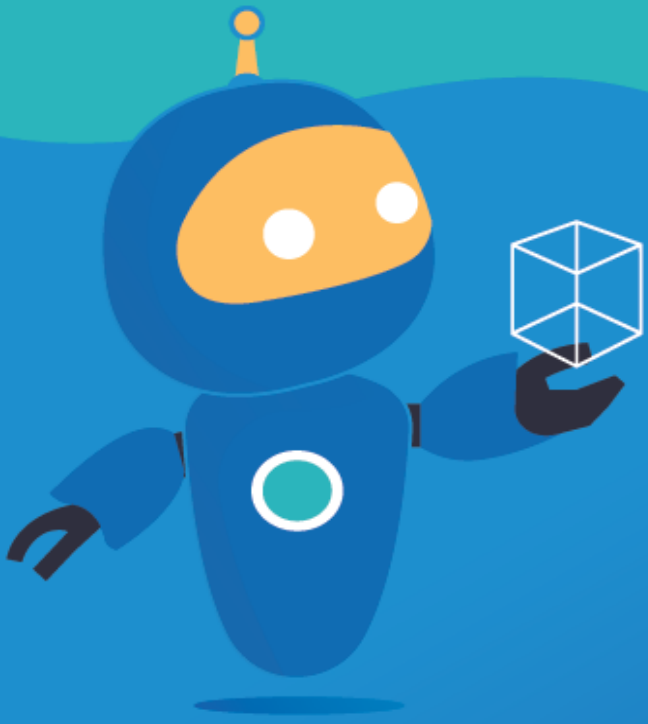
Generation AI

IO3 – School Program for Primary Education Students

Basic Challenge Tutorial - CARDET



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Challenge Tutorial Template

Use this template to design and develop the tutorial of the challenge through a Game-Based Learning (GBL) approach.

Name	Developing a Waste Management System
Tool	PictoBlox is a graphical programming software based on Scratch that teaches you to code efficiently using coding blocks. Using these blocks, you can make interactive games and animations or program robots and projects https://thestempedia.com/product/pictoblox/download-pictoblox/ Quarky is a super fun AI learning companion that makes learning new technologies like artificial intelligence and robotics engaging and fun. Quarky is a reprogrammable robot with built-in Wi-Fi and Bluetooth programmed through PictoBlox. https://thestempedia.com/product/quarky/ **Important Notice**: If you do not have Quarky at your school, you can use only Pictoblox.
Aim	The game aims to differentiate the waste based on its type. “Biodegradable waste” or “Non-biodegradable waste”

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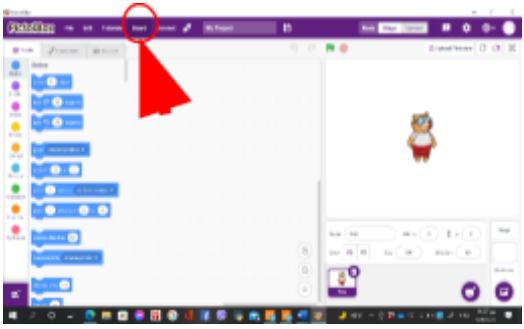
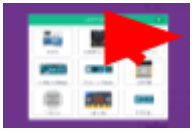
Description	You will create a system with Pictoblox to differentiate the waste based on its type. By using the camera of your technological device (i.e. computer/tablet/phone), the system will scan the waste. If it detects biodegradable waste, the LEDs Quarky's matrix will turn green and say, "biodegradable waste". If it is non-biodegradable waste, the LEDs will turn blue (or red) and say "non-biodegradable waste". https://youtu.be/guXGsrvn2Gg
Step-by-step	1. Open PictoBlox on your desktop.  2. Click the Board button in the toolbar  3. Select board as Quarky.  4. Select the appropriate Serial port if the Quarky is connected via USB or the Bluetooth Port if you want to

