

Tasks T1 – T7 carry 3 points each

T1. Storage Strategy

The Beaver must pick up five sick cats to take them to the vet. He has several animal carriers. Each carrier has a limited capacity in kilograms.

Carrier	Capacity
A	10 kg
B	15 kg
C	20 kg
D	5 kg

Cat	Weight
Tiny	3 kg
Blacky	7 kg
Fatboy	10 kg
Colorina	5 kg
Lazyboy	6 kg

The beaver’s goal is to:

- pick-up **all the cats**
- use the **fewest number of carriers possible** without exceeding the carrier capacity

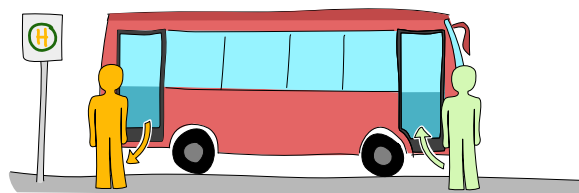
Question / Challenge

Which of the following options will allow all the cats to be carried using the **fewest number of carriers**?

- A) Tiny and Blacky in Carrier B; Fatboy, Colorina, and Lazyboy in Carrier C
- B) Tiny and Blacky in Carrier A, Fatboy in Carrier B, Colorina in Carrier D, Lazyboy in Carrier C
- C) Tiny and Colorina in Carrier A, Blacky and LazyBoy in Carrier B, Fatboy in Carrier C
- D) Fatboy and Colorina in Carrier B, Tiny, Blacky and Lazyboy in Carrier C

T2. Bus

A driver-less intercity bus runs along the route. Usually, the bus stops at a station when people are waiting to board or when passengers are getting off the bus. But today, the bus's computer is malfunctioning and it only stops at a station when there are passengers waiting to board and there are passengers getting off the bus at the same time. The bus always stops at the first and last stations despite the computer failure.



Bus stations are numbered from 1 to 5. There are the following waiting passengers:

- at station 1, Maria wants to board and she wants to get off at station 2
- at station 1, Vasil wants to board and she wants to get off at station 4
- at station 2, Simon wants to board and she wants to get off at station 5
- at station 3, Elena wants to board and she wants to get off at station 4
- at station 3, Kalina wants to board and she wants to get off at station 5

Question / Challenge

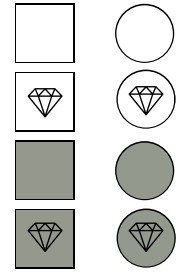
What is the list of all the passengers who cannot get to their desired station?

- A) Elena
- B) Vasil and Kalina
- C) Vasil, Elena, and Kalina
- D) Vasil

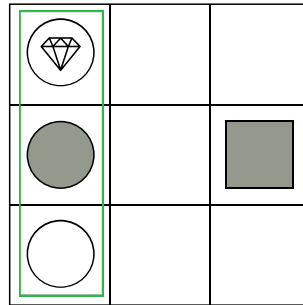
T3. Third Game

The beavers Anna and Bento are playing a game called Third. They use a 3x3 board and eight unique pieces with three defining characteristics:

- **Color:** Grey or White.
- **Shape:** Square or Circle.
- **Marking:** With or Without a diamond on it.



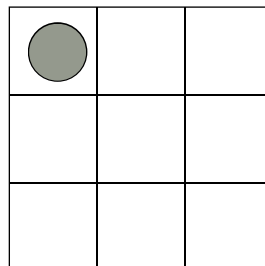
To win, a player must complete a row, column, or diagonal where the three pieces share at least one characteristic described above. For example:



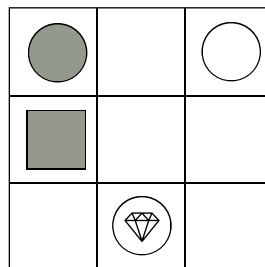
On the board above, one player wins because he placed the third piece in the first column obtaining three pieces with the same characteristic aligned: circled-shape pieces.

