PHIRO
Unplugged

ROBOTIX

USA | INDIA

Inspiring the Innovators of Tomorrow

Robotix since 2010 is on a mission to give children, playful and powerful educational experiences that make learning fun. Our goal is to equip K-12 students with hands-on experiential knowledge in STEM fields & 21st Century skills making them "future ready".

Phiro, Playbits and Robobricks are award winning STEAM products designed and manufactured by Robotix. Our products have received very goodresponse from many International & Indian STEMeducators. Thousands of satisfied customers across the Globe play and learn with Phiro, Robobricks & Playbits.

K-12 Training : Robotix provides to over 40,000 students in 36 schools in India with state of art STEM curriculum, carefully researched and prepared, mapping the latest International trends. Our STEM training empowers young kids with 21st century skills through Coding, DIY, Maker Studio, Robotics and STEAM classes.

Play Learn Foundation : Amazon & Ford have chosen Robotix to be their STEM education partner for extended societal reach. Indian Girls Code is an initiative aimed at underprivileged girls to bridge the Digital gender gap.

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"Empowering Learners"

PHIRO Unplugged

Teacher's Guide

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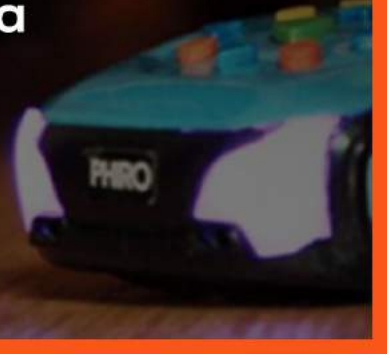


INTRODUCTION TO PHIRO

PHIRO: A Smart Robot For Kids to Learn To Code

Phiro is a LEGO® compatible robotics toy for all kids. Play, Code & Innovate to develop 21st century skills.

What basic skills do our kids need today, to succeed in the future?

Just like reading, writing and arithmetic, problem solving and innovative thinking are essential 21st century life skills our kids need.

Research shows that one of the most effective ways for kids to learn problem solving is through coding & robotics.

To address all these points, Phiro, a robotics & coding platform teaches problem solving and computational thinking, basic skills required for the next generation.

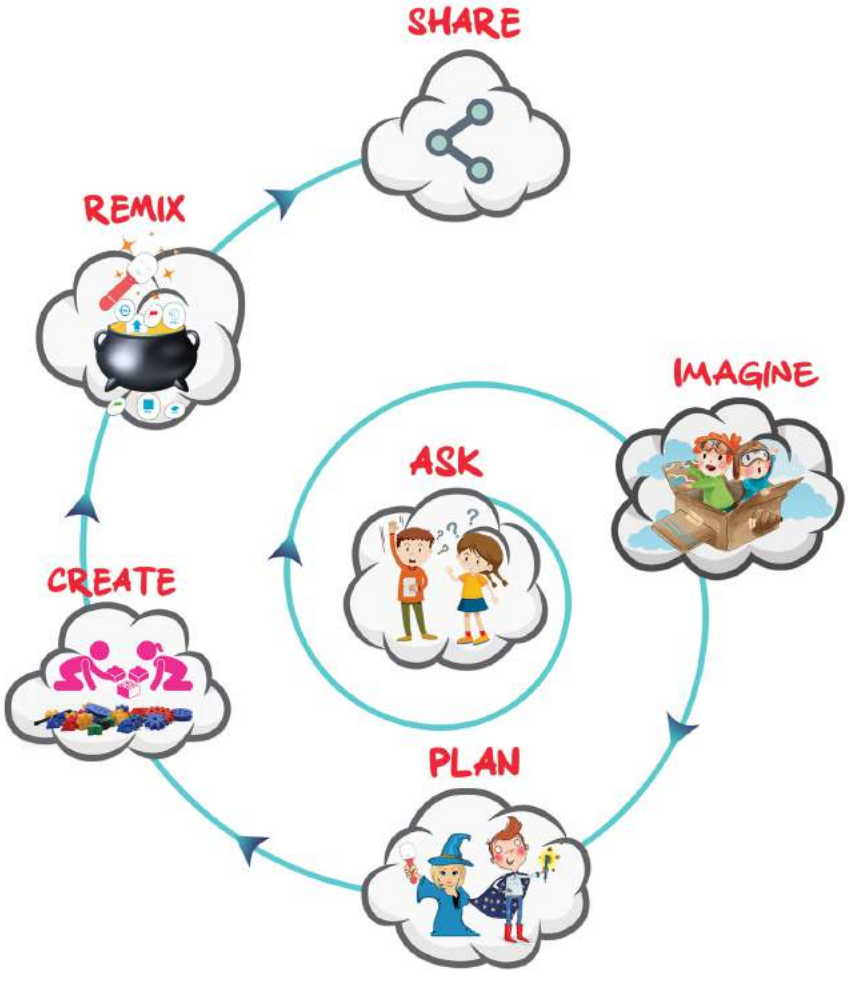
With Phiro, kids can unleash their inner artist, engineer, economist, astronomers or anything they want.