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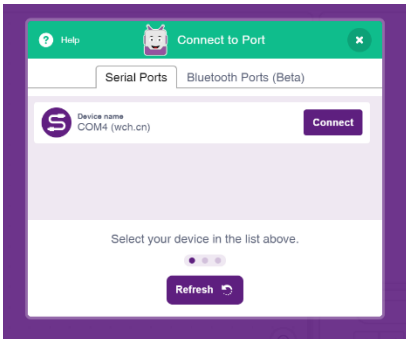
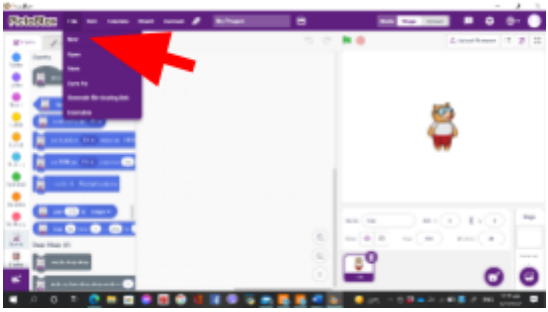
connect Quarky via Bluetooth and press Connect.

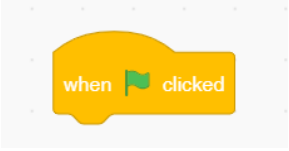


5. Open a new project by selecting ***New*** from ***File***.



A. **<u>First, we write the script to detect the objects</u>**.
Follow the steps below:

1. Go to the ***Events*** palette and add a **when flag clicked** block into the scripting area.



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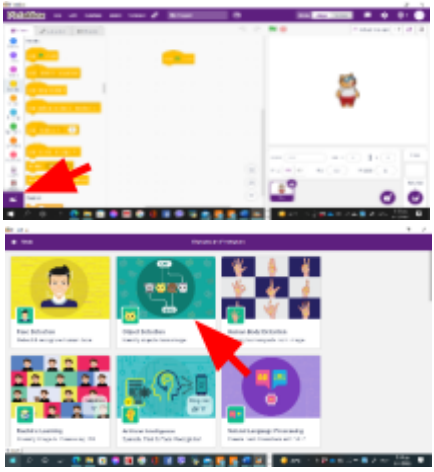
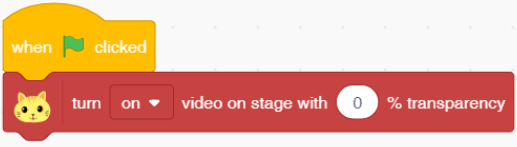
To detect the objects, we need the Object Detection palette.

2. Add the Object Detection palette from the Extension palette.



3. Add a ***turn () video on stage with () %*** transparency block below the ***when flag clicked*** block.



To create a bounding box around the object that our system will detect:

4. Add a ***() bounding box*** block from the Object Detection palette.

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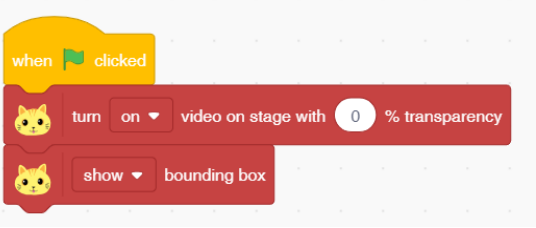
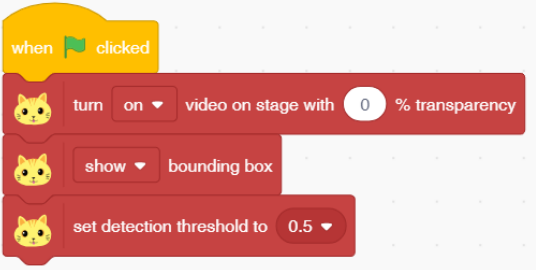
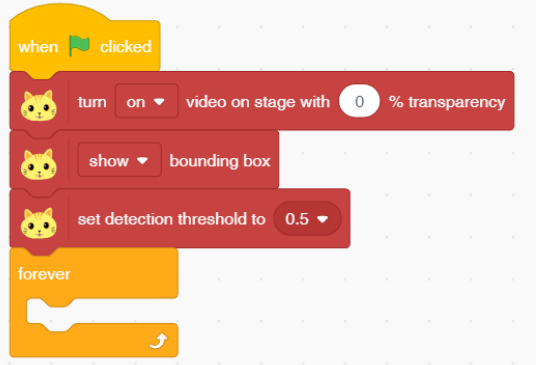


5. Add a ***set detection threshold to ()*** block. Here the number is the confidence level. We are going to set it as 0.5.



