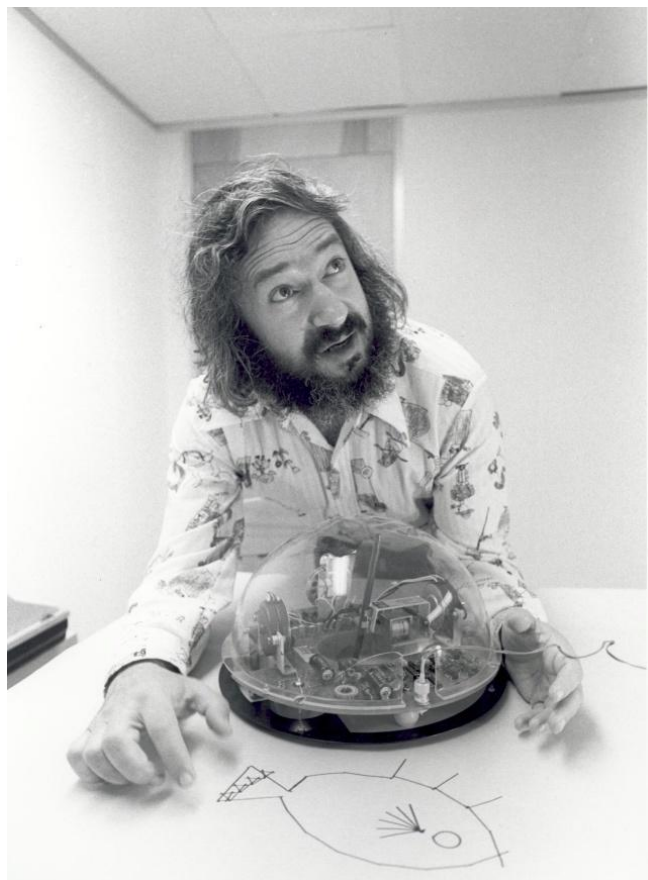


Playing and Learning with Floor Robots

Dr. Katerina Glezou
HNSS Pedagogical Member



What is a Floor Robot?



Floor Turtle
by Seymour Papert (late 60's)



Bee-Bot, Pro-bot, Ozobot, Ino-Bot, Edison, Sphero, Ollie (2017)

Bee-Bot™



<https://www.youtube.com/watch?v=wcAHpLO0BWA>

What is a Bee-Bot?

- Programmable floor robot for Child Care, Early Years & Lower Primary
- A simple, robust, child-friendly digital device
- Starting point for teaching
 - ✓ control,
 - ✓ directional language
 - ✓ basic programming.



Why Bee-Bot?

Bee-Bot is a great cross-curricular resource to teach kids the **first stages of programming**.

- It can be used to help children understand
 - ✓ what algorithms are and
 - ✓ how simple programs can be created and then executed.
- It enables children to improve their skills in directional language and programming through sequences of forwards, backwards, left and right 90 degree turns.



Why Bee-Bot?

- Engages children in a wide variety of **cross curricular learning activities** – Literacy, Numeracy, Geography etc activities.
 - Reinforce number recognition and sequencing.
 - Help with shape, colour, size & position recognition.
 - Travel the world with BeeBot and introduce children to oceans, countries, etc.



Why Bee-Bot?

Bee-Bot is a great tool to support the development of **computing skills**:

- Introduction to sequencing and control.
- Develops positional and directional language.
- Understand algorithms.
- Program sequences and repetitions.
- Use logical reasoning to predict the behaviour of simple programs.
- Design, create and debug programs.
- Detect and correct errors in programs.
- Supports development of fine motor skills.



Why Bee-Bot?

Bee-Bot is a great tool to support the development of **problem-solving and critical thinking skills**:

Through a series of sequential challenges, students learn to:

- direct Bee-Bot on increasingly complicated routes,
- develop an understanding of programming, prediction, self-evaluation, and mapping in the process.



The children play & learn!



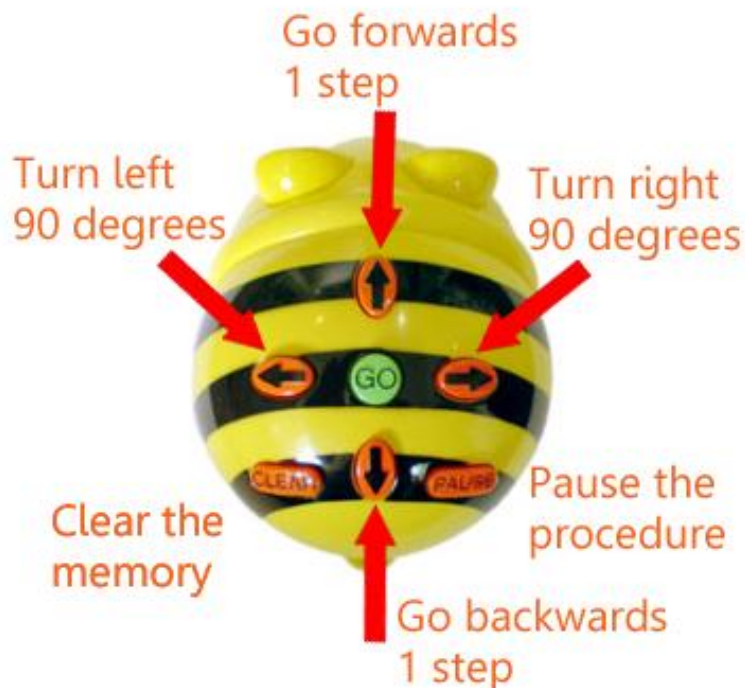
The Bee-Bot programming language consists of only five movement commands

- forward 150mm,
- backward 150mm,
- right turn 90 degrees,
- left turn 90 degrees,
- pause (||) for 1 second and make a tick sound.

Plus two device control commands.

- clear (X),
- GO - executes commands.

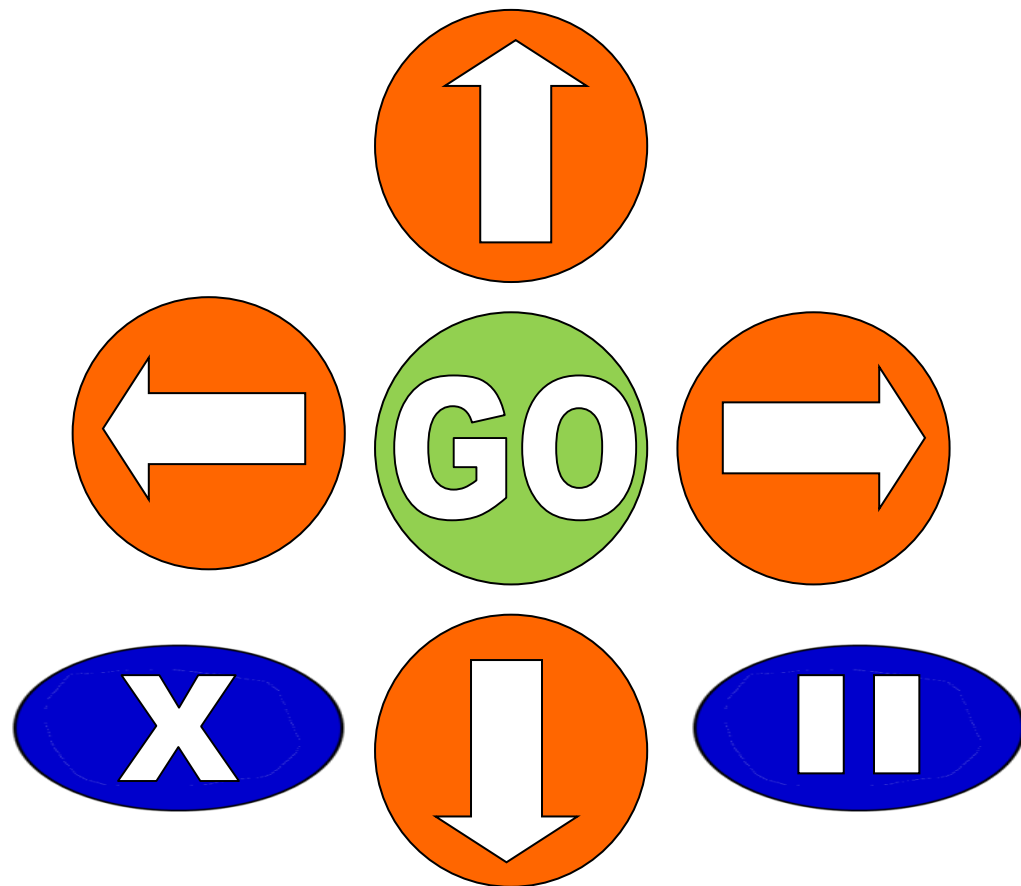
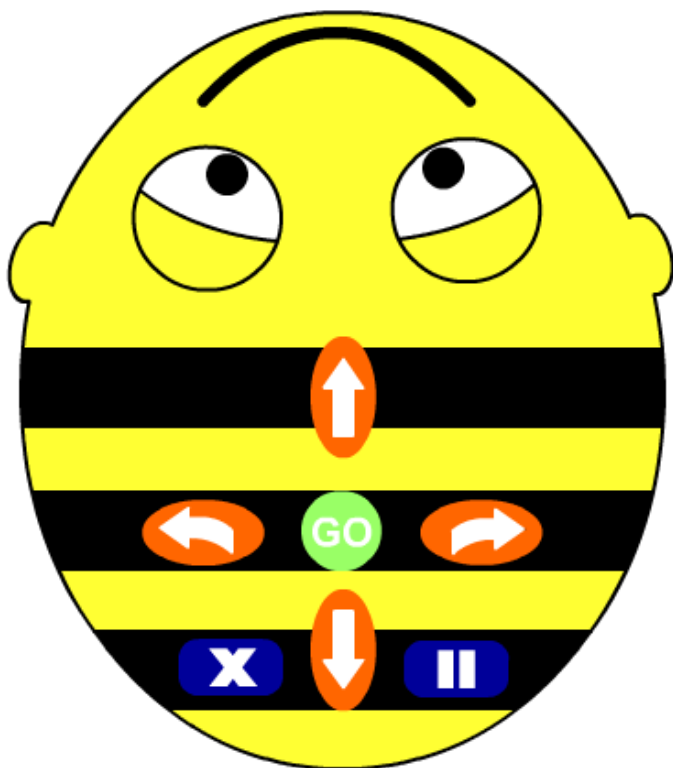
These are based on a small subset of the Logo programming language.



