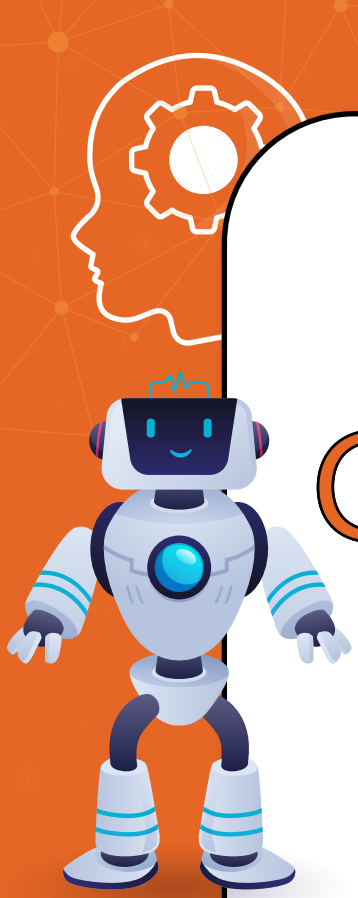
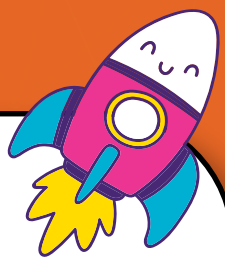
In Line with CBSE & in Tune with
Child's Aspirations
& their Technological Future





Easy Computers & Coding

CLASS 4

Follows
TIY (Teach it Yourself) Approach

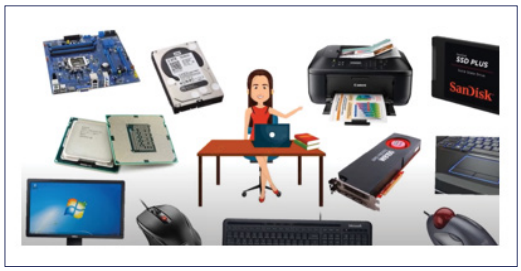
LIST OF CONTENT

Part 1 Computers

Part 2 Coding

Part 3 Popular Technologies & More

HARDWARE & SOFTWARE



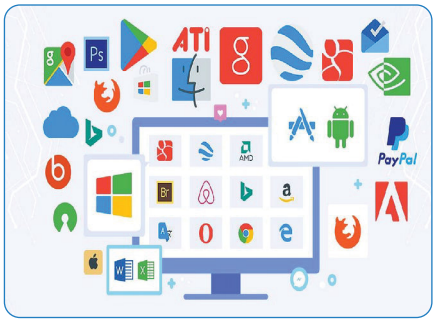
Learning Outcome

By the end of lesson 1, students will:

- Know about Hardware & Software.
- Understand the relation between a Computer, laptop, iPad & a smart phone.
- Recognize key hardware items & software variants.

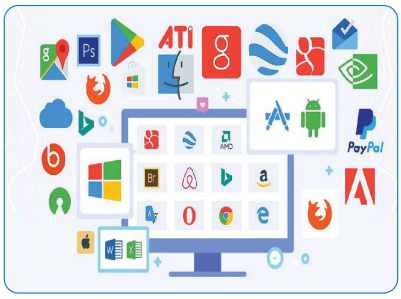
What is Hardware & Software?

Parts of a computer that we **CAN** touch & feel are called **HARDWARE**



Parts of a computer that we **CANNOT** touch & feel are called **SOFTWARE**

The beauty is that **HARDWARE** cannot work without a **SOFTWARE**



& **SOFTWARE** CANNOT work without a **HARDWARE**

As a human I have a **body** which is my **Hardware.**
I have a **brain** that tells me what to do. That is my **Software.**

How do Hardware & Software Work

My Interaction with computers is governed by a cycle of three things called **IPO.** These



Input Devices **Processing** **Output Devices**

- **Input** – Domain of **Input Devices.**
- **Processing** – Domain of **CPU** (Central Processing Unit).
- **Output** – Domain of **Output Devices.**

Input Devices. These are devices that Input Data to a Computer.

When we want a computer to type out **"HELLO WORLD"** we must type in **"HELLO WORLD"** as an input using a **keyboard.** This keyboard is an **Input Device.**

Other input devices:

Mouse | Mic | DVD | Web Cam | Joy stick | Scanner

Can you think & tell me some more Input Devices?

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DIGGING INTO WINDOWS 11

Learning Outcome

By the end of this lesson - children will be aware of:

- How to start windows, & the use of file explorer & context menu.
- Creating, opening, renaming & saving of files & folders.

Let us Start Using Windows 11

1 Switching on the Computer

- When we switch on the computer, Windows OS **starts uploading** from computers hard drive into the temporary memory - RAM automatically.

  This Process of loading data is called **Booting.**
- Once this process is over, the main screen of windows appears on the monitor. This screen is called the **Desktop.** It has the **icons** and the **taskbar.**

2 File Explorer

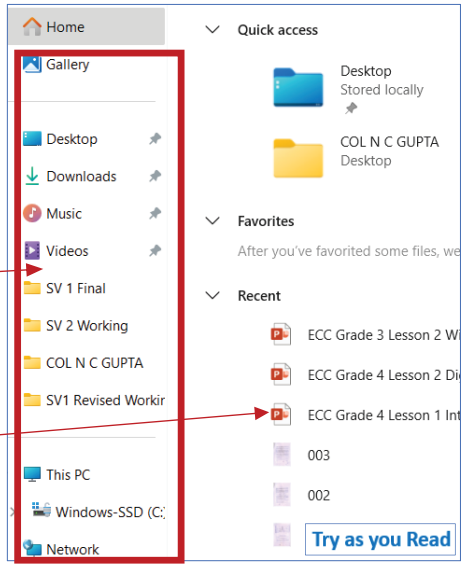
To **open** File explorer, click on

Start Button > All Apps > File Explorer.

A multiple option window opens.

Note: It is a huge list. You will have to scroll to desired option shown alphabetically. Its:

- Left part is a navigation plane. This provides quick access to common folders like desktop & documents (see on top).
- Main window provides quick access to certain files. Shows favorites & Recent files. It makes access to resources easy.



- **Short cut – Window Key + E**

3 Start Button & Start Menu

It is placed on the **Taskbar.** Clicking on it opens the **Start Menu.**

It shows the **icons** & is divided in two parts:

- **Pinned,** containing pinned Icons.
- **Recommended,** containing recommended icons.

Try as you Read

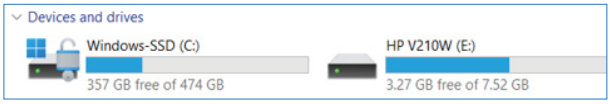
4 Viewing Content of a File

- To view content, **double click** on the file or folder.
- To change the layout of the files & folders, click on **view** at the center of ribbon.

Try as you Read

5 Using "This PC" Option

- This option can be accessed from two places:
  - Directly from the desktop.
  - Left plane of File explorer.
- It gives access to folders & files stored on the computer.



Context Menu

It is a **pop-up menu** accessed with **right** click of the mouse.

It is also called **Short-cut Menu.**

Shift + F 10 is the **short cut key** for opening context menu.

