

The Hidden Treasure

by Frédérique

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Last winter, two weeks before Christmas, I fell sick.

I had a very bad headache and a high fever,
and I coughed about every two minutes.

I was in pretty bad shape.



Happily, my grandmother was with me most of the time.

She took very good care of me.

She gave me some medicine that tasted good.

Often her charming black poodle came into my room.

He jumped onto my bed. We smiled at each
other, and I was no longer so uncomfortable.

A few days later, I was feeling a little better.

My grandmother gave me a glass of orange juice every two hours and told me some nice stories.

At the end of the week, she presented me with a big box containing 72 marvelous colored pens.

I was very excited.

I drew many pictures and soon forgot that I was sick.

I began to feel much less sorry for myself.

By the end of the second week, I was in much better shape, but my friends still were not allowed to visit me. The time seemed to be moving very slowly.

My grandmother came to my bedroom with a large package.

"I brought you a new game which you can play by yourself," she said. "It is a spy story."

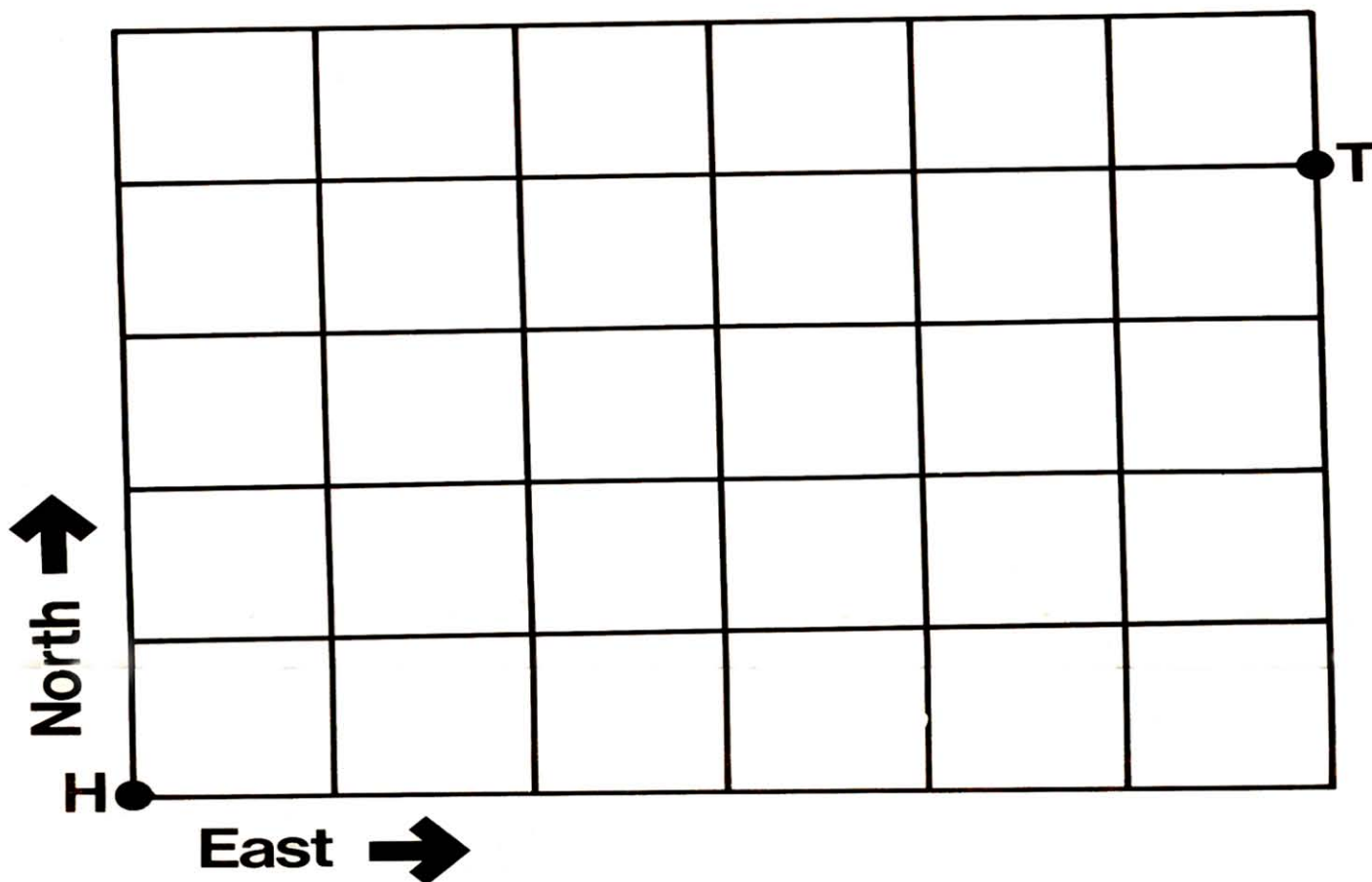
I was very excited.



I opened the box quickly and found this grid drawn on a piece of cardboard.

I was a little disappointed.

My grandmother looked at me and smiled.



“It is part of the map of a little town,” she said.

“H is the house of a famous spy whose name is **SPIKE**.”

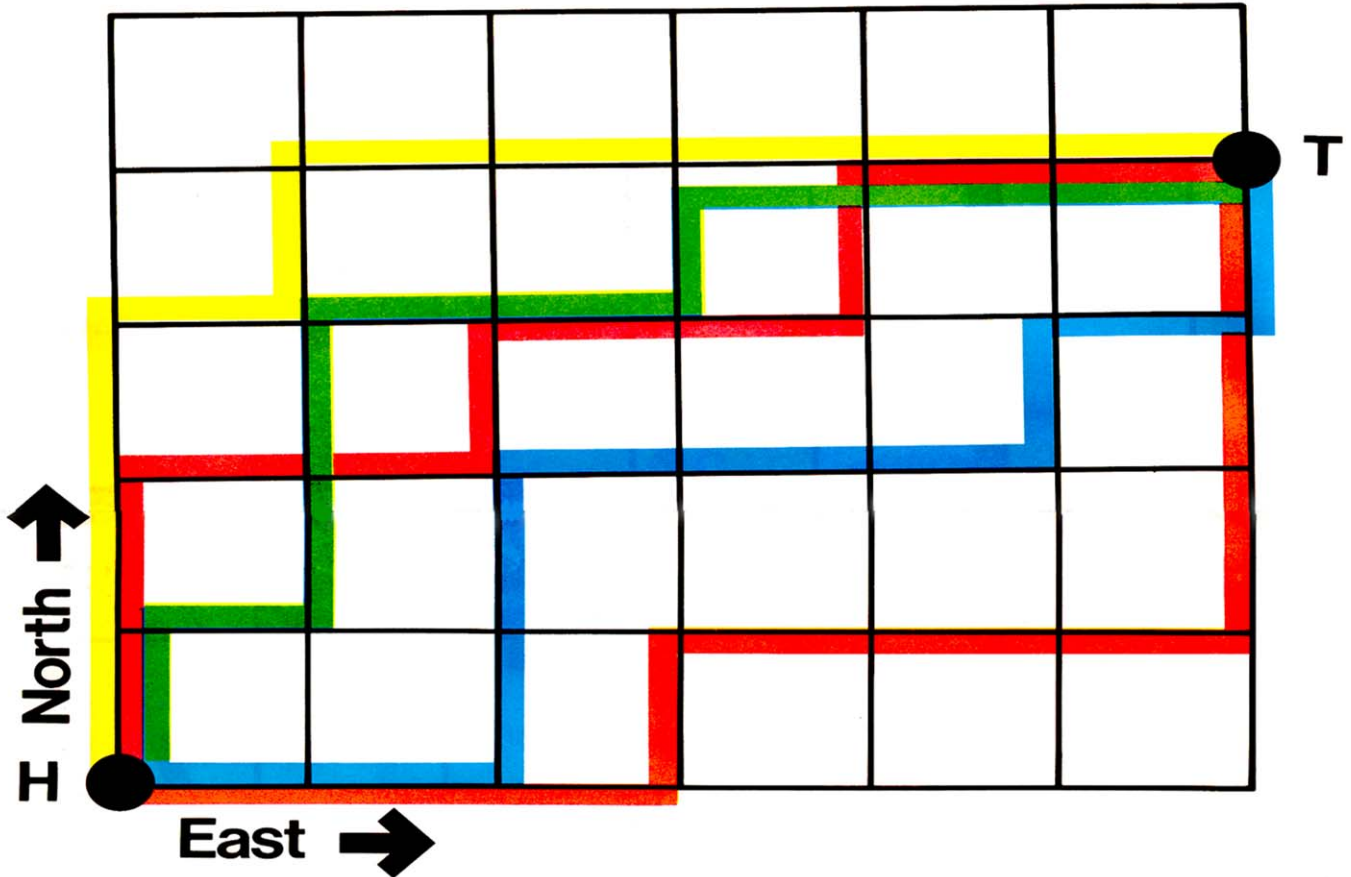
I was immediately interested.

