RoBy
Robotics vs Bullying

PANEVĖŽIO RAJONO ŠVIETIMO CENTRAS

Co-funded by the Erasmus+ Programme of the European Union

PANEVĖŽYS DISTRICT EDUCATION CENTER

COMMUNITY **ALGORITHM** IN A ROBOT'S **BACKPACK**

METODICAL PUBLICATION

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PANEVĖŽIO RAJONO ŠVIETIMO CENTRAS

NAUJAMIESČIO MOKYKLA

VELŽIO GIMNAZIJA

PANEVĖŽIO R. KREKENAVOS LOPŠELIS-DARŽELIS „SIGUTĖ"

Sypsenėlė
VELŽIO LOPŠELIS - DARŽELIS

PANEVĖŽIO ILTIES PROGIMNAZIJA

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Robotics versus Bullying

2023, Naujamiestis town.

It would be extremely hard to find a field which is not yet been tested or accompanied by robots these days. Robotics is no longer just a theory of the future; it is a part of our present reality. Robotics in education is particularly effective in engaging children who are attracted by smart innovation and a hands-on approach to learning. This is an immersive tool that makes the abstract and complex concepts of science and technology easier to understand, meanwhile developing creative thinking and coordinating teamwork.

Depending on the different interests and learning abilities, each child can be assigned a separate work task: to design, to construct or to code. For teachers it is a great tool for enabling collaborative activities, developing students' leadership skills, teamwork mindset, facilitating socialization.

This methodical publication Community Algorithm In A Robot's Backpack is a source of ideas which came out from the friendship between the educational robots and the Preschool and Primary school teachers and librarians of Panevėžys city and Panevėžys district. We have included practical tasks and tools that we developed and tested together with our students in this robot's backpack. Engaging activities allow children to solve problems in a fun and stress-free way simultaneously performing programming tasks, developing algorithmic thinking, creatively searching for optimal solutions, harmonious communicating and cooperating in the team.

We hope that there will be no shortage of new discoveries and improvisations in your lessons!

Laura Šinkūnienė

Common marking

- Aim
- Tools
- Description
- Summary
- Age
- Subject
- Duration

In this publication you will find...

Author: Preschool teacher ARNĖ BUDAVIČIENĖ
Panevėžys district Krekenava nursery-kindergarten SIGUTĖ

Having programmed the robot according to the indicated arrows perform the tasks hidden in the boxes.

3—7 year old	Calculation, programming, arts, physical activity	30—40 mins.

Robot, robot grid with cards, 2 dices, various art and group activity tools

Getting started: *cards are placed on the robot grid and the gameplay is explained.*

Tasks:

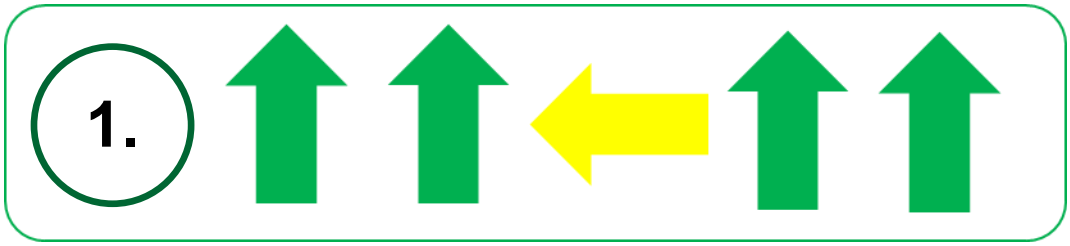
- *Two dices are rolled.*
- *Points rolled are counted.*
- *The card of the resulting sequence of arrows is selected.*
- *Following the specified sequence, the robot is programmed.*
- *It is considered what other way the robot could arrive at the same card.*
- *The task indicated on the card is performed.*
- *Another child repeats the steps.*

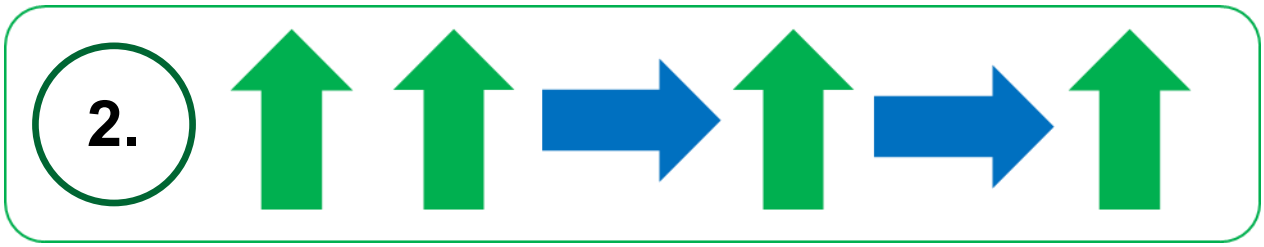
- Is there another way to achieve the goal?
- Is this the shortest path?

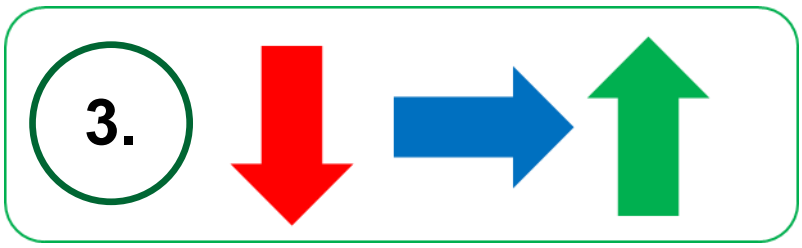
Robot grid

	A	B	C	D	E
1	1.		9.		5.
2		8.	12.	2.	
3	4.	10.	**START**	11.	7.
4		6.		3.	

Arrow sequence cards

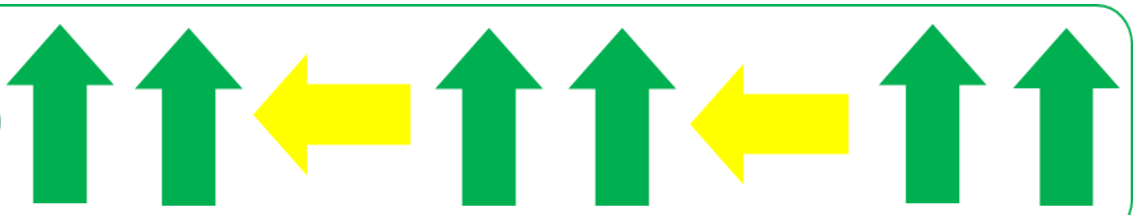






Arrow sequence cards

4.



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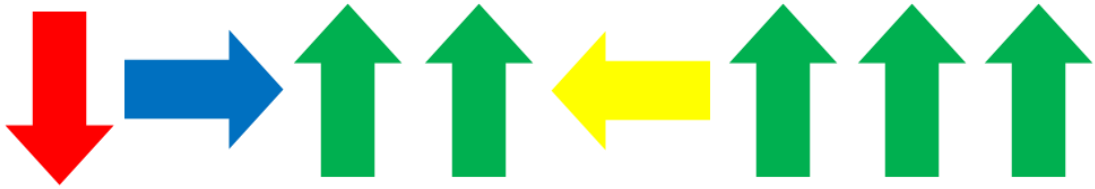
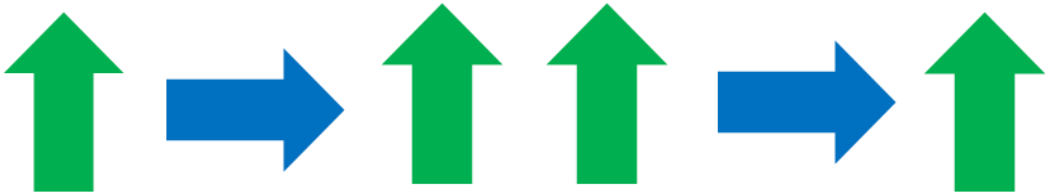


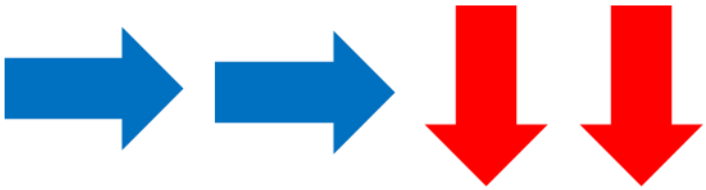
6.

7.



8.

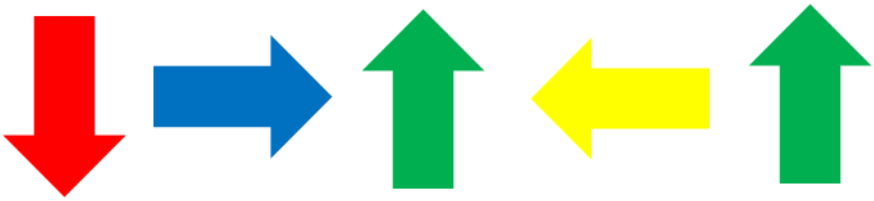
9.



Arrow sequence cards

10.

11.



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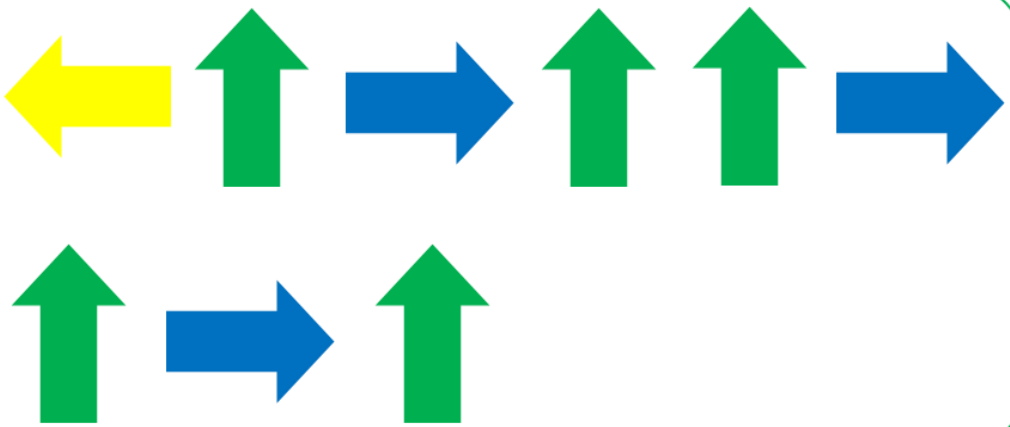


Task cards

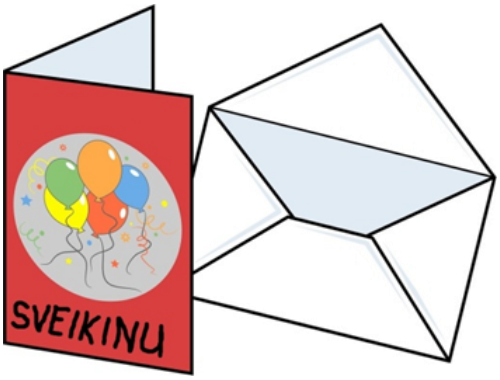
START

Task cards

Create your favorite animal from plasticine

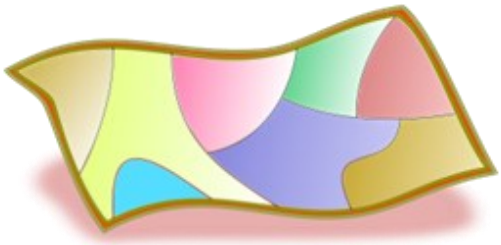
Choose and wash one toy

Make a greeting card for your friend

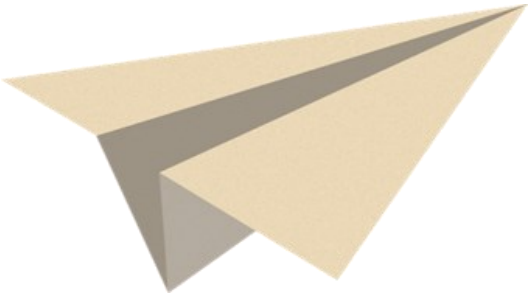


Jump like a frog 10 times

Place a piece of paper on the ground and draw a picture



Fold the paper airplane and decorate it



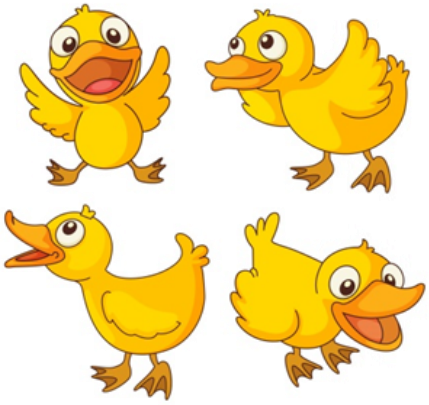
Task cards

Draw a picture, cut it, mix the pieces and put them back together

Go slowly foot after foot and get a drink of water

Draw a portrait of your friend

Dance the "Duck Dance"



Color the selected picture with all the colors you have

Draw the outline of your palm, cut it out and decorate it

Author: Preschool teacher INGA BALTRIMAVIČIENĖ
Panevėžys district Velžys nursery-kindergarten ŠYPSENĖLĖ

When programming the robot, make your way from the START to the END and complete the tasks provided.

4—6 year old

Calculation, logical thinking, cooperation

30 mins.

Robot, robot grid, picture cards, robot markers, game dice .

Getting started: *children choose how they want to label their robots with to distinguish them. If more children are playing, they are divided into teams, roles are assigned (who will program the robot, who will play the dice, who will complete the tasks). The rules of the game are discussed.*

Tasks:

- *The robots are placed on the START field.*
- *The child rolls the game dice and foresees the robot's path. The robot is programmed for as many steps as there are points on the dice.*
- *The player who moves the robot and stops on the right square performs the assigned task.*

- How did you feel when programming the robot? Why?
- Did you manage to find the right path?
- Was the task interesting for you? Why?
- Which was the most difficult part of the task and why?
- Why was help needed?

Robot grid

	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							
7							

Robot markers

Picture cards

1.

Compliment each player

5.

Compliment each player

8.

The player behind you moves **2** spaces forward

16.

Hug yourself and tell yourself something nice!

4.

Go back to START field

12.

Hug yourself and tell yourself something nice!

Picture cards

11.

Return to the mountains below

15.

Return to the mountains below

6.

Sing a happy song

9.

Sing a happy song

17.

Sing a happy song

7.

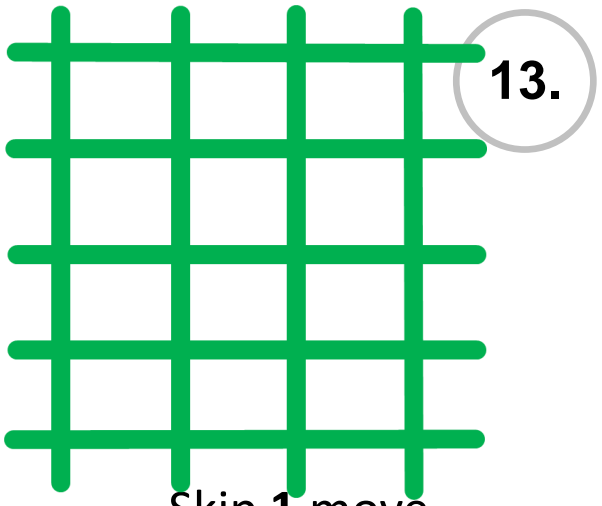
Do a calming exercise together

Picture cards

Go to **SPEAKER** field

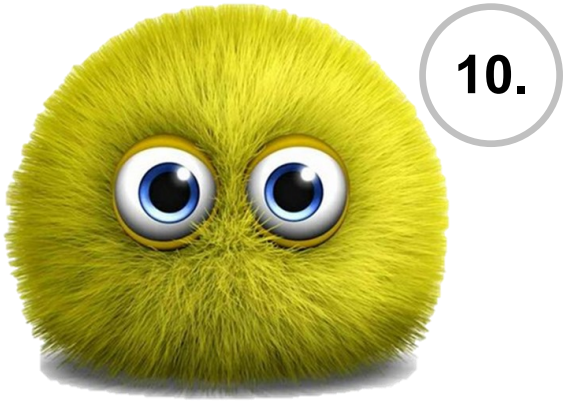
Go to **SPEAKER** field

Skip **2** moves



Skip **1** move

Show positive emotion without speaking



Show positive emotion without speaking

Picture cards

START	**FINISH**

Lyrics

If you like this song, give it a clap. If you like this song, give it a clap. If you like this song, sing it all day long. If you like this song, give it a clap.	If you like this song – stamp your feet. If you like this song - stamp your feet. If you like this song, sing it all day long. If you like this song - stamp your feet. .
If you like this song, shout Hurray! If you like this song, shout Hurray! If you like this song, sing it all day long. If you like this song, shout Hurray!	If you like this song, sing again. If you like this song, sing again. If you like this song, sing it all day long. If you like this song - sing again!

Author: Preschool teacher INGA BALTRIMAVIČIENĖ
Panevėžys district Velžys nursery-kindergarten ŠYPSENĖLĖ

While programming the robot find the right path from arrow to arrow.

4—6 year olds

Calculation, logical thinking, cooperation

30 mins.

Robot, robot grid, arrow cards, picture cards, markers, tablets.

Getting started: *children prepare a mat for the robot — they arrange the pictures on the robot's grid according to the given example. You need to find a way, traveling from one picture to another, according to the example on the cards.*

Tasks:

- *Children use the arrow cards to lay out the path.*
- *The path is transferred to the robot's **CODING** environment (using the tablet); **BASIC CODING** mode is used.*
- *The robot is connected to a smart device.*
- *The robot is prepared for drawing, a felt-tip pen is inserted.*
- *The robot draws a programmed path on the prepared grid.*

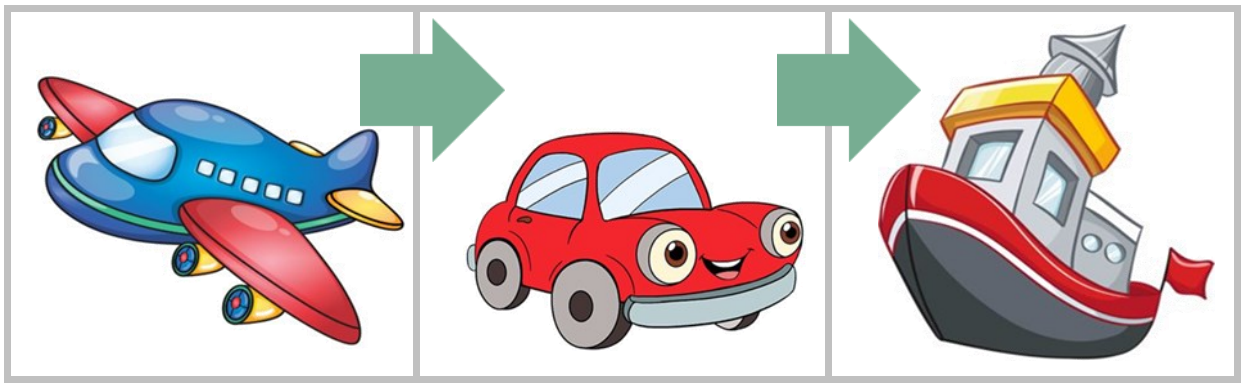
- How did you feel when programming the robot? Why?
- Did you manage to find the right path?
- Was the task interesting for you? Why?
- Which was the most difficult part of the task and why?
- Why was help needed?

