PI CODE CLUB

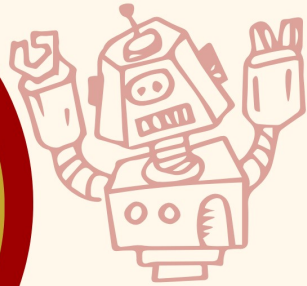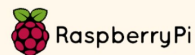## PI CODE CLUB
Unlimited Possibilities

ABOUT US
PI CODE CLUB is to encourage the young mind to experiment, discover and create Exciting Stories, Animation, Games and Robotics

EXCITING ROBOTICS PROJECTS FOR STUDENTS

make the

COMPUTER Room

BOOK FOR CLASS 1

CODING, ROBOTICS &ICT
●●●

Sonic Pi

RaspberryPi

forever
imagine
program
share
SCRATCH

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Welcome to the exciting world of coding and robotics! This book is designed to be your guide and companion as you embark on a journey through the realms of programming and robotics, exploring the endless possibilities that these fields offer.

In our rapidly advancing technological landscape, understanding how to code and build robots has become more than just a valuable skill; it's a gateway to innovation, problem-solving, and creativity. Whether you are a beginner eager to dive into the basics or an experienced programmer looking to delve into the intricacies of robotics, this book has something for everyone.

We've crafted this book with the intention of providing a comprehensive and hands-on approach to learning. Each chapter is meticulously structured to guide you through fundamental coding concepts, gradually building up to the complexities of robotics. Along the way, you'll have the chance to apply your knowledge through practical exercises, ensuring a deep and practical understanding of the material.

Coding and robotics are not just about mastering syntax or assembling mechanical components. They are about unleashing your imagination, solving real-world problems, and contributing to the ever-evolving landscape of technology. Throughout this book, we encourage you to think creatively, push your boundaries, and embrace the joy of experimentation.

Whether you're a student, hobbyist, or professional, this book aims to be your trusted companion on your coding and robotics journey. Feel free to explore, tinker, and most importantly, enjoy

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the process of bringing your ideas to life through the power of code and the wonders of robotics.

So, without further ado, let's embark on this exciting adventure together. Happy coding and happy building!

PI CODE CLUB TEAM

- Mrs.Rafiya Shaikh
- Mrs.Tejeswani Shinde
- Miss. Maduri Jadhav

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2.	Fun with Keyboard and Mouse	9
3.	Scratch 3.0	16
4.	Robotics - Mav-Bits	27

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1. About Computer

> Introduction to computer.

> Uses of computer.

> Features of computer.

> Parts of computer

What is a computer?

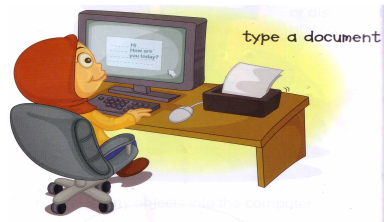A computer is an electronic device which makes our work easy by doing a certain kind of work.

We play games, watch movies, send and receive messages, draw pictures and solve problems with the help of this machine.

What are the uses of computer?

The computer helps with typing and printing documents.

Computer is used to listening music.

Computer is used to watch movies and videos.

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A computer helps you to use the internet and sending E-mails to your family and friends.

use the Internet

You can play different games using computer.

play games

It can help you in drawing and painting.

draw a picture

What are the features of computer?

- A computer works continuously.
- A computer works fast and does large calculations in seconds.
- A computer never makes mistake.
- A computer can do many kinds of work at the same time.

Parts of a Computer:

The primary parts of a computer are Monitor, CPU, Keyboard, and Mouse. The secondary parts are Printer, Scanner, Speakers and Headphones.

Monitor -

- It looks like a television screen. It is a screen which displays what the computer is doing.

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- The monitor is also known as Visual Display Unit (V.D.U.).
- It has a power button using which it can be turned on and off.

CPU -

- It stands for **Central Processing Unit**. It is present inside the CPU box.
- It is the brain of the computer. It also controls the other parts of a computer.

Keyboard -

- A keyboard has many small buttons called keys. There are many types of keys.
- By pressing the keys, you can type any letter or number. It helps you to give commands to the computer.

Mouse -

- A mouse has two or three buttons. You can give commands using the mouse too.
- You can create drawings using a mouse.

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You can also play games using a mouse.

