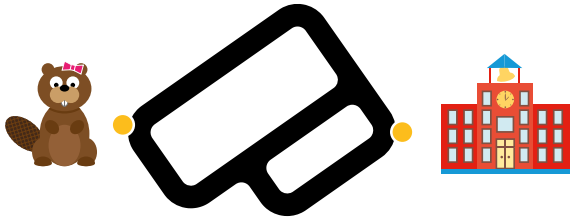
How Many Routes

BEBRAS Australia

Beaver Jane regularly walks to school.
Jane likes to change her route each day, but she only takes paths to the school that are most direct.



Question

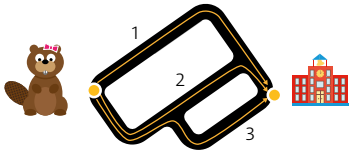
How many different routes can Jane take to school?

1 2 3 4 5 6

This question comes from the UK

Answer

The correct answer is 3



Explanation

Beaver Jane can walk to school using three different routes. Each route uses a different combination of roads but all three pathways lead her to the school.

Computational Thinking: Abstraction

digital careers

Birdhouse

BEBRAS Australia

You are building a birdhouse for a friend who has given you these instructions:
"I would like a birdhouse with 2 windows and a heart".

Question

Which birdhouse fits those rules?

1 2 3 4

This question comes from Romania

Answer

House 3

Explanation

House 1 is not correct because it has only one window and two hearts.

House 2 is not correct because it has two windows, but no heart.

House 4 is not correct because it has only one window.

Computational Thinking: Abstraction

digital careers

Bebras Unplugged | Beginner
INSTRUCTIONS: Print in colour single sided | Cut on the solid line | Fold on the dotted line | Stick together

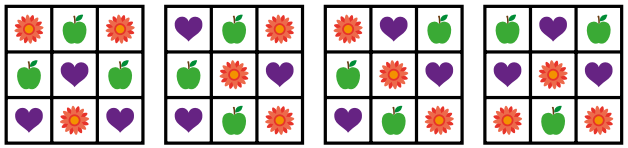
Sudoku

BEBRAS Australia

Benjamin is asked to fill a box with different shapes. The box has 9 sections.

Rules: There must be only one of the same shape in each row.
There must be only one of the same shape in each column.

Benjamin has four goes!



A B C D

Question

Which of the following boxes is correct?

A B C D

This question comes from Hungary

Answer

C is correct according to the rules

Explanation

A is wrong because there is at least 1 column with two of the same shapes.

B is wrong because there is at least 1 row with two of the same shapes.

D is wrong because there is at least 1 row with two of the same shapes.

Computational Thinking: Abstraction

digital careers

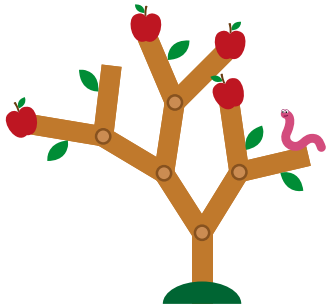
Worm

BEBRAS Australia

A worm is sitting at the end of the branch of the tree shown to the right.

It wants to eat all the apples by moving through the tree's branches.

Each branch section is made of 1m long sections.



Question

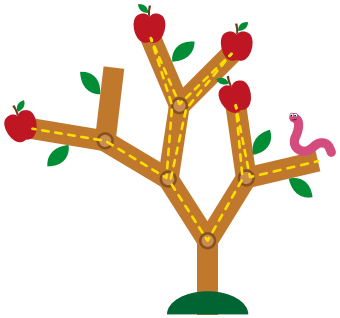
What is the shortest distance, in metres, that the worm has to crawl to eat all the apples?

4m, 9m, 13m or 15m

This question comes from Slovenia

Answer

The correct answer is 13.



Explanation

The worm has to reach all the apples.
4m and 9m are not the correct answers, because it is not possible to reach all apples passing 4 or 9 branch parts only. A path with a length of 13m allows the worm to reach all the apples. First it has to reach the closest apple and then the remaining three apples. Notice, it does not matter in which order the worm will reach the remaining apples. The 15m long path is too long.