The game begins with an empty board. Players take turns, but their opponent chooses the piece they must place. After placing it, the player selects the next piece for their opponent, and so on.

Anna started the game by choosing the gray circle without diamond (●) for Bento to play, then Bento places it on the board.

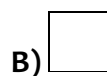


They continued alternating until the board reached the following state:



Question / Challenge

Which of the pieces below can Anna give Bento to place on the board to ensure he does **NOT** win on his turn?



T4. Beaver timber

Emil and his friends love to hike. During their hikes, Emil's friends collect information about trees that they see, and write it down in long tables.

	<p>Severin collects information on leaf shapes () and the corresponding tree species ().</p>
	<p>Quirina collects information about the fruit (), the corresponding tree species (), and whether they are conifers ().</p>
	<p>Ladina collects information about the color of the wood (), the corresponding tree species (), and whether it is good beaver timber to construct lodges ().</p>

Emil has found a leaf in the forest and knows its shape. He wants to know whether the wood of this tree species is good beaver timber.

Question / Challenge

Which of his friends does he have to ask, and in which order, to find the right answer?

- A) Ladina only.
- B) First Severin, then Quirina.
- C) First Severin, then Ladina.
- D) First Quirina, then Severin, then Ladina.

T5. Spatial reasoning - output

Beaver Xavier wants to program his first online game and is learning to transform a picture. As a start, he only allows two operations for the picture, M and R:

Input	Operation	Output
	M (Mirror always on vertical axis)	
	R (Rotate 90 degrees clockwise)	

You have this original picture:



This sequence of operations is performed from left to right: R R R R M R M

Question / Challenge

What will the Output look like after performing the sequence of operations?



A)



B)



C)



D)

T6. T-shirt sorting

Bani Beaver works at a factory that makes t-shirts. Every t-shirt has 2 properties:

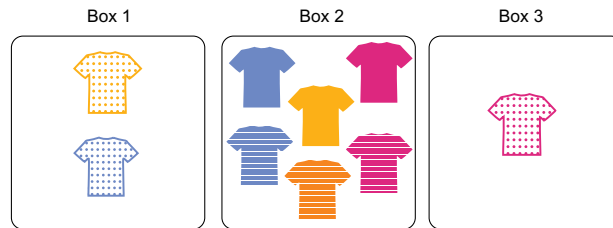
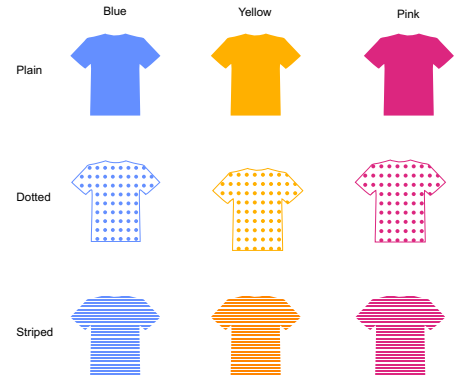
- **Colour:** Blue, Yellow, Pink
- **Pattern:** Plain, Dotted, Striped

Bani has a machine which sorts t-shirts into three different boxes based on her instructions.

On Monday, she gave the following instruction how to deal with each t-shirt:

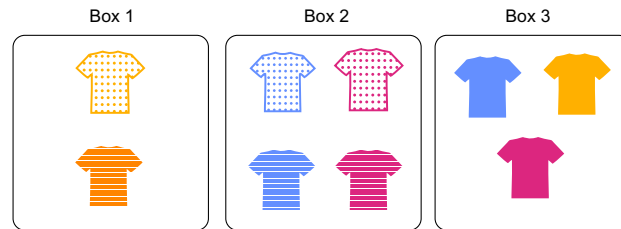
- If the pattern of the t-shirt is Plain or Striped, put it in Box 2;
- else, if the colour of the t-shirt is Pink, put it in Box 3;
- else, put it in Box 1.

