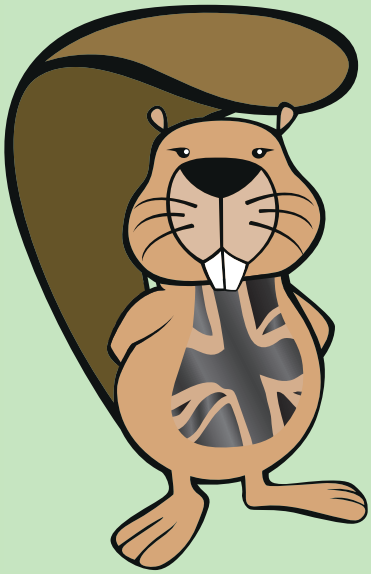
Google

UNIVERSITY OF OXFORD



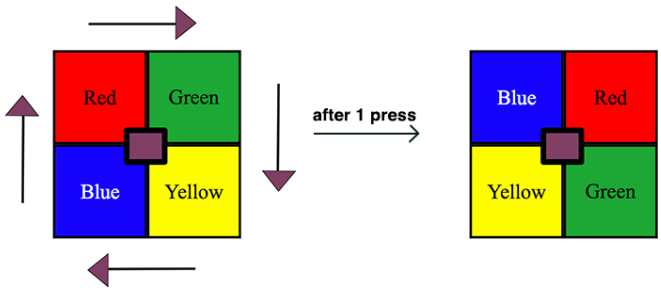
UK Bebras Computational Thinking Challenge

2018

Answers

www.bebras.uk

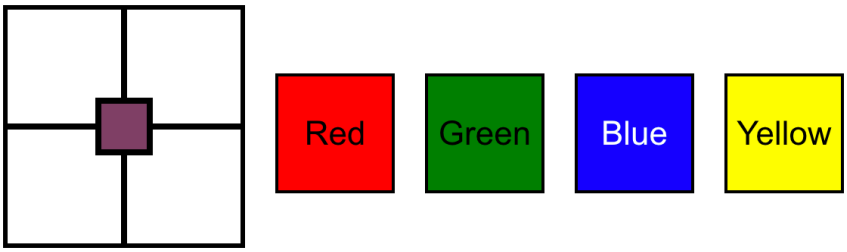
Here is a simple push square game. The colours rotate every time the centre button is pressed:



Task:

If we press the button one more time, where would the red, blue, green and yellow squares be?

Drag and drop the colours into their correct places.



Shoe Prints

Kits: A Intermediates:
Castors A Seniors:
Juniors: Elite:

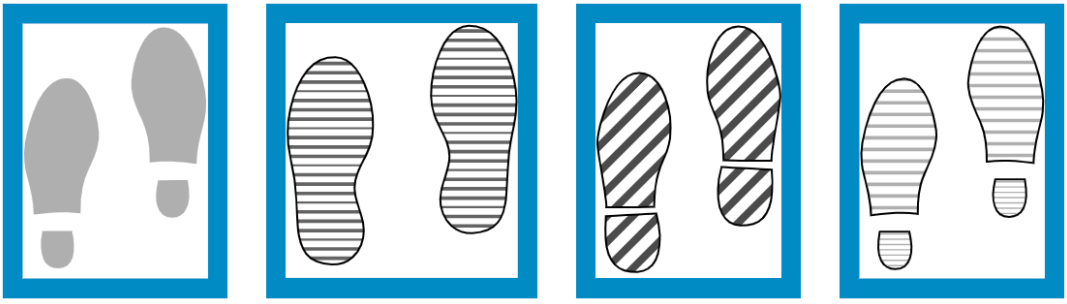
Four footprints have been found in the mud.

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

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

Question:

Choose the set of shoe prints that could belong to the robber.



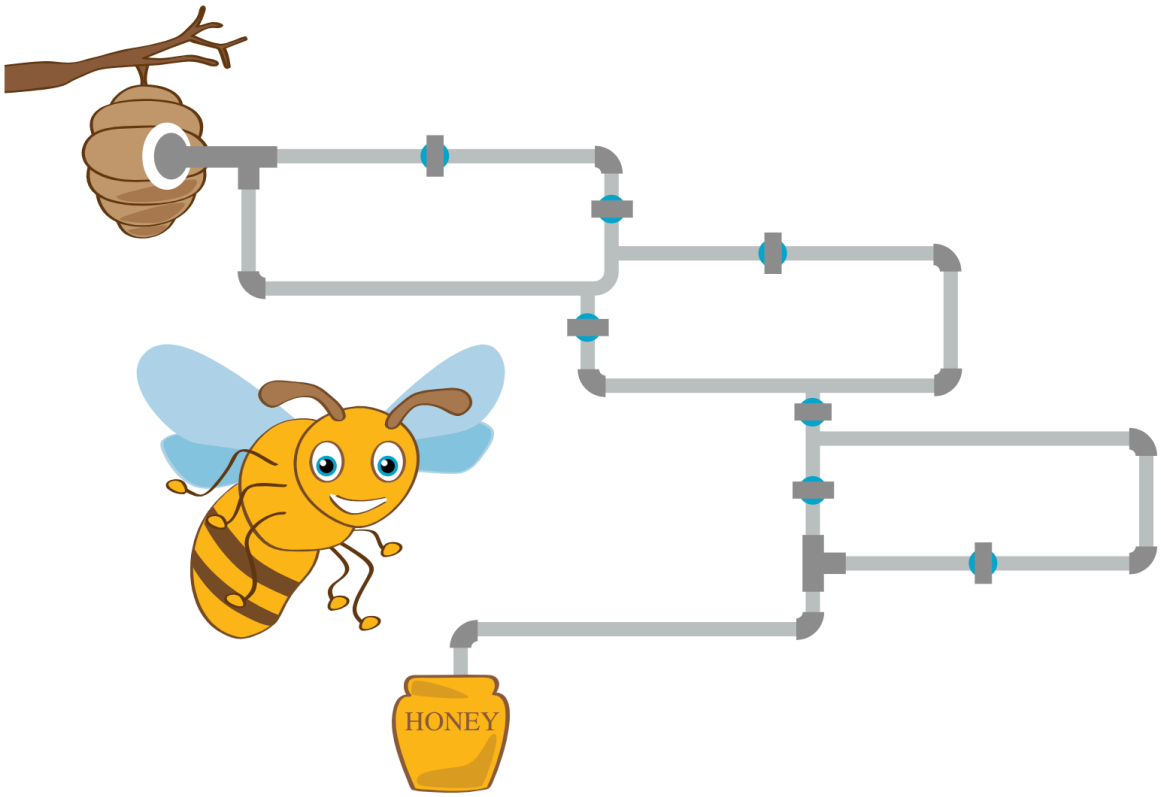
Honey Pot

Kits: B
Castors: A
Juniors:
Intermediates:
Seniors:
Elite:

Bertie the bee has to fill the honey pot as quickly as he can.

Bertie can open and close the taps ( ) in the pipes below by clicking on them.
By doing this he can control which way the honey flows.

Task:
Click on the taps to make the honey reach the pot by the shortest possible path.



Pizza

Kits: A
Castors: A
Juniors:

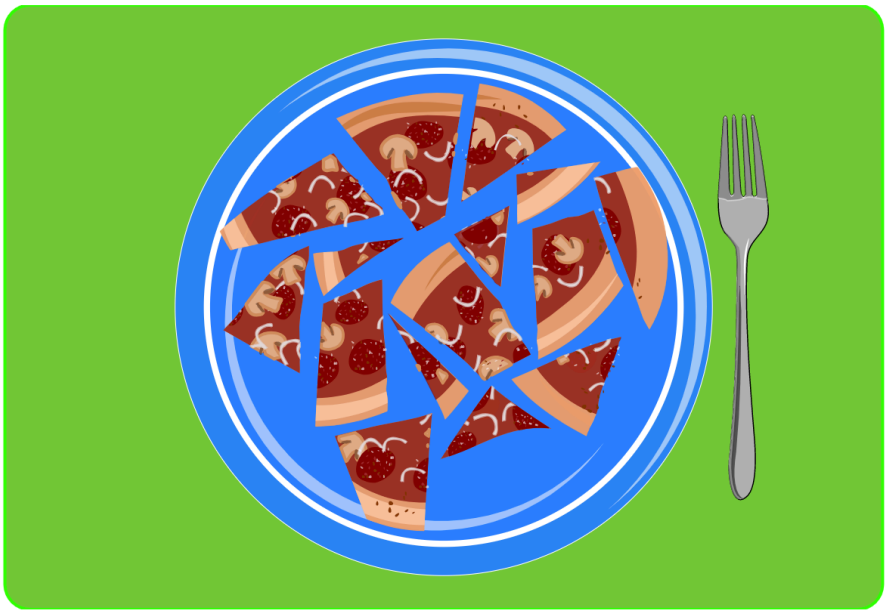
Intermediates:
Seniors:
Elite:

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.

Task:
Select all of the pieces of pizza that Lucilla should eat with her fork.

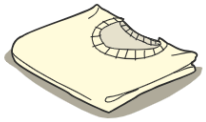


Pile of Clothes

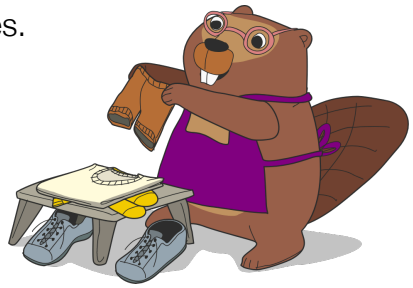
Kits: B
Castors:
Juniors:

Intermediates:
Seniors:
Elite:

These are Bruno's clothes:

shirt	vest	trousers	underwear	braces	socks	shoes
						

Beaver Dad carefully arranges little Bruno's clothes, into four piles.