It has two use options:

- Right click on blank space of desktop.
- Right click on a icon.

1 Rt-click on an Icon

- If you rt click an icon, a context menu related to that icon appears.
- Context menu are dependent on the actions associated with that icon.

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FORMATTING TOOLS OF MS WORD

Learning Outcome

By the end of this lesson - children will know how to:

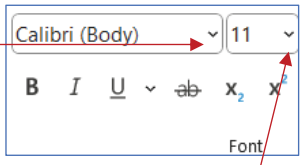
- Format fonts & font effects.
- Format paragraphs.
- Apply borders to paragraphs & pages.

Formatting of Font

Formatting is all about adding visual touches to a document to make it easier to read, & look more appealing.

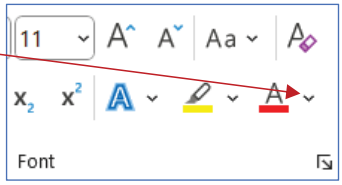
It addresses things like margins, spacing, font selection, font size, margins & alignments, that help improve the look & feel of the document.

1 Deciding/Changing Font Type & Size



- **Default type** is Calibri(body). For other fonts, click. A dropdown containing dozens of fonts appears. Click on desired font. It gets added.
- **If you want to change** the font type of a word or a part of the text, select the text & repeat the above process. Font shall change.
- **Default size is 11.** Procedure to change is similar & dropdown used is.

2 Deciding/Changing Font Color.



- **Default color** is Black. For any other color, click. A dropdown containing the color pallet appears.

Click on desired Color. It gets added.

- **To make changes,** select text that needs color change

& then select color. Color of even one character in the text can be changed.

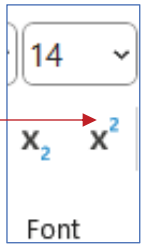
Go over all options in the dropdown.

3 Applying Superscript or Subscript to the Font.

Superscripts are **characters set above normal line** of type (e.g., in 2^{nd}).

Subscripts are **characters set below** (e.g., in C_{vex}).

Used in charts, footnotes or for chemical & physical formulas.



To make superscript, Type (say) R2. Select 2. Click on:

Shortcuts:

- To Apply/remove Subscript effect – press **Ctr + =.**
- To Apply/remove Superscript effect – press **Ctr + Shift + =.**

Formatting of Font Effects

Text Effects modify fonts to make them more engaging. They **change the look** of the typeface, & add emphasis to the message. **This is an example.**

1 Applying Bold, Italics & Underline

This is done by these three icons in font selection.

Select the **text to be changed,** select the **effect.** It is done.

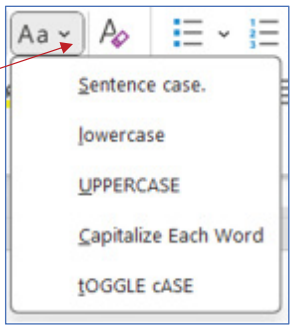
B makes it bold. **I** slants it to the right & **U** underlines it.

Style of line to be used for underlining can be selected in its dropdown.

2 Changing Case of Text

Case that humans use to write is **Sentence case.**

If after writing we want to change the case one option is to write it again. Alternately select the text to be changed, click on Change Case dropdown. Select the new case, & it is done.



- Case can be selected at the **start** of a document also.
- Options shown in the dropdown are self explanatory.
- **For upper case,** we can use the **CapsLk** key on keyboard.

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STYLING TOOLS OF MS WORD

Learning Outcome

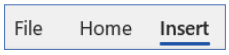
By the end of this lesson - Children will learn the use of styling tools. They will understand procedures related to inserting objects in a word document. In particular they will be able to:

- Add Pages, Text boxes, Shapes & Pictures.
- Work with WordArt, SmartArt & ClipArt Icons.

Insertion in MS Word

Entering of text in a word document is done using options on the home page. **Styling** to make the document more presentable is done by **Insertion Tools**

Insertions or Adding is done using **Insert** tab in the ribbon.



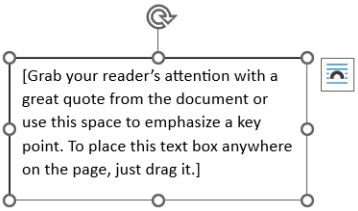
Clicking Insert displays **Nine Groups** of insertions. These include pages, text , tables, illustrations, videos, links, comments, headers, footers & symbols to make a simple document a great document.

Inserting Pages, Text & Shapes

1 Fixing Position of Text box on Page

Text box exists in Insert tab (See below)

This icon appears on the right side of text box →



Clicking on this gives option to **Anchor** at fixed position or **Move with text.**

This anchoring/move can be done with **Text wrap** options.

2 Adding Text Box in a Document

Text box in a document  is a **Placeholder** to add text in.
It exists in Insert tab.

Text box can be placed **anywhere** in the document.
Clicking on it, gives a dropdown with two options:

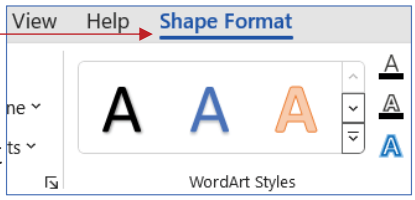
Option 1. **Draw text box.** To draw, click this option. Cursor changes **to Plus** +. Move to
required place on document & draw a square or rectangular box.

Option 2. Built-in box.
Gives 32 useful box options.
A sample box option is:

See all Options & Try Them.

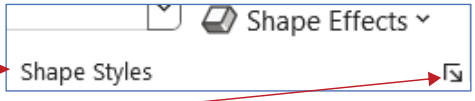
Note: While the **cursor is inside** the textbox

Shape Format tab appears on the ribbon.
This tab is in blue while others are black. This is because it is temporary. It will disappear if you take cursor outside it. This gives access to format the box with all the goodies of word.

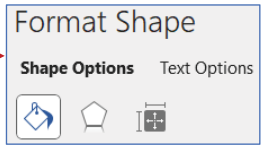


3 Change Text Box Style

- Select **text box.** In **Shape Styles** group in tab bar, click on **More** dropdown arrow.

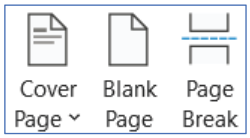


Format Shape options appear along right edge.
Select desired option.
Once done, click outside the box.



4 Adding Page in a Document

To add a page, go to **Page** group, under **Insert** tab. Its 3 options are:



- **Cover Page.** Clicking on it gives built-in options. Select the style you like.

- **Blank Page**. This opens a new page. It can be opened anywhere in your multipage document.
- **Page Break.** This end you page here, & takes you to a new blank page to continue.

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INTRODUCTION TO POWER POINT

Learning Outcome

By the end of this lesson children will be comfortable with:

- Layout of power point screen.
- Making of a presentation with text only.
- Making a presentation with text & images.

What is a Presentation

Presentation is the process of communicating a **topic** to an audience

Presentation Software allows you to create an electronic **slide show** containing text, images, clipart, charts, audio, animation, video & links.

What is Power point

Power Point is a presentation software of Microsoft

Slide is a page containing all the goodies for communicating the topic.

A **presentation** consists of multiple slides.