She added, “T is the spot where some stolen treasure is hidden. Driving his car, Spike explores all of the routes that go from his house to the spot where the treasure is hidden. He has to be careful because in this part of town all of the streets are one-way, from South to North or from West to East.”

“Yes,” said Grandma, “but when you drew the green and yellow routes, you forgot that the streets are one-way.”

“You are right. I will begin the picture again.”

I drew two new routes.



“Do you think you have finished?” asked my grandmother.

“No,” I replied, “but I have 72 pens and there can’t be that many routes.”

WHAT DO YOU THINK ABOUT THAT?

I went on with my drawing. Grandma smiled and left the room followed by her charming black poodle.

I drew and I drew and I drew.

"I have 17 different routes already," I thought. "There are a lot of them." However, I was not discouraged.

"Now I have 36 different routes." I was getting a little nervous.

Grandma came back to my bedroom.

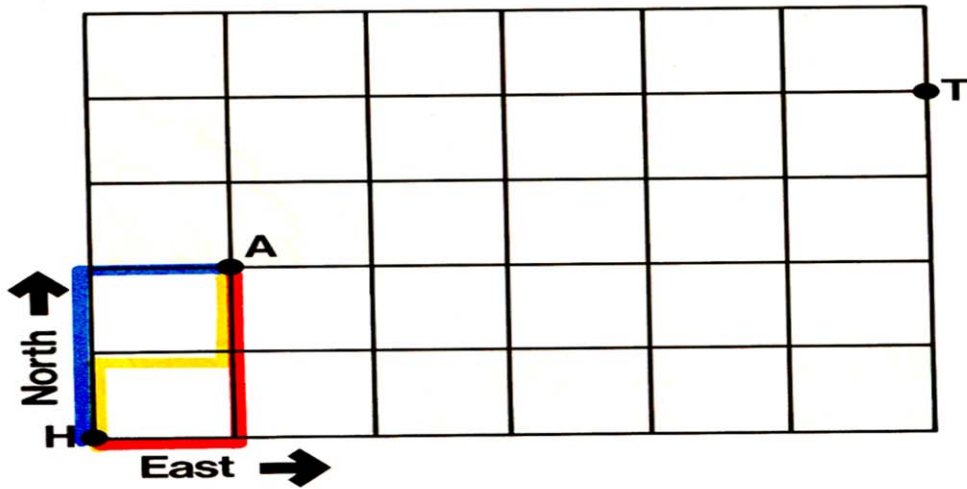
"Did you finish your drawings?"

"Not yet," I replied, a little annoyed. In fact, I was completely lost but I didn't want to admit it. "I have already found 36 routes. But now, it is becoming more and more difficult to draw new ones. There are too many colors! My picture is not clear."



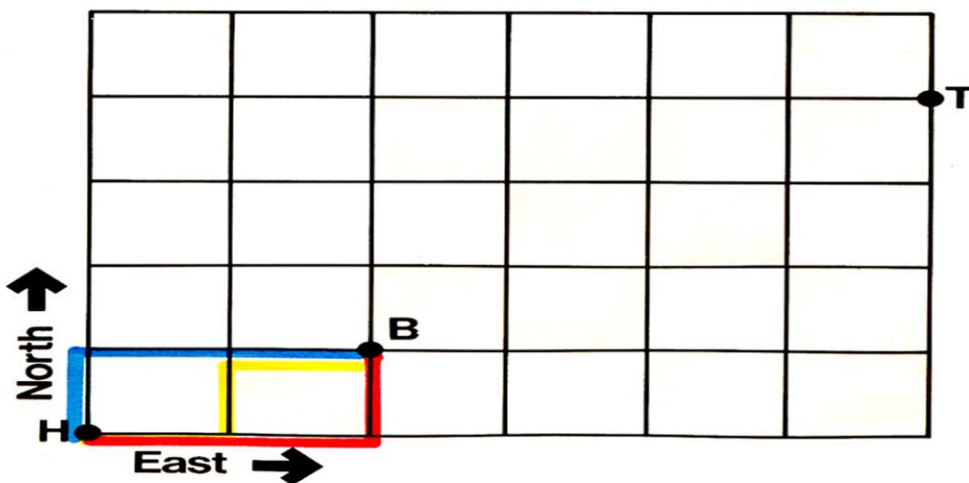
“Be patient,” advised Grandma. “Do you know how many routes there are from H to A?”

“That’s easy,” I said, a little surprised at being asked such a simple question. “There are three routes. I will draw them for you.”



“And from H to B?” asked Grandma.

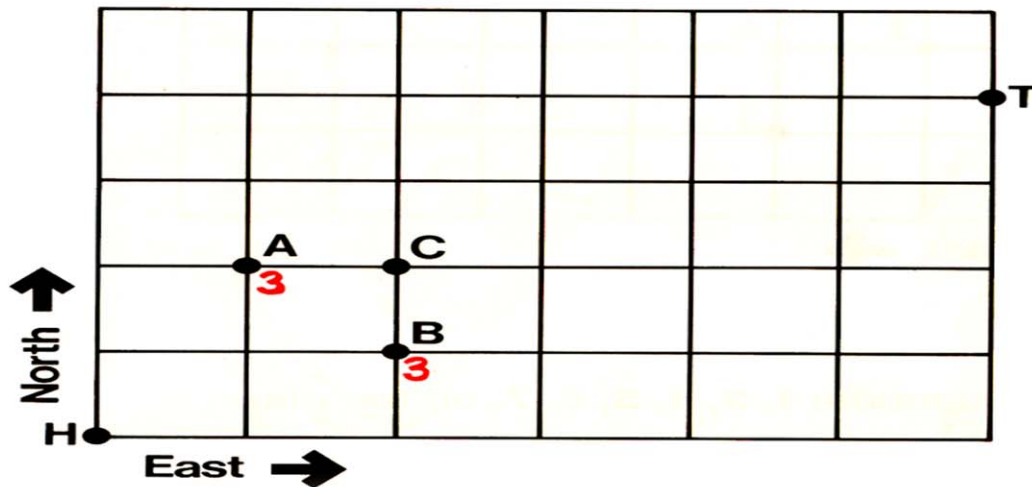
“Clearly, three routes too. Here they are. Why do you ask me such easy questions?” I remarked. She smiled.



“And how many routes from H to C?” asked Grandma.

I was too tired to draw any more paths. “Perhaps it is possible to find the answer without drawing any more paths,” I thought.

I was quiet for a long time.



Suddenly, I shouted, “It’s easy! Driving from H to C, Spike must go through either A or B. There are three routes from H to C going through A.”

SHOW THEM WITH YOUR FINGER.