Bruno puts on his clothes in the order that they are in the pile, starting from the top.
Bruno wants to wear the braces over his shirt.

Question:
Choose a pile of clothes that Bruno will be happy with.

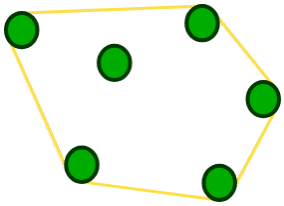
Trees in a Circle

Kits: B Intermediates:
Castors: Seniors:
Juniors: Elite:

Example:

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

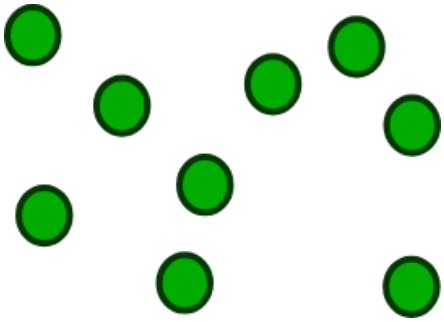
Only 5 trees are touched by the rope.



Question:

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

4 5 6 or 7

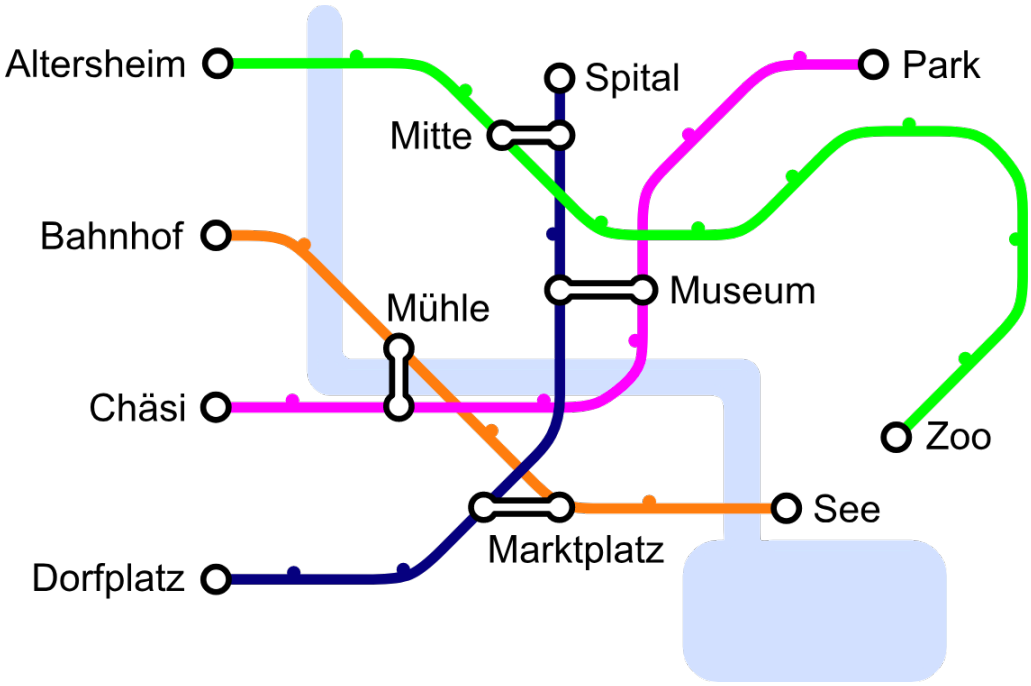


Subway

Kits:
Castors: C
Juniors:

Intermediates:
Seniors:
Elite:

A train system consists of 4 train lines that start at the stations:
Altersheim, Bahnhof, Chäsi, and Dorfplatz.



There are also four transfer stations: Mitte, Museum, Mühle and Marktplatz.
Transfer stations allow passengers to change from one train line to another.

John went to the Zoo. He changed train lines exactly once.

Question:
At which station did John start his journey?

Altersheim Bahnhof Chäsi or Dorfplatz

One Hour One Task

Kits:
Castors:
Juniors: B
Intermediates: A
Seniors:
Elite:

The beavers have a robot that can perform many tasks.

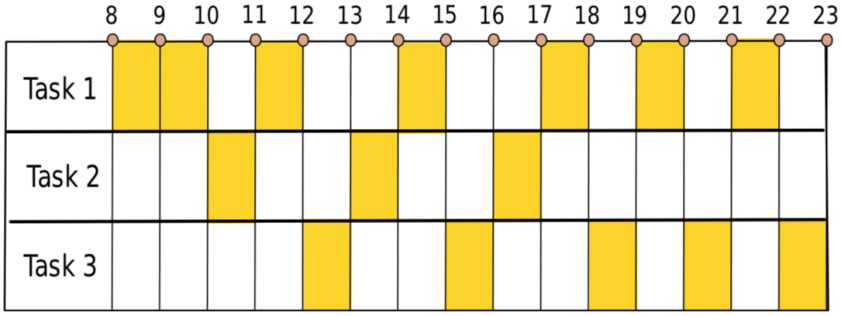
In any one hour, the robot can work on only one task. At the end of each hour it checks if it has received a new task:

If yes, the robot must begin work on that new task immediately.

If no, the robot continues working on the task which has been left the longest.

Example:
The following timetable shows an example of the robot's work in one day.

Task 1: a 7-hour task, received at 8:00
Task 2: a 3-hour task, received at 10:00
Task 3: a 5-hour task, received at 12:00

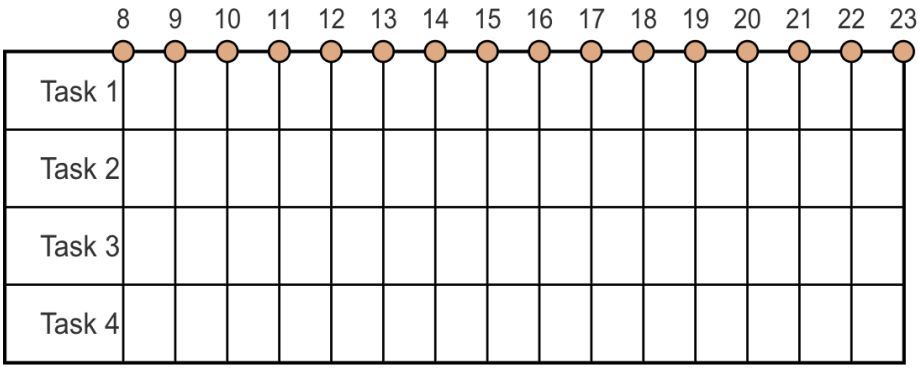


The robot finished Task 1 at 22:00, Task 2 at 17:00, and Task 3 at 23:00.

Question:
The robot was given 4 new tasks:

Task 1: 5-hours long, received at 8:00
Task 2: 3-hours long, received at 11:00
Task 3: 5-hours long, received at 14:00
Task 4: 2-hours long, received at 17:00

Show the schedule the robot will follow by clicking on the appropriate cells below.



Rubbish Robots

Kits:
Castors: B
Juniors: A

Intermediates:
Seniors:
Elite:

The picture shows the map of a park divided into rectangles. The number in each rectangle represents the number of pieces of litter left there by visitors.

The park keepers have two robots, Anton and Boris, who collect all the litter 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

1	3	1
0	2	6
0	1	3
1		
	Anton	Boris

Question:

How many pieces of litter will Boris collect?

3 9 11 or 12

Three Friends

Kits: Intermediates:
Castors: Seniors:
Juniors: A Elite:

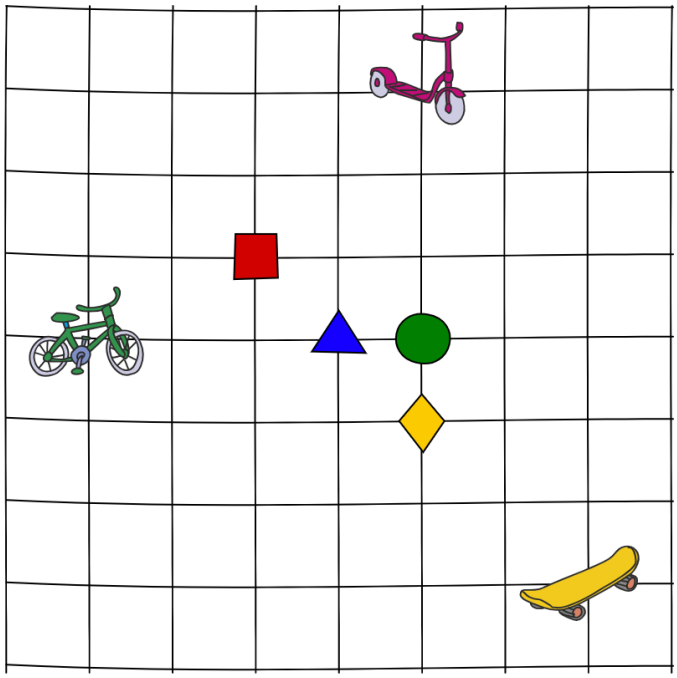
Three friends want to meet.

The map below shows where they are at the moment.
Bob is with his bike, Alice is on her skateboard and Jenny is with her scooter.
They want to meet at either the square, triangle, circle or diamond.

Distances are measured by: Adding up the distance travelled horizontally and vertically along the gridlines.

Example:
The distance from Alice (on her skateboard) to the blue triangle is 6.

