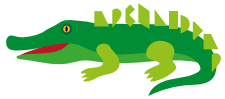
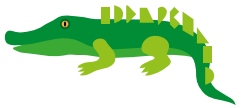
Crocodile Scales

BEBRAS Australia

Crocodile families all have the same sequence of scales running down their spines.

Cheryl and Charlie Crocodile belong to the same family and if they lose a scale, it can regrow.





A B C D E F

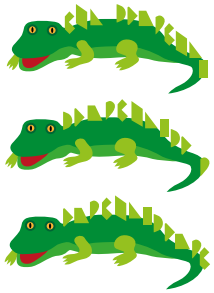
Question

Of the pictured crocodiles, which ones could be in the same family as Cheryl and Charlie?

This question comes from Australia

Answer

A, E and F



Explanation

B is incorrect because the scale pattern is backwards.

C can't be right because the pattern does not match.

D can't be right as there is one a scale missing in the spot there should be a half cross scale.

Computational Thinking: Pattern Recognition

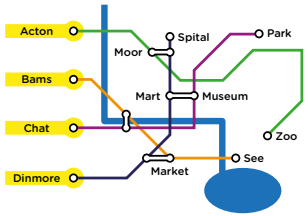
CSIRO digital careers

Subway

BEBRAS Australia

A train system consists of four train lines that start at the stations: Acton, Bams, Chat, and Dinmore.

John went to the Zoo. He changed train lines exactly once at Moor, Museum, Mart or Market.



Question

Which station did he start his journey from?

Acton, Bams, Chat or Dinmore

This question comes from Taiwan

Answer

The answer is Dinmore.

Explanation

If John starts at Acton, he will not transfer. Two transfers are needed if John starts at Bams or Chat.

Computational Thinking: Evaluation

CSIRO digital careers

Bebras Unplugged | Intermediate

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

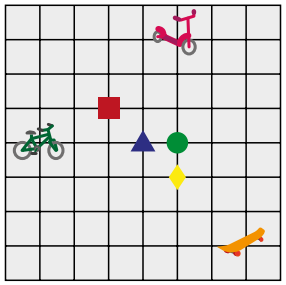
Three Friends

BEBRAS Australia

Three friends want to meet. The map on the right shows where they will start from.

Bob is on his bike, Alice is on her skateboard and Jenny is on her scooter.

They want to meet at either the square, triangle, circle or diamond and they can only travel along any of the gridlines horizontally or vertically. The distance from Alice (on her skateboard) to the blue triangle is 6.



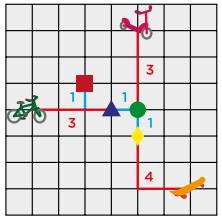
Question

Which meeting place should they choose so that the total distance the three friends must travel is the shortest possible?

This question comes from Vietnam

Answer

They meet at the green circle.



Explanation

By calculating the total distance to each location, we can calculate the shortest distance.

Red square is: 4 + 3 + 8 = 15

Blue triangle is: 4 + 3 + 6 = 13

Green circle is: 3 + 4 + 5 = 12

Yellow diamond is: 4 + 5 + 4 = 13

Computational Thinking: Modelling and Simulation

CSIRO digital careers

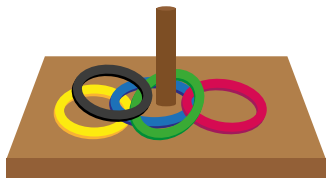
Ring Toss

BEBRAS Australia

Sarah is playing the game Ring Toss.

For each round she has 5 rings to try to throw around a peg.

Every ring that successfully lands around the peg scores points, but not every throw is worth the same number of points and a missed throw scores no points:



THROW	POINTS
1st throw	5
2nd throw	4
3rd throw	3
4th throw	2
5th throw	1

Question

Sarah threw her five rings as shown.

How many points did she score?

This question comes from Malaysia

Answer

Rings landed: blue and green.
Total of 6 points.

Explanation

As blue is on top of the yellow ring, and under the others, it scored 4 points.

As green is on top of all but the black ring, it was the 4th throw, and scores 2 points.

Computational Thinking: Abstraction

CSIRO digital careers

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

Flowers

BEBRAS Australia

A flower shop sells the following types of flowers: 

The flowers come in white, yellow or blue.

Clara wants a bunch of six flowers. She tells the florist:

- There must be two of each of the colours yellow, white and blue
- Flowers of the same type must not have the same colour
- There should be no more than two of each type of flower

A B C D

Question

Which of the following bunches will Clara be happy with?

