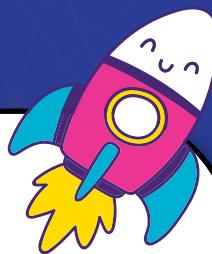




In Line with CBSE & in Tune with
Child's Aspirations
& their Technological Future



Easy Computers & Coding

CLASS **2**



Follows
TIY (Teach it Yourself) Approach

LIST OF CONTENT



Part 1 Computers

Lesson	Title	Page No
	Machines & Computers	
1.	Recap of grade 1	
2.	Understanding Hardware & Software	
	Computer Basics	
3.	IPO Cycle in Computers	
4.	A peep into Storage Devices	
5.	A peep into Processing	
	Multimedia	
6.	Making Lines & Curves with Paint	
7.	Making Shapes with Paint	
8.	Paint Tools	



Part 2 Coding

	Title	Page No
	Scratch Jr	
9.	Understanding Blocks	
10.	Let us Code	
11.	Scratch Jr Challenge	



Part 3 Popular Technologies & More

	Title	Page No
12.	Artificial Intelligence	
13.	Technologies Awareness Chatbot & Wireless	
	Guide to learning Technology	
	A peep into Robotics	



How to Benefit from the Series

Learning is a **Slow Process**. You can **Never Remember** everything, but you can always **Refer** to it. We have made the book very graphic with easy highlighting. To enable you to take the maximum benefit from the series, we recommend:

- Read it like a **Story Book**, not just once, but many times.
- Always remain a lesson or two **Ahead of the Class**.
Its Teach it Yourself approach will help.
- Make **Annotations** on the margins.
- Practice the **Projects & Quiz**.
- Preserve the books for at least **Two Grades Ahead**.



You never know when referring to them will be required.

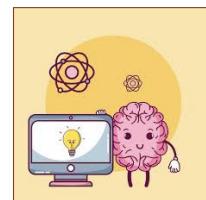


Synopsis of Grade 1 Learning

In lesson 1 we learnt about hand tools & machines. Difference between simple machines, complex machines & automatic machines. We also learnt that a computer is a complex machine working on electricity.



In lesson 2 we saw that humans & computers are similar & have a brain. Brain of a computer is its CPU. It requires a SW or set of instructions to work. We also learnt about the keyboard mouse & monitor which make up the computer



In lesson 3 we saw the difference between a hand operated machine and a computer aided machine. We also learnt about the various uses of a computers in our daily life.



Lesson 4 was about connecting, operating & shutting down of a computer. We also learnt about hazards of electricity & precautions we need to take while working with Computers.



In lesson 5 we got a good idea on how to use a mouse and the different types of mouse pointers.



Lesson 6 was devoted to the use of a keyboard.



Lesson 7 was the lesson in which we really got to use a computer.

We started to learn about an application software of windows 11 called MS Paint. We learnt how to draw simple shapes using this application.

In lesson 8 we moved to the second part of the book.

- We started learning how computers help us learn Coding, without which even a computer cannot work.
- We were exposed to the difference between Computer hardware and software.
- Why language that humans & computers understand are different, & why children need to learn them.



In lesson 9, we were given our first taste at coding using an app called Scratch Jr using block based coding language.



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Lesson 2

Understanding Hardware & Software



Era of No Software
& Apps



Learning Outcome

By the end of the lesson children will be:

- Introduced to hardware & software.
- Compare computers with humans.
- Differentiate between System & Application Software.



Humans vs Computers

- Every Child is **Born with a Brain**.

At birth the brain is **Empty**.

- He slowly **Fills** it with knowledge.

He does so by **Co-relation** If I cry, I get attention.

He does so all by **Himself**.



LIKEWISE

- Every Computer is **Made with a Brain**.

When made the brain is **Empty**.

It has **No** knowledge.

- Humans **Load** it with knowledge.

This enables it to work for humans.





Hardware/Software in Computers

In a computer system:

- **Hardware** refers to components you can feel & see. Components that **Store and Run** the written instructions provided by the software.



- **Software** refers to its parts that you cannot see but enables the **User to Interact with the Hardware** to perform & control specific tasks.

In a Computer, the software that controls:

- The **Overall Functioning** of the _____ computer, is called the **System Software**.
- The one that controls the operations of a **Specific Utility** or application that _____ it can perform, is its **Application Software**.



Think & Tell

1 Compare:

- (a) Brain of a human with a computer.
- (b) System software with application software.

2 Fill in the blanks:

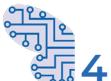
- (a) Hardware refers to components you can.....
- (b)refers to components you cannot see.

3 Select True or False:

- (a) Application software refers to specific apps we can use on a PC.
- (b) Software allows computer users to interact with the computer.
- (c) A computer can be used without a software.

