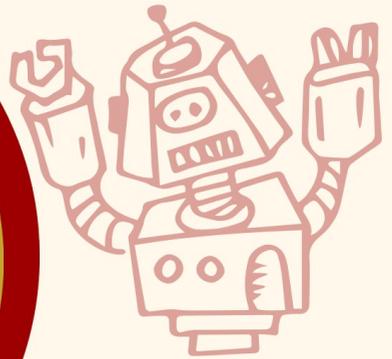


PI CODE CLUB

Unlimited Possibilities

ABOUT US

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



BOOK FOR CLASS 5

CODING, ROBOTICS & ICT



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 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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Computer System

Basics of computer - Parts of computers

- **Basics Of computers?**

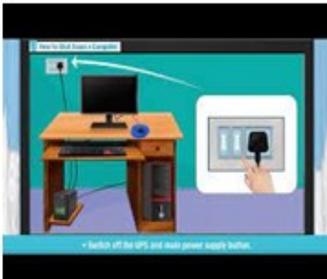
How to on and off the computer?

Let's start (on) the computer



Step1: Switch on the power supply of switch button

Step2. Switch on the power button of CPU



Let's off the computer

Step1. Select the Start button

Step2. Select the Power button **Step3.** then select Shut down.



1) Monitor



A monitor is an electronic output device. It is used to display images, text, video, and graphics information generated by a connected computer. A computer monitor is an electronic device that shows pictures for computers. Monitors often look like smaller televisions.

Uses:

- Display pictures.
- Display videos.
- Display text.
- Play Games

C.P.U.:



C.P.U. is defined as central processing unit.

The CPU is the brain of a computer, containing all the circuitry needed to process input, store data, and output results. The CPU is constantly following instructions of computer programs that tell it which data to process and how to process it.

Uses: CPU performs all types of data processing operations. It stores data, intermediate results, and instructions (program). It controls the operation of all parts of the computer.

Mouse:



A mouse is a small device that a computer user pushes across a desk surface in order to point to a place on a display screen and to select one or more actions to take from that position.

Mice typically have two buttons, a scroll wheel and a [laser](#) sensor. They are used to move the [cursor](#) on the screen, select objects and click on buttons.

Uses: 1. Primary used for moving the cursor or pointer on the screen.
2. For other functions like to open program, select text or file, drag and drop, hover and scroll.

Keyboard:



A computer keyboard is an input device that allows a person to enter letters, numbers, and other symbols (together, these are called characters) into a computer. It is one of the most used input devices for computers. Using a keyboard is often called typing.

Uses:

keyboard is used for typing message for communication.

Keyboard is used for entering text.

Keyboard is used to operate some devices.

Printer:



A printer is basically an output device which prints a hard copy of the electronic data that is stored in the computer or any other devices. The electronic data may include documents, text, images or even the combination of all three.

Uses:

The main function of the printers is to present text or images to flat media such as paper in various sizes. After all, everyone needs a printer for different needs. For example, high school and college students usually need to print black and white documents.

Scanner:



A scanner is a device that captures images from photographic prints, posters, magazine pages and similar sources for computer editing and display. Scanners work by converting the image on the document into digital information that can be stored on a computer

Uses

They are commonly used in offices to scan documents such as contracts, invoices, and reports, making it easier to manage and organize paperwork.

Headphones



Sometimes called earphones, headphones are a hardware output device that connects to a computer line

out or speaker's port or wirelessly with Bluetooth.

Headphones allow you to listen to audio or watch a movie without disturbing people around you.

Activities

A. Read the sentence and write the correct answer.

1. To start the computer we have to switch on the _____.
2. C.P.U. is defined as _____.
3. A computer _____ is an input device that allows person to enter letters, numbers, and other symbols
4. _____ Used to move the cursor on the screen, select objects and click on buttons.

B. Complete the steps to off the computer.

Step1. Select the -----button

Step2. Select the Power button

Step3. Then select -----down.

Write the uses Of Following Parts Of Computer

- 1) Monitor
- 2) Scanner
- 3) Mouse

Look Picture and Name the parts of computer



4)

2. Keyboard Knowledge

- What is Keyboard
- Types Of Keys and their Function

Keyboard:



A **keyboard** is one of the primary input devices used with a computer. Like an electric typewriter, a keyboard is composed of buttons to create letters, numbers, and symbols, and perform additional functions.

Keyboard is used for entering a text, numbers and Different symbols. Some keyboards are wired or some keyboards are wireless.

Types of Keys of keyboard

1) Alphabetical keys

A keyboard has 26 alphabet keys. Alphabet keys have letters on them. They are used to type words and sentences.



Use: Alphabet keys have letters on them. They are used to type words and sentences. You can write both capital and small letters.

2) Number Keys

The number keys are digits 0 to 9,

+(addition),-(subtraction), *(multiplication) and / (division) symbols, . (Decimal point), Num-lock and ↵ Enter keys. With help of number keys we can type numbers. It is on right side of keyboard.



Use: input numerical values into a computer or other device and can also be used for other functions such as navigating through menus and entering special characters when combined with the Shift or Alt keys.