ACTIVITIES

A. If the sentence is correct colour the HAPPY FACE , if the sentence is incorrect colour the sad face ☹ .

1) A computer is an electronic machine.

2) A computer makes our work very difficult.

3) A computer can make mistake.

4) A monitor looks like a TV screen.

5) A CPU is called the heart of a computer.
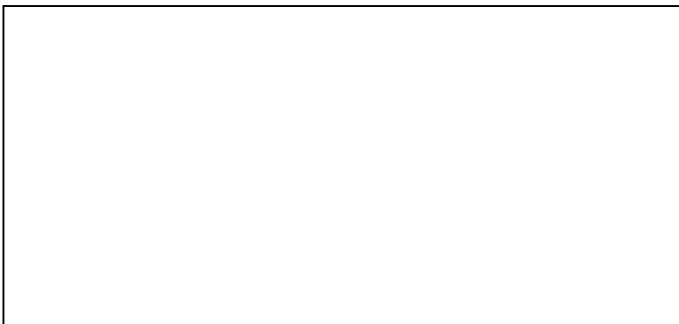
6) A keyboard has many small buttons

Called keys.

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B. Puzzle.
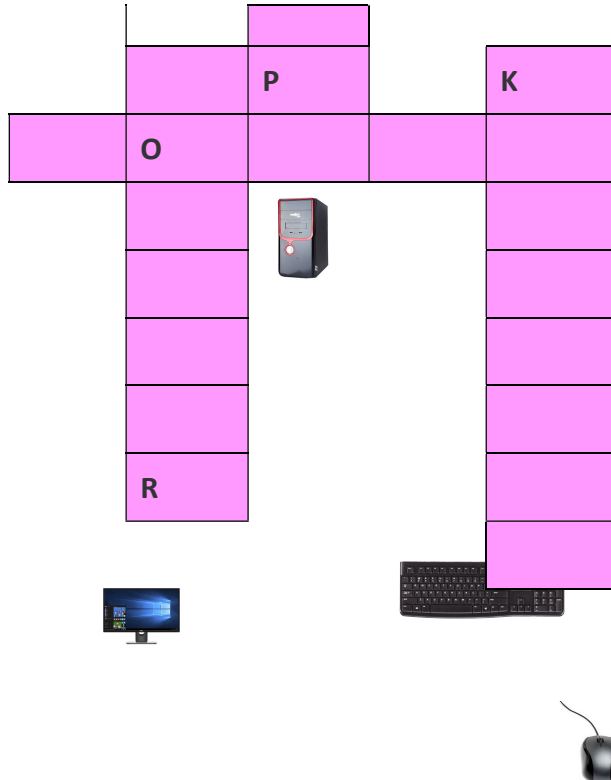
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C. Write the correct use of computer below of the image.

_____

_____

_____

_____

D. Draw a Computer.

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2. Fun with Keyboard and Mouse

> ➢ About Keyboard
>
> ➢ Introduce Letter keys and Number keys
>
> ➢ Special keys – Spacebar key and backspace key.
>
> ➢ About Mouse
>
> ➢ GCompris

About Keyboard:

The keyboard is used for entering data into the computer system. It can type words, numbers and symbols.

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Introduce Letter keys and Number keys:

There are (A to Z) 26 letter keys in 3 rows. First row (Q, W, E, R, T, Y, U, I, O, P) 10 letters. Second row (A, S, D, F, G, H, J, K, L) 9 letters. Third row (Z, X, C, V, B, N, M) 7 letters. These are middle on keyboard. And used to typing the words.

Letter keys

Numeric keys (0 to 9) are used to type numbers on the computer. You can also use the Numeric Keypad which is on the right side of the keyboard.
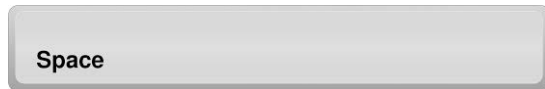

Numeric Keypad

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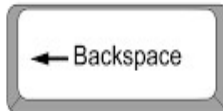**Special keys – Spacebar key and backspace key.**

Spacebar Key:

This key is the longest key on the Keyboard. It is used to give space in between words.

Space

Backspace key:

The backspace key is a keyboard key that's used to erase any character or symbol before the cursor on your screen.
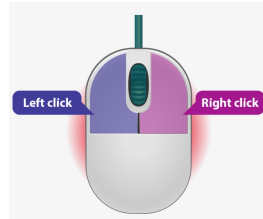

Navigation key:

The 'arrow' keys allow you to move your cursor in all directions on the page or screen - up, down, left and right.