4 Draw for me:

- (a) A simple computer system.
- (b) A simple human brain.



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Learning Outcome

By the end of the lesson children will have an idea of:

- IPO Cycle.
- Input devices.
- Output Devices.



Concept of IPO

In 1964, McGrath proposed an **input-process-outcome (IPO)** framework. While this was for studying team effectiveness, Bill Gates found it to be very applicable in the development of the PC.

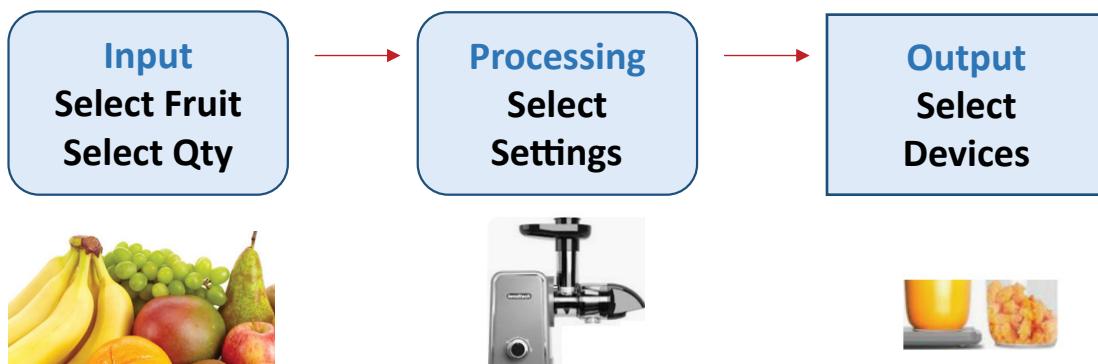
Concept of IPO model breaks a system down into three basic categories:

Inputs, Processes, & Outputs.

Inputs refers to the **Raw Data, Materials, & Instructions**, required by a machine to process it & give an output.



Example:

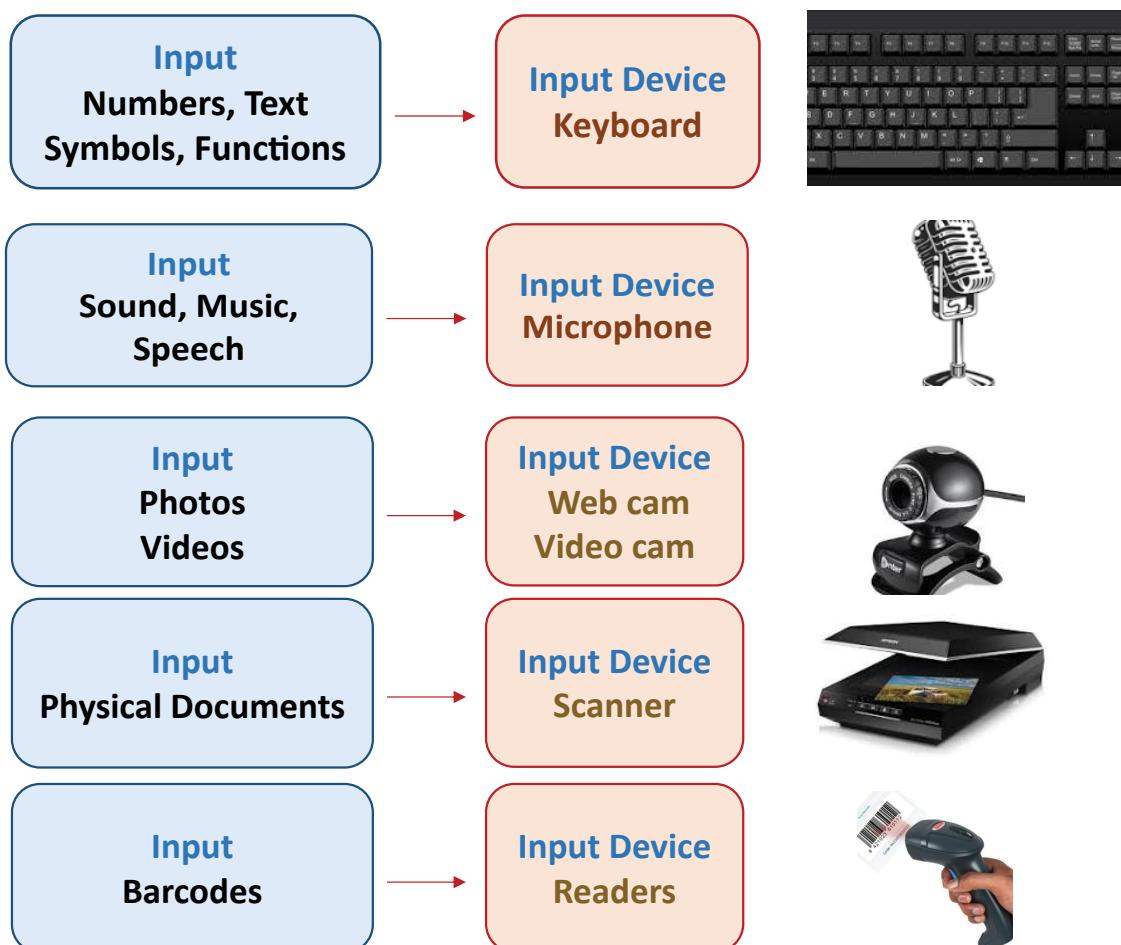


Types of Outputs

A computer can accept many types of inputs.

Different devices provide these inputs.

Some key Inputs & Input Devices are:

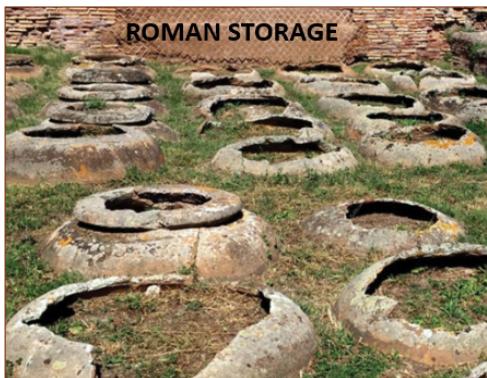


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Lesson 4

A Peep into Storage Devices



The Participants

By the end of the lesson, children will have a reasonable idea of:

- Evolution of storage devices over the last century.
- What are storage device
- Floppy Memory cards, Pen drive & Cloud storage.



What are Storage Devices

In today's Computer world, we have five basic types. These are:

- Floppy disks.
- Optical disks (CDs and DVDs).
- Hard disk drives (HDD).
- Flash drives.
- Solid-state drives (SSD).

Technologically, they are divided into three types:

- **Magnetic** storage devices, such as hard disk drives.
- **Optical** storage devices, such as CD, DVD and Blu-ray discs.
- **Solid** state storage devices, such as SSD & USB memory sticks.



Depending on how frequently they need to be used, these are further divided into two categories:

- **Temporary** or Volatile storage devices. These are in constant use.
- **Permanent** or Non-volatile storage devices. used for saving our works.



Evolution of Storage Devices

1 HDD

- In 1951, IBM invented the first

Hard Disk Drive (HDD). It was a monster.

Its weight was around one ton.

- Its equivalents of today fit in your pocket & weigh a few grams.



2 Floppy Disk

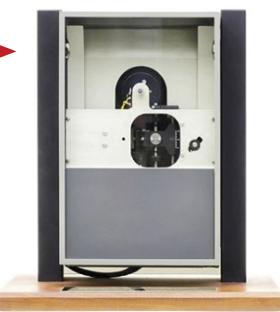
- In 1971, IBM invented the first

Flexible Disk Drive (FDD).

Also called **Floppy Disk Drive:**

- It was designed to load Mainframe Computers.
- Later it was used by PC's as a handy portable

Storage Device.



3 CD ROM

- In 1982 Sony & Philips combined to come out with the **Compact Disk (CD).**



- Designed for music, it required a **CD Player**
- **CD ROM**, its counterpart for computers was released in 1984.



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Lesson 5

A Peep into Processing



Learning Outcome

By the end of the lesson, children will have a clear idea of:

- How processing takes place in the CPU.



Learning Outcome

History of **Data Processing** has three distinct eras:

- Era of **Manual** data processing (prior to eighteenth century).
- Era of **Automatic** data processing (Late nineteenth century).
- Era of **Electronic** data processing (mid twentieth century).

① Era of Manual Data Processing

- Its typical example was **Book Keeping**.

A **Person whose job was** to do calculations manually **was called “Computer”**.

- In India these books were, & are still used & called **“Khata”**.



② Era of Electronic Data Processing (EDP)

- EDP represents a later development. Census Bureau of USA, was again the first to use the newly developed **UNIVAC 1** system for the 1950 census.



3 Era of Automatic Data Processing

The first well recorded example of this was the use of Hollerith's punch card equipment by **US Census Office in 1890**. They were able to complete tabulating census data in 2 to 3 years, compared with 7 to 8 years for the 1880 census.

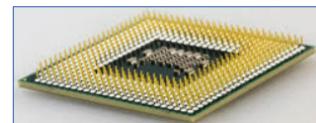


Processing in Computers

In computer processing is done by the **Control Unit (CU)**.