Robot grid

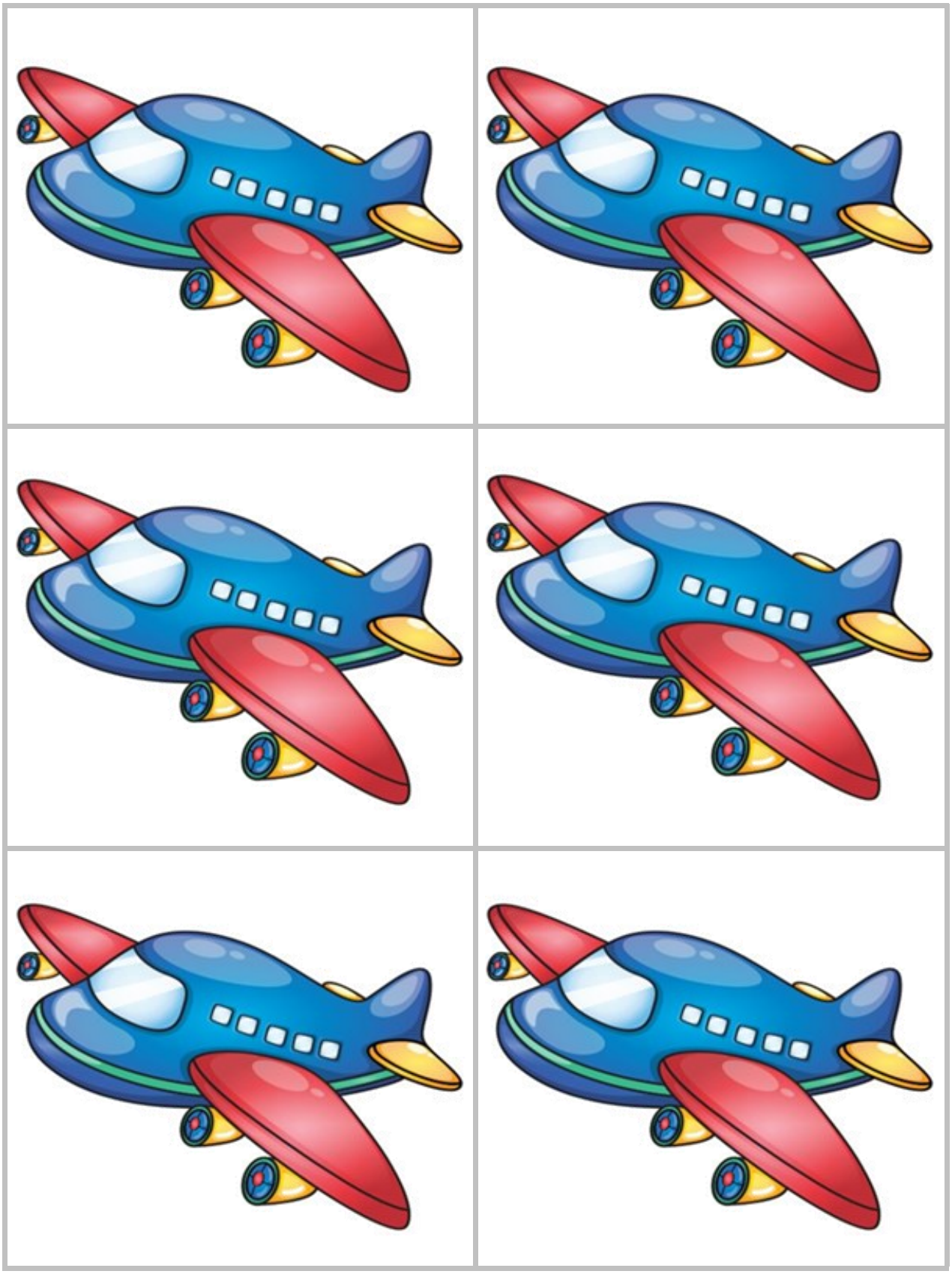
	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							
7							

Example

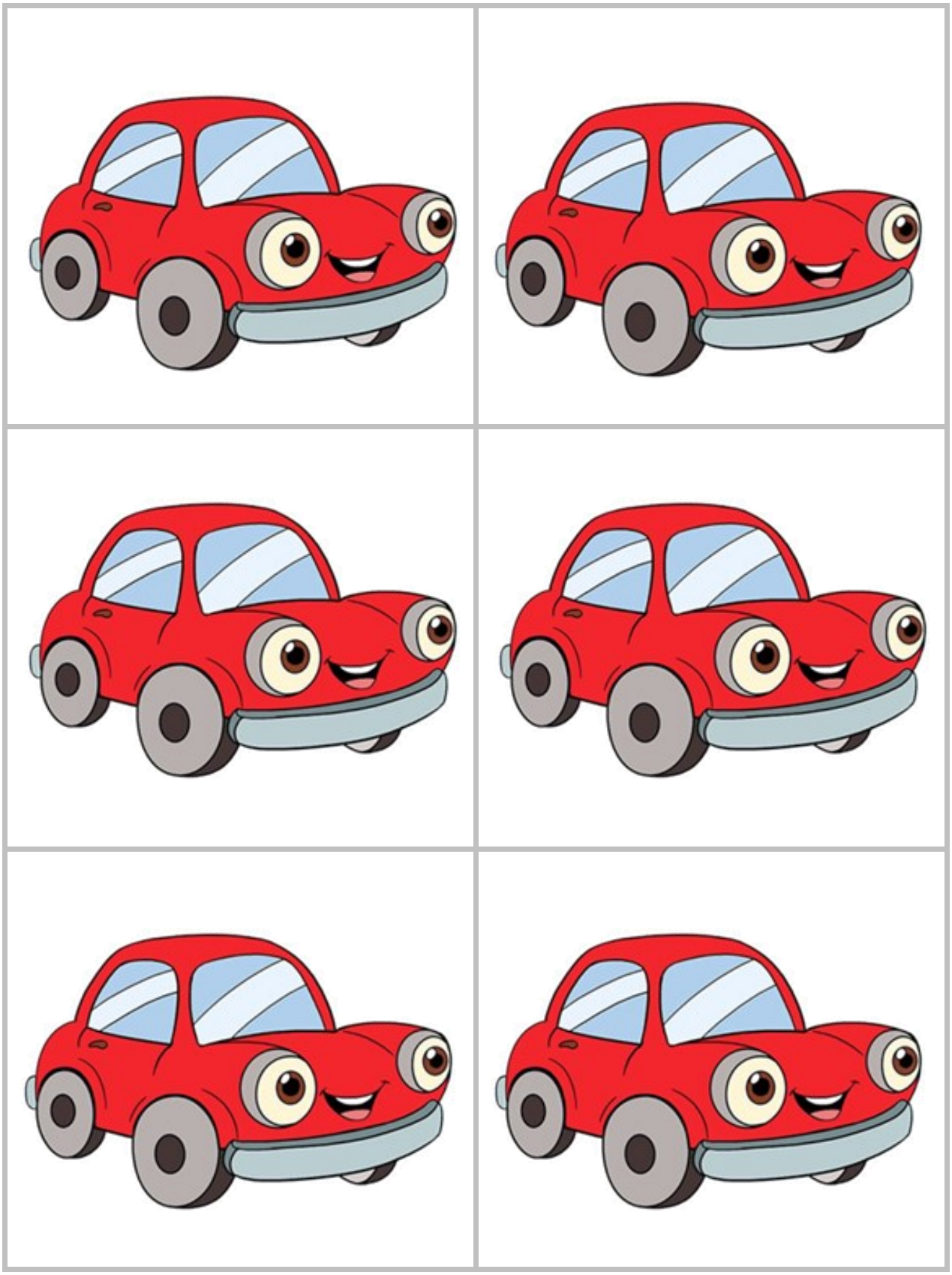
Find your way by moving from one picture to another, following the example given:



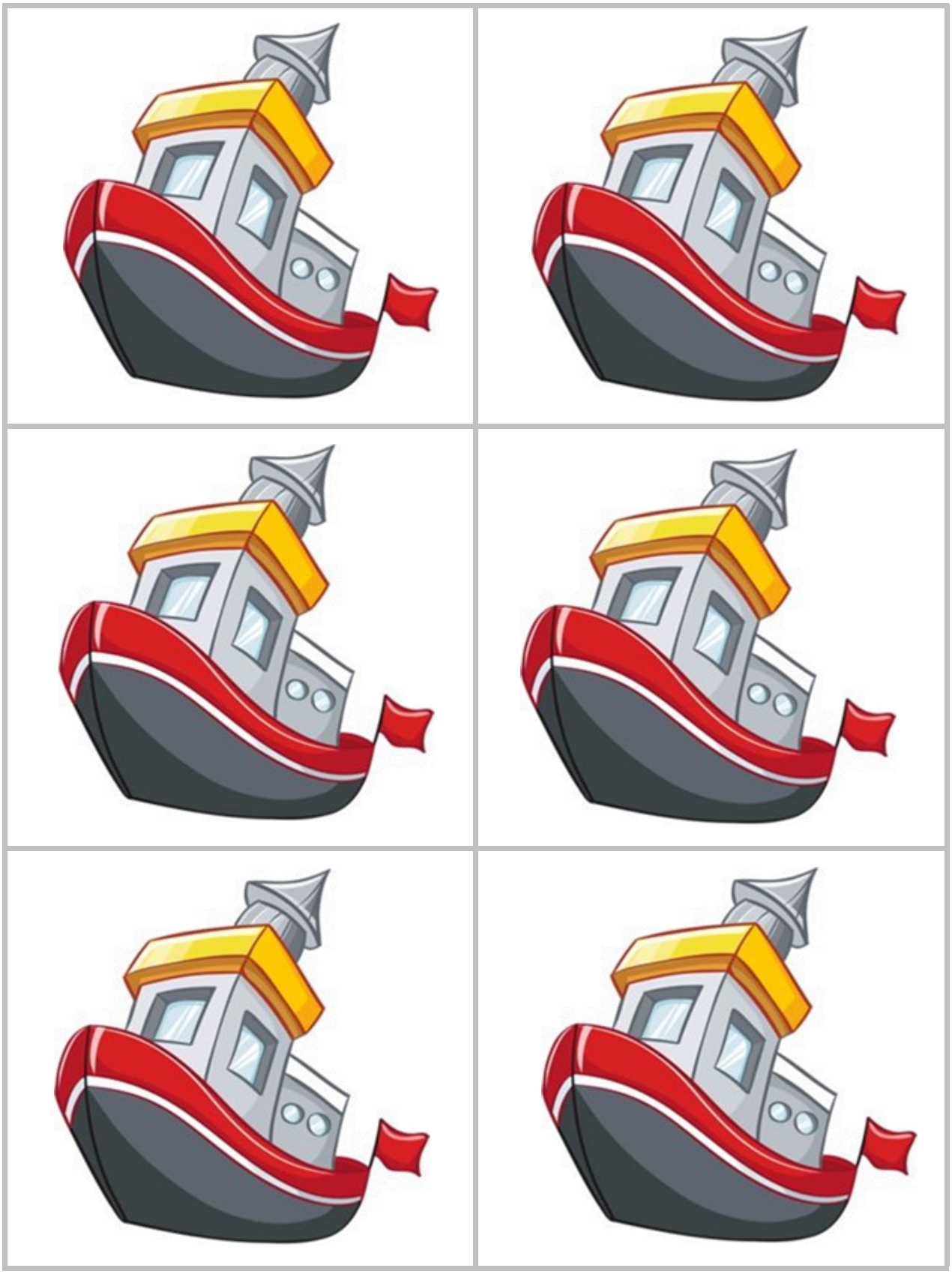
Picture cards



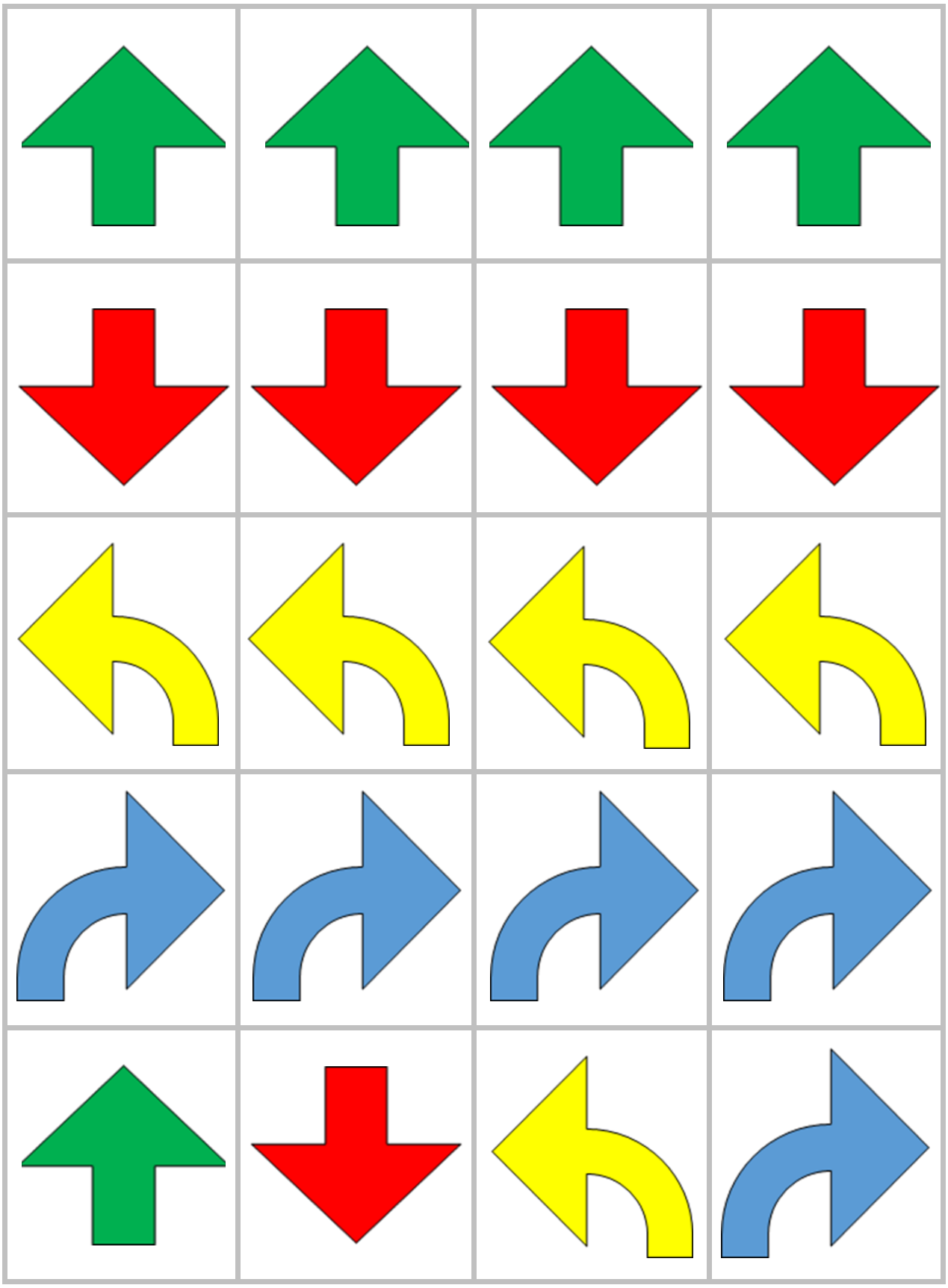
Picture cards



Picture cards



Arrow cards



Author: Librarian LAURA ŠINKŪNIENĖ
Panevėžys District Naujamiestis School

Having revised the terms (left, right, up, down, ascending, decreasing) and their values, the students have to create a robot number (form 0 to 9) drawing plot program, where numbers are drawn and arranged in an ascending or descending order.

Grades 1—2, five groups

Mathematics, informatics, arts and technology

1 lesson

Worksheet, A4 sheets, direction cards, 4 color pencils (green, blue, yellow, red), robot, felt-tip pen, tablet.

- **Getting started:** *grouping, revision of key concepts (left, right, up, down, ascending, descending), a brief presentation of the task, a reminder on how to link the robot with the tablet.*

Tasks:

- *The group receives a worksheet with two written numbers on a checkered paper. One number code is written with errors which students need to find and correct, another number – they need to write the code themselves.*
- *By sharing the work in a group, students create a digital drawing algorithm and search for errors in the program code.*
- *The numeric code for the robot is written only in the specified colors and directional arrows (as shown on the robot), arrow cards are available.*
- *The code is transferred to Mind Designer* **CODING** *environment (on the tablet), the* **ADVANCED CODING** *mode is used.*
- *The program for each digit is saved under a separate name.*
- *The robot is paired with a smart device.*
- *The numbers are printed on individual A4 sheets.*
- *A numeric code is glued next to the drawn number (the errors should be highlighted).*
- *The work of the group is presented in a numerical order, finding the correct position for each number (ascending or descending).*

**** If the group did the work quickly, the teacher may offer students to improve the given numbers, e.g. add more details and then having transfered to the app code, draw those numbers using the robot.*

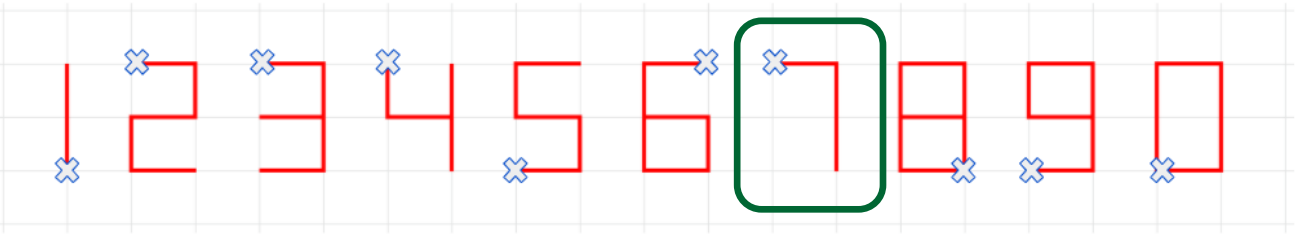
- *How did you decide what role you would play in the group?*
- *Which was easier - find the error or write a new code for a number? Why?*
- *Was the numeric code written immediately?*
- *How did you improve your program?*
- *Is it possible to draw the same digit using a differently written program code? Why?*
- *Where did you need the help most? Who helped?*

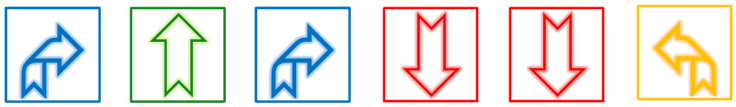
WORKSHEET

Group name	
Organizer	
Programmer	
Bug fixer	

TASK 1

Check the program code of the circled number. **X** marks the robot's **STARTING POINT**. When working together, find, mark, and correct the mistakes. **DRAW** a number on the sheet using the robot.