“There are three routes from H to C going through B.”

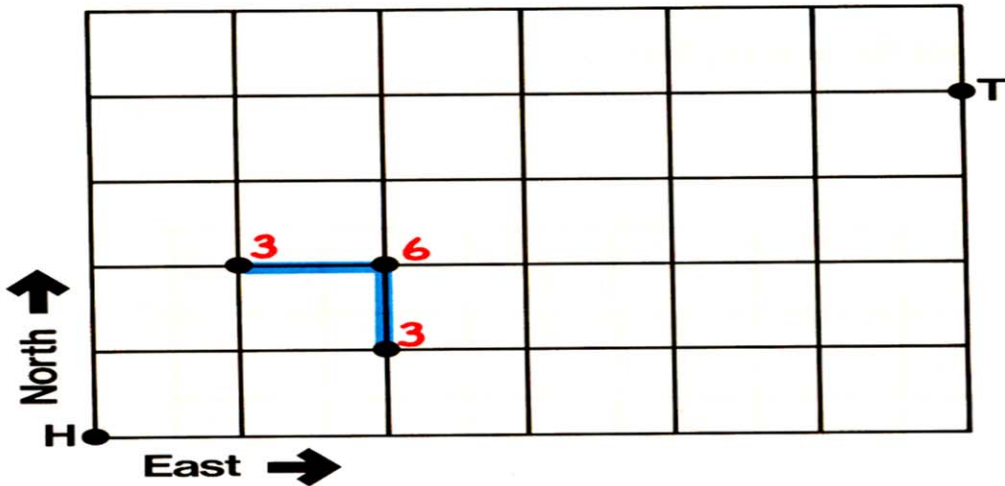
SHOW THEM WITH YOUR FINGER.

“So there are $3 + 3 = 6$ routes from H to C,” I concluded.

SHOW THEM WITH YOUR FINGER.

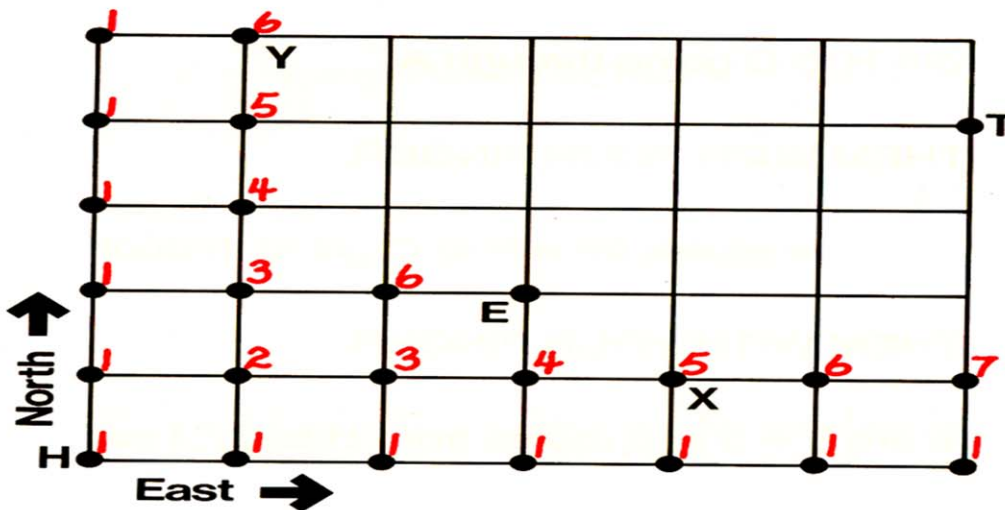
“Correct,” said Grandma. “Now, you have the right idea. You can go on by yourself.”

I hummed, “ $3 + 3 = 6$; $3 + 3 = 6$; $3 + 3 = 6$,”
 and looked carefully at the map. All of a sudden I shouted,
 “I’ve got it; I’ve got it! I think I have the solution.”



I wrote the numbers 1, 2, 4, 5, 6, 7, on the map.

DO YOU UNDERSTAND WHY?



WITH YOUR FINGER, SHOW THE FIVE ROUTES FROM
 H TO X AND THE SIX ROUTES FROM H TO Y.

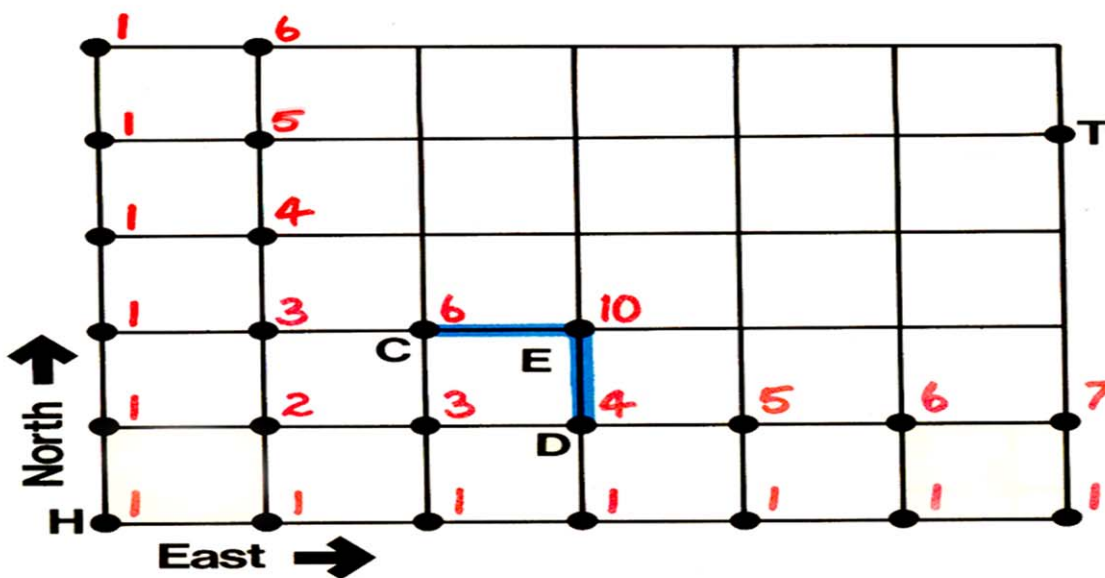
“Driving his car from H to E, Spike must go through either C or D,” I muttered. “There are six routes from H to E going through C.”

SHOW THEM WITH YOUR FINGER.

“There are four routes from H to E going through D.”