It is the brain of computer's **Central Processing Unit (CPU)**.

It directs & coordinates execution of inputs & instructions.



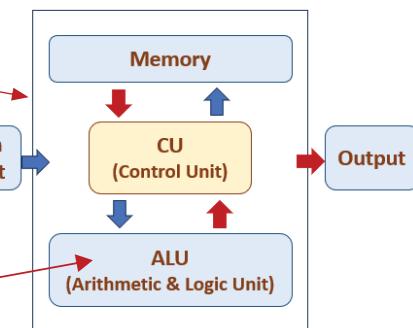
It's often called the **Instruction Sequencer**.

In IPO cycle, **CPU** does the **Processing**.

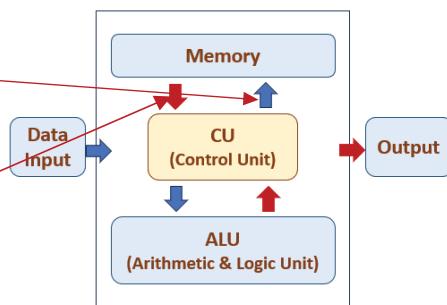
Inside the CPU:

- Input devices give data to CU:
- CU now has two choices:
 - First choice is **To Process it Directly**.

For this, it first sends it to ALU
gets a response, & then gives an output.



◦ Second choice is to **Store the Data**
& use it later. For this data is sent
to the memory.
Now at the time of use
it first retrieves the data from storage
& then goes over the steps mentioned
as first choice above.



Children, this is an **Important Diagram to Remember**. Entire working & coding of a computer is based on this diagram.



Think & Tell

1 Fill in the blanks:

- In eighteenth century a, person doing calculations was called
- In India these accounting books were called.....
- Use of punch cards in US census of 1890 was first example of

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Lesson 6

Making Lines & Curves with Paint



Learning Outcome

By the end of the lesson, children will know:

- How to draw lines & curves in Paint.
- Make abstract paintings using lines & curves.



History of lines and curve

History of Lines & Curves relates to **Geometry** as well as to Arts. Its:

▪ Early sixth century BC records date back to **Euclid - Father of Geometry.**

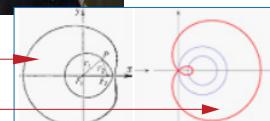


▪ Seventeenth Century is the **Century of Curves**. In 1645

Rene Descartes came



out with "**Ovals of Descartes**".

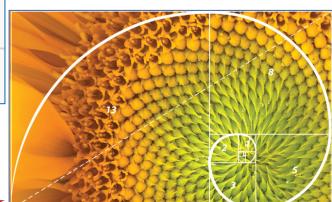


▪ This was followed with

the famous **Cartesian Ovals**

& the existence of

Fibonacci Sequence in **Flower Petals**



of Mother Nature & in **Mathematics**.



- Lucid is also credited with inventing the **Golden Ratio**.

- When you divide a line into two parts

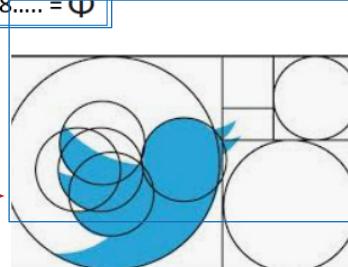
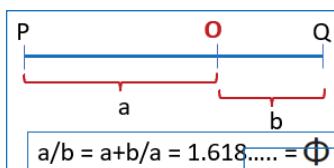
the longer part (a)

divided by the smaller part (b)

is equal to the sum of (a) + (b)

divided by (a),

which is equal to **1.618** which is equal to **Phi**.



- This formula is widely used to create

Shapes, Logos, Layouts, & more.



Recap of Grade 1

In Grade 1, we have been introduced to MS Paint.

We had a brief look at its opening screen.

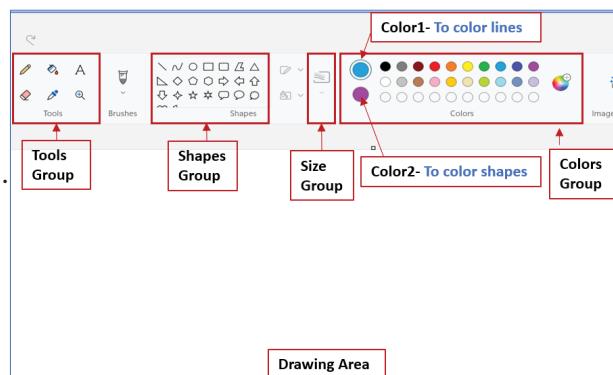
We also learnt:

- How to **Draw** a shape.
- How to **Color** it.
- How to **Save** it.
- How to **Make** a painting & an emoji.



