Hands-On

(A Book of Information and Communication Technology)

Hands-On

Class - VII

7

D.A.V. Publication Division

D.A.V. College Managing Committee
Chitragupta Road, New Delhi-110055

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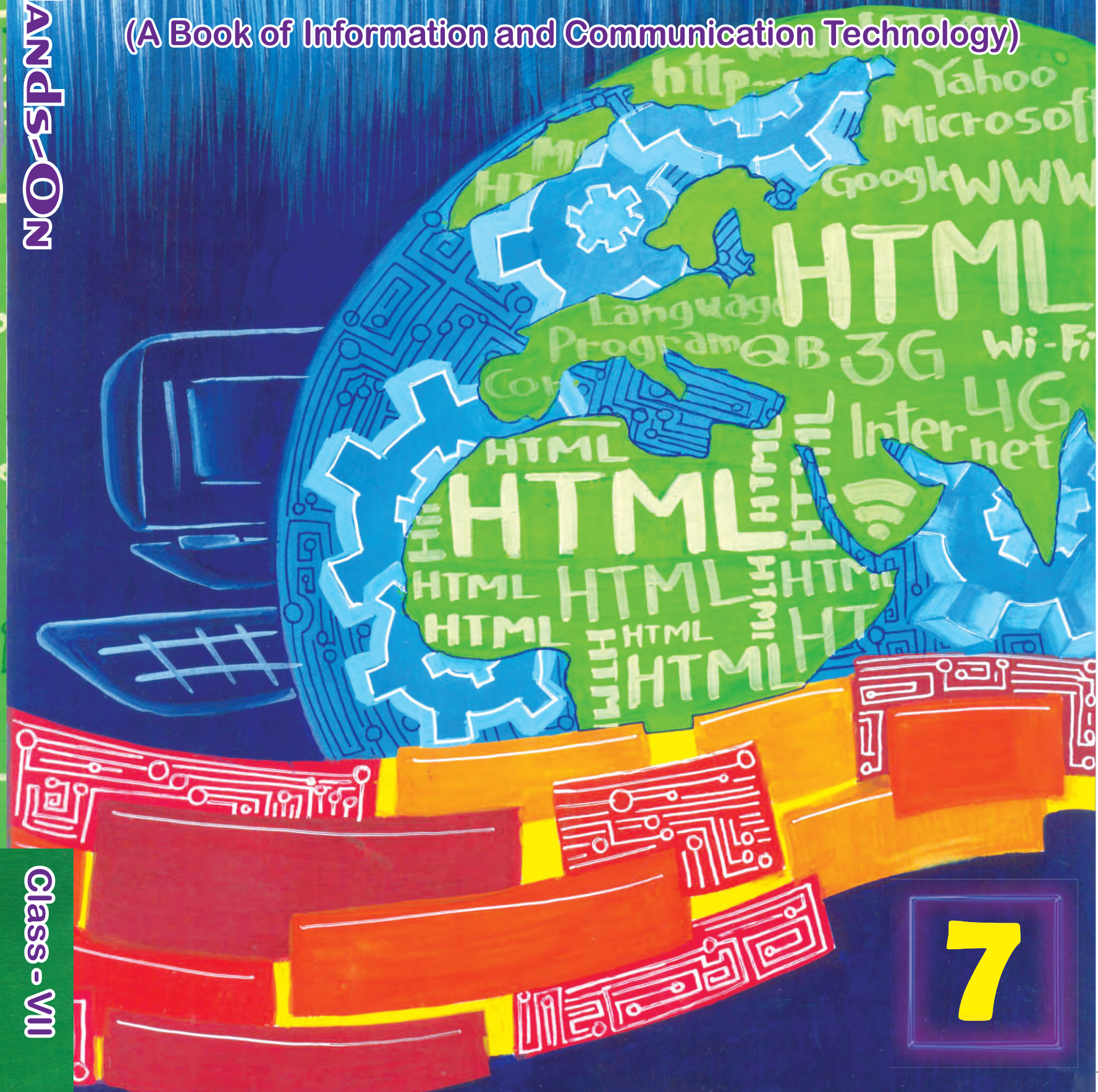
Hands-On

(A Book of Information and Communication Technology)

Class

VII

Foreword

D.A.V. College Managing Committee has been doing yeoman's work in the field of education for more than a century now. It has had the privilege of contributing positively to the field of education in big cities as well as in the remote areas of India. In fact, it has become a movement with an objective of carrying the lamp of education to the doorsteps of the people living in various corners of the country. If the spirit of spreading education among different sections of the society has been one of its objectives, the raising of the quality and standard of education has become the most important purpose of this movement. We aim at the overall development of the personality of the child wherever he/she is and in whatever situation he/she grows.

With this aim in view, the D.A.V. Centre for Academic Excellence, a wing of the D.A.V. College Managing Committee, has been bringing out innovations in the curriculum of its Classes from LKG to VIII in a phased manner since 1992-93. Accordingly, the books were designed in such a manner as to make them lively, interesting and user-friendly. Text books for Classes-LKG to VIII, based on the curriculum prescribed for these standards, have been designed inhouse. These have been well-received and highly appreciated by both the teachers and students. The text of these books has been prepared by the expert groups comprising practising teachers from schools and subject experts from various educational bodies of repute.