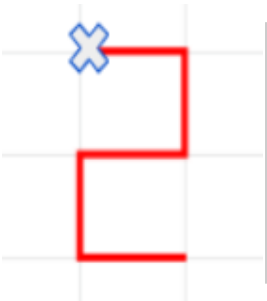


Bugs found:

Corrected Code:

TASK 2

Using the robot programming environment **CODING**, select the mode **ADVANCED**. Create an algorithm for the robot to draw the specified number. **SAVE** the program. **DRAW** the number on the sheet using the robot.



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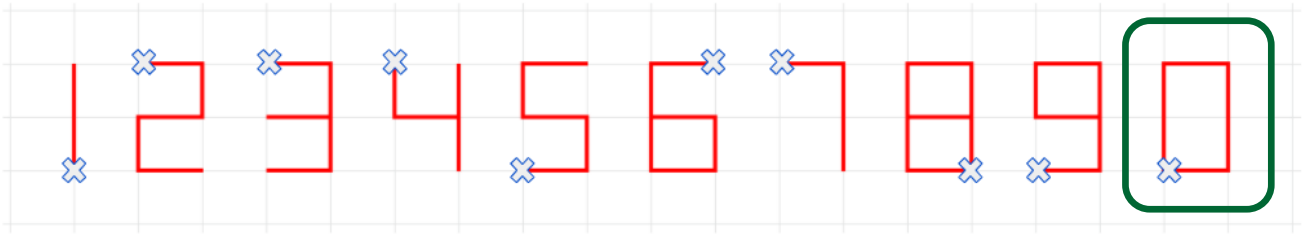

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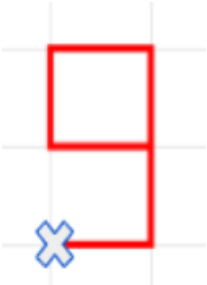

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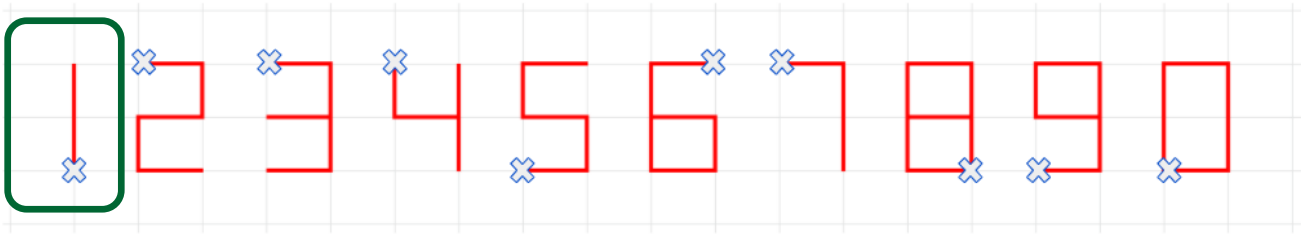

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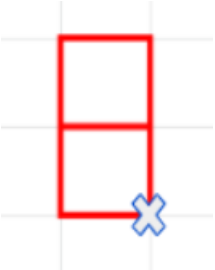

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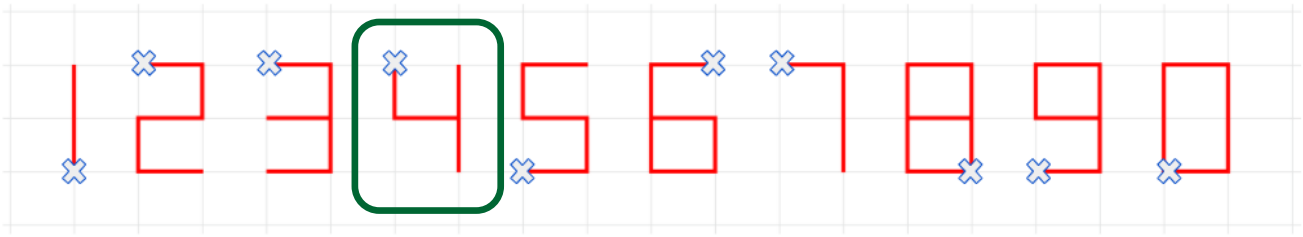

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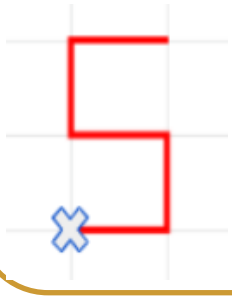

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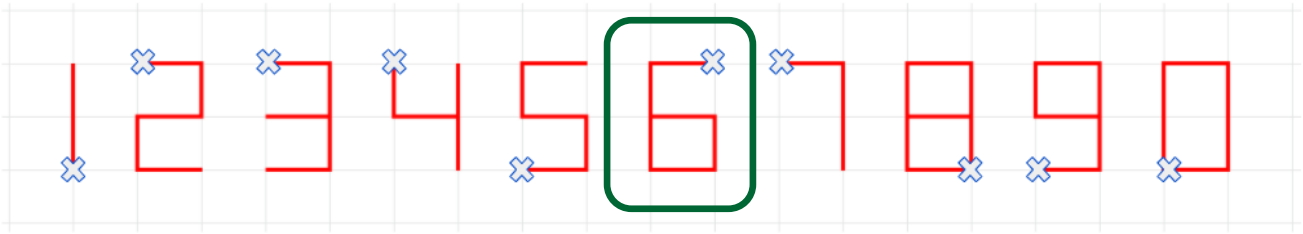

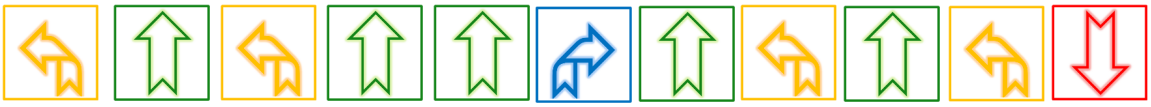

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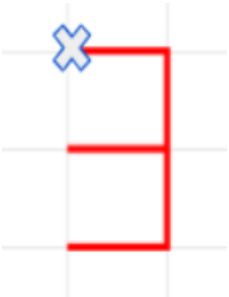
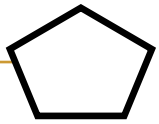


WORKSHEET



TASK 3

Glue the numeric code on the sheet of paper next to the drawn number.

TASK 4

Present the group work in a sequence of numbers by finding that number **an appropriate location** (in an ascending or descending order).

TASK 5

As you work together, **MODIFY** your **NUMBER** on a checkered paper, mark the **START POINT** (**X**).

Create an algorithm for the robot to draw the **MODIFIED** number.

SAVE the program.

DRAW the number on the sheet using the robot.

Author: Librarian LAURA ŠINKŪNIENĖ
Panevėžys District Naujamiestis School

Having revised the terms (left, right, up, down, top, bottom) and their values, the students have to draw a graphic drawing according to the given instructions; the code should be changed so that the robot can draw the drawing.

Grades 2—3, four groups

Mathematics, informatics, arts and technology

1—2 lessons

Worksheet, A3 sheet, direction cards, grey pencil, 4 colour pencils (green, blue, yellow, red), direction cards, robot, felt-tip pen, tablet.

- **Getting started:** *grouping, revision of key concepts (left, right, up, down, top, bottom), a brief presentation of the task, a reminder on how to link the robot with the tablet.*

Tasks:

- *Firstly the students divide into roles: draftsman, teacher, examiner, programmer, etc., after that students perform a graphic dictation following the marked point with arrows and numbers to find out what drawing is encoded on the sheet.*
- *When checking the drawing code students supplement it or change it so that the drawing itself could be drawn by a robot.*
- *The code for the robot is written only in the specified colors and direction arrows (such as those shown on the robot), it is suggested to use arrow cards (included).*
- *The revised code is transferred to the Mind Designer robot* **CODING** *environment (on the tablet) using* **ADVANCED CODING** *mode.*
- *The created programme is saved.*
- *The robot is paired with a smart device.*
- *The encoded drawing is drawn on the A3 sheet by a robot.*

- A graphic dictation and the drawing code are glued next to the drawing.
- Group work is presented to classmates at RoboArt gallery.

*** If the group did the work quickly, the teacher may offer them to create their own drawing on a checkered paper, write the drawing code for the robot (in a language understandable for the robot) and draw it.

- *How did you decide what role you would play in the group?*
- *Why did you have to change the graphic dictation code?*
- *How was the graphic dictation code different from the robot code?*
- *Did you succeed to write the code for the robot immediately?*
- *Where did you need the help most? Who helped?*

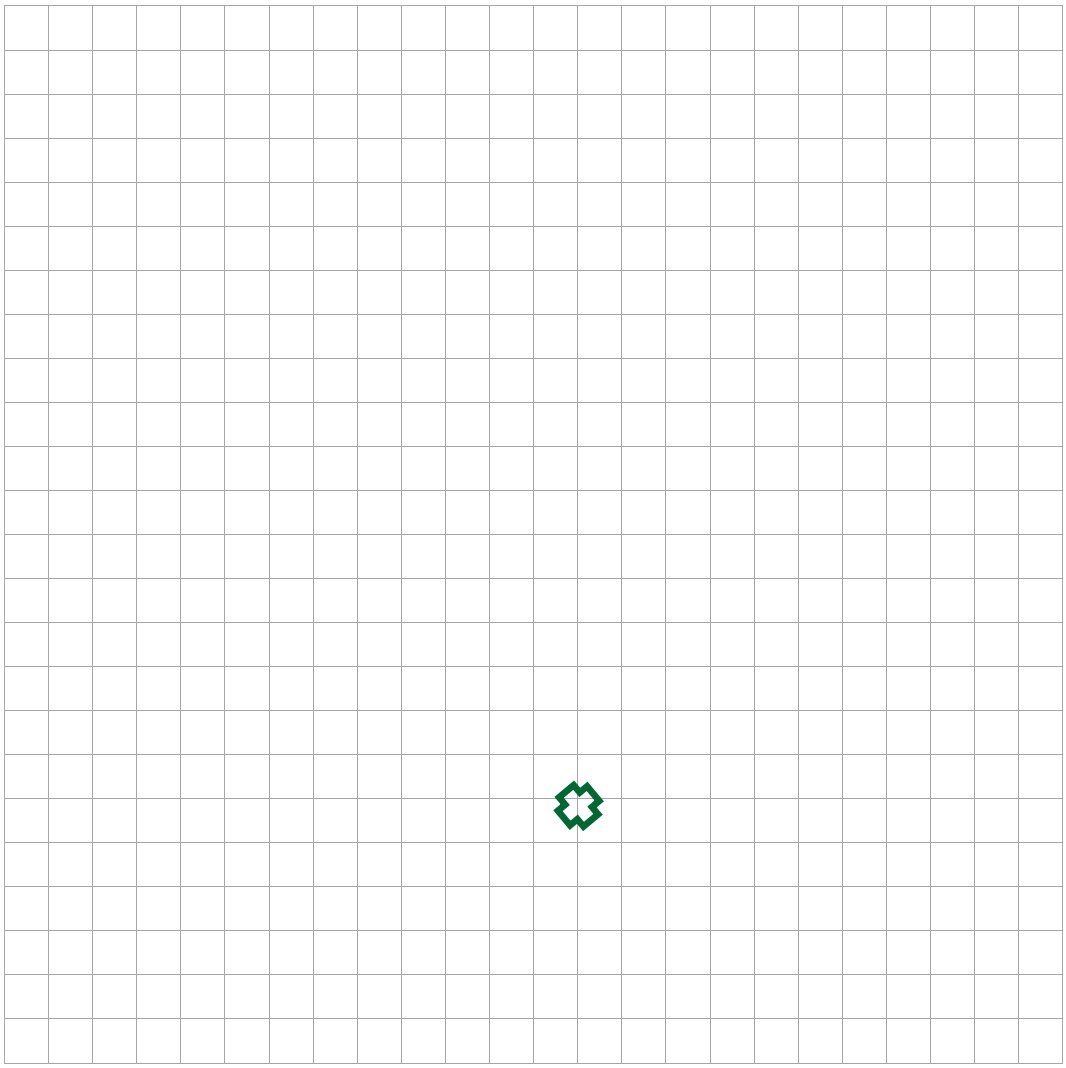
WORKSHEET

Group name	
Organizer	
Programmer	
Bug fixer	

TASK 1

As you work together, using a PENCIL start from the **marked point (x)** and follow the **ARROWS** and **NUMBERS** to find out what drawing you get.

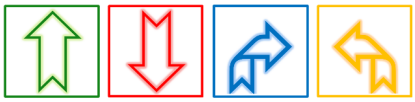
1↑ 2← 3↑ 1← 3↓ 2← 1↑ 1→ 5↑
2← 1↑ 3→ 1↑ 1← 3↑ 3→ 3↓ 1←
1↓ 3→ 1↓ 2← 5↓ 1→



WORKSHEET

TASK 2

Correct the **CODE** of the drawing so that it can be drawn by the robot. Write down the **CODE** with the appropriate **COLOR** and **DIRECTION** arrows (you can use arrow cards).



The corrected code:

TASK 3

Using the **CODING** environment select the **ADVANCED** mode.

Create an algorithm for drawing. **SAVE** the program. Set the robot to **DRAW** the drawing on a sheet of paper.

Glue the code and a hand drawn example with a code on the sheet next to the drawing drawn by the robot.

NOTES

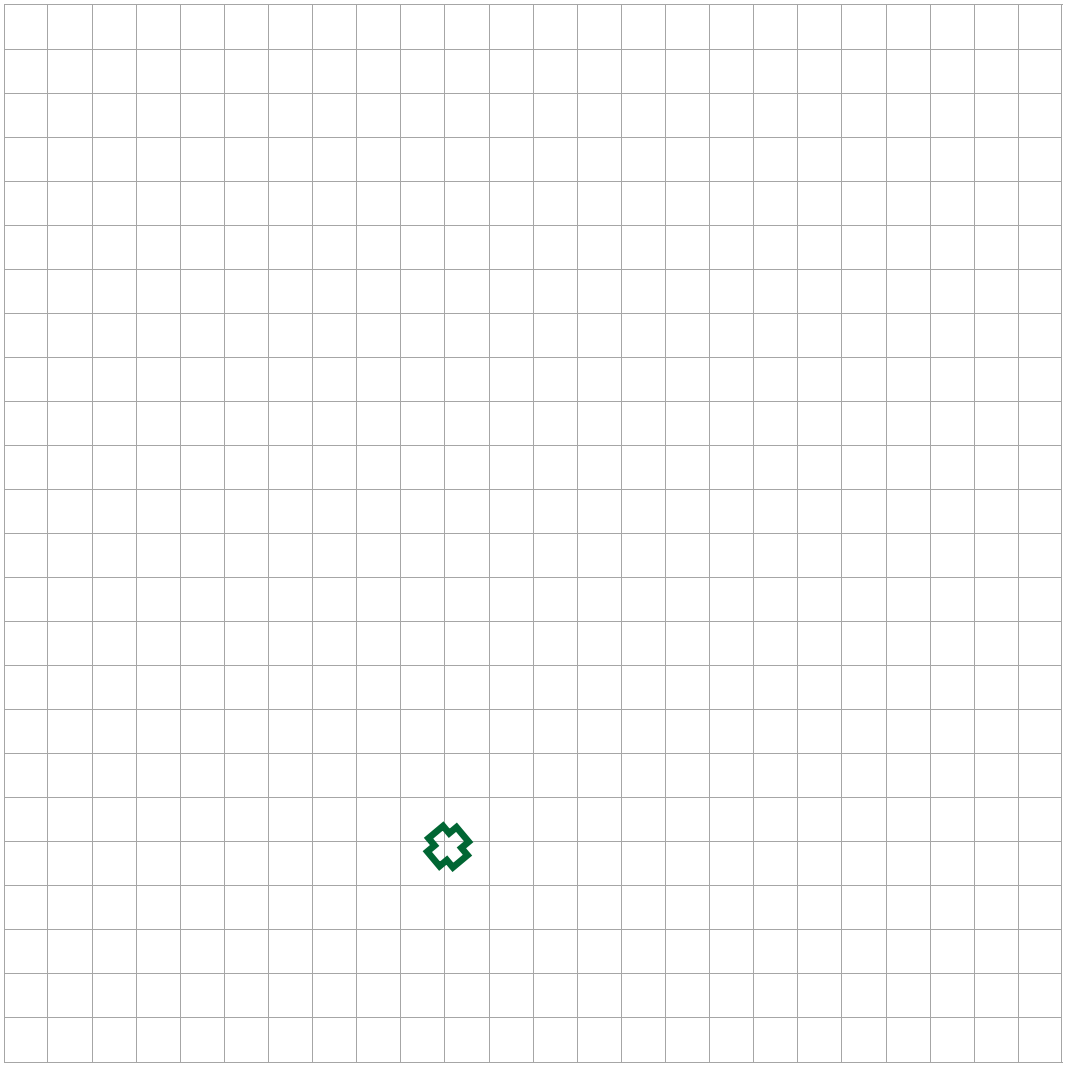
WORKSHEET

Group name	
Organizer	
Programmer	
Bug fixer	

TASK 1

As you work together, using a PENCIL start from the **marked point (x)** and follow the **ARROWS** and **NUMBERS** to find out what drawing you get.

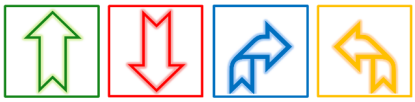
3↑ 3→ 3↓ 1→ 5↑ 1→ 1↑ 1← 1↓
4← 5↑ 1→ 1↑ 1← 1↓ 3← 2↓ 2→
8↓ 1→



WORKSHEET

TASK 2

Correct the **CODE** of the drawing so that it can be drawn by the robot. Write down the **CODE** with the appropriate **COLOR** and **DIRECTION** arrows (you can use arrow cards).



The corrected code:

TASK 3

Using the **CODING** environment select the **ADVANCED** mode.

Create an algorithm for drawing. **SAVE** the program. Set the robot to **DRAW** the drawing on a sheet of paper.

Glue the code and a hand drawn example with a code on the sheet next to the drawing drawn by the robot.