Opening Power Point 2019

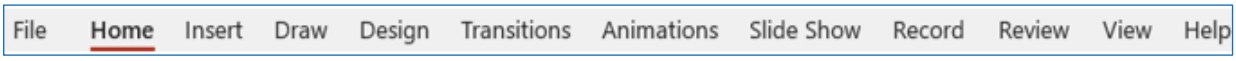
- Process of opening power point is same as word – **Windows 11 > Start button > Power point > Blank presentation.**
- Default name is **Presentation 1.** Give it a new name.

Try as you Read

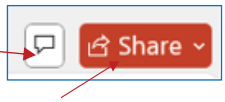
Key areas of the **Opening Screen** are:

1 Title Bar. This sits at the **very top** & has the title of the presentation **(ppt).** On its left is the **Quick Access Toolbar.** On its right are the three icons for **Search, Minimizing, Maximizing & Closing.**

2 Ribbon. This sits **below the title bar.** It has tabs for **13** different groups.



It also has a Comment box. This is a place where person reviewing the ppt can leave a comment for the author. **Share** will allow you to share the ppt with others **via the cloud.**



3 Tabs Bar. This sits below the **ribbon.** Default tabs are for Home group.

Is it not similar to word?

Tabs of other groups will be different. **Select & try.**

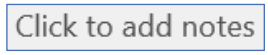
4 Ruler. This sits below the **tab bar.** We have the Horizontal ruler & the Vertical. It helps object placement. Part of it is shown below.

5 Slide Pane. This is blank space below the **ruler.** This is where we **make our ppt.**

6 Slide Navigation Pane. This sits on the left of **slide pane.** It has thumbnail version of all the slides:

- Clicking on any thumb nail brings the slide to slide pane.
- You can now work on it.
- Rearrangement of slides is done here.

7 Notes. Explanatory notes for benefit of readers can be added here.



It sits **at left bottom of slide pane.**

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INTRODUCTION TO PAINT 3D

Learning Outcome

By the end of this lesson - children will Know:

- The function of all the terms & icons used including their location on the screen.
- Drawing of simple lines & saving the projects.
- Drawing of 2D shapes.
- Introduction to 3D shapes.

Paint 3 D

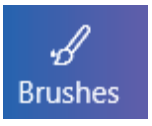
Paint 3D is an advancement of classic Paint, with art tools for your 2D canvas or for making 3D objects

It lets you insert stickers, textures & shapes

You can make 3D stickers from image files. 2 D objects can be converted into 3D objects.

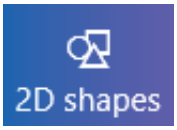
Basic Tools & their Functions

To make learning easy, we shall start by making **you aware of the vocabulary** used:



We mimic real life writing pens & painting brushes. We can be used on both 2D & 3D surfaces. Use our **Rotation handle** to turn 3D objects while painting.

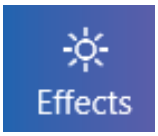
We are used to draw on both 2D & 3D surfaces. Use our **Stamp tool** to make a copy & then stamp it at multiple places in your canvas.



We contain basic 3D models & objects. Use our **Doodles** to draw tubular, round & sharp-edge shapes.

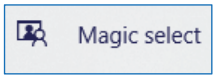
We are 2D image. We wrap around 3D models. Image could be any including your own. Use us as **texture stickers** to wrap images around 3D objects

We add words. Our 2D version will **anchor** the text to your canvas, while 3D will **allow you to move** it around the canvas & also rotate it



We create unique moods like mysterious nights. Use us to change the **environment & lighting** in 3D scenes on your canvas.

We **pop out** a part of the image to be removed from a background onto another layer, **& intelligently auto-fill** the gap. It happens magically & thus its name.



We allow you to move around & **see your content from any angle.** We also allow youto **zoom in or out** of the canvas.

We are a **Digital** Canvas mimicking a Painters Canvas. Our size can be adjusted by you.

We are a **browsable catalogue** of **free** 3D models. Simply search & import us, & then recolor & customize us.

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CONSOLIDATING PART 1 - COMPUTERS

Recap of Essentials

1 What is Data Capacity, Motherboard, Memory & Storage

Data capacity is defined in multiples of 1000 bytes.

Motherboard is the hub of a computer

Memory is for temporary use of computer & **Storage** permanent.

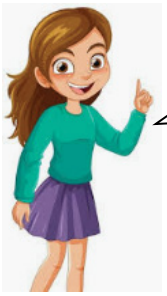
RAM is a volatile memory. Data not saved is lost on closing the PC

ROM writes data on a chip permanently & is available even after a computer is put off. It is non-volatile. It is a storage device. External memories are storages in which data is never lost.

2 Tell us Six Things about Windows 11

- Paint 3D Comes **pre installed** in windows 11.
- Layout is different from word, power point & classic paint, but **working concepts** are similar. Focus on these.
- Ribbon contains **all the tools.** Explore each.
- Below this sit the selection tools, view tools, Active tool plane & the canvas. **Start by drawing lines & curves.**
- Then **start making** 2D shapes & move to 3D.

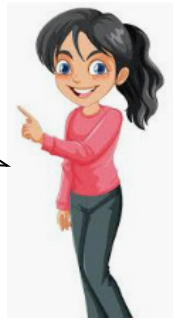
3 Let me tell you about Word Formatting



- **Formatting** is making changes to a document.
- **Selecting** the part to be edited is the first step.
- MS word has **tools & procedures** to do so.
- Margin to the left of the document is **Selection Bar.**
- Key **editing operations** include moving, cutting, copying, pasting, deleting undo & redo
- **Shortcuts** exist for some.

4 Let me tell you about Word Styling

- **Styling** is done using **Insert** tab on ribbon.
- Insert **has nine groups** - pages, text , tables, illustrations, videos, links, comments, headers, footers & symbols.
- These help **Create** beautiful documents.
- Method of use of all groups is similar. **Learn one, try all.**
- **Practice** is all that is required.

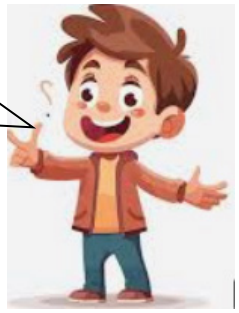


5 Let me tell you about Power Point

- Power Point is office SW to make **presentations.**
- Its **layout & use follows** procedures similar to word.
- Initially **explore** its Title bar, Ribbon plus its 13 groups, layout of task bar of each group & Status bar.
- **Make** a simple presentation.
- **Make more & keep exploring** ribbon's 13 groups.

6 Introduce us to Paint 3D

- Paint 3D Comes **pre installed** in windows 11.
- Layout is different from word, power point & classic paint, but **working concepts** are similar. Focus on these.
- Ribbon contains **all the tools.** Explore each.
- Below this sit the selection tools, view tools, Active tool plane & the canvas. **Start by drawing lines & curves.**
- Then **start making** 2D shapes & move to 3D.



Identify & Tell Me

1 Identify the icons & mention where do they exist.

a).  b).  c).  d).  e). 

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SEQUENCING & DECISION MAKING

Learning Overview

In grade 3 we were introduced to mblock5 & we did a few project

By the end of this lesson - children will:

- Know the role of all the eleven control blocks.
- What are Conditions & Conditional statements.
- How decision making works.
- Making if and if-else statements.