This book, titled *'Hands-On'* (Class-VII) is a part of the set of text books for Class-VII. The text of this book is within the framework of the curriculum. The book is activity-oriented and efforts have been made to stimulate the child's thinking and develop in him or her the spirit of inquiry. It contains information for improving the knowledge of the child and for providing the child with an opportunity to apply that knowledge.

I am confident that this book will be liked by our teachers, students and parents.

Punam Suri
President
D.A.V. College Managing Committee

Preface

For more than a decade now, the D.A.V. College Managing Committee (DAVCMC) has been publishing text books for its public schools. The needs of children in different age groups were assessed and programmes designed accordingly. Instructional material in the form of curriculum guidelines, teachers' manuals and text books were developed for Classes-LKG to VIII in a phased manner.

The D.A.V. Centre for Academic Excellence has developed a set of text books for the Class-VII. These books are completely based on the curriculum prescribed by the NCERT. Every year, the D.A.V. Centre for Academic Excellence reviews these books based on the feedback received from the schools. These efforts have made the books child-friendly and brought uniformity in the educational standards in all D.A.V. Schools.

The Publication Division of DAVCMC has endeavoured to present the text of this book in an interesting manner with colourful diagrams and layout. We hope it will be received well by both the teachers and students.

I am thankful to all those people who, at various stages of the development, made a significant contribution in one form or the other, which made it possible to complete the book in time.

I shall certainly welcome feedback and suggestions for the improvement of the book.

Director (Publication)

Dear Teacher

Computers have become an integral part of our daily lives. Accordingly, the knowledge of computers and its usage need to be introduced in D.A.V. Schools at an early stage. *Hands-On* (*A Book of Information and Communication Technology*) is an outcome of our efforts towards the same. The series is meant for the students of Classes-III to VIII. It introduces them to the world of computers in an interesting and interactive way, and the topics chosen are such that these cater to the latest developments in the field of computers.

ICT (Information and Communication Technology) is largely a skill based subject. Twenty-first century is a technological era hence, it becomes mandatory to develop the desired ICT skills to excel and gather knowledge. As ICT is a backbone or a tool for teaching other subjects also, so we have introduced an integrated approach while explaining various softwares and we strongly recommend that ICT teachers should involve other subject teachers as desired in the lessons.

In this entire series we have focussed on teaching open source software instead of proprietary software. You will find that the contents in each lesson are mainly explained step by step along with the relevant screen snapshots for clear understanding. At various places, instructions, which will help you to guide the students, are given in the box titled 'Note for teachers'. Any other interesting and non-evaluative information is included in the box titled 'Do you know?'.

The series extends an application approach by presenting a box titled 'Activity' which is to be attempted by the students themselves. "Hands On" and "Activities sessions" should be conducted as per the instructions given in each chapter. Enough space in the text book is provided for the students to write the output of the program or of various activities. This book should be treated as text cum work book. The language has been kept simple and only necessary technical terms have been explained.

All the exercises of the book will enable you to evaluate the understanding and application level of students. You can guide the students to find answers to these queries through discussion, practical, browsing through internet, etc.

I trust that the students will find the series interesting to read. I would welcome feedback and suggestions from teachers, students and parents for the improvement of the series.
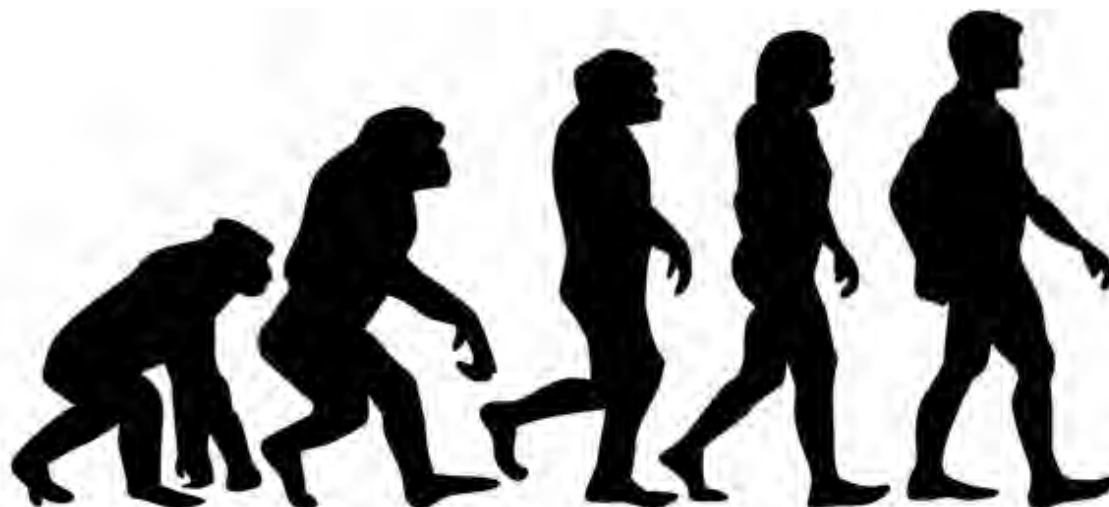
Dr Nisha Peshin
Director (Academics)

CONTENTS

1 The Evolution of Computers

Learning Objectives :

After the completion of this chapter learners will be able to:

■ appreciate the evolution of computers,

■ differentiate between different generations,

■ understand and appreciate the Tech Trends.