NOTES

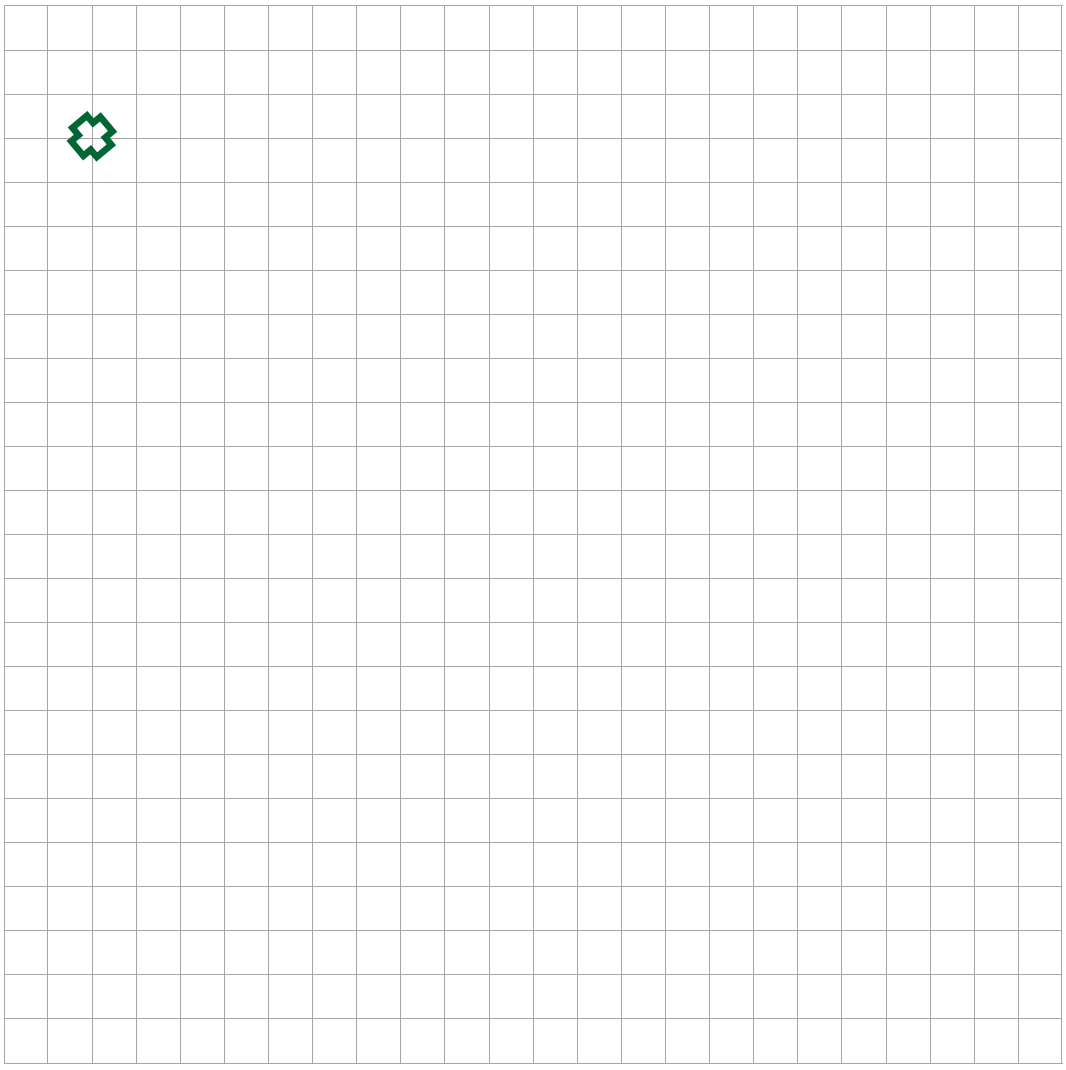
WORKSHEET

Group name	
Organizer	
Programmer	
Bug fixer	

TASK 1

As you work together, using a PENCIL start from the **marked point (x)** and follow the **ARROWS** and **NUMBERS** to find out what drawing you get.

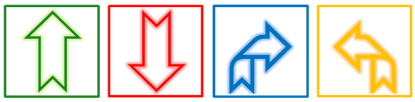
3 → 6 ↓ 2 → 4 ↑ 4 → 4 ↓ 2 → 2 ↑ 4 →
2 ↓ 1 → 1 ↓ 2 ← 2 ↑ 2 ← 2 ↓ 4 ← 4 ↑
2 ← 4 ↓ 4 ← 5 ↑ 2 ← 2 ↑



WORKSHEET

TASK 2

Correct the **CODE** of the drawing so that it can be drawn by the robot. Write down the **CODE** with the appropriate **COLOR** and **DIRECTION** arrows (you can use arrow cards).



The corrected code:

TASK 3

Using the **CODING** environment select the **ADVANCED** mode.

Create an algorithm for drawing. **SAVE** the program. Set the robot to **DRAW** the drawing on a sheet of paper.

Glue the code and a hand drawn example with a code on the sheet next to the drawing drawn by the robot.

NOTES

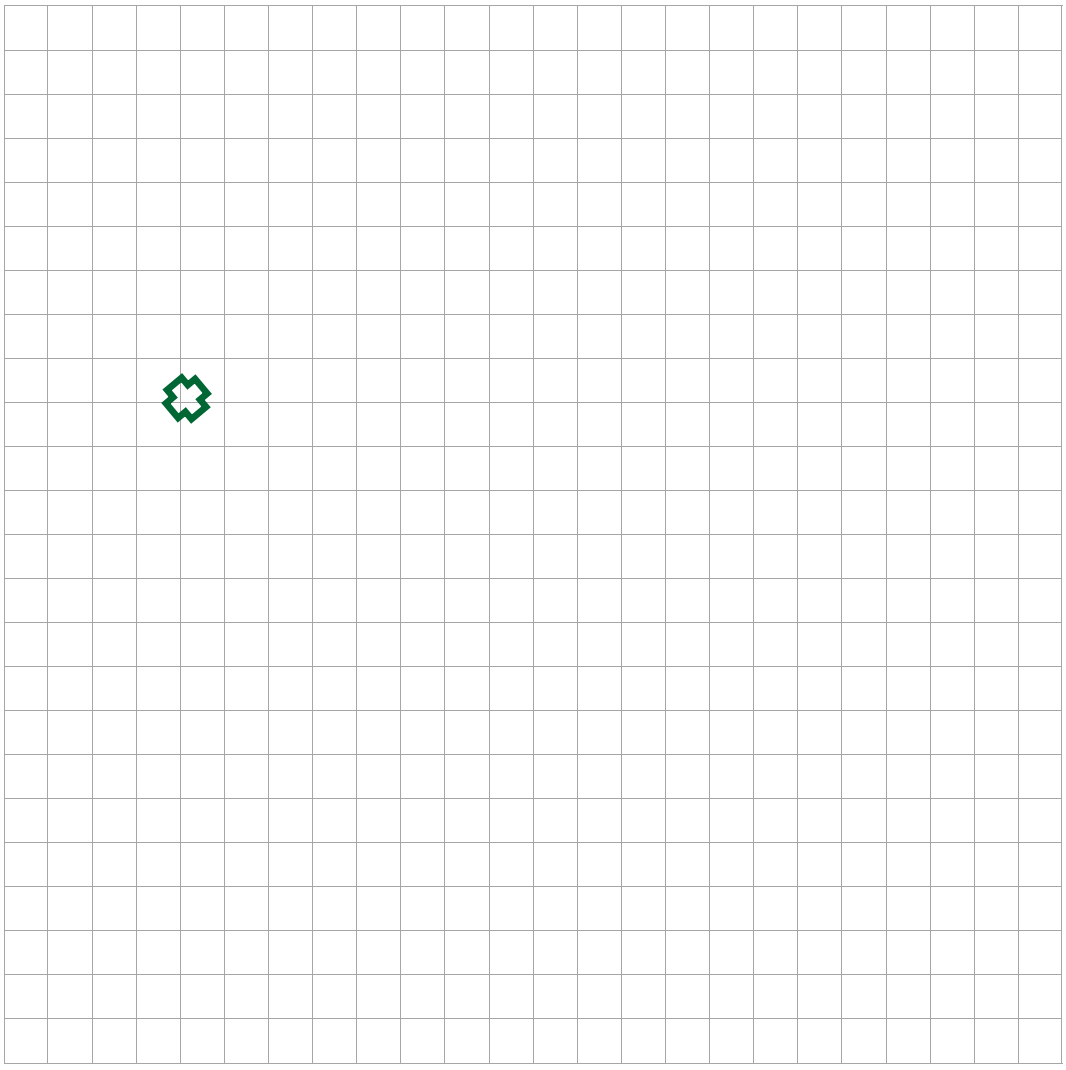
WORKSHEET

Group name	
Organizer	
Programmer	
Bug fixer	

TASK 1

As you work together, using a PENCIL start from the **marked point (x)** and follow the **ARROWS** and **NUMBERS** to find out what drawing you get.

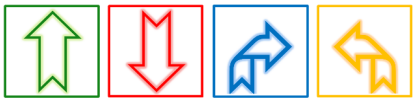
2 → 4 ↓ 1 → 2 ↑ 1 → 1 ↑ 4 → 1 ↓ 1 →
3 ↓ 1 ← 1 ↓ 1 ← 1 ↑ 4 ← 1 ↓ 1 ← 1↑
1 ← 3 ↑ 1 ← 2 ↑



WORKSHEET

TASK 2

Correct the **CODE** of the drawing so that it can be drawn by the robot. Write down the **CODE** with the appropriate **COLOR** and **DIRECTION** arrows (you can use arrow cards).



The corrected code:

TASK 3

Using the **CODING** environment select the **ADVANCED** mode.

Create an algorithm for drawing. **SAVE** the program. Set the robot to **DRAW** the drawing on a sheet of paper.

Glue the code and a hand drawn example with a code on the sheet next to the drawing drawn by the robot.

NOTES

WORKSHEET

Group name	

TASK 4-a

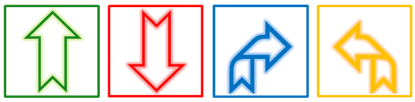
As you work together, create a new drawing, mark the **start point** (**x**). **TRANSFER** the drawing to another team.

WORKSHEET

TASK 4-b

Using the **CODING** environment select the **ADVANCED** mode.

Create an algorithm for drawing you get from another teem. **SAVE** the program. Set the robot to **DRAW** the drawing on a sheet of paper.



The code:

TASK 5

Glue the code and a hand drawn example on the sheet next to the drawings drawn by the robot.

Present your drawings to other teems at **RoboArt** gallery.

QUESTIONS?

- How did you decide what role you would play in the group?
- Why did you have to change the graphic dictation code?
- How was the graphic dictation code different from the robot code?
- Did you succeed to write the code for the robot immediately?
- Where did you need the help the most? Who helped?

Codes for drawings

ROBOT

↰ ↑ ↓ ↱

1 ↓ 1 ↰ 2 ↑ 1 ↱ 3 ↑ 1 ↰ 1 ↑ 1 ↱ 3 ↓ 1 ↰ 2 ↑ 1 ↱ 1 ↑ 1 ↱

1 ↑ 1 ↰ 5 ↑ 1 ↰ 2 ↑ 1 ↱ 1 ↑ 1 ↱ 3 ↑ 1 ↰ 1 ↑ 1 ↰ 1 ↑ 1 ↱

3 ↑ 1 ↱ 3 ↑ 1 ↱ 3 ↑ 1 ↱ 1 ↑ 1 ↰ 1 ↑ 1 ↰ 3 ↑ 1 ↱ 1 ↑ 1 ↱

2 ↑ 1 ↰ 5 ↑ 1 ↰ 1 ↑

1 ↓	2 ←	3 ↑	1 ←	3 ↓	2←	1 ↑	1 →	5 ↑
2 ←	1 ↑	3 →	1 ↑	1 ←	3 ↑	3 →	3 ↓	1 ←
1 ↓	3 →	1 ↓	2 ←	5 ↓	1 →			

GIRAFFE

↰ ↑ ↓ ↱

3 ↑ 1 ↱ 3 ↑ 1 ↰ 3 ↓ 1 ↱ 1 ↑ 1 ↰ 6 ↑ 1 ↱ 1 ↑ 1 ↰ 1 ↓ 1 ↰

5 ↑ 1 ↱ 6 ↑ 1 ↱ 1 ↑ 1 ↰ 1 ↓ 1 ↰ 4 ↑ 1 ↱ 2 ↓ 1 ↱ 2 ↑ 1 ↰

8 ↓ 1 ↱ 1 ↑

3 ↑	3 →	3 ↓	1 →	5 ↑	1 →	1 ↑	1←	1 ↓
4 ←	5 ↑	1 →	1 ↑	1 ←	1 ↓	3 ←	2 ↓	2 →
8 ↓	1 →							

Codes for drawings

SNAKE

↰ ↑ ↓ ↱

1 ↱ 3 ↑ 1 ↰ 6 ↓ 1 ↱ 2 ↑ 1 ↰ 4 ↑ 1 ↱ 4 ↑ 1 ↰ 4 ↓ 1 ↱ 2 ↑
1 ↰ 2 ↑ 1 ↱ 4 ↑ 1 ↰ 2 ↓ 1 ↱ 1 ↑ 1 ↰ 1 ↓ 1 ↰ 2 ↑ 1 ↱ 2 ↑
1 ↰ 2 ↑ 1 ↱ 2 ↓ 1 ↰ 4 ↑ 1 ↱ 4 ↑ 1 ↰ 2 ↑ 1 ↱ 4 ↓ 1 ↰ 4 ↑
1 ↱ 5 ↑ 1 ↰ 2 ↑ 1 ↱ 2 ↑

3 →	6 ↓	2 →	4 ↑	4 →	4 ↓	2 →	2 ↑	4 →
2 ↓	1 →	1 ↓	2 ←	2 ↑	2 ←	2 ↓	4 ←	4 ↑
2 ←	4 ↓	4 ←	5 ↑	2 ←	2 ↑			

TURTLE

↰ ↑ ↓ ↱

1 ↱ 2 ↑ 1 ↰ 4 ↓ 1 ↱ 1 ↑ 1 ↰ 2 ↑ 1 ↱ 1 ↑ 1 ↰ 1 ↑ 1 ↱ 4 ↑
1 ↰ 1 ↓ 1 ↱ 1 ↑ 1 ↰ 3 ↓ 1 ↰ 1 ↑ 1 ↱ 1 ↓ 1 ↰ 1 ↑ 1 ↱
1 ↑ 1 ↰ 4 ↑ 1 ↱ 1 ↓ 1 ↰ 1 ↑ 1 ↱ 1 ↑ 1 ↰ 1 ↑ 1 ↱ 3 ↑ 1 ↰
1 ↑ 1 ↱ 2 ↑

2 →	4 ↓	1 →	2 ↑	1 →	1 ↑	4 →	1 ↓	1 →
3 ↓	1 ←	1 ↓	1 ←	1 ↑	4 ←	1 ↓	1 ←	1 ↑
1 ←	3 ↑	1 ←	1 ↑					

Author: Expert primary education teacher and career education specialist ASTA SAKALIENĖ
Panevėžys VILTIES Progymnasium

Working in pairs analyze the robot's path algorithm and program the robot; by studying the illustrations determine what materials the objects are made of.

2nd grade

Science, information technologies, career education

45 mins.

Robot, game mat, arrow cards, worksheet, answer sheet, picture cards, question cards.

- **Getting started:** *The students discuss the objects surrounding them, what materials are the objects in the classroom made of, which materials are natural and which are artificial. The teacher presents some examples of things that are made of not one, but several materials. The specific items in the class are grouped into wooden, rubber, ceramic, cotton, metal, plastic, glass.*

Tasks:

- *The students are divided into pairs (the game Say hello: students freely walk around the classroom shaking each other's hand in a friendly way and saying something nice; after the signal, the last friend they said hello to is the one they work with in a pair), after being paired the students discuss their roles, the lesson topic is announced, the teacher reminds the students how to program a robot and briefly presents the tasks stating the expectations of the lesson.*
- *Students work in pairs. After analysing the algorithms of the robot's path on the worksheet, they write down their guesses, program the robot to drive to the questions. The students look for answers on the game mat and program the robot to reach it. Students take notes in the worksheet and mark if they managed to program the robot correctly from the first try, they also write down the letter that is written next to the picture.*

- *Students who work faster are offered to answer questions D1 and A3, and provide examples of objects.*
- *After completing the tasks, the students count and note on the worksheet at the bottom of the table how many correct guesses there were in total, which number they circled the most (how many times they tried to program the robot correctly).*
- *When the answer table is shown, students check whether they have completed the task correctly by correcting mistakes with a green pen. Attention is drawn to the last column. If they answered all the questions correctly, they will read the word "Features". It is informed that the topic of the next science lesson will be "Features of materials".*
- *A pair of students presents their work, describes how they managed to complete the tasks together.*
- *Homework assignment: Take a picture of an object that is made of 3 or more different materials, e.g., a table lamp made of metal, plastic and glass.*

- *Did you manage to answer all seven questions? Did you answer the two additional questions?*
- *Which question was the most difficult or the easiest one? Why?*
- *How did you succeed to decode the robots' path algorithms and to program the robot?*
- *How will this lesson be useful in the future?*
- *What did you learn from working together with a friend?*

Notes

The first example on the worksheet can be done together to make sure that all students understand what needs to be done. In the next lesson, the students will learn to group objects made of the same material, name the properties (attributes) of materials, group materials according to their properties, find out under what conditions the properties of materials can change (heating, melting, burning).