When a program has finished the Bee-Bot makes a sound and flashes its lights.

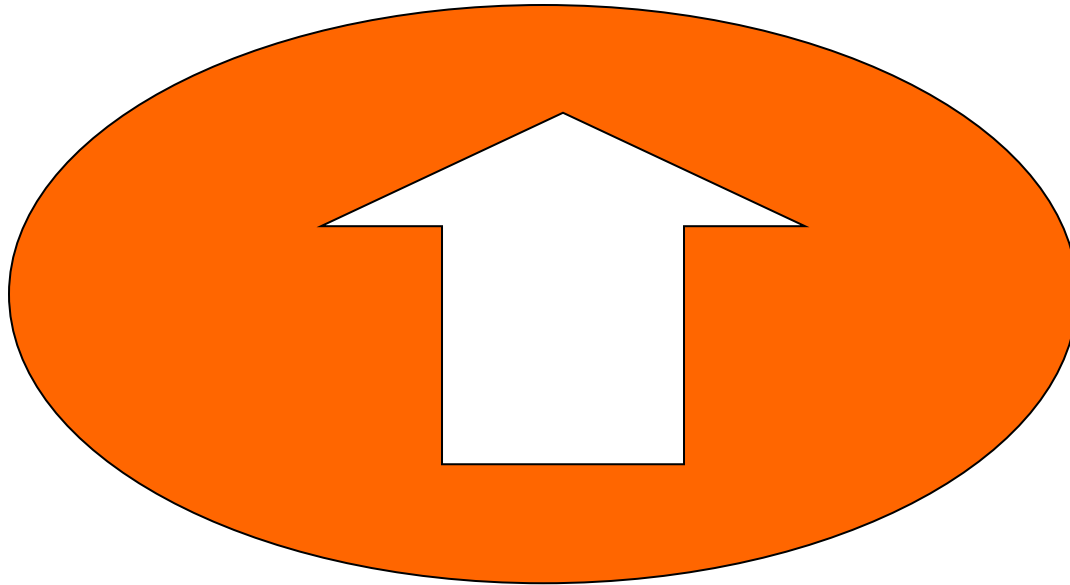
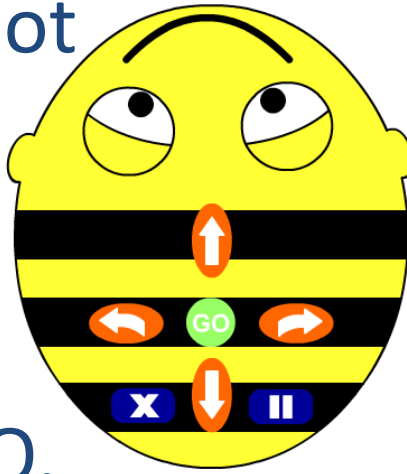


What programming commands can we use?



To move your Bee-Bot
Forward,

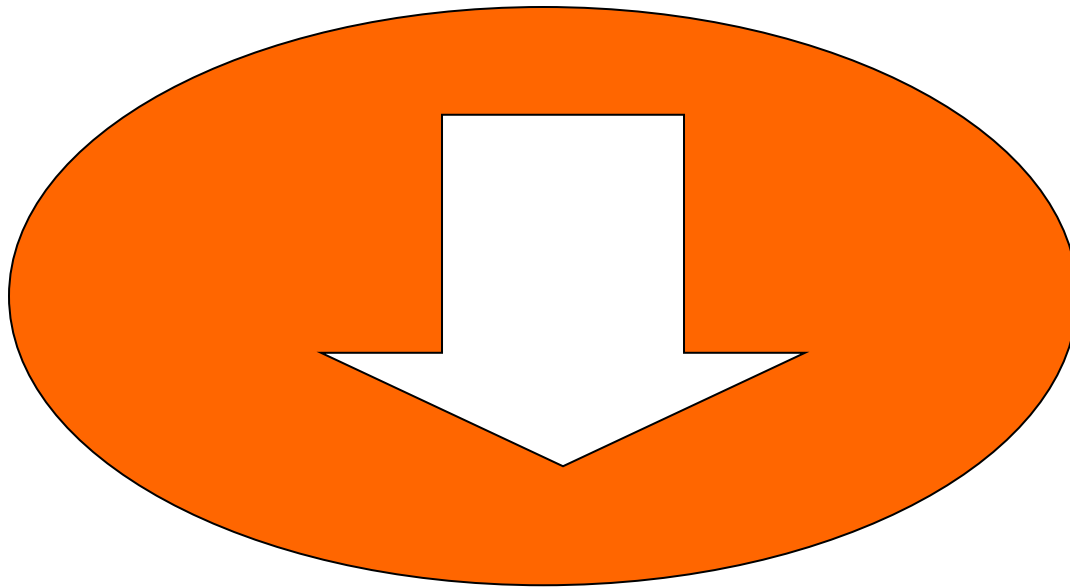
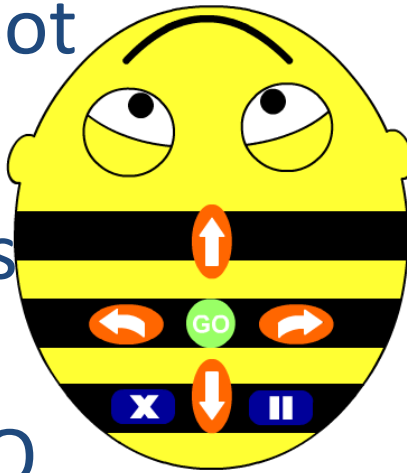
Press the Forward
arrow x amount of
times, then press GO.



Forward

To move your Bee-Bot
Backwards,

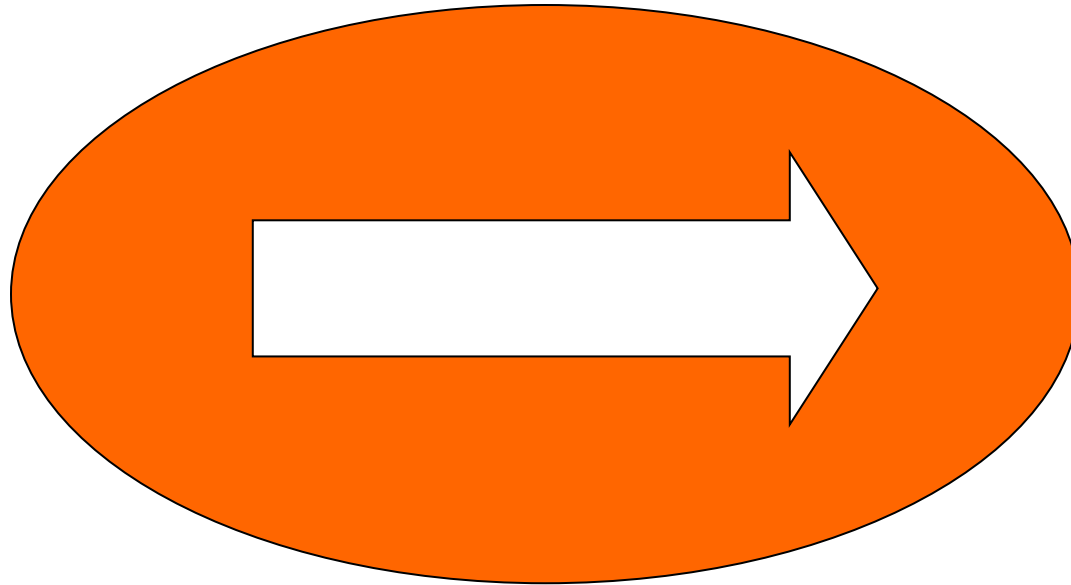
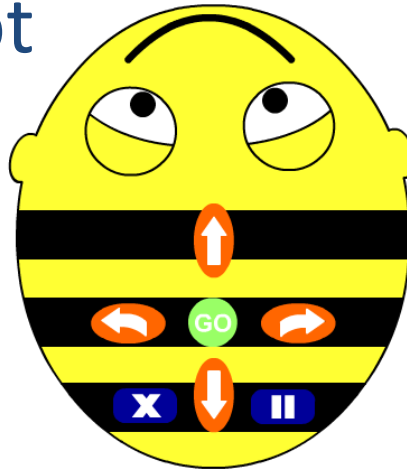
Press the Backwards
arrow x amount of
times, then press GO.