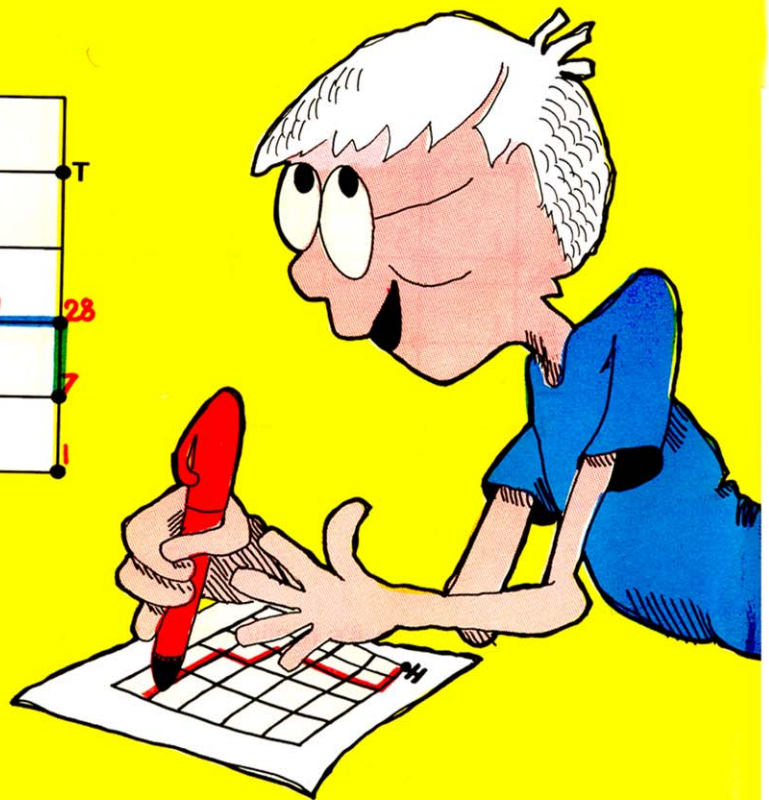
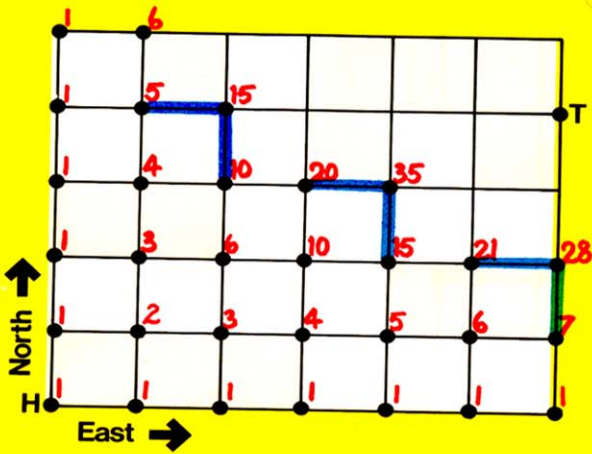
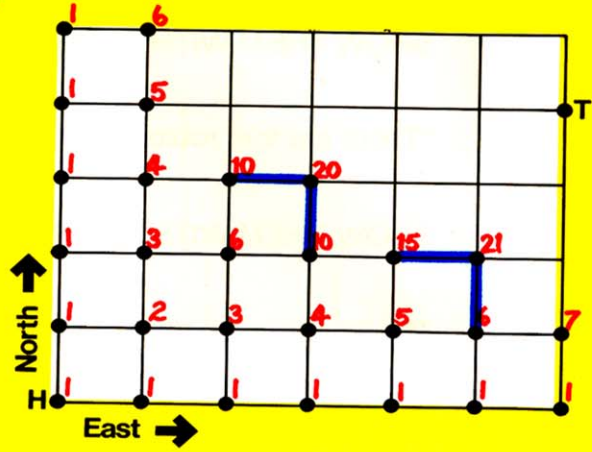
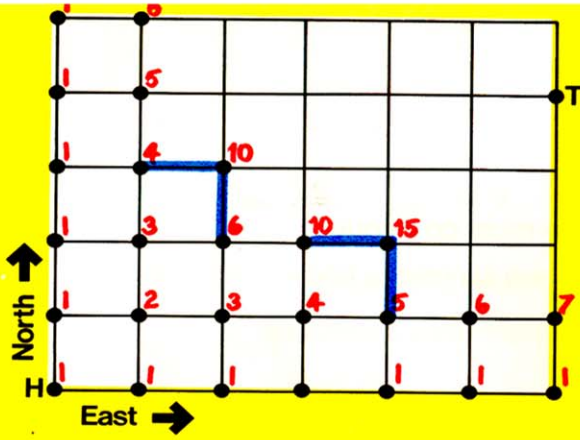
SHOW THEM WITH YOUR FINGER.

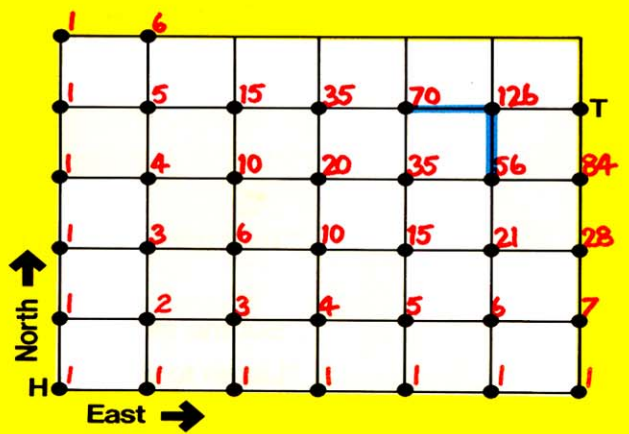
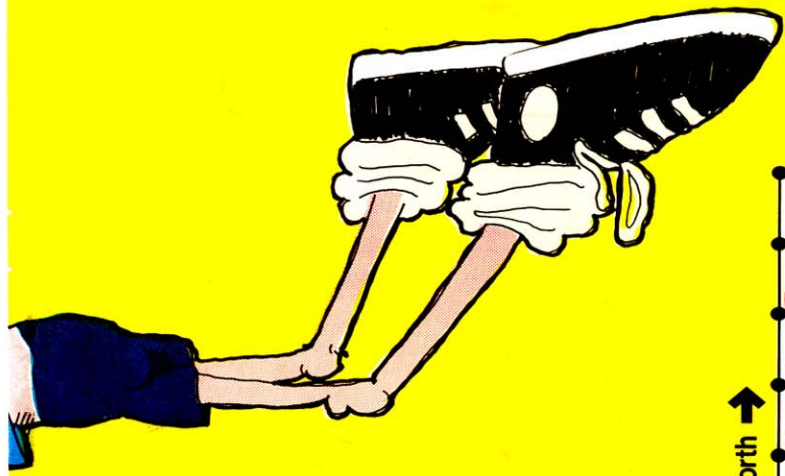
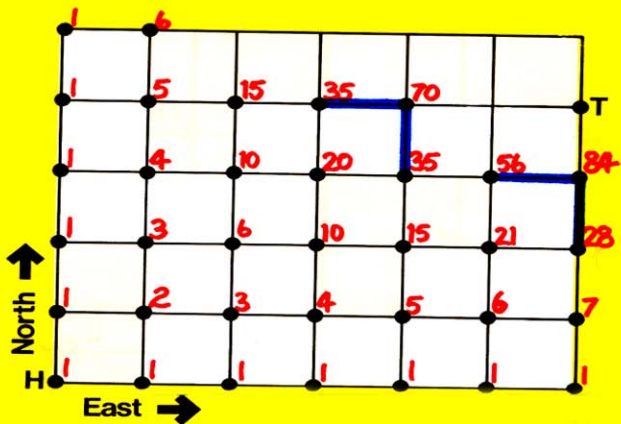
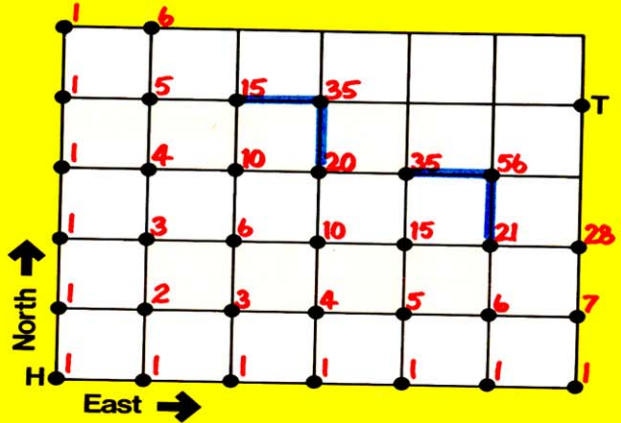
“So there are ten, $6 + 4 = 10$, routes from H to E,” I concluded.



“And now, it’s really simple to calculate the other numbers.”