6. Go to the ***Control*** palette and add a ***forever block*** below the set detection threshold to () block.



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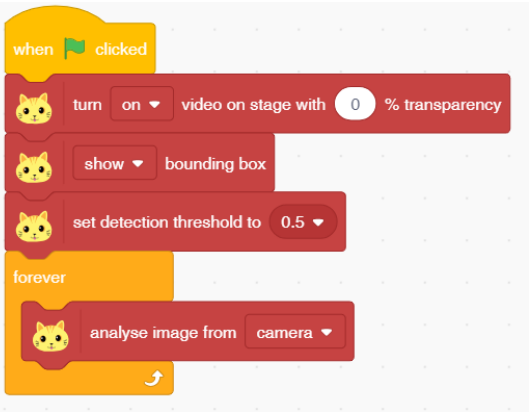
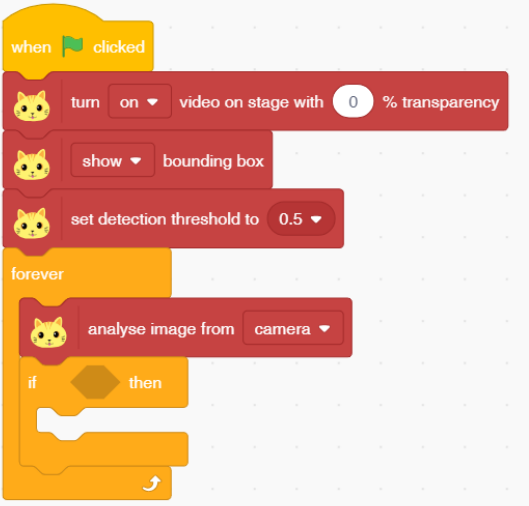
7. Inside the ***forever block***, add an ***analyse image from the ()*** block. The camera is set as the default source.



B. Second, we write the script to classify the objects

8. In the same script, go to the ***Control*** palette and add an ***if*** block below the ***analyse image from ()*** block.



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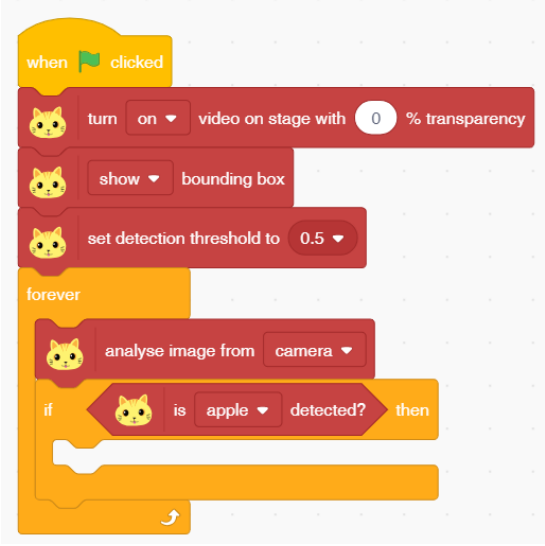
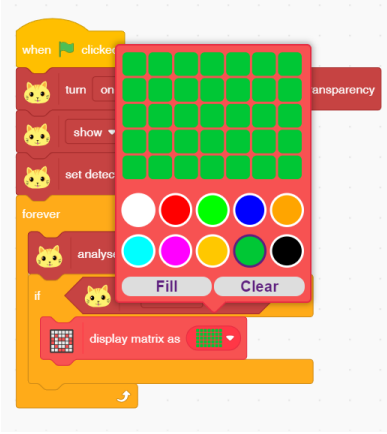
9. Inside the diamond-shaped space, drop an ***is () detected ?*** block. Select *apple* from the drop-down menu.



10. Add ***display matrix as ()*** blocks from the ***Display*** palette inside the if arm. Make all the LEDs a GREEN color.