Backwards

To turn your Bee-Bot
Right,

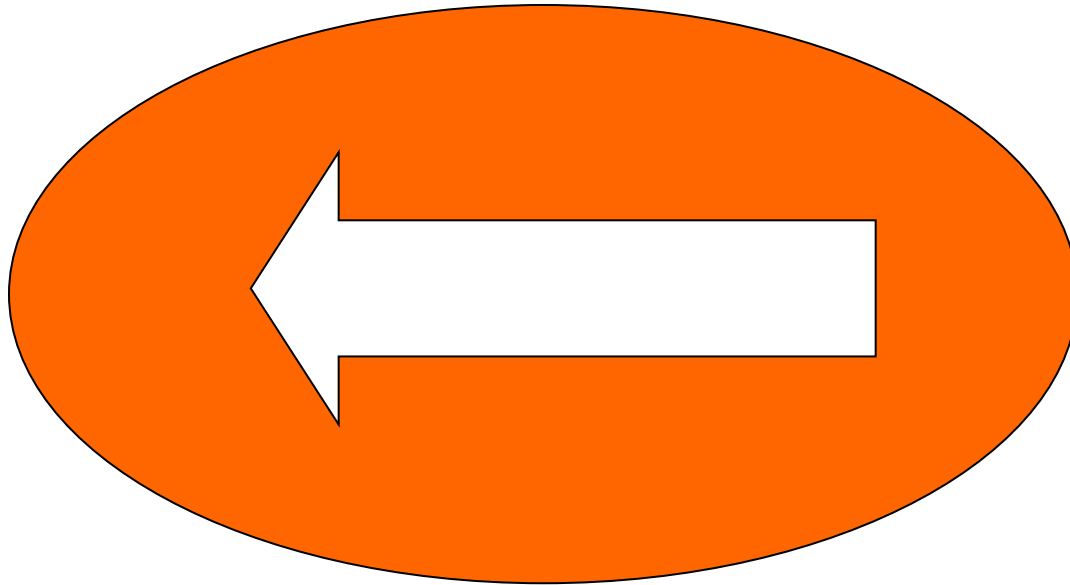
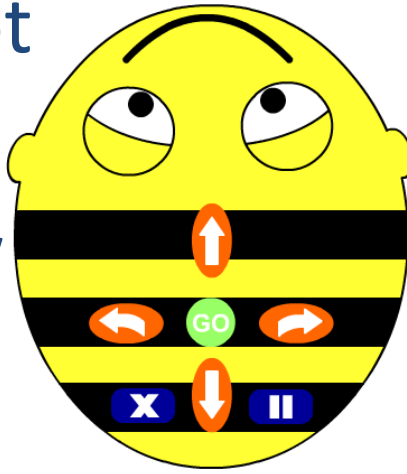
Press the Right
arrow x amount of
times, then press
GO.



90° Right

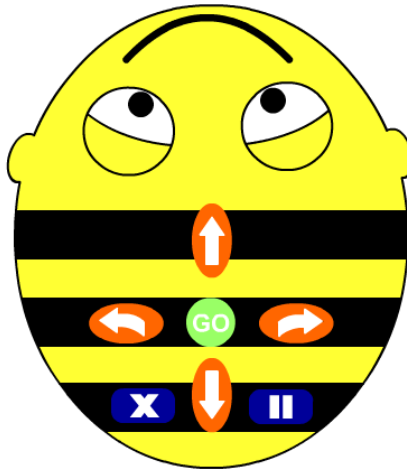
To turn your Bee-Bot
Left,

Press the Left arrow
x amount of times,
then press GO.



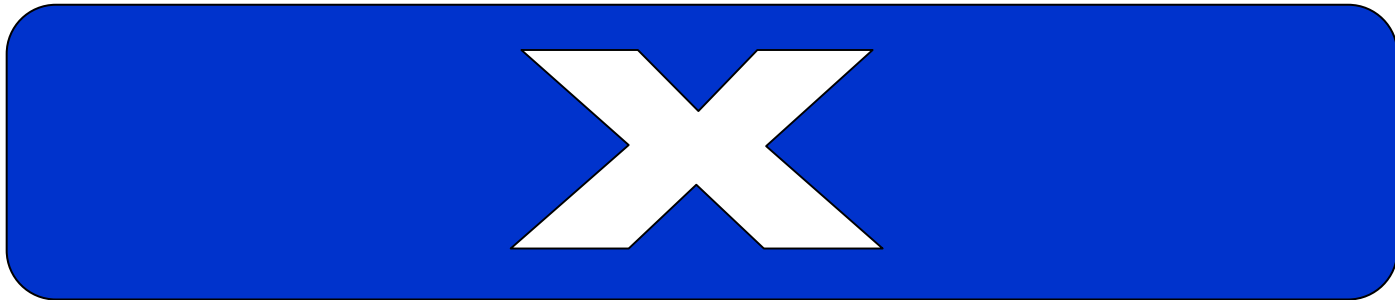
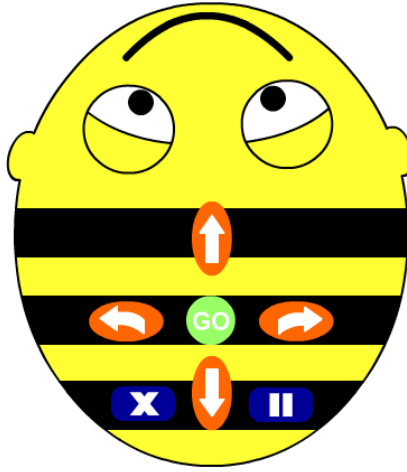
90° Left Turn

To execute the
commands,
press GO.



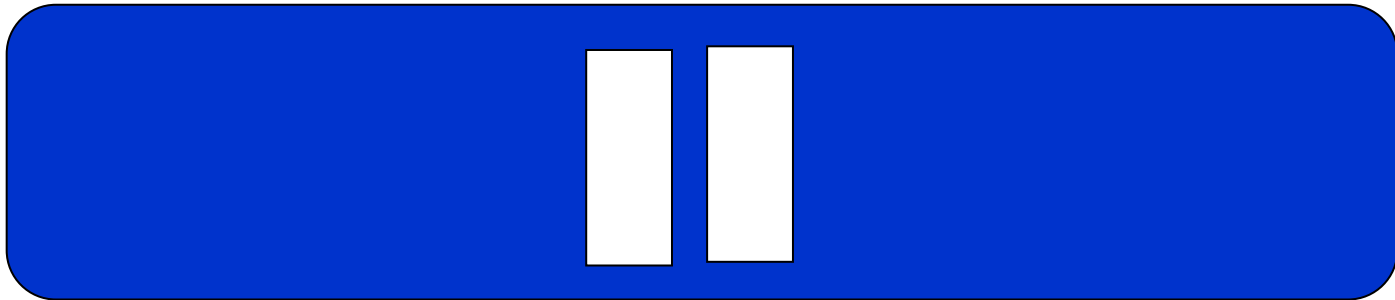
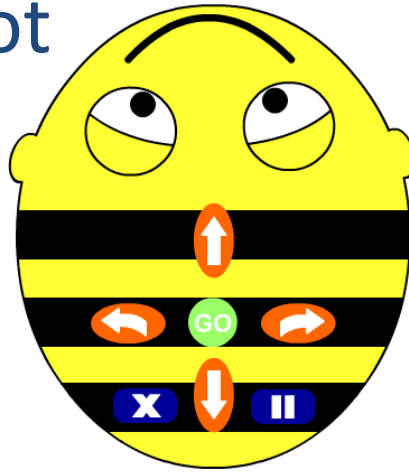
Start the program

To reset or clear
the Bee-Bot
memory,
Press the Clear
button.



Clear the memory

To pause the Bee-Bot
for 1 second,
Press the Pause
button.



Pause

How to turn your Bee-Bot ON & OFF



- To turn your Bee-Bot on, switch the button on the bottom of the Bee-Bot to ON.
- To turn your Bee-Bot off switch the button on the bottom of the Bee-Bot to OFF.

Programming

- An **algorithm** is a list of finite rules to follow in order to solve a problem. *Algorithms need to have their steps in the right order.*
- **Programming** is the process of creating a set of instructions that tell a computer how to perform a task.