This question comes from Switzerland

Answer

D

Explanation

D is the only bunch that meets all the stated rules.

Computational Thinking: Decomposition

CSIRO digital careers

Message Service

BEBRAS Australia

Violet wants to send a message to Leo with the help of some beavers and some cards.

She breaks the message into groups of, at most, 3 letters on each card. She then gives one card to each beaver.

Violet knows that sometimes the beavers get distracted while transporting their cards, and they arrive at different times. Therefore, Violet also numbers the cards in the correct order before giving them to the beavers. Leo must then put then back in order to read the message.

Example: To send the message DANCETIME, Violet creates these 3 cards:

[1] DAN [2] CET [3] IME

Leo received the following sequence of cards from the beavers:

[3] KEY [5] CKS [2] HOC [1] GET [4] STI

Question

What was the original message that Violet sent to Leo?

This question comes from Switzerland

Answer

[1] GET [2] HOC [3] KEY [4] STI [5] CKS

Explanation

The original message was GETHOCKEYSTICKS after the cards are put in numerical order and words are constructed.

Computational Thinking: Decomposition

CSIRO digital careers

Bebras Unplugged | Intermediate

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

Beaver Tournament

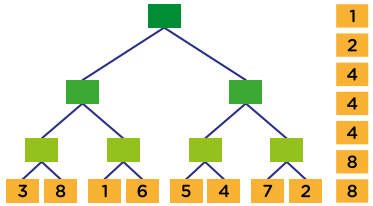
BEBRAS Australia

Beaver Krešo watched a tournament of races and recorded the winners of each stage on the board below.

The runners wore the same numbers, from 1 to 8, throughout the tournament.

Krešo used numbered cards to represent each runner.

When the tournament was over his younger brother Tomo mixed up all the cards, except those from the first stage of the tournament.



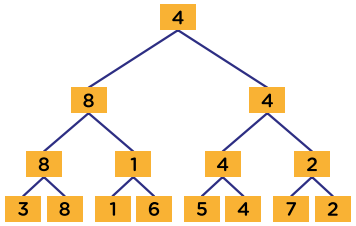
Question

Which runner won the race?
Who was their final competitor?

This question comes from Croatia

Answer

Runner 4 won and their final competitor was Runner 8.



Explanation

The more races a runner won, the more frequently their card will appear in the pile. Runners from round one would not have their card in the pile.

To fill the results, we need to look at which of the two competitors of each race numbers are among the remaining cards.

Computational Thinking: Abstraction

CSIRO digital careers

Five Sticks

BEBRAS Australia

Adam has five sticks. He puts them on the table and creates this shape:

Nola comes to the table. She takes one stick and puts it in a different place:

Then Bob comes to the table, he also takes one stick and puts it in a different place.

Question

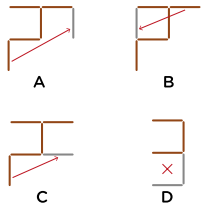
Which shape did Bob not make?

A B C D

This question comes from Slovakia

Answer

D



Explanation

As the image shows, D would require the movement of more than one stick to produce the D shape.

Computational Thinking: Abstraction

CSIRO digital careers

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

News Editing

BEBRAS Australia

There are 10 students working on the school's newspaper.

Every Friday they write or edit their own articles.

On the plan the orange cells show when the students need a computer.

During any one hour, only one student at a time can work on a computer.

Students	Hours	8:00	9:00	10:00	11:00	12:00	13:00	14:00
	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10							

Question

What is the minimum number of computers needed for all of the students to work according to the plan shown above?

This question comes from Hungary

Answer

5 computers

Students	Hours	8:00	9:00	10:00	11:00	12:00	13:00	14:00
	1		PC 3	PC 3				
	2			PC 1	PC 1	PC 1	PC 1	
	3	PC 1	PC 1					
	4					PC 3	PC 3	PC 3
	5		PC 4	PC 4				
	6				PC 2	PC 2		
	7			PC 5	PC 5	PC 5	PC 5	PC 5
	8		PC 5					
	9	PC 2	PC 2	PC 2				
	10						PC 2	PC 2

Explanation

The table shows the arrangement that works with the minimum number of computers.

Computational Thinking: Decomposition

digital careers

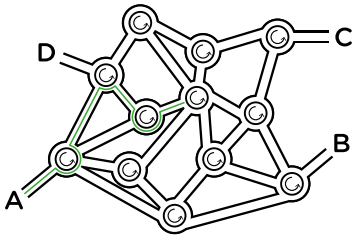
Roundabout City

BEBRAS Australia

In Roundabout City, the navigation software does not give instructions like:

- At the next roundabout, take the 4th exit
- At the next roundabout, take the 1st exit
- At the next roundabout, take the 2nd exit

Instead, it gives you a sequence of numbers, like "4 1 2" which would make you go the way seen to the right.