Phiro Unplugged is recommended for playful-learning for kids ages **4 to 8**.

Kids can learn to code & program the Phiro robot without a computer!

Phiro Unplugged is a great robotic tool to learn the fundamentals of Computer Science Viz Sequential Programming, Algorithm Design, Debugging, Conditionals, and Loops. With Phiro, educators can also introduce kids to the basics of Binary Coding.

ROBOTIX DESIGN THINKING



- The Robotix design thinking process is a creative learning spiral interspersed with story telling.
- This unique combination empowers children to explore magical, whimsical, imaginary worlds, seamlessly blending with real life experiences.
- Design thinking helps you first define a problem and then develop solutions with the end user in mind.
- The main premise of design thinking is to create and test ideas in order to learn and improve on these ideas.

BUILD A MODEL | SHARE YOUR STORY

ASK

Take Phiro out of its box. Show to the students.

- Ask them if they know what "Phiro" might be.
- Ask them if they know what a robot is

Phiro is a robot

With Phiro, kids can:

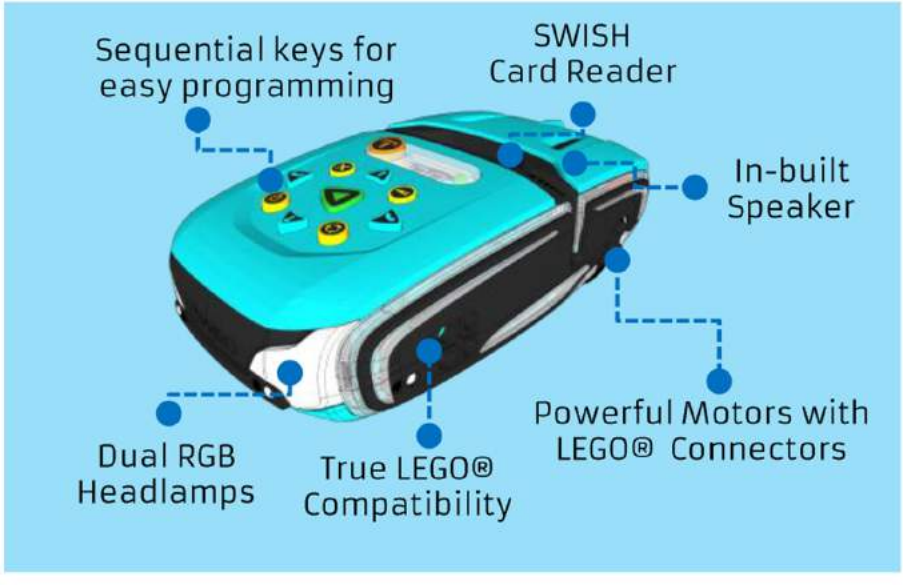
- Invent their imagination
- Play interactive games
- Solve problems in math or science
- And so much more...

