**Time Allowed:** 120 minutes

---

Tasks T1 – T7 carry 3 points each

T1. Zoo Animals

The following diagram shows three circles. Each circle shows different animals. One circle shows animals with stripes, one circle shows animals with more than two legs, and one circle shows animals with wings.

If an animal has wings and stripes then it will be placed in the overlap of both circles.
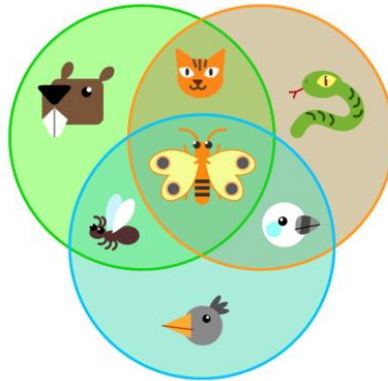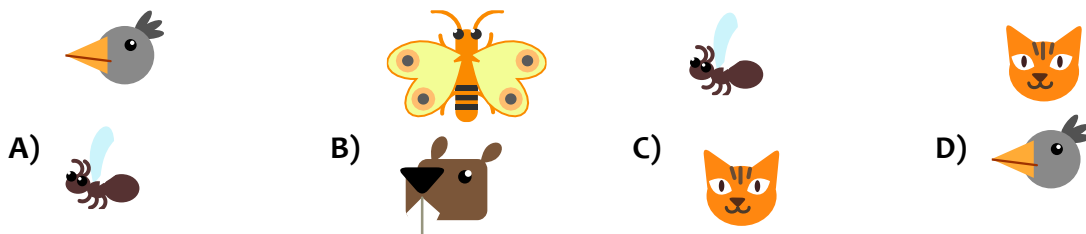

Your friend has selected two types of animals that she likes. She tells you:
- I like winged animals that don't have stripes or many legs.
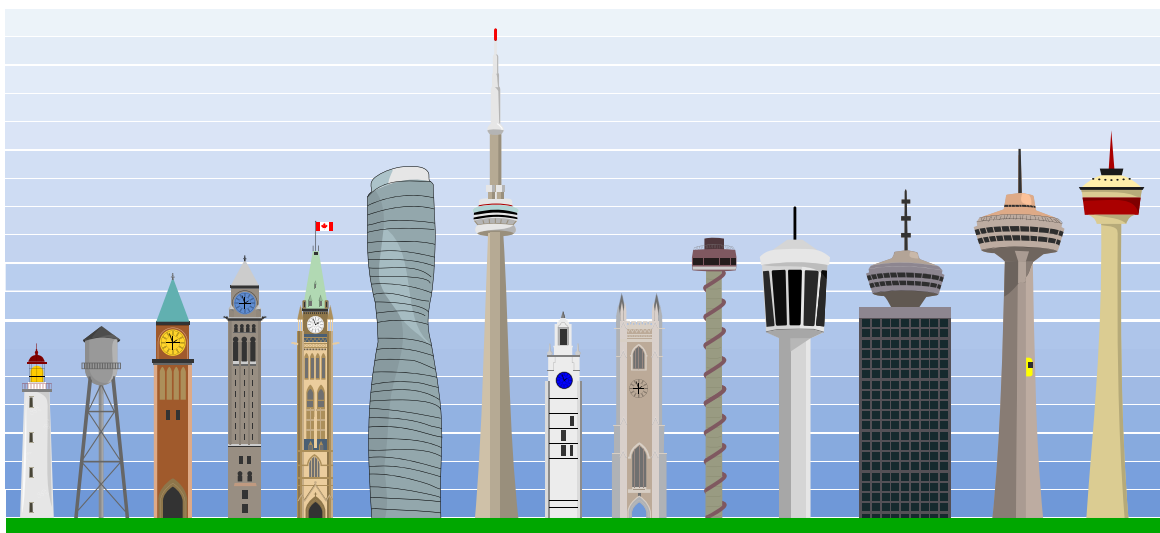- I also like animals without wings and that have stripes and many legs.

Question / Challenge

What animals does your friend like?