3) **Arrow keys**

They usually consist of four buttons with up, down, right, and left arrow. Arrow keys are also called navigation keys. Such as moving the cursor from one line of text to the next.



Use:

Arrow keys are used to move the cursor left, right, up, and down on the screen, enabling you to move through documents and webpages without having to use your mouse.

4) Function keys

The function keys are situated at the top of your keyboard and are assigned from F1 to F12



Use: A function key is a key on a computer or terminal keyboard that can be programmed to cause the operating system or an application program to perform certain actions, a form of soft key.

4) Special Keys

A keyboard key that is used to perform functions such as launching a specific application, opening a folder or playing music or videos. Special function keys are added to many keyboards to provide shortcuts for widely used tasks. Keys on

Keyboard used for special tasks are special Keys i.e. Tab, Caps Lock, Enter, Alt, Ctrl, Num Lock, Shift, backspace, Esc



Use: A special key, in the context of computing and technology, refers to a keyboard key that performs a specific function beyond the standard alphanumeric input. Examples of these include keys like Control (Ctrl), Alt, Shift, Function (Fn), Escape (Esc), and the Windows key on a Windows-based computer.

Activities

A) look at the following picture and write type of keys









B) Answer in one sentence

- 1) One of the primary input devices used with a computer.

- 2) A keyboard has 26 alphabet keys.

- 3) They usually consist of four buttons with up, down, right, and left arrow.

- 4) keys are situated at the top of your keyboard and are assigned from F1 to F12

- 5) Keys i.e. Tab, Caps Lock, Enter, Alt, Ctrl, Num Lock, Shift, backspace, Esc are called _____

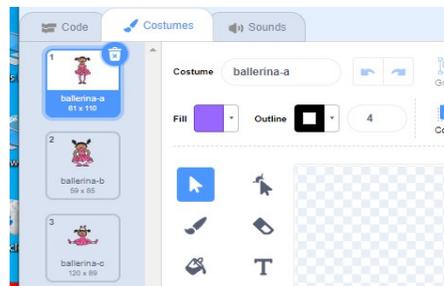
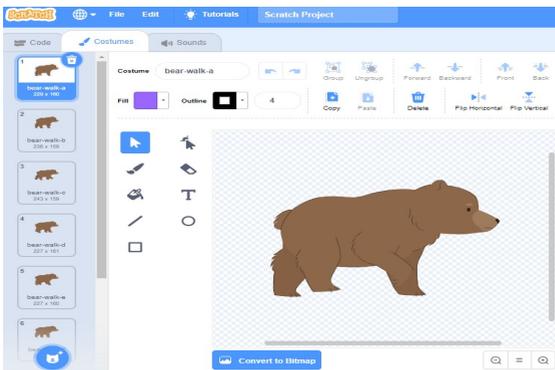
3. Scratch 3.0

- What is costume?
- creation of sprite with costume
- Blocks from motion, looks and control
- Projects

Scratch 3.0:

What is costume of sprite?

In Scratch, a Costume is a method to dress up a character or a sprite. Users can add different accessories to make their sprite look better. These costumes can be named, created, edited, deleted, and changed but every sprite must have at least one costume. Below figure shows costume of sprite.

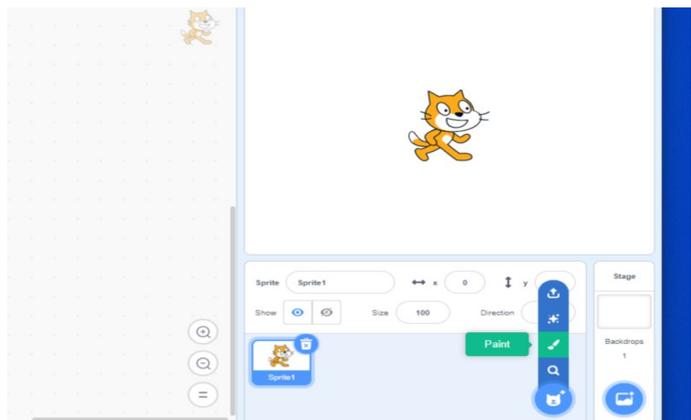


In the above pictures of you can see on the left side of sprites these are the costumes (movements) of sprite