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About Mouse:

A mouse is a pointing device. A mouse enables us to point at and clicks on the items. Most types of mouse have two buttons, and some will have a wheel in between the buttons.

GCompris:

GCompris is a high quality educational software suite, including a large number of activities for children aged 2 to 10. Some of the activities are game orientated, but nonetheless still educational.
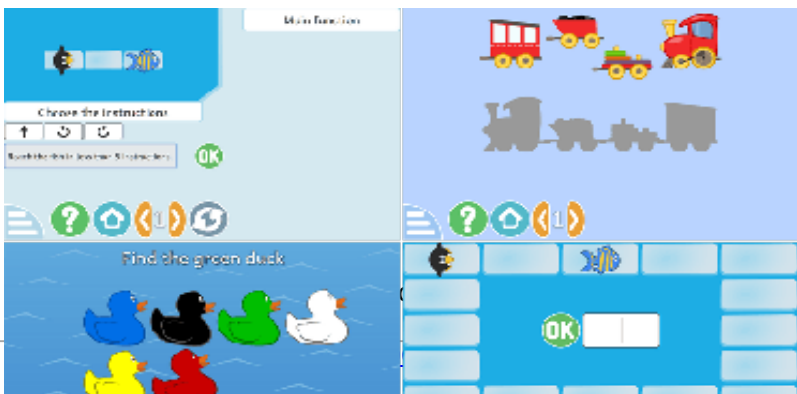
Here is the list of activity categories with some examples:

- computer discovery: keyboard, mouse, touchscreen ...
- reading: letters, words, reading practice, typing text ...

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- arithmetic: numbers, operations, table memory, enumeration, double entry table ...
- science: the canal lock, the water cycle, renewable energy
- geography: countries, regions, culture ...
- games: chess, memory, align 4, hangman, tic-tac-toe ...
- other: colours, shapes, Braille, learn to tell time ...

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Activities

A. Fill in the missing keys on the Keyboard.

B. in the mouse shown below, which button is used for left and right clicks? Mark with 'L' for left click and 'R' for right click.

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C. Rearrange the letters to form the words below.

(Mouse, click, keyboard)

1. cickl   -   _____

2. uomes   -   _____

3. ordyekba   -   _____

D. Help CRAB to ~~...~~ (arrow) keys

1st Std – Coding, Robotics, A.I and ICT

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Scratch 3.0

➢ Introduction – Coding and scratch.

➢ Parts of scratch screen

➢ About sprite

➢ About backdrop

What is coding?

Coding creates a set of instructions for computers to follow. These instructions determine what actions a computer can and cannot take. Coding allows programmers to build programs, such as websites and apps. Computer programmers can also tell computers how to process data in better, faster ways.

Block Coding:

Computer programming is a method for these instructions, and computer programmers develop code to solve issues or complete tasks. Block code is a programming element that converts text-based software code into a visual block format to reduce potential errors. Users can construct games, apps, and other programs by dragging and dropping visual block programming representations of text-based code (event

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listeners, functions, variables, audio, and more) into the code editor.

Scratch:

Scratch is a free block-based coding platform that allows you to create your own games, stories, and animations.

To Download Scratch:

Following Steps need to be followed to download scratch :

Step 1 : visit: https://picodeclub.com/aspdat/page.asp?id=22

Step 2 :click on scratch

Step 3: Choose your OS

Step 4: Install the Scratch App for Your OS

Step 5: Running the Application

To use Scratch online:

Students can visit following link and use the scratch online

https://scratch.mit.edu/projects/
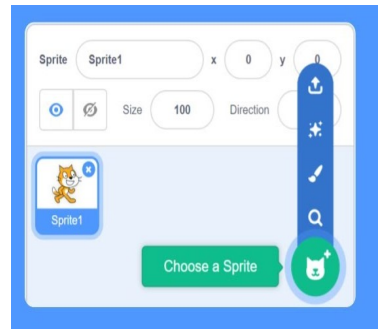
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Let's fun with scratch 3.0:

Sprites: are the actors or main characters of the project. Sprites are programmed to do something in Scratch.
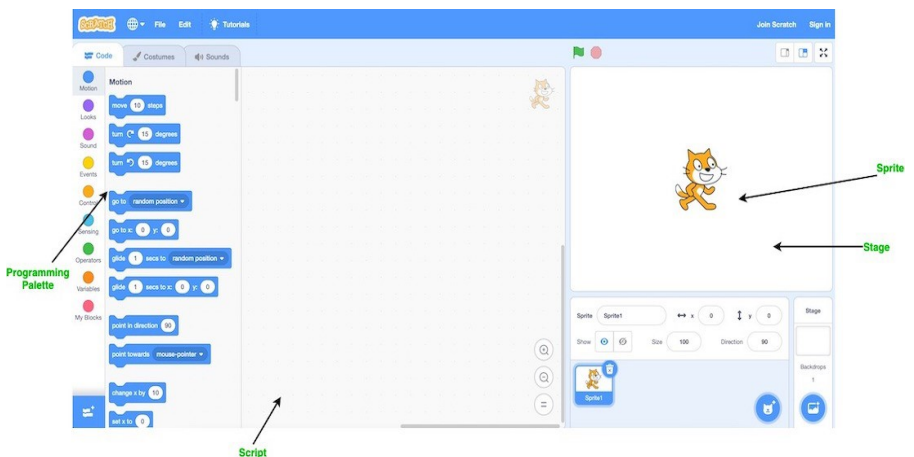
Stage: Similar to the stage in play. This is where everything will take place. The stage can be different background.

Script: tells the sprite what to say or do. Each sprite is programmed with script.

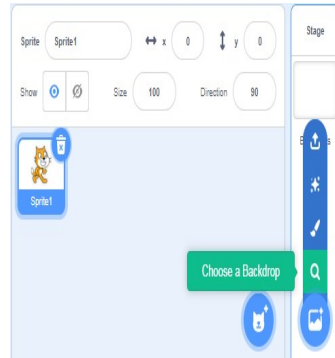**Programming Palette:** elements used to program the sprite to do or say something.

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Backdrop: A backdrop is an image that can be shown on the Stage.
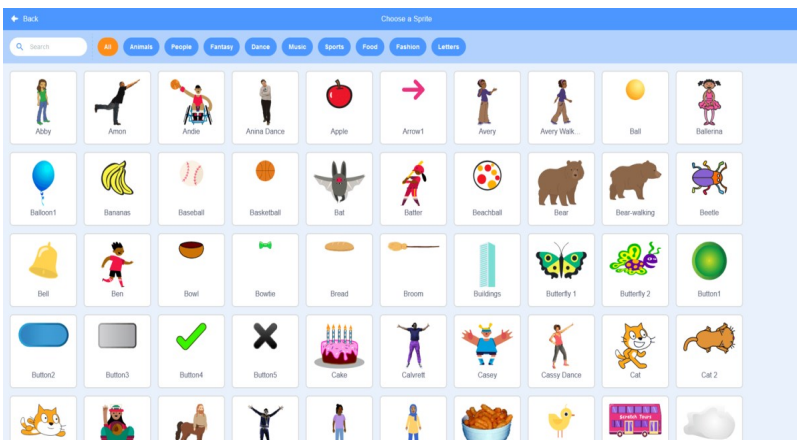

Let's work with the sprite:

To add a new Sprite-

- Click the buttons beside NEW SPRITE.

- Choose from the library,

- Paint your own sprite,

- Upload your own image or sprite.

Sprite library:

Any Scratch program can have an unlimited number of sprites.

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Backdrop:

To add new backdrop-

- Click the BACKDROP BUTTON (looks like a mini mountain with a sun) to choose a new backdrop.

- Choose a backdrop from the library (such as "Spotlight-Stage").

- Click OK.

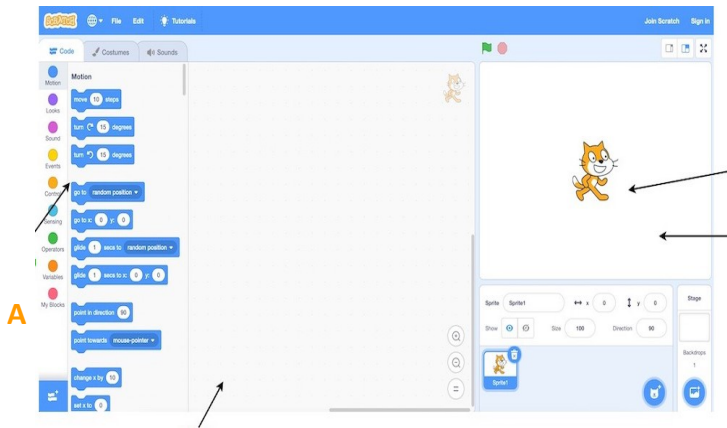- The new backdrop now appears on the Stage.

