

## Paired Socks

### **Question:**

A clothing store has a large bin of socks. Unfortunately, each sock has been separated from its corresponding matching sock.

Thankfully, each individual sock is tagged with a special code, composed only of 0's and 1's. Two socks are paired together if their codes are different in every digit: where one code has 1, the other code has 0 and vice versa. For example, a sock with the code 0110 is paired with the sock with code 1001.

**Which one of the following pairs of codes is not a correct pairing of socks?**

### **Possible Answers:**

1010 - 0101

0011 - 1100

1011 - 0100

1101 - 0001

## Missing Step

### Question:

Beaver Johnny received a task from his computer science teacher. He has two cards, card  $A$  and card  $B$ . On card  $A$  is a number, and on card  $B$  is a different number. Each card can only hold one number at a time. He has to exchange the numbers on card  $A$  and card  $B$  by the following three steps:

$$A \leftarrow A + B;$$

???????

$$A \leftarrow A - B;$$

The first step,  $A \leftarrow A + B$ , means that we should add the number on card  $A$  and the number on card  $B$  and replace the number on card  $A$  with this sum.

The third step,  $A \leftarrow A - B$ , means that we should subtract the number on card  $B$  from the number on card  $A$ , and replace the number on card  $A$  with this difference.

However, Johnny has forgotten the second step.

**Which of the following is the correct second step?**

### Possible Answers:

$$A \leftarrow A + B;$$

$$B \leftarrow A - B;$$

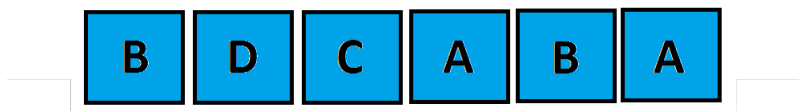
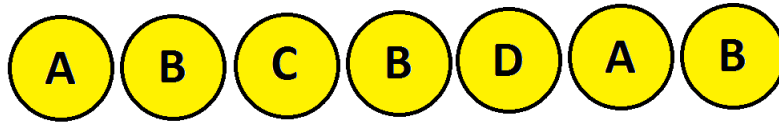
$$B \leftarrow B - A;$$

$$A \leftarrow B;$$

## Best Match

### Question:

You can connect a circle and a square that both have the same letter in them using a *straight* line.



What is the maximum number of such connections you can make without crossing any lines?

### Possible Answers:

- 2
- 3
- 4
- 5

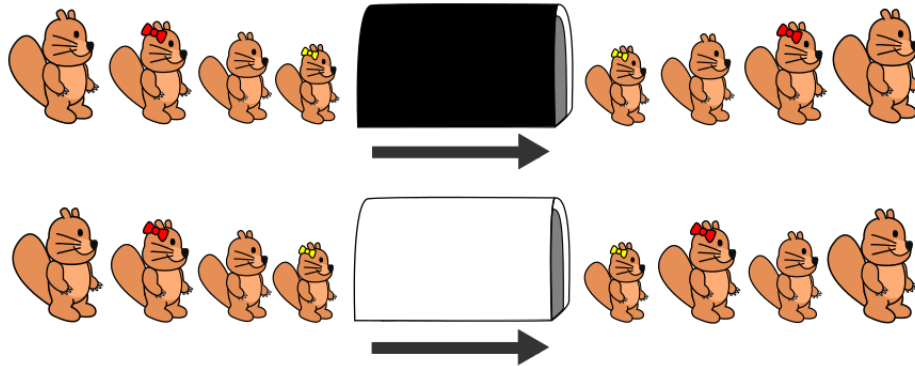
# Zebra Tunnel

## Question:

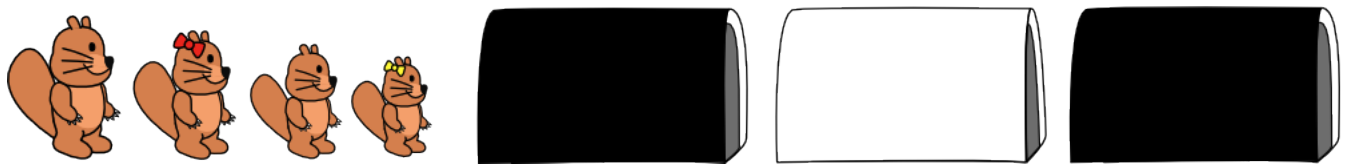
There are two kinds of tunnels in BeaverLand.