Question

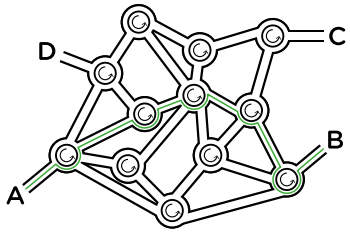
If you were given these instructions 3 1 3 2 3 which of the lettered exits would you end up at?

Remember that Roundabout City drives on the right, and move around the roundabout in an anticlockwise direction.

This question comes from Slovenia

Answer

Exit B



Explanation

As shown in the image that follows the stated rules, exiting at the 3rd exit then the 1st exit and following the pattern.

Computational Thinking: Abstraction

digital careers

Bebras Unplugged | Intermediate

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

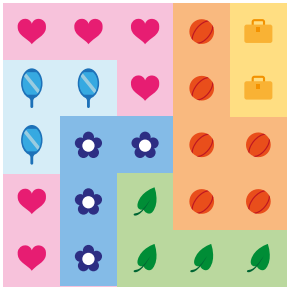
Painting Wallpaper

BEBRAS Australia

Robyn is wallpapering.

She uses rectangular wallpaper pieces of different sizes.
Each wallpaper piece has only one colour with one pattern on it.

Sometimes, Robyn covers part of one piece of wallpaper with a new rectangular piece.



Question

In which order has Robyn placed the wallpaper?

This question comes from the USA

Answer

Explanation

The yellow wallpaper with the briefcases is the only wallpaper that isn't cut off by another one, so that should be the last one.

The suitcase cuts off the basketball wallpaper only, meaning it was placed second last. From there the basketball wallpaper cuts off the leaf wallpaper, the leaf wallpaper cuts off the flower wallpaper, the flower wallpaper cuts off the mirrors and the mirrors cut off the hearts.

Computational Thinking: Abstraction

digital careers

Party Guests

BEBRAS Australia

To arrange a dinner party Sara the beaver needs to talk to five friends: Alicia, Beat, Caroline, David and Emil.

Sara can talk to Emil right away. However, to talk to her other friends, there are a few points to consider:

1. Before she talks to David, she must first talk to Alicia
2. Before she talks to Beat, she must first talk to Emil
3. Before she talks to Caroline, she must first talk to Beat and David
4. Before she talks to Alicia, she must first talk to Beat and Emil

Question

If Sarah wants to talk to all of her friends, who would she speak to first and last?

This question comes from the Czech Republic

Answer

Emil is the only friend that doesn't need to be spoken to after another, so he must go first. Caroline is spoken to last.

Explanation

As Caroline depends on both Beat and David, Beat depends on Emil, David depends on Alicia, and Caroline must be last

Computational Thinking: Decomposition

digital careers

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

Beaver Code

BEBRAS Australia

Barbara has been given two stamps.
With one she can produce a little flower, with the other a little sun.
Being a clever girl, she thinks of a way to write her own name by using the code below:

Letter	B	A	R	E	Y
Code	✿	☀☀	☀✿☀	☀✿✿✿	☀✿✿☀

So Barbara becomes: ✿☀☀☀✿☀✿☀☀☀✿☀☀☀

She then writes the names of her friends.
Unfortunately, they all got mixed up.

☀☀☀✿☀☀✿✿☀☀☀ ☀☀✿✿☀✿✿☀

✿☀☀☀✿☀☀✿☀☀✿✿☀ ☀✿☀☀☀☀✿✿☀

Question

Which code above reads Abby?

This question comes from Switzerland

Answer

✿☀☀✿☀✿✿☀

Abby ✿☀☀✿☀✿✿☀
Arya ✿☀☀☀✿☀☀✿☀☀☀
Barry ✿✿☀☀☀✿☀☀✿☀☀✿☀
Ray ✿☀✿☀☀☀☀✿✿☀

Explanation

Only Abby starts with an A and a B and so we look for a code with two suns and a flower at the start.

