

# **SET OF TASKS**

# FOR BASIC PROGRAMMING

# **OF ROBOTIC SNAIL**





Created as a part of the project: SHARING AND PROMOTING BEST PRACTICES AND NEW IDEAS: IT THINKING FOR PRESCHOOLERS (Nr.: 2022-1-CZ01-KA210-SCH-0000816555) in collaboration between Karuke kindergarten and Malá technika z.ú.



### Set of tasks for basic programming of robotic snail

Created as a part of the project ERASMUS+: SHARING AND PROMOTING BEST PRACTICES AND NEW IDEAS: IT THINKING FOR PRESCHOOLERS (č. 2022-1-CZ01-KA210-SCH-000081655)

In collaboration with Karuke kindergarten, Estonia and Malá technika z.ú., Czech Republic

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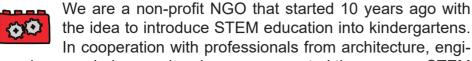
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#### **ABOUT US**



#### Hello from Malá technika!



neering, psychology and pedagogy we created the program STEM KIDS Academy that covers 8 basic and 4 advanced topics. Our lecturers have visited kindergartens and primary schools with these hands-on lessons ever since.



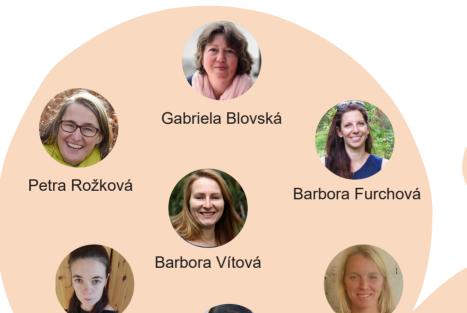
Later we dived into creating of programmes focused on the development of logical, mathematical and digital thinking, where children are playfully taught the basics of pro-

gramming competencies with the aid of a large scale of educational robots.



Since the beginning we have collaborated with more than 2700 kindergartens and primary schools all over the Czech Republic.

In this Erasmus+ project we connected an Estonian kindergarten Karuke in the city of Kohtla-Järve with two Czech kindergartens – in Světice and in Prague Na Chodovci \*\* MŠ Na Chodovci .



Miloslava Makovičková

Lucie Lacinová

Šárka Landkammerová

#### **ABOUT US**



#### Hello from team Karuke!

Based on the national curriculum for kindergartens in Estonia, our Kindergartens in Estonia, our

These activities develop mathematical, linguistic, scientific and environmental skills and support creative, social and personal development. We also use STEM learning methods and new technologies. Our school has well-equipped classrooms (interactive boards and educational robots, projectors, computers and the Internet connection).



Our teachers are well educated and forward looking people. We recognize the importance of equipping today's children with the skills and knowledge necessary to navigate the future.

Teachers of the team Karuke are creative and playful and they continue to come up with new ideas and games. Thanks to the positive cooperation with Czech colleagues, several of them have found a place within the pages of this book.



Jelena Zahharova



Aleksandra Zvereva



Ilona Maharramova



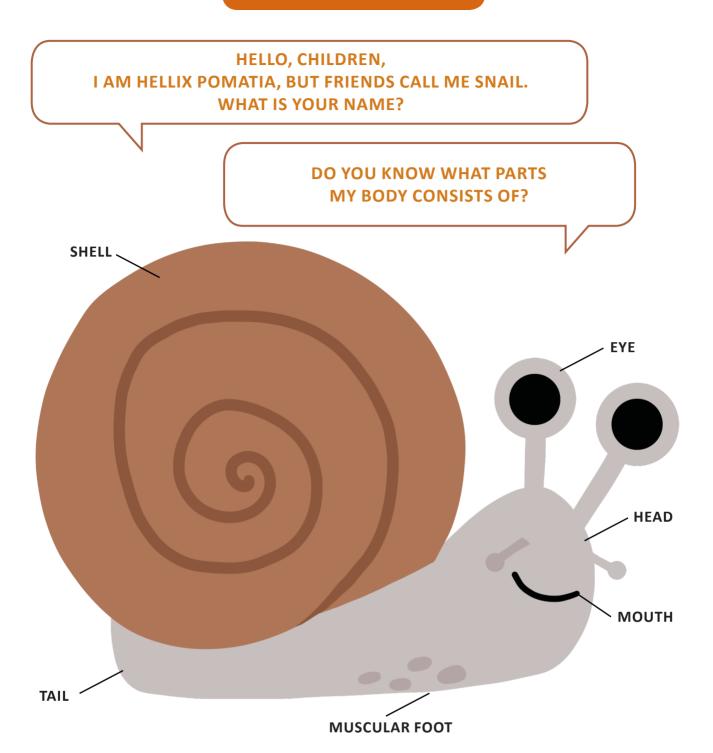
Alina Motorina



Jevgenia Suslova



Pille Pärs



### Life cycle of a snail





### PICK ONE IMAGE FROM THE PYRAMID.



### **TEACHERS' NOTES:**

- Child picks a question an image from the pyramid.
- Teacher reads the question and shows pictures related to each answer.
- With each answer the teacher shows certain amount of fingers:



- Children show the correct answer with their fingers.
- In some questions there are more correct answers.

### SNAIL'S QUIZ



### WHAT DO YOU KNOW ABOUT ME?



### Where does a snail live?



in a sea



at the edge of a forest



in a garden



### What colour is a snail?



🧗 dark brown



light brown



y pink



### How big is a snail?



like a hen



like a froggie



like a kitten



### When does a snail like to go on a trip?



When it rains.



When it's hot.



When it snows.



### What does a snail like to eat?



ice cream



bugs



leaves



## What does a snail do when it gets scared?



It runs away.



It screams.



It hides in its shell.



### What does a snail do in the winter?



🏅 It eats.



It goes sledding.



It sleeps.