Recap of Paint Window

- This is the opening window.
- It contains the four most used groups & the drawing area.
- It also mentions the two color options.
- **Kindly Remember it.**



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lesson
7

Making Shapes with Paint



Learning Outcome

**By the end of the lesson, children will
be clear of:**

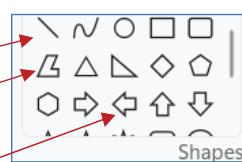
- Drawing shapes as per the pallet.
- Combining these shapes for purpose of art.



In Last Lesson We Saw

The shapes group offers 23 shapes. In this:

- First two are to draw **Lines & Curves**.
- Six help make **Geometric Shapes**.
- Fifteen are **Pre-defined Filled Shapes**.



We have learnt Lines & Curves in the last lesson. In this we shall learn the geometric shapes. We shall start with the most important – Polygon.

- Shapes are a **Key Part** of Mathematics & art.
- In mathematics they are essential to **Astronomy**.
- In Art, shapes have been the center of **Storytelling**.
- Most recent art form stems from **Cubism**

created by **Pablo Picasso** in 1907.



- It makes use of the **Five Basic** shapes – triangles squares, rectangles, circles and ellipses.
- From these are created other more **Complex Shapes** such as polygons or combinations of circles and rectangles.
- Surprisingly, **MS Paint** is suited to this & similar art forms.



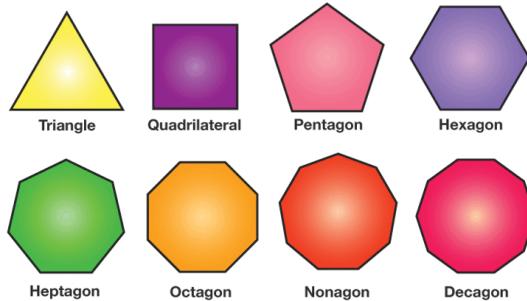
Making Geometric Shapes

1 Polygon

A Polygon is a **Plane Figure**

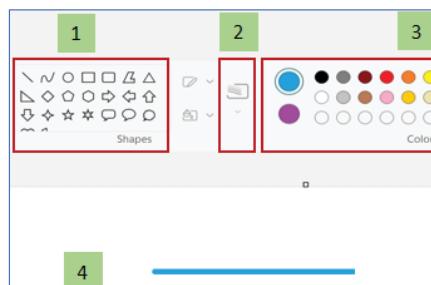
with at least

- Three **straight sides**
 - and corresponding **angles**
- and, typically five or more.



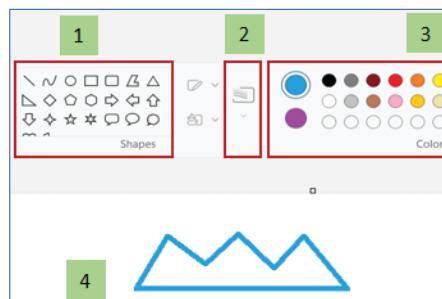
To draw a Polygon:

- (1) Click polygon in shapes pallet.
- (2) Select thickness using size tool.
- (3) Choose color using color 1.
- (4) Drag & draw a straight line as first side of the polygon.



Now click at different points in the drawing area as per the figure you plan to make. While doing this, keep joining the line with previous point.

Double-click to finish. This will join the last to first automatically.



2 Triangle

To draw a Triangle:

- (1) Click triangle in shapes pallet.

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Lesson 8

Paint Tools



Learning Outcome

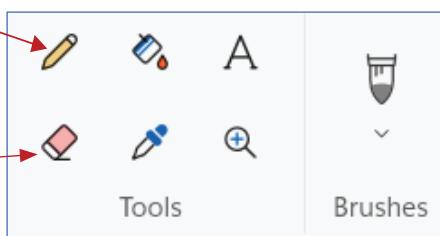
By the end of the lesson, children will know:

- Tools pallet of MS Paint.
- Options for Brushes.
- Using the various tools for drawing & painting.



Understanding Tools Group

- This has six Tools & one Brushes dropdown.
- Left to right & top to bottom, these are:
 - Pencil tool.
 - Fill tool.
 - Text tool.
 - Eraser
 - Color snipper.
 - Zoom.