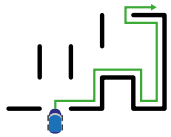
Computational Thinking:
Decomposition

digital careers

Mazes

BEBRAS Australia

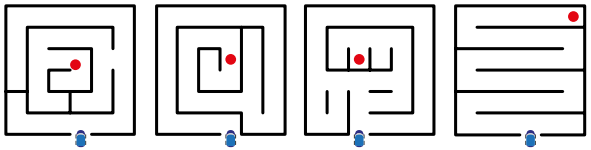
A robotic car uses a simple rule to drive through a maze:
Turn right whenever possible.



Question

In how many of the following mazes will the car reach the red dot if it uses this system?

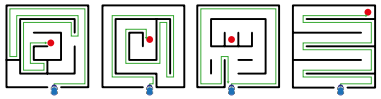
A B C D



This question comes from Belgium

Answer

Three, only Maze C doesn't reach the dot.



Explanation

Only Maze C results in the red dot never being reached when following the rules.

Computational Thinking:
Algorithms

digital careers

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

Secret Recipe

BEBRAS Australia

Esther has asked Ivan to cook a special cake made of five ingredients. She has put labels next to the ingredients in the garden. One ingredient has no label.

The labels tell Ivan which ingredient must be added next in the sequence.

The garden looks like this:

Question

Which ingredient should be added first?

This question comes from Hungary

Answer

The red flower.
The first added ingredient must be the one with no image referring to it.

Explanation

If Esther starts with the red flower, she can add all five ingredients in the right order.

Choosing the strawberry, she could not have continued to the next as there is no paper with it.
The apple is not correct because if she had started with the apple, she would have skipped the red flower.
The pine cone is not correct because if she had started with the cone, she would have skipped the red flower and the apple.

Computational Thinking: Decomposition

CSIRO digital careers

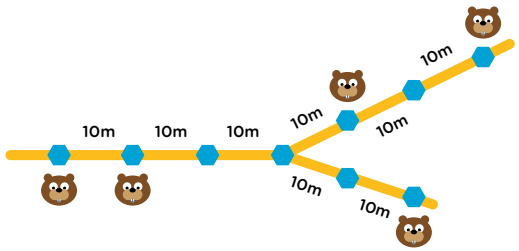
Bus Stop

BEBRAS Australia

The lodges of five beavers are shown on the map below.

The beavers want to put a bus stop in one of the places marked by blue hexagons. All the hexagons are 10m apart.

The beavers decide that the sum of the distances from their lodges to the bus stop must be as small as possible.

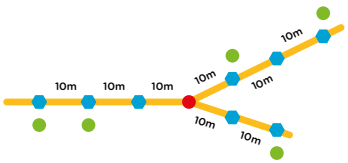


Question

What is the best place to put a bus stop?

This question comes from Ukraine

Answer



Explanation

The best place to put a bus stop is at the red dot in the image. This minimises the distance for the most number of beavers. With the maximum distance being 30m. In any other location, the maximum distance would be larger than 30m for at least one beaver.

Computational Thinking: Abstraction

CSIRO digital careers

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

Trains

BEBRAS Australia

The train lines in Beaver City all have their own number.

Unfortunately the numbers are only shown on this map.

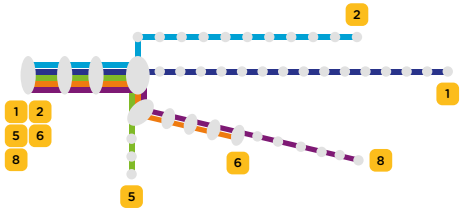
When you are on a train you cannot see the line number anywhere!

You board a train at the main station where all the lines begin.

After three stations your train makes a turn.

At the next station it makes another turn.

Four stations later you have arrived at your destination.



Question

Which train line are you on?

This question comes from Hungary

Answer

Line 6

Explanation

The first turn eliminates Line 1.

The second instruction (a turn at the next stop) eliminates Line 5.

The only destination at the end of the four stops is Line 6.

Computational Thinking: Abstraction

CSIRO digital careers

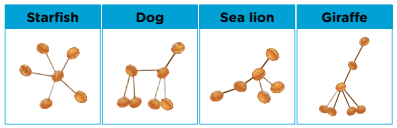
Walnut Animals

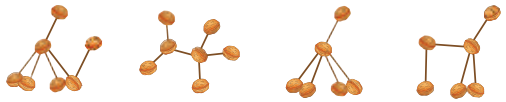
BEBRAS Australia

Gerald was playing in the woods.

He used nuts and sticks to create four nice animals.

His sister managed to bend the animals around without removing any of the sticks, producing the following shapes:



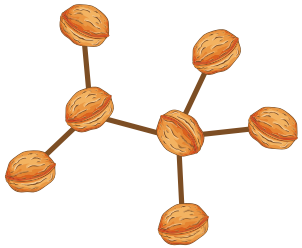


Question

Which of the following figures can be bent back to make the figure of the dog again?