WORKSHEET **STUDENTS' NAMES:**

		Which grid cell will the robot go to?	Program the robot.	Read the question in that box.	Program the robot to stop at the box containing the answer.	Write the letter that is in that box next to the picture.
No.	 **Analyze the Mind Designer bot path algorithm**	Consult each other and write down your guess, e.g. C3.	If your guess is correct, mark it +	Write down the coordinates of the cell (eg C3) that contains the answer.	Did you manage to program the robot correctly right from the first time? Circle the correct number.	Place the robot in the "Start" box.
1.	↑ ← ↑				1 2 3	
2.	↓ → ↑ ↑				1 2 3	
3.	→ ↑ ← ↑ ↑ → ↑				1 2 3	
4.	← ↑ → ↑ → ↑ ↑ ↑ ↑ ← ↓				1 2 3	
5.	↓ → ↑ ↑ ← ↑ ↑ ← ↑				1 2 3	
6.	↑ ← ↑ → ↓ ↓ ← ↑				1 2 3	
7.	↑ ← ↑ → ↑ ← ↑				1 2 3	
		How many correct guesses in total?		**Which number did you circle the most?**		

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WORKSHEET (ANSWERS)

		Which grid cell will the robot go to?	Program the robot.	Read the question in that box.	Program the robot to stop at the box containing the answer.	Write the letter that is in that box next to the picture.
No.	**Analyze the Mind Designer bot path algorithm**	Consult each other and write down your guess, e.g. C3.	If your guess is correct, mark it +	Write down the coordinates of the cell (eg C3) that contains the answer.	Did you manage to program the robot correctly right from the first time? Circle the correct number.	Place the robot in the "Start" box.
1.	↑ ← ↑	**B2**		**B4**	1 2 3	**F**
2.	↓ → ↑ ↑	**E4**		**F1**	1 2 3	**E**
3.	→ ↑ ← ↑ ↑ → ↑	**E1**		**D3**	1 2 3	**A**
4.	← ↑ → ↑ → ↑ ↑ ↑ ↑ ← ↓	**F3**		**A2**	1 2 3	**T**
5.	↓ → ↑ ↑ ← ↑ ↑ ← ↑	**D2**		**F4**	1 2 3	**U**
6.	↑ ← ↑ → ↓ ↓ ← ↑	**A4**		**C1**	1 2 3	**R**
7.	↑ ← ↑ → ↑ ← ↑	**A1**		**E2**	1 2 3	**ES**
		How many correct guesses in total?		**Which number did you circle the most?**		

ROBOT GRID

	A	B	C	D	E	F
1	Which item is made using this material? 	 X	 R	Which object is made of only sand and chalk?	Which item does not use metal, ceramics, water, or wool in its production?	 E
2	 T	Which object is made only of metal?	 I	Which item does not use glass, rubber, wood, metal, food, or plastic?	 ES	 G
3	Which object is made only using glass?	 D	START	 A	 M	In the production of which item, glass is one of the components?
4	Which item is made using this material? 	 F	 E	 U	Which item is made of metal and rubber?	 U

Picture cards

X

R

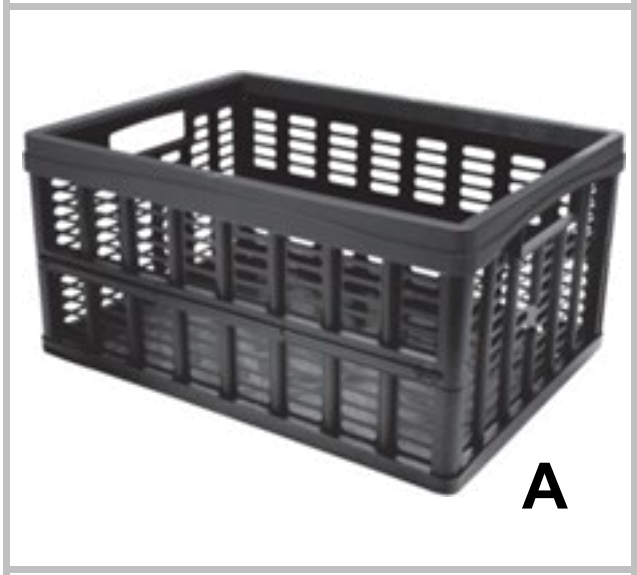
E

T

I

ES

Picture cards



Picture and question cards

U

U

Which item is made using this material?

Which item is made using this material?

Question cards

Which object is made of only sand and chalk?	**Which item does not use metal, ceramics, water, or wool in its production?**
Which object is made only of metal?	**Which item does not use glass, rubber, wood, metal, food, or plastic?**
Which object is made only using glass?	**In the production of which item, glass is one of the components?**

Question cards

Which item is made of metal and rubber?	**START**

Author: Expert primary education teacher JOLANTA ANDRIUŠKEVIČIENĖ
Panevėžys district Velžys Gymnasium

Working together in pairs or groups, perform calculations and create suitable algorithms according to the given descriptions.

3rd—4th grade

Mathematics, information technologies

45 mins.

Robots, number grid, worksheets.

Getting started: *students divide into pairs or groups; they prepare robots and the grid of numbers. Worksheets are distributed.*

Tasks:

- *The purpose of the activity is introduced.*
- *Cooperating with each other the students perform calculations according to the given descriptions.*
- *Appropriate algorithms are created.*

- Comment on each group member's contribution to the task.
- What did you enjoy? What difficulties did you face?
- Review your numeracy skills.
- How did you understand the concepts?
- Describe your feelings. If necessary, use a mood meter.

Number grid

	A	B	C	D	E	F
1	8	15	1		36	
2	7		24	45	3	10
3	4	21		30		6
4		2	18	5	9	60

Mood meter

Enraged	Furious	Frustrated	Shocked	M	Surprised	Upbeat	Motivated	Ecstatic
Livid	Frightened	Nervous	Restless	O	Hyper	Cheerful	Inspired	Elated
Fuming	Apprehensive	Worried	Annoyed	O	Energized	Lively	Optimistic	Thrilled
Repulsed	Troubled	Uneasy	Peeved	D	Pleasant	Joyful	Proud	Blissful
M	O	O	D	M	E	T	E	R
Disgusted	Disappointed	Glum	Ashamed	E	Blessed	At Ease	Content	Fulfilled
Mortified	Alienated	Mopey	Apathetic	T	Humble	Secure	Chill	Grateful
Embarrassed	Excluded	Timid	Drained	E	Calm	Satisfied	Relaxed	Carefree
Alone	Down	Bored	Tired	R	Relieved	Restful	Tranquil	Serene

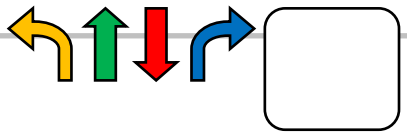
Mood meter link https://eenhigby.weebly.com/mood-meter.html

Task cards

TASK 1

Working individually, according to the given description, perform the calculations. Compare answers with your group mates. Using arrow cards make an algorithm - the path for the robot to reach the right number.

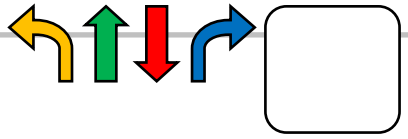
The units digit is the product of 2 and 3, the tens digit is the quotient of 27 and 9.



TASK 2

Working individually, according to the given description, perform the calculations. Compare answers with your group mates. Using arrow cards make an algorithm - the path for the robot to reach the right number.

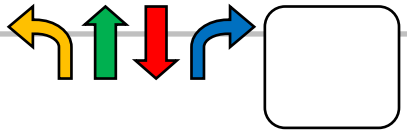
The tens digit is the difference of 19 and 15, the units digit is the sum of 3 and 2.



TASK 3

Working individually, according to the given description, perform the calculations. Compare answers with your group mates. Using arrow cards make an algorithm - the path for the robot to reach the right number.

The number is even. The tens digit is 2 times smaller than the units digit.

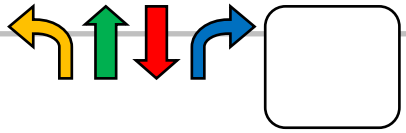


Task cards

TASK 4

Working individually, according to the given description, perform the calculations. Compare answers with your group mates. Using arrow cards make an algorithm - the path for the robot to reach the right number.

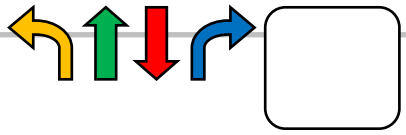
The number is odd. The tens digit is 2 times bigger than the units digit.



TASK 5

Working individually, according to the given description, perform the calculations. Compare answers with your group mates. Using arrow cards make an algorithm - the path for the robot to reach the right number.

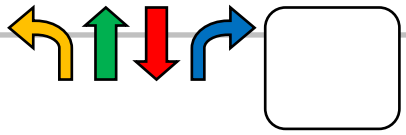
The smallest one-digit number.



TASK 6

Working individually, according to the given description, perform the calculations. Compare answers with your group mates. Using arrow cards make an algorithm - the path for the robot to reach the right number.

The difference between the largest two-digit number and the product of 23 and 3.

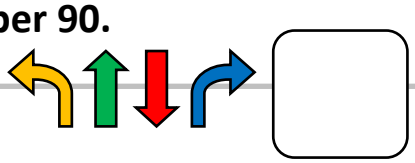


Task cards

TASK 7

Working individually, according to the given description, perform the calculations. Compare answers with your group mates. Using arrow cards make an algorithm - the path for the robot to reach the right number.

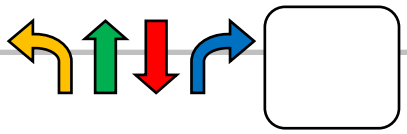
The quotient of the difference between the largest three-digit number and the smallest two-digit number and the number 90.



TASK 8

Working individually, according to the given description, perform the calculations. Compare answers with your group mates. Using arrow cards make an algorithm - the path for the robot to reach the right number.

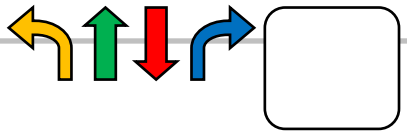
A two-digit number in which both digits are odd numbers.



TASK 9

Working individually, according to the given description, perform the calculations. Compare answers with your group mates. Using arrow cards make an algorithm - the path for the robot to reach the right number.

A number that is obtained by adding two equal odd two-digit numbers. .

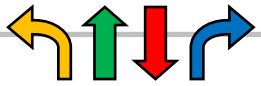


Task cards

TASK 10

Working individually, according to the given description, perform the calculations. Compare answers with your group mates. Using arrow cards make an algorithm - the path for the robot to reach the right number.

A two-digit number is equal to the product of odd one-digit numbers.



Answers

TASK 1	36
TASK 2	45
TASK 3	24 / 36
TASK 4	21
TASK 5	1
TASK 6	30
TASK 7	10
TASK 8	15
TASK 9	15+15=30
TASK 10	3 x 5=15 / 3 x 7=21 / 5 x 9=45

Author: Expert primary education teacher JOLANTA ANDRIUŠKEVIČIENĖ
Panevėžys district Velžys Gymnasium

Working cooperatively students recognize different objects based on given angles.

3rd—4th grade

Mathematics, information technologies

45 mins.

Robots, number grid, worksheets.

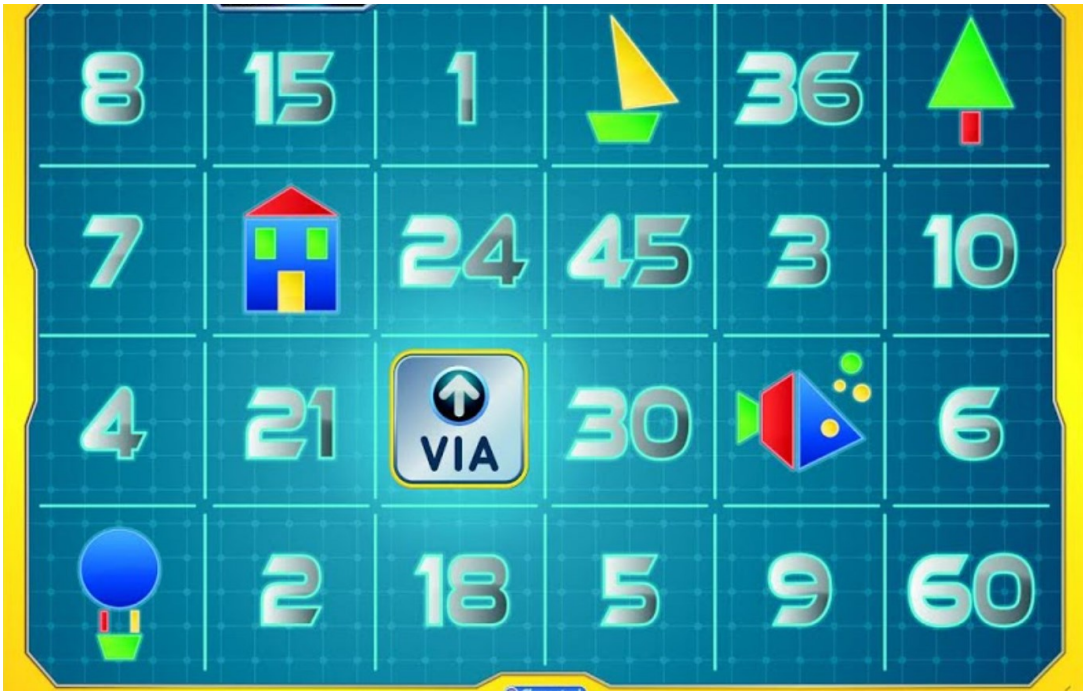
- **Getting started:** *students divide into pairs or groups; they prepare robots and the grid of numbers. Worksheets are distributed.*

Tasks:

- *The purpose of the activity is introduced.*
- *Working cooperatively students recognize different objects based on given angles.*
- *Appropriate algorithms are created.*

- Comment on each group member's contribution to the task.
- What did you enjoy? What difficulties did you face?
- Evaluate how you succeeded to identify the given angles.
- Describe your feelings. If necessary, use a mood meter.

Number grid



Mood meter

Enraged	Furious	Frustrated	Shocked	M	Surprised	Upbeat	Motivated	Ecstatic
Livid	Frightened	Nervous	Restless	O	Hyper	Cheerful	Inspired	Elated
Fuming	Apprehensive	Worried	Annoyed	O	Energized	Lively	Optimistic	Thrilled
Repulsed	Troubled	Uneasy	Peeved	D	Pleasant	Joyful	Proud	Blissful
M	O	O	D	M	E	T	E	R
Disgusted	Disappointed	Glum	Ashamed	E	Blessed	At Ease	Content	Fulfilled
Mortified	Alienated	Mopey	Apathetic	T	Humble	Secure	Chill	Grateful
Embarrassed	Excluded	Timid	Drained	E	Calm	Satisfied	Relaxed	Carefree
Alone	Down	Bored	Tired	R	Relieved	Restful	Tranquil	Serene

Mood meter link https://eenhigby.weebly.com/mood-meter.html

Task cards

TASK 1

Which robot grid picture has 12 corners?

Using the direction arrows, make an algorithm — a path to the right object.

TASK 2

Which robot grid picture has 4 sharp corners?

Using the direction arrows, make an algorithm — a path to the right object.

TASK 3

Which robot grid picture has 4 steep angles?

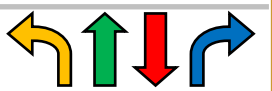
Using the direction arrows, make an algorithm — a path to the right object.

Task cards

TASK 4

Which robot grid picture has 4 obtuse angles?

Using the direction arrows, make an algorithm — a path to the right object.



TASK 5

Which robot grid picture doesn't have 4 obtuse angles?

Using the direction arrows, make an algorithm — a path to the right object.

Answers

TASK 1

Air-balloon

TASK 2

Ship

TASK 3

Christmas tree

TASK 4

Fish

TASK 5

House/ Christmas tree

Author: Expert primary education teacher JOLANTA ANDRIUŠKEVIČIENĖ
Panevėžys district Velžys Gymnasium

Working together in pairs or groups, calculate numerical phenomena and create suitable algorithms.

4th grade

Mathematics, information technologies

45 mins.

Robots, number grid, worksheets.

Getting started: *students divide into pairs or groups; they prepare robots and the grid of numbers. Worksheets are distributed.*

Tasks:

- *The purpose of the activity is introduced.*
- *The meaning of numerical phenomena is clarified through working cooperatively.*
- *Appropriate algorithms are created - arrow paths to the appropriate value of the numeric expression.*

- Comment on each group member's contribution to the task.
- What did you enjoy? What difficulties did you face?
- Review your solving numerical phenomena and calculation skills.
- Describe your feelings. If necessary, use a mood meter.

Number grid

	A	B	C	D	E	F
1	8	15	1		36	
2	7		24	45	3	10
3	4	21		30		6
4		2	18	5	9	60

Mood meter

Enraged	Furious	Frustrated	Shocked	M	Surprised	Upbeat	Motivated	Ecstatic
Livid	Frightened	Nervous	Restless	O	Hyper	Cheerful	Inspired	Elated
Fuming	Apprehensive	Worried	Annoyed	O	Energized	Lively	Optimistic	Thrilled
Repulsed	Troubled	Uneasy	Peeved	D	Pleasant	Joyful	Proud	Blissful
M	O	O	D	M	E	T	E	R
Disgusted	Disappointed	Glum	Ashamed	E	Blessed	At Ease	Content	Fulfilled
Mortified	Alienated	Mopey	Apathetic	T	Humble	Secure	Chill	Grateful
Embarrassed	Excluded	Timid	Drained	E	Calm	Satisfied	Relaxed	Carefree
Alone	Down	Bored	Tired	R	Relieved	Restful	Tranquil	Serene

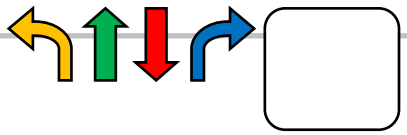
Mood meter link https://eenhigby.weebly.com/mood-meter.html

Task cards

TASK 1

Calculate the value of a numerical expression individually. Compare answers with your group mates. Create an algorithm — the robot's path using arrows to the correct value of a numerical expression.

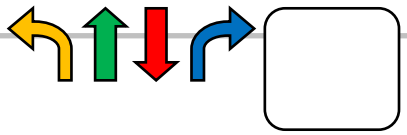
10 000 – 860 : 2 x 10 – 5 640 =



TASK 2

Calculate the value of a numerical expression individually. Compare answers with your group mates. Create an algorithm — the robot's path using arrows to the correct value of a numerical expression.

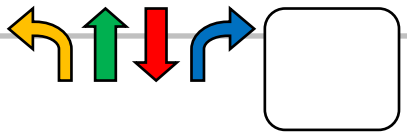
84 – (54 – 45) x 6 =



TASK 3

Calculate the value of a numerical expression individually. Compare answers with your group mates. Create an algorithm — the robot's path using arrows to the correct value of a numerical expression.

(92 – 89) x (63 : 9) =

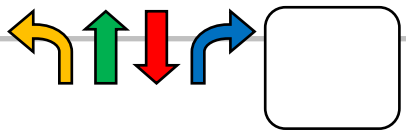


Task cards

TASK 4

Calculate the value of a numerical expression individually. Compare answers with your group mates. Create an algorithm — the robot's path using arrows to the correct value of a numerical expression.

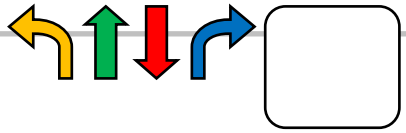
3 + 6 x 8 – 15 =



TASK 5

Calculate the value of a numerical expression individually. Compare answers with your group mates. Create an algorithm — the robot's path using arrows to the correct value of a numerical expression.

2 500 : 50 + 100 : 2 – 535 =



Answers

1. 10 000 – 860 : 2 x 10 – 5 640 = **60**
2. 84 – (54 – 45) x 6 = **30**
3. (92 – 89) x (63 : 9) = **21**
4. 3 + 6 x 8 – 15 = **36**
5. 2 500 : 50 + 100 : 2 – 535 = **15**

Authors:
Librarian LAURA ŠINKŪNIENĖ
Methodologist primary education teacher ALMA BRIEDIENĖ
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Having learnt about the causes of fear and anxiety, through team collaboration, create an algorithm for overcoming fear.

4th—6th grade

Science, moral education, informational technologies

60—90 mins.

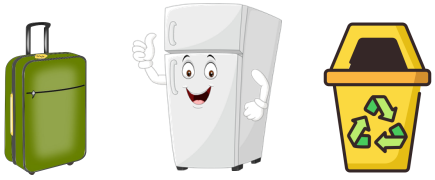
Robots, 2 robot grids, cards: "Fear Train", "Travel diary", "Suitcases", "Algorithm for overcoming fear", two envelopes, two-color stripes, 3-4 m bright rope, 10 pcs. clothespins, sticky rubber, stickers.