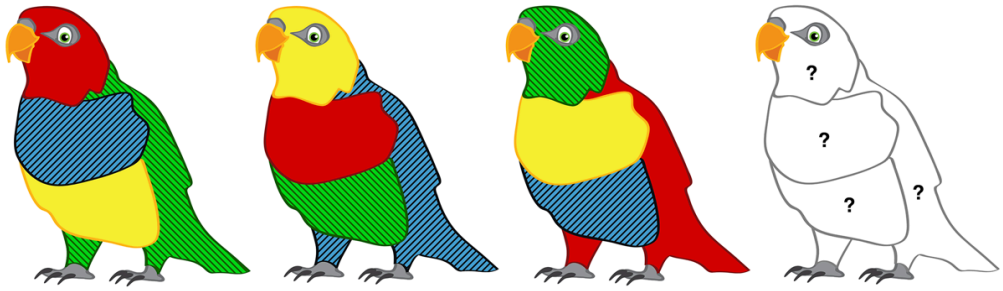
Task:
Which meeting place should they choose so that the total distance the three friends must travel is the shortest possible?



Bird Colours

Kits:	C	Intermediates:	
Castors:	B	Seniors:	
Juniors:	A	Elite:	

The Rainbow Parrot, has had four chicks.

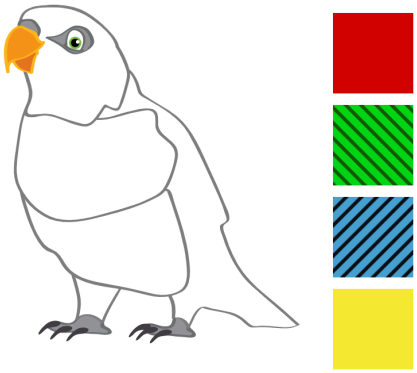


Each young parrot has four colours: red, blue, green and yellow.
Each colour in a parrot must be in a different part of the body to the other parrots.

Question:

Based on the first three chicks, what colour patterns will the fourth have?

Drag and drop the colour patterns onto the body on the right.



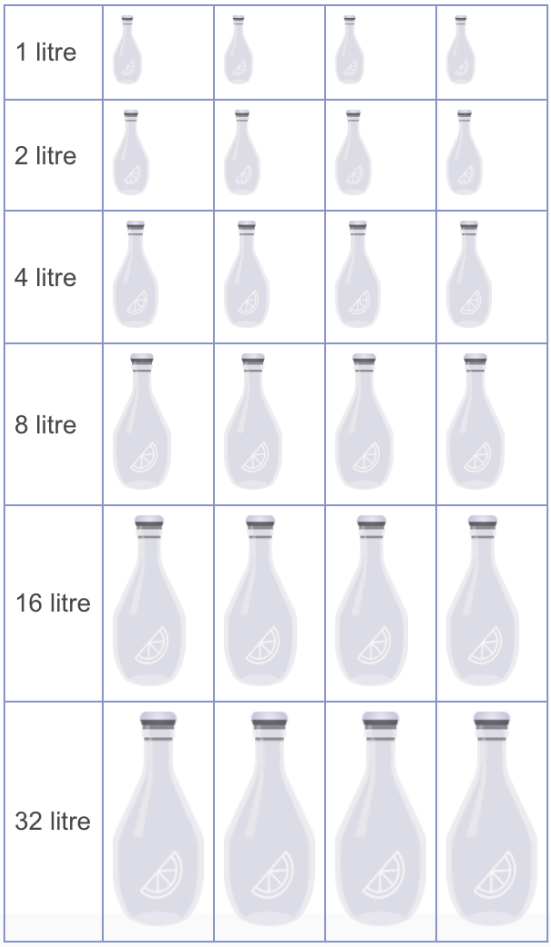
Lemonade Party

Kits:
Castors:
Juniors: A
Intermediates: A
Seniors:
Elite:

Janet made 37 litres of lemonade at home and now she wants to take it to school for a celebration.

Janet wants to take all 37 litres in bottles.
She has several empty bottles with various sizes but she wants to use the smallest number of them.

Task:
Click on the bottles that she should use.



Email Message

Kits:
Castors: B
Juniors: A
Intermediates:
Seniors:
Elite:

You have received an email to your school email address:

Subject: Update Your Information!
Message: Please send your ID number and password, or your account will be closed.

Question:
Which are the best two actions to take:

1. Reply with your ID number and password.
2. Reply with a made up ID number and password.
3. Delete the e-mail without replying.
4. Send your ID number and password to some of your friends.
5. Tell a school teacher or your parents about this email.

1 & 5 2 & 4 2 & 5 or 3 & 5

Flowers

Kits:	C	Intermediates:	
Castors:	B	Seniors:	
Juniors:	B	Elite:	

A flower shop sells the following types of flowers:


gladiolus


lily


tulip


rose

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.

Question:

Which of the following bunches will Clara be happy with?

Roomsharing

Kits: Intermediates:
Castors: Seniors:
Juniors: B Elite:

The members of the Girls' Computer Club are planning a weekend trip.
They will stay in a hostel with large rooms, that can take a maximum of six guests each.
But who will share rooms with each other?

Each girl submits her room sharing wishes on a card saying:

- which other girls she absolutely wants to share a room with (+)
- which other girls she definitely does not want share a room with (–)

The club president wants to keep all members happy. So she must assign the girls to rooms and fulfil all their room sharing wishes.

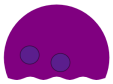
Task:
Help the club president assign the girls to their rooms, drag the wish-cards into one of the rectangles.
(The rectangles represent different rooms.)

Emma +: -: Alina	Lara +: -: Emma	Alina +: Lilli -:	Mia +: Emma, Zoe -:	Lilli +: -: Lara	Zoe +: -: Alina

Infinite Ice-cream

Kits: Intermediates: A
Castors: Seniors:
Juniors: Elite:

There are two ice-cream sellers. They use the same four flavours:

 ,  ,  and 

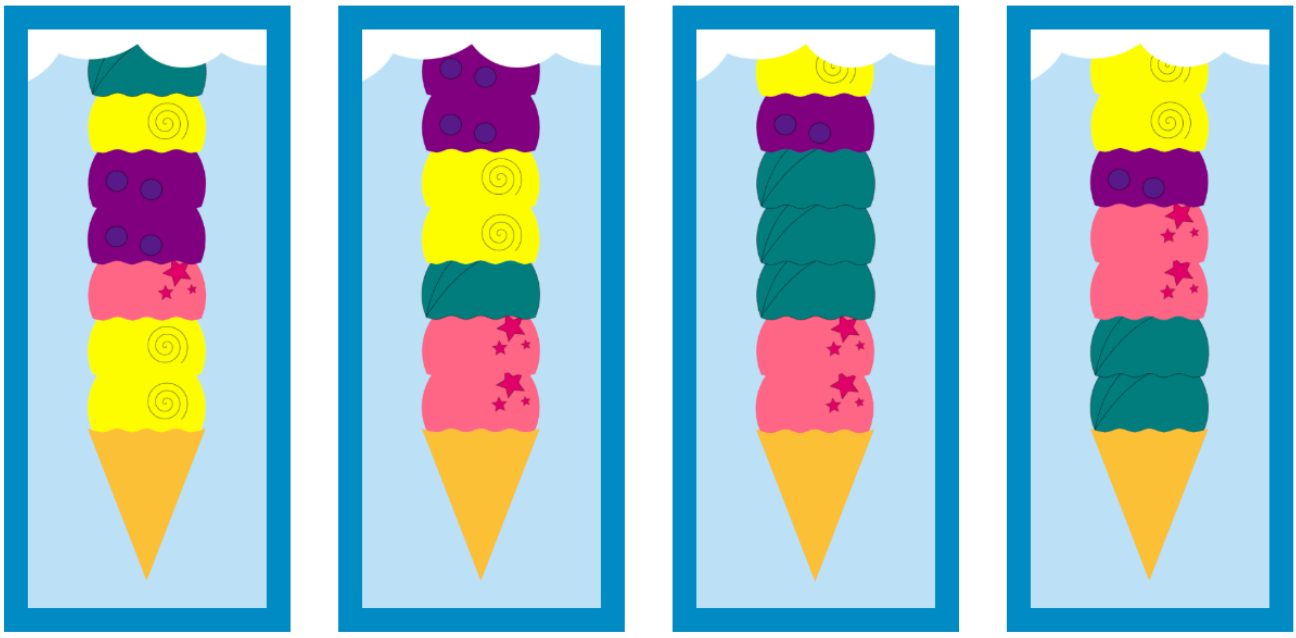
The first seller uses the following instructions to make ice-cream:

1. Start with an empty cone.
2. Pick a flavour at random, and add two scoops of that flavour.
3. Add one scoop of any different flavour.
4. If the requested height is reached, stop, otherwise go to Step 2.

The second ice-cream seller does not follow any instructions.

Question:

You can only see the first few scoops of the ice-cream cones below. Which one is certainly from the second seller?



Mutation of an Alien

Kits: Intermediates:
Castors: Seniors: A
Juniors: Elite:

An alien has a head, a body, two arms, and two legs.

The alien can be transformed through the following mutation commands:
(It is possible that the shape of a part is mutated more than once.)