The machine put the t-shirts into boxes as shown:



Question / Challenge

On Tuesday, Bani wanted the t-shirts to be sorted like this:



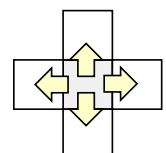
Which of these instructions would give Bani the desired result?

- A) If the colour of the t-shirt is Yellow, put it in Box 1; else, if the pattern of the t-shirt is Plain, put it in Box 3; else, put the t-shirt in Box 2.
- B) If the pattern of the t-shirt is Plain, put it in Box 3; else, if the colour of the t-shirt is Yellow, put it in Box 1; else, put the t-shirt in Box 2.
- C) If the colour of the t-shirt is Blue or is Pink, put it in Box 2; else, if the pattern of the t-shirt is Plain, put it in Box 3; else, put the t-shirt in Box 1.
- D) If the pattern of the t-shirt is Dotted or is Striped, put it in Box 2; else, if the colour of the t-shirt is Yellow, put it in Box 1; else, put the t-shirt in Box 3.

T7. Foggy Day

It is a very foggy day on Bebrasland and the low fog is expanding everywhere.

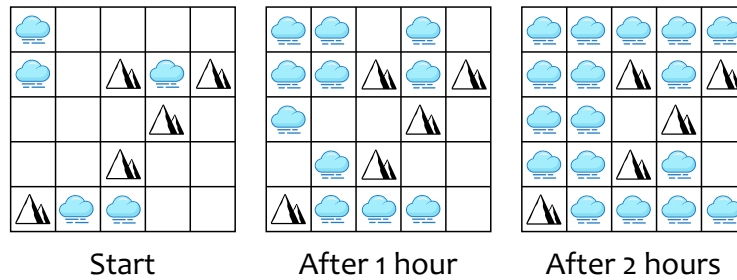
The map of the terrain can be seen as a grid. The fog ☁️ starts in some positions and each hour it expands to all 4 neighboring positions: left, right,



up and down. The fog will eventually expand to all positions except those with a mountain

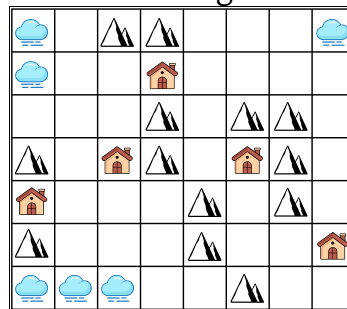


The following example shows a starting map and what happens in the next 2 hours:



Question / Challenge

For this map, how many hours will it take the fog to cover all houses ?



A) 3

B) 5

C) 7

D) 9

Tasks T8 – T14 carry 4 points each

T8. The Clever Beavers' Secret Code

In Beaver Valley, a group of clever beavers built a special computer to store their secrets. This beaver-computer uses sequences of **0s** and **1s**, called **bits**, to store all information.

Step 1: Numbers with 5 bits

The beavers first decided to use exactly **5 bits**, allowing them to represent numbers from **0 to 31**. Each bit has a value:

16	8	4	2	1
----	---	---	---	---

To find out which number is represented, simply add the values of bits set to 1.

- 00001 = 1
- 00101 = 4 + 1 = 5
- 11111 = 16 + 8 + 4 + 2 + 1 = 31

Step 2: Letters with 5 bits

The beavers also wanted to write messages, so they used the same numbers to represent letters:

- **A** = 1 (00001)
- **B** = 2 (00010)
- **C** = 3 (00011)
- ...
- **Z** = 26 (11010)

But now, how can the computer tell if the 5 bits 00010 mean the letter **B** or the number 2?

Step 3: The clever solution — an extra bit!

The beavers added an **extra bit** at the beginning:

- If the first bit is **0**, it's a letter.
- If the first bit is **1**, it's a number.