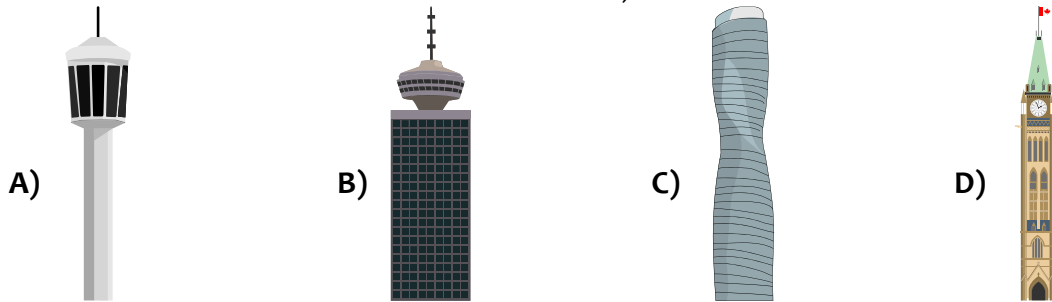A)   B)   C)   D)

### T2. Skyline

A skyline consists of 14 towers as shown.

Question / Challenge

If the towers were listed from shortest to tallest, which tower would be 10th on the list?

A)   **B)**   **C)**   **D)**

T3. Log Classifier

In Beaver village there is a log storing facility, which stores logs depending on three properties: number of inner rings, number of bark lines and number of nodes, as in the image below.

Inner rings   Bark lines   Nodes

A   B   C   D
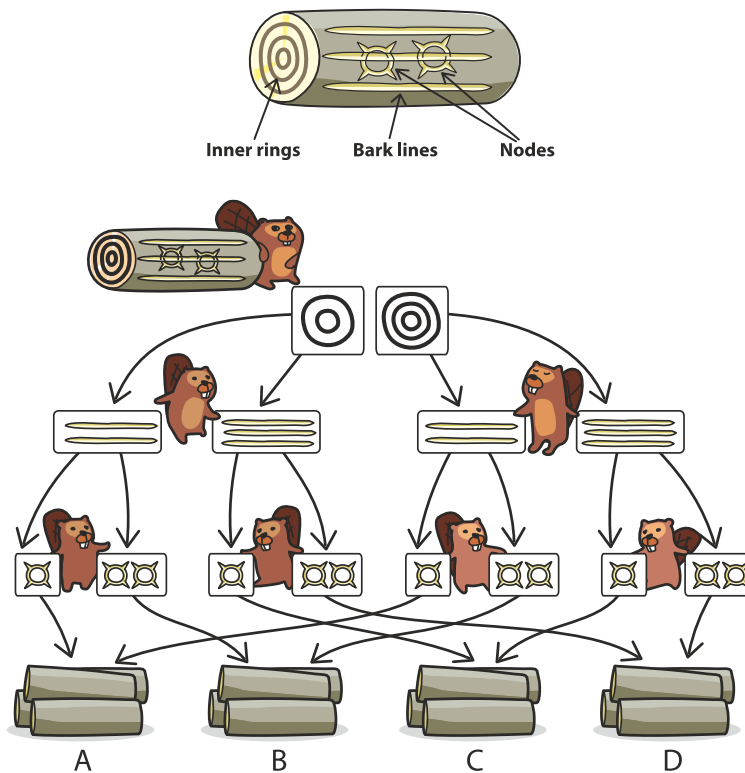
Above you can see how beavers sort logs based on their inner rings, bark lines and nodes, by sending logs between them, starting from the top beaver until the stacks on the bottom.

The log shown above will be placed in stack D. This is because the log has three inner rings (so it goes right from the first beaver), three bark lines (so it goes right from the second beaver) and two nodes (so it goes right from the third beaver).

Question / Challenge

On which stack will the log shown below be sent based on its properties?

A) A   **B)** B   **C)** C   **D)** D

T4. Secret Digits

Beaver homes are numbered using symbols instead of digits according to the table shown:

For example, the digit 5 is written by locating the digit in the table and then combining its row symbol with its column symbol to create the new symbol.

Here is a picture of one beaver's home:

Question / Challenge

What digits are on this beaver's home?

A) 1795   B) 1973   C) 2357   D) 8450

T5. Steps

A robot has to climb a stair with 4 steps. The robot can pass from one step to the other by doing one of the following two movements.

Example

M1: Go one step forward.
M2: Jump three steps forward.
For example, the robot could move as shown in the next picture.
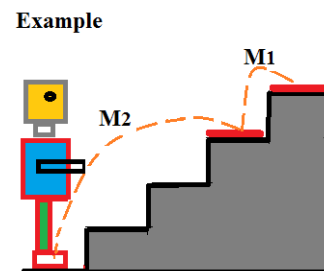
Question / Challenge

In how many different ways, can the robot climb the stair?