Programming Bee-Bot

- **Set a challenge.**
- **Work out an algorithm.**
- **Program a Bee-Bot.**

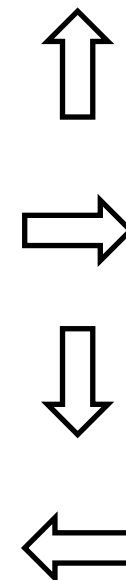
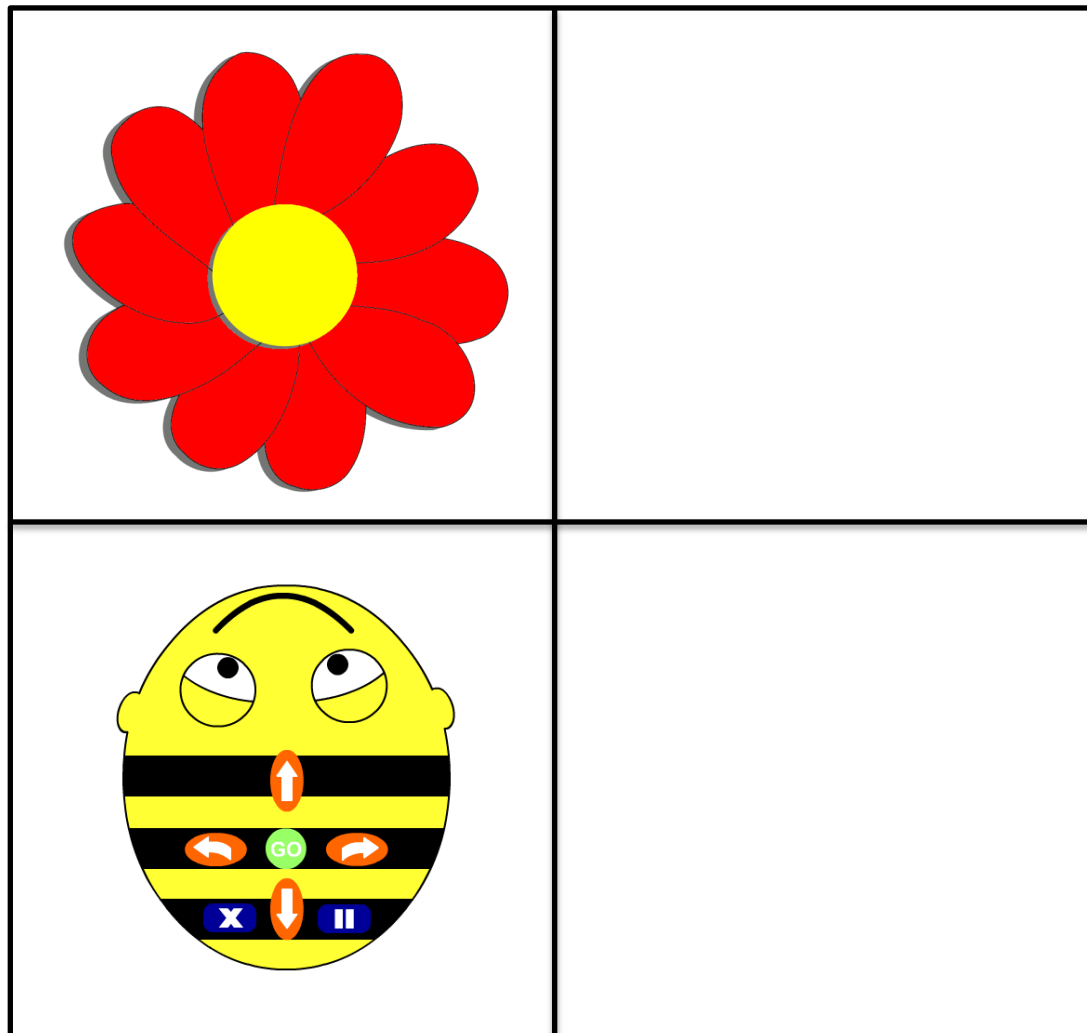


Challenges

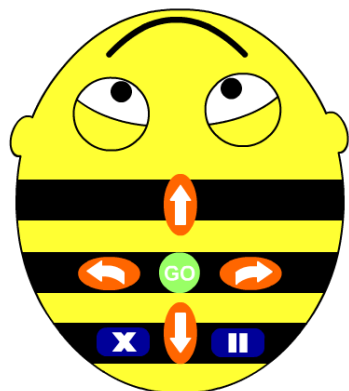
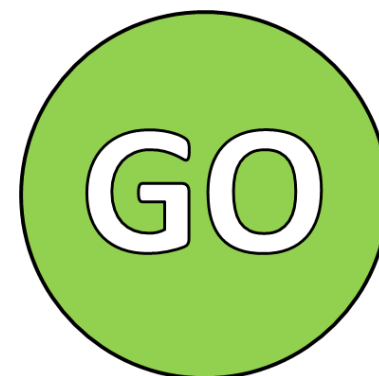
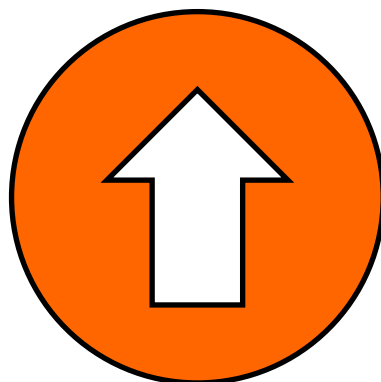
- Let's **Program, Play & Learn!**
- Give instructions to Bee-Bot!
Have fun!



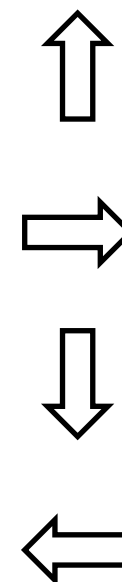
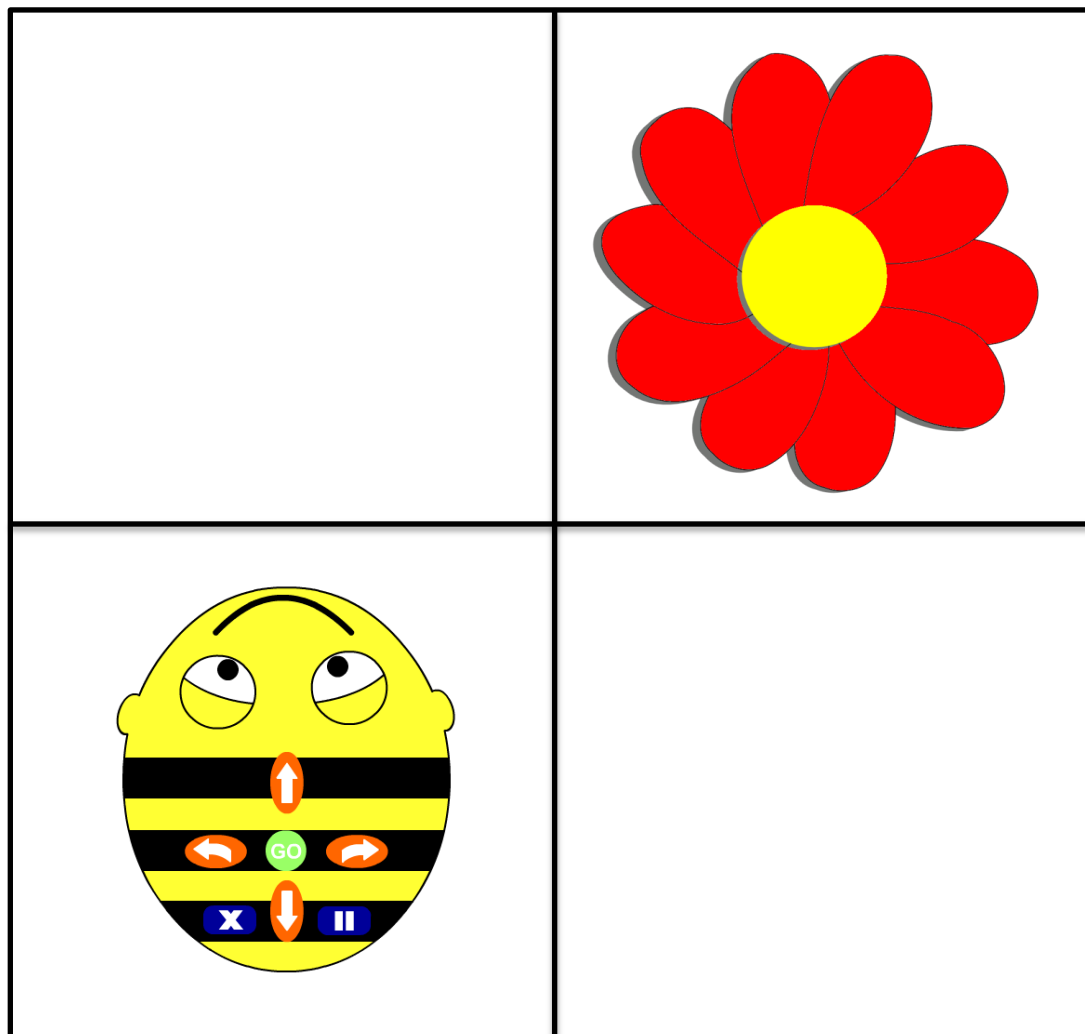
CHALLENGE 1



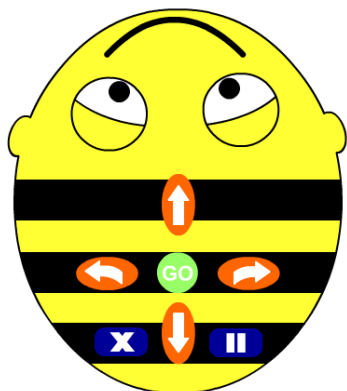
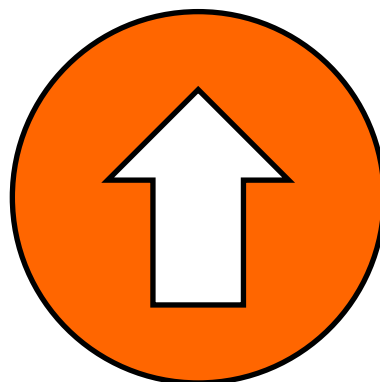
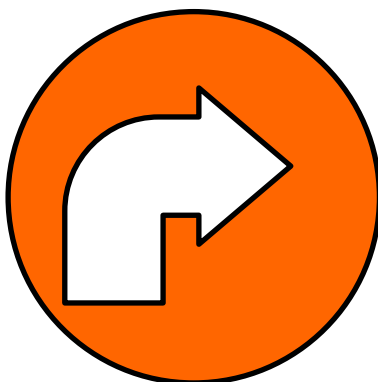
SOLUTION