Tobo and Dobo are attending the History Class. The History teacher explains the Stone Age –Palaeolithic (Old Stone) Age, Mesolithic(Middle Stone) Age and Neolithic(New Stone) Age.

She recalls–How Human Beings Evolved? (learnt in Class V, (Ch-Early Man) History period ends. Next is the Computer Period.

Dobo and Tobo kept wondering about the evolution of man from ape-like ancestors.

Computer Teacher: Tobo, What are you thinking about?

Evolution? Human vs Computer

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Tobo: Our History teacher just told us about Human Evolution? I am thinking how computer evolved?

All students of the class laughed, a partial computer is thinking about its evolution.

Teacher: Many inventors contributed to the evolution of computers. **A computer is a complex piece of machinery made up of many parts, each of which can be considered a separate invention.**

Teacher: Okay! Let's talk about evolution of computer.

THE HISTORY OF COMPUTING

The computer had its beginning in 19th century when English mathematics professor named, **Charles Babbage** designed **Analytical Engine.** It is on this design, that the basic framework of the computers of today are based on.

Dobo: Train Engine!!

Teacher: No, not train. Watch this video and you will find out what an analytical engine is.

ACTIVITY :

1. Let's watch a video on "History of Computers" by using the link given below:

   https://youtu.be/LvKxJ3bQRKE

   Watch the video carefully and answer the questionnaire that follows:

   1. The first Calculating Device: _____

   2. The First Programmable weaving device:_____

   3. Herman Hollerith designed :_____

   4. A code in encrypted form is called as _____

5. The process of converting encrypted data back into its original form, so that it can be understood _____

6. The first Programmable electronic computer:_____

7. IBM designed machines using _____ to store information in Banking.

8. The First Network: _____

2. Divide the Class into two groups:

✦ One group will collect pictures and information about the type of computers before year 2000.

✦ Other group will collect pictures and information about the computers after year 2000 till date.

Each group will present the pictures and share information collected by them with the whole class.

GENERATIONS OF COMPUTERS

Teacher: Depending on the time period in which the computers were used and their operation, they are divided into different generations.

Dobo: What are Generations?

Teacher: Like we have different Generations (GrandParents, Parents, Children) at Home depending on our age or the year in which we are born. In the same way we classify Computers into five different generations.

ACTIVITY :

Trace your Ancestral Generations:

Generation	Name
Great- Great-Great Grandfather	
Great-Great Grandfather	
Great Grandfather	
Grandfather	
Father	
Yourself	

Let's watch a PPT **:http://www.slideshare.net/RajatMore/generations-of-computer-14065948**

Teacher: Have you seen the Early Mobile Phone –the First Mobile Phone?

Dobo: No.

Teacher: Let's see the different generations of Mobile Phones. I have some photos with me:

1999   2000   2008   2010   2012   2016

✹ Earliest Mobile phone was simple phone, **bulky** with only **calling feature.** The screen was also very small. There was no camera in it.

✹ Gradually, more features were added in the upcoming phones. Every new model of phone had better features than the previous ones.
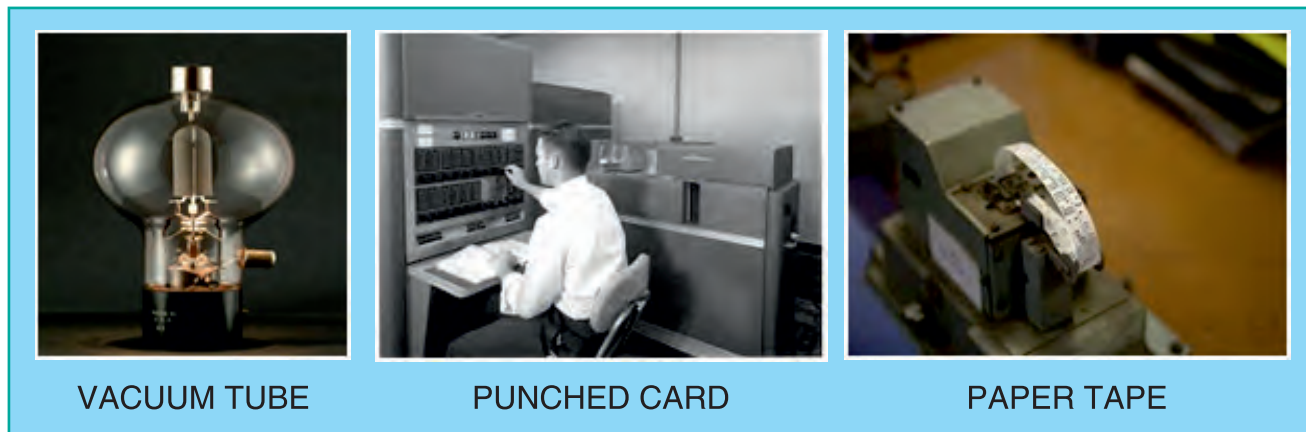
4

Have you seen your father's smart phone?