Control Blocks

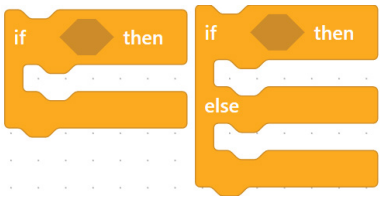
So far, we have done **Straight Line Coding.** In this, a few blocks are stacked one below the other, as per a simple sequence

Coding goes far beyond. It needs to evaluate conditions, take decisions, repeat select lines of code, control clones & more.

In Scratch, these operations are carried out by **Control Blocks**

Types of Control Blocks

Depending on action they perform, Control Blocks are divided in to five categories:

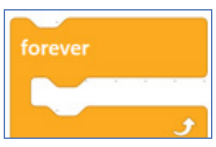


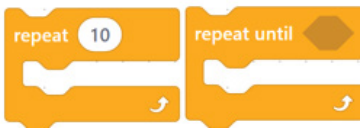
1 Decision Makers. We are two of them. We do two things:

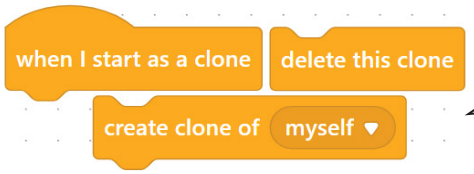
- **Evaluate Conditions** (if hungry).
- **Take Decisions** based on the result of evaluation (then eat lunch).

2 Repeaters or Loopers. We are three of them. We **Repeat,** or **Loop** a block of code for:

- Specified number of times.
- Until a condition hold good Forever







3 Clone Controllers. We are three of them. We **Control Operations** of a Clone of a Sprite

4 Code Pausers. We are two of them.
We **Pause a Code** for:

- Specified duration.
- Until specified condition fails.

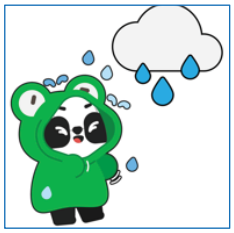
5 Code Stoppers. I am the only one. I stop the further running of the code. Have a look at my dropdown.

Conditions & Conditionals

1 Conditions

Let us take an example. Mr Panda wants to go to the market.

- He opens the door to check the weather.
- If it is raining, he will take the raincoat.
- If not, he will go without it.



Thus, word **"Raining"** Becomes a **Condition.**

2 Conditional Statements

These question the "Existence of a **Condition"** – **Is It Raining?**

They help **Computers Take Decisions** out of that happening.

- If **Conditional Statement is True,** then computer **Executes the Action** specified for that statement & Mr Panda goes out with a raincoat.

- If **it is False,** then the computer **Skips or Ignores it** & Mr Panda goes without a raincoat.

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LOOPS

Learning Overview

By the end of this lesson - children will know:

- What is iteration?
- What are loops & why are they required.
- How to write code lines using different types of loops.

Loops

In coding, loop is a **'Sequence of instructions'** that is:

- Continually **monitored & repeated.**
- Until a specified **condition** is reached.

This condition triggers its **exit** from the loop, to **execute the outcome** of the condition

Working of a Loop

World of automation is full of examples. Say we want to automate our AC.

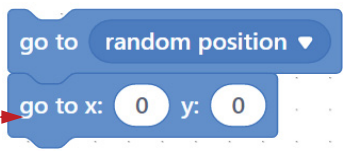
There could be many ways of doing so. **Coding offers the simplest:**

- Say our story is - **"If room temp goes above 27 degree, switch on the AC".** Once written, this code will be uploaded in the brain of the AC.
- Now:
  - A **temp sensor** in the AC will keep on **checking the condition** (If temp > 27) to be true or false. This is called **ITERATION.**
  - Moment the condition becomes True (temp is > 27), iteration or checking of the loop will stop, & the code will **Exit the Loop.**
  - It will proceed to **execute** the instruction we have specified in the next line of the sequence (switch on the AC).

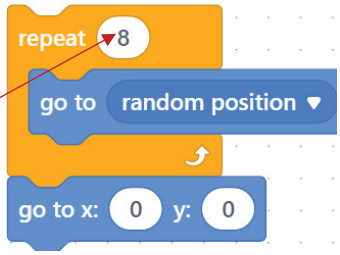
Coding is all about understanding this Simple Logic.

1 For Loop

Let us take the same example of **Flying Panda.** Say our project involves Mr Panda going to a random location & then returning back its code will be simple.



If it has to go to a random position twice, it will still be simple. Line 1 will be repeated twice. But if it has to go eight times, then line 1 will be repeated eight times. **This makes the code long.**



- A better solution is to **put line I in a loop,** & **specify number of times** it must repeat itself.
- Since number of times, **For** which, it must repeat itself is defined, it is called the **For Loop.**

Put the trigger & try the code. Play with the sprite & number of repeats.

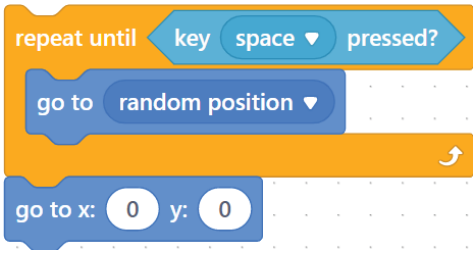
2 While Loop

This repeats **While a condition is true**, & **exits** moment the condition becomes **false.** Let us take the same Flying Panda example.

In this the condition is **"repeat until Space Key Pressed".**

It is placed at the **top** of the loop (line 1).

Thus, it will keep repeating itself until space key is pressed (While condition holds good). Moment space is pressed (condition becomes false), it exits the loop to execute the line below the loop.



It is also called a **Conditional Loop.**

3 Forever Loop

In case the above was put in a forever block. It would repeat the code forever.

In programming this is called an **Infinite Loop.**

Note: Since this is going to repeat itself for ever, it will never exit to execute a line below it. Thus, they are made as a **cap block** with no provision to stack a block below it.

Consolidation Project

Boy Catching Balloon

Story Line: "A boy wants to catch a balloon but it is not easy. How will you depict this in code?

Coding is done in parts. For this story, we have three parts:

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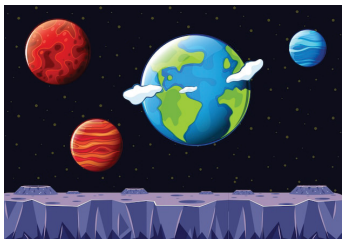
ANIMATION



Learning Overview

By the end of this lesson - children will know:

- What is animation & animation frame.
- 2D animation sequence.
- Importing an animation Collage.
- Making a basic animation project.

Animation

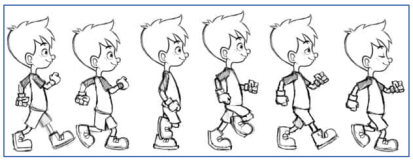
Animation is simulation of Movement & Activities, created by a series of static images, placed in a sequence

Before the brain finishes seeing the **First Image of the sequence,** it starts seeing the second, & so on.