Examples:

[Type Bit] + [Data Bits] → [Combined 6 bits] → Meaning

0 + 00010 → 000010 → letter B

1 + 00010 → 100010 → number 2

0 + 00011 → 000011 → letter C

1 + 00101 → 100101 → number 5

Now it's your turn to decode! The following 18-bit sequence contains a three-character secret message. Remember to process it in **three groups of 6 bits each**, using the rules you learned:

000011100100000010

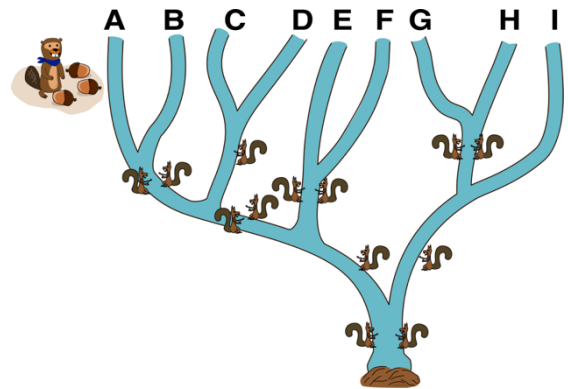
Question / Challenge

What message is encoded in this 18-bit sequence?

- A) B1T B) C4B C) 3D2 D) B42

T9. Catch the acorn

A beaver is playing ‘Catch the acorn’ with the squirrels. There are nine streams, labeled A, B, C, D, E, F, G, H and I, all meeting at the beaver’s dam at the bottom. The beaver has three acorns and can choose three streams and place one acorn into each one. He wants at least one acorn to arrive at the dam.



The squirrels guard the streams, either alone or in pairs.



One squirrel alone:

- They miss the first acorn but catch the second one.
- If two acorns arrive at the same time, they only catch one of them.



Two squirrels in a pair:

- They catch the first acorn, but they fight over it, so they miss the second one.
- If two acorns arrive at the same time, they only catch one of them.

Each stream has 0 or 1 acorns and all acorns are released at the same time.

Question / Challenge

What is the correct order so that the beaver place three acorns at the tops of three different streams so that at least one acorn reaches the dam?

- A) BDF B) BGH C) CEG D) EFI

T10. Emma's Garden

Emma wants a magical garden. Today is her planting day.

She has space for 4 types of magical flowers in her garden. She has 9 different types of flowers to choose from. Each type of flower takes a certain number of days from planting before it starts blooming, and it stays blooming for a certain number of days.

Emma wants to choose the flowers so that there will be a period of at least 15 days when at least one type of flower will be blooming. She needs to think carefully about how long each flower takes from planting to blooming and how long it lasts.

These are the flowers that Emma has to choose from:

Flower number	Flower name	Number of days from planting to blooming	Number of blooming days
1	Daisy	8	4
2	Lavender	3	4
3	Lily	10	2
4	Marigold	4	3
5	Orchid	13	3
6	Peony	13	4
7	Rose	3	6
8	Sunflower	12	5
9	Tulip	2	2


Question / Challenge

Today is Emma's planting day. Which four flowers should she plant in order to have flowers blooming every day for at least 15 days?

- A) 1, 7, 8, 9 B) 2, 4, 6, 8 C) 3, 5, 7, 8 D) 1, 4, 8, 9

T11. Fabulous Machine

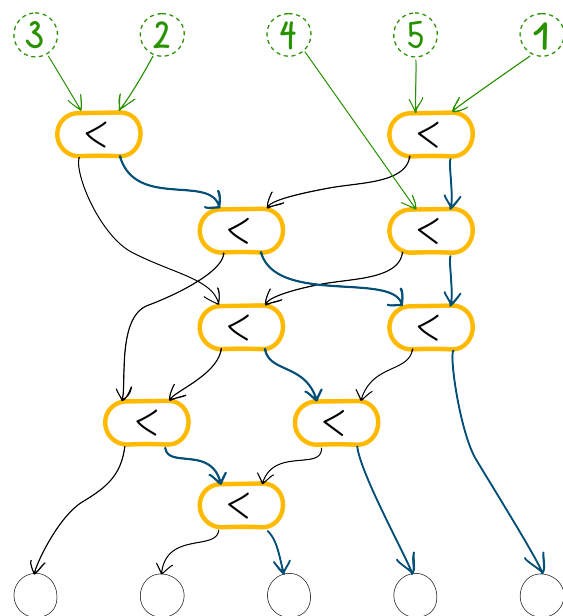
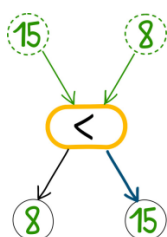
The Beavers have a fabulous machine. Five numbers are put on the input spots at the top, like 3, 2, 4, 5, and 1, for instance.