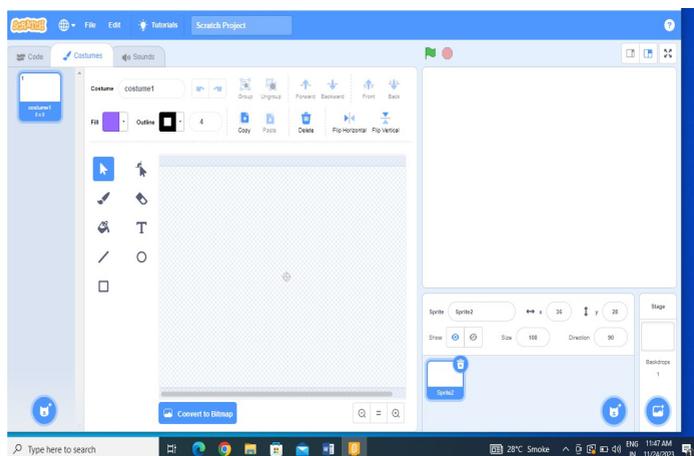
Creation of sprites with costume

Create sprites

Step1: open scratch and go to choose sprite option

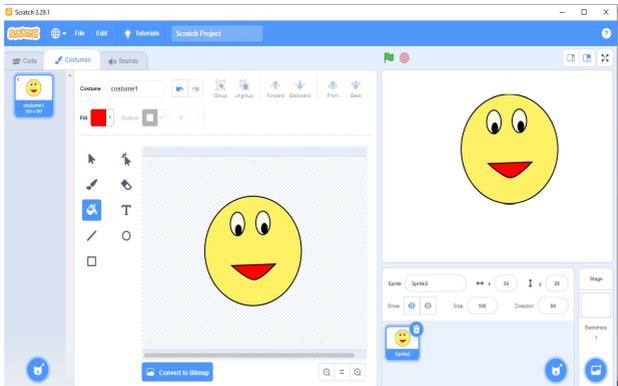


Step2: then choose paint option using different option in paint we can create different sprites.

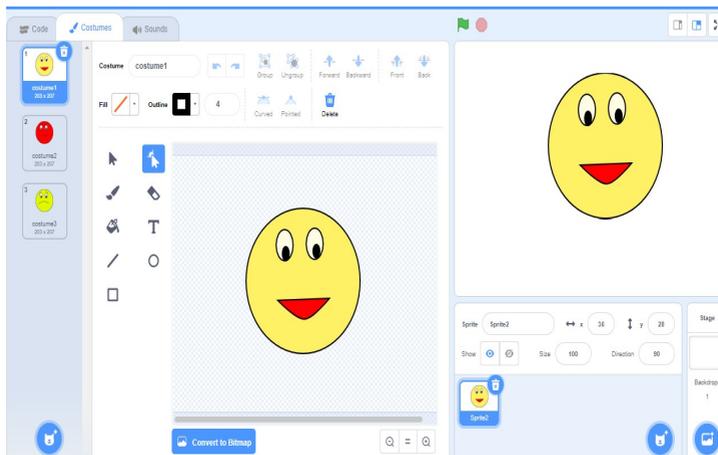


Step3.with help of giving option on left side of creation screen we can create sprite

For.eg. Emojie

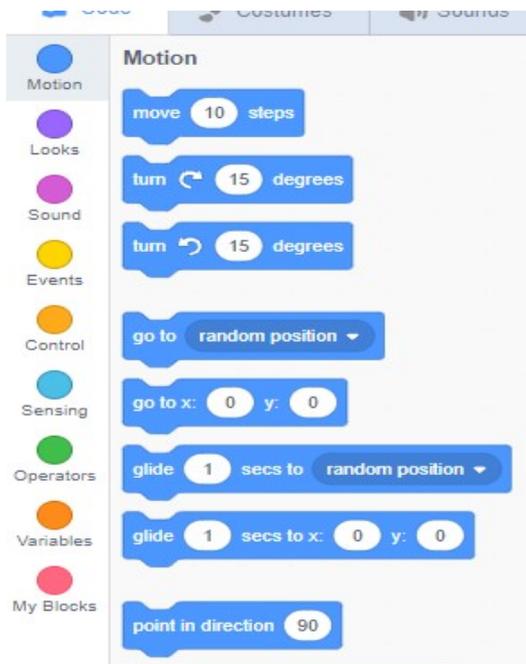


Step4. For creating costume right click on sprites and like that we can add different costumes for our sprite.



Activity: Create own sprites in scratch3.0 and their costumes. For e.g. trees, birds, faces of emojis.

Blocks from motion:



showing movements of sprite these blocks in Scratch are used to move or turn sprites. They are used to control the sprite's

movement. Motion blocks enable the students to move their sprite (or character) around the stage.



This block is used to move the sprite by a finite number of steps



These are used to turn the sprite by a specified angle in a clockwise direction. These are used to turn the sprite by a specified angle in an anti-clockwise direction.



The “go to x, y” enable the sprite to move to the coordinates that you have written and selected in the block.

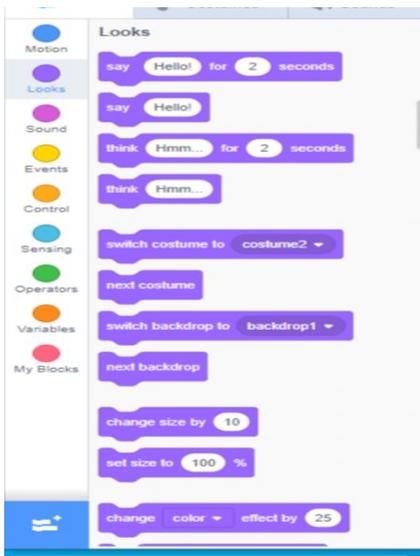


This is used to move the sprite, at a steady pace, to the chosen x and y coordinates in the mentioned time in the block, in the decided time, in a gliding movement.



The point in direction () block is a stack block and a motion block. The block points its sprite in the specified direction, rotating the sprite. The blocks use the 360 degrees in a circle.