This **blends** these **static images** into a **moving image** called **Animation or Animated Movies.**

In Animation, these static images are called **Animation Frames.**

Since image retention time of the brain is around 1/10 of a sec, **seeing six frames per sec,** gives the **effect of motion.**



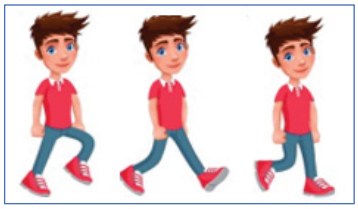
I am a typical **animation Sequence** of six frames.

I am **the traditional pains taking Method** of making such animation frames.

I am the **new instant method** called **CGI (computer generated imagery).**

2D Animation

I am a 2D animation sequence. Individually we are called **Costumes.** We are added as **Sprites** to **My Sprites library.** We have to be **individually coded** & in the same sequence.

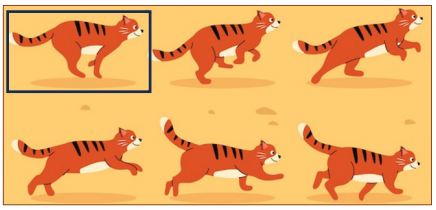


Freepix, Colour box Shutter Stock & More

You can **Draw** the animation frames yourself or **Downloaded** from sites like ours.

Animation Collage

I am an **Animation Collage** from one web site. My first frame is a **Sprite.** Others are **Costumes** We have Names from Cat 1 to Cat 10. This helps us **being coded separately.** To start, try a fee download version.



Animation Project – Agile Cat

The story line for this project is:

There is an agile cat in a jungle. She is running around & enjoying herself. A photographer is impressed by her jumps. He clicks one motion image as a clip of one of her jump.

Can you make this photo clip of her jumps through code?

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SCRATCH CAN BE FUN

Text to Speech Technology

1 Text-to-Speech (TTS)

It is a technology that takes text on a digital device as an input, & converts it into audible speech called audio, as an output. It is also called **'Read Aloud'** Technology.

When sounds come out of someone's mouth to create words, it makes a series of vibrations. Part of AI, TTS works by picking up on these vibrations & translating them into a digital language through a device called A to D Converter. Till recently, these converters were **Hardware Devices**. Thanks to coding, today they are **Software Apps.**

2 Implications to a Young Mind

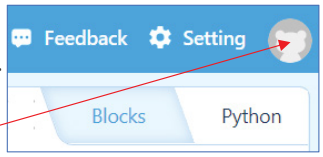
Implications of above capability of Code, to convert bulky hardware devices to simple software apps is that tomorrow, a traditional color printer that occupies a large space in your office, could be replaced by a printing app controlling a small color pallet.

Learning coding early in life will open a child's thinking buds to such **creative possibilities.**

Writing a Simple TTS Code

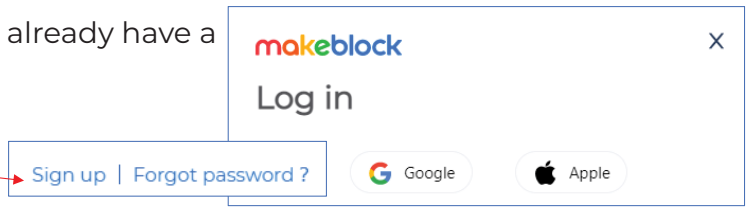
To write a TTS code:

- Open mBlock 5. Select sprites. The opening screen appears.
- Connect to the internet.
- To log in, click on log in icon at top right of the screen.
- Log in screen appears.

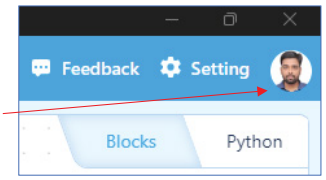


The screen gives two options:

- **Option 1.** Log in if you already have a Gmail account.
- **Option 2.** Sign up to create an account.

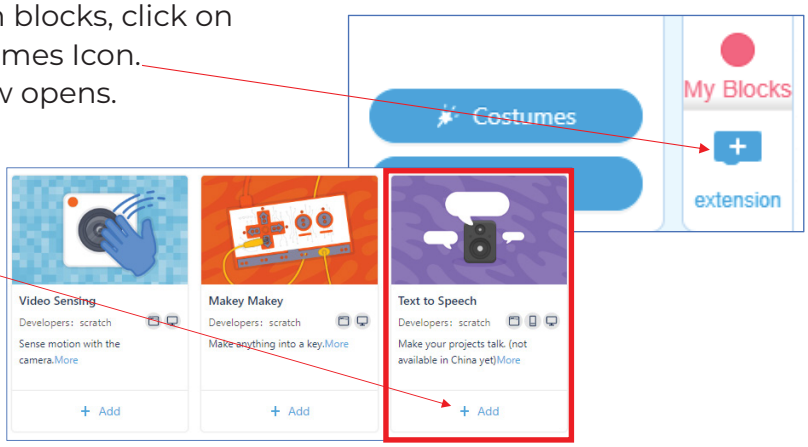


Once sign is complete, top right of the screen shows this.

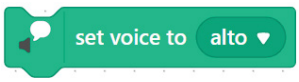


To select Text to Speech blocks, click on extension next to Costumes Icon. Block extension window opens.

In this, select the TTS extension by clicking on Add.

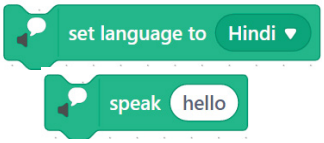


TTS block has three block statements:



- First has a dropdown in which

Alto is female voice. Tenor is male voice. Squeak is variant of female voice. Giant is variant of male.

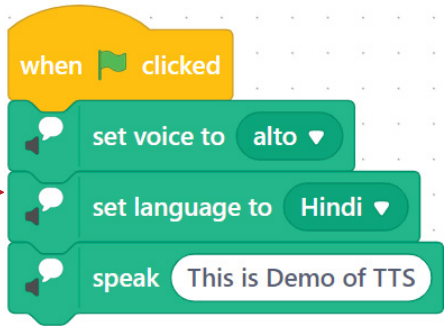


- Second sets the accent.

Its dropdown has options. Say we select Hindi accent.

- Third is for entering the text.

Typical code of the converter is:



- Now run the code.
- You will hear the entered text in an Indian accent.
- Change the parameters & see the result.

An **advance interactive version of TTS** will be learnt in **grade 5.**

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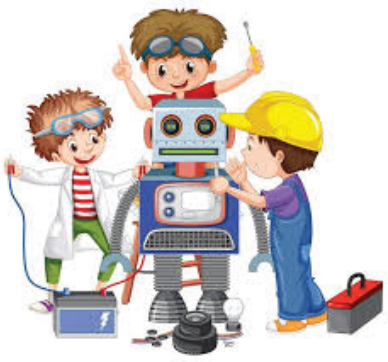
DAY OUT WITH MBOT & CODEY



Learning Review

By the end of this lesson – children will have a reasonable understanding of:

- Coding baisc movements of two different mobile robots.
- Integration of sound & light with these movements.
- Role of sensors in execution of these movements.
- Basic understanding of IR sensor.
- Introduction to an AI based Color Recognition app.