Mutation Commands

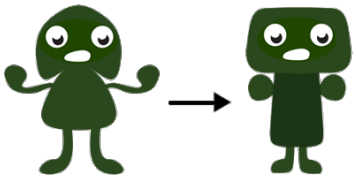
H(C): change head to , H(S): change head to , H(T): change head to

B(C): change body to , B(S): change body to , B(T): change body to

A(+): make arms long , A(-): make arms short

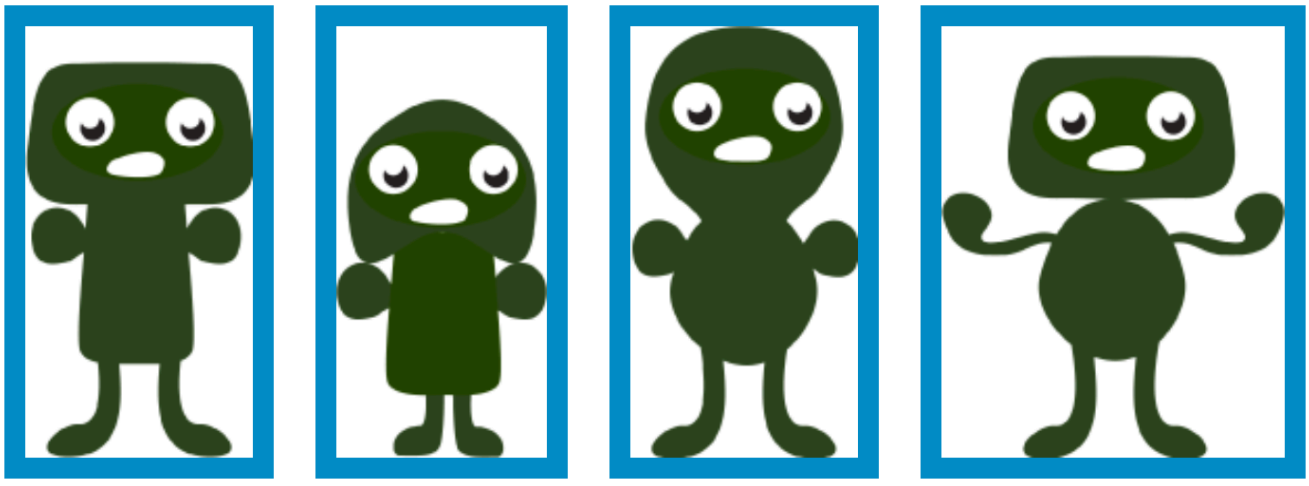
L(+): make legs long , L(-): make legs short

Example:
Transformation example for H(S), B(S), A(-), L(-):

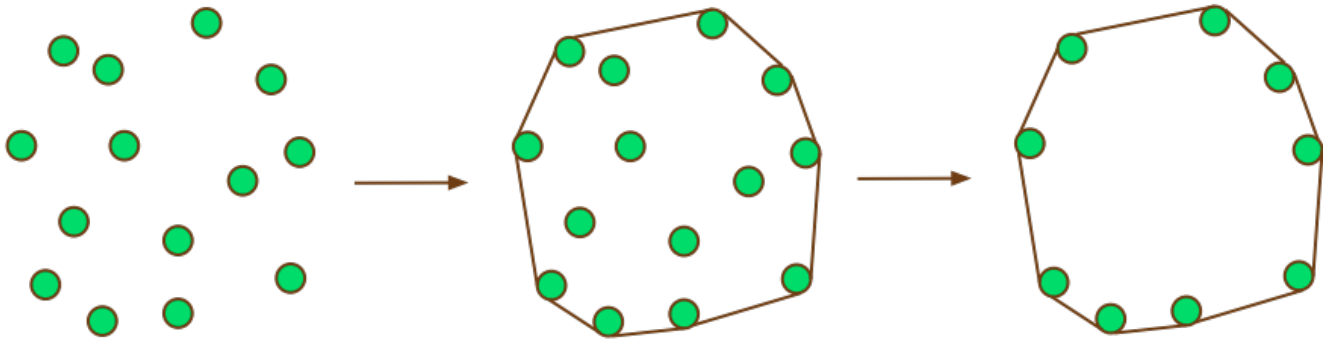


Question:
What will the alien look like after receiving the following commands?

H(T), L(+), B(T), A(+), H(C), A(-), B(C)



Beavers surround their village with a rope around the trees on the outside of the village. They then cut down the trees that are not needed to support the rope:



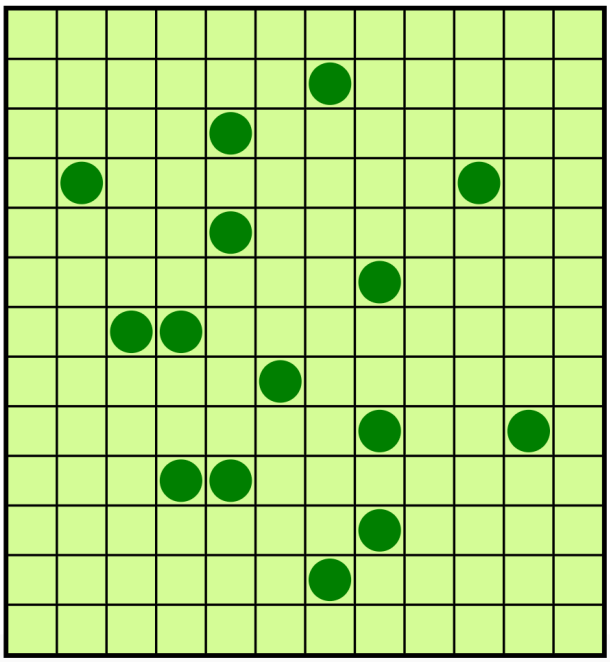
First they make a map the trees on a grid of squares like the one shown below. Then they select the smallest number of trees needed to support the rope.

Notes:

- Trees are shown as green circles.
- To make this easier, the beavers assume that all trees have the same diameter (thickness) and are in the centre of the squares in the grid.

Task:

Select all the trees that must NOT be cut down by the beavers in the plan below.



Arrow Maze

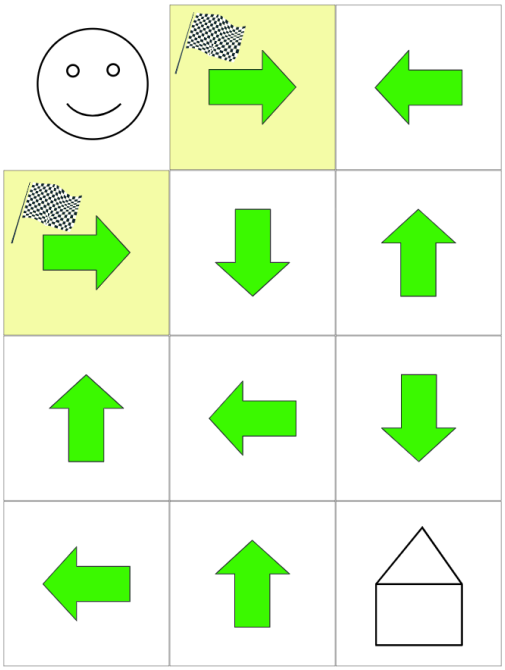
Kits: Intermediates: A
Castors: Seniors:
Juniors: B Elite:

Help Smilie get through the arrow maze and back to his house.

When standing in a square with an arrow, Smilie must move to the next square by following the direction of the arrow.
Smilie can start from either yellow square with a start flag.

At the moment it is impossible for Smilie to reach his house.

Task:
Change the direction of only one arrow so that Smilie can follow the arrows to his house.
(Click repeatedly on an arrow to change which way it points.)



Colouring In

Kits:	C	Intermediates:	A
Castors:	C	Seniors:	
Juniors:	A	Elite:	

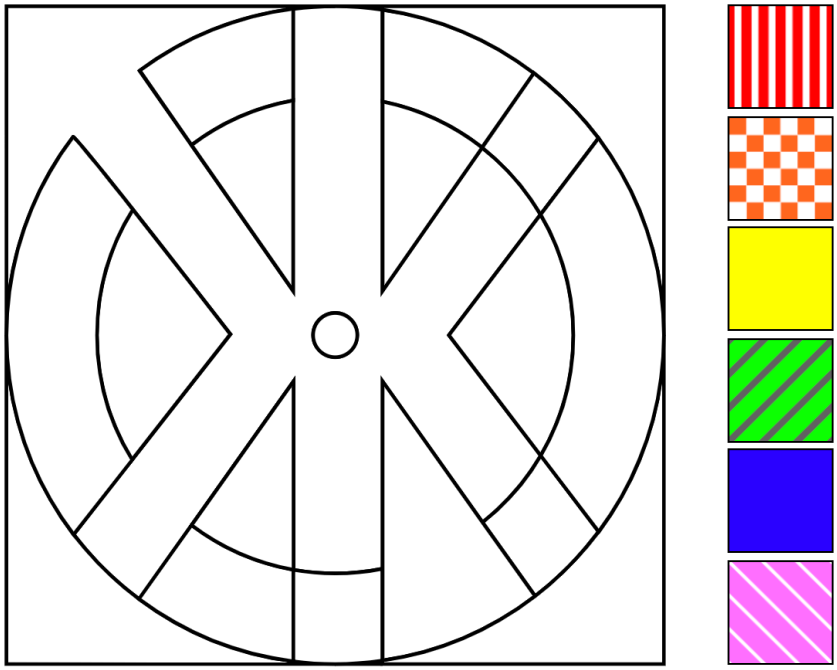
The pattern below needs colouring in!

There are two rules:

1. Use as few colours as possible
2. No two areas that share an edge can be the same colour.

You can try colouring in the pattern yourself.

To do this drag any of the 6 colours provided on to the pattern.



Question:

What is the minimum number of colours required?