Using the Tools

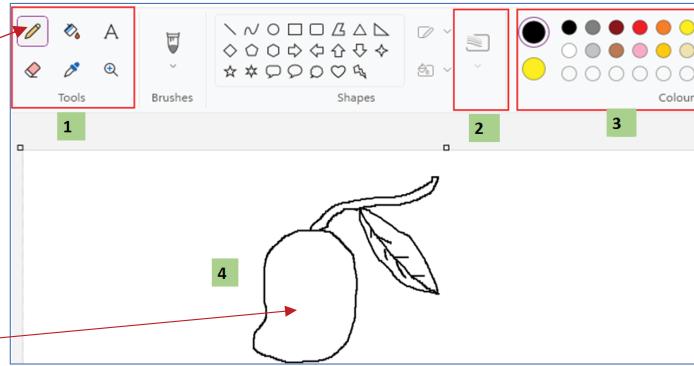
1 Pencil Tool

It is used for **Free Hand**

drawing of figures.

To use:

- 1) Select pencil.
- 2) Select line thickness using size tool.
- 3) Select color using color 1.
- 4) Drag mouse pointer to drawing area to draw.



Close the drawn figure.

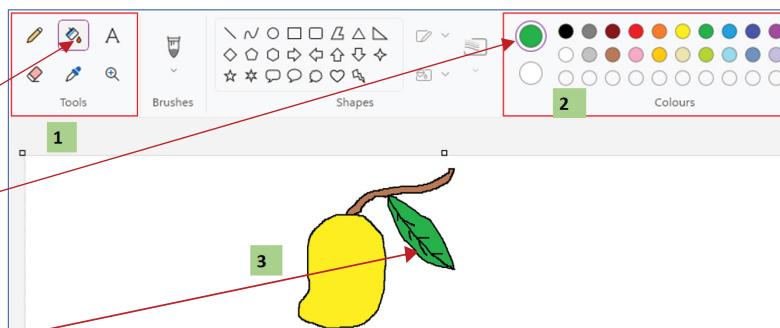
Note: You will need **Lot of Practice** for smooth movement of the pointer.

2 Fill Tool

Having drawn the figure you need to fill it with a color.

To do this:

- 1) Select Fill tool.
- 2) Select fill color using color 1.
- 3) Click inside closed area



to color it. Repeat for adding color to other parts of the drawing.

Note: If figure has any open end, the color will spill to entire drawing area.

3 Text Tool

Used to add Text anywhere in drawing area. To use:

- 1) Click on Text tool.
- 2) Click in drawing area.
- A text box appears.
- 3) Select text color using color 1.

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Lesson 9

Understanding Blocks



Learning Outcome

By the end of the lesson, children will have a clear idea of:

- Types or categories of blocks.
- Action statements under each category of block.



Types of Blocks

Scratch Jr offers **Six Types (Categories)** of Blocks. These are:

Trigger Blocks.



Motion Blocks.



Looks Blocks.



Sound Blocks.



Control Blocks.



End Blocks.

Each Block has:

- A separate **Color**.
- Set of **Pre-defined Statements**, on which the action to be taken is specified.





Concept of Trigger

Say we want to tell the character (Tic) to take 4 steps & then say 'Hello'.

Its code will be:

In this

Green Flag is the Trigger,



When it is clicked, it tells Tic to start the Action, dictated by the blocks ahead of it.



Triggering Statements

They are yellow in color. We have five statements to trigger action.



Start when Green Flag is clicked.



Start when we Tap or touch Tic (character).



Start when we bump in to Tic (character).

Send Message **Orange** | Start when receive message **Orange**.

These are called broadcast statements.

They are important in controlling two or more characters



Move Statements

They specify the **Movements** to be performed by a character on the stage.

They are Blue in color. We have eight move statements. These are:



Number of steps/turns/hops is specified in white boxes using the in build calculator.

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Lesson 10

Let Us Code



Learning Outcome

By the end of the lesson, children will know:

- How to Code in Scratch Jr.
- Be motivated to code on their own.



Two Important Capabilities

For children in the age group of 5 to 7, Scratch Jr is an excellent learning platform. It has two very useful capabilities which every child must exploit after learning the basics .

Thus:

- In this lesson, we shall do two projects to **Consolidate Basics**.
- In lesson 11, we shall do two project to **Demonstrate Capabilities**.
- In lesson 12, we shall do five project to make the **Coding Bug Bite** you.

We hope with all this, children will **Do Their Bit** – Practice, Practice & **more Practice**.



Project 1 — Coding Two Characters

In grade 1 we had **Worked With One** character only, & learnt how to:

- Code the default character.
- Delete a character.



- Add a new character.
- Draw your own character.
- Add a background.

In this project we **shall Code** Two characters – Default & a new one.

1 Adding the New Character

- Create a new project by clicking add  button in My Projects window. Project window will open with a default character of Scratch Jr.
- In project window, click on add  button on the left side of window. Character library opens. Select character & click on the tick  button. It gets added on the stage. We can now adjust the position of both the characters by dragging them to desired location.
- Now add a background by clicking on change background button  and selecting any background of your choice and click on .
- The two now need to be coded. Both will be coded separately with separate trigger.