Computational Thinking: Modelling and Simulation

digital careers

Bebras Unplugged | Beginner
INSTRUCTIONS: Print in colour single sided | Cut on the solid line | Fold on the dotted line | Stick together

Parking Lot

BEBRAS Australia

There are 12 spaces for cars in a parking lot.
Each space is labelled with a number.

The pictures below show which spaces were used on Monday and which spaces were used on Tuesday.

Monday

Tuesday

Question

How many parking spaces were empty both on Monday and Tuesday?

3 4 5 6

This question comes from Canada

Answer

4 spaces were empty on both Monday and Tuesday as can be seen in the image below.

Explanation

Only spots 13, 16, 18 and 19 did not have a car parked in them.

Computational Thinking: Abstraction

CSIRO digital careers

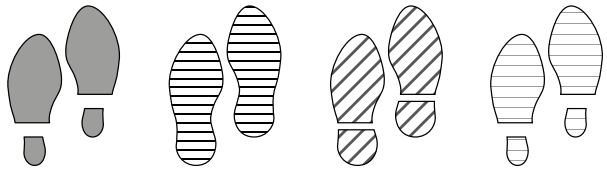
Shoe Prints

BEBRAS Australia

Four footprints have been found in the mud.

The police are looking for a robber who wore shoes with these properties:

- The soles have a stripey pattern
- The heel is thin



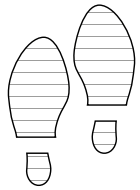
Question

Which shoe print would match the robber?

This question comes from Turkey

Answer

Shoe print 4



Explanation

If you look at all the shoe prints in the question, only the shoe print shown has both thin heels and a stripey sole.

Computational Thinking: Abstraction

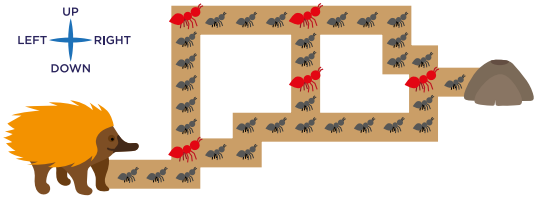
CSIRO digital careers

Bebras Unplugged | Beginner
INSTRUCTIONS: Print in colour single sided | Cut on the solid line | Fold on the dotted line | Stick together

Ant Hill Scramble

BEBRAS Australia

Edna the echidna wants to go to the anthill.
To get there she must collect all the lager, red ants.



A Right, up, right, down, right, up, right
B Right, up, right, up, right up, right, down, right, down, right
C Right, up, right, up, left, down, right
D Right, up, right, down, right, down, right

Question

What set of commands would get Edna all the red ants?

A B C D

This question comes from Australia

Answer

A

Explanation

All answers begin with Edna walking right from the starting point, but only A collects all red ants and ends up at the ant hill.

B can't be right as the path described does not collect all red ants.

C and D can't be right as the paths as they do not follow the line of ants.

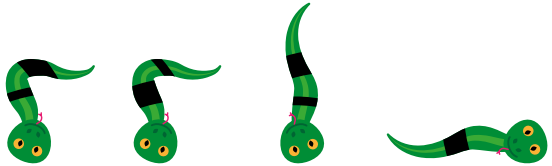
Computational Thinking:
Algorithms

CSIRO digital careers

Snake Samba

BEBRAS Australia

Sally the snake is coming up with a dance.



Question

Which image comes next in the dance?

A B C D

This question comes from Australia

Answer

C

Explanation

A, B & D can't be right as it does not follow the pattern as the tail of the snake changes position in each dance step: it is either a straight or bent after the other. The small black stripe swaps to be over or under the wide black stripe in each alternate move and in each second dance step the snake rotates (90 degrees) in a clockwise direction.

To meet all of these rules the next dance step the head of the snake points in new direction (down), with the tail remaining unmoved (straight), and the black small stripe moves over the wide black stripe.