Dobo: Yes. It has a number of features like Camera, Internet, Video Recording, apps etc. It is like a mini Computer in our Hand.

Teacher: I hope you now understand how today's Smart Phone evolved from the first Mobile Phone. In the same way, **each of the five generations of computers is characterised by major technological development that fundamentally changed the way computers operate.** Most developments resulted in computers becoming:

❋ increasingly smaller,

❋ cheaper,

❋ more powerful and

❋ efficient computing devices.

Just like we refine ourselves every day by new learning experiences, computers were also refined in terms of **hardware** and **software** in every generation.

FIRST GENERATION (1940-1956) VACUUM TUBES

| VACUUM TUBE | PUNCHED CARD | PAPER TAPE |

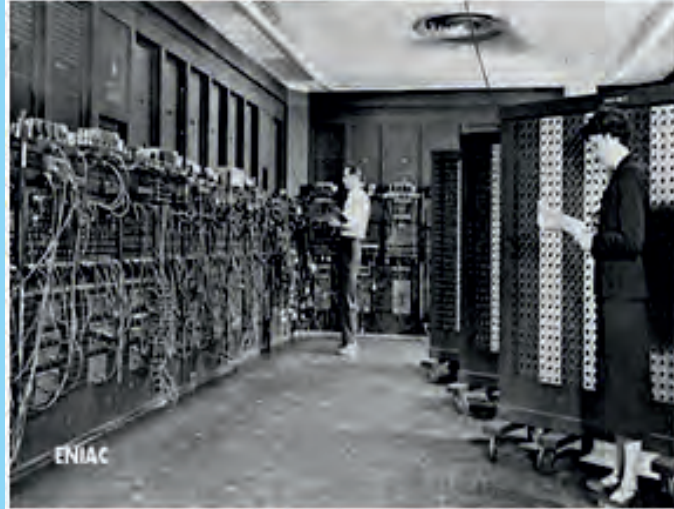| Generation (Period)	Hardware Characteristics	Software Characteristics	Other features
First (1940-1956)	♦ **Vacuum tubes** ♦ **Magnetic drums** for memory ♦ Input on **punched cards** and **paper tape** ♦ Output in the form of printouts	♦ Machine language ♦ Solved only one problem at a time. ♦ Mostly Scientific Applications	♦ **Bulky** in size ♦ Highly **unreliable** ♦ **Limited commercial** use and costly ♦ Difficult Commercial production ♦ Difficult to use

The **UNIVAC** and **ENIAC** computers are examples of first-generation computing devices.

UNIVAC was the first commercial computer delivered to a business client, the U.S. Census Bureau in 1951.

A UNIVAC computer   A ENIAC Computer

SECOND GENERATION (1956-1963) TRANSISTORS

Generation (Period)	Hardware Characteristics	Software Characteristics	Other features
Second (1956-1963)	♦ Transistors ♦ Magnetic Cores memory ♦ Magnetic tapes ♦ Disks for secondary storage	♦ Batch Processing system ♦ Assembly Language ♦ High level programming languages developed ♦ Scientific and commercial applications	♦ Faster, Smaller, more reliable ♦ Easier to program than previous generation systems ♦ Commercial production was still difficult and costly

DO YOU KNOW

An integrated circuit (IC) is a small electronic device made out of a semiconductor material. The first integrated circuit was developed in the 1950s by Jack Kilby and Robert Noyce.

THIRD GENERATION (1964-1971) INTEGRATED CIRCUITS

Integrated Circuit   Third Generation PC

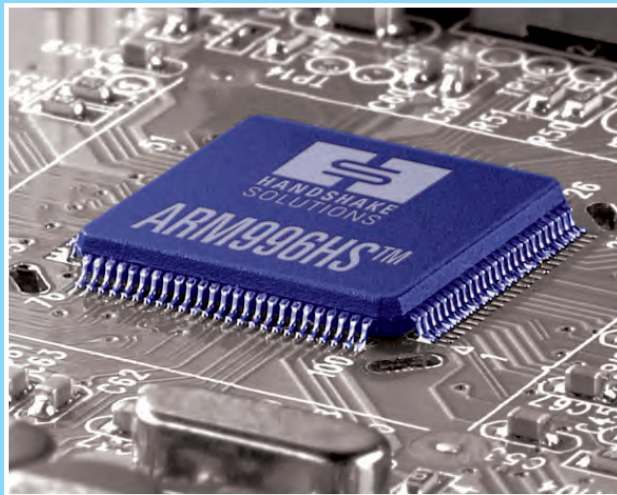| Generation (Period)	Hardware Characteristics	Software Characteristics	Other features
Third (1964-1971)	♦ IC's with SSI and MSI technologies ♦ Larger Magnetic Cores Memory ♦ Larger capacity disks and magnetic tapes secondary storage ♦ Minicomputers	♦ Timesharing operating system ♦ Standardization of high level programming languages ♦ Machine independent software	♦ Faster, smaller, more reliable, easier and cheaper to produce ♦ Commercially, easier to use and easier to upgrade than previous generation systems. ♦ Scientific, commercial and interactive online applications