Getting started: *firstly find out how students understand the concept of "fear", in which situations have they felt fear, or do they often experience fear, anxiety or stress at school. Then the game "The Train of Fear " is being played.*

Tasks:

- *After finding out the personal moment of feeling fear, it is suggested to find a "travel buddy" (two colour ribbons tied in the middle are used — use as many colors as there will be teams, e.g. green-red, blue-yellow, green-yellow, etc.) The strips are held in the fist so that it is not visible that different colours are tied together. The players are asked to select one strip and hold it in the hand. While everyone is holding the strips, questions can be asked: did you choose the same colour strip as your friend? Why? Maybe s/he wanted to be braver? Safer? Then the players are asked to find a friend slowly without letting go of the strip. The players are divided into teams according to the drawn out colours.*
- *The teams are given the envelopes with the tasks "Suitcases" or "Fear defeating algorithm.*
- *Team members collaboratively develop the specified algorithm and test it programming the robot on the robot grid specified in the task.*

- *Team members collaboratively develop the specified algorithm and test it programming the robot on the robot grid specified in the task.*
- *The players individually fill in the "Travel Diary".*
- *For the feedback the cards are used on the robot's grid (or board) to which students add their observations:*
  - *I TAKE IT NOW*
  - *I SAVE IT FOR THE FUTURE*
  - *I THROW IT AWAY or I RECYCLE.*

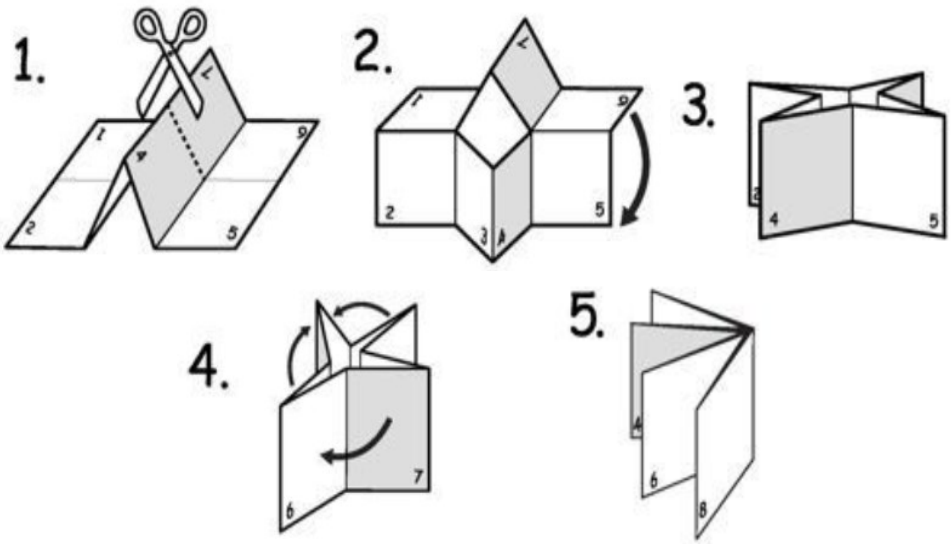


- *Did all of you get off at the same stop on the Fear Train trip? Why?*
- *How did you feel working in a team? Did you follow the rules when completing the task?*
- *Which part of the assignment was the most difficult? How did you find the solution?*
- *What helps to manage the fear?*
- *When do we feel safer in class?*

Notes

The work can be organized taking into account the age of the students, teams numbers, robot skills. Tasks can be divided into parts, more situations can be added.

Folding diagram of the "Travel Diary"



Game — The Train of Fear

Imagine that you alone have to go on a train trip at midnight and come home from a station on foot.

Choose a moment when fear overcomes you (when you want to stop and discontinue travel), then come and stand up near selected card in a scale of fear.

(The "Fear Train" situation cards are read one by one and pinned on the stretched rope using the pins. The text should be read slowly, giving the time for students to assess their fear level and choose a place on the "fear scale".)

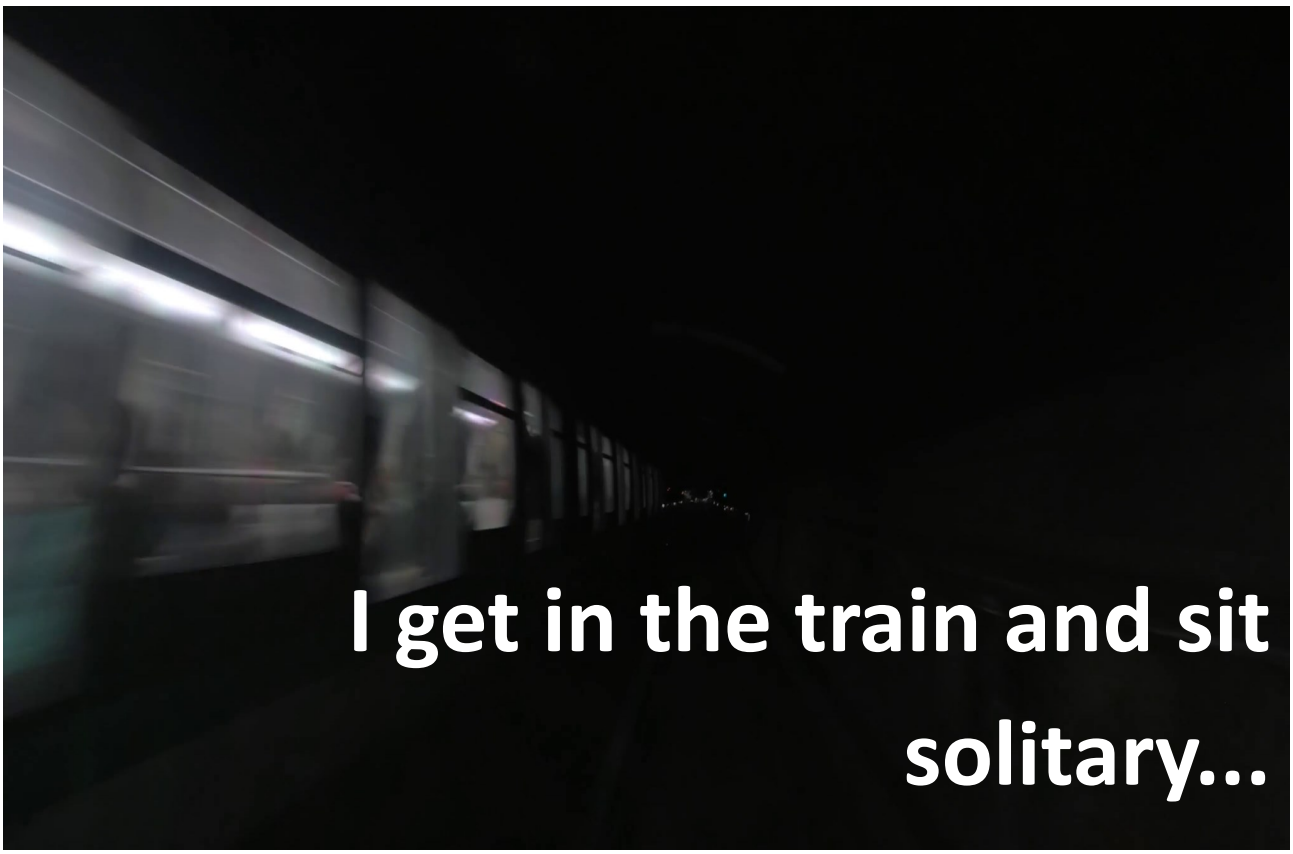
1. I`m alone on a platform at midnight and waiting for a train...
2. I get in the train and sit solitary...
3. At the next stop all passengers get off, I`m staying alone...
4. I get off, it is dark around, no living spirit...
5. I hear steps behind my back, I`m going to go faster...
6. Someone, who follows me, also starts going faster...
7. I go to the next side of the road, someone follows me...
8. I look back and see that husky man is following me...
9. I'm almost running, the man comes up and touches my shoulder...

- *Maybe, somebody wants to finish his/her journey right now?*
- *Perhaps there are passengers who want to change their choice?*

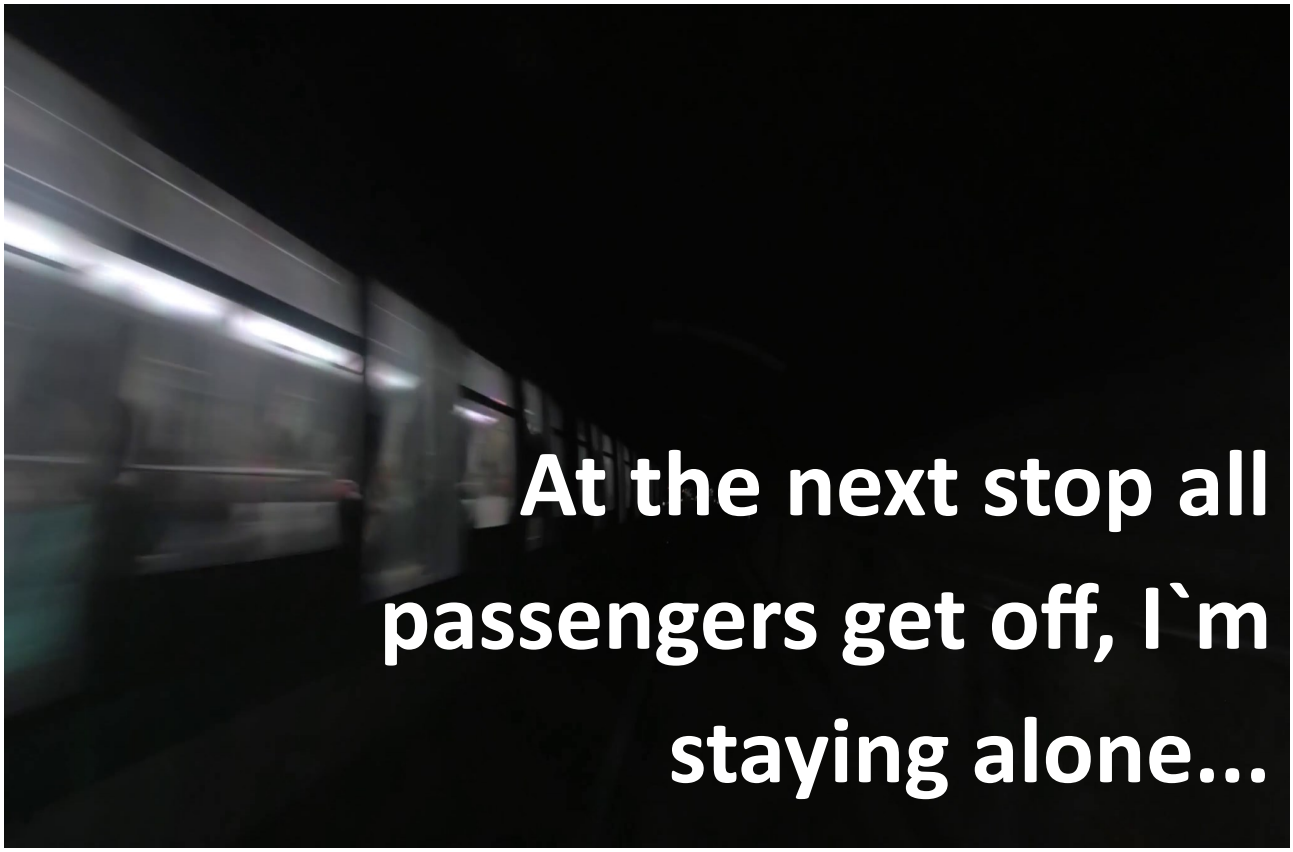
NOTES

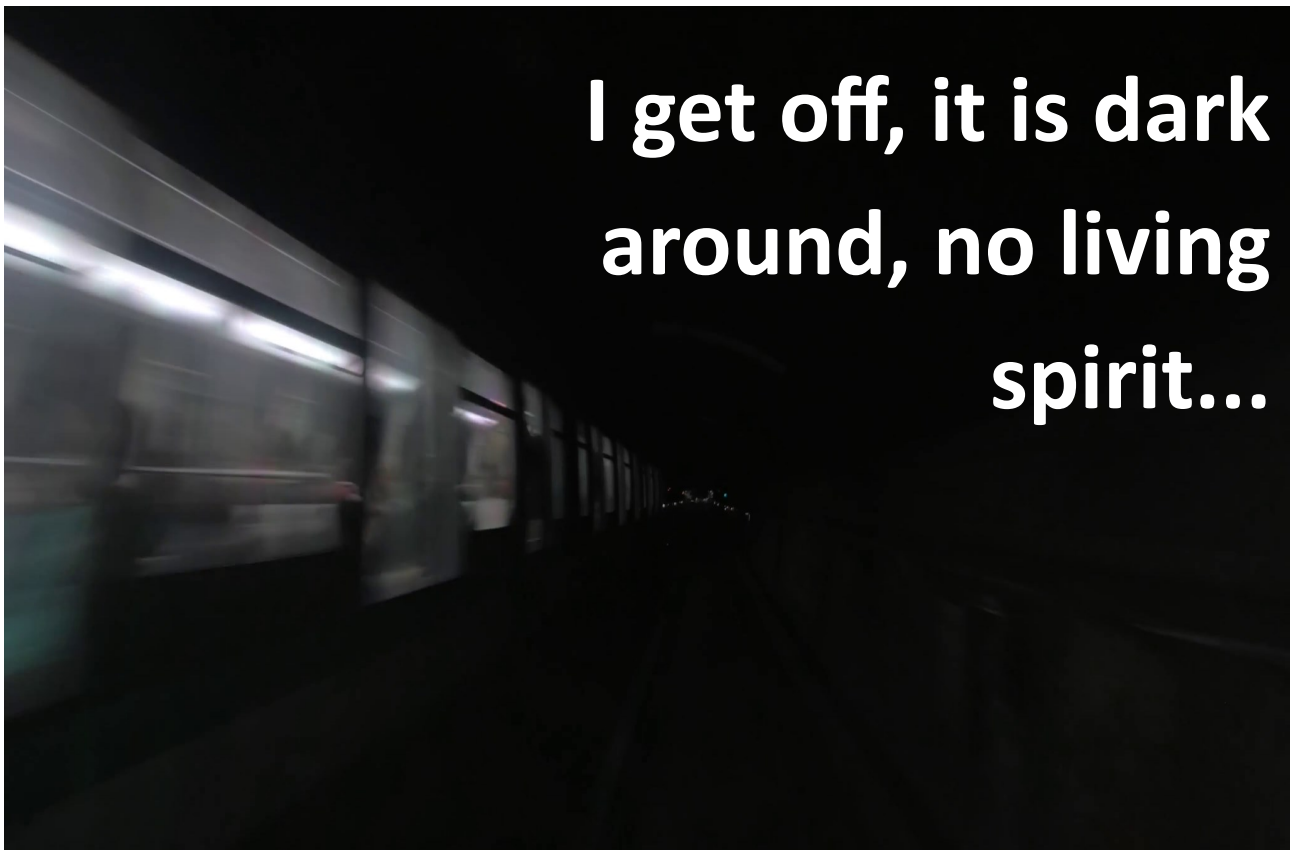
Here is proof that we all are different and our reactions are different, too. There are people who would never travel at night, there are people who will travel by train, but when they go off,they won't go on foot and so on. Different people different moments sensation of fear.