A) 1   B) 2   C) 3   D) 4

T6. The maze

Sara is at the entrance of a garden maze with four exit gates. The girl has a map which suggests that the maze could be quickly crossed if she acts according the following simple rule:

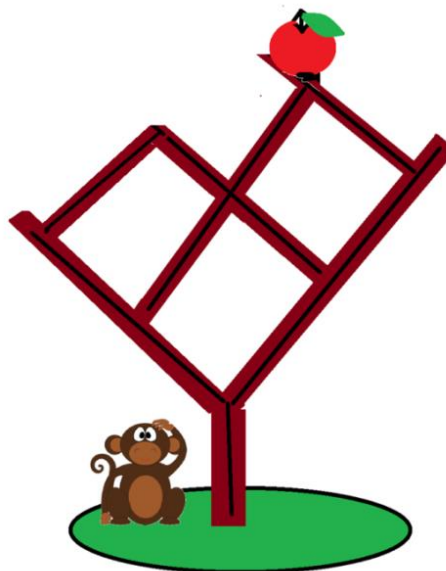When reaching an intersection with a red circle, turn to the right!
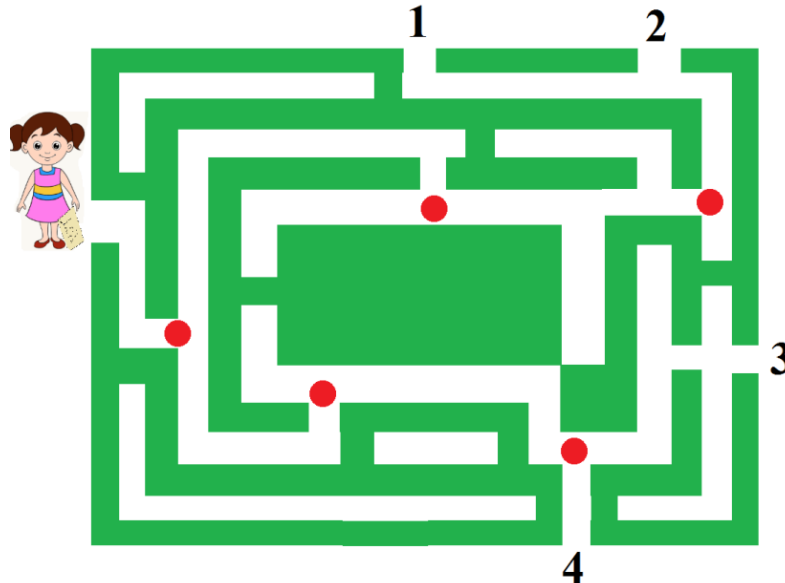
Question / Challenge

What exit gate will Sarah reach if she follows the above rule?

A) 1   **B)** 2   **C)** 3   **D)** 4

T7. Monkey's tree

A monkey wants to take the apple from the top of the tree .

Question / Challenge

How many different roads can the monkey use to reach the top of the tree, if she only goes up?

A) 3   **B)** 4   **C)** 5   **D)** 6

Tasks T8 – T14 carry 4 points each

T8. Damaged Secret Table

The secret writing here is based on coding the letters of the Latin alphabet by new symbols. The secret is described in the following table. Unfortunately parts of the table have been wiped out and so parts of the table are missing:

Question / Challenge

What is the original plain-text of this cipher-text, even though the table is damaged?

A) INFORMATION SECRET	**B)** INFORMATICS IS COOL
C) MATHEMATICS IS COOL	**D)** INFORMATION IS COOL

T9. Remembering a Password

Beaver Pfifikus wants to create a password that he can remember, but cannot be guessed easily by anybody else. So he uses a special method to create his password.

Beaver Pfifikus likes to say this sentence:

I like goulash made by Chef Wilhelm

So he uses this sentence to create his password:

I1l4g7m4b2C4W7

Question / Challenge

Using the same method, what password will you get from this sentence:

I learn informatics from Miss Hannah?