# SNAIL'S QUIZ AT OUR KINDERGARTEN



Preparation



Selecting a question



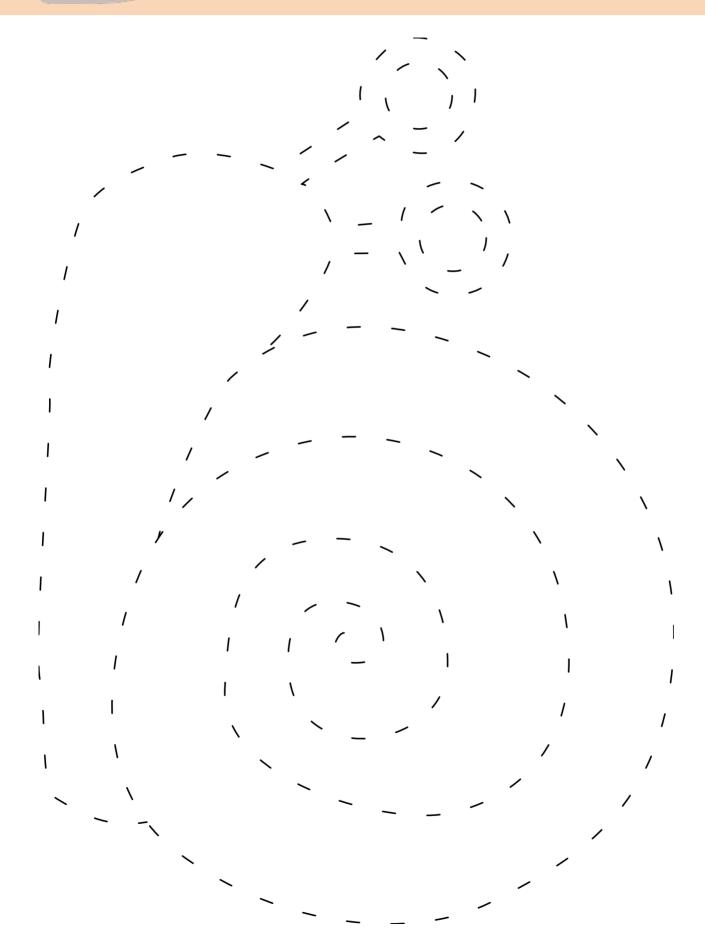
Taking the quiz



We're having such a good time!



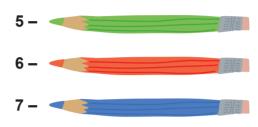
### **HOW TO DRAW A SNAIL?**

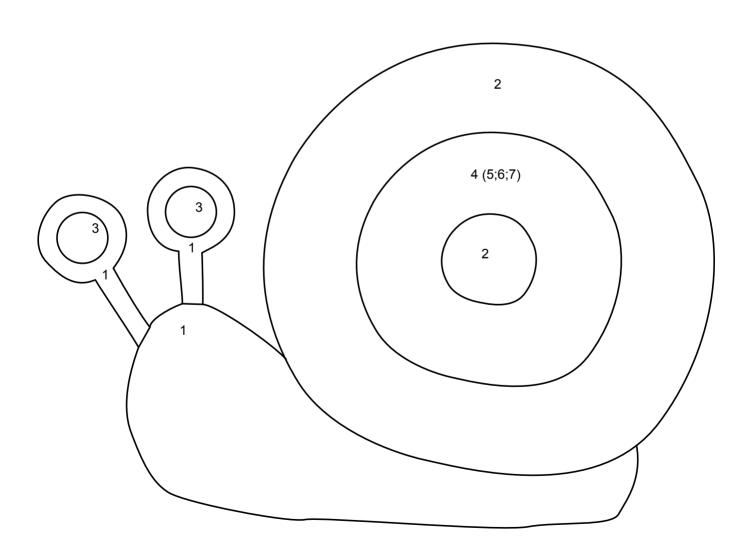




### **HOW TO COLOUR A SNAIL?**









### MAKE MY FRIENDS FROM VARIOUS MATERIALS.

**PAPER** 



**PLAYDOUGH** 







GINGERBREAD DOUGH

NATURAL MATERIALS



MY SHELL







### **TIME SEQUENCE**



What happens to snail when it











What does snail do during the year? Start with spring.









Guess the aging of snail.









### **TEACHERS' NOTE:**

Making timelines is important for the development of logical and structured thinking.

The ability to sort information in the right time sequence is one of the most important abilities required for programming.

### **ROBOT'S INTRODUCTION**



HOW TO OPERATE THE ROBOTIC SNAIL QOBO?

### THE ROBOTIC SNAIL QOBO



VIDEO HOW TO OPERATE THE ROBOTIC SNAIL QOBO



### **PROGRAMMING CARDS**



**START**This card makes the robot



move forward.

**FORWARD**The robot moves one step forward.



TURN LEFT
The robot turns 90 to the left and moves one step forward.



**BLUE LIGHT**The robot starts blinking blue and moves one step forward.



**FINISH**The robot stops and finishes the program.



TURN RIGHT
The robot turns 90 to the right and moves one step forward.



**RED LIGHT**The robot starts blinking red and moves one step forward.



ORANGE LIGHT
The robot starts blinking orange and moves one step forward.







### **GREEN LIGHT**

The robot starts blinking green and moves one step forward.



### **PURPLE LIGHT**

The robot starts blinking purple and moves one step forward.



### **SOUND OF A POLICE SIREN**

The robot wails like a police siren and moves one step forward.



### **DANCE MUSIC 1**

The robot plays dance music and moves one step forward.



### **YELLOW LIGHT**

The robot starts blinking yellow and moves one step forward.



#### **INDIGO LIGHT**

The robot starts blinking indigo and moves one step forward.



### **SOUND OF A TRAIN**

The robot makes the sound of a train and moves one step forward.



### **DANCE MUSIC 2**

The robot plays dance music and moves one step forward.

### **PROGRAMMING CARDS**





### **TOUCH CARD**

The robot stops and waits for the user to touch its face. Then it moves one step forward.