Computational Thinking:
Pattern Recognition

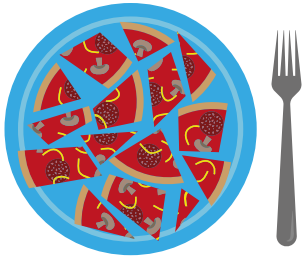
CSIRO digital careers

Bebras Unplugged | Beginner
INSTRUCTIONS: Print in colour single sided | Cut on the solid line | Fold on the dotted line | Stick together

Pizza

BEBRAS Australia

Lucilla is learning how to eat pizza. Here are her Mum's rules:
Pieces with crust should be eaten with hands.
Pieces without crust should be eaten with a fork.



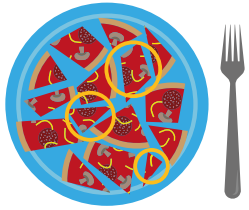
Question

How many pieces of pizza should be eaten with a fork?

This question comes from Italy

Answer

Three pieces



Explanation

The image shows the only three pieces that have no crust which would be eaten with a fork.

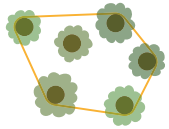
Computational Thinking: Abstraction

digital careers

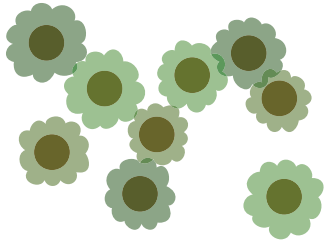
Trees in a Circle

BEBRAS Australia

The green circles on the right show the position of six trees. Joni has tied a rope around them shown by the yellow line.
Only five trees are touched by the rope.



Example



Question

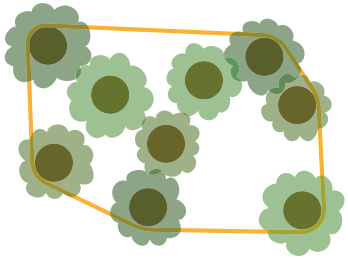
If the trees shown on the right are wrapped with a rope in the same way, how many trees will be touched by the rope?

4 5 6 7

This question comes from Canada

Answer

6 trees



Explanation

The image shows that six trees would be looped if a rope was extended around the trees around the outside of the group.

Computational Thinking: Modelling and Simulation

digital careers

Bebras Unplugged | Beginner
INSTRUCTIONS: Print in colour single sided | Cut on the solid line | Fold on the dotted line | Stick together

Rubbish Robots

BEBRAS Australia

A park is divided into rectangles. The number in each rectangle represents the number of pieces of rubbish left there by visitors.

The park rangers have two robots, Anton and Boris, who collect all the rubbish they find in every rectangle they enter.

The robots were given the following instructions:

First, robot Anton was sent:

↑ = upwards ↑ = upwards ← = left

Next, robot Boris was sent:

↑ = upwards ↑ = upwards ← = left

Question

How many pieces of rubbish will Boris collect?

3 9 11 12

This question comes from Slovakia

Answer

9 pieces of rubbish

Explanation

Boris will collect 3, then 6, then 0, for a total of 9.

The last square that Boris lands in will have 0 pieces in it as Anton, who goes first, would have already collected them.

Computational Thinking: Evaluation

CSIRO digital careers

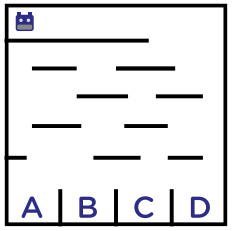
Falling Robot

BEBRAS Australia

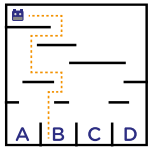
A robot moves through a vertical maze. The maze consists of various platforms. The robot begins in the upper left corner and then moves to the right.

When it reaches the end of a platform, it falls down onto the platform below.

As soon as the robot lands it changes direction. Eventually the robot reaches one of the buckets at the bottom of the maze.



The image on the right gives an example of how the robot will move down.



Question

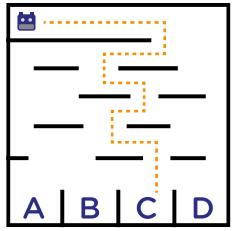
Which bucket will the robot reach in the maze?

A B C D

This question comes from France

Answer

C



Explanation

The robot follows the same basic rule, or algorithm when moving down the maze. This makes the robot fall in a pattern changing directions at each level of the maze.