A) i7ZtDXDlrPIxO	**B)** E4SKHprGzVsr8
C) P1L5z13u4x4H6	**D)** I1l5i11f4M4H6

T10. Picking Mushroom

Beavers do not eat mushrooms. They collect them for the Mushroom Museum. The Museum is only interested in rare mushrooms. The rarity of the mushroom is defined by the score in the following table:

<Shape and Score of mushroom>					<Decision based on score>
	[sack]	**[hat]**			Mushroom score (sum) is
hat / sack	Multiple layered 1 point	horned 2 points	dotted 3 points	striped 5 points	·0 - 3 points: common · 4 points and more: rare

Beaver Cobi goes to the forest to collect rare mushrooms to show in the museum.

Question / Challenge

Which mushrooms should Cobi pick?

M1   M2   M3   M4

A) M1, M2, M3   **B)** M2, M3,M4   **C)** M1, M2, M4   **D)** M1, M3, M4

T11. Heaviest mark

There are five boxes, each with a different shape drawn on it. Using a balance scale, you can compare the weights of two boxes.

An example: shows that ♥ is heavier than ● .
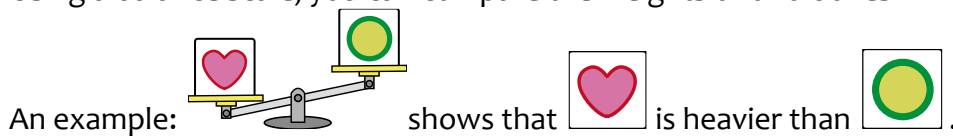
Five comparisons were made:
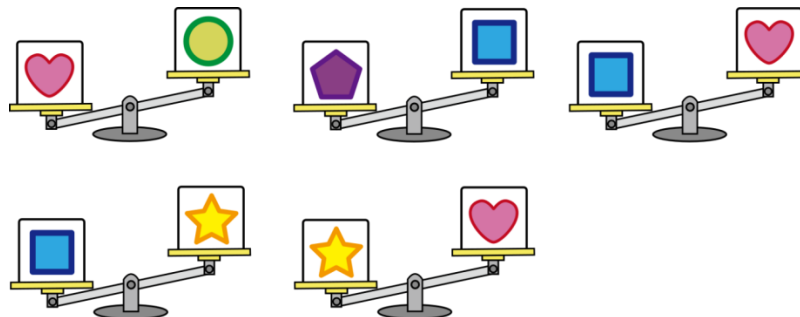
Question / Challenge

Which is the heaviest box?

**A)** ♥   **B)** ★   **C)** ⬟   **D)** ●

T12. Magic Potions

The chemist has two types of potions, A and B. If he mixes two bottles into a cauldron, one after the other, and heats them, the potion changes color as shown on below.
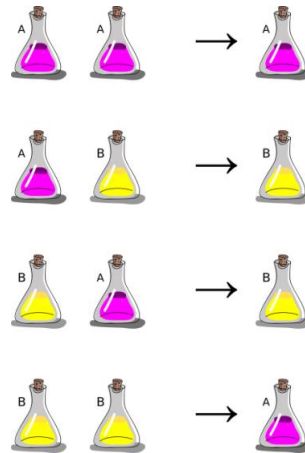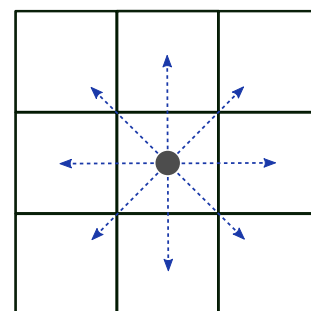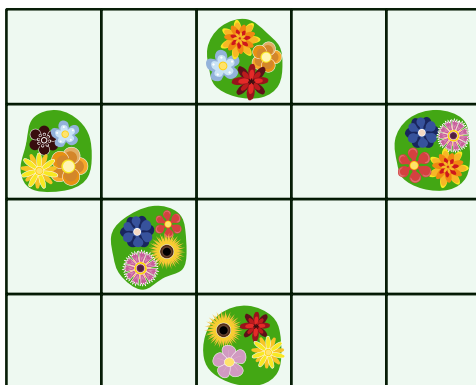

Question / Challenge

The chemist mixed exactly 4 bottles of his potions in the given order. The result of the mixture became type B . Which is the order of the bottles he used?

A)

B)

C)

D)

T13. Sprinkler

Beaver Bob planted some flower-beds in his square-grid garden (see the figure on the left). To make sure each flower-bed gets enough water, Bob decides to place some sprinklers at the empty squares of his garden. Each sprinkler can water all flower-beds in the eight squares next to it, as you can see in the picture on the right.