When a sequence of beavers enter a black tunnel one after the other, they come out in reverse order.

When a sequence of beavers enter a white tunnel one after the other, they come out with the first and the last beaver swapped.

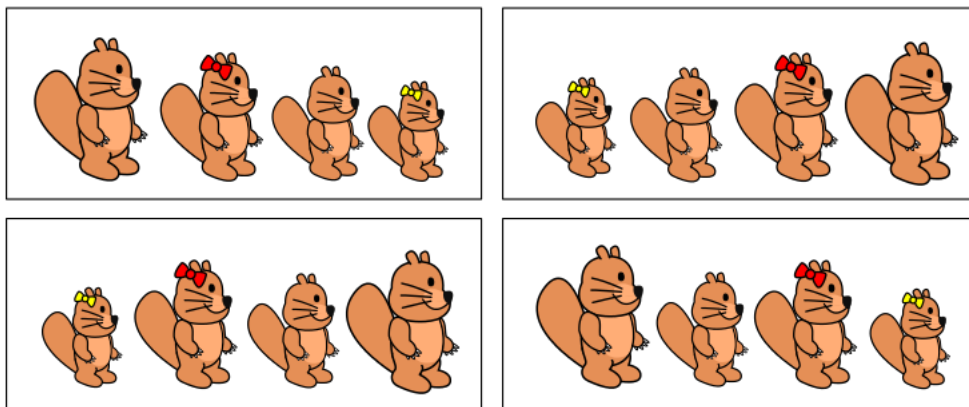


A Beaver family goes through three tunnels as shown.



In what order are they arranged in when they come out of the last tunnel?

Possible Answers:

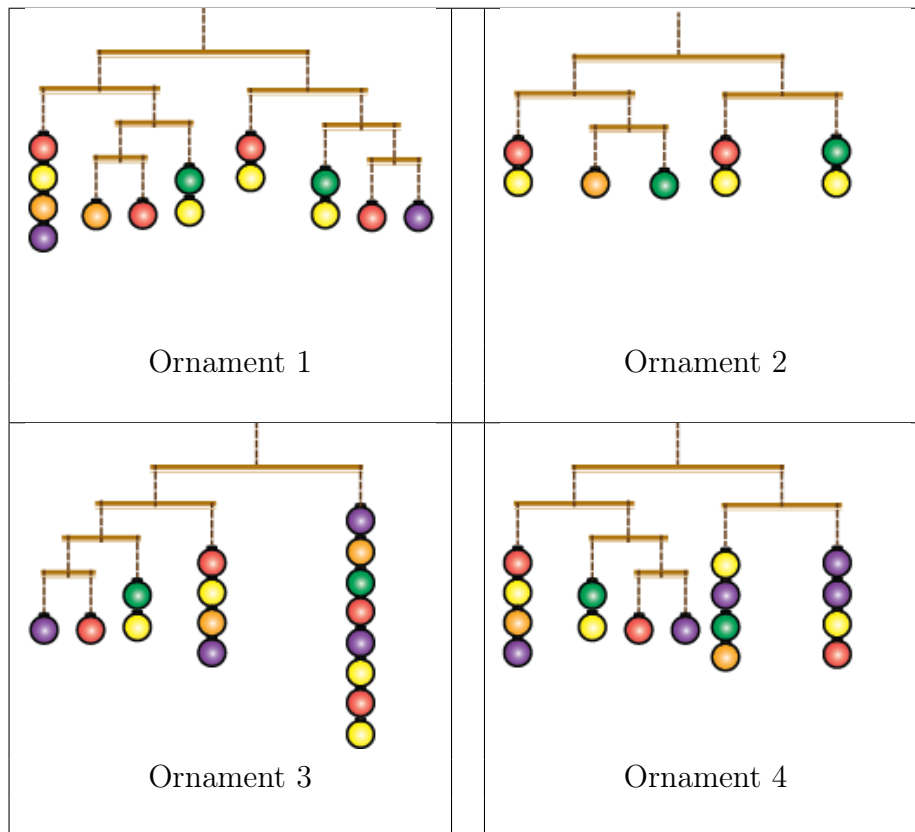


# Ornaments

## Question:

Holidays are almost here and Katy Beaver is preparing four ornaments.