Backdrop library –

This library is used to get pre-made backdrops on projects.

Activities

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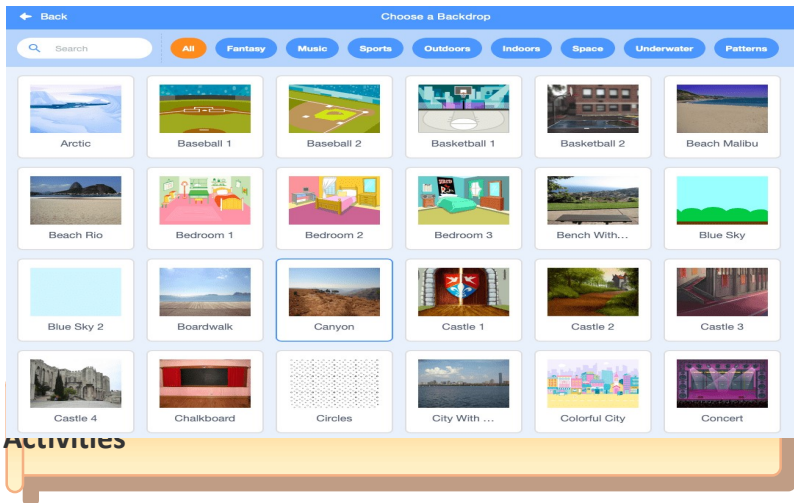
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Activities

A. Name the part of the scratch screen given below.

B

A   : _____

B   : _____

C   : _____

D   : _____

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B. Fill in the blanks.

(Backdrop, say or do, instructions, sprite)

1. Coding is using a set of _____to communicate with computers.

2. A _____ is an image that can be shown on the Stage.

3. Script tells the sprite what to _____.

4. _____are the actors or main characters of the project.

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Projects

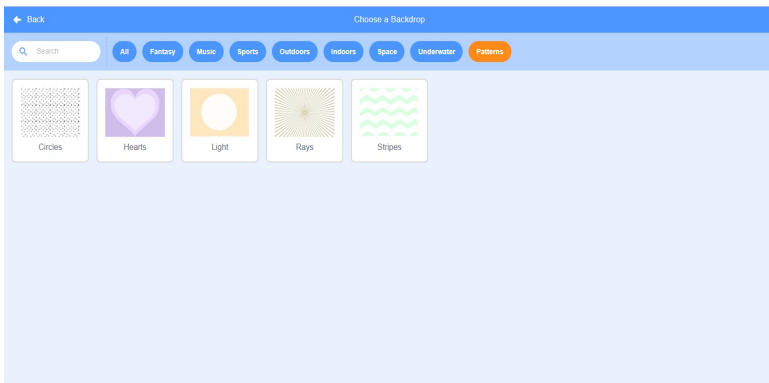**1. Let's make an above project with help of different sprites and backdrops.**

Steps:

For sprites:

1. Open Scratch 3.0.

2. Open sprite library.

3. Click on Letters category – select letter A.

4. Click on food category – Select Apple.

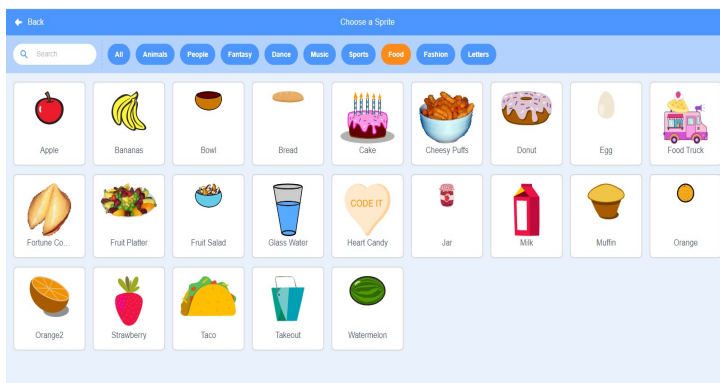1st Std – Coding, Robotics, A.I and ICT

5. Arrange sprites on screen according to your choice.

For Backdrop:

1. Open Backdrop library.

2. Select patterns category – select circles.

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By following the above steps you can add more sprites of your choice on your project.
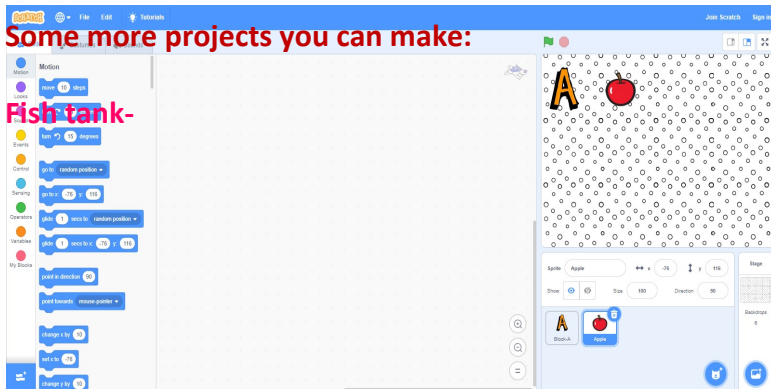
Some more projects you can make:

Fish tank-

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The Jungle -

4. Robotics - Mav-Bits

- ➢ Introduction of Robotics
- ➢ Introduction of Mav-Bits.
- ➢ Battery
- ➢ LED & RGB
- ➢ Projects.

Robotics:

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Robotics is the intersection of science, engineering and technology that produces machines, called robots that replicate or substitute for human actions.

Introduction of Mav-Bits:

Mav-bit is a kit that contain small bits those can help to the student to understand the basic concept of components.

Component list:

1. Battery

2. LED

3. RGB.

Battery:

A battery is a collection of one or more cells that go under chemical reactions to create the flow of electrons within a circuit.

Non-Rechargeable: Some are non-rechargeable or single-use, once they are fully discharged, they should be recycled.

Rechargeable: Some are rechargeable, you can plug them in to charge and get multiple uses before the battery needs to be

LED:

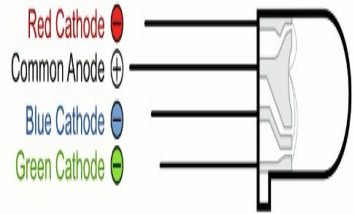LED   stands
for light
emitting   diode.
It   is   a

1st Std – Coding, Robotics, A.I and ICT

semiconductor device, which can emit light when an electric current passes through it.

The cathode lead being shorter than the other as the anode (+) lead is longer than the cathode (k).

RGB:

RGB LED means red, blue and green LEDs. RGB LED products combine these three colours to produce over 16 million hues of light. Note that not all colours are possible.
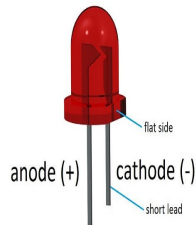
PROJECTS

1: GLOWING LED

In this project we are going to show how to power on an LED. Connection is shown in the following images. Connect the components as per the circuit diagram.

Components Required:

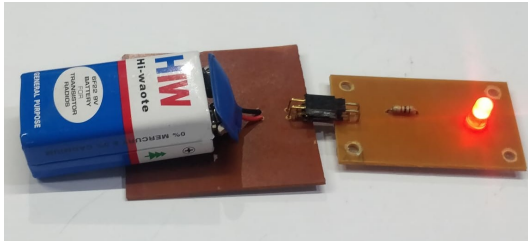1. LED Bit

2. Battery

3. Battery Cap

STEP 1: Take LED, Battery and Connector

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STEP 2: Connect LED Battery Cap and Battery

Result: The LED will start Glowing.

2 Glowing RGB Led:

In this project we are going to show how an RGB Led glows does. Connection is shown in the following images. Connect the components as per the circuit diagram.