Coding Devices

Coding Images or sprites are good for applications like animation, making games etc.

In Real Life we will be coding devices & robots using sensors

Let us have another **Day Out** with two of our robot friends – mBot & Codey Rocky

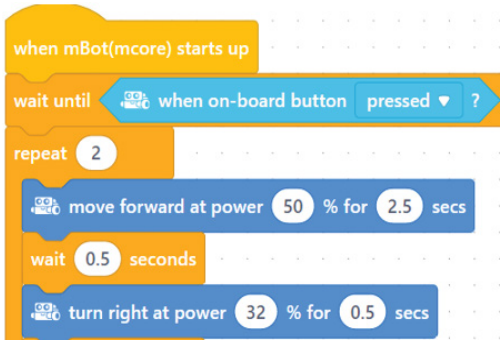
If you don't have us, upload us as sprites in My Sprite Library. To learn how to write the code, use us as sprites.

1 mBot Moves in a Rectangular Path

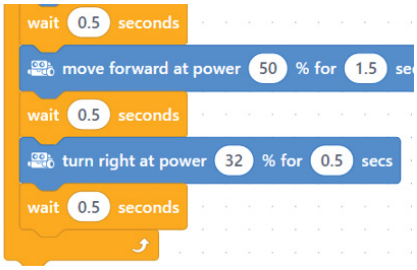
In a rectangle opposite sides are equal, two are bigger & two smaller, & corners are 90 degree.

mBot **Executes** this movement in three parts:

- In part 1, it moves forward with 50% power for 2.5 secs, then turns right with 32% power for 0.5 sec. This completes the longer side.



- In part 2, it moves for 1.5 secs with 50% power and turns right with 32% power for 0.5 sec. This completes the smaller side.
- It now needs to repeat these two moves once again to complete a rectangle. This is done by putting the above code lines in a repeat loop & setting the number to 2.



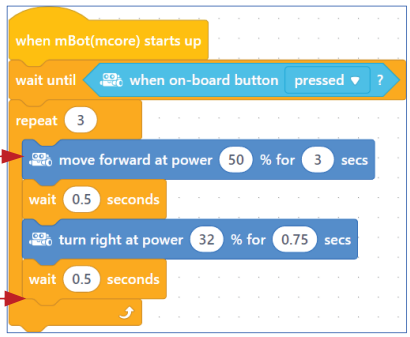
This is the **Logic** followed to mimic different geometric shapes.

2 mBot Moves in a Triangular Path

In an mBot the degree of turn at the end of the move has to be controlled by using its power for a specific time required to execute it. This is done by hit and trail. In the attached code line 3 **controls its forward move.**

Line 4 **controls its angle of turn** as mentioned above.

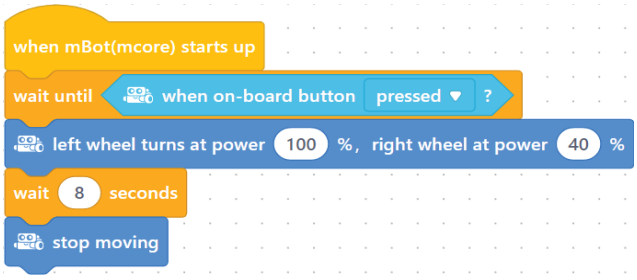
These two actions need to be repeated for each of its three sides. Thus a repeat loop set at 3.



On the other hand, Codey Rocky has a Gyro sensor. **Thus degree of turn can be specified** & need not be hit & try. If an external gyro sensor is attached to mBot, even it can be turned to specified degrees.

3 mBot Moves in a Circular Path

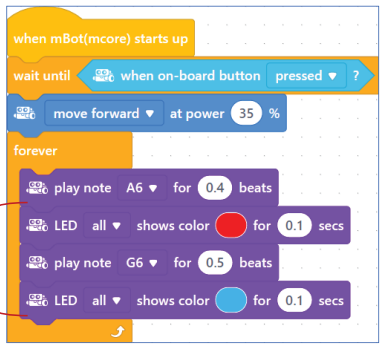
To move mBot in circular path the wheels of mBot should run with different power. It will turn in direction of wheel moving at lower power. Clockwise & anti clockwise move is decided accordingly.



4 mBot Mimics Actions of an Ambulance

An ambulance is identified by the typical musical note it emits and the blinking light that appear over its roof.

Its typical code is shown. In this the musical notes have been specified in lines 4 & 6. The LED light colour in lines 5 & 7.



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CONSOLIDATION PART 2 - SCRATCH

Recap of Essentials

1 Conditions, Statements & Decision Making in Coding

Computers cannot work without **coding.**
They know if A is typed, print A. This is **simple coding.**
Decision making is 1st step in imparting **intelligence** to computers. This is done by adding **Conditions** to code using **Statements. Statements If & Else** help code decide between two options. In Scratch these are done using **Control Blocks.** They form the basis of **Computer aided Automation.**

2 Loops in Coding

1. Codes use **Process of Iteration** to monitor conditions to be evaluated using if & else statements.

2. This iteration must be done till specified condition evaluates to true. A loop helps the code keep iterating these conditions.

3. This gives us **Three types of Loops.**

4. For Loop is used when number of iterations is known.

5. While Loop is used when number nor known.

6. We are have the **Forever Loop.**

3 Animation through Code

1. Animation is sequence of images to show motion.

2. These require images called frames placed in sequence.

3. So far these were made by artists by hand.

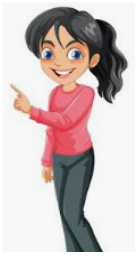
4. Today we use CGI (computer generated imagery) to do so.

5. Code can then be used to convert these into a motion movie or game. Min 6 frames/sec are required .

6. Higher the better.

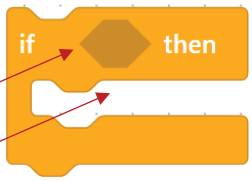
4 Converting Text to Speech using Code

1. Called Read Aloud technology, it is a feature of AI.
2. It converts digital text into audible text.
3. Traditionally it makes use of A to D converters.
4. Today code can do this for us.
5. Learning such technologies early in life can be a game changes for a child's future.



Identify & Tell Me

1 See the attached Block and answer:



(a) Name its block category.
(b) What is this category used for?
(c) What is placed in the hexagon?
(d) What is placed in the white space?
(e) Make a sample code using this & other blocks as required.

2 What do you understand by a process called Iteration.

3 Have a look at the three looping blocks below. In these:

(a) Give their names.
(b) What exactly does each one do.
(c) Under what condition is each of them used.
(d) Make a simple code using the three blocks.

Make for Me

1. Code showing a man saying
" Three Cheers for Team India,
Hip Hip Hurray, Hip Hip Hurray, Hip Hip Hurray, & the people repeating the HIP, HIP Hurray portion without using any loop.
2. Now make the same code using a loop.
3. Which is a better method of coding?

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USING THE INTERNET

Learning Overview

By the end of this lesson – children shall know:

- Important Internet terms.
- Difference between search & browsing.
- Web browsers & search engines
- Accessing web sites & responsibilities.