Along arrows and switches , the numbers make their way through the machine, down to the output spots at the bottom.

Each of the nine switches compares two incoming numbers and routes ...

- ... the smaller number to the left and
- ... the larger number to the right.

Here is an example:



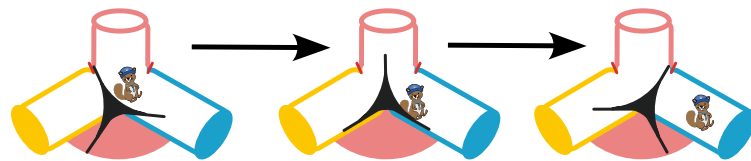
Question / Challenge

What task does the fabulous machine perform?

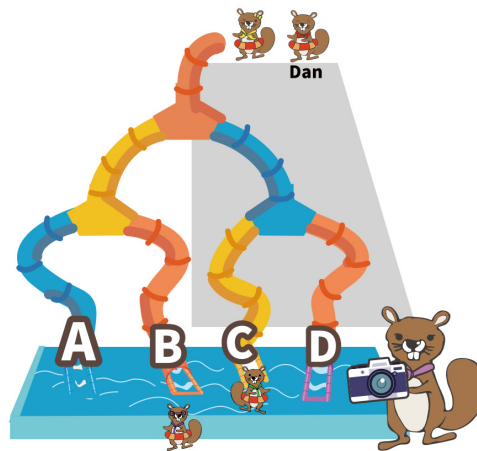
- A) Output the numbers in reverse order! Result: 1, 5, 4, 2, 3
- B) Sort the numbers in ascending order! Result: 1, 2, 3, 4, 5
- C) Sort the numbers in descending order! Result: 5, 4, 3, 2, 1
- D) Output the numbers in the same order! Result: 3, 2, 4, 5, 1

T12. Exciting water slide

The Beaver Amusement Park has an exciting dynamic waterslide. The following diagrams show how it works: a mechanism controls the exit direction of each fork; whenever a beaver passes through a fork, the exit direction flips.



As the following picture shows, Little beaver Dan wants to try the waterslide. Mommy beaver wants to know where Dan will exit the slide so that she can take good pictures. She first sees a beaver exit from slide B, and then another from slide C. Little beaver Dan is the one after the next beaver.



Question / Challenge

From which slide will Little beaver Dan exit?

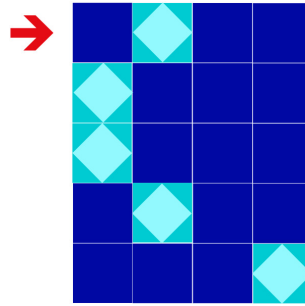
- A) Slide A
- B) Slide B
- C) Slide C
- D) Slide D

T13. Tiles

Maria must tile a floor with 24 tiles: 19 plain and 5 patterned .

The floor is arranged in a grid of 5 rows by 4 columns. She began placing the tiles from the position indicated by the red arrow, from left to right. After completing a row, she continued the row below, always from left to right.

