the guards would send them back. It takes 8 minutes to cross the bridge.

The guard was allowed to take a 5 minutes break. One woman could cross the bridge and move to the outside world. How did she do that?

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Answer:

When the guard was at rest, the woman started to walk towards the outer world. She walked for 5 minutes and then turned back towards the planet. Since she had no document with her, she could not come inside the planet. Therefore the guard sent her. Hence she was able to leave the planet.

Recover Data from Memory Card

Suppose you have three memory cards, M1, M2, and M3, each with a 1GB capacity. You also have 3GB of data. You have to divide these data into M1, M2, and M3 such that if any one of the memory cards among M1, M2, M3 got crashed, you should be able to recover all the data from the remaining two memory cards.

For example, if M1 crashes, you should recover 3GB of data from M2 and M3.

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Answer :

Suppose the 3GB data is divided into three groups, A, B, and C. Then the distribution would be like this.

M1-> A^B

M2-> B^C

M3-> C^A

Now suppose memory card M3 is crashed, and we are left with data of M1 and M2. As we know that

M1 contains data which is the xor of A and B.

M2 contains data which is the xor of B and C.

We can perform the below steps to recover the whole data.

Step 1: XOR of M1 and M2 gives (A^B)^(B^C) = B

Step 2: XOR of this B which is obtained from step 1 with M1, gives (A^B)^B = A

Step 3: XOR of this B which is obtained from step 1 with M2, gives (B^C)^C = C.

Performing the steps as mentioned above will give the data A, B, and C.

Similarly, we can perform these steps in the case of M1 and M2.

N right-angled Triangle

Find all values of n > 1 to divide a rectangle into n right-angled triangles.

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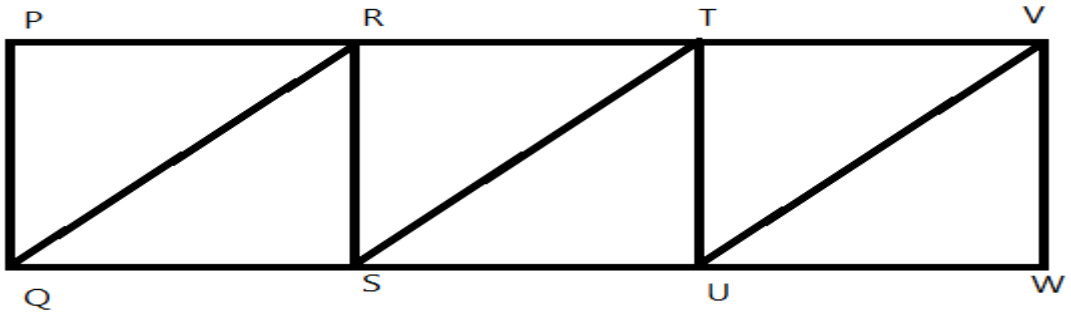
Solution:-

We can solve the puzzle by considering it case-wise.

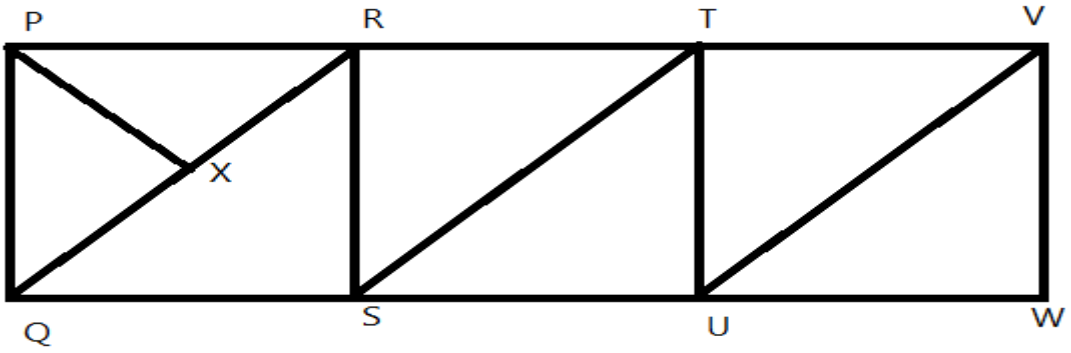
Case 1: n is even: divide the rectangle into n/2 small rectangles and divide each of the smaller rectangles obtained along its diagonal.