Shortish Program

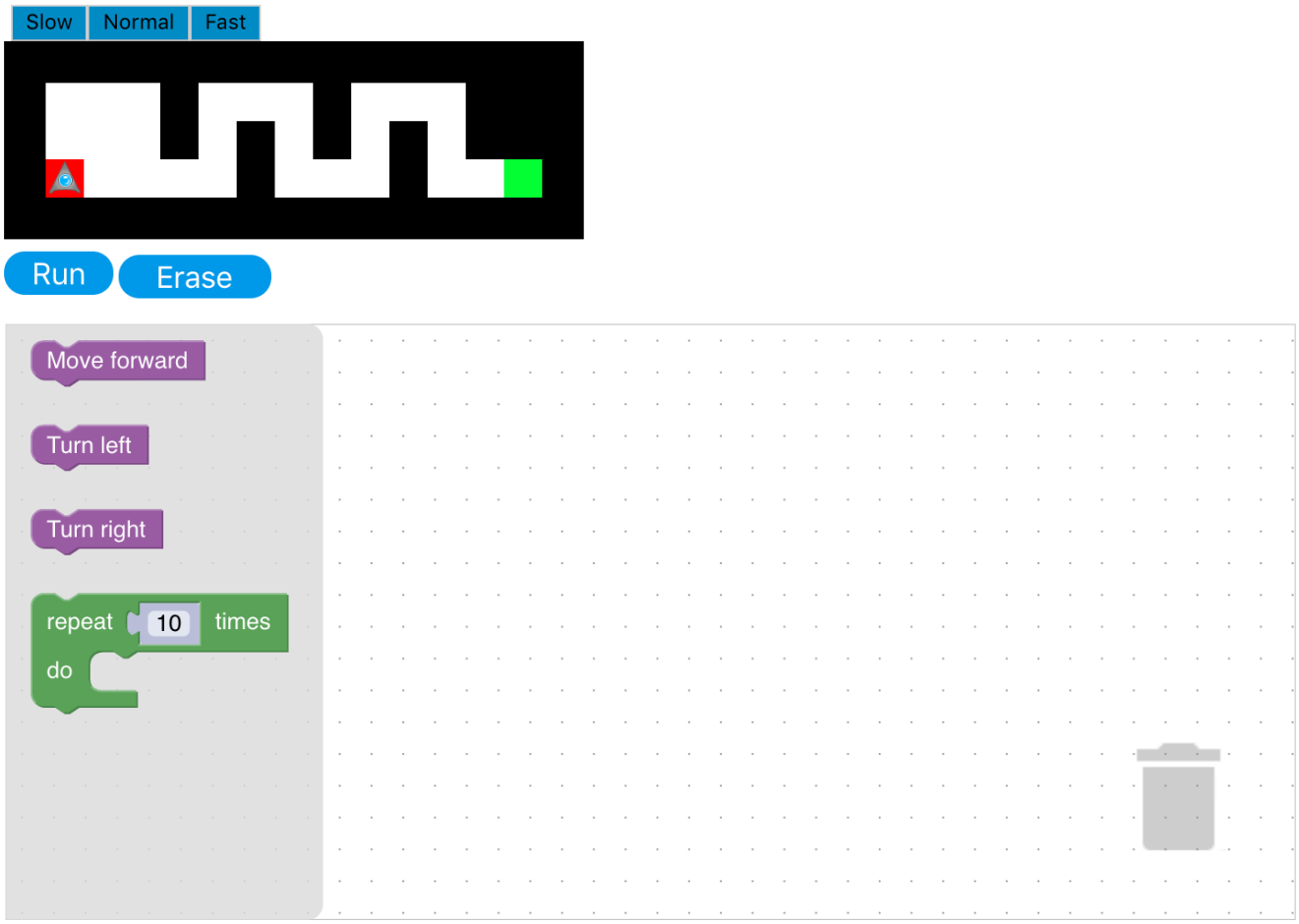
Kits:		Intermediates:	B
Castors:	C	Seniors:	A
Juniors:	B	Elite:	

The program shown on the right drives a triangular robot.

Following these instructions, the robot drives in a small square twice and ends up back where it started. (You can try it out below if you wish.)
The whole program uses only 5 code blocks (3 x purple, 1 green, 1 grey).

Task:

Write a program that gets the robot to the green square using 12 blocks or less.



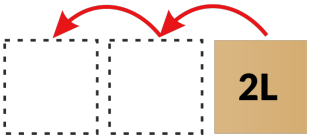
Programming Instructions:
Drag the code blocks into the workspace on the right.
Clip them together to make your program.
Try out your program by pressing Run.

There are 8 boxes on a board. The positions of the boxes are labelled from 1 to 8.

One of three types of movement rule is placed in each box.
An example of each rule type is given below:

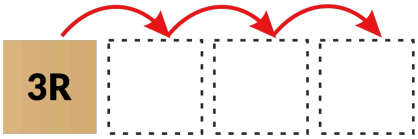
1. Movement to the Left

e.g. 2L means move two boxes to the left:



2. Movement to the Right

e.g. 3R means move three boxes to the right:



3. Do not move

If the rule says "0", do not move from this box at all.

Question:

Consider this board:

1R	3R	2L	0	3R	1R	3L	2L
1	2	3	4	5	6	7	8

Which box should you start in so that, by following the rules, every box is visited?

2 3 5 It is not possible to visit every box

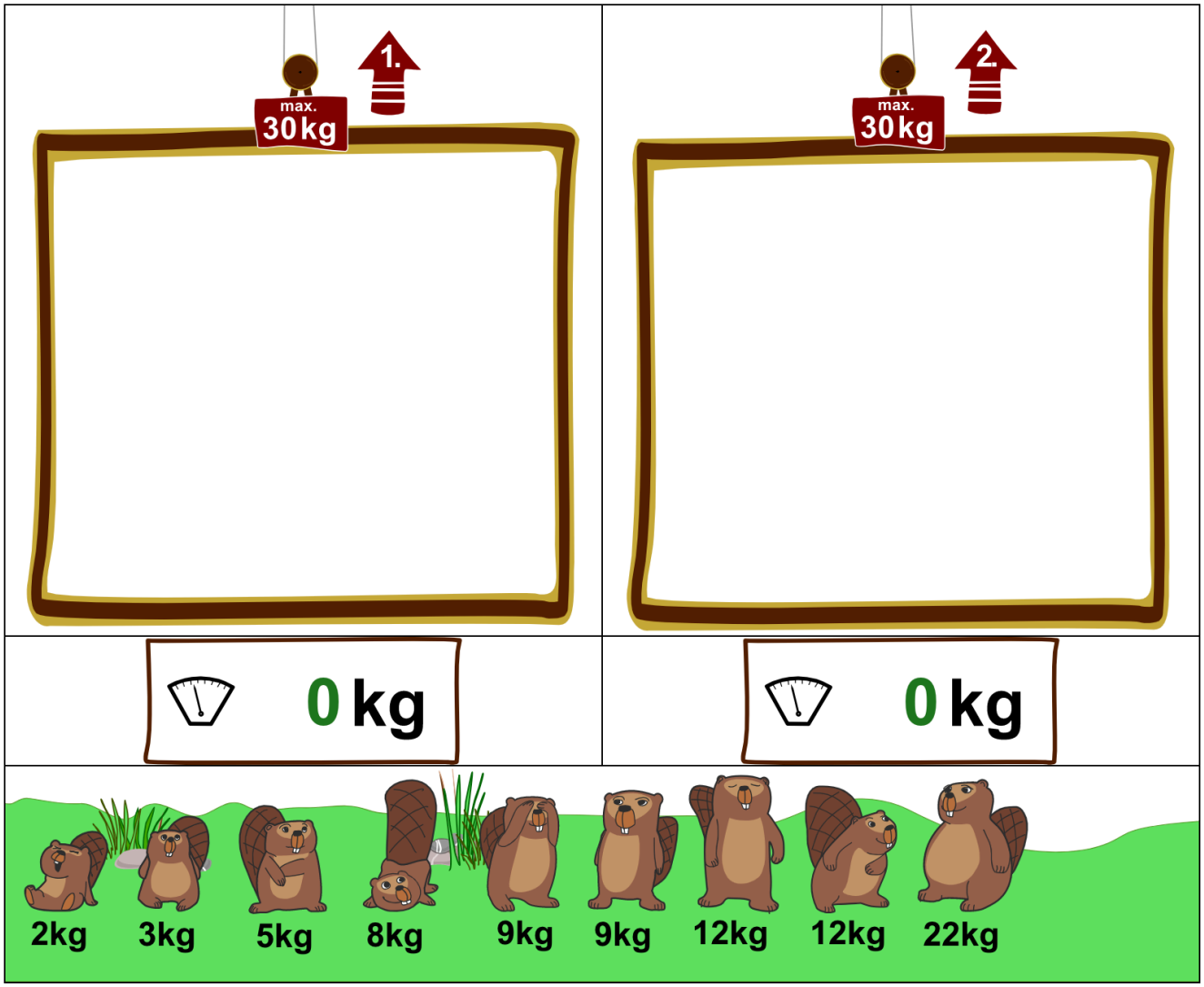
Elevator

Kits:		Intermediates:	B
Castors:	C	Seniors:	A
Juniors:	C	Elite:	

A lot of beavers need to use two lifts.

Each lift can only take a maximum of 30kg.

Task:
Drag the beavers in to the lifts so that as many beavers as possible can take the lifts at once.



Passcode

Kits:		Intermediates:	B
Castors:		Seniors:	A
Juniors:	C	Elite:	

Beaver Daniel received a chest of gold that is locked with an electronic lock. The lock can be opened by entering a code of 9 digits.
Daniel has received the following hints about the code:

- The only digits in the code are 2, 6, 7 and 9
- The digit with the highest value is used the lowest number of times in the code.
- The digit with the lowest value is used the highest number of times in the code.
- The code looks the same in reverse.
- All consecutive digits are different.
- The last digit entered is odd.

With the information given above, can you determine the pass code?

Task:
Drag the digits to the passcode area and click on 'Save answer' when you think you have the correct code.

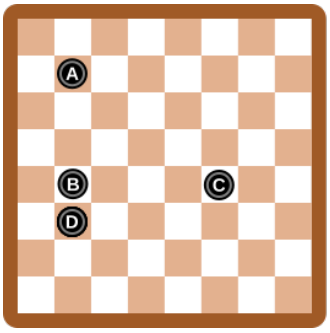
Rows and Columns

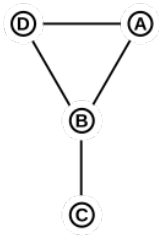
Kits:		Intermediates:	
Castors:		Seniors:	B
Juniors:		Elite:	A

Below on the left you see a picture of a game board with 4 pieces placed on it.