Cards — The Train of Fear

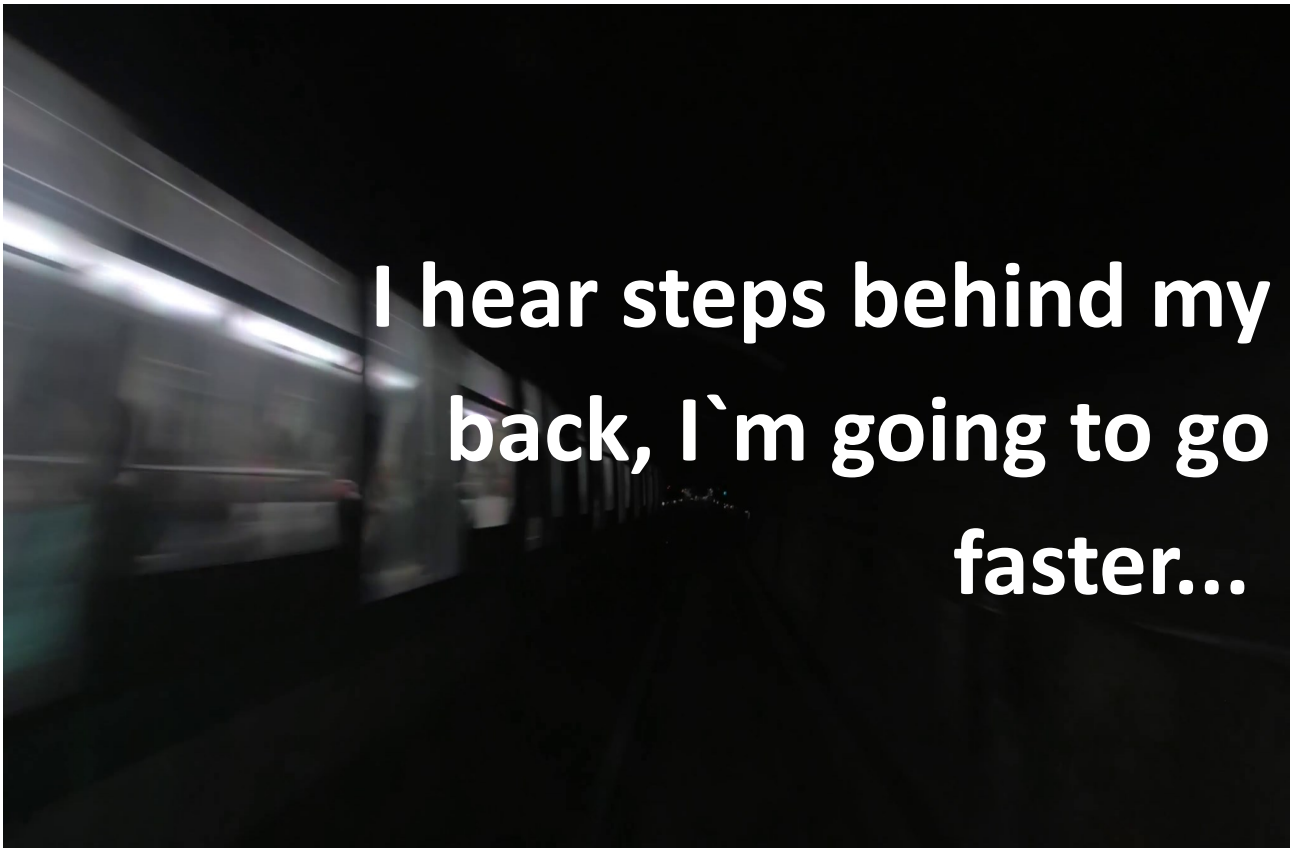


Cards — The Train of Fear

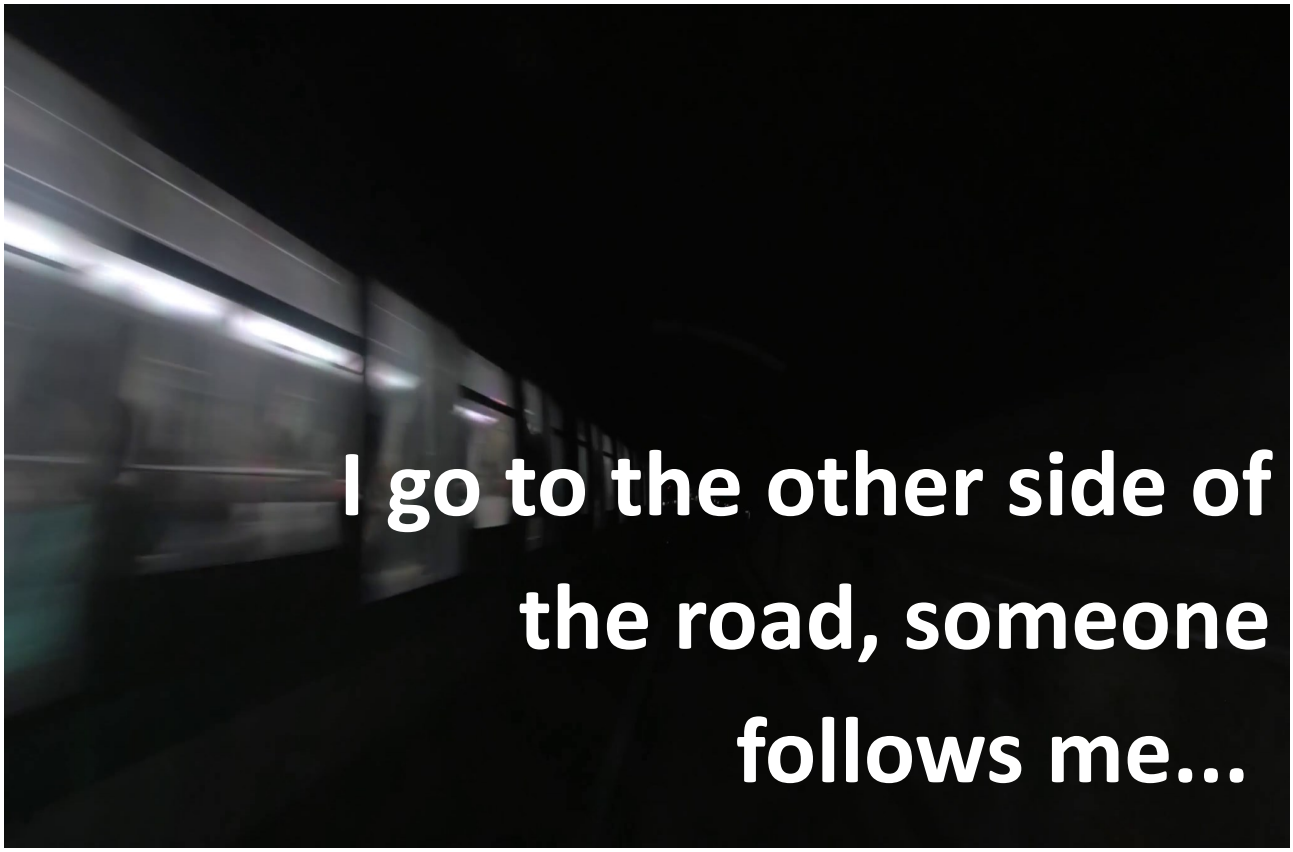




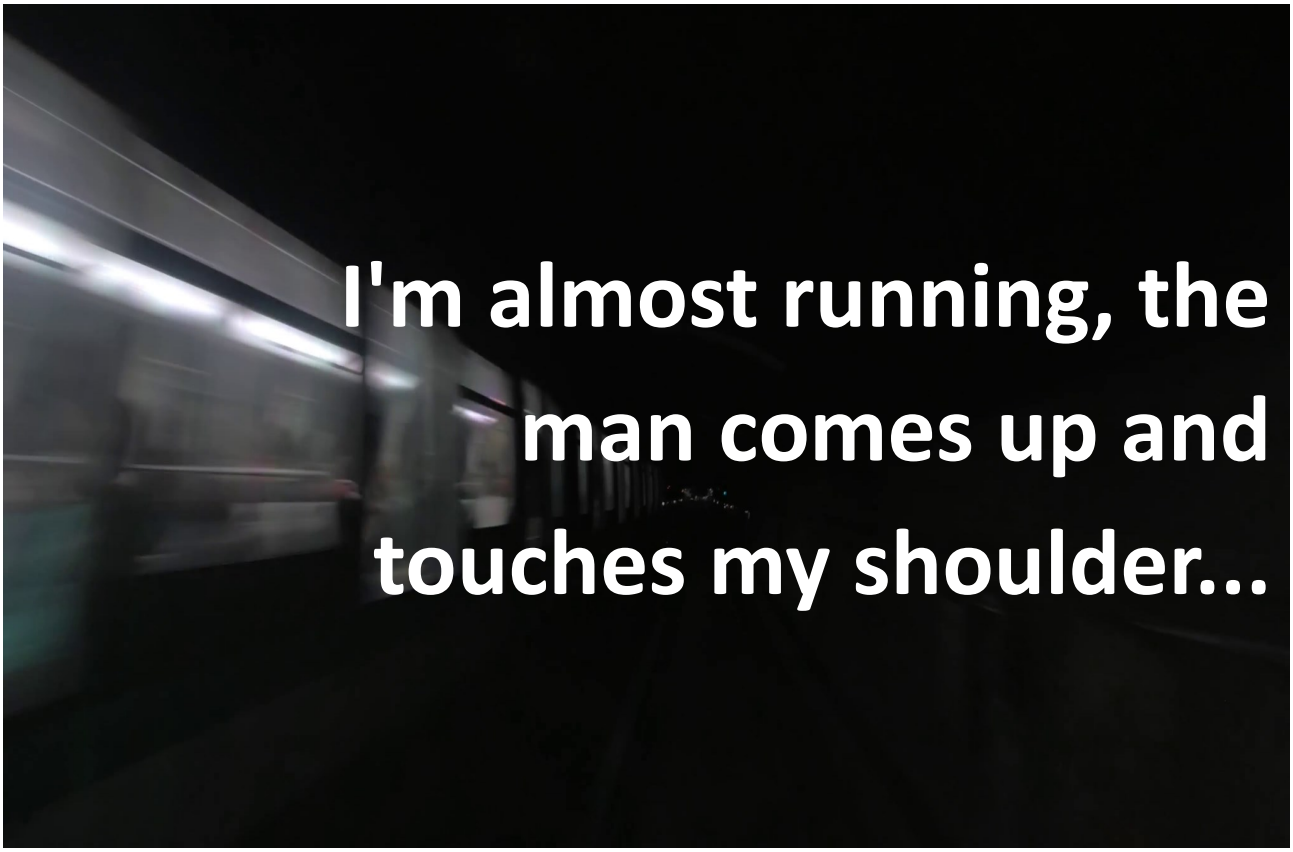
Cards — The Train of Fear

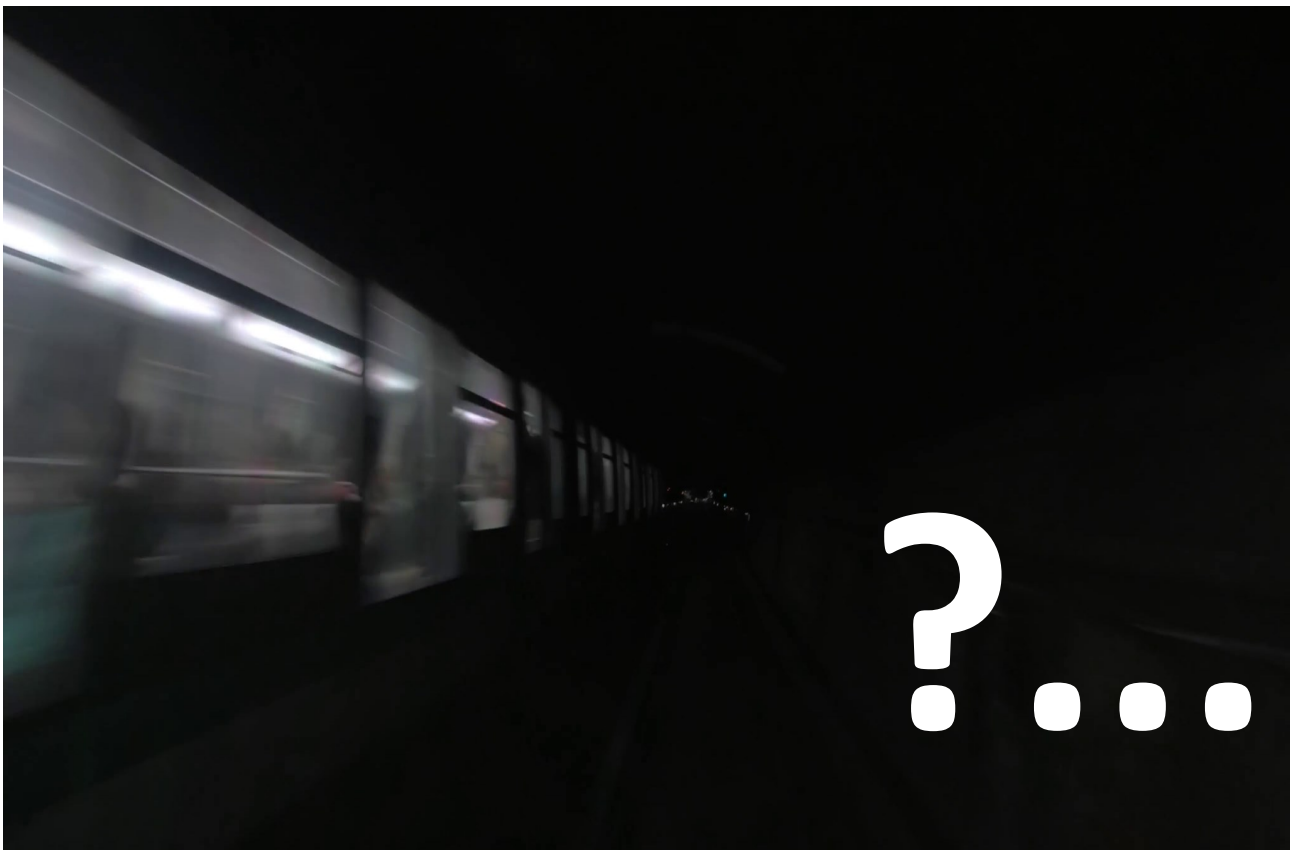


Cards — The Train of Fear



Cards — The Train of Fear





Task — Suitcases

- Working together and following the specified rules, with the help of the robot sort the cards into two bags:
  - **BAGGAGE OF FEAR** and
  - **TRIP WITHOUT STRESS**.
  - The robot only travels through **EMPTY** cells.
- Create a staging of the trip (act it out) and present it.

RULES:

- Work is shared by all team members.
- Everyone is responsible both for her/himself and for the whole team.
- Everyone helps the team to complete the task.
- The work is presented by the whole group.

Task cards — Suitcases

	
DAY	**NIGHT**
SMARTPHONE	**FLASHLIGHT**
GUN	

Task cards — Suitcases

TRAVEL ALONE	TRAVEL WITH FRIEND
I AM DOING THAT CONSTANTLY	I AM DOING THAT FIRST TIME
WELL KNOWN TRAVEL GOAL	UNKNOWN TRAVEL GOAL
OTHER TYPE OF TRANSPORT	

Robot grid for the task - Suitcases

	A	B	C	D	E	F
1						
2						
3						
4			START			
5						
6						

Notes

Situation cards are shuffled and placed in any order. The robot only drives through empty cells. The sorted card is "transported" by sticking it with an adhesive rubber to the robot.

- **What helps to manage fear?** (discussion, possible conclusions)
  - It is safer to travel with a friend.
  - When I have tools to help me in a critical moment, I gain courage.
  - It is very important to have a purpose (for example, I am going to visit
  - a sick friend and maybe this is the last chance to meet him).

Task "Algorithm for overcoming fear"

Working together and following the given rules, create **THE ALGORITHM FOR OVERCOMING FEAR**:

- In the robot grid find the cards to help you cope with fear in class and stick a green sticker on them.
- Use the arrows to write the shortest path and pass it with the robot (**all boxes on the robot's path must be marked with stickers**).
- Comment your choice.

THE ALGORITHM FOR OVERCOMING FEAR:

RULES:

- Work is shared by all team members.
- The section of the road to the selected card is programmed by each team member.
- Everyone is responsible both for her/himself and for the whole team.
- Everyone helps the team to complete the task.
- The work is presented by the whole group.

Robot grid for the ALGORITHM FOR OVERCOMING FEAR task

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6			START			

Coordinates of the boxes marked with stickers (write down):

Cards for the ALGORITHM FOR OVERCOMING FEAR task

I`m not asking because others think that I am know-nothing	Teachers and parents are waiting / hoping for the best results, I can't disappoint them…
In the group, we decide how we will achieve the learning goals	Everybody obey / have to agree with group leader
I can help others; By helping friends - I learn better	I am responsible only for myself in a team

Cards for the ALGORITHM FOR OVERCOMING FEAR task

Important the common team goal	**In a success or failure case I am responsible team member**
When I am afraid in speaking / answer in public, I'm checking (ask advise) with my friend	

Notes

The situation cards are shuffled and arranged in such a way that the fear overcoming tips would be arranged in a circle in the robot grid.

- **When do I feel safer in class?** (discussion, possible conclusions)
  - I feel safer in class when I know I have a chance to get support.
  - I feel safer in class when I can help, I feel needed.
  - I can overcome my difficulties and fears when a common goal is achieved.
  - Joy shared with friends doubles, and fears – dissolves.
  - Prosocial behaviour motivates personality growth and strengthens it.

Užduoties „Baimės nugalėjimo algoritmas“ kortelės

Studying alone	I feel safer when I study with a friend (in a group)
Everything have to find out myself	I can and am not afraid to ask friends or teachers for help
Mistakes will determine my evaluation	I am not afraid to make mistakes — my group mates will give me advice; Mistakes help us improve

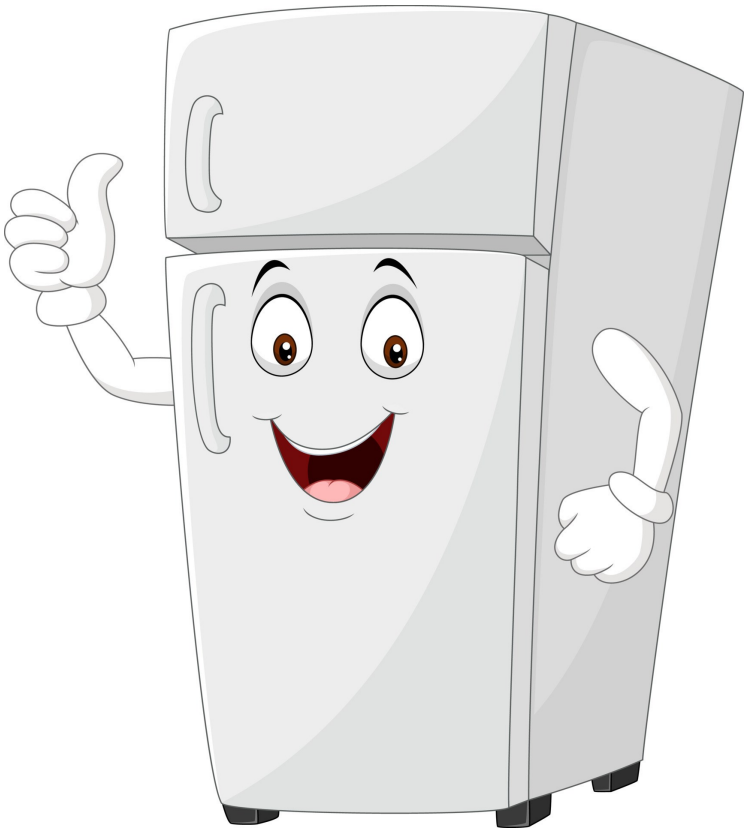
Robot grid for the ALGORITHM FOR OVERCOMING FEAR task (ANSWER):

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6			START			

Coordinates of the boxes marked with stickers (ANSWER):

B5 —> A4 —> B3 —> C2 —> D2 —> E3 —> F4 —> E5

Feedback cards



WRITE down the CODE for Algorithm For Overcoming Fear

Use arrows

.....

.....

.....

.....

.....

.....

THE ALGORITHM OF FEAR IN THE LESSON

Working in a team, you figured out and found ways to overcome fear in class.

WRITE down at least **3 ways** that help you feel safer in the class:

SUITCASES

SUITCASES

Objective: Working in a team think about reasons, which make feel safe on a trip.

TASK: Create safe and unsafe travel presentation.

Put cards into two suitcases:
*Suitcase "**Baggage of Fear**" OR
*Suitcase "**Trip without stress**"

CARDS:
*Well known travel goal / * I am doing that constantly / * flashlight / * night /
* travel alone / * smartphone / *day /
* I am doing that first time / * travel with friend / * unknown travel goal /
* other type of transport /

FEEDBACK:

I TAKE IT NOW:

I SAVE IT FOR THE FUTURE:

I THROW AWAY or I RECYCLING:

.....
(NAME)

Travel Diary

THE TRAIN OF FEAR

Objective: Think about that all feel different and not everyone wants to take a risk.

PROCESS: Imagine, that you alone have to go on a train trip at midnight and come home from a station on foot. Choose a moment when fear overcomes you, then stand up near selected card in a SCALE OF FEAR.

****

STEPS:

1. I`m alone on a platform at midnight and waiting for a train.
2. I get in the train and sit solitary.
3. At the next stop all passengers get off, I`m staying alone.
4. I get off, it is dark around, no living spirit.
5. I hear steps behind my back, I`m going to go faster.
6. Someone, who follows me, also starts going faster.
7. I go to the other side of the road, someone is following me.
8. I look back and see that husky man follows me.
9. I`m almost running, the man comes up and touches my shoulder.

***

MARK where you would like to get off.

WHY?