Hands On

Lets solve this online:

1. Computer History Quiz:**https://www.quia.com/quiz/453325.html?AP_rand=87656829**

2. Computer History Jigsaw Puzzle:**http://www.surfnetkids.com/games/computerhistory-js/**

FOURTH GENERATION (1972-2010) MICROPROCESSORS

MICROPROCESSOR   FOURTH GENERATION PC

Generation (Period)	Hardware Characteristics	Software Characteristics	Other features
Fourth (1972-2010)	♦ Microprocessors; semiconductor memory ♦ Personal Computers ♦ Super Computers based on multi processing technologies ♦ Spread of High speed computer networks ♦ Larger capacity main memory, hard disks ♦ Optical disk as portable read only storage media ♦ Notebooks, powerful desktop PC's and workstations ♦ Internet	♦ GUI Based Operating systems ♦ Multiprocessing OS ♦ Object Oriented Design and Programming, ♦ Network based and super computing applications ♦ Distributed OS ♦ Parallel programming ♦ World Wide web ♦ Multimedia, Internet applications	♦ Small, affordable, reliable and easy to use PC's ♦ General Purpose machines ♦ Easier to upgrade ♦ Rapid software development possible ♦ Portable computers ♦ Powerful, cheaper, reliable and easier to use desktop machines ♦ Easier to produce, commercially and easier to upgrade ♦ Rapid software development possible

FIFTH GENERATION (PRESENT AND BEYOND) ARTIFICIAL INTELLIGENCE

Generation (Period)	Hardware Characteristics	Software Characteristics	Other features
Fifth (present and beyond)	♦ Superconductors ♦ Powerful servers, supercomputers ♦ Interspace ♦ Cluster computing	♦ Can understand natural human language	♦ Voice Recognition ♦ Capable of learning and self organization

For More information on Computer History refer:www.computerhistory.org/timeline/memory storage

ACTIVITY :

1. Watch the video on 'Generations of Computers' to understand more about different generations and answer the questionnaire that follows:

   Link: https://www.youtube.com/watch?v=LJ5c3AycRIE

   QUESTIONNAIRE BASED ON VIDEO

   1. Which generation of Computer used Vacuum tubes? _____

   2. Which generation of Computer used Transistors? _____

   3. In which generation High Level languages were developed?_____

   4. Which generation of Computer used Intergrated Circuits?_____

   5. Which generation of Computer used Microprocessors?_____

   6. Name a few devices at your home which uses computer._____

2. List the unique Hardware and Software characteristics of each Generation:

Generation	Evolution of Hardware	Evolution of Software
First		
Second		
Third		
Fourth		
Fifth		

Tobo: What is the future of Technology?

Teacher: Tech Trends!

Tobo: What is that Ma'am?

TECH TRENDS - Innovating in the digital era

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Teacher: These are the new technologies that are currently developing or will be developed over the next five to ten years. Some of the latest technological trends that are innovating in the digital era are:

* Robotics

* Wearable Devices

* Tech tats, which attach to the skin like a Temporary Tattoo.

* Mind Reading Machines

* Virtual Reality/ Virtual World

* Artificial Intelligence

* Big Data/ Cloud Computing

* Wi-Fi

* Wireless charging standards.

ACTIVITY :

"WHO AM I ACTIVITY?"

Divide the class into five groups. Let each group be assigned one generation of computer. Each group will tell two or more characteristics of the generation and the other groups will identify that generation.

Assessment Activity

Divide the class into teams. Assign one topic from the list given above to each team. They will collect information and pictures on the allotted topic and will present the revolutionary idea which can radically transform our day to day life and explain its features to the class using OpenOffice writer.

2 Scratch-I

Learning Objectives :

After the completion of this chapter learners will be able to:

■ appreciate the use of different blocks available in Scratch software,

■ learn to choose, paint, edit and resize characters (Sprite),

■ share the projects online.

INTRODUCTION

What does the above image show? _____

It is a cartoon of Mickey and Minnie. We all love watching such animated cartoon movies on television, but have you ever thought of creating animations by yourself? Don't you think it will be fun?

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We can animate our own favourite characters by using some computer software. Can you recall names of any such animation software? _____

Let us discuss in detail about one such software called **Scratch**.

Scratch software was designed for fun; it is and educational software and easy to use and learn. It offers **tools** for **creating interactive stories, games, animations** and much more using block-based programming. This software is developed by MIT media lab and can be downloaded from *www.scratch.mit.edu*.