This question comes from the Czech Republic

Answer



Explanation

By looking at the connections for each part of the animal and transforming around the connections we can see a the similarities in the connections and the patterns develop. All of the other arrangements would not lead to the dog shape being produced.

Computational Thinking: Modelling and Simulation

CSIRO digital careers

Bebras Unplugged | Intermediate

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

Geocaching

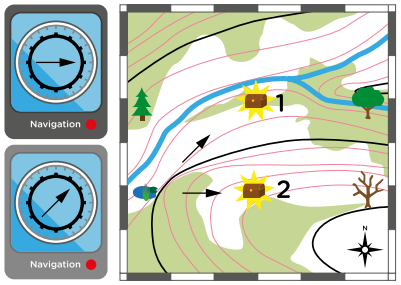
BEBRAS Australia

Two friends, Anna and Bob, are searching for treasure.

They have a smartphone app that shows them the direction to the treasure they are looking for. The two boxes on the map show where the treasure is.

Anna is searching for box 1.
Bob is looking for box 2.

Anna and Bob are standing in the same place. The picture shows the map and a screenshot of the smartphones.



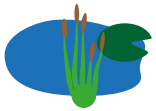
Question

At what landmark are they standing?

This question comes from the Czech Republic

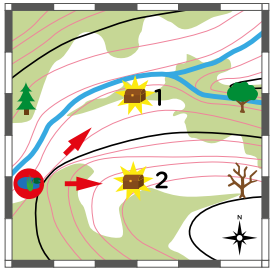
Answer

The pond



Explanation

Both locations on the right of the screen would not match the placed boxes. Of the two left landmarks, only one allows both Anna and Bob to collect the treasure.



Computational Thinking: Decomposition

CSIRO digital careers

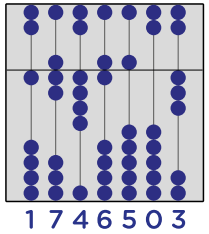
Abacus

BEBRAS Australia

A number is represented on a Chinese abacus by the position of its beads.

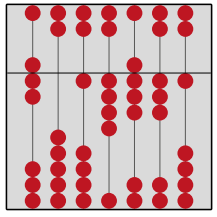
The value of a bead on the top part is 5; the value of a bead on the bottom part is 1. The abacus is reset to zero by pushing the beads away from the centre.

To represent the number 1,746,503 the appropriate beads are moved towards the centre of the abacus:



Question

What number does the following abacus represent?



This question comes from Switzerland

Answer

7,014,831

Explanation

By adding the values of the beads that are nearest to the centre of the abacus the answer shown can be obtained.

Computational Thinking: Algorithms

CSIRO digital careers

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

Only Nine Keys

BEBRAS Australia

Daniel is sending text messages from his old phone. For every letter he has to press the proper key once, twice, three or four times, followed by a short pause.

In order to type ‘C’ he has to press the number 2 key three times because ‘C’ is the third letter written on this key.

In order to type ‘HIM’ he has to press the number 4 key twice, followed by the number 4 key three times and finally the number 6 key once.

Question

Daniel presses exactly six times to enter the name of a friend. What is the name of his friend?

Miriam, Iris, Emma, or Ina?

This question comes from the Czech Republic

Answer

Ina

Explanation

MIRIAM requires 12 taps: M=1, I=3, R=3, I=3, A=1, M=1.

IRIS requires 13 taps: I=3, R=3, I=3, S=4.

EMMA requires 5 taps: E=2, M=1, M=1, A=1.

INA requires 6 taps: I=3, N=2, A=1.

So INA is the correct name.

Computational Thinking: Abstraction

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Loading Lisas

BEBRAS Australia

Two fishermen own two boats, named “Lisa 1” and “Lisa 2”.
Each boat can hold a maximum cargo of 300kg.

The fishermen are given barrels filled with fish to transport.
On each barrel is a number that shows how heavy the barrel is in kilograms.

You must make sure that neither boat is overloaded.

Question

What is the maximum possible load of fish that can be carried?

This question comes from Germany

Answer

Max weight 590kg

Explanation

If you try to load heavy barrels first, you will end up at 220+60=280 kilos and 130+120=250 kilos which is only 530 kilos total.

There is only one way to make 300: 120+90+90, so a weight higher than 590kg is not possible.

Computational Thinking: Evaluation

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