CHALLENGE 2

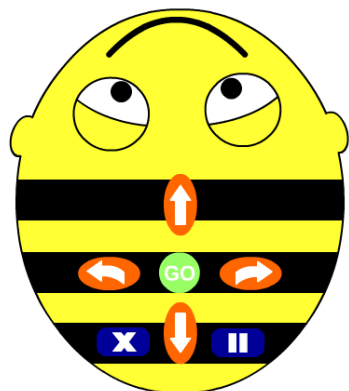
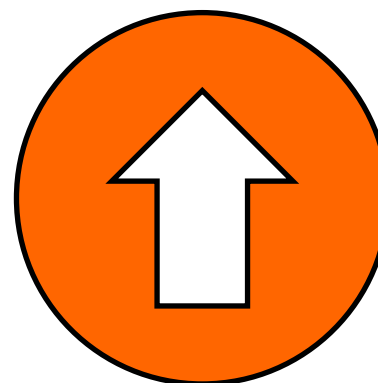
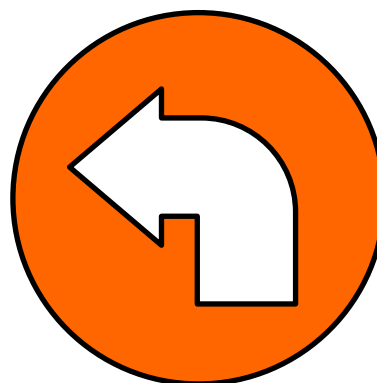
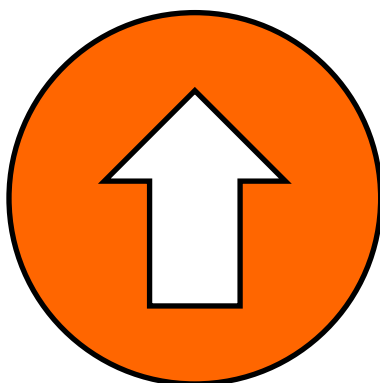
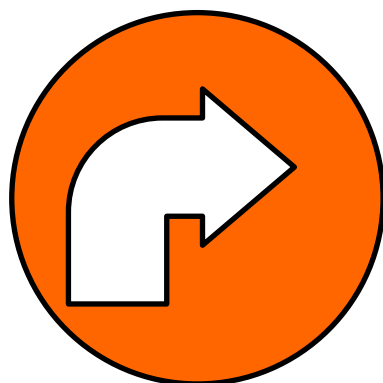


SOLUTION

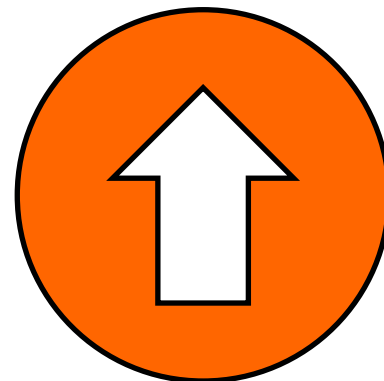
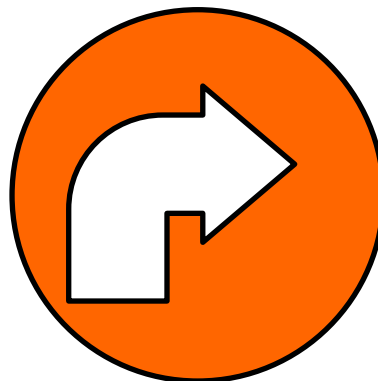
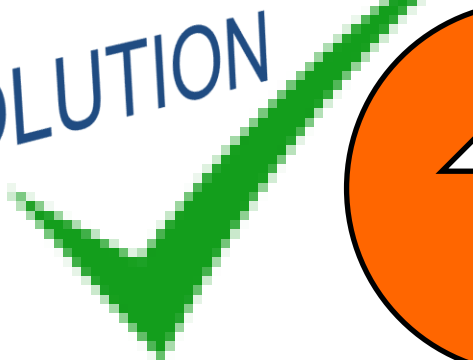


ONLY ONE SOLUTION?

SOLUTION

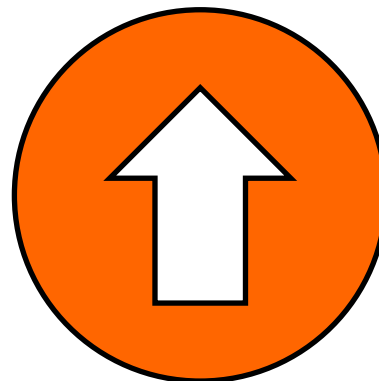
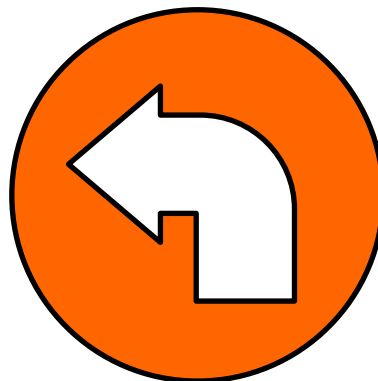
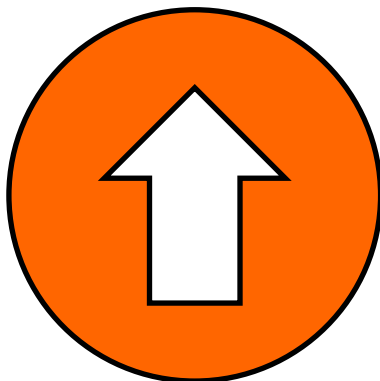
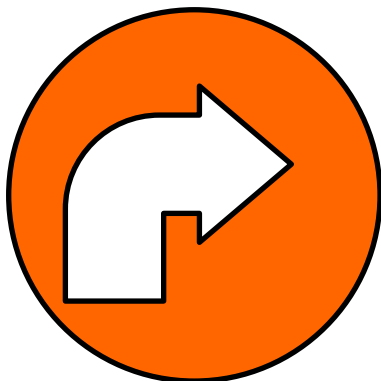


1st SOLUTION

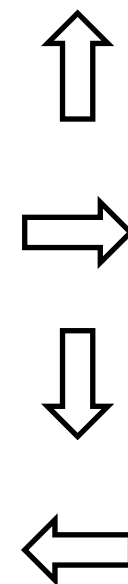
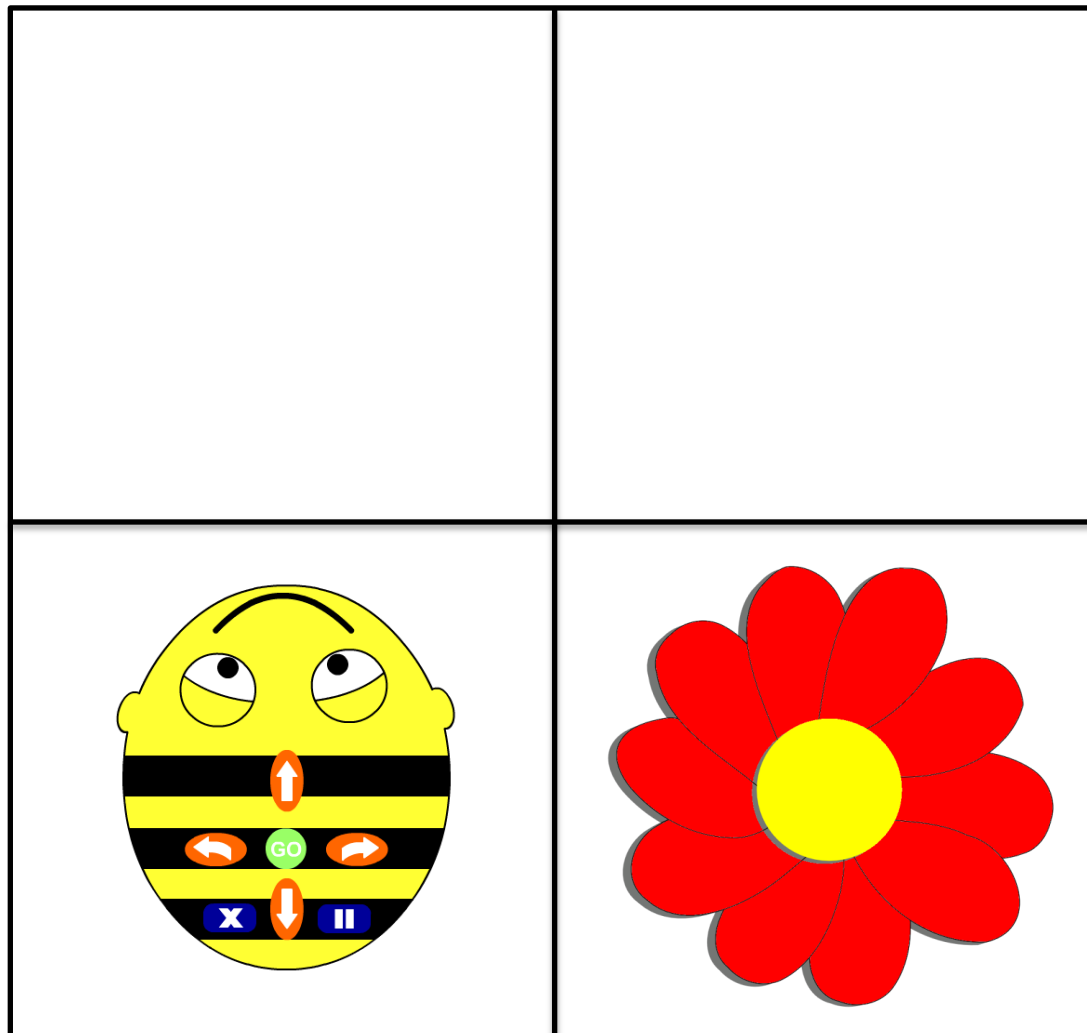