The final floor design is represented in the following image:



Question / Challenge

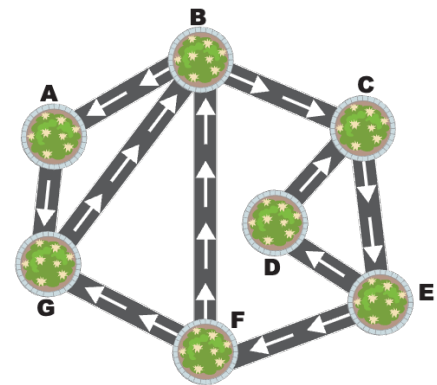
What strategy did Maria follow to create the design?

- A) Maria uses a patterned tile to separate the groups of plain tiles. In each group, she places one more plain tile than in the previous group.
- B) Maria uses a patterned tile to separate the groups of plain tiles. In each group, she places twice as many plain tiles as in the previous group.
- C) Maria placed the patterned tiles so that no two patterned tiles were neighbour each other.
- D) Maria placed the patterned tiles so that every column had at least one patterned tile.

T14. A blocked street

The map in the right shows a city, which has 7 parks connected by 10 one-way streets. The street network allows citizens to travel from any park to any other.

Bertrand and Noam are organizing a peaceful sit-in for peace, which will involve blocking one street. To minimize disruption, they need to choose a street to occupy that will still allow citizens to travel between any two parks in the city, respecting the one-way street directions.



Question / Challenge

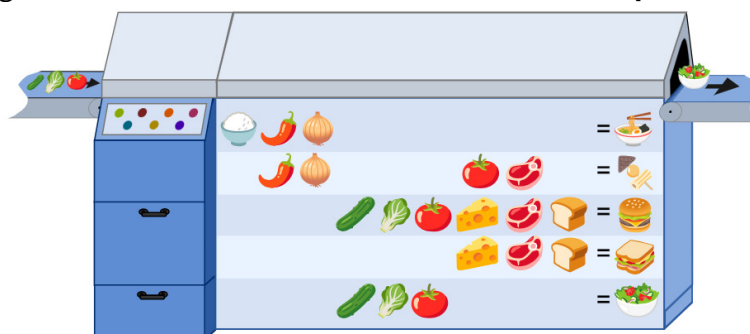
Which of the following street segments should the organizers choose for the sit-in?

- A) AB
- B) BG
- C) CE
- D) FG

Tasks T15 – T21 carry 5 points each

T15. The Bebravy Food Machine

The **Bebravy Food Factory** uses a special machine to prepare dishes. The machine checks the incoming ingredients and tries to match them with the **recipes** shown below:



Each recipe must be matched exactly, using consecutive ingredients in the correct order. The machine cannot skip any ingredient. Once used, an ingredient cannot be reused. Unused ingredients will pass through without change.

For example:

This input:	
... gets processed as:	
... to produce this output:	

Question / Challenge

These ingredients will be put on the conveyor belt:



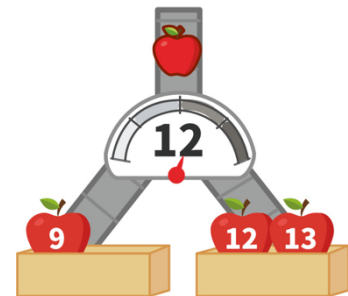
What is the smallest number of outputs (dishes and unprocessed ingredients) that the machine can produce with this input?

- A) 7
- B) 8
- C) 9
- D) 10

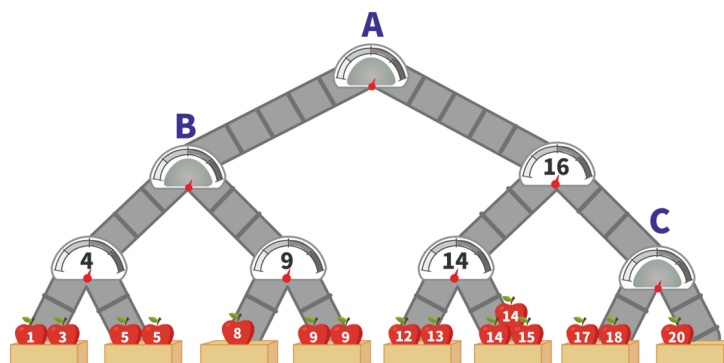
T16. Apple classification machine

At Beaver orchard, apples are sorted into 8 weight-based grades, with apples of the same grade sent to the same packaging area.