The diagram to the right of the board represents the positions of the pieces.
It is drawn in the following way:

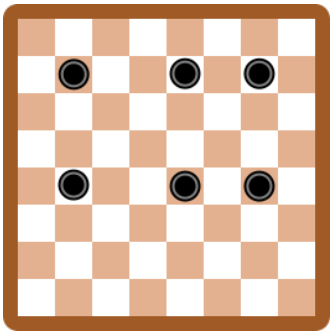
- For each piece on the board, draw a circle.
- If two pieces are in the same row on the board or in the same column on the board, then draw a line between their circles in the diagram.
  (Do not draw any other lines in the diagram.)



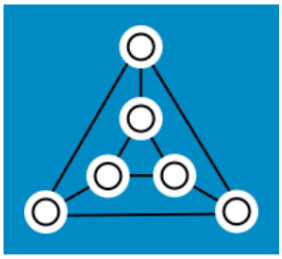


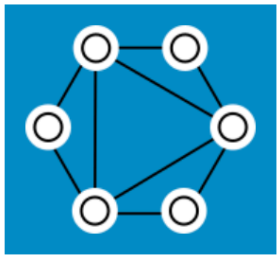
Letters have been placed on the pieces and the circles so you can easily check that the diagram is correct.

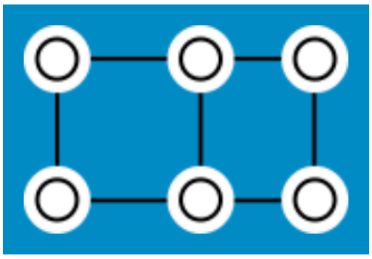
A new board with six pieces is shown below.
A new position diagram for this board is drawn in the same way.

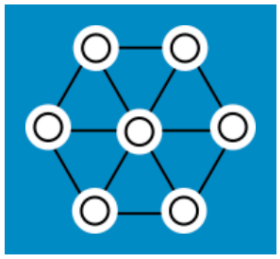


Question:
Which of the four diagrams below were drawn?









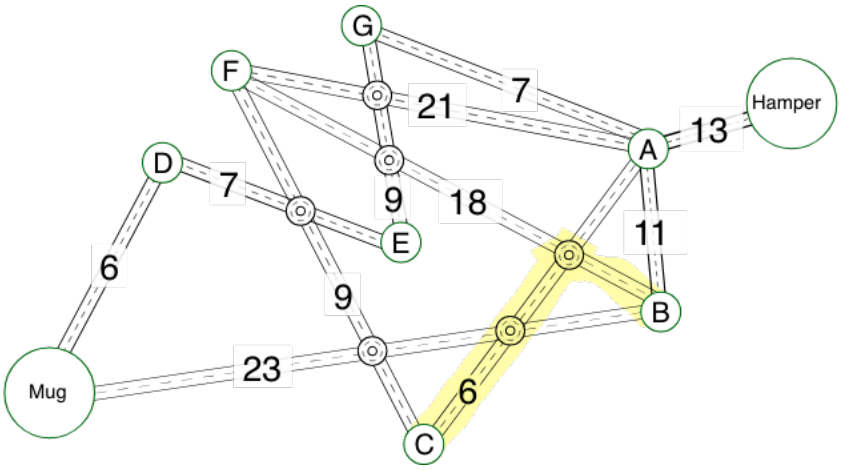
Toll Roads

Kits:		Intermediates:	B
Castors:		Seniors:	B
Juniors:	C	Elite:	

Bob decided to drive from Hamper to Mug.

In the map below, circles with letters are cities and lines are two-way roads.
Roads also have roundabouts where they intersect.
The number beside a road is the toll that cars must pay every time they enter the road.

Cars can change their route at roundabouts but they need to pay the full toll for the road they enter.
For example, to drive from city B to city C you can take road 18 and road 6 thus the toll fee is 24.



Question:
What is the minimum toll fee Bob should pay to drive from Hamper to Mug?

Flipping Cards

Kits:		Intermediates:	
Castors:		Seniors:	B
Juniors:		Elite:	B

A row of cards is laid out in front of you.

The cards may lie face up:  or face down: 

How to play:

For each step in the game you:

- examine the cards from right to left
- if the current card is face down, you turn it face up and stop
- if the current card is face up, you turn it face down and move to the next card
- when you run out of cards, you stop.

The images below show the effect of such a step:

Before: 

After: 

Here are 7 cards lying face down:

(You can flip them over by clicking on them.)

Reset

Question:

How many steps will it take, using the system above, to make all 7 cards face up?

A. It will take 10 steps or less.

B. It will take more than 10 steps but at most 100.

C. It will take more than 100 steps but at most 1000.

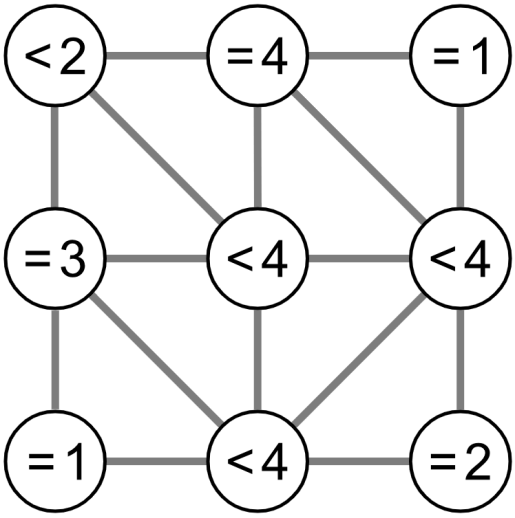
D. It will take more than 1000 steps.

E. You can never reach the situation with all 7 cards facing up.

Your job is to colour in some of the circles in the picture below.

The circles have connections to some of their neighbours.
The numbers inside each circle indicates the number of neighbours which need to be coloured in. For example, the circle marked with "=3" must have exactly 3 of its 4 neighbours coloured in. Similarly, the circles marked with "<4" must have less than 4 of their neighbours coloured in.

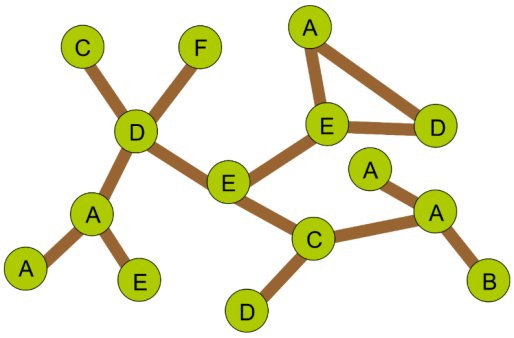
Task:
Colour in the required circles by clicking on them:



Park Walk

Kits:		Intermediates:	C
Castors:		Seniors:	B
Juniors:	C	Elite:	B

This is the map of a park:



The green circles with letters represent the trees and the brown lines are paths. Note that some letters are used to label more than one tree.

Walking from tree F to tree B can be described as **F D E C A B**.

Last Sunday two families walked in the park.

The Wilde family's walk was **B A A A C E D E E D A**.
The Gilde family's walk was **F D C D A E A D E D A**.

Both families started their walks at the same time.
Walking from one tree to another tree, down one path takes the same amount of time.

Question:
How many times did the two families meet at a tree?

Once **Twice** **Three times** **They never met at any of the trees**

Treasure Maps

Kits:		Intermediates:	B
Castors:		Seniors:	A
Juniors:		Elite:	A

Pirate Beaver has a very large treasure map which is cut into smaller pieces. Each map piece shows a region of 8 units wide and 8 units long (Fig. 1). However, Pirate beaver has a very small boat and cannot take all the map pieces with him. Smart as she is, Pirate beaver finds a way to document each region (map piece) into a small chart in her note book. Here is how:

1. If all units in the region are in the same colour, she marks a "square" on her notebook with the same colour.
2. Or else, she marks a "circle" (shown as Chart 1) and then divides the region into 4 subregions (shown as Fig. 2) according to its central point.
3. Repeat step 1 and 2 until all units are recorded (shown as Chart 4).

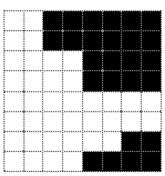


Fig. 1

Chart 1

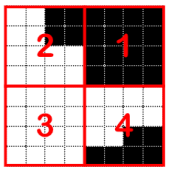


Fig. 2

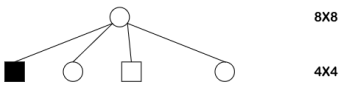


Chart 2

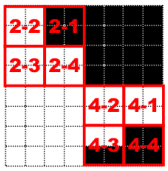


Fig. 3

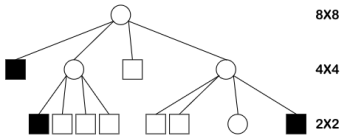


Chart 3

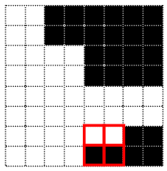


Fig. 4

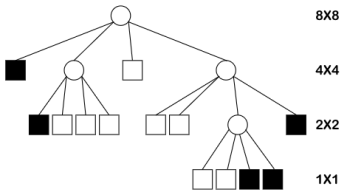
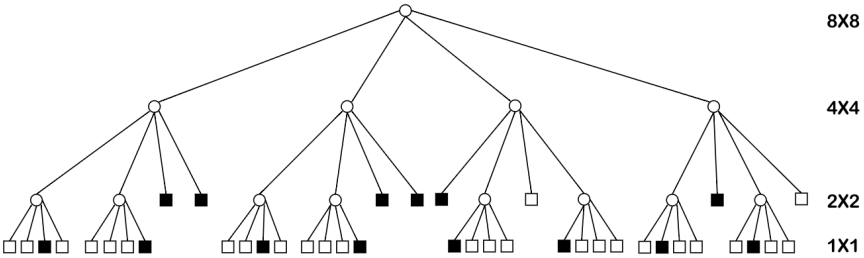


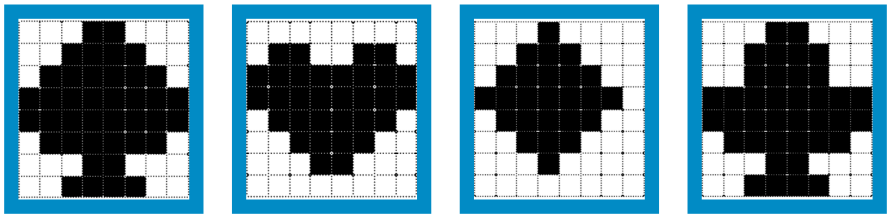
Chart 4

Question:

Here is another chart in Pirate Beaver's notebook:



Which of the following map pieces does it represent?