Looks Blocks



Looks Blocks are blocks that allow you to edit the way your sprite looks. It can also

change costumes for your sprite and make your sprite say something. This is an important block if you want your project to be with buttons.



The block displays a speech bubble with the text specified for the sprite executing it, which appears on the screen for the specified number of seconds.



The block changes its sprite's costume to a specified costume.



The block changes the scene background to the one specified.



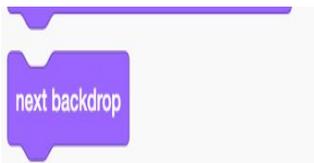
If the block sprite is hidden, it will display the sprite. If the sprite is already displayed, nothing will change. If the block sprite is displayed, it will hide the sprite. If the sprite is already hidden,



The block modifies the specified effect on its sprite by the specified amount. There are seven different effects to choose from: color, swirl, pixelate.

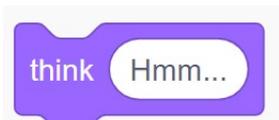


The next costume block is located in the Looks block panel . When used, the block allows you to transition the selected sprite's costume to the next one in the Costumes pane.



The **Next Backdrop** block is a Looks block and a stack block. The block changes the backdrop to the next in the list of backdrops,

it can be used for slideshow-style projects as shown below



The **Think () block** is a Looks **block** and a stack **block**. The **block** gives its sprite a **thought** bubble with the specified text.

Control Blocks

Control blocks are used in Scratch programming to control scripts under certain conditions. Some of the widely used control blocks are as follows: A. Repeat Block: This block is used to repeat commands for a specified number of times.



The block suspends its script for the specified number of seconds. The expectation can also be a decimal number.

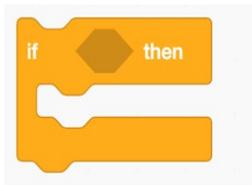


The blocks inside this block will loop a number of times, before allowing the script to continue. If a decimal is inserted, the number is



Blocks held inside this block will be in a loop.

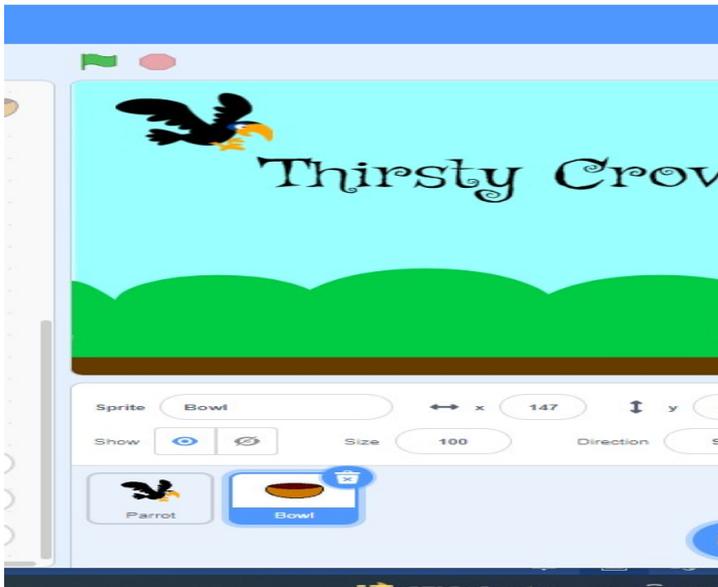
Just like the Repeat() block and the Repeat Until() block, except the loop never ends.



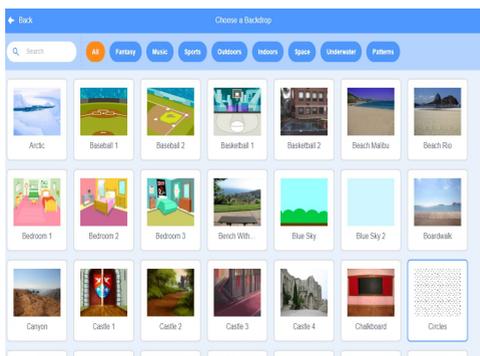
The condition is only checked once; if the condition becomes false while the script inside the block is running, it will continue to run until it is finished.