To handle the harvest efficiently, Mr. Beaver designs an automatic sorting machine. He puts apples on top of the machine. As each apple moves through the machine, it passes weight sensors that determine its path: if an apple is equal or heavier than the sensor's value, it drops through the right chute; otherwise, it drops through the left one. The number on each apple represents its weight.



The machine has already sorted some apples, and the results are shown in the picture below. The displays on the weight sensors A, B, and C are broken, so we need to figure out the values.



Question / Challenge

Which of the following values could be correct for weight sensors A, B, C?

- | | | | | | | | | | | | |
|----|--|--|----|--|--|----|--|--|----|--|--|
| | | | | | | | | | | | |
| A) | | | B) | | | C) | | | D) | | |

T17. Encryption

George encrypts words using the algorithm consisting of two steps:

1. First, he goes through the word **from left to right**, taking each letter in an **odd position** (first, third, fifth, ...) and joining them together. E.g. for the word bread, he gets bed in this step.
2. Then he goes through the word **from right to left** and gradually joins all the other letters to the end of the encrypted word from the first step. Thus bread is finally encrypted into bedar.

George found that if he repeats this algorithm several times, he will get the original word: e.g. encrypting the word **milk** he gets mlki, encrypting mlki he gets mkil and mkil would be encrypted into milk. He got the **original word** after **3 encryptions**.

Question / Challenge

How many times does George have to use his encryption algorithm to get the word **society** from the word **society**?

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

T18. Mail room

Mel owns a mail company. She has four rooms that each move parcels from a start point to an expected location following a list of commands.

Parcels start on a YELLOW tile and move in the direction of the arrow.

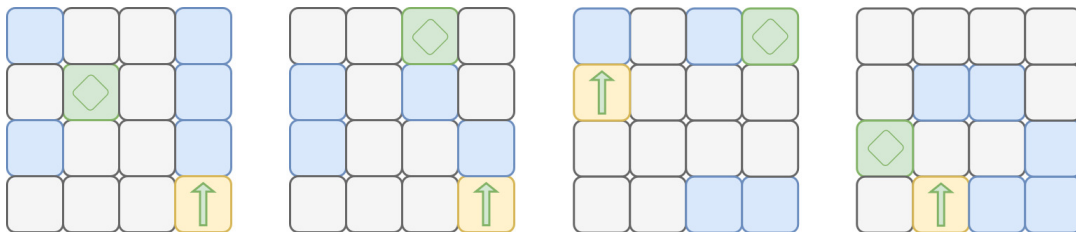
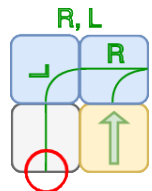
When on a GREY tile, the parcel will continue moving in the current direction until it encounters a wall or a different colour tile.

When on a BLUE tile, the parcel will turn either left (L) or right (R) according to the next command in the list of commands.

If on a BLUE tile and the command leads to a wall, the parcel bounces off the wall and continues moving in the opposite direction. If on a GREY tile and the parcel hits a wall, it stops on the GREY tile.

When the parcel enters a GREEN tile, it stops and all remaining commands are skipped.

Mel would like one list of commands to deliver parcels in all four rooms to GREEN tiles.



Question / Challenge

Which list of commands will Mel choose?