Medical Lab

Kits:		Intermediates:	C
Castors:		Seniors:	C
Juniors:		Elite:	C

A diagnostic device in a medical lab must repeatedly shake specimens taken from patients.

The device works according to a computer program, which is written on numbered lines. The device reads the program line by line. It always reads one line and then executes it immediately. If the line contains the command `go to X`, the device jumps to the line `X` and continues reading and executing.

The Program:

```
1. set A to 0
2. add 1 to A
3. go to 6
4. if A equals 60 go to 8
5. set A to 0
6. add 1 to A
7. go to 2
8. shake the specimens A times
9. end
```

The program is able to store a number `A`, to add `1` to the number stored in `A`, and compare its value with another number.

Question:
How many times will the device shake the specimens when this program is run?

The specimens will never be shaken.

The specimens will be shaken once.

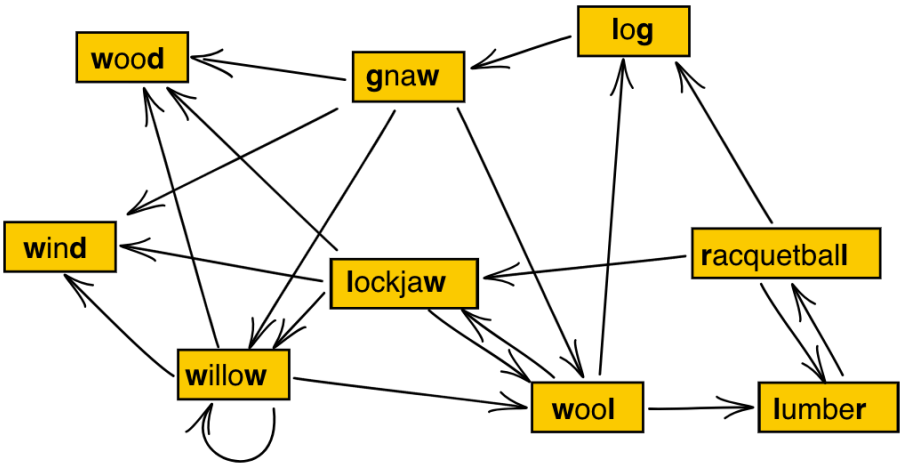
The specimens will be shaken 60 times.

The program will not stop the specimens being shaken.

Beavers often play a word chain game.

Game Rules:
Place 9 word cards face up in front of both players.
Player one starts by saying one of the words.
Player two says another word which begins with the last letter of the previous word.
Player one says another word which begins with the last letter of the previous word and which has not been used yet.
Play continues in this way until there is no new word available.

Below is a set of 9 cards. Arrows have been added to help with this question:



Question:
What is the largest possible number of words that can be said in one game?

Gifts

Kits:		Intermediates:	C
Castors:		Seniors:	C
Juniors:		Elite:	B

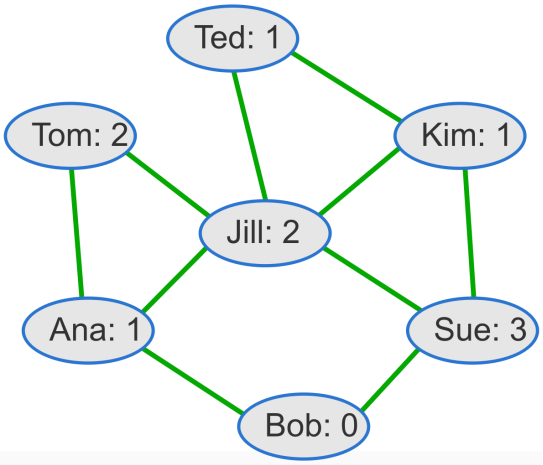
Some friends are planning a party.

The diagram below shows some of the friendships in the neighbourhood – two people are friends with each other if a line connects their names.

For each pair of friends, only one of them is to buy and bring a gift for the other.

The numbers in the diagram show how many gifts each person can buy.
No friend is supposed to buy more gifts than this number.

Task:
Click on the lines in the diagram to show who gives and receives presents.
Click again to change the arrow direction. Click once more to remove the arrow.
(Click Save when you are satisfied with your answer.)



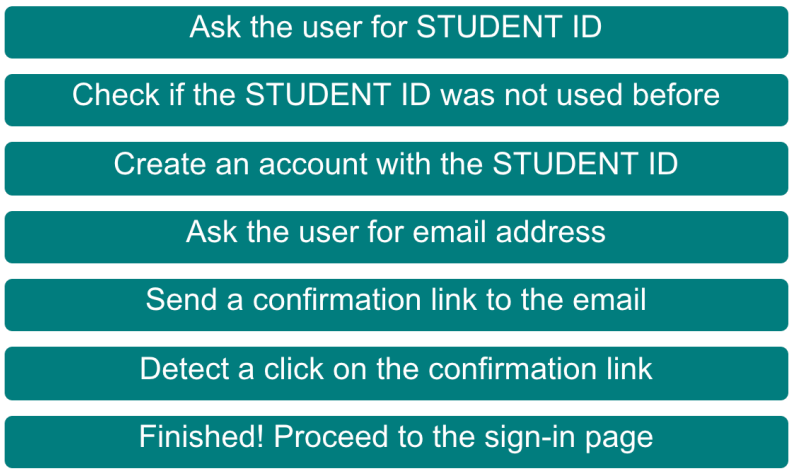
Signup Debugging

Kits:		Intermediates:	B
Castors:		Seniors:	A
Juniors:		Elite:	A

Sara is developing a website for her friends to share their art projects.

She designed a sign-up process so a user can first create an account with a unique STUDENT ID as a username and then enter a valid email address for further communication.

The following diagram shows the steps of her design:

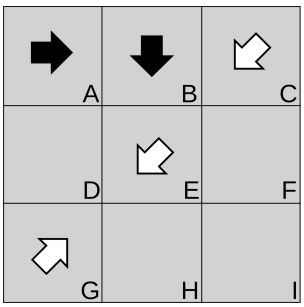


During testing she found a critical design bug:
If a user mistypes their email address, they do not receive the email with a confirmation link and consequently they can not sign-in. On the other hand, they can not start the process all over again as their STUDENT ID has already been submitted and it is not available any longer.

Task:
Help Sara by re-arranging the sign-up design steps to remove the bug.
(You can re-arrange the program by dragging and dropping the instructions in the sequence.)

Arrows

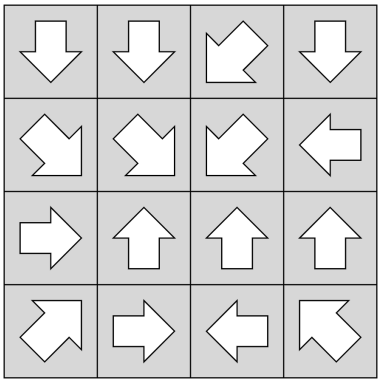
Kits:		Intermediates:	C
Castors:		Seniors:	B
Juniors:	C	Elite:	A



In the figure on the right, the black arrow at A points at one black arrow (at B) and one white arrow (at C).
The white arrow at C points at exactly two white arrows (at E and at G).

In the figure below, you can change arrows from black to white or white to black by clicking on them.

Task:
Create a set of arrows so that all white arrows point at exactly one other white arrow and all black arrows point at exactly two other black arrows.



Ballroom Floor

Kits:		Intermediates:	
Castors:		Seniors:	C
Juniors:		Elite:	C

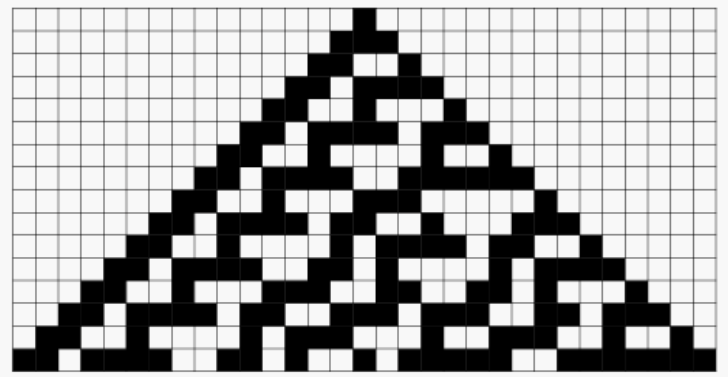
Beaver has to tile a big ballroom floor that is made up of 16 rows of tiles and 31 columns.

She decides to program the pattern, based on a set of rules. Here is an example "rule set":

When laying a new tile, Beaver looks at the three tiles directly above the new tile and finds which rule in the rule set it matches. This then shows her whether the new tile should be black or white.