Question / Challenge

What is the minimum number of sprinklers that Bob needs to use in his garden in order to water all flower-beds?

A) 1   B) 2   C) 3   D) 4

T14. A Beaver at the Castle

A smart beaver needs a fir tree to build a dam on a river. But he only has one carrot. At Grandson Castle there is a trade today and exchange is possible. The beaver goes there with his carrot and hopes to exchange it for a fir tree.

In each room two exchanges are allowed according to the following table

Room A:	carrot → fish	or	coin → maple leaf
Room B:	carrot → cupcake	or	ring → ice cream
Room C:	ice cream → coin	or	ring → maple leaf
Room D:	carrot → cupcake	or	carrot → ice cream
Room E:	carrot → coin	or	ring → fir tree
Room F:	ring → coin	or	ice cream → fish
Room G:	ice cream → ring	or	carrot → fish
Room H:	carrot → maple leaf	or	cupcake → fish

Question / Challenge

What is the sequence of rooms the beaver has to go in, to ensure that he will eventually get a fir tree?

A) DGE **B)** GGE **C)** AGE **D)** DBC

Tasks T15 – T21 carry 5 points each

T15. Library Books

Beavertown Library only has a small pile of books. When a beaver borrows a book, the librarian records the beaver's name and takes the book at the top of the pile. When a beaver returns a book, the librarian records the beaver's name and places the returned book on the top of the pile.

At the beginning of the week the pile of books was arranged as shown:	The library's log book for the week shows the following information:
	 Alba - borrow Felix - borrow Alba - return Marta - borrow Felix - return Cato - borrow
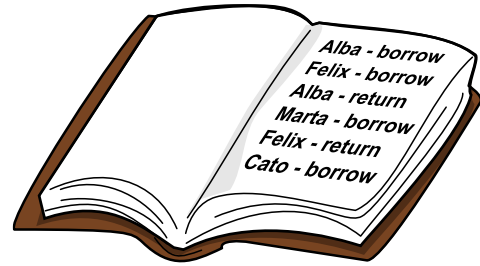
Question / Challenge
Which book did Cato borrow?

A) Charlotte's Web   **B)** Curious George
C) Go, Dog, Go!   **D)** The Hobbit

T16. Party Message
Beaver Ann and her friends use a special code to send notes to each other. Now Ann is preparing a secret party and wants to send the entrance password to her friends.

Secret message:

```
1:321231111
0:2112411111
1:3213123
0:21212151
?
```

1	1	1	0	0	1	0	0	1	1	1	0	1	0	1
0	0	1	0	1	1	0	0	0	0	1	0	1	0	1
1	1	1	0	0	1	0	0	0	1	0	0	1	1	1
0	0	1	0	0	1	0	0	1	0	0	0	0	0	1
1	1	1	0	1	1	1	0	1	1	1	0	0	0	1
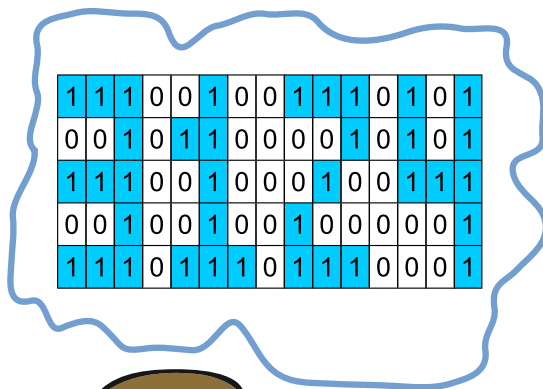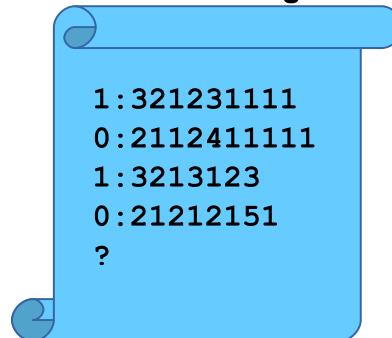
Question / Challenge
What will be the last line of the secret message?