2 Project Story.

- To code we need a story. A story tells us what & how to code.
- Say our story is – **Tic, our default character meets a boy (Rahul) in the country side. He says 'Hello Rahul.' The boy replies 'Hello Tic. How are You'.**
- Character & background must be selected as per the story.

3 Coding Tic

- Select trigger - Green flag from **Trigger Statements** section. Drag & drop in script area.
- Drag and drop statement **Say** block from Looks blocks and attach it to trigger.
- Click inside **Say** block to change default message to (say) - **Hello, Rahul..**



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Lesson 11

Scratch Jr Challenge



Learning Outcome

By the end of the lesson, children will have a clear idea of:

- Making a project story.
- Coding the project.
- Enhancing the project to the next level.



Project 1 — Kiaan in the Park

Kindly do all the projects as you read:

- **Project Name.** Every project must have one.

The name will depend on the story.

Story is what we want the characters to do.

- **Project Story.** **There is a boy in the park, Whose name is Kiaan. He moves five steps & says “Hi my name is Kiaan and I live here in Mumbai”.**

- **Project Preliminaries.** Select a character & a background. These are taken from library.



- **Project code:** 
- **Doing More.** Having done a project, always look at doing more to make it better, & to learn more. In your own time, do the following:
 - Add a Pop sound before Kiaan says something.
 - Add move four steps backward after he has spoken.



Project 2 — The Hungry Monkey

- **Project Story-** There is a monkey in the jungle searching for food. Suddenly it sees a fruit tree & jumps to eat the fruit.



- **Project requirements-**

Select a background.

Add a monkey as a character.

- **Project code** 

- **Doing More.**

- Now, add a Pop sound before monkey jumps to the tree.
- Move monkey down the tree & move it to another position.



Project 3 — Flying Butterfly

This project is similar to the previous.

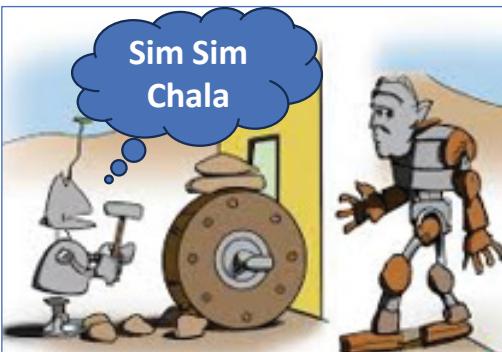
Project Story. There is a butterfly at one end of a farm. It flies anticlockwise to another end of the farm. After that to another end till it comes back.

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Lesson 12

Artificial Intelligence



Learning Outcome

By the end of the lesson, children

Will know:

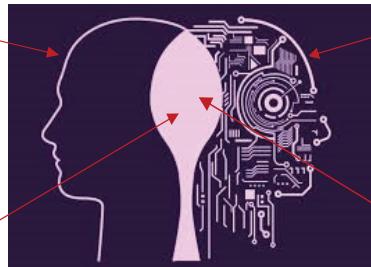
- What is AI.
- Simple examples of AI.
- How AI works.



So Far We Have Learnt Two Facts

1 Fact no 1

This is a **Human** head.



This is **Machines** head.

Common part contains:

- Humans **Brain**.
- Both Brains

Machines **Brain** (CPU).

Need to Coded.

2 Fact no 2

Humans code:

- There **Own Brains** to work for Themselves.
- They also code, the **Brain of Machines** to work for Humans.





So What is AI

"AI is like a **Smart Helper** who learns from the things he **Sees & Hears** just like you learn from your **Experiences** & then remember them to be **Used when Required**".

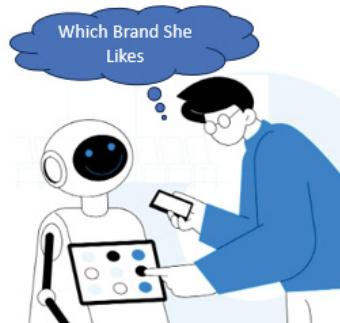


"AI is the Ability of Machines to **Think & Learn** the way humans do".

This 2 in 1 Sweeping & mopping robot is doing just this. He thinks & works like a human, learns his mistakes and keeps improving till he becomes perfect.

However, when **Machine Starts** Coding themselves they help humans work faster. Example predictive typing in our phone when sending a message. At this stage **Coding** enters the world of **Artificial Intelligence (AI)**.