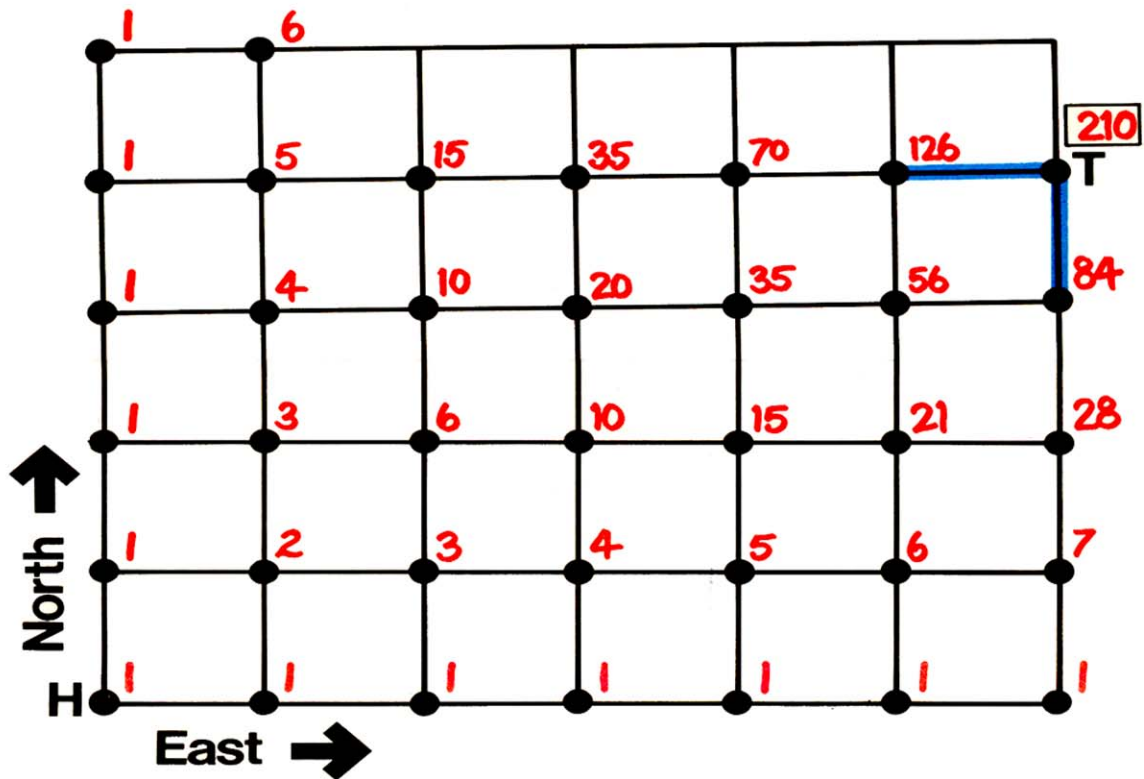
BEFORE TURNING THE PAGE, CALCULATE THESE NUMBERS BY YOURSELF. I HOPE YOU WILL ENJOY THESE CALCULATIONS AS MUCH AS I DID.





“Grandma, come here quickly. One more step and I have it!”

“There are 210 routes from H to T,” I said very proudly. “That is amazing! I understand why my picture was confusing me.”



“Your game was very nice, Grandma.”

“But the story is not over yet,” said my grandmother.

“Listen to what happened next.”

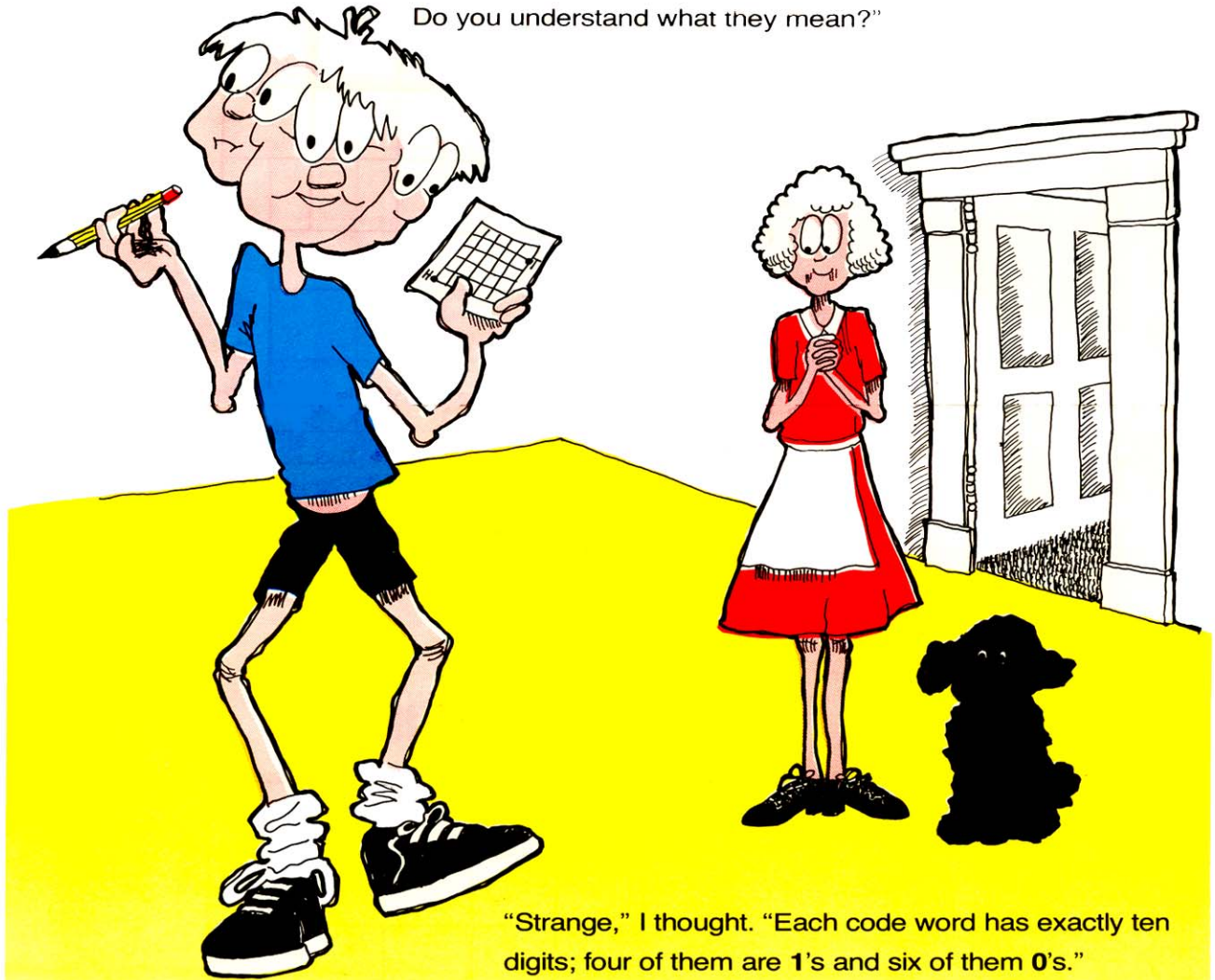
“You know that spies use secret codes to send messages. Well, each time Spike was exploring a route from H to T, he wrote in his notebook a code word like one of these:

0100100110

1100000011

0100010101

Do you understand what they mean?”

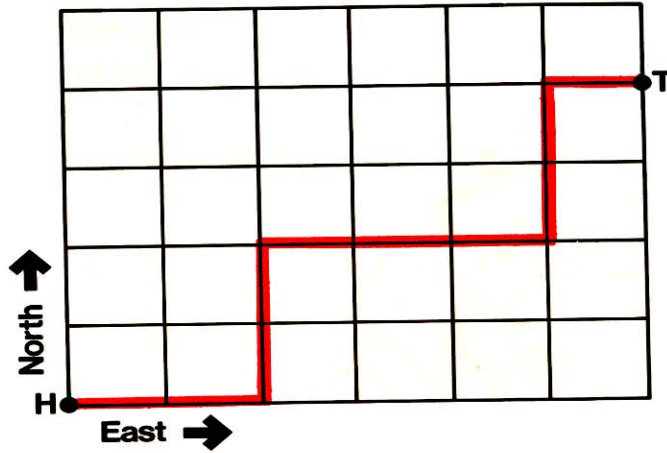


“Strange,” I thought. “Each code word has exactly ten digits; four of them are 1’s and six of them 0’s.”