Projects

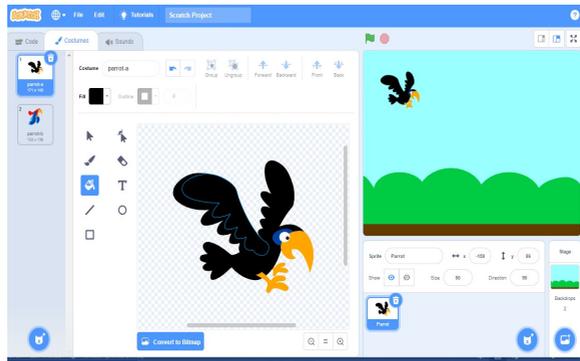
Create a Story with multiple sprites



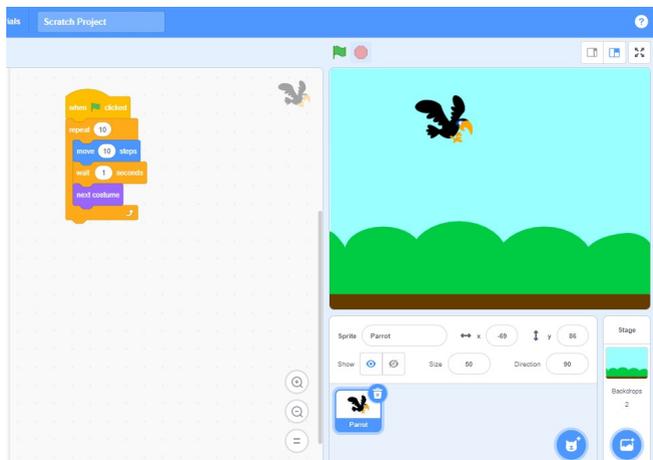
Step1. Select suitable Backdrop



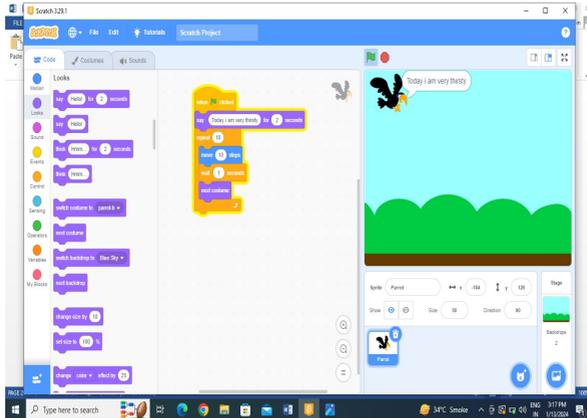
Step2. Select Parrot Sprite and make it crow with paint Option in scratch



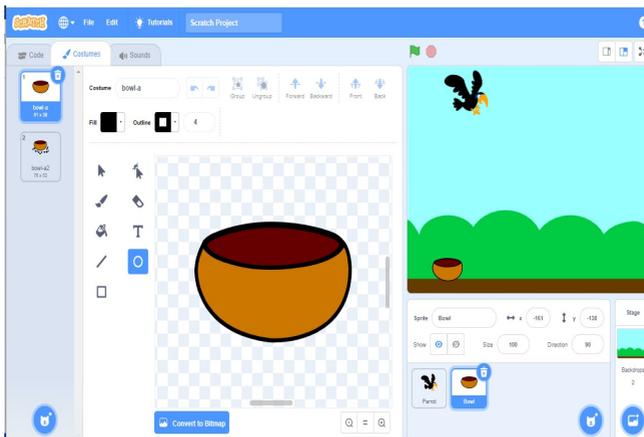
Step3. Put the codes of flying bird on that crow



Step4.Add codes for dialogues of sprite



Step5. Take bowl and make costumes of bowl using paint



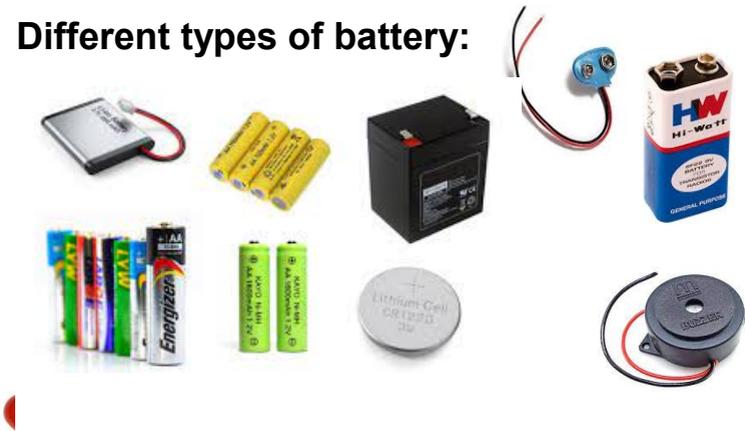
Robotics

- Battery
- LED,RGB and Buzzer
- Function Of LDR
- Function Of Potentiometer
- Function Of Motor
- *Projects*

Battery:

9-volt batteries power our smoke alarms, household items and toys. They can be found in most homes. But these batteries can be a fire hazard if not stored safely or disposed of with care. Keep batteries in original packaging until you are ready to use them.

Different types of battery:



LEDs (Light Emitting Diodes) convert electrical energy directly into light, delivering efficient light generation with little-wasted

E.g.



An RGB colour value specifies the relative intensity of red, green, and blue to cause a specific colour to be displayed.



A buzzer is used to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc.

It is used in



Function of LDR



LDR, also known as Photo resistor Means light dependent resistors (LDR), are light sensitive devices most often used to indicate the presence or absence of light, or to measure the light intensity.

Principle of LDR

LDR (Light Dependent Resistor) as the name states is a special type of resistor that works on the photoconductivity principle means that resistance changes according to the intensity of light. Its resistance decreases with an increase in the intensity of light.