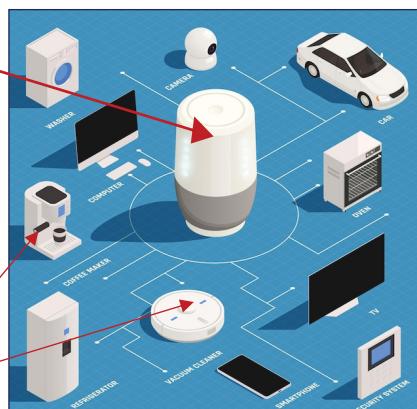
"With AI, computers can perform tasks that are typically done by people, including processing language, problem-solving & **Telling customer Preferences**".



Digital Assistant Alexa

is today's most popular AI device. It is a **Computer Program** that uses AI & machine Learning to **Understand** & respond to Voice Commands & perform tasks.

It is used to assist humans in a **Variety of Applications** as shown in the diagram.



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Lesson 13

Technology Awareness



Learning Outcome

By the end of the lesson, children will have basic awareness of four key technologies:

- Chatbot.
- Wireless.
- Wi-fi.
- Bluetooth.



World of Chatbot

1 What is Chatbot

Till a few years back, people would go to a **Travel Agent** → to discuss, & do travel bookings.



Today, Chatbot is a **Robotic Travel Agent**

inside your smart phone.

- Sitting anywhere, you can discuss with him, & do the booking at any time.
- **Isn't that Great.**

2 Types of Chatbot's

If the Bot (short of robot) is replacing a travel agent it is called a **Travel Bot**.

If it is replacing a insurance agent it is an **Insurance Bot** & so on.



3 Can Chatbots Multitask

Of course they can. Example one chatbot can do the work of a Travel Agent & an Insurance Agent.

4 Do Bots have a Name

Yes they do. This is a **Virtual Assistant Bot**.

Croma is its name. **It will help you shop**.



5 Chatbot Entrepreneur

You can make a chatbot to service any segment of the industry. You can add them in websites.

They are all futuristic routes to Entrepreneurship

6 Future of Bots

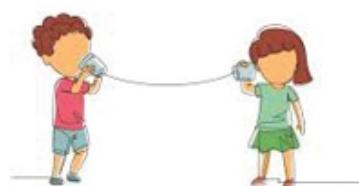
It is limitless. In the next few years, we will have thousands of them, covering every industry.



World of Wireless, Wi-Fi & Bluetooth

1 What is Wireless

Century back the only way to communicate was through a **Telephone Connected by a wire**.



Today we can do the same, but **Without any Wires**.

This is called **Wireless**.

Its symbol is:



The **Mobile Phone** you speak with is one type of wireless system.

A **Satellite System** communicating with Chandrayan is a wireless system.

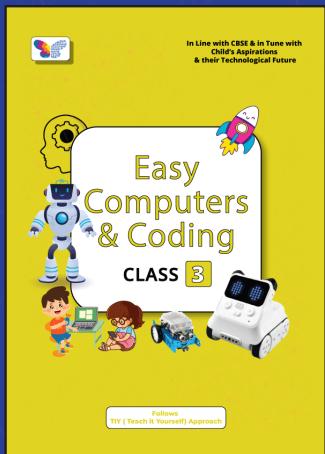
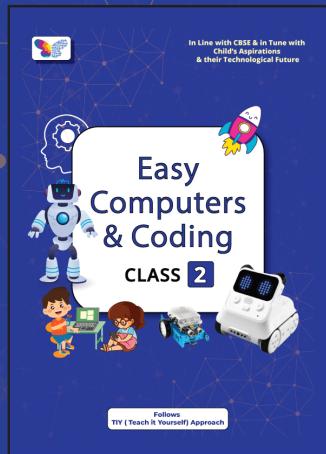
Your **FM Radio** is a wireless system.

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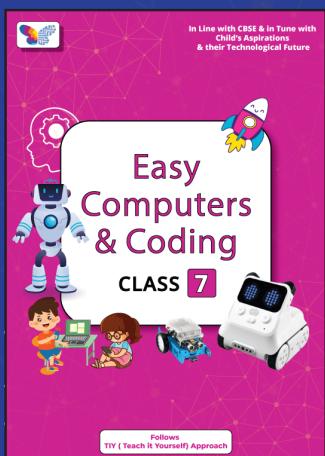
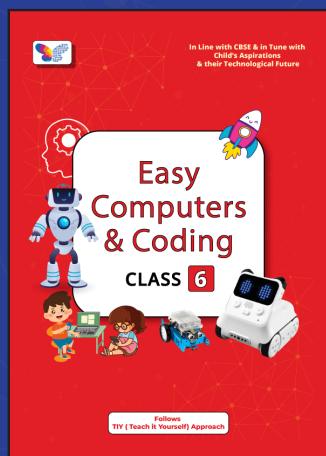
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OUR BOOK TITLES

Level-1



Level-2



Level-3