“Six 0’s and four 1’s,” I said to myself as I looked at the map. Suddenly I shouted, “I know! Each time he goes North, he writes 1, each time he goes East, he writes 0.”

I drew this picture:

0011000110

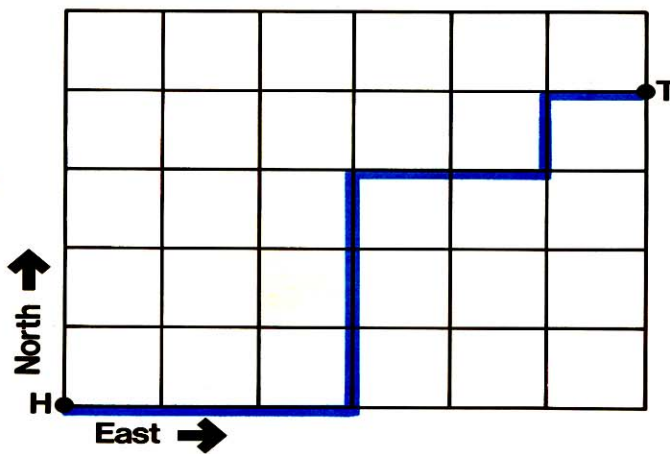


“**0011000110** is the name of this red route,”
I said.

“Right! Can you draw the route that Spike calls
0001110010?”

“Easy. Here it is.”

0001110010



Very excited, I drew some more routes and for each of them I wrote its secret code.

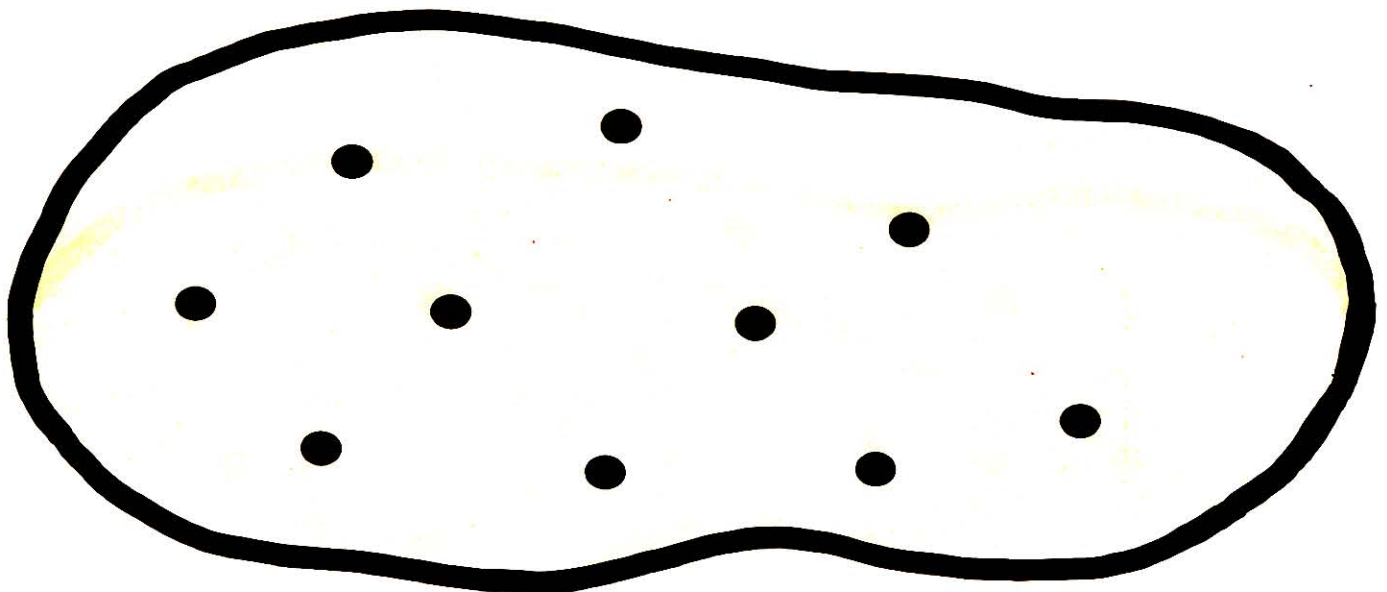
DRAW A FEW FOR YOURSELF ON THE MAP ON PAGE 3.

“And now, this is how the story goes on,” said Grandma.

I listened very carefully.

“By exploring the 210 routes going from H to T and talking to a lot of people, Spike became convinced that exactly four thieves had hidden the stolen treasure at the spot T.

After a very careful investigation, he discovered ten suspects. Here they are. I have drawn dots for them inside this string.”



“But how can I find which four are guilty?” I asked.
“I hope that Spike is going to question them all.”

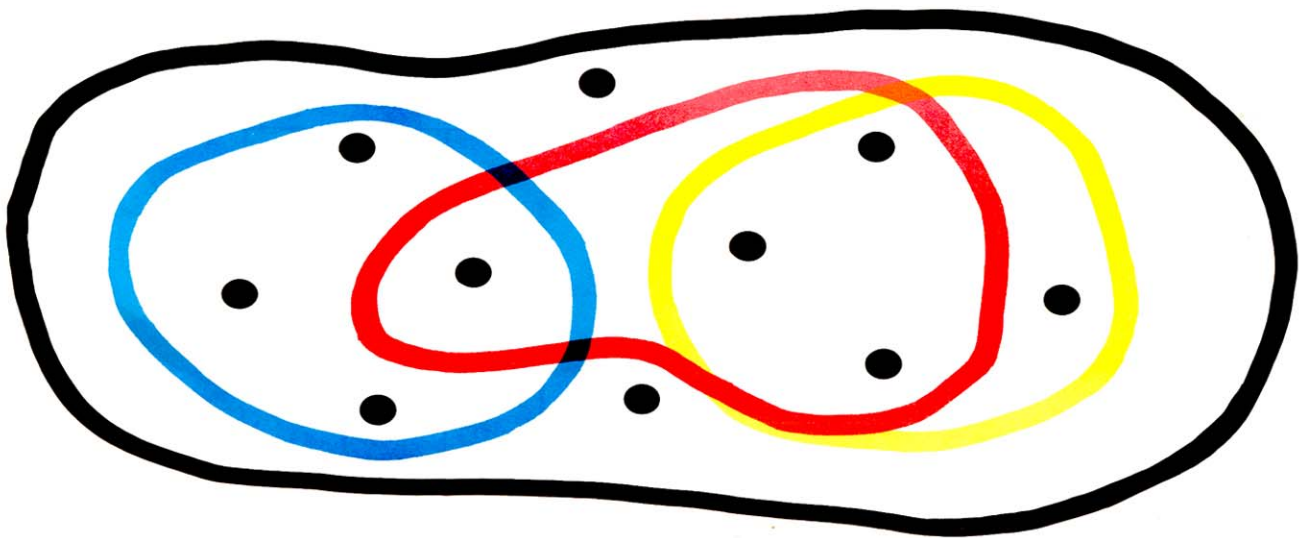
“Yes,” said my grandmother. “Spike is convinced that they will confess if all four of them are questioned together at the same time. He plans to organize a meeting for each group of four suspects.”

“Won’t that take a lot of time, Grandma?”

“Yes! But do you know why it will take so long?”

“In how many ways is it possible to choose four people from among the ten suspects?” asked Grandma.

“That’s easy! I shall draw all of the strings that have exactly four dots inside them. Look. Here are three of them.”