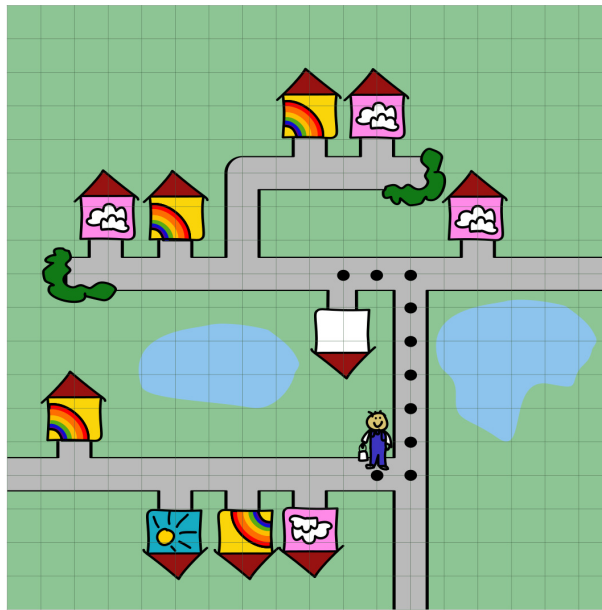
- A) L, R, R, L, L B) R, R, L, L, R C) R, L, R, R, L D) L, L, R, L, L

T19. House painter

Kei is moving into a neighbourhood where there are houses of many colours: pink (P), yellow (Y) and blue (B). Kei's new house is currently painted white, but he wants to change that.

Kei would like the colour of his house to balance out the colours of his neighbourhood. He wants to pick the colour that occurs least frequently among his N closest neighbours, where N is a positive whole number. Distance is measured as the length of the road between two houses. If there are multiple colours that satisfy that condition, he breaks the tie by picking the colour that occurs closest to him.

The map below shows Kei's house (in white) and the locations and colours of the neighbouring houses.



Kei knows that, depending on what number N he picks, he might paint his house a different colour.

For example, for $N = 3$, he finds 2 houses are pink (P) and 1 house is yellow (Y) among his 3 closest neighbours. So he will paint his house yellow.

For $N = 2$, he finds 1 house is pink and 1 is yellow. Since the pink house is closer to him, he will paint his house pink.

Question / Challenge

Which option correctly matches each value of N to the corresponding colour of Kei's house?

A) $N = 6$: pink, $N = 9$: blue

C) $N = 6$: yellow, $N = 7$: yellow

B) $N = 5$: pink, $N = 7$: yellow

D) $N = 8$: yellow, $N = 7$: pink

T20. Dure

Hana's village follows the tradition of 'Du-re'. Du-re is a Korean cooperative system where villagers work together on farming tasks.



In her village, they need to arrange 3 days every week for Du-re with the following rules:

1. At least 4 villagers must participate in each Du-re day.
2. Each villager should participate in at least one Du-re day.
3. No one must work on all Du-re days.

The availability of the villagers are shown below ('O' means available.).

Name	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Ain	O		O		O	O	
Boa	O	O	O				
Chaewon		O			O		
Doyun			O	O		O	
Eunwoo	O			O			O
Felix		O		O		O	
Gaon	O		O				O
Hana		O			O	O	

Question / Challenge

On which days should Du-re be scheduled?

- A)** Monday, Tuesday, Wednesday **B)** Monday, Tuesday, Saturday
C) Monday, Wednesday, Saturday **D)** Tuesday, Wednesday, Saturday

T21. Beaver book exchange club

Six beavers Anita, Babloo, Chintu, Deepa, Esha, and Falak give and receive books as part of a book exchange club. Each beaver has favorite genres. They only exchange books according to the following to maximize their enjoyment:



- Each beaver gives exactly one book of their favorite genre to another beaver with whom he shares a favorite genre.
- Each beaver receives one book of another one of their favorite genres from another beaver with whom he shares a favorite genre.

These are their favorite genres:

Beaver	Mystery	Adventure	Science fiction	Fantasy	History	Biography
Anita	✓	✓				
Babloo			✓	✓		
Chintu					✓	✓
Deepa		✓	✓			
Esha	✓				✓	
Falak				✓		✓

Question / Challenge

If Chintu gives his book to Esha. What type of book is given to Babloo, and from whom?

- A)** Fantasy, from Anita **B)** Fantasy, from Falak
C) Science Fiction, from Deepa **D)** Science fiction, from Chintu

END