Katy plans to make them from wooden sticks (which will be horizontal pieces), threads (to connect balls to sticks) and small balls (to make the ornament look pretty). She has prepared four sketches. Unfortunately, one of them will not hang as nicely as she imagines.



We can ignore the mass of sticks and threads. All balls have equal mass. An ornament is *well-balanced* if the number of balls hanging on the left side and the right side of each stick is equal.

**Which ornament is not well-balanced?**

## Possible Answers:

- Ornament 1
- Ornament 2
- Ornament 3
- Ornament 4

## Deletion Game

### **Question:**

Bob the Beaver plays a game against Sam the Squirrel.

At first Bob removes four numbers from the list 1, 2, 3, 4, 5, 6, 7, 8.

Then Sam deletes two of the remaining numbers.

Bob wants the positive difference between the remaining two numbers to be as large as possible. Sam wants this positive difference to be as small as possible. Both Bob and Sam know what the other player is trying to achieve.

**What is the positive difference between the last two numbers if both Bob and Sam play as well as possible?**

### **Possible Answers:**

1

2

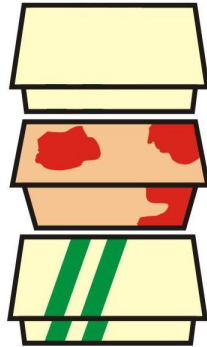
3

4

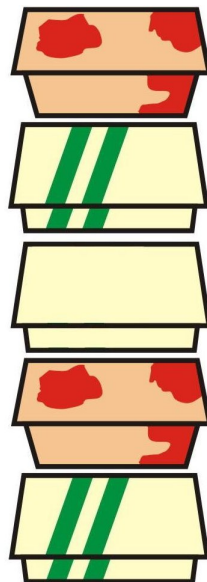
# Burgers

## Question:

Tim and Tom are working at a burger restaurant. Tim cooks burgers one at a time. After cooking a burger, he places it into one of three different boxes: one with stripes, one with a pattern and one plain box. If he has cooked three burgers, he would have a stack as follows:



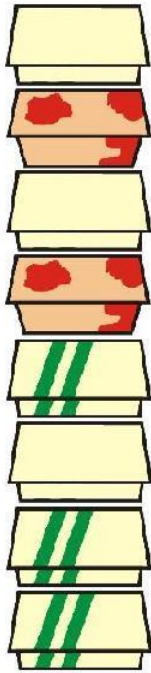
If he cooked two more burgers, he would have a stack like:



As Tim cooks a burger, he places that box on the top of the stack of not yet sold burgers, and continues to cycle through the three different boxes (stripe, pattern, plain, stripe, pattern, plain, ...) into which to place the burger.

Tom is selling the burgers one at a time and always takes the uppermost box from the stack. Tim is cooking faster than Tom can sell the burgers.

After some time, Tom has sold some burgers and Tim has cooked more burgers. Suppose the stack of unsold burgers looks like the following:



What is the fewest number of burgers sold by Tom?