#### **RIVER**

Use this card as a crossroads while building a path in puzzle mode.



#### **BANANA**

The robot recognizes the fruit, names it and moves one step forward.



### **APPLE**

The robot recognizes the fruit, names it and moves one step forward.



### **HELP-TO-MOVE CARD**

The robot stops and waits for the user to pick it up and place it on the next card.



### **RANDOM CHOICE**

This card can be only used before the CONDITION card. The robot randomly chooses a CONDITION apple or banana and moves one step forward.



### CONDITION

If the robot has picked up an apple, it turns 90° to the right and makes a step forward. If the robot has picked up a banana, it turns 90° to the leftand makes a step forward.

### PROGRAMMING FOR CHILDREN FROM 4 YEARS



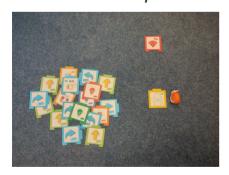
CREATE A PATH FULL OF FUN. PICK PROGRAMMING CARDS THAT YOU WANT AND CONNECT THEM IN A LINE LIKE A JIGSAW.

### **INSTRUCTIONS:**

- Create a program according to your fantasy.
- Start with a card . End the program with a
- From the chosen cards, create a program on the grid.
- Put the snail on start and press the START button on its shell.

### **INSPIRATION:**

Task example





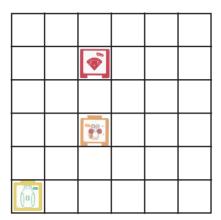






# BUILD A PATH FOR THE ROBOTIC SNAIL IN THE GRID. DANCE WITH IT ALONG THE WAY ...

### TASK EXAMPLE



### SOLUTION



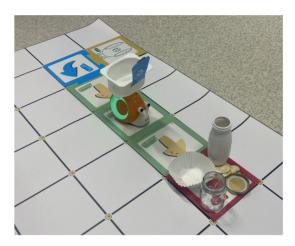
### **TEACHERS' NOTE:**

- Put the card START , the card DANCE and the card FINISH on any place in the grid.
- Let children pick programming cards to connect the path for the robotic snail (adjust according to the age of children).
- Children put the programming cards in the grid like a jigsaw thus building a path for the snail from the card START through the card DANCE to the card FINISH.
- Children build by trial and error. Let them make mistakes.
- Set the robotic snail on the card START, turn it on and check its programme/ path.
- Correct the programme if needed.



# HELP ME WITH WASTE SORTING. PROGRAM A PATH FOR ME TO THE CORRECT WASTE CONTAINER.





### **TEACHERS' NOTE:**

- A child selects a piece of waste to sort out (bio, metal, plastic, paper).
- They programme the path to the right container.

NOTE: Move the card START as necessary.





# LET'S PICK MUSHROOM TOGETHER. CAN YOU IDENTIFY WHICH ONES ARE EDIBLE?





### TASK:

- Build a path through the edible mushrooms to the basket.
- Do you remember each mushroom's name?

### **TEACHERS' NOTE:**

Prepare the task in the grid with pictures or photos of mushrooms.

Photos are prepared for use in the pouch at the back of the booklet.











### **EDIBLE AND POISONOUS MUSHROOMS**



penny bun



larch bolete



russula



birch bolete



chanterelle





blusher



fly amanita



dead cap



common stinkhorn



# COLLECT THE CORRECT SET OF BALLS AND BRING THEM TO THE PLATE OF THE DESIRED COLOUR.



Task preparation



Teacher helps with the setting of the task.



Child build a path for the snail.



The snail collects coloured balls along the way and brings them to the correct plate.



The robotic snail completed the task. HURRAY!

### **TEACHERS' NOTE:**

- Children pick the plan by themselves.
- Then they collect the necessary set of balls into a basket on the back of Qobo.
- And it makes up the path to the plate of the selected colour.





SORT THE ITEMS BY SEASONS. THERE IS EACH SEASON ON THE PLAYING FIELD (SPRING, SUMMER, AUTUMN, WINTER). MAKE ME A PATH TO THE CORRECT SEASON.



### **TEACHERS' NOTE:**

- Children choose items connected to a particular season.
- A child selects any point on the playing field where to put the selected item.
- The child independently chooses where the snail will start its path.
- Having reached the chosen item, the child determines what time of year the item belongs to.

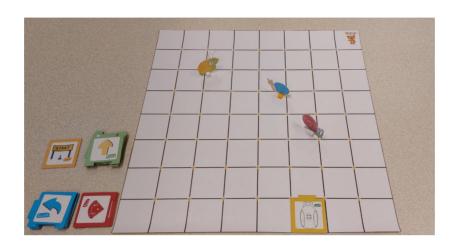
### **EXAMPLE:**

The solution depends on the choices of the child during the game.





#### **SNAIL'S FRIENDS**



### TASK:

Come and visit all my friends and find out what colour they are.

### **TEACHERS' NOTE:**

- Let's prepare snails of different colours. For example: red, blue and yellow. They can be from different materials. Or use the snails that are attached in the pouch on the back of the booklet.
- Put the snails of different colours in the grid.
- Build a road so that the robotic snail visits all its friends of different colours.
   When meeting a snail, the robotic snail will change its colour and say it. Children repeat the names of the colours with the robotic snail.

### **POSSIBLE SOLUTION:**

















# SNAIL'S STORY WITH A PROGRAMMING TASK

ONCE THERE WAS A SNAIL WHO WENT ON A TRIP . IT MOVED ONE STEP AND TURNED RIGHT . SUDDENLY A POLICE CAR RUSHED PAST HIM , WAILING LOUDLY. THE SNAIL GOT SCARED AND TURNED BLUE . HE SPED UP AND MOVED TWO STEPS FORWARD . THEN HE STOPPED TO TAKE A REST .

### TASK:

Build the path for the robotic snail according to the story.