A) 0:3131331   **B)** 1:321231111   **C)** 1:3131331   **D)** 1:231231111

T17. Pancake

In a restaurant, Shiny saw 3 pancakes arranged on a plate. She wanted the apple pancake which was at the bottom of the plate. Pancakes are taken only from the top.
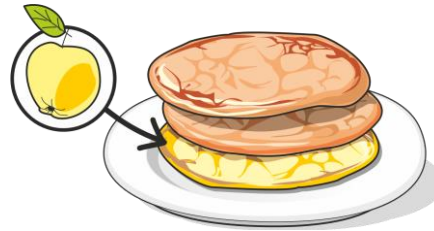
After the first pancake was served to another person, the cook placed 4 fresh pancakes on top of the earlier pancakes. He first added an apple pancake followed by 3 other pancakes. A girl took 2 pancakes. The cook placed 4 more fresh pancakes on top, but this time there were no more apple pancakes.

Question / Challenge

What is the smallest number of pancakes that have to be taken before Shiny can get an apple pancake?

A) 8   **B)** 5   **C)** 6   **D)** 7

T18. Painting the houses

The people on Be-Taro's street think that their white houses will be much improvedby painting them a different color. They decide topaint the houses according to these rules:
1. Each house must be painted either red, green or blue.
2. Two houses next to each other must not be the same colour.
3. A house must not be the same colour as the house directly across the street.

In the picture below you see that some of the houses have already been painted.
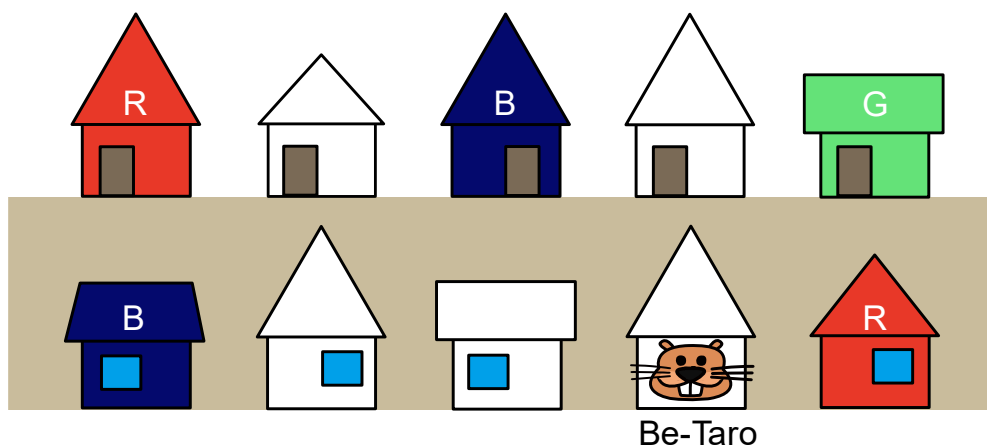
Be-Taro

Question / Challenge

Which colour can be used for Be-Taro's house?

A) Only red can be used   **B)** Only blue can be used
C) Only green can be used   **D)** Be-Taro can choose either blue or green.

T19. Jumping kangaroo

A kangaroo jumps home. She can jump only along the path, only vertically (up or down) or horizontally (left orright) and only if there are not more than two bricks in the way.
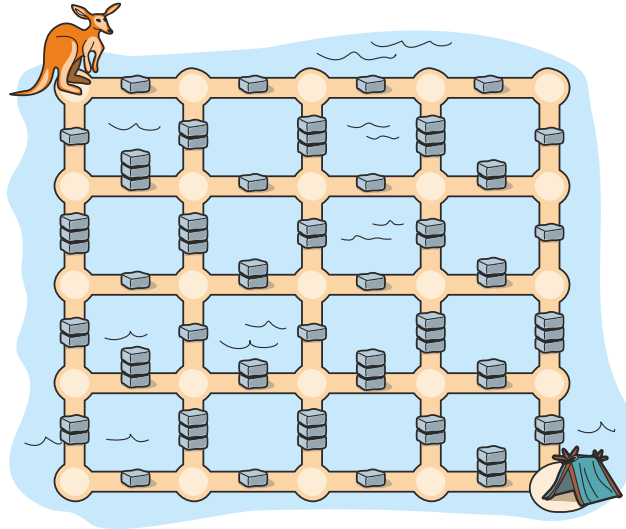

The kangaroo wants to be home as quickly as possible.

Question / Challenge

How many jumps does the kangaroo need to make?