Computational Thinking: Modelling and Simulation

CSIRO digital careers

Bebras Unplugged | Beginner

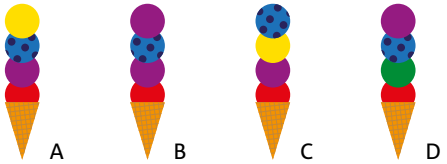
INSTRUCTIONS: Print in colour single sided | Cut on the solid line | Fold on the dotted line | Stick together

Ice Cream Machine

BEBRAS Australia

There is a special ice cream machine that creates cones with 4 scoops of ice cream.

It does so in an ordered way. Here you see, from left to right, the last 3 ice creams that the machine has made.



Question

Which ice cream will the machine produce next?

A B C D

This question comes from Germany

Answer

A

Explanation

The order of ice creams always follow a pattern:
yellow – blue – purple – red – yellow – blue – purple – red.

Applying this pattern you can see that A is the next ice cream in the pattern.

Computational Thinking:
Pattern Recognition

CSIRO digital careers

Broken Window

BEBRAS Australia

Six children were playing in the yard.
One of them threw a ball and broke Mr. Beaver's window.
Mr. Beaver only saw the back of the child running away.
The child had a red shirt and short dark hair.

Question

Who broke the window?

This question comes from Slovakia

Answer

John broke the window.

Explanation

Only three of the children wear a red shirt: Jane, John and Dan. But Jane has long blonde hair and Dan's hair is violet.

So, it had to be John.

Computational Thinking:
Decomposition

CSIRO digital careers

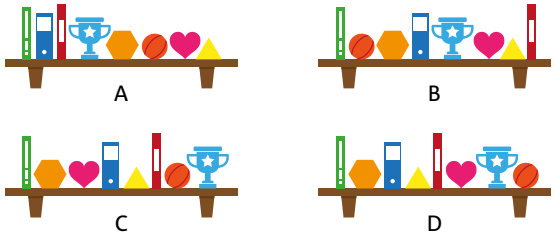
Bebras Unplugged | Beginner
INSTRUCTIONS: Print in colour single sided | Cut on the solid line | Fold on the dotted line | Stick together

Shelf Sort

BEBRAS Australia

Beatrix is trying to rearrange her shelf. She has two rules:

1. Rectangular items must not be next to each other.
2. Circular items must not be next to rectangular items.



Question

Which one of these shelves has followed her rules correctly?

A B C D

This question comes from Australia

Answer

D follows the rules correctly.

Explanation

A can't be right as there are rectangular objects together.

B can't be right as there is a circular object next to a rectangular object.

C can't be right as there is a circular object next to a rectangular object.

The only correct answer can be D as it follows the rules stated.

Computational Thinking: Algorithms

digital careers

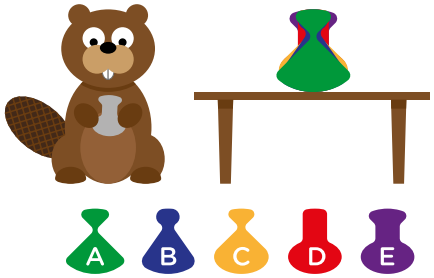
Bottles

BEBRAS Australia

A beaver puts five bottles on a table.

He places them so that every bottle has a bit showing.

He places the first bottle at the back of the table and puts each new bottle in front of those already placed.



Question

In what order are the bottles placed when they appear as shown in the picture?

E D C B A D B C A E E C D A B D C E B A

This question comes from the USA

Answer

E D C B A

Explanation

The bottles need to be sorted based on their shape and size. The wider the top or the middle of the bottle, the further back it is placed on the table.

Computational Thinking: Abstraction

digital careers

Bebras Unplugged | Beginner

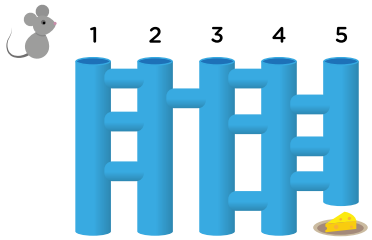
INSTRUCTIONS: Print in colour single sided | Cut on the solid line | Fold on the dotted line | Stick together

Tube System

BEBRAS Australia

A mouse wants to reach the cheese at the end of tube 5.
The mouse always follows these commands:

1. Go downwards until a crossing.
2. At the crossing, move through to the next vertical tube.
3. Go to command 1.



Question

In which tube should the mouse start so that it reaches the cheese?