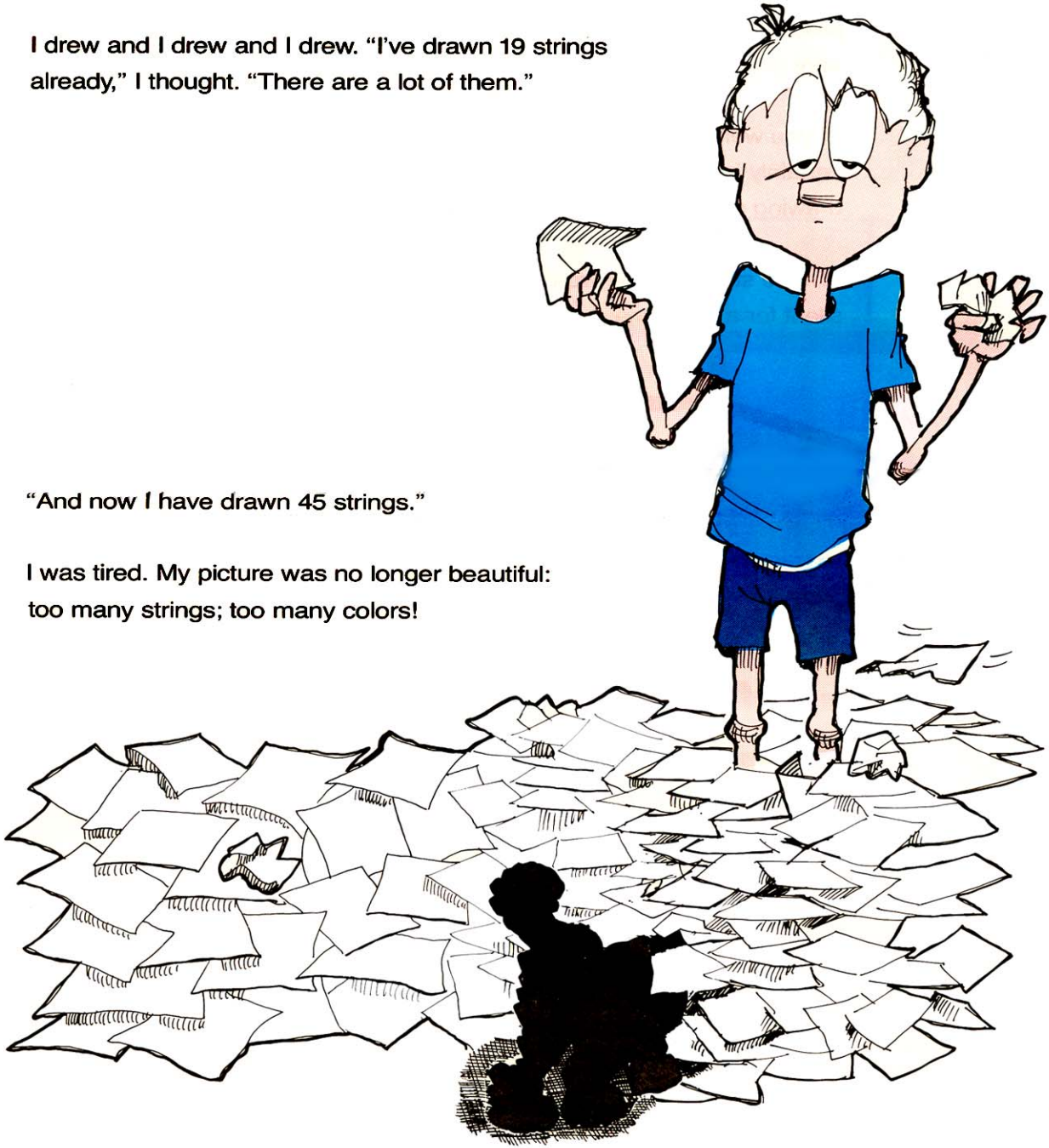
I love drawing with my marvelous colored pens.
Now I could use them again. I was so happy.

Grandma went out of the room with her charming black poodle.

I drew and I drew and I drew. "I've drawn 19 strings already," I thought. "There are a lot of them."

"And now I have drawn 45 strings."

I was tired. My picture was no longer beautiful:
too many strings; too many colors!

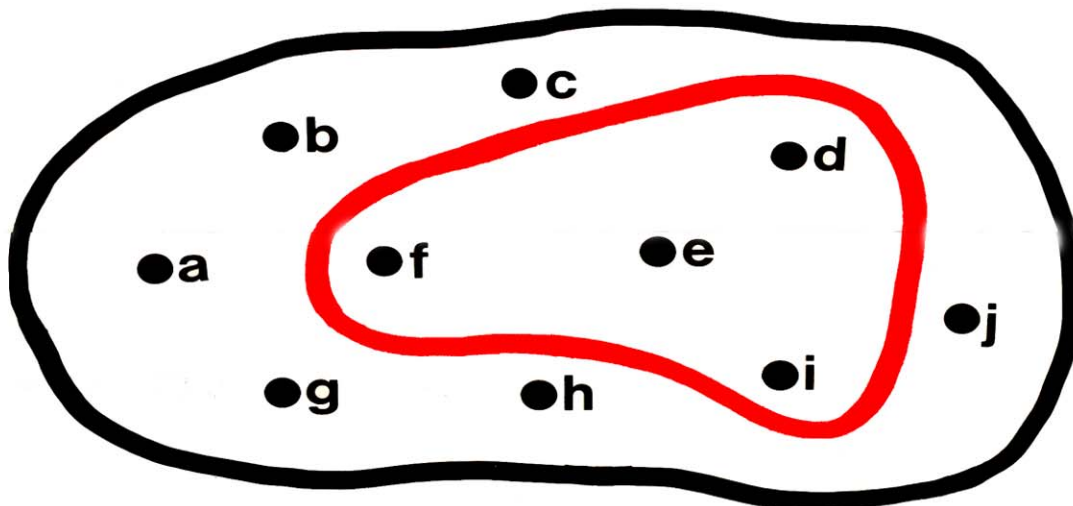


“Did you find out how many strings there are?” asked Grandma with a big smile when she came back.

“Not yet,” I replied, a little confused. “I thought your problem was going to be easy. In fact, it seems to be very complicated.”

“If you were a spy,” said my grandmother, “you would certainly invent a new code. Look at this secret drawing of Spike’s. Do you understand what it means?”

“Those strange code words again,” I thought. I was silent for a long time.