### **SOLUTION:**







### TASK:

Make up and tell a story about a snail according to the prepared cards.























- · Build a path.
- Make up and tell a story.
- Put the snail on START and let's go.

### **EXAMPLE SOLUTION:**



### **TEACHERS' NOTE:**

Choose different programming cards and make up more funny stories about the snail and its adventures.













WHERE DO I GO?

### **WATCH AND TRY TO GUESS:**

What does the snail get when it rolls the dice?

A banana or an apple?

The snail's random choice decides which route it will take to the finish.



### TASK:

### **TEACHERS' NOTE:**

Build a path for the snail following the instructions above and watch how the programme unfolds.

It is the introduction to programming with a condition.

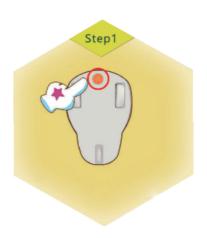
When the snail is on the RANDOM CHOICE card and gets an APPLE, it turns right and moves forward to the next card in the programme.

When the snail is on the RANDOM CHOICE card and gets a BANANA, it turns left and moves forward to the next card in the programme.

### PROGRAMMING FOR PRESCHOOLERS



### **PROGRAMMING IN A ROW**



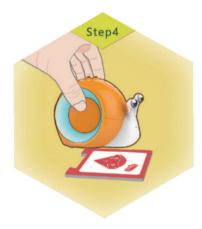




on the bottom side of the robot.

Hold the ON/OFF button Scan the START card.

Scan the next card from the programme you have prepared.





Scan the card FINISH. Press the START button.

### **EXAMPLE OF A PROGRAMME:**









### **START**

This card START is used for advanced programming in a row (scanning).



### LOOP 3X

This card is used together with the END LOOP card. The sequence inserted between these two cards gets repeated three times.



### **LOOP 6X**

This card is used together with the END LOOP card.
The sequence inserted between these two cards gets repeated six times.



### **END LOOP**

This card ends the command sequence inserted after the card LOOP 3x or the card LOOP 6x.



### TASK:

Build a path to an animal and then to its home.

### **TEACHERS' NOTE:**

- A child selects an animal (a bear, a wolf, a fox, etc.).
- Then, they create a path for the snail to reach the chosen animal.
- Subsequently, the child programmes a path to the correct home.

### **SAMPLE SOLUTION:**

To an animal (e.g. a wolf):





To a wolf's den:





**CAUTION:** Always mark the starting point with a symbol (e.g. a heart).



### **FOREST ANIMALS AND THEIR HOMES**

The **EUROPEAN BEAVER** lives on the river banks, where there is plenty of wood. Beavers build canals, dams and LODGES on the river banks and in the water.

The **RED FOX** lives in a **BURROW**. A burrow is a home dug deep into the ground. There is a tunnel leading to the chambers. A burrow can have multiple entry tunnels.

The **BROWN BEAR** spends the winter in a **DEN**. It can be a small cave or a space dug under tree roots.

The **RED SQUIRREL** usually lives in tree hollows.

The **GREY WOLF** lives in a cave.

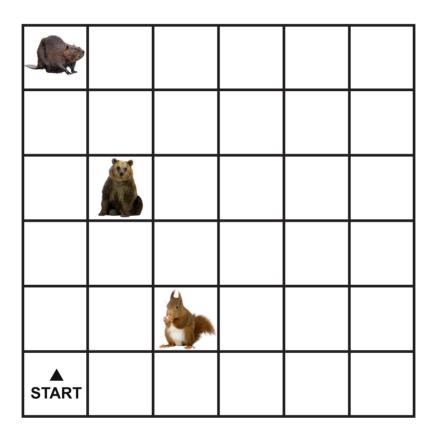




**FOREST ANIMALS** 

### Find a path from the START to each forest animal.

Use a coloured pencil to mark the path on the worksheet, and then write it down in a row using arrows.



### **Use these arrows:**

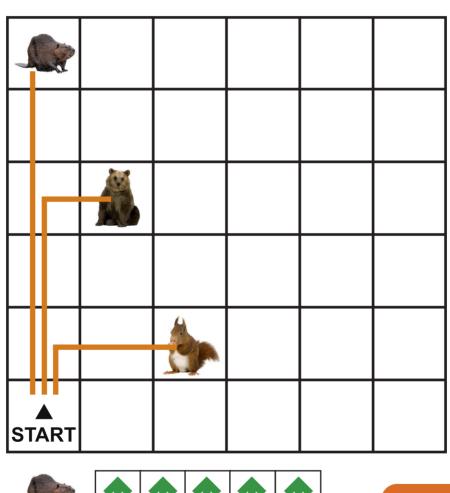
forward (step)

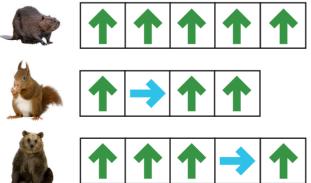


### **FOREST ANIMALS**

### **TEACHERS' NOTE:**

This solution features only the shortest paths. There are several possible solutions to the task.



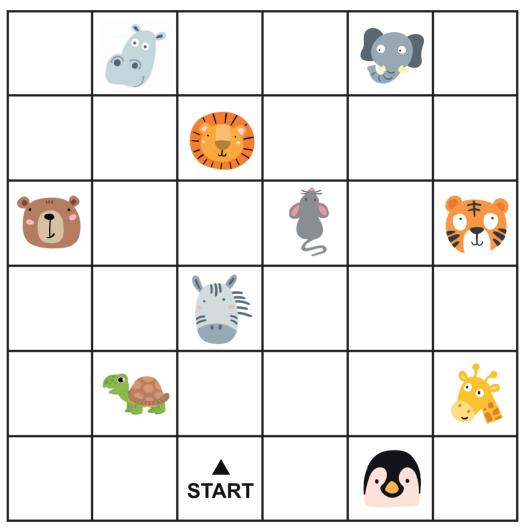






PROGRAM THE ROBOT TO FEED THE ANIMALS IN THE ZOO. BE CAREFUL, EACH ANIMAL HAS ITS OWN SPECIFIC FOOD TO EAT.