2nd SOLUTION

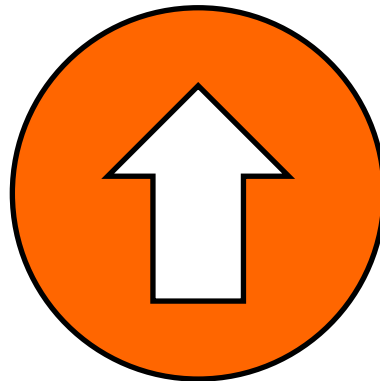
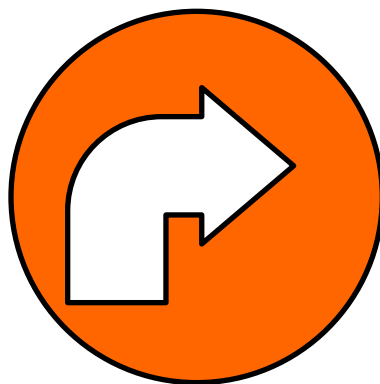
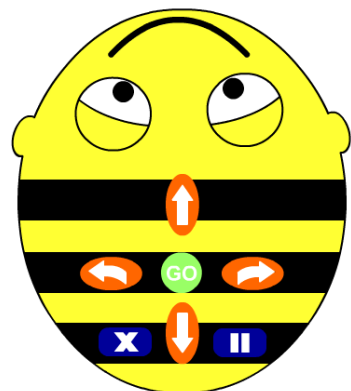
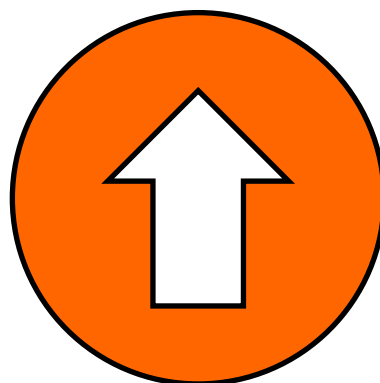
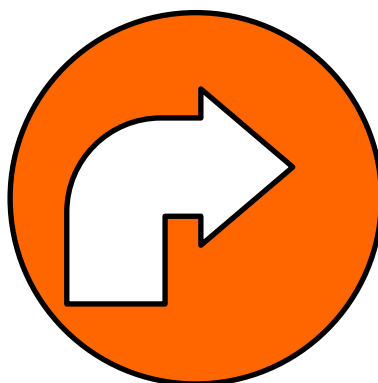
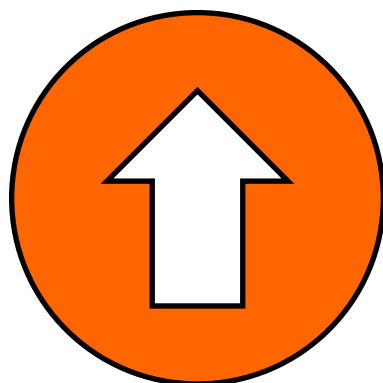
WHAT'S THE BEST SOLUTION?



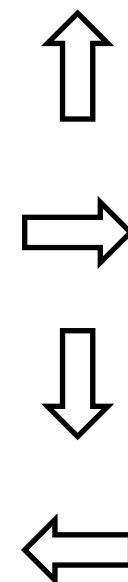
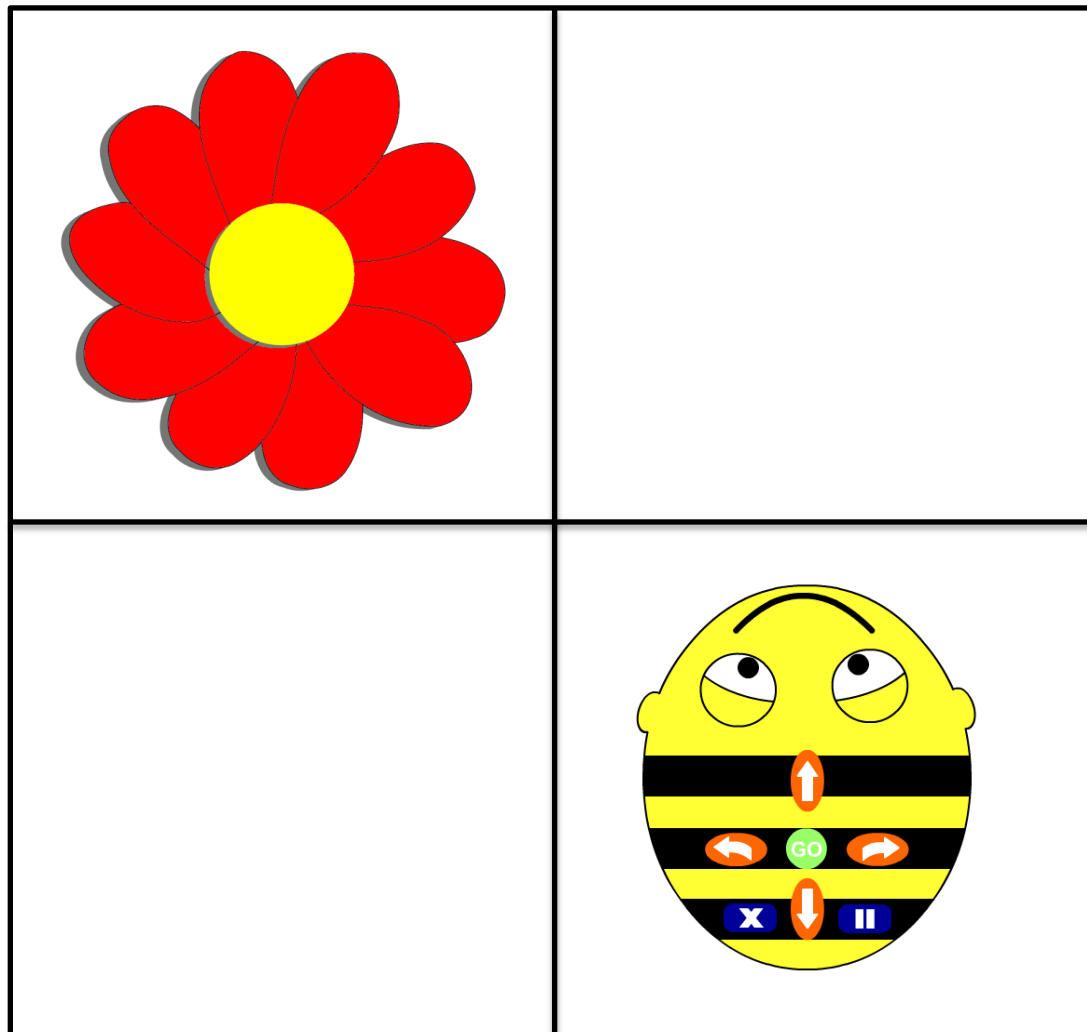
CHALLENGE 3



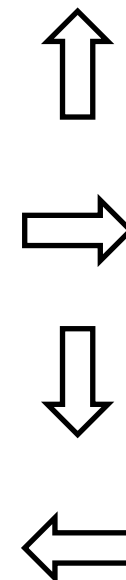
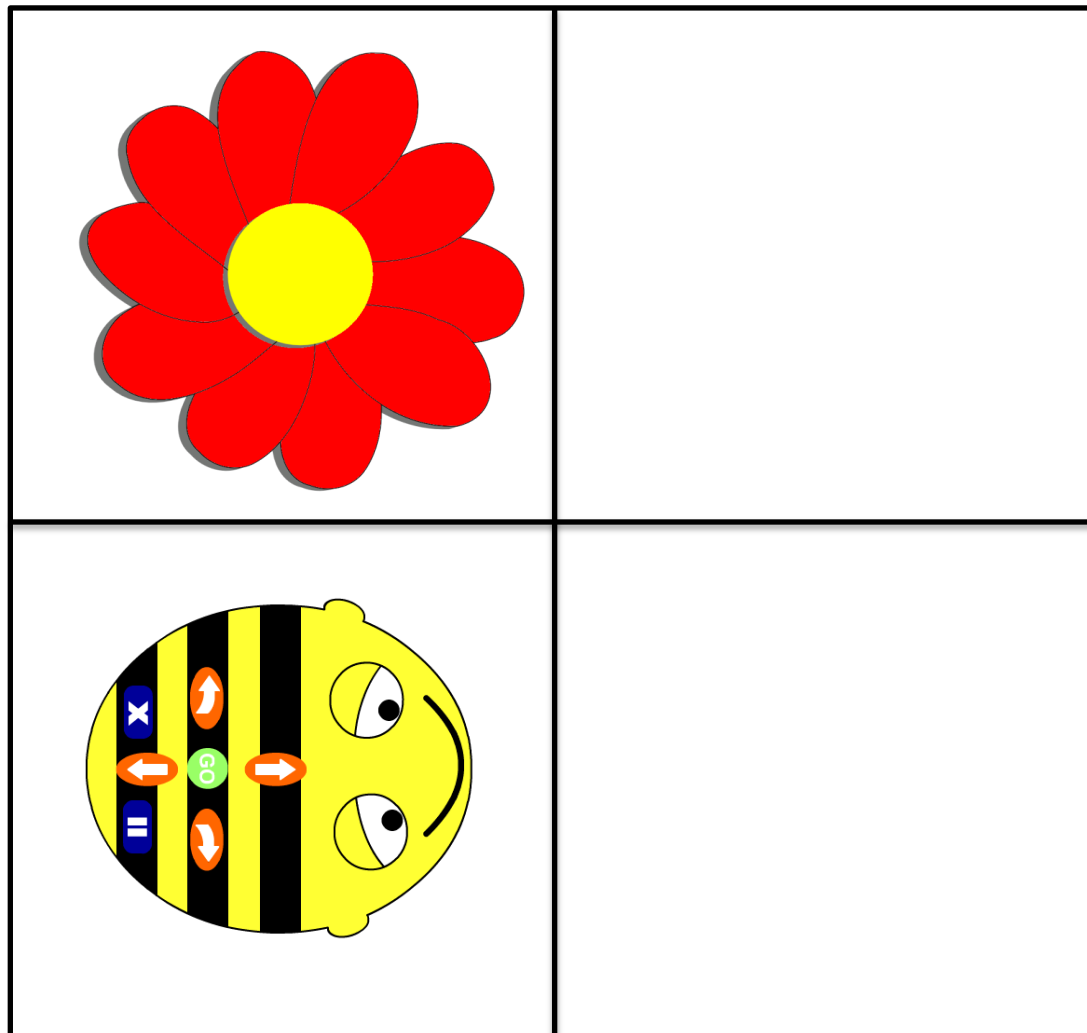
SOLUTION