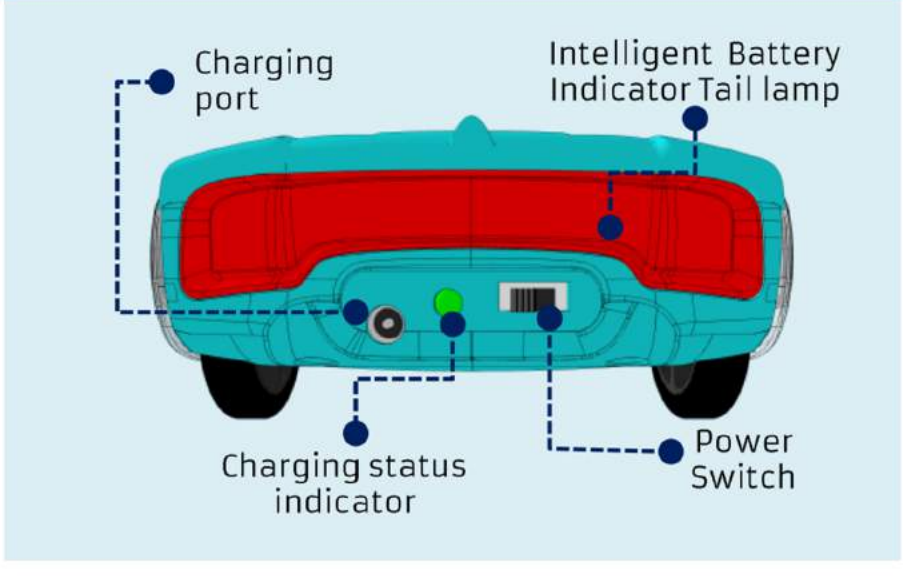
A - Phiro Robot
B - USB Charger
C - Phiro LEGO® adaptor accessory
D - Phiro Swish Cards
E - Accessory Clip

ANATOMY OF PHIRO

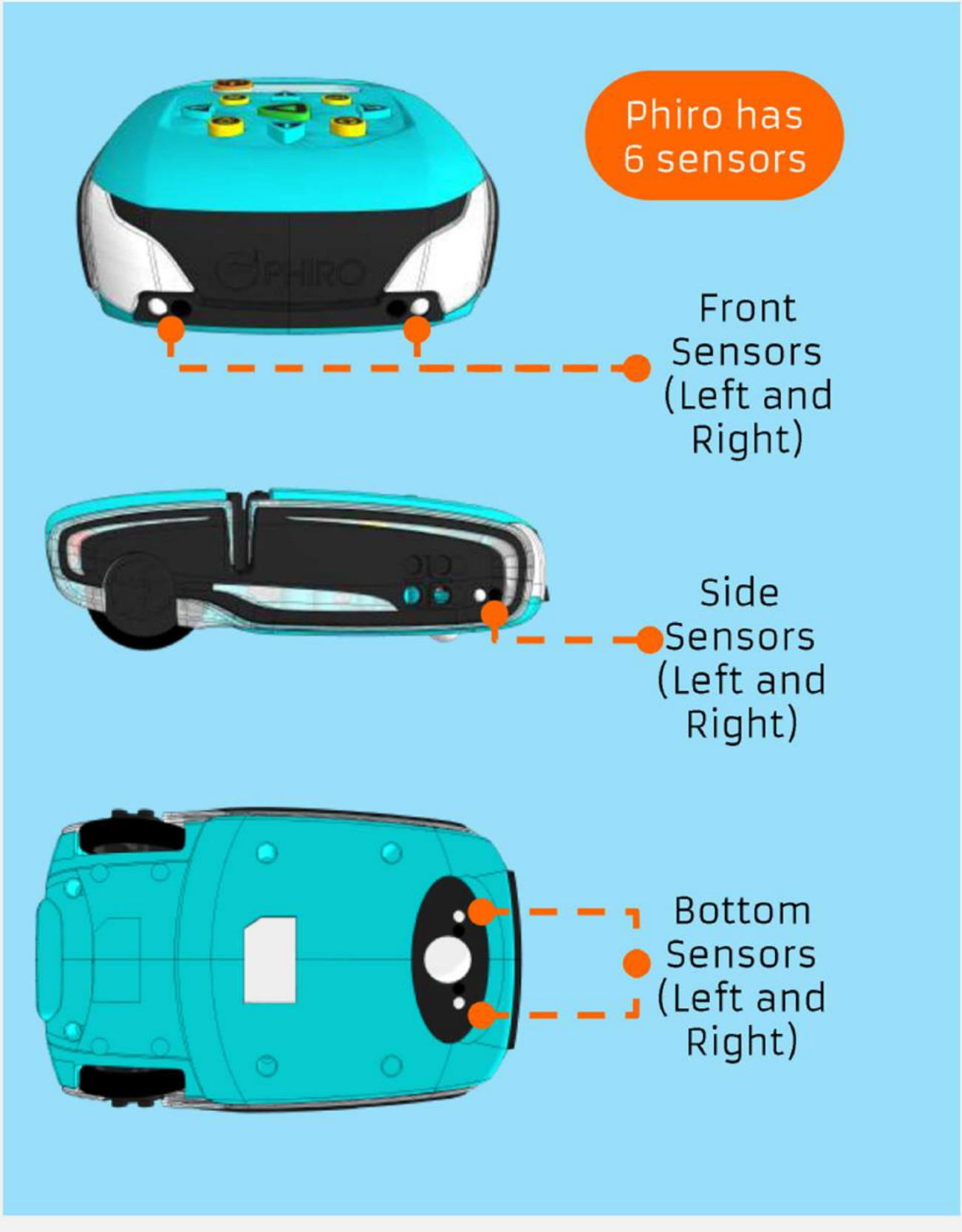
Hardware:

- Tell the children that we program Phiro to be alike working brain for our robot.
- Phiro has INPUTS and OUTPUTS.
- Explore & Identify the INPUTS & in-built OUTPUTS with the children using the color guide below.





ANATOMY OF PHIRO: SENSORS



IMAGINE

ACTIVITY

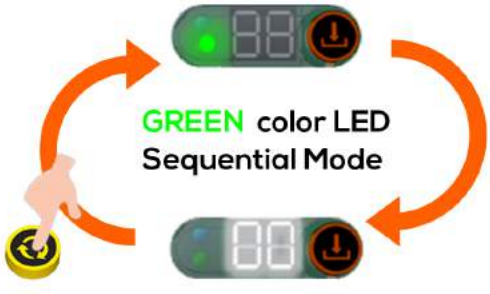
Ask the students -

- Can anyone tell me what coding is?
- How can we control Phiro's actions?

- Coding is a special language for computers, robots & other technology.
- It is written using numbers and symbols.
- Explain how coding is a set of instruction or "how tos".
- To invent with Phiro, let's explore how this special robot works.
- You can program Phiro Unplugged without a computer using Phiro's Keys or Swish Cards.
- The keys control Phiro's movements in different directions.
- The Swish Cards have different commands based on their colors.
- Let's try to program Phiro together. Press the "MODE" button.
- This changes the programming modes between "Sequential"

Phiro Unplugged has two programming modes

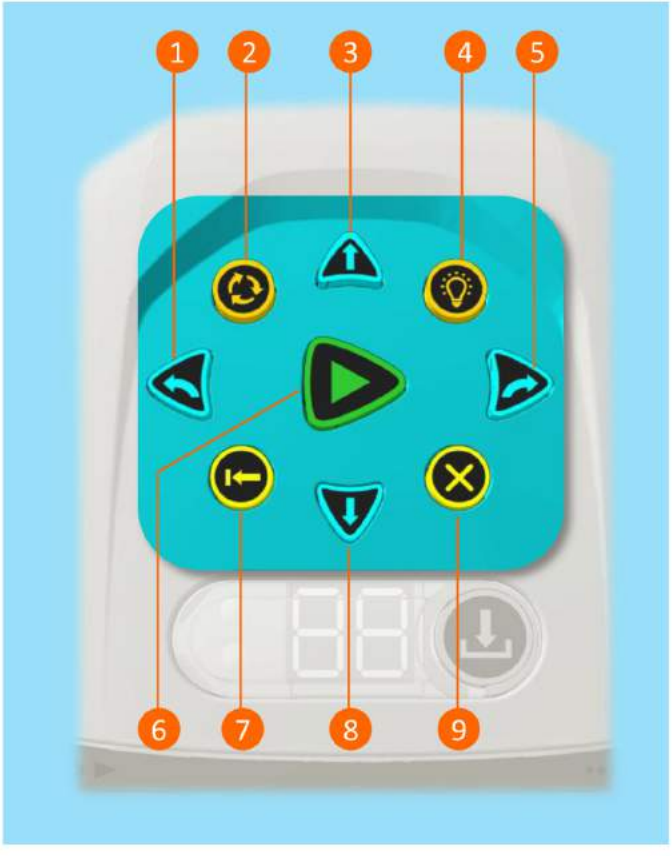
- **Sequential buttons**
- **Swish cards**



DIGITAL DISPLAY
SWISH Card Mode

When we press the Mode button, we can see the change to SWISH Card mode.