Feed animals with meat and and, or grass.



Choose an animal to feed.

What does this animal eat?

Use a coloured pencil to mark the path on the worksheet, and then write it down in a row using arrows  $\leftarrow \uparrow \rightarrow$ .

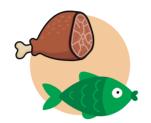
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### **SAMPLE TASK AND SOLUTION**



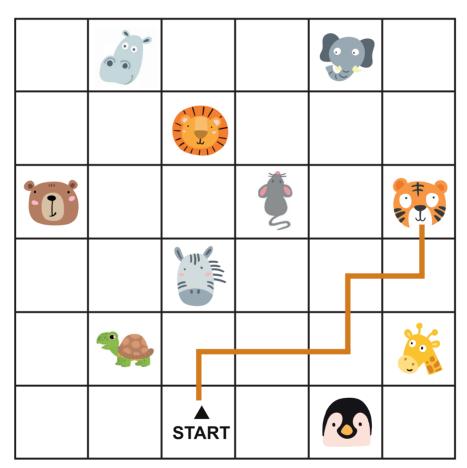
### **FEED THE TIGER**

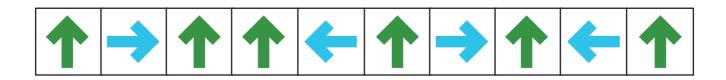
First, choose what the tiger eats.



or









# HELP ME COLLECT ALL THE NUMBERS IN ORDER AND FIND OUT WHICH WORD IS ENCRYPTED.



In Estonia, preschoolers learn numbers and letters as part of their early education.

Preschoolers even begin to learn to read whole words.



### TASK:

- Arrange the cards according to the given scheme.
- The teacher marks the starting point.
- The child builds 4 different paths, each leading to a specific digit, following the correct sequence of the number series.
- After gathering all the numbers in the correct order, the child takes off the numbers from the cards.
- · The child reads the word they collected.

### **SAMPLE SOLUTION:**

- 1.
- 2.
- 4.



# THINK OF WORDS STARTING WITH THE LETTERS HIDDEN IN THE GRID.



In Czechia, preschoolers learn counting using dots or items, and they also begin to guess the initial letter of a word during their early education.

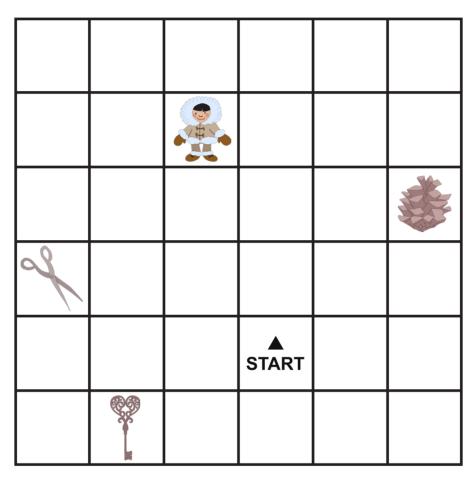
#### TASK:

- Place the START card on any empty space on the grid.
- There are hidden letters K,L,M,S under each card on snails number 1-4.
- Children programme paths to the cards in the right order.
- Children reveal the top card to discover a picture with an initial letter.
- Each child in the group tries to come up with another word beginning with the same letter.





Find a path to the pictures that make up my name in Czech: **ŠNEK** 



Use a coloured pencil to mark the path on the worksheet, and then write it down in a row using arrows  $\leftarrow \uparrow \rightarrow$ .

Š			
N			
E			
K			



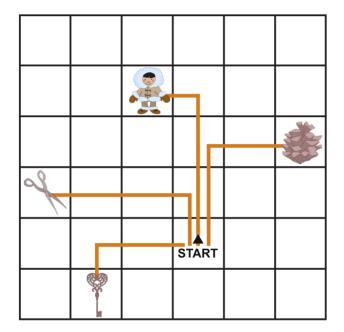
Find a path to the pictures that make up my name in English: **SNAIL** 

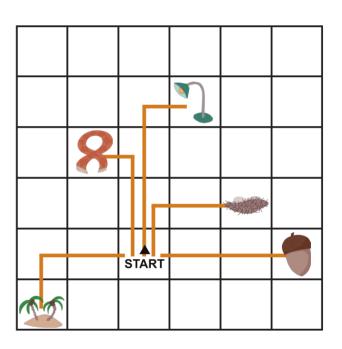
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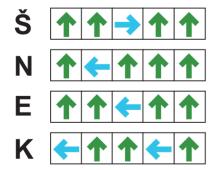


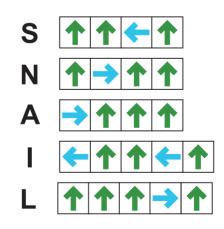










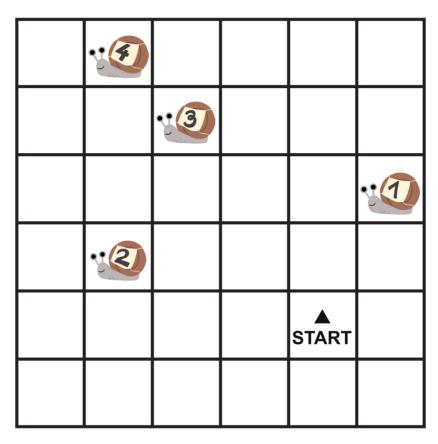




#### **SNAIL & NUMBERS**

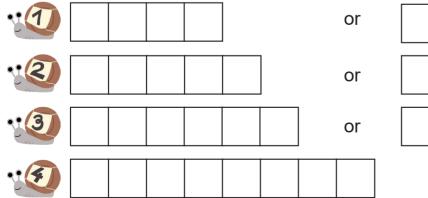
Find and write down a path to each snail in the correct order.