For example: For n=6, in the rectangle PVWQ, we first form 3 smaller rectangles as PQRS, RSUT, TUWV. Then, we divide each rectangle along its hypotenuse QR, ST, UV, respectively, to get 6 right-angled triangles.



Case 2: n is odd: In this case, first, divide the rectangle into n-1 small triangles using the approach mentioned above and then can cut any of the triangles along with the height onto its hypotenuse.

For example, for n=7, we first form 6 triangles as mentioned above, and then we cut triangle PQR and the height onto its hypotenuse to obtain the 7th triangle PXQ.



Warriors and a Boat

A group of 25 warriors had to cross a broad and deep river with no bridge in sight. They notice two 10-year-old boys playing in a rowboat by the shore. The problem is that the boat is so small that it can only hold two boys or one warrior. How can the warriors get across the river and leave the boys in joint possession of the boat?

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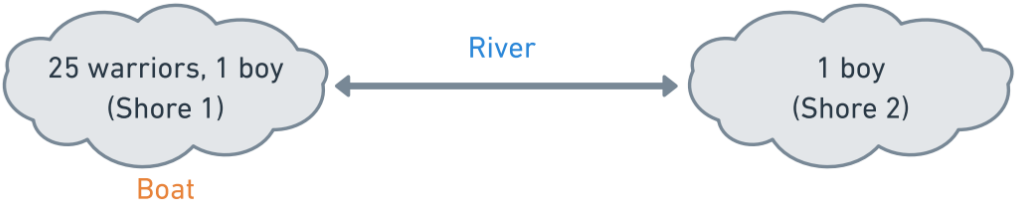
Solution:

Let's solve this problem step-by-step.

1. **The initial situation is:**

2. **At first, the two boys will take the boat to the other side, as shown in the figure.**

3. **Then, one boy will return with the boat, and one boy will stay at the other end.**



4. **When the boy returns, one of the warriors will row the boat across the river.**

5. **When the warrior reaches the other end, the boy there will come back with the boat.**

Hence, the boat needs to be rowed four times for one warrior to cross the river. So, for 25 warriors, the boat needs to be rowed 100 times from shore to shore. Also, for n warriors, in total 4n warriors are required.

Light All Candles

Consider a circle with 2014 candles, and only 2 of them are ignited, and the rest are not ignited. Anyone can choose any of the candles and change the state of the neighbouring candles (ignited to not-ignited or not-ignited to ignited). The task is to light all the 2014 candles?

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Solution:- **Yes, it is possible to get all the candles ignited.**

- **Firstly label all the 2014 candles from B-1 to B-2014(in sequence).**
- **As the positions of the candles in the ignited state are not mentioned in the problem statement, consider that those two candles are adjacent to each other and are labelled B-1 and B-2.**
- **Therefore, candles labelled from B-3 to B-2014 are initially in the Not-ignited state, and all the candles in the Not-ignited state are adjacent to each other.**

Follow the steps below to solve the given problem:

- **Consider all the 2012 remaining candles in groups of 4.**
- **To light up all the candles, perform the following strategy:**
  - **The first group consists of candles B-3 to B-6.**
  - **Select the second candle from the chosen group and change the state of adjacent candles.**
  - **Here, select candle B-4 and change the state of candles B-3 and B-5 from the Not-ignited state to the ignited state.**
  - **The second step is to select the third candle from the chosen group and change the state of its adjacent candles.**
  - **Here, select candle B-5 and change the state of candles B-4 and B-6 from Not-ignited to ignite.**
- **Similarly, the above process can be repeated for a total of 503 groups(consisting of 4 candles each), and all the given 2014 candles can lighten up.**