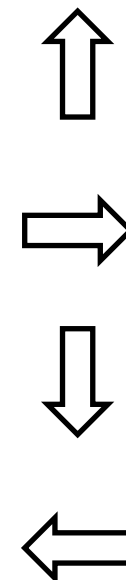
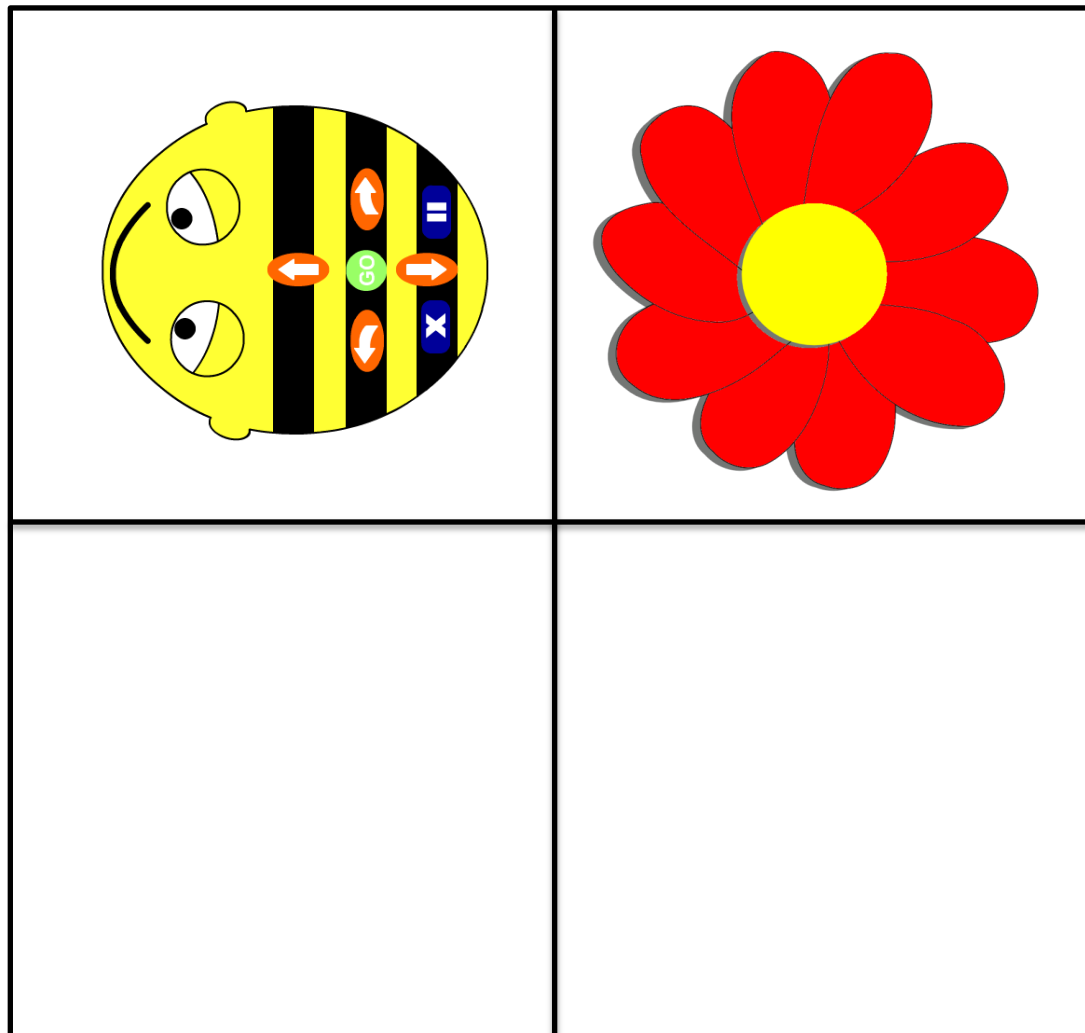
CHALLENGE 4





CHALLENGE 5



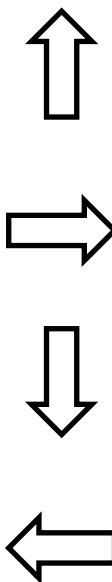
CHALLENGE 6



CHALLENGE 7

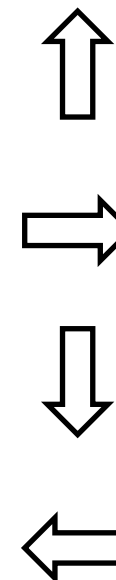
4				
3				
2				
1				
	A	B	C	D

START	FINISH	STEPS
A1	C2	

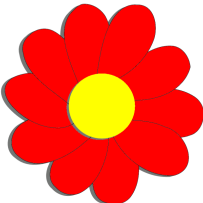
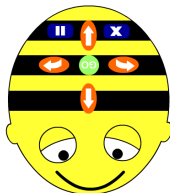