A) 7 **B)** 10 **C)** 14 **D)** 18

T20. Jigsaw Puzzles

Beaver David has an unlimited amount of jigsaw puzzle pieces. The pieces come in 12 different shapes, and 3 different colors:

RED:
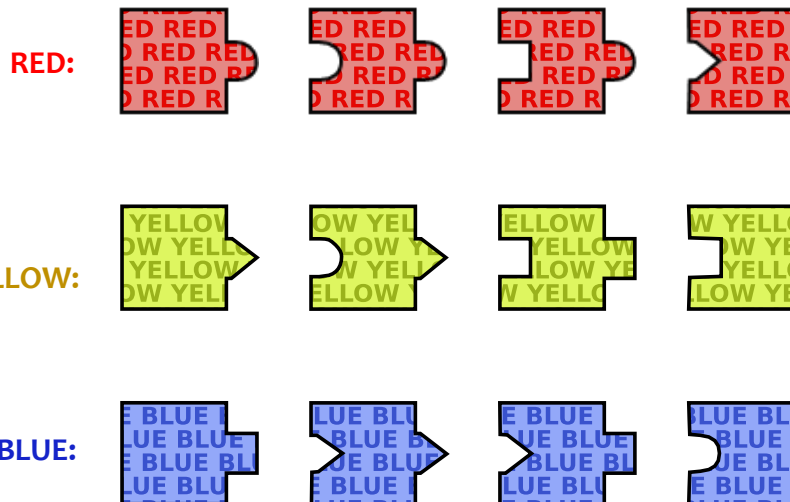
YELLOW:

BLUE:

Using these pieces, he can create various color sequences, for example:

BLUE ->**YELLOW** ->**YELLOW** ->**RED** ->**YELLOW** ->**BLUE** ->**YELLOW** ->**YELLOW**

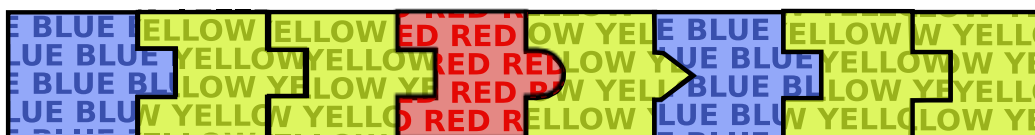Every sequence must start with a start piece (a piece with a flat left side) and end with an end piece (a piece with a flat right side). Also, David can't join two pieces on their flat sides.
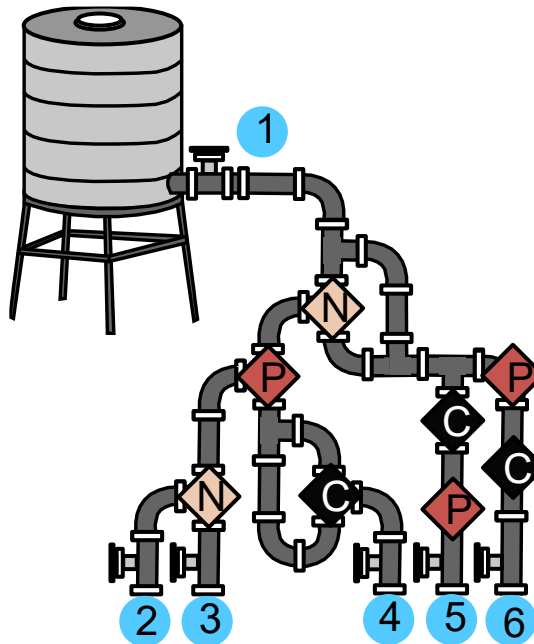
Question / Challenge

Which one of the following color sequences can't be constructed using David's set of jigsaw pieces?

A) YELLOW ->BLUE ->BLUE ->RED ->RED ->RED ->BLUE
B) BLUE ->YELLOW ->RED ->YELLOW ->RED
C) RED ->RED ->YELLOW ->BLUE ->BLUE ->BLUE
D) BLUE ->RED ->YELLOW ->BLUE ->RED ->YELLOW ->RED

T21. Water filtering

Mr Beaver, sick of the polluted water in his city, decides to build a water filter to remove the impurities. In order to be purified, the water must pass through sand (N), gravel (P) and coal (C), mandatory in this particular order.

Question / Challenge

If tap 1 is already open, which tap must he open to let clean water come out?

A) Taps 2 and 3   B) Taps 4 and 6
C) Taps 3 and 5   D) Tap 4