Function of Potentiometer



A potentiometer is used as a voltage divider or variable resistor in a circuit. Some applications include dimmer switches for lights, brightness controls in televisions, and faders in audio equipment. Regulator of fans. A potentiometer is an instrument for measuring voltage

Function of Motor



Electric Gear motors(BO motors)are used in applications that require high torque and lower speed like automatic doors, wipers, plates inside a microwave, etc... The Electric motor without gears is useful in many applications, like the fan, toy cars, etc.

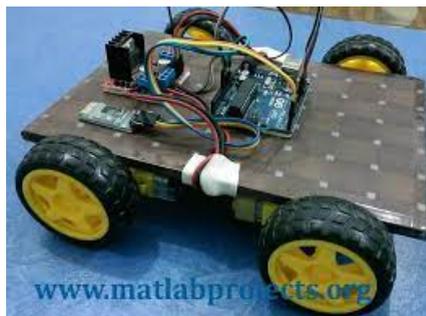
A BO motor is a type of electric motor that is powered by a rechargeable battery. These are commonly used in portable devices and vehicles,

Different types of Motors

I shaped Motor L shaped motor
Double shaped motor



Use of motors



Projects

Blowing LED's with Ardublock

Step1. Open Arduino Application



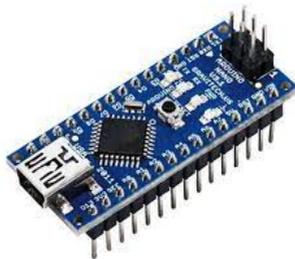
Step2. Open Tools Option And active Port

Step3. Choose Ardublock option from tools

Step4. Put the codes in coding area



Components used



Activity:

Blowing RGB LED's with Ardublock



Component used

Some LED and RGB based Projects



LED City



LED Tree

Mavboard Introduction

Mavboard is a customized all in one board with microcontroller, small electronic components, motors and sensors.

It has Arduino Nano as a microcontroller. We can also call it as a brain of the Mavboard.

Basically microcontroller means which can control small-small functions or activity.

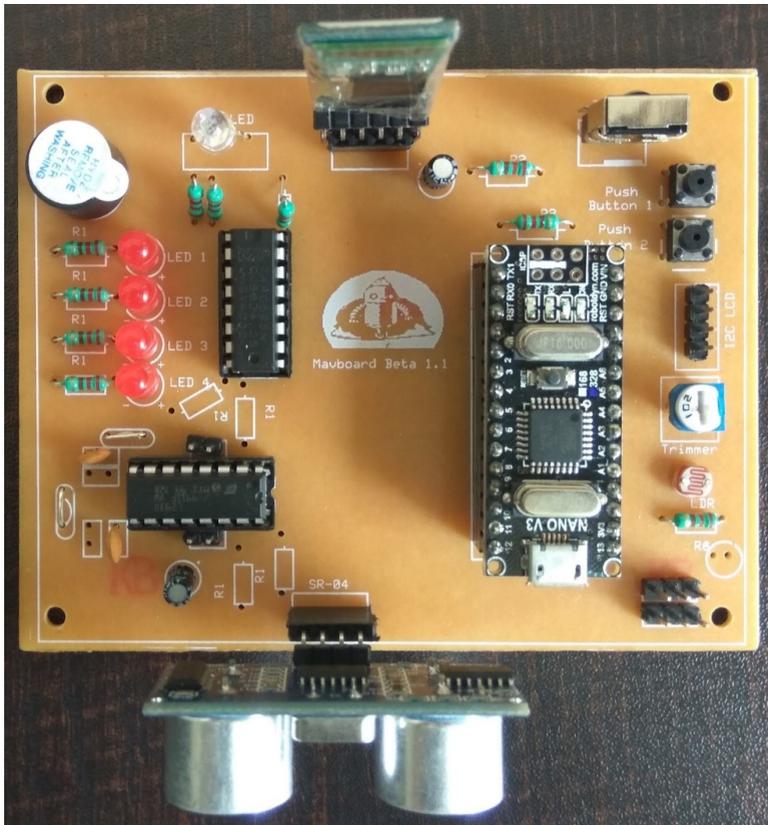
It has led's, RGB LED, Push Button, Potentiometer, LDR, Sensors and motor driver to control motors.

We have to give commands to microcontroller to perform particular activities, in the form of coding.

Here we are going to use blocks-based programming language, which means that you program by dragging and dropping chunks of code – the blocks.

Ardublock is visual programming software we are going to use for it.

Instead of writing code in a programming language, we prefer drag and drop the blocks.



Mavboard Installation

Steps to be followed

Step 1:

add library by opening arduino ide going Sketch/include Library/add zip library

Step 2: Windows User copy paste "tools" Folder into your
C:Users\User_name/Documents/Arduino/
Folder