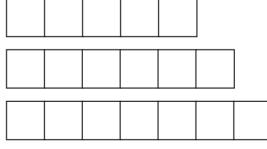
Watch out, you must not step on any snail.



Which way did you find?

Use a coloured pencil to mark the path on the worksheet, and then write it down in a row using arrows  $\leftarrow \uparrow \rightarrow$ .

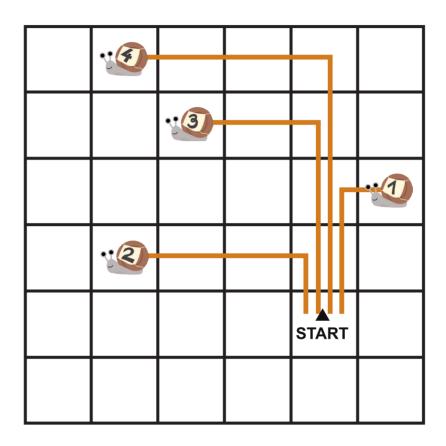






## **SNAIL & NUMBERS**

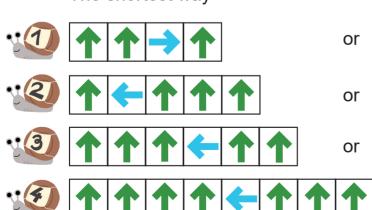
# THIS SOLUTION INCLUDES ONLY THE SHORTEST PATHS.



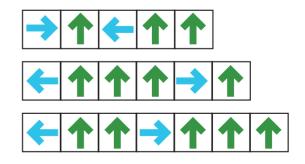
## **TEACHERS' NOTE:**

There are multiple solutions for this task.

The shortest way



Another possible solution









#### **PANCAKE RECIPE**

## Ingredients:

- o 2 cups all-purpose flour
- o 2 cups milk
- o 1 egg
- 1 tbsp vanilla sugar
- o Salt
- o Oil
- · Add a pinch of salt to the milk.
- Whisk together with sugar and an egg.
- Gradually, stir in the flour.
- Stir or whisk until well combined and set aside for about 10 minutes.
- On a preheated pan, cook thin pancakes from on sides until golden brown.
- Can be decorated with anything sweet, e.g. apple or banana.



#### **MAKING PANCAKES**

#### TASK:

Help me collect all the ingredients necessary for making pancakes.

#### **TEACHERS' NOTE:**

- In advance, buy ingredients to make pancakes (oil, an egg, flour, milk and sugar), and also some items that are not part of the recipe.
- Place all the ingredients randomly in the grid.
- Children build a path through all the ingredients according to the recipe.
- I In the end, put all the ingredients in a bowl and stir well to create a pancake batter.

#### **SAMPLE SOLUTION:**







#### **PROGRAMMING WITH A CONDITION**



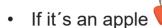
#### **DECORATE YOUR PANCAKE.**

#### TASK:

Snail has made pancakes.

How will it decorate them? With an apple or a banana





, the snail will dance.

If it's a banana \(\lambda\), it will turn purple.



#### PROGRAMMING WITH A CONDITION:

Build the path according to the instructions. Use the following programming cards:





















#### TASK PREPARATION



## **SOLUTION**



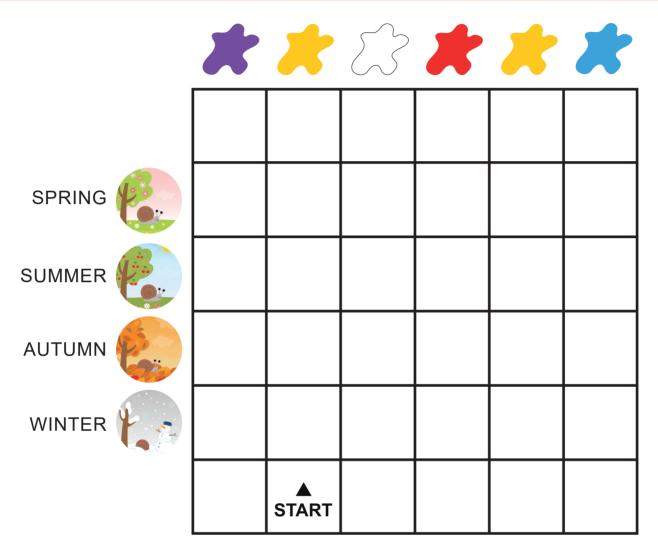


# DO YOU KNOW THESE SPRING FLOWERS?





# DURING WHAT SEASON OF THE YEAR DO THESE FLOWERS BLOOM?



## TASK:

Place the spring flowers to the correct square in the grid according to the colour.







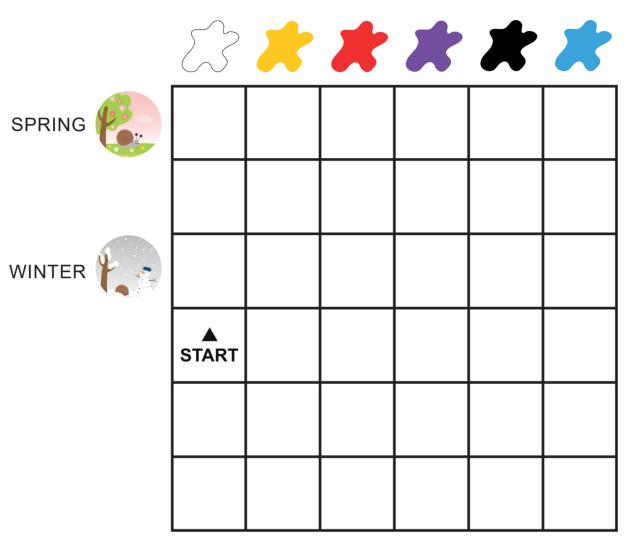




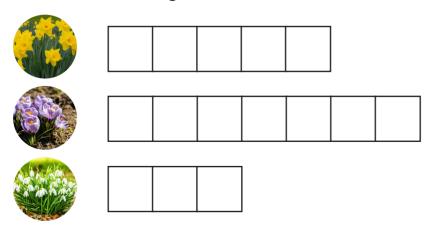




DETERMINE, WHETHER A FLOWER BLOOMS IN SPRING OR IN WINTER AND WHAT COLOUR IT IS. ACCORDING TO THAT, FIND THE CORRECT SPACE FOR THE FLOWER IN THE GRID.