1 2 3 4 5

This question comes from Austria

Answer

Tube 3

Explanation

The mouse must always follow the rules and move in the same pattern.

From tube 1 the mouse always reaches tube 3.

From tube 2 it reaches tube 1.

From tube 4 it reaches tube 2.

From tube 5 the mouse gets to tube 4.

Computational Thinking: Algorithms

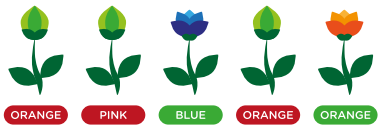
CSIRO digital careers

Flowers

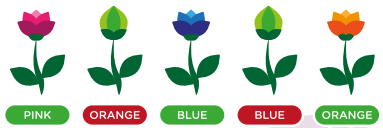
BEBRAS Australia

Jane is playing a guessing game on the computer.
Jane tries to guess the colour of five different flowers hidden within a bud. When Jane guesses the colour correctly the bud opens up and reveals the correct colour of the flower.

Jane's first go:



Jane's second go:



Question

What colours did the computer choose for the five flowers?

A. blue pink blue orange orange
B. pink blue blue blue orange
C. pink blue blue pink orange
D. pink pink blue pink orange

This question comes from Switzerland

Answer

C: pink blue blue pink orange

Explanation

The first flower was pink so answer A cannot be correct.

The second flower must be blue because the flower did not appear when pink and orange were guessed. So answer D cannot be correct.

The fourth flower must be pink because the flower did not appear when orange and blue were guessed. So answer B cannot be correct.

Computational Thinking: Decomposition

CSIRO digital careers

Bebras Unplugged | Beginner
INSTRUCTIONS: Print in colour single sided | Cut on the solid line | Fold on the dotted line | Stick together

Birthday Balloons

BEBRAS Australia

Mother Beaver bought ten balloons of three colours with the numbers as shown:

0 Green
1 Yellow
2 Red
3 Green
4 Yellow
5 Red
... etc.

Question

If Mother Beaver was born in the year 1983, can you pick the balloons in the correct order to show Mother Beaver's year of birth?

Yellow, Red, Green, Red
Yellow, Green, Green, Green
Yellow, Red, Red, Green
Yellow, Green, Red, Green

This question comes from Turkey

Answer

Yellow, Green, Red, Green

Explanation

The question states that the balloon with the number 1 on it will be yellow, and the 3 green. So we know the answer must start with yellow and end in green. If we continue the pattern, 6 is green, 7 is yellow, 8 is red and 9 is green. The answer therefore must be yellow, green, red, green.

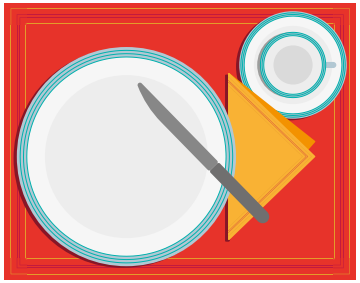
Computational Thinking: Abstraction

CSIRO digital careers

Setting the Table

BEBRAS Australia

Beaver Bob has set the breakfast table as shown in the picture, including a tablecloth, napkin, cup and saucer, a knife and a plate.



Question

In which order has he placed the objects on the table?

This question comes from Hungary

Answer

The tablecloth was placed first because all the other things are on top of it. The next item was the cup because the napkin is on top of the cup. The plate is on top of the napkin and the knife is on the plate.

Explanation

To find the object that was placed on the table first you can look at each object and ask the question, "is this object on top of something else?" If the answer is yes, the object was not the first item to be placed on the table.

Computational Thinking: Decomposition

CSIRO digital careers

Bebras Unplugged | Beginner
INSTRUCTIONS: Print in colour single sided | Cut on the solid line | Fold on the dotted line | Stick together