Linux User: copy paste "tools" Folder into
your /home/User_name/Arduino/ Folder

Arduino Installation

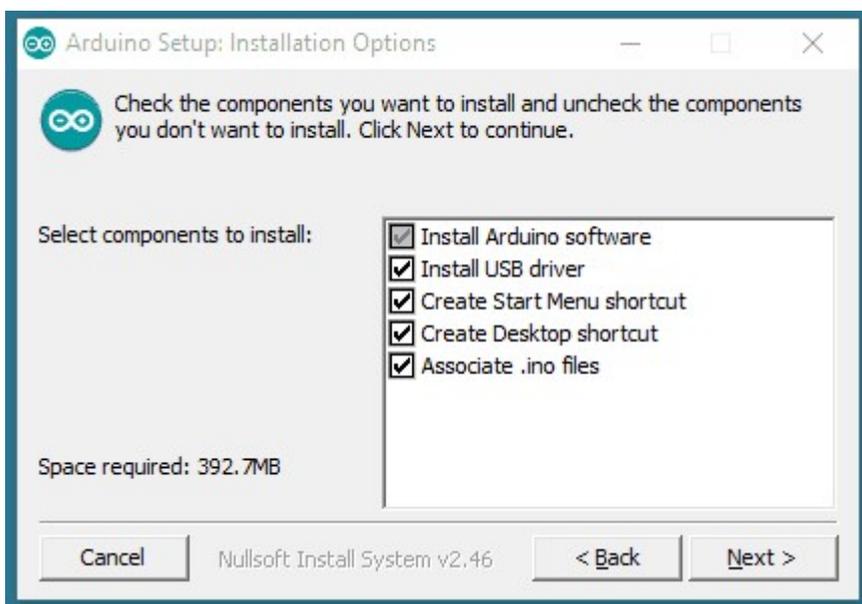
This document explains how to install the Arduino Software (IDE) on Windows machines.

Download the Arduino Software (IDE)

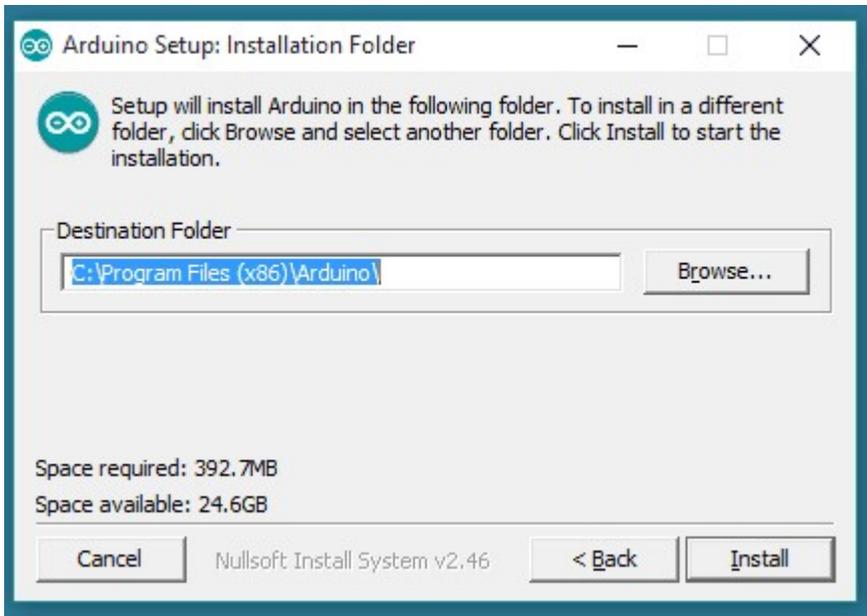
Get the latest version from the [download page](#). You can choose between the Installer (.exe) and the Zip packages. We suggest you use the first one that installs directly everything you need to use the Arduino Software (IDE), including the drivers. With the Zip package you need to install the drivers manually. The Zip file is also useful if you want to create a [portable installation](#).

When the download finishes, proceed with the installation and please allow the driver

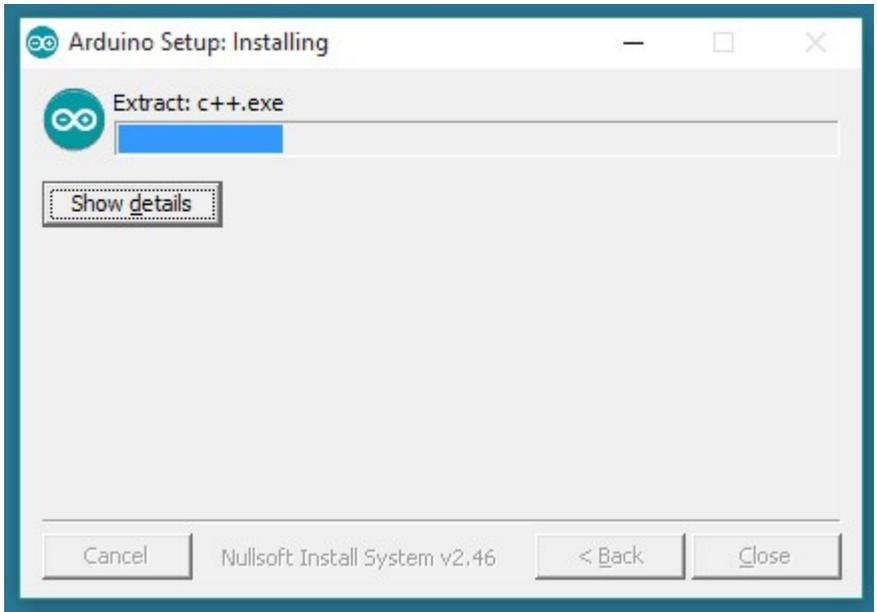
installation process when you get a warning from the operating system.