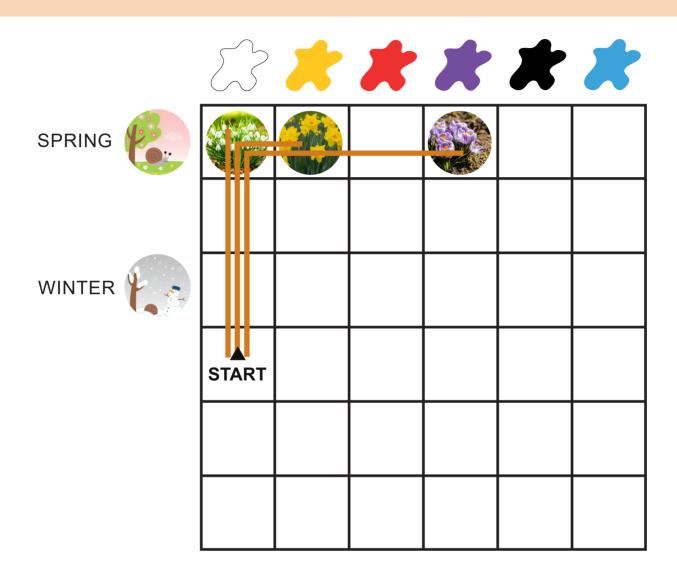


Use a coloured pencil to mark the path on the worksheet, and then write it down in a row using arrows  $\leftarrow \uparrow \rightarrow$ .





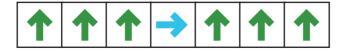
### **SPRING FLOWERS**













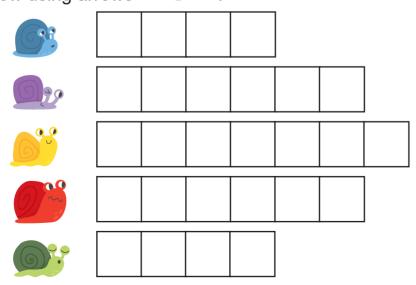




## **SNAIL AND HIS FRIENDS**

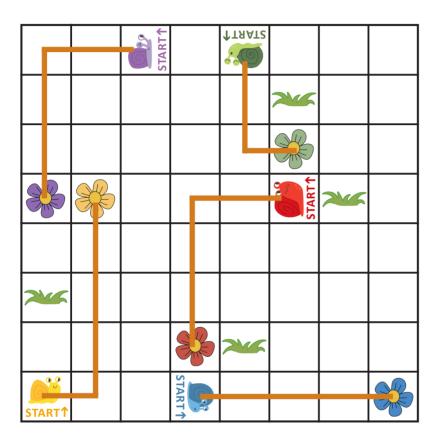
	START1		TAAT2			
				START	246	
246						
			244			
START ↑		START 1				

Use a coloured pencil to mark the path on the worksheet, and then write it down in a row using arrows  $\leftarrow \uparrow \rightarrow$ .

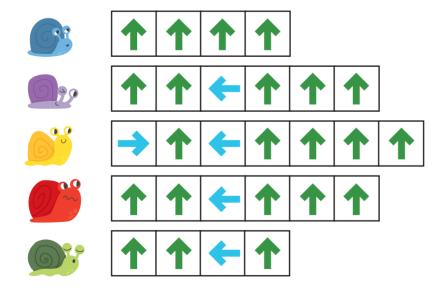




#### **SNAIL AND HIS FRIENDS**











# DO YOU KNOW THESE TRAFFIC SIGNS?



Crossroads



Railway level crossing without gate or barrier ahead



No bicycles



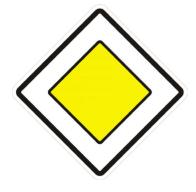
No pedestrians



Bicycles and pedestrians only



Zebra crossing ahead



Main road



Road work ahead

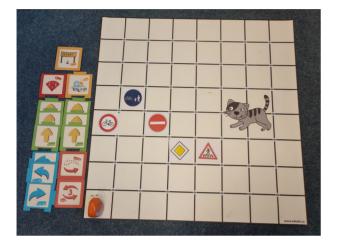


No entry





#### TASK PREPARATION



#### **SOLUTION**





#### TASK:

- Prepare the traffic signs in the grid, and next to it, place the selected programming cards as shown in the preparation photo.
- Create a program for the robotic snail to navigate past all the traffic signs.
- Scan the program and observe at which signs the snail wails like a police siren.

#### **TEACHERS' NOTE:**

This task is focused on working with a sequence and the use of the LOOP 3x card and END LOOP card.



#### **ROAD SAFETY WITH SNAIL**

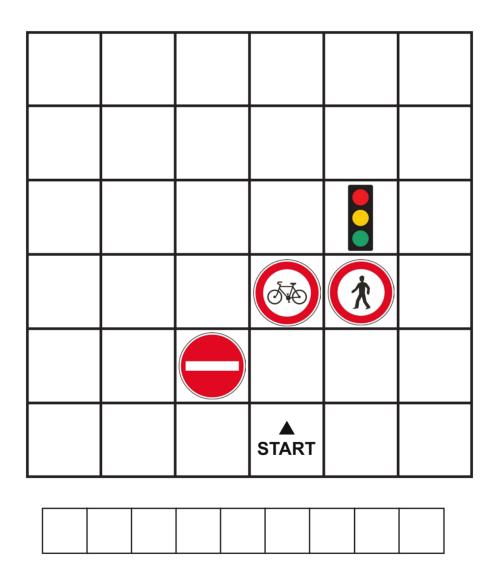
Do you know what these signs indicate ?