Animations, games and stories created in Scratch can be shared online on its website *www.scratch.mit.edu*.
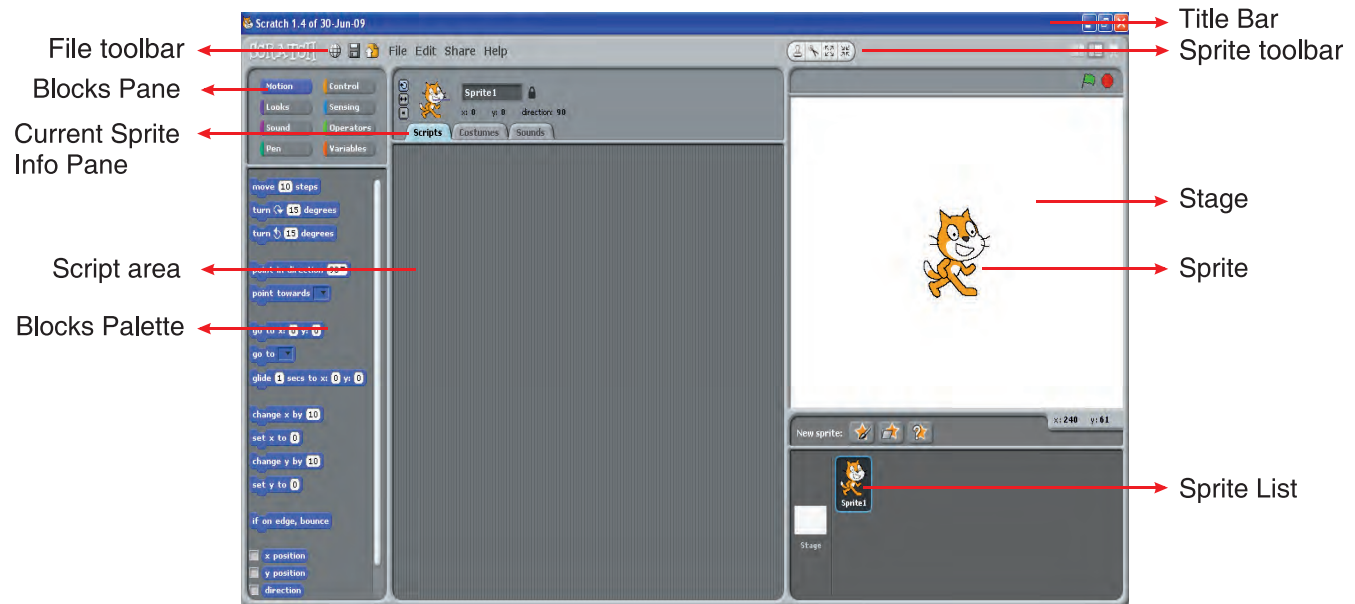
Hands On

Visit the Scratch website to see the uploaded projects. You will be amazed to see so many members and their projects on the website.

Let us begin our journey of learning and creating projects in Scratch by learning about its various components.

COMPONENTS OF SCRATCH SCREEN

On opening Scratch, we get the following screen-

Title Bar
Sprite toolbar
File toolbar
Blocks Pane
Current Sprite Info Pane
Stage
Sprite
Script area
Blocks Palette
Sprite List

Hands On

Explore all the inbuilt projects of Scratch. To open a sample project

1. Click the File menu ->> Open … Option

2. Click the Examples tab from the left pane.

3. Choose the desired category of projects.

Let's discuss the various features of Scratch components one by one.

1. Blocks Pane

You must have played jigsaw puzzles where irregular cut pieces of various shapes have to be fitted together to form a picture or a design.

Similarly, in Scratch there are different **colored blocks** that can be connected to each other like a jigsaw puzzle to create animations, games and stories.

We can find **eight color coded blocks** in scratch namely:

1. **Motion**
2. **Control**
3. **Looks**
4. **Sensing**
5. **Sound**
6. **Operator**
7. **Pen**
8. **Variables**.

All these blocks further contain different puzzle-pieces like shapes in the **Blocks Palette** that can be used to create code in Scratch.

Hands On

Click on each block in the Blocks Pane and review the different shaped blocks in the Blocks Palette.

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2. Script Area

In order, to create an animated movie, we have to first decide and write the script. In Scratch we **write** the script in the **Script area**.

It is an area where blocks from the blocks palette are placed to write a script.

In order to create a jigsaw puzzle we need to select and drag the blocks from the blocks palette and drop them in the **Script Area.**

Blocks can be removed by **dragging the block(s) back from the script area into the blocks palette**. We can also change the values of blocks in the Script area. We will learn to write the script in the next chapter.

3. Stage

Usually before starting the shooting of any animated movie, sets are designed and prepared. In Scratch, these sets are designed on the stage.