To allow her rules to work at the edges, Beaver decides to imagine that all the tiles that are outside of the floor are also white and remain white.

Beaver decides to start with one black tile in the middle on the top row. Using the example rule set, the following pattern is formed:



The ballroom owner doesn't like this pattern very much!

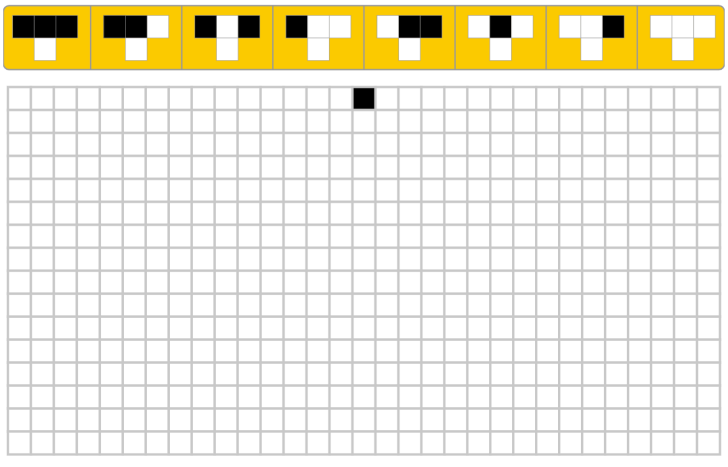
She wants the last row of the floor to start and end with a black tile.
It must also alternate between black and white tiles like this:

Task:

Create a new set of rules that will produce the required result.

Do this by clicking on the squares in the rule set to turn them either black or white.

Remember, you have to start with one black tile in the middle of the top row.



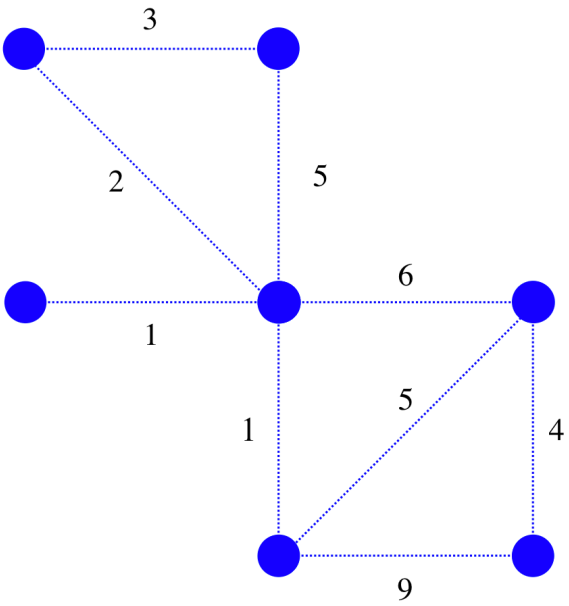
Optical Fibre

Kits:
Castors:
Juniors:
Intermediates:
Seniors: C
Elite: B

An internet service provider (ISP) wants to set up a new network.

There are seven cities which have to be connected so that every city can send and receive messages from any other city.
The company has to pay to setup links between cities. The costs are shown on the lines linking the cities below.

Task:
Select the links that should be built to connect the cities with the least cost.



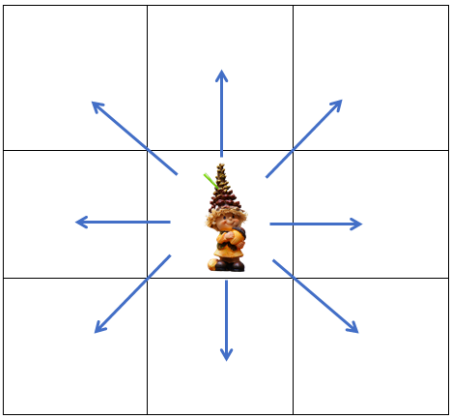
Buried Treasure

Kits:
Castors:
Juniors:
Intermediates:
Seniors: C
Elite: B

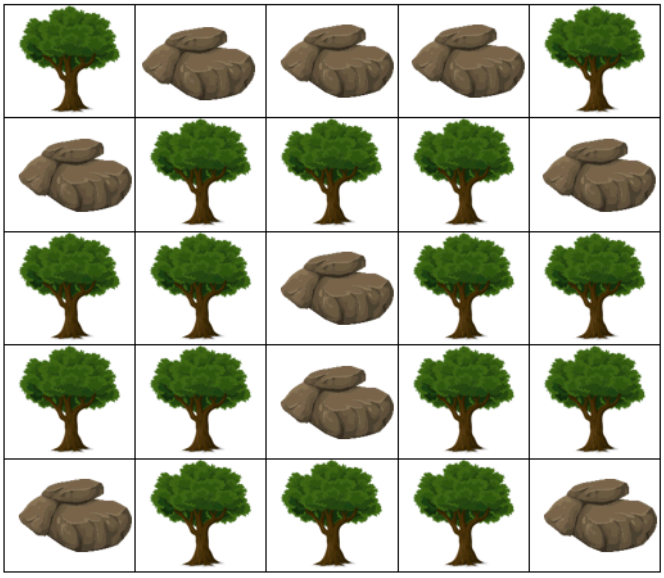
There are 5 Forest Imps living in a wood.
Each imp wants to bury its treasure somewhere in the wood.
Forest Imps only bury their treasure under trees.

They all have a map with the wood divided into squares.
Each square contains a tree or a rock.

Forest Imps can see in all directions as shown on the right and can see through trees!
Forest Imps cannot see through rocks.



The forest map:

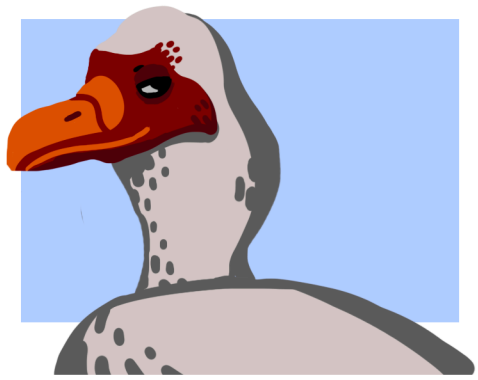


Question:
In how many ways can the 5 Forest Imps bury their treasure in the wood without seeing each other?

1 2 3 4 or 5

Truth or Lies

Kits: Intermediates:
Castors: Seniors:
Juniors: Elite: C



A beaver explorer has discovered a new island.

On this island she finds a very rare group of birds that can answer many questions but can only do so truthfully.
Later she realises that some of these birds can only tell lies.

The explorer knows there are 11 truthful and lying birds on the island in total.

She asks all of them: "How many truthful birds are there on the island?"

She gets these results:
3, 2, 5, 7, 3, 4, 4, 3, 5, 0 and 4

Question:
How many truthful birds are on the island?

0 2 3 4 5 or 7

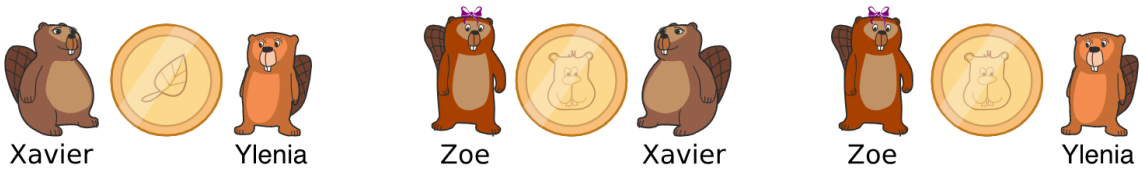
Xavier (X), Ylenia (Y), and Zoe (Z) often play the national lottery.

They would all like to know if one of them wins but they also want to keep this piece of information secret if it is them!

To keep their privacy, they decide to act this way:

1. They will meet privately in pairs and toss a coin, observed by both.
2. Beavers that have not won the lottery announce whether the two tosses they observed were **equal** or **different**
3. If a beaver has won the lottery they announce the opposite of what they observed (e.g. a beaver will announce **different** if the two tosses observed were in fact equal, or **equal** if the two tosses were different.)

Example:
If the tosses are:



and Zoe won the lottery: everyone will announce "*Different*".

Question:
Xavier announces *Equal*, Ylenia announces *Equal*, Zoe announces *Different*.
What did happen assuming, at most, one beaver won the lottery?

We can be certain that nobody won the lottery

We can be certain that somebody won the lottery but we don't know who won

We can be certain that somebody won the lottery and we know who

We do not know whether or not anybody won the lottery

Scheduling Rehearsals

Intermediates:
Seniors:
Elite: C

A ballet school is planning a performance, where the ballerinas will dance some duets.

There are 6 ballerinas: Alessa, Birgit, Chloe, Dorien, Evelien, Fleur.

They will dance the following duets:

- Alessa - Birgit
- Evelien - Dorien
- Alessa - Evelien
- Birgit - Chloe
- Dorien - Alessa
- Fleur - Birgit
- Chloe - Evelien
- Birgit - Dorien
- Dorien - Fleur
- Fleur - Evelien

The ballet teacher wants to schedule the rehearsals for this afternoon with a time slot for each duet in such a way that, when changing from one rehearsal to the next, one of the dancers can remain for the next rehearsal.

E.g., when Alessa and Evelien have the first rehearsal slot, then the next rehearsal could be Chloe and Evelien.

Question:
Which ballerina can *not* be in the first duet whatever schedule the ballet teacher comes up with?

Alessa Birgit Chloe Dorien Evelien or Fleur

Switch On

Kits:		Intermediates:	C
Castors:		Seniors:	C
Juniors:	C	Elite:	C

Below is a network of lights and switches.

When you use any of the switches, the three lights connected to this switch will change their state: from off to on, or from on to off.

Task:
Switch on all the lights!
Click on one switch at a time in order to use it.