Choose the components to install.



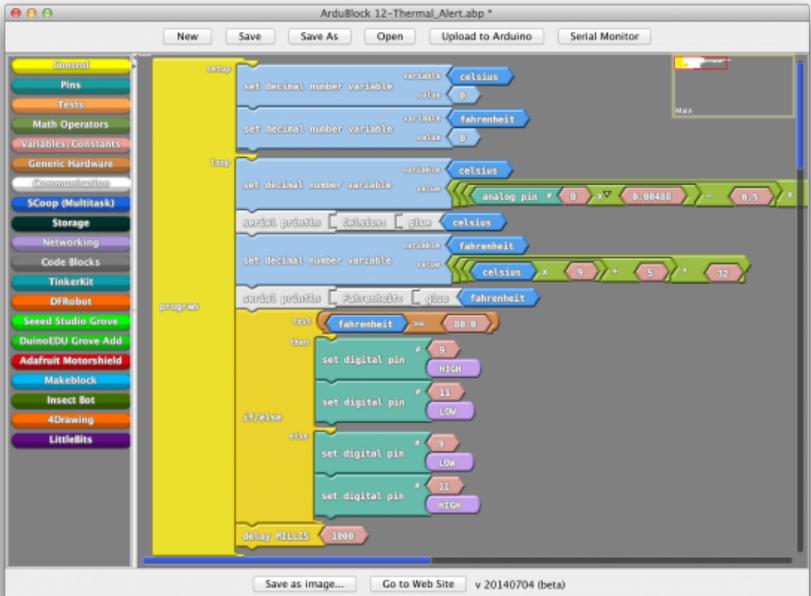
Choose the installation directory.



The process will extract and install all the required files to execute properly the Arduino Software (IDE)

Ardublock Installation

ArduBlock is a programming interface designed to make programming with Arduino easier. Instead of writing code, ArduBlock allows you to visually program with blocks similar to Scratch.



ArduBlock is an "add-on" to Arduino. As a result, the Arduino IDE is required. This allow ArduBlock to run on any platform (Windows, Mac, or Linux) because Arduino is multi-platform. Additionally, this allow an easy transition between ArduBlock and Arduino if you want to move from visual programming to text programming.

NOTE: As of Arduino 1.6.12, the ArduBlock .jar from their official website no longer works due to a change in the Arduino IDE. However, we've modified the ArduBlock source code and compiled a compatible version.

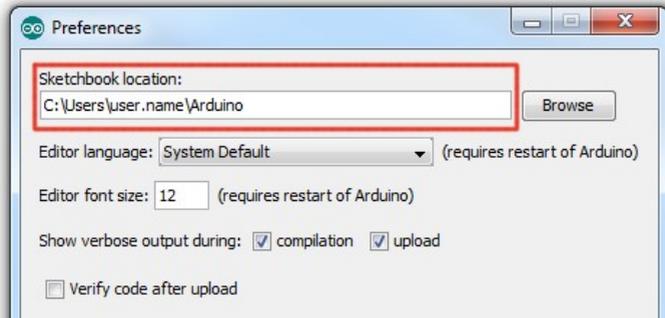
Install ArduBlock:

Download and Install Arduino IDE

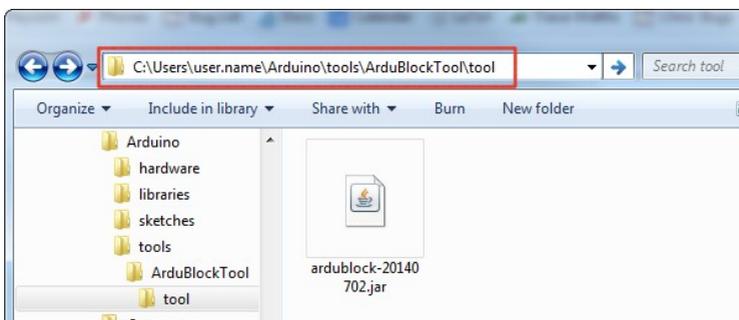
Download ArduBlock (there's a few options)

Download it from our server (updated and compiled to work with Arduino 1.6.12+)

Identify your Arduino Sketchbook location (the folder where your sketch is saved). You can find that by going to File > Preferences in your Arduino IDE.



Create the following folder structure:
[sketchbook location]/tools/ArduBlock/tool



Paste the ArduBlock .jar file you downloaded earlier into the new tool folder you just created.

Start (or restart) Arduino IDE

Select the Board and Serial Port. Always remember to do this because once you are in the ArduBlock interface, it will not prompt you for this information when you click upload.

Open ArduBlock. Run ArduBlock under Tools > ArduBlock.

Unlimited Possibilities

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



Raspberry Pi

Maverickden Stem Robotics Pvt. Ltd.
Centre :Vashi, Thane, Bandra, Versova, Malaysia, Singapore, Indonesia
+91 8850093759/9321216118
E-mail:picoclubindia@gmail.com/
Website: <https://picoclub.com/>