When the mouse is moved anywhere on the white area of the screen, the value of ⌈x: 215   y: -267⌉ x and y coordinates changes.
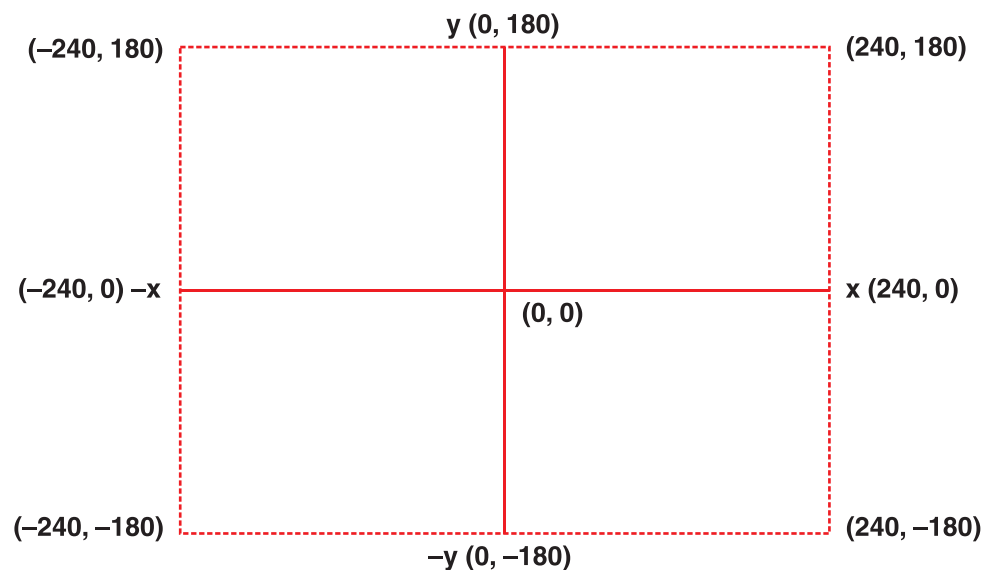
This **white area** is called the **Stage**. In this area our stories, games and animation is executed.

The stage is divided into an **x-y grid**. It is 480 units wide and 360 units long. The middle of the stage has x and y coordinates as (0.0).
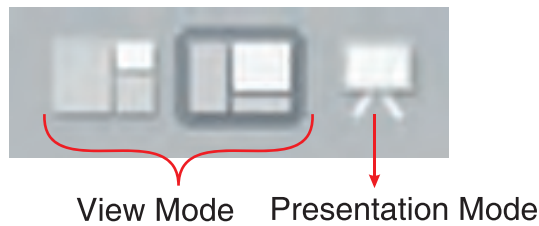

ACTIVITY :

Plot x-y axis on a graph paper as shown below. You may take the help of your mathematics teacher.

We can change the view of the stage by clicking on these three buttons-

View Mode   Presentation Mode

The stage has two more buttons:

* **Start green flag scripts**—when we click on this button the script gets activated.

* **Stop everything**—when we click on this button all the activated scripts are stopped

4. Sprites

Once the script is written and the sets are finalized, the next step is to choose the characters for our movie. In Scratch, the **characters that perform animations are called Sprites**.

A sprite is a small graphic object that moves independently around the stage, producing animation effect. A new project always starts with a single cat sprite.

Working with a Sprite

Scratch has a **gallery** full of **different sprites.** We can choose any sprite from this gallery for our project. Sometimes we are unable to find a suitable sprite; in such case we can paint a new sprite.

To get more sprites, explore the three **New sprite** buttons :

(a) **Paint new sprite**

(b) **Choose a new sprite from file**

(c) **Get surprise sprite**

DO YOU KNOW

New sprite can also be chosen from the images downloaded from the web. The image formats recognized by the scratch are — JPG, BMP, PNG AND GIF (Including animated GIF).

Hands On

Paint new sprite in Paint Editor using the given steps:

1. Import sprite **hair2** from **Things** costume.

2. Click Ellipse Tool and click hollow mode. Draw a circle.

3. Use Eraser tool to trim the circle.

4. Click Select Tool button, select the semi-circle and place it below the hairs to make the outline of the face.

5. Click Ellipse Tool - hollow mode. Draw a circle inside the face to make one eye.

6. Click Stamp Tool button and select the eye to copy.

7. Again use Ellipse tool to make nose.

8. Once again draw a solid circle, use eraser to trim it half.

9. Select the semi-circle. Click on flip vertically.

10. Place this semi-circle on hair to make a ribbon.

11. Now, be more creative and finish the sprite.

(A) Editing a Sprite

We have learnt how to choose and paint a sprite. Now, let us work with its toolbar.

We can select any tool from the toolbar and then click on the sprite on the stage to perform an action. To return to the arrow cursor, we need to click on the blank area of the screen.

Duplicate Delete Grow Sprite Shrink Sprite

Hands On

Use paint editor and sprite toolbar to show the stages of growth of a plant.

(B) Creating a Costume of a Sprite

As you have different dresses in your wardrobe, a sprite can also have different dresses. In scratch, it is called a **costume.**

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A **costume** is an **alternate appearance** of a sprite. To create a costume, click on the Costumes tab. There are three ways to create and edit a new costume.

These are-

* **Paint**—Opens the Paint Editor.
* **Import—I**mports the sprite from the inbuilt costumes gallery or any saved image from the computer.
* **Camera**—Opens a web cam to take a picture for a new costume.

Hands On

1. Download any animated image from the internet. Import the image to the Costumes tab and observe its different costumes.