RESOURCES

ILLUSTRATIONS

https://www.vecteezy.com/vector-art/517525-funny-cute-cartoon-characters-robot
https://www.nicepng.com/ourpic/u2q8r5o0q8q8e6q8_cute-animal-clipart-for-free-download-animals-clip/
https://www.discoverwildlife.com/animal-facts/mammals/facts-about-zebras/
https://www.worldwildlife.org/species/elephant
[https://www.msaquarium.org/p/animals/animal-guide/bottlenose-dolphins
https://www.pestworldforkids.org/pest-guide/bees/
https://www.pestworldforkids.org/pest-info/bug-articles-by-type/how-do-ants-communicate-with-each-other/
https://www.knau.org/knau-and-arizona-news/2017-07-17/group-calls-for-release-of-mexican-gray-wolves-in-new-mexico
https://www.pinterest.com/pin/154318724718886818/
https://www.pinterest.com/pin/12173861482545581/
https://www.pinterest.com/pin/4574037109051366/
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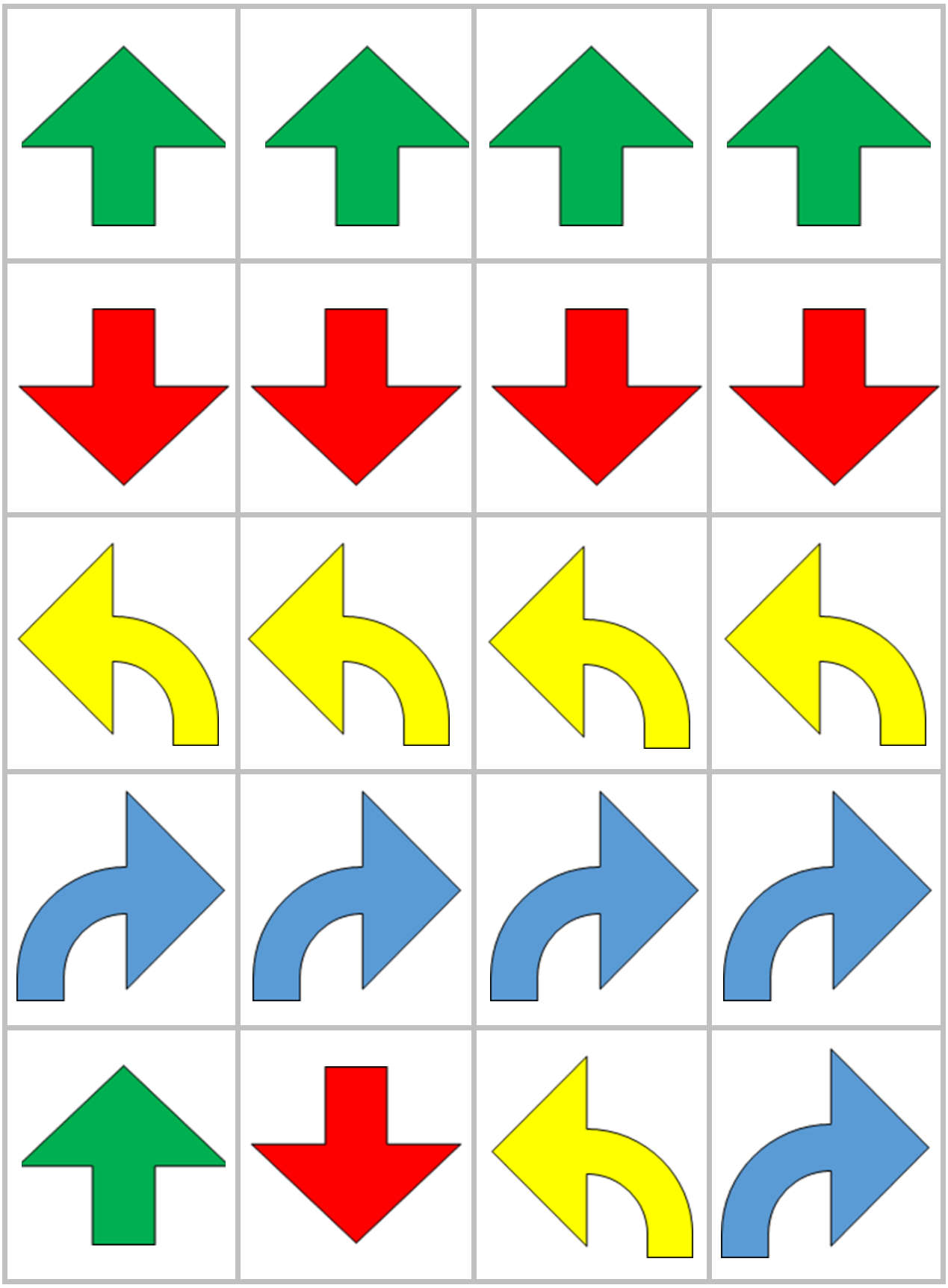
APPENDIX



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Enraged	Furious	Frustrated	Shocked	M	Surprised	Upbeat	Motivated	Ecstatic
Livid	Frightened	Nervous	Restless	O	Hyper	Cheerful	Inspired	Elated
Fuming	Apprehensive	Worried	Annoyed	O	Energized	Lively	Optimistic	Thrilled
Repulsed	Troubled	Uneasy	Peeved	D	Pleasant	Joyful	Proud	Blissful
M	O	O	D	M	E	T	E	R
Disgusted	Disappointed	Glum	Ashamed	E	Blessed	At Ease	Content	Fulfilled
Mortified	Alienated	Mopey	Apathetic	T	Humble	Secure	Chill	Grateful
Embarrassed	Excluded	Timid	Drained	E	Calm	Satisfied	Relaxed	Carefree
Alone	Down	Bored	Tired	R	Relieved	Restful	Tranquil	Serene

Mood meter link https://eenhigby.weebly.com/mood-meter.html

Enraged	Furious	Frustrated	Shocked	M	Surprised	Upbeat	Motivated	Ecstatic
Livid	Frightened	Nervous	Restless	O	Hyper	Cheerful	Inspired	Elated
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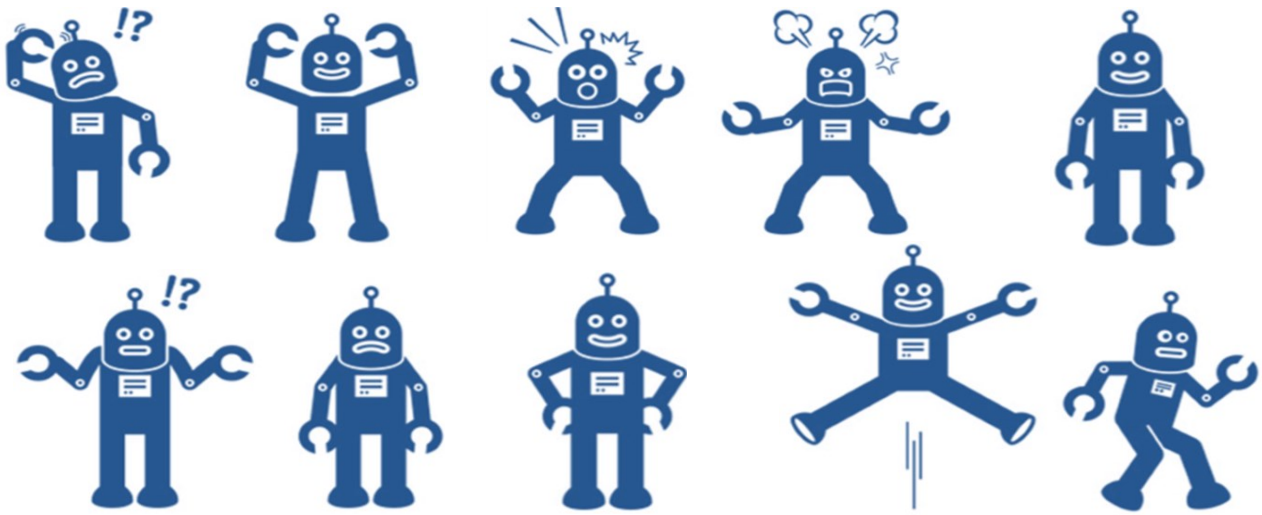
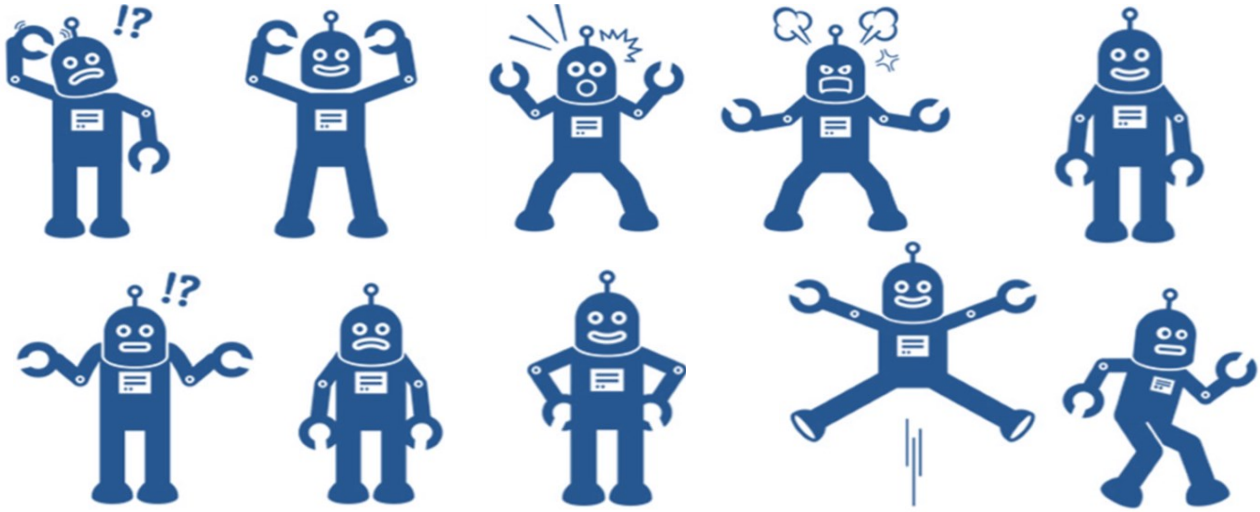
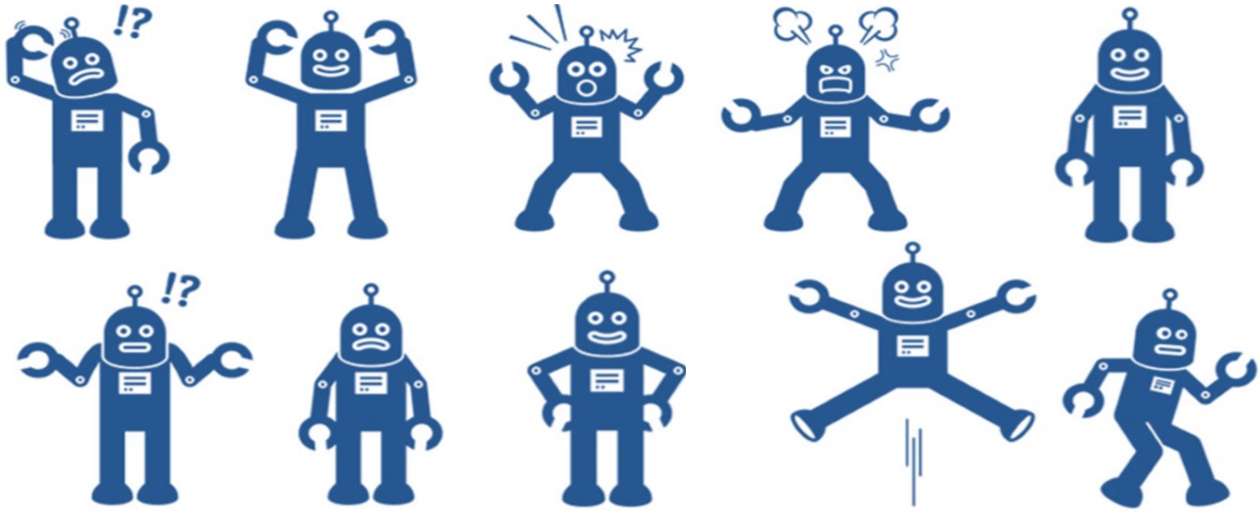
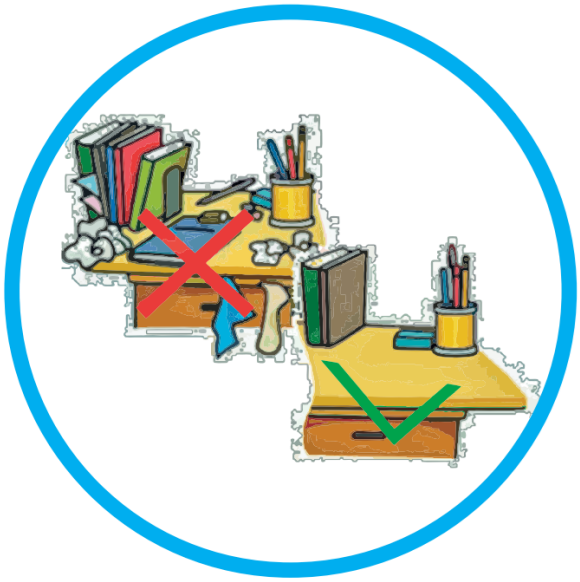
Alone	Down	Bored	Tired	R	Relieved	Restful	Tranquil	Serene

SELF-ASSESMENT ROBOT CARDS









Enable APP mode on the robot, pair it with your smart device:

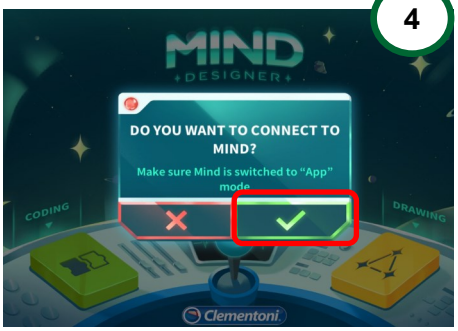
1

Bluetooth

2

3

4



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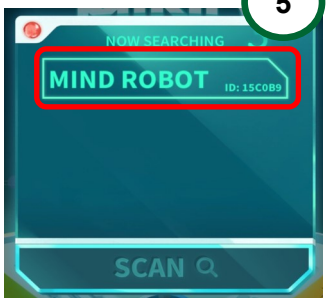
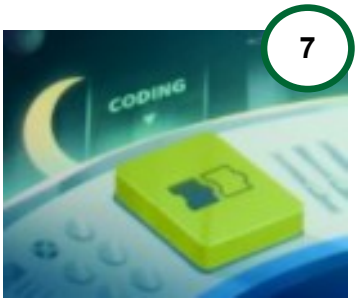


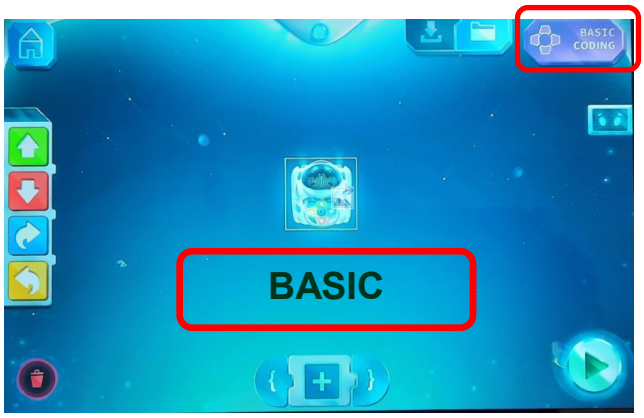
6

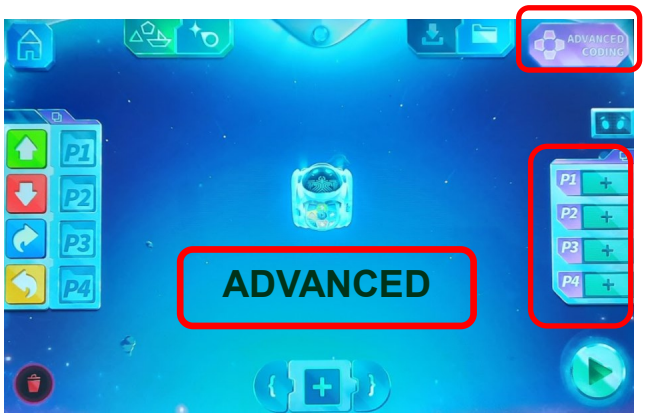
Select the CODING programming environment —>

7

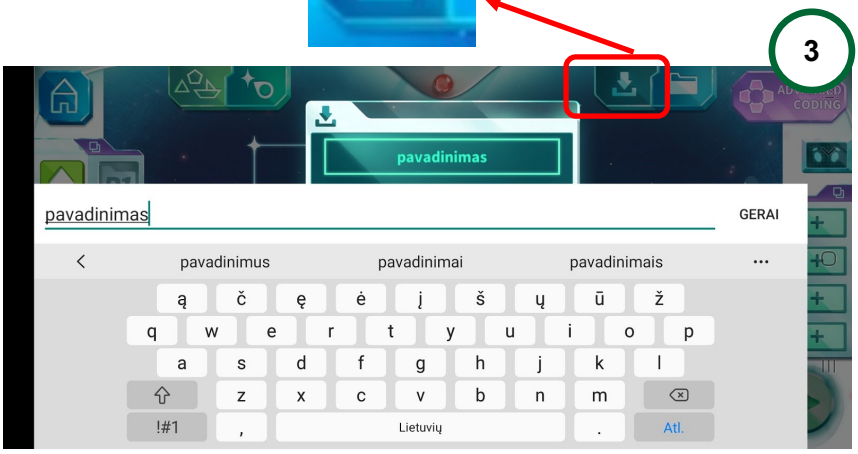


Available programming modes : BASIC (line length 15 cm, turning angle 90°) and ADVANCED (line length and turn angle can be adjusted, procedures can be created).



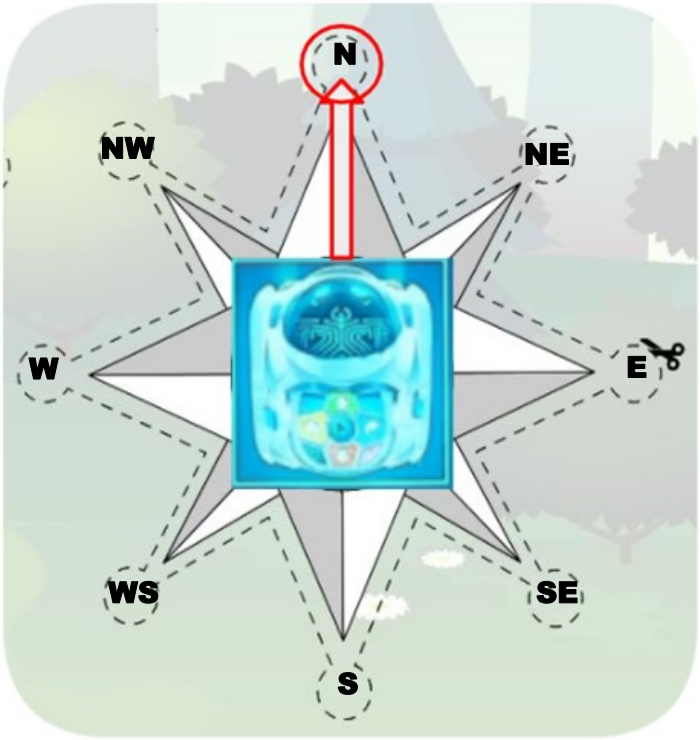


How to SAVE the programme?



To start the programme —>

NOTE!



The starting direction of the robot is NORTH.

Write all the programs starting from this position.

COMMUNITY ALGORITHM IN A ROBOT'S BACKPACK

Metodical Publication

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Robotics vs Bullying

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