SOLUTION

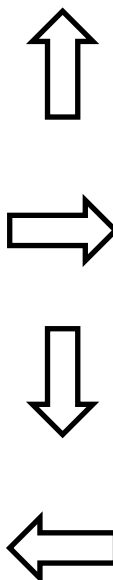
START	FINISH	STEPS
A1	C2	↑ → ↑ ↑



CHALLENGE 8

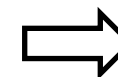
4				
3				
2				
1				
	A	B	C	D

START	FINISH	STEPS
A1	C2	↑ → ↑ ↑
B2	D4	

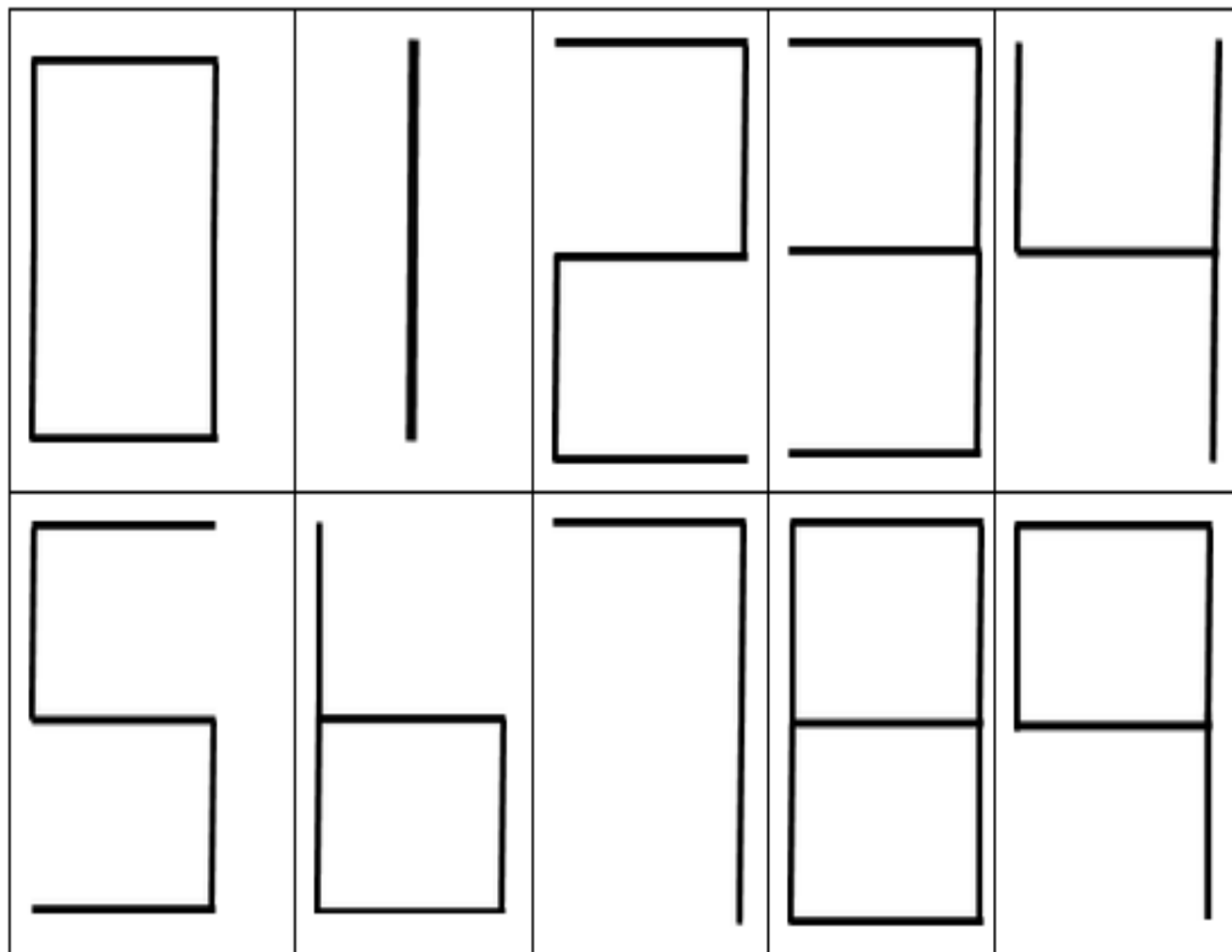


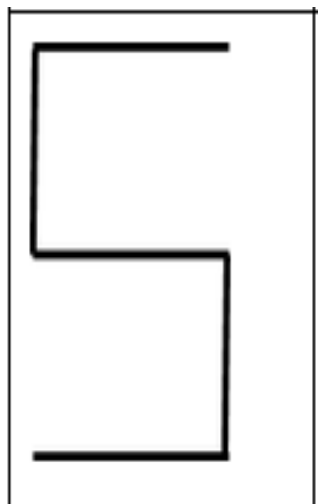
SOLUTION

START	FINISH	STEPS
A1	C2	↑ → ↑ ↑
B2	D4	↓ ↓ ← ↑ ↑

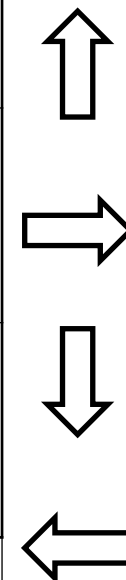


CHALLENGE 9

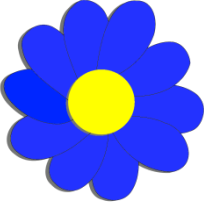
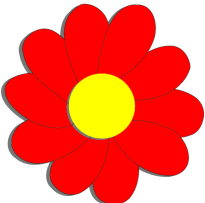
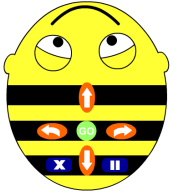




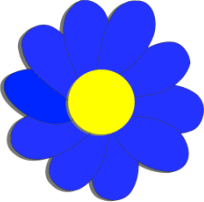
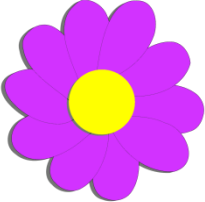
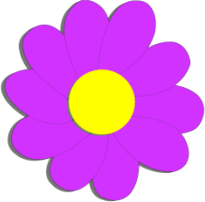
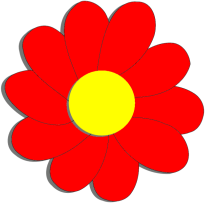
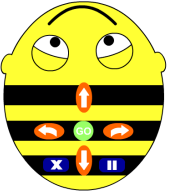
4				
3				
2				
1				
	A	B	C	D



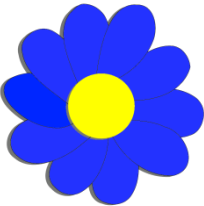
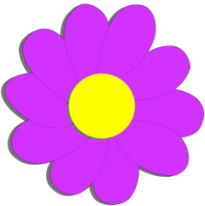
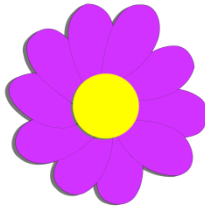

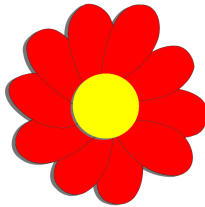


CHALLENGE 10

4				
3				
2				
1				
	A	B	C	D

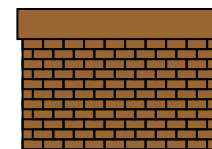
CHALLENGE 11

4				
3				
2				
1				
	A	B	C	D




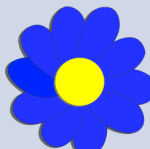




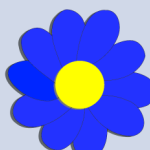




CHALLENGE 12

4				
3				
2				
1				
	A	B	C	D

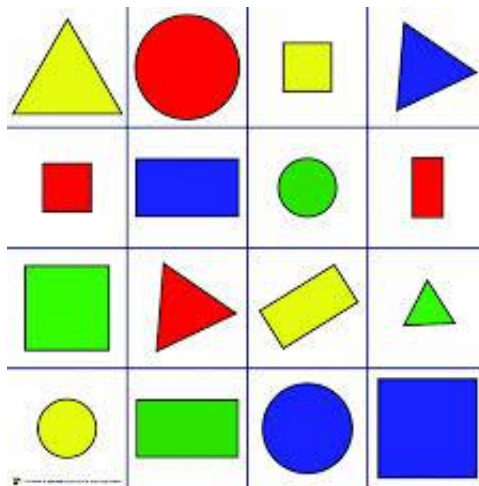
ATTENTION!
OBSTACLES!



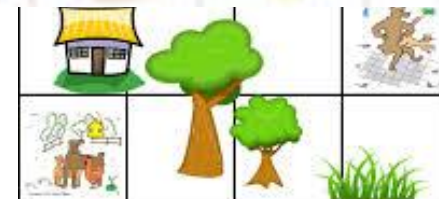
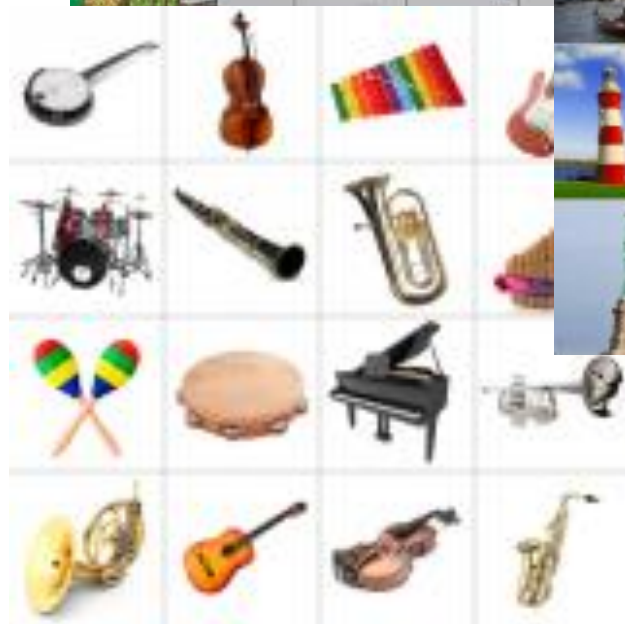
CHALLENGE 13

<i>Start on</i>		<i>Finish at</i>		
<i>Start on</i>		<i>Finish at</i>		<i>in the fewest moves</i>
<i>Start on</i>		<i>Finish at</i>		<i>avoiding all</i> 
<i>Start on</i>		<i>Finish at</i>		<i>travel over all</i> 
<i>Start on</i>		<i>Finish at</i>		<i>pause on every</i> 

A lot of Mats!



A lot of Mats!



Bee-Bot in Scratch

<https://scratch.mit.edu/projects/34765070/>



Bee-Bot Emulator

<https://www.bee-bot.us/emu/beebot.html>



Well done! You have been programming a robot!



References

- [https://www.bee-bot.us/downloads/file/Bee Bot product sheet.pdf](https://www.bee-bot.us/downloads/file/Bee_Bot_product_sheet.pdf)
- <https://www.tes.com/teaching-resource/bee-bot-shape-mat-and-challenge-cards-11009699>
- <https://www.tes.com/teaching-resource/children-s-instruction-planning-sheet-for-bee-bots-6218057>
- http://elresources.skola.edu.mt/wp-content/uploads/2010/06/doc_669_2468_beebotguideA4v2.pdf
- <https://barefootcas.org.uk/barefoot-primary-computing-resources/computational-thinking-approaches/tinkering/ks1-bee-bots-tinkering/>
- <https://barefootcas.org.uk/barefoot-primary-computing-resources/concepts/programming/ks1-bee-bots-12-3-programming-activity/>
- <https://csermoocs.adelaide.edu.au/library/GettingToKnowBeeBot.pdf>
- <https://scratch.mit.edu/projects/34765070/>
- <https://www.youtube.com/watch?v=4TjwU1N7gxU>
- <https://www.youtube.com/watch?v=wcAHpLO0BWA>
- <https://www.youtube.com/watch?v=ZJaSQgsDQ1w>

Thank you for your attention!

Program, Play & Learn!

Have fun!



Dr. Katerina Glezou

HNSS Pedagogical Member

glezou@gmail.com

kglezou@di.uoa.gr

<http://logogreekworld.ning.com/profile/KaterinaGlezou>

<https://www.linkedin.com/in/katerinaglezou/>

https://www.researchgate.net/profile/Glezou_Katerina