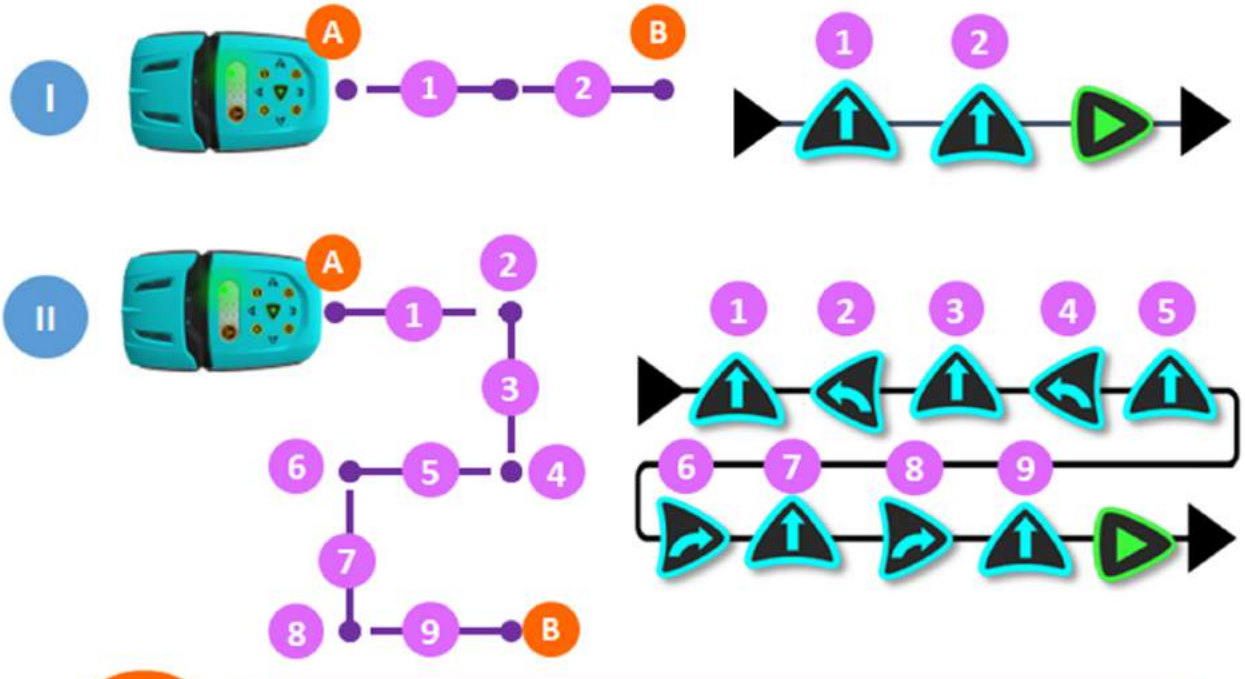
SEQUENTIAL KEY PROGRAMMING MODE



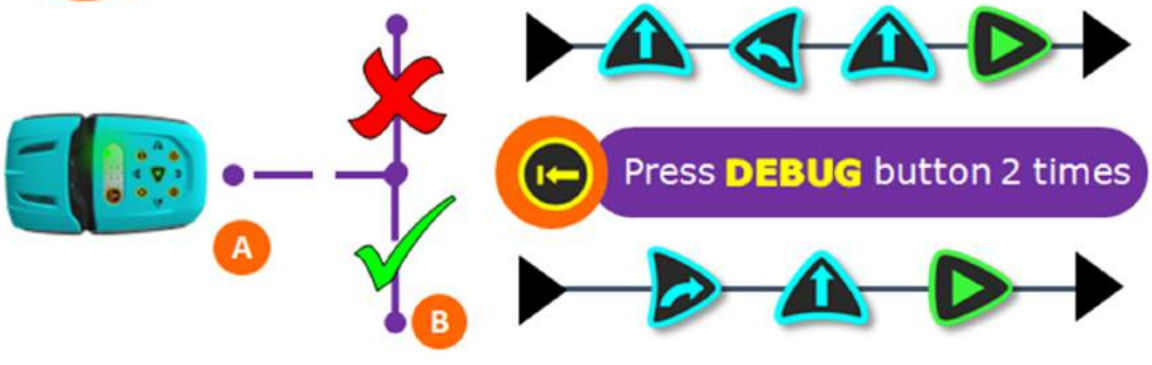
1. **LEFT –** Turns Phiro Left (Seq. Mode only)
2. **MODE –** Cycle through 3 Phiro Modes
3. **FORWARD –** Move Phiro forward by 15 cm approximately
4. **LIGHT –** Sets the color of the headlamps (Seq. Mode)
5. **RIGHT –** Turns Phiro Right (Seq. Mode)
6. **PLAY/PAUSE -** Executes a program. Also functions as a
7. **PAUSE** key when pressed during program execution (Seq. & SWISH Card Modes).
8. **DEBUG –** Erase last command (Seq. & SWISH Card Modes)
9. **BACKWARD –** Move Phiro backward by 15 cm approximately (Seq. Mode)
10. **DELETE –** 1Delete/Erase full program (Seq. & SWISH Card Modes)