**Possible Answers:**

- 4
- 5
- 6
- 7

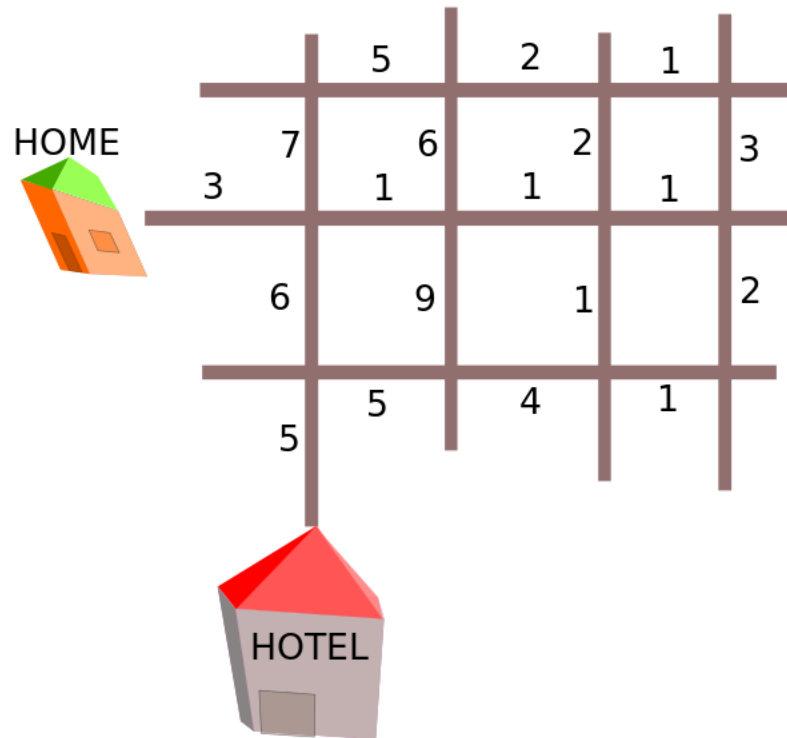


## No Turning Left!

### Question:

Betty the Beaver uses the roads in Beaver City to get from the Hotel to Home as fast as possible. However, her car cannot turn left!

The travel time (in minutes) between intersections in Beaver City is shown below.



How long does Betty take to get from Hotel to Home?

### Possible Answers:

- 35 minutes
- 33 minutes
- 32 minutes
- 30 minutes

## Measuring Cups

### **Question:**

You have a set of measuring cups. The sizes of the cups are: 8000 mL, 4000 mL, 2000 mL, 1000 mL, 500 mL, 250 mL and 125 mL. You have filled the 4000 mL, 1000 mL, 500 mL, 250 mL and 125 mL cups with flour.

Your sister also has an identical set of measuring cups of exactly the same sizes. She has filled the 125 mL, 500 mL and 2000 mL cups with flour.

Your father has a third identical set of measuring cups of exactly the same sizes. His cups are initially all empty.

All the flour from your cups and your sister's cups are put into your father's cups such that each of his cups are either full or empty.

**What is the fewest number of your father's cups that are full?**

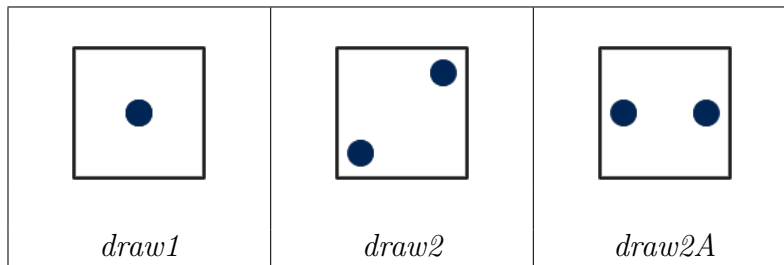
### **Possible Answers:**

- 1
- 2
- 3
- 4

# Dice

## Question:

You have a machine that draws black circles on a white square to create the face of a die. Your machine is quite simple; instead of using 6 different patterns (one for each possible face of a 6-sided die), it only uses four commands. The result of three of these commands (*draw1*, *draw2* and *draw2A*) are shown below:



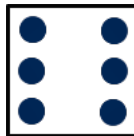
The fourth command, *turn90*, turns the face by 90 degrees clockwise. For example, we can perform the two commands *draw2A*, *turn90* to produce the following face:



As another example, we can perform the sequence of commands *draw1*, *draw2*, *turn90* to produce this face:



Which sequence of commands could have been used to draw this face *exactly* as shown below?



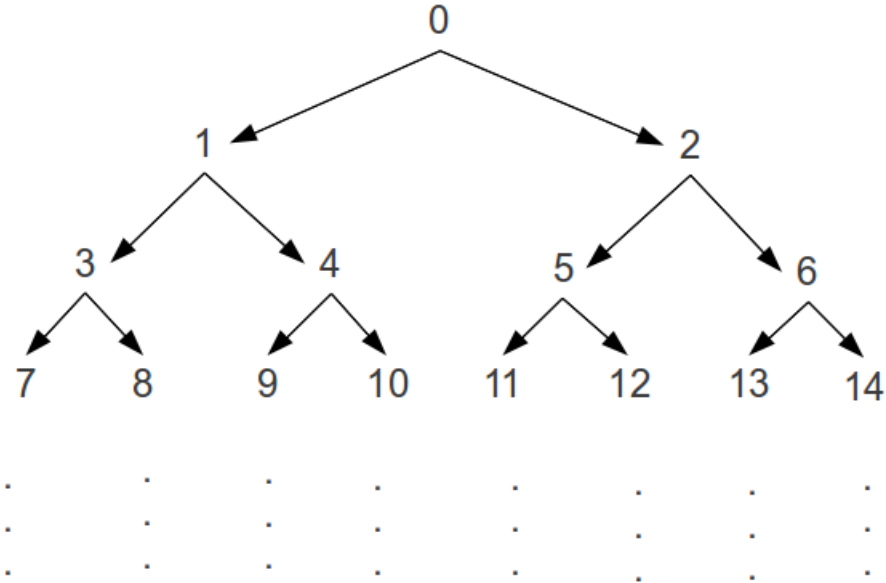
## Possible Answers:

- draw2A*, *turn90*, *draw2*, *draw1*
- draw2A*, *draw2*, *turn90*, *draw2*
- draw2*, *draw2A*, *turn90*, *draw2*
- draw2*, *turn90*, *draw2*, *draw2A*

## Descend the Tree

### Question:

Your friend writes down all of the integers starting from 0 to 2046 in the following way:



Specifically, below every number there are two numbers: one on the left and one on the right. For example, below 3, the number 7 is on the left, and the number 8 is on the right. The numbers can be read in increasing order from the top row to bottom row and from left-to-right within a row.

Notice that we can get from 0 to 11 by going right (R) (from 0 to 2), left (L) (from 2 to 5) then left (L) (from 5 to 11).

**Starting at 0, what sequence of left (L) and right (R) moves will end up at 100?**

### Possible Answers:

LRRLRR

RLLRLR

RLLRLR

LLRRLR

## Putting People in Line

### Question:

You are arranging people in order based on the numbers on their shirts. The order to start is:

7 3 2 9 8 5 1 4 6

You will arrange individuals using the following technique:

- Look at two consecutive people at a time, starting from the left.
- If the person on the left has a number which is larger than that of the person on the right, switch the positions of those two people; otherwise, leave them in the order they are in.
- Move to the right one position, so that you are comparing one new person with one of the people just compared, and repeat the above comparison and potential swap.

Once you have compared the right-most two people in the list, we call this one “pass” over the list.

**How many passes over the list are required until the list is in the order**

1 2 3 4 5 6 7 8 9?

### Possible Answers:

2  
4  
6  
9

# Trees in the Forest

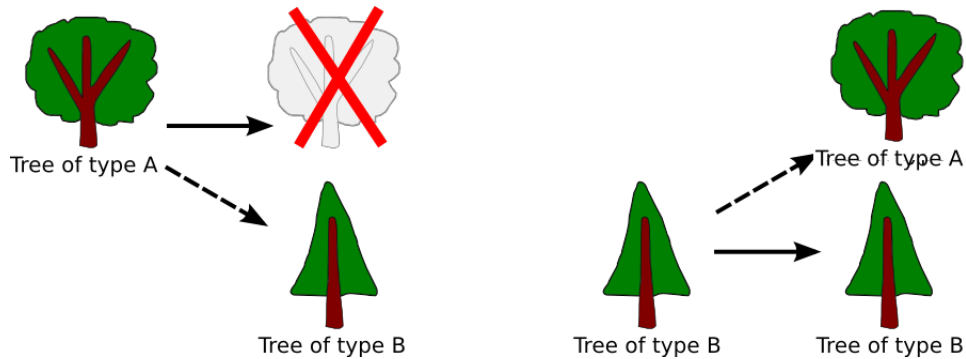
## Question:

In a forest, there are two types of trees.

Type A trees live for only one year, but after this year, they transform into a tree of type B.

Type B trees live forever and produce a new tree of type A at the end of every year.

These two scenarios can be illustrated as follows, with each arrow representing the transformation at the end of one year.



For example, if we start with one type A tree, after one year there will be one type B tree in the forest. Similarly, if we start with one B tree, there will be one type A tree and one type B tree in the forest after one year.

**If we start with just one type A tree in the forest, how many type A trees and type B trees will there be after 10 years?**