Understanding Internet Vocabulary

We shall start by making **you aware of the vocabulary** used.
Key elements of Internet, placed in a logical sequence to help understanding are:

The Web

A global network linking documents, pictures & videos stored in computers, & used by peoples in different parts of the world. It is also referred to as the **World Wide Web (WWW)**

Web Site

Collection of files in **multiple pages,** covering a particular theme or subject, and managed by a particular person or organization. A website **resides on servers** connected to the WWW

ISP

Called **Internet Service Provider,** it is the ISP that creates the required **connection** between your computer & web site. This is done over a **wired or wireless media.**

Router

Connection between the computer & the web does not exist all the time. A **router** using **TCP/IP protocol,** creates it as & when required.

Web Browser

It is an **App SW** residing on the computer. It is the **users interface** to reach the content contained in the web site. Chrome, Microsoft Edge, Mozilla Firefox & Opera are examples. They are all similar.

URL

It is a **unique address** given to every web site & its page, required to reach them from a computer. Users enter these URL in the browser as & when required

Web Page

These are **Digital Pages** containing the desired content which could be text, graphics, audios, videos, links & more. Users open, go over download or interact with them using the web browser.

Home Page

It is the **Default Webpage** for visitors arriving to a site. Being the main page, it provide an overview of information & links to other pages.

Web Content

It is any written, audio, or visual element **of use to visitors** to the web site. It can include product details, photos, embedded videos, podcasts, blogs and other information.

Searching & Browsing

These are the most used apps of Internet. **What is the difference?** If you are searching the net, you are looking for something using a **Search Engine.**

Browsing is a broader term. Important is you don't have to be looking for something but consuming its content like in your school site, news site, shopping site etc. using a **Web Browser.**

Web Browsers

1 Purpose of Web Browser

It is a software program **for accessing websites.** When we request for a web page using a URL, the browser:

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DRONES - FLYING PRINCIPLES

Learning Overview

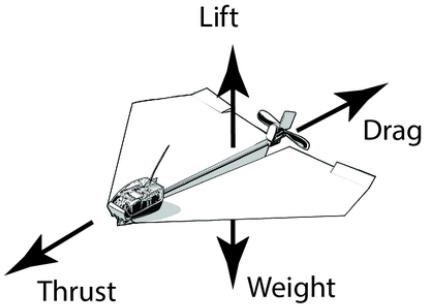
By the end of this lesson – children will have a fair idea of:

- How things fly.
- Clockwise & counter-clockwise working of drone rotors.

How Things Fly

Most of you have flown paper planes, but have you ever wondered **How they Fly?**

We will Tell You How



- When you push a paper airplane forward with your hand, you give it a force known as **Thrust.**
- As it moves forward, air is pushing back on the plane. This is called **Drag.**
- While flying, air moves over & under the wings. This creates a force called **Lift.**
- While earths gravity pulls it down. This is called **Weight.**

Remember:

As long as Thrust & Lift are **greater than** Drag & Weight, it flies

Moment Thrust & Lift are **lesser than** Drag & Weight, it lands.

Now make one paper plane yourself & follow these four forces.

In an Aircraft, this forward move or Thrust is given by the Engines

In a Helicopter it is given by its Rotors.

But how do they LIFT OFF the ground?

To understand this, do a small experiment. Next time you go by car, carefully take your palm out. Keep it parallel to the ground with fingers pointing forward. Give a slight upward move to the fingers. The airflow below the palm is now greater than the flow above it. The result is that lift becomes greater than weight, lifting the entire palm up.

Remember, while flying your paper plane you lifted its nose upwards while pushing it forward. This made the Thrust & Lift greater than Drag & Weight and it flew off.

Working of Rotors

- A drone has one **Head** & four, six or eight **Rotors.** The rotors are connected to the head by **Arms** as shown here.
- Flight is balanced & controlled by allowing two propellers to rotate clockwise, & two counter-clockwise.

See QR.

- This way, the four propellers can together generate **lift & thrust.**

The question remains How?

To get its answer, take your mind to your **Boating Trip.**

- As long as the paddles are moved with same force on both sides, the boat moves forward.
- To turn, one **paddle must move faster** than the other.

Now consider:

- The **boat as the head of the drone & the paddles as the rotors.**
- Its forward move, backward move, turns & hovering can all be controlled by controlling the speed of the rotors.

However, the question still remains. **Why do we move rotors of a drone in clockwise & counter-clockwise directions?**

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MY HOME TINKERING LAB

The Tinkering Trunk

Play is a Child's Greatest Teacher. Hands-on playing, like making & tinkering, are essential for building an inquisitive mind & impart **Problem Solving Skills**

Having set up a space or a lab for tinkering at home, the most important thing is to make a **Tinkering Trunk**

Tinkering box is an old **Box to Save** old, broken, items & scraps of paper, fabric, & other materials.

To keep this trunk full, develop a **Collectors Mindset.** Out on a trip with parents, collect pebbles, twigs & the like. Tinker to convert them into **Usable Items.**

Role of Parents

Tear Things Apart. Breaking down things help understand correlation between **Form & Functionality**

Tinker together. Challenge children with ideas to build using **unusual material** & at **different scales**

Let Visualization & Imagination go wild. Encourage thinking from a marble roll to a mars colony. Help bridge the gap between their **Dreaming & Doing**

Gift Children the Joy of
Gifting their Creations
to grandparents

The Tinkering Trunk

These three projects are just to **Set the Ball in Motion.** Children must think of what to make, apply there mind, & make on their own.

Project 1 - Costar for Morning Tea. My Parents love their morning tea. To make this, I must decide the shape, size & material. I must decide the early morning message to be written on top of each. I must ensure it can be **reused for a long time.**

Project 2 - Costar with Daily Changing Message. My mother would love to get a new message every day. I must figure out a way how I can **slide a message inside and outside** of the costar.

Project 3 - Costar Holder. This is essential & should be our **USP (unique selling proposition)**. I will try and make it so that it can accommodate two, four or six placemats. Naturally, it will be in two pieces that slide into one another to adjust to thickness.

Tinkering with MS Word

MS Word is a Power House of Capabilities.
Let us tinker with two of them.

Project 4 - Smart Art. Refers to graphics available in Word that you can use to create flow charts, process charts, organization charts, & the like. Make a document with four sub heading as below.
Under each sub heading add a SmartArt representing that sub heading graphically:

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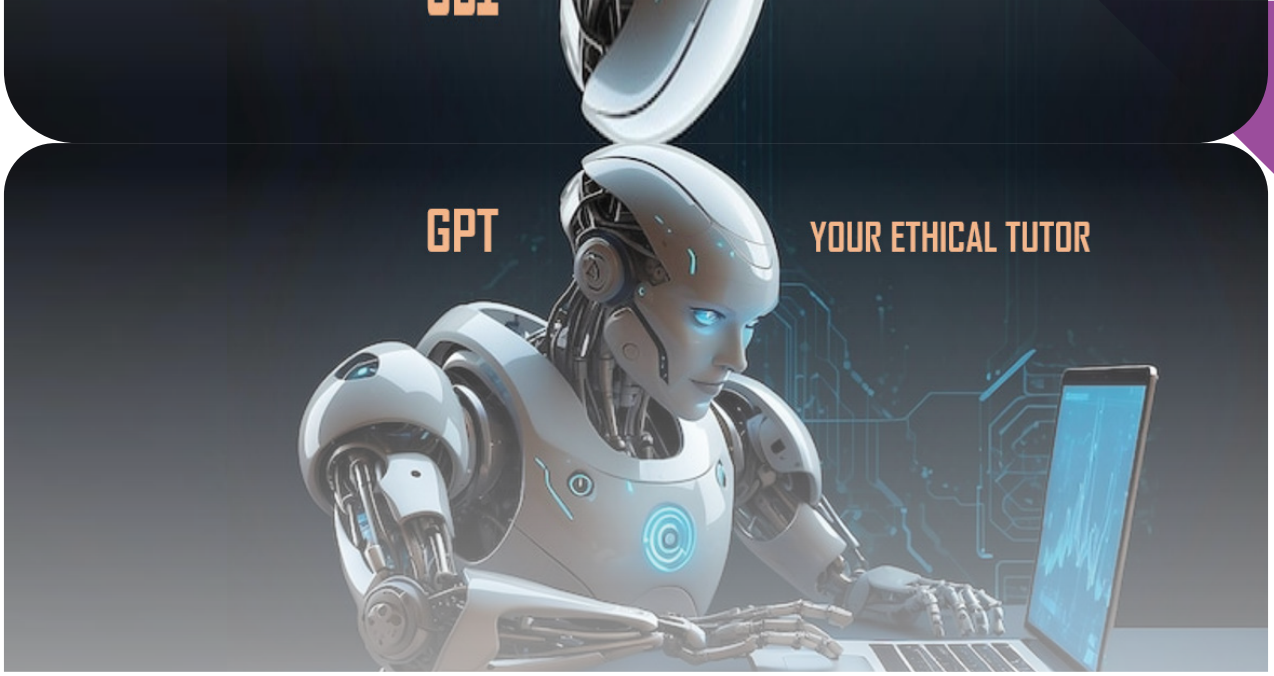

1 They Both Rock

Have you ever **Analyzed your Grandfather?**
He has spent ages Learning.
While learning he has gone over tons of books.
He has spent years teaching. You can ask him questions on any subject. He still helps you learn & do things.

Isn't he Rocking!

Do you know **GPT is like your Grandfather!**
He spends lot of time Learning.
To learn, he has gone over tons of data.
He has access to an even larger data base to keep learning from.
You can ask him questions on any subject.
He can help you learn & do things.

Isn't he also Rocking!

GPT stands for **Generative Pre-trained Transformer.** In this high-sounding word:

- **Generative** is a type of AI, that can create new content and ideas, including conversations, stories, images, videos, and music.
- **Pre-trained** is a learning technique, used by a set of its codes, to train itself using a large amount of data, to perform above tasks.
- **Transformer** is a network architecture, that uses mechanisms to fine tune itself & improve its output capabilities to human levels, and at near instantaneous speeds.

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Small children learn by **Asking Questions.**
They love asking them to Grandparents

Grandparents are a **Reservoir of Knowledge.**

As time passes, children get sucked into the education system, & loose out on asking questions.

Asking questions is the **Natural Learning Mode** of humans.

Search Engines Offer this Mode.

Search Engines Work in Three Steps

Step 1 – Crawling	Step 2 – Indexing	Step 3 – Ranking
		
Like grandma searching her mind, Google Bot Spider, searches the web by crawling through its pages.	Like grandma, the Bot puts together options that it feels will meet your curiosity to learn.	Like grandma, answers appear in that order on the search engine result page (SERP).

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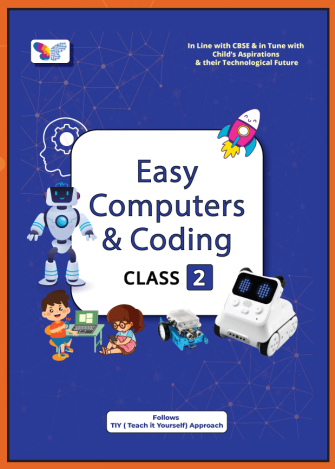
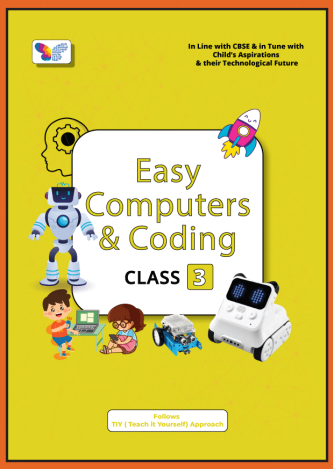
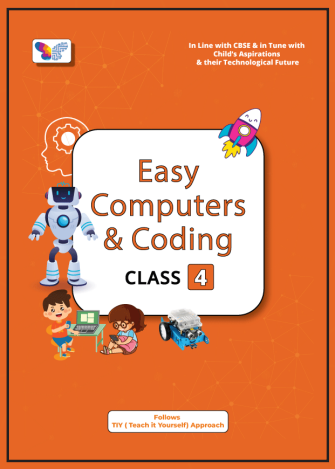
OUR BOOK TITLES

Level-1







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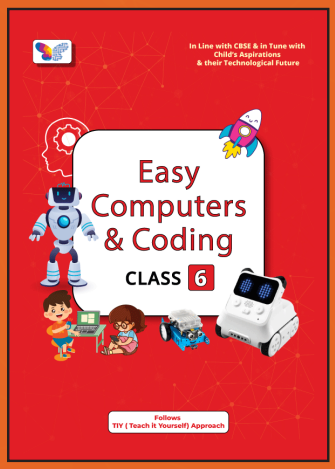

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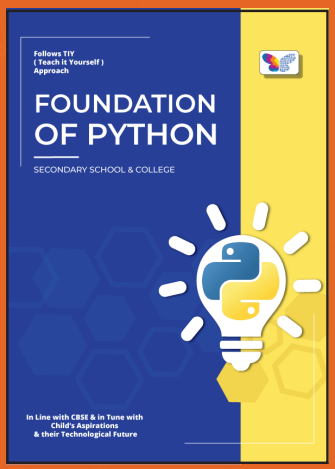

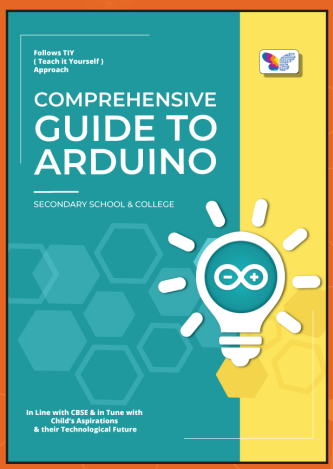

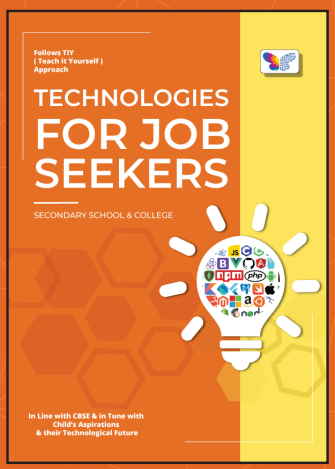

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