SEQUENTIAL KEY PROGRAMMING MODE

- Try out the activities outlined below to get an idea of how the Sequential programming mode works for Phiro.
- Program Phiro with the Sequential Keys to get from point "A" to Point "B"



If you make a mistake, press the **DEBUG** button to erase the last command

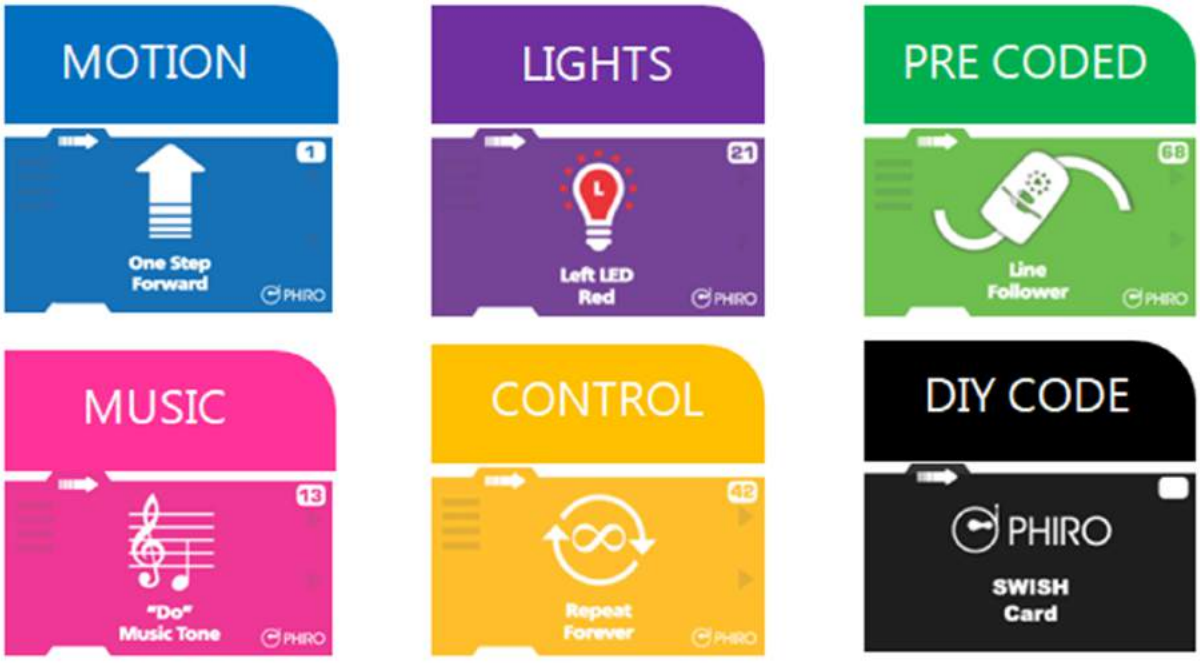


Press **DEBUG** button 2 times

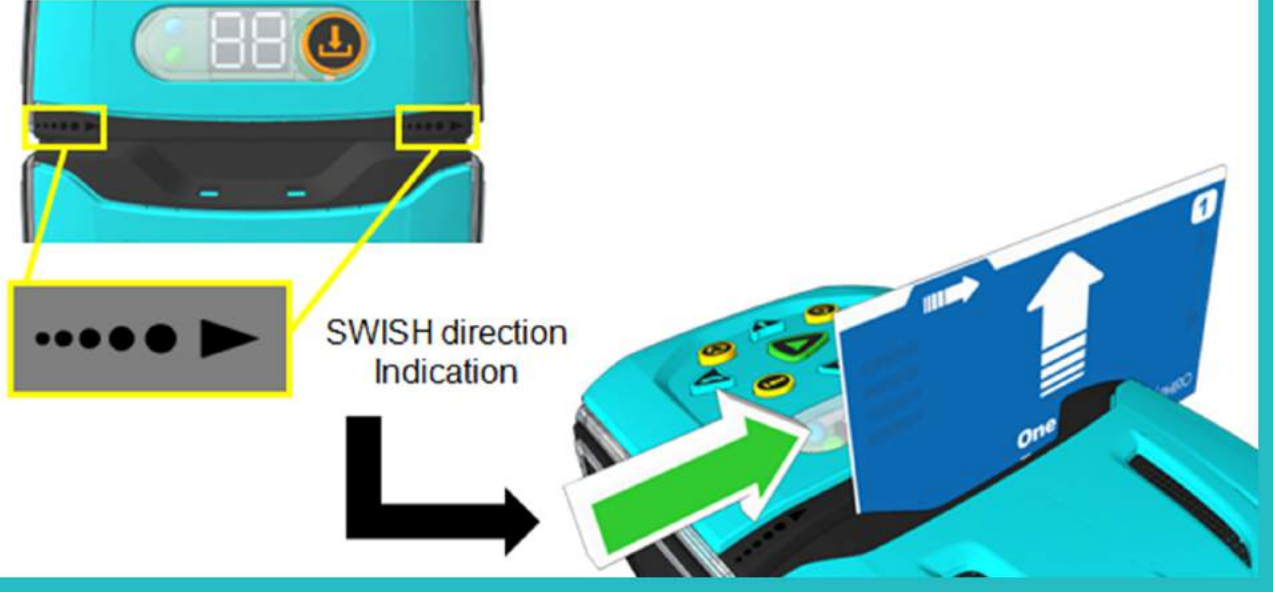
To make a NEW program, press the **CLEAR** button & then start programming

SWISH CARD PROGRAMMING MODE

- You can program Phiro Unplugged without a computer using Phiro's Keys or Swish Cards.
- The Swish Cards have different commands based on their colors. Show & review the functions of the Swish cards with students



- To program Phiro with the SWISH Cards, place the card (Code side) facing the sensor.
- Swipe in the direction as indicated in the image below from Left to Right.



Press the **MODE** button until the digital display lights up

Coded side of the card should face the SWISH Card Reader

If the card is swiped correctly, Phiro will beep once

If swished incorrectly, Phiro will beep twice.

Phiro will display the card number for 2 seconds, & then display the total number of cards that have been swiped so far.

Make sure Swiped card number and displayed card number are the same.
If not, use **DEBUG**
key to erase the previous command and swipe again.

PHIRO SWISH CARD PROGRAMMING MODE

- Try out the activities outlined below to get an idea of how the SWISH CARD programming mode works for Phiro.
- Program Phiro by swiping the cards in the sequences provided below.

I

- Remeber to press the DOWNLOAD button followed by the PLAY button, after swiping the cards, to execute the program.

II

III

IV

V

ASSESSMENT

Assessment Requirements:

- Students can be instructed to write down and identify how any problems with their code. Why it didn't work?
- Class Notebook / Science Journal
- Participation: By working together in groups of two to program Phiro for each of the following challenges.

Extension Ideas:

- Draw - Phiro's path
- Document -How they could improve their code in their Science Journal.
- Change one line of their code.

PERFORMANCE EXPECTATIONS

- NGSS K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

- NGSS K-2-ETS1-2 Develop a simple sketch, drawing or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

- NGSS K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

- ISTE 1.c Use models and simulations to explore complex systems and issues.

- ISTE 4.b Plan and manage activities to develop a solution or complete a project.

- ISTE 6.a Understand and use technology systems.