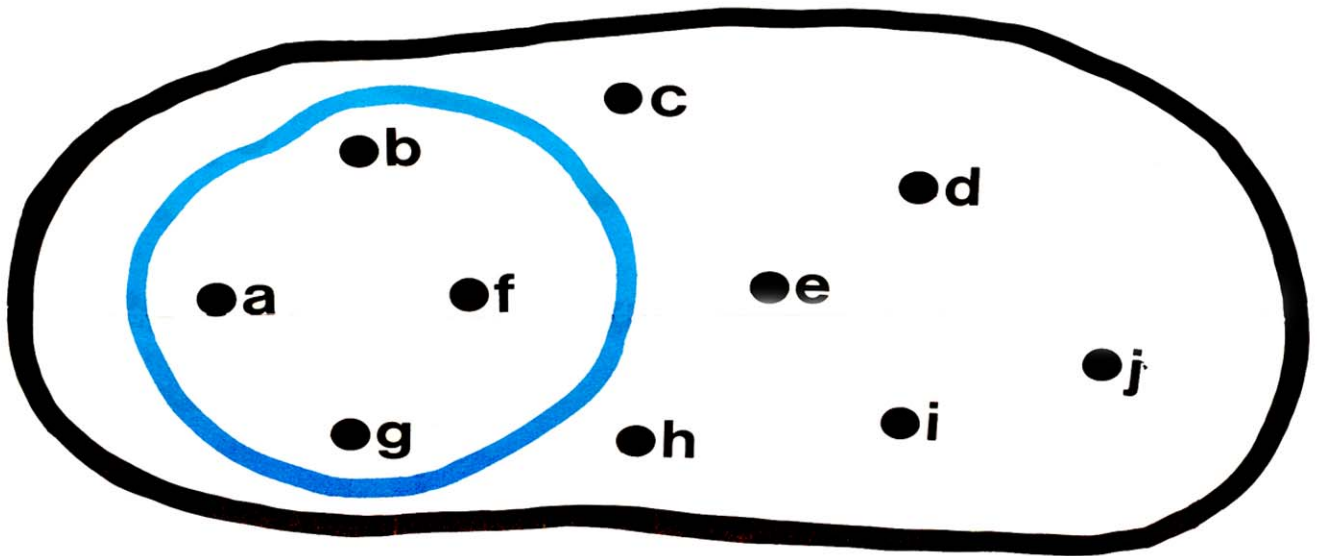


abcde fghij
0001110010

WHAT DO YOU THINK OF THIS PICTURE?
TRY TO BREAK THE CODE.

Suddenly I shouted, "If a person is inside the string, Spike writes **1**; if a person is outside the string, Spike writes **0**."

"Look, here is a blue string and I have written its code word using Spike's secret code."



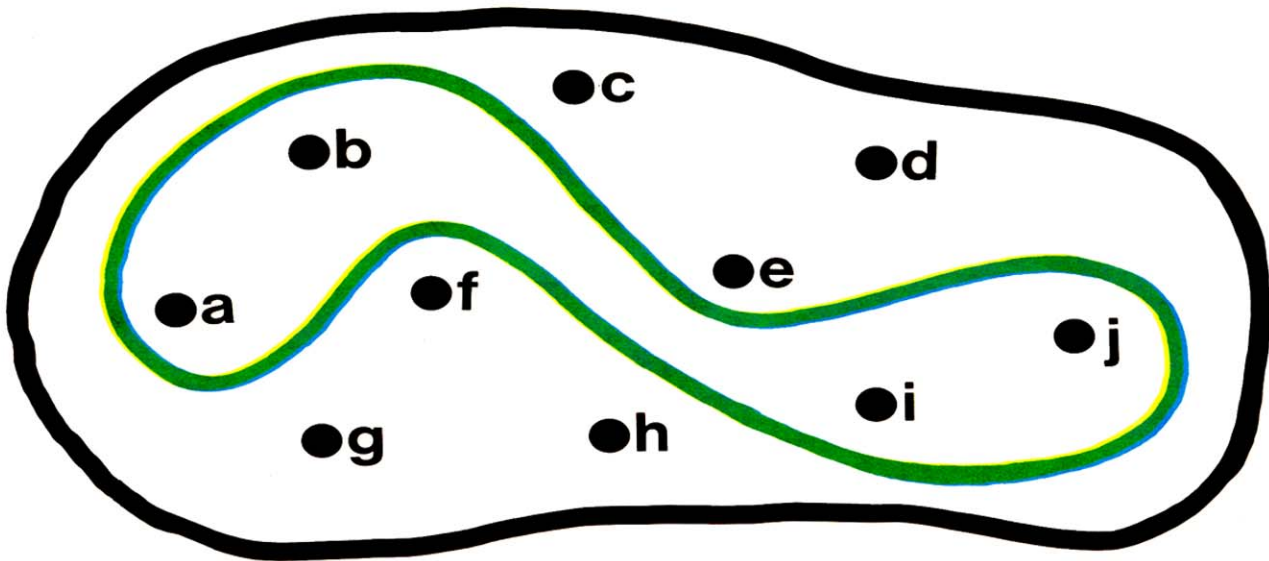
a b c d e f g h i j
1100011000

"Can you draw the string for the code word **1100000011**?" asked Grandma.

TRY TO DO IT YOURSELF BEFORE TURNING THE PAGE.

“Easy. Here it is.”

“Right.”



a b c d e f g h i j
1 1 0 0 0 0 0 0 1 1

“How many strings are there with exactly four dots inside?” Grandma asked again.

I responded, “For each string, we can write one of Spike’s secret code words with ten digits, six 0’s and four 1’s. And for each of Spike’s secret code words, we can draw a string with exactly four dots inside.”

I kept quiet and thought for a long time.



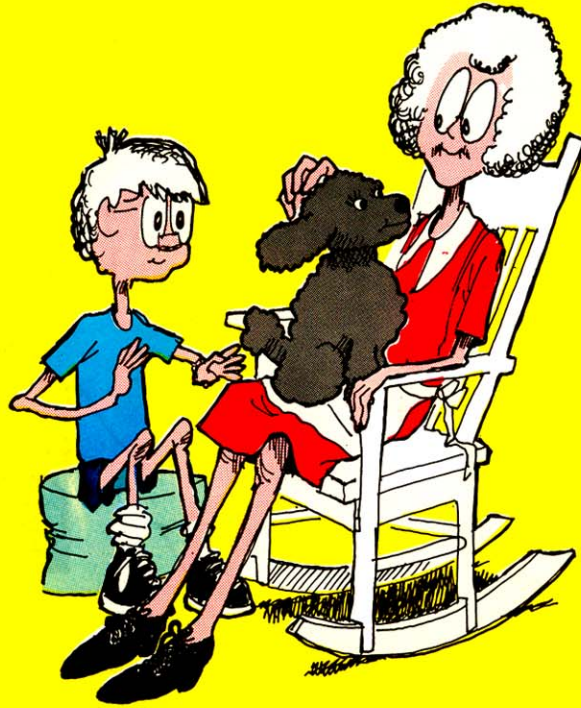
Suddenly, I became very excited, "It's the same problem as before. We used exactly the same secret code words to label the routes."

"That's right," said my grandmother. "We found 210 roads from H to T. So we must have the same number of strings."

"210 strings! Spike will be very busy. He has to organize 210 meetings of four suspects at a time."

“When I am older, I would like to become a spy,” I thought. “They have a lot of fun and they know some very strange and interesting tricks. Your game was wonderful, Grandma. Please invent a new one.”

With her charming black poodle on her lap, my grandmother smiled.



The principal character in “The Hidden Treasure” is a boy who has the misfortune to fall ill at Christmas time. Fortunately for him, however, his grandmother is on hand to help him feel less sorry for himself. She gives him two interesting puzzles to figure out and a large box of colored pens to help in that enterprise.

The first puzzle has to do with the efforts of the famous spy, Spike, to investigate the mysterious case of the Stolen Treasure. As part of this investigation, he has to travel along all of the possible routes from his house to the place where the treasure is hidden. Even though all of the roads in that area of town are one-way, there are still surprisingly many possibilities. The second puzzle involves Spike’s attempts to wind up his investigation by interviewing all ten suspects four at a time. We discover that there is a very strong link between the two puzzles, and this greatly simplifies the situation.

A full appreciation of this story relies on the reader answering questions and performing various tasks as the plot unfolds. By becoming involved in this way, the reader will be introduced to an important area of mathematics that has to do with systematic counting procedures.

Edward Martin

Stories by Frédérique

Ages 5 to 8

The Playful Numbers
81 Roses
I Am a Very Happy Boy
One Out of Seven
The Happy Puppet
The Old Shoemaker
Two By Two
The Little Dreamer
Where’s My Nose?
The Magic Box
The Baby Is Born
The Weird Story of 24
Summer School in the Old Days

Ages 8 to 12

The Little Donkey
Singing Friends
Dancing Friends
The Living Lines
I Am Not My Name
Nabu Wins an Award
The Square Trap

Ages 10 to 14

The Hidden Treasure
A Very Strange Neighborhood
Election in the Number World
A Valentine Mystery

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