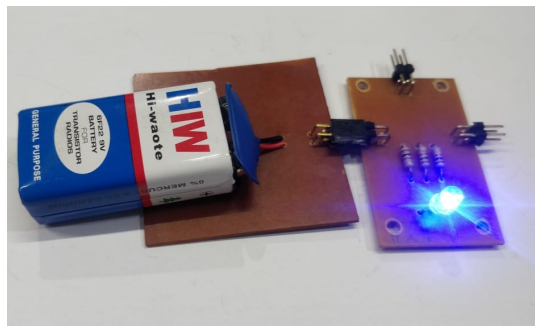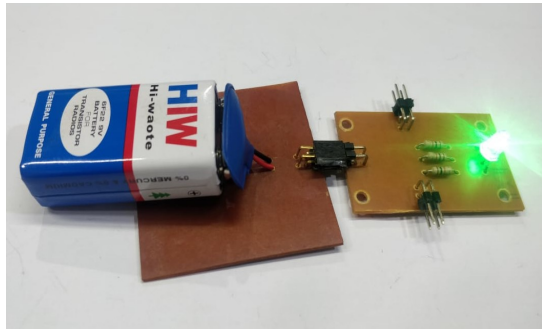### Components Required:

1. RGB Bit

2. Battery Cap Bit

3. Battery

STEP 1: Take Battery, Battery Cap Bit and RGB Bit.

STEP 2: you can see 3 Input Pins to RGB Bit. Connect All 3 Pins of RGB with Battery One by One.

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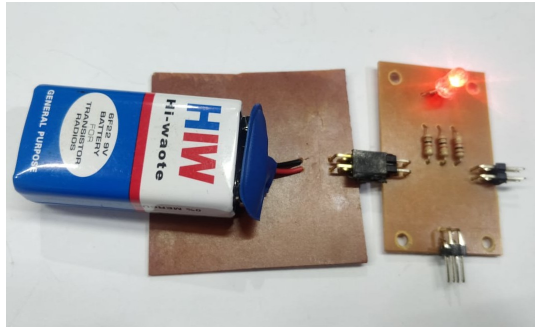
Result: You can see different Colour Light from Different Points

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A. Look at the pictures below and find out which are rechargeable and non-rechargeable batteries. Fill Red colour in rechargeable batteries and Green colour in Non – rechargeable batteries.

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B. Name the following LED's diode and complete the following fill in   the blanks.

_____   _____
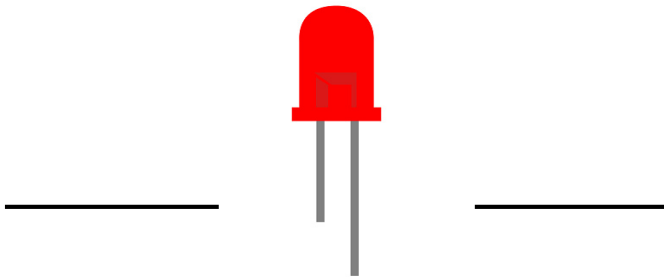
L:_____   E:_____   D:_____

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D.I.Y. Projects Torch Light

Materials Required

Tape

Scissors

Wires

Battery

Resistor

LED

Switch

Circuit Diagram

LED

Resistor

Switch

+ -

Battery
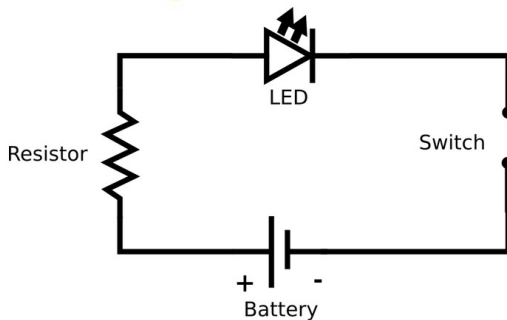
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How to make Torch Light:

Step 1: Connect a wire to the one end of the on / off switch

You can get a small on/off switch in any electrical shop near you. Make sure that the wire is connected securely to the switch and does not come off easily.

Step 2: Connect a led to other end of the switch

A LED has two legs and usually the longer led is positive terminal and shorter one is negative terminal. However it may be different in your case. So, you have to test the terminal using a battery and a resistor before connecting it. Please do not connect the two terminal of LED to the battery, use a resistor [270 ohm], otherwise you might damage the led and burn your finger.

Step 3: Connect a resistor to the other leg of the LED

Always remember to connect a resistor while lighting a LED. The resistor limits the flow of current from battery so that the LED is protected and glow for long time.

Step 4: Connect the wire connected to the shorter leg of LED to the negative terminal of battery.

Make sure that the positive terminal of LED is connected to positive terminal of battery and negative terminal of LED to negative terminal of battery.

Step 5: Connect the wire coming from the longer leg of LED to the positive terminal of battery.