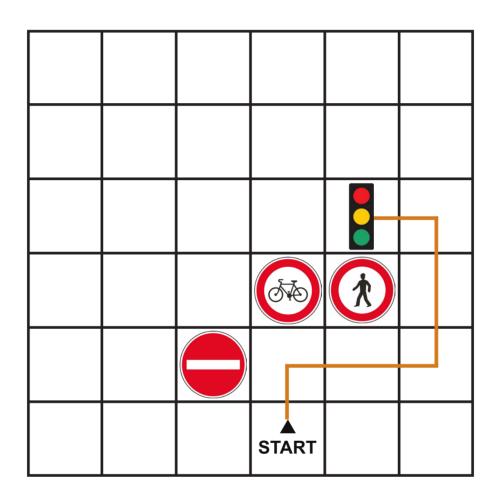
Write down a program using arrows to guide the snail, ensuring it avoids all the prohibitory signs and safely reaches the traffic light \( \begin{align\*} \begin{align\*} \left & \left & \end{align\*} \end{align\*}.



Use a colored pencil to mark the path on the worksheet, and then write it down in a row using arrows  $\leftarrow \uparrow \uparrow \rightarrow$ .



## **ROAD SAFETY WITH SNAIL**



# **SOLUTION:**



# TEACHERS' NOTE:

Multiple solutions are possible for this task.



#### TASK:

I'm so lonely... Will you collect all the playdough and make a friend for me?

### **TEACHERS' NOTE:**

- · Create a plan on how to model a snail.
- · Bring enough playdough.
- Have children place pieces of playdough in the grid.
- Then they build a path for the robotic snail to collect all the playdough.
- Finally, let the children model a snail following the provided plan.

#### **SAMPLE SOLUTION:**









# A PICTURE STORY ABOUT TWO FRIENDS – THE SNAIL AND KARUKE THE BEAR





# TALK ABOUT THE STORY

When answering, allow all children to vote by showing the number of fingers corresponding to each option.



Who is Karuke the bear's friend?







What hurt the bear?







What can be used to heal the bear?





Who can give honey to the bear?





What did the bees want from the snail?







What did the birds want in return for their feathers?











Arrange the attached cards in the right correct order for the story about two friends – the snail and Karuke the bear, and then narrate the story.

## **SOLUTION:**



#### **THEATRE**

Cut out the characters from the story, glue them on sticks and perform the story as a theatrical play.

The character cutouts for the paper theatre are included at the back of the booklet.







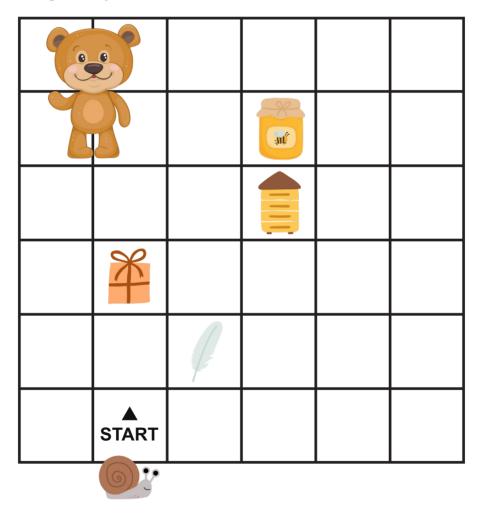


# THE STORY ABOUT THE SNAIL AND KARUKE THE BEAR

What did the snail bring to Karuke the bear to heal his ear?

Does the snail get honey from the bees immediately?

Come up with a path for the snail to bring the bees what they need, enabling him to then bring honey to the bear.

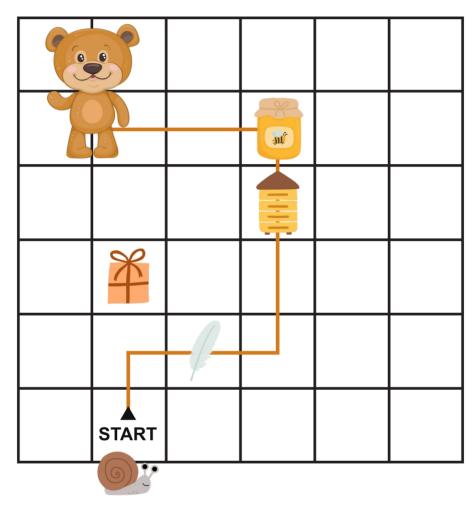


Use a coloured pencil to mark the path on the worksheet, and then write it down in the row using arrows  $\leftarrow \uparrow \rightarrow$ .

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# THE STORY ABOUT THE SNAIL AND KARUKE THE BEAR



## **SOLUTION:**







#### **FAREWELL TO DEAR FRIENDS**

#### PLEASE EVALUATE THE ASSETS OF THIS TEACHERS BOOKLET.

Scan your answers and send them to: info@mtuni.cz
Thank you very much for your answers.

#### 1. I found the concept of this booklet.

interesting average below average

2. The booklet helped me with using the robotic snail to teach children programming.

helped a lot helped a bit didn't help

3. The booklet inspired me.

a lot a bit not at all, I knew everything already



We succeeded in creating a fine team of teachers with international scope. Experiences from different cultural background have been interchanged along with various views on the education of children that enriched the daily work of all participants.

The collaboration on this booklet has been not only entertaining, but it also inspired many new activities and projects that we will continue to carry out together. We managed to create firm professional relations and genuine friendships.

We are looking forward to future get-togethers and joint work.

Do you have any comments or observations regarding the booklet? Would you be interested in collaborating with us on a European or any other project? Contact us at info@mtuni.cz.

Thank you very much.

ALL WORKSHEETS ARE AVAILABLE IN A FREE PRINTABLE VERSION at the link: www.mtuni.cz/snail-qobo