## Possible Answers:

34 A trees, 20 B trees

54 A trees, 144 B trees

34 A trees, 55 B trees

121 A trees, 55 B trees

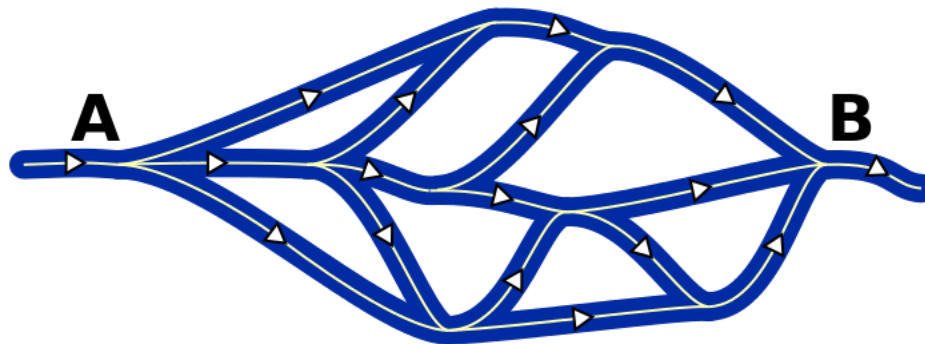
## River Inspection

### Question:

Beavers want to explore the system of rivers below.

At least one beaver has to swim along each river.

Due to the heavy current, beavers can only swim downstream and they can only do one trip from A to B. So the beavers start at A, and meet at B.



What is the minimum number of beavers needed to explore the system of rivers?

Possible Answers:

- 3
- 4
- 5
- 6

## Visiting Friends

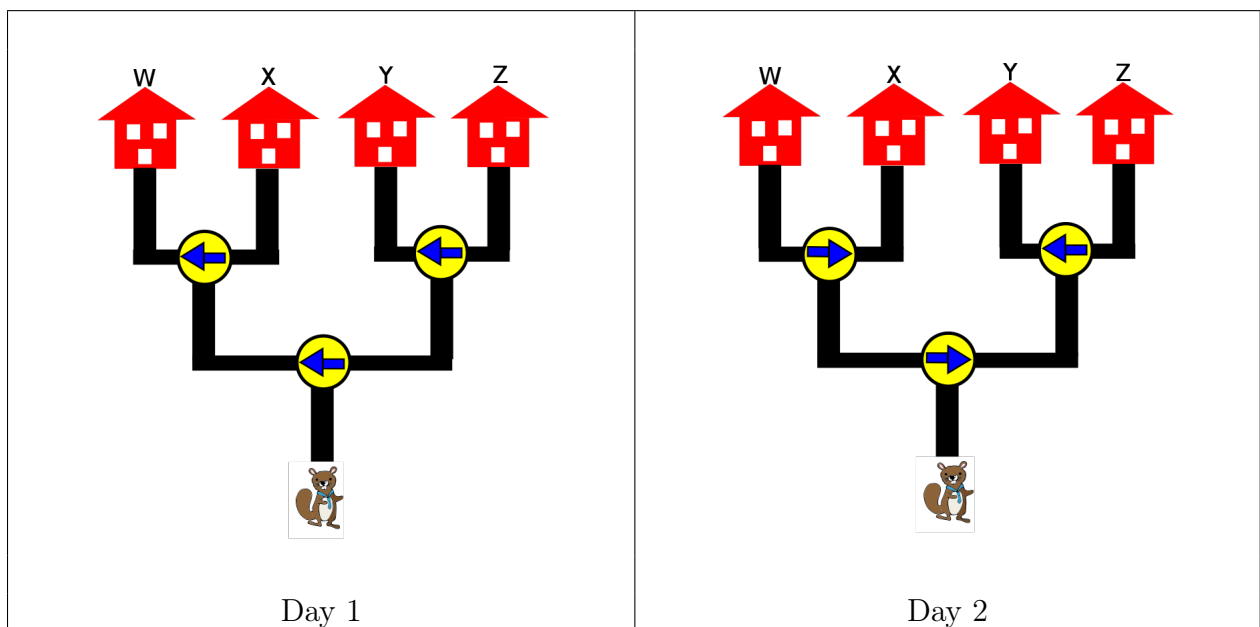
### Questions:

Mr. Beaver has 4 friends living in different villages, and he plans to visit one of these friends every afternoon.

Mr. Beaver will follow the direction of the arrow on signs at each intersection.

Initially, all arrows point to the left road. When passing an intersection, Mr. Beaver switches the arrow to the opposite direction.

For example, on Day 1, Mr. Beaver takes the road on the left at the first intersection, takes the left road on the second intersection, and reaches Village W. On Day 2, Mr. Beaver turns right at the first intersection, then left at the second intersection, and arrives Village Y.



Which village will Mr. Beaver visit on day 30?

### Possible Answers:

- Village W
- Village X
- Village Y
- Village Z