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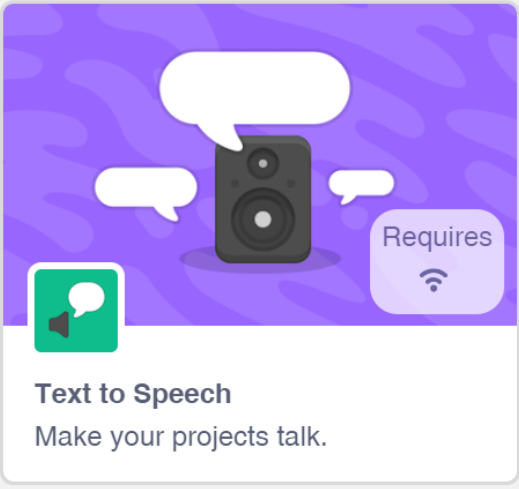
To make our system say out loud the type of waste it has detected we will add the ***Text to Speech*** extension from the ***extension*** palette



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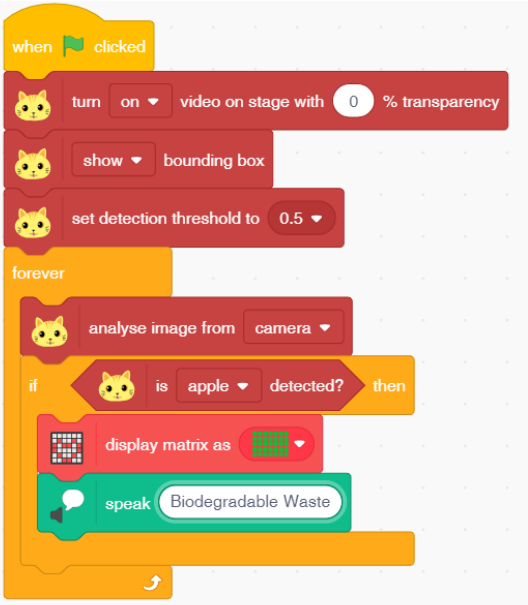
11. Add a ***speak ()*** block under the if the arm of the if block and write «***Biodegradable Waste***»



12. Repeat steps **8 to 11** for a *bottle,* and this time, write "***Non-Biodegradable Waste***" in the speak () block and make all LEDs **BLUE** or **RED** color.

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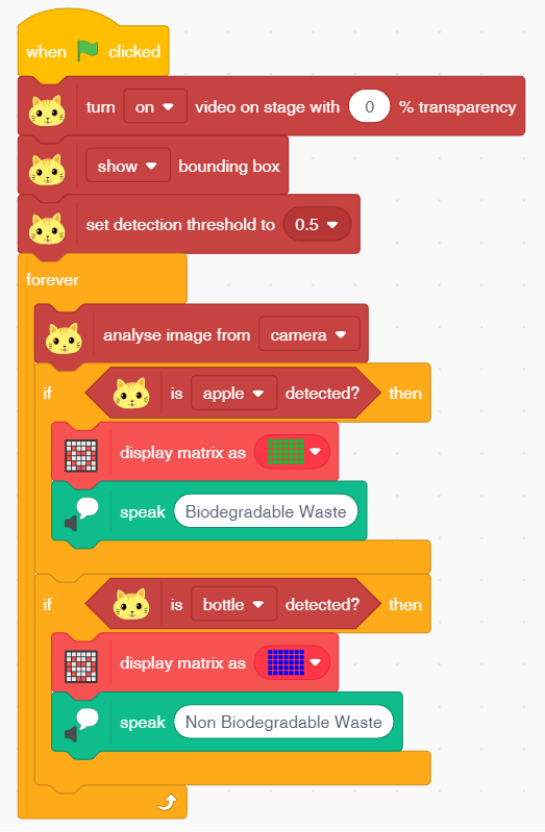

13. Add any number of different objects to your script, repeating steps 8 to 11 or 12.

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Important Notice: If you do not have Quarky at your school, remove step 10.

Click the green flag to test the script and have fun.

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