Check the connection of LED and battery. Make sure that switch is between the LED and battery.

Step 6: Secure the connection using an electric tape.

Be careful to make the connection secure among wire, resistor, LED, switch and battery.

Step 7: Now your torch is ready to be used when there is no light.

Do the final test and see if the LED glow when u turn on the switch, if it turns ON, then your torch is ready to use. Also to make it more interesting you can add a buzzer in place of LED and hear what happens !

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D.I.Y. Projects Greeting Card

What you will need:

For the paper circuit there are only three essential materials.
• Copper tape
• Surface-mount LED
• 3V 12mm Coin Cell Battery

Other materials that you may need (depending on the design of your paper circuit) are the following: soldering iron, safety glasses, tweezers, clips, clear tape, scissors, pencils and pens to trace the pattern

For the greeting card
• Paper cardboard (in different colors)
• Thicker paper cardboard (same color as your base card)
• Scissors or hobby knife
• Glue stick/Glue

What you need to do:

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Greeting card pattern

Choose a pattern for the greeting card. Ideally, you want to choose a pattern that has two layers so the paper circuit you will make can be hidden in between the layers. A simple card will do like the cake design that we have below. When the recipient of the card presses the "press Here" circle, the flame of the cake should light up.

• Take a colour paper cardboard that will be your base. Fold it in the middle. This will be the base of your card.

• Print your design (in our example the cake) on another paper cardboard. You can opt to use different colors for the cake's icing to make the card more festive. Cut out different colors for each portion of the cake pattern.

• Cut out a hole on the flame – this is where the LED will be seen when it lights up.

• Set it aside for assembly late

• Paper circuit

• Print another copy of the design so you can trace the paper circuit on it accurately. You want to make sure that the battery and the "press here" on the cake design will be on the same spot. The same is true for the LED and the flame of the design.

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•   Cut the cake design and glue it on the card.

•   Layout the copper tape as shown in the paper circuit pattern below. Peel off the copper tape backing to reveal the adhesive side. This will help the copper tape stick to the paper cardboard. This layout will depend on your chosen design.

•   Paper circuit pattern

•   Position the copper B tape first. Place the coin battery on top of it. Make sure that the side with the positive sign is facing up.

•   Position the copper A tape next. You need to start from the flame. Measure the surface mount LED to know how far copper A should be from copper B. The LED should be able to lie on top of both copper tapes.

•   When you get to the end of the copper A tape that is near the battery, fold the end of the tape back on itself so the sticky side will be against each other. That way, when the copper a tape is pressed onto the battery, the copper side will touch it – not the side with the adhesive. Bend the tape so it is on top of the battery, but not touching it. You want it to touch the battery only when the recipient presses the "Press HERE" button.

•   Place the surface mount LED. You can use tweezers to help mount it. Check if you placed it correctly by touching the copper A tape to the battery. If the LED does not light

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up, flip the battery over. When it lights up, secure the LED with clear tape. You can also use a soldering iron to put them together.

• Assemble the card

• Take the cake design (the colourful one) and place it on top of the paper circuit.

• Since the battery will be a bit bulky, you may want to elevate the "Press HERE" button. You can do this by placing some folded paper around the battery so the cake design on top of it will be elevated. You can choose to elevate the whole cake design if you wish. That is up to you. Just make sure that when the recipient presses the button, it will be shallow enough to allow the copper tape to touch the battery and thus make the flame light up.

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CODING & ROBOTICS

PI CODE CLUB is to encourage the young mind to experiment, discover and create Exciting stories, Animation, Games and Robotics

PI CODE CLUB is a concept to encourage young minds to develop their logic and creativity, Team Building, Confidence and networking among themselves, thus making the fear of technology befriended for overall development. We have built a simple and workable model suitable for Schools to integrate in your Syllabus. Young Minds will explore the digital world practically by experimenting and developing loops and functions with scratch, HTML, Python

- **Introduction to Block Coding**

- **Develop their skills, critical & creative thinking, and engage with other children's**

- **Showing live demonstrations of how to create stories, building games, animation & More!.**

- **Introducing MAVBITS with basic electronics**

- **To Learn How to build Bots on their own**
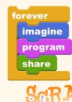
python   SCRATCH   π))) Sonic Pi   🍓 RaspberryPi

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Website: https://picodeclub.com/

Coding, Robotics & ICT-Level 1