2. Create a costume as per the following instructions-

   1. Import a new sprite titled butterfly3 from the **Animals** folder.

   2. Erase its wings with the help of Eraser tool.

   3. Click the OK button when done.

   What name can be given to this new sprite? _____

3. Choose a sprite that has more than two costumes. Import all its costumes. Now, Rename, edit and copy the costumes

5. CURRENT SPRITE INFO

Next step in creating an animated movie is to give **names to the characters**, their position on the sets designed etc. In scratch, all these things are done through Current sprite info pane.

Current Sprite Info shows the following –

* **Sprite's name –** here we can type in a **new name** for the sprite.
* **x-y position** – It shows **the exact position** of the sprite on the stage.

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* **Direction –** It indicates **the direction in which the sprite will move**. The blue line on the sprite's thumbnail shows the sprite's direction. We can drag this line to change the sprite's direction which may be 0 = up, 90 = right, 180 = down, −90 = left.

* **Lock state –** Click "Lock to" change the sprite's lock state. An unlocked sprite can be dragged in the presentation mode.

* **Rotation style –** The buttons control the appearance of the costume as the sprite changes its direction.

 The costume rotates as the sprite changes direction.

 The costume faces either left or right.

 The costume never rotates (even if the sprite changes its direction).

6. Sprite List

As the casting of the characters in the movie is shown either in the beginning or at the end of the movie, similarly in scratch the casting can be displayed in the sprite list pane.

The Sprite List displays thumbnails for all sprites in a project. The **name of each sprite appears below its thumbnai**l. We can rearrange the sprites by dragging these thumbnails.

If we right click the thumbnail of a sprite, the following list of menu options is displayed-

* **Show:** displays a sprite that is off the Stage or hidden (or press shift+click on the sprite's thumbnail)

* **Export this sprite:** saves the sprite as a sprite file, which can be imported into another project.

* **Duplicate:** creates a copy of a sprite on the stage.

* **Delete:** deletes a sprite from the stage

Hands On

From the previous activity, erase the wings of the butterfly to create a caterpillar sprite. Export this caterpillar sprite and import it in a new project. Now show different stages of life cycle of a butterfly.

7. Background

We have learnt many features of a sprite. All these features when worked on a plain and white background of the stage area looks very boring. We can make the background of the stage area colorful and attractive.
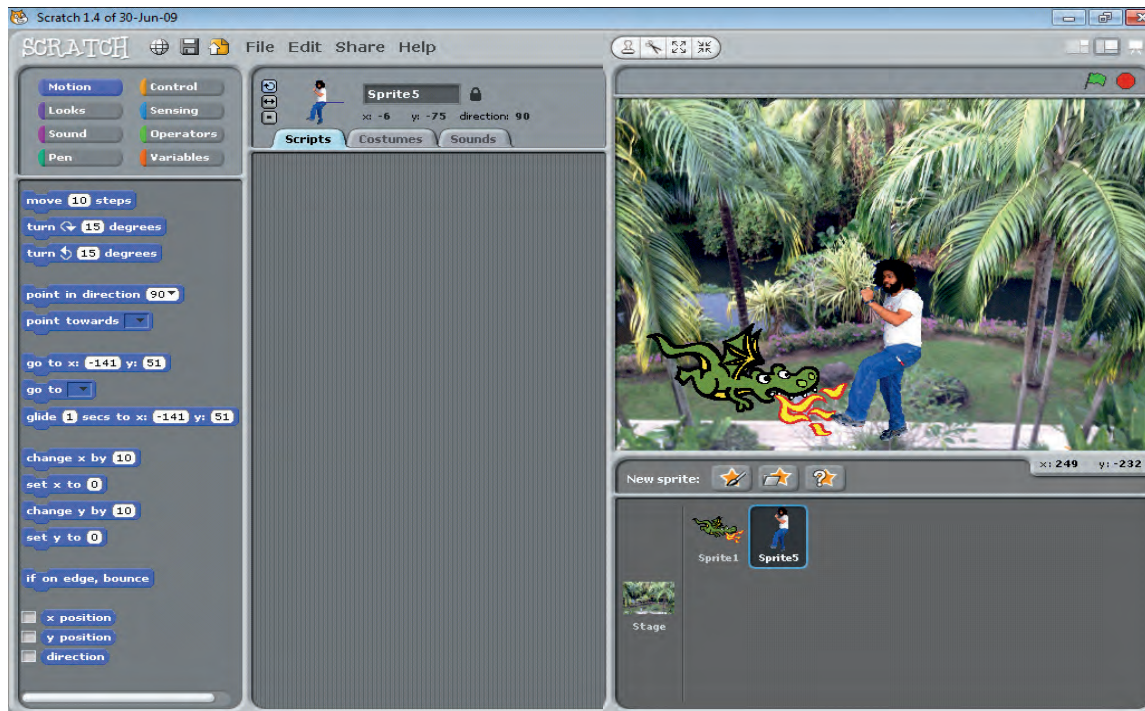
Just as a sprite can change its appearance by switching costumes, the Stage can also change its appearance by switching backgrounds as shown in above picture.

To change the background of the stage –

✹ Click on the Stage icon (White Square) at the left of the Sprite List.

✹ Click on the **Backgrounds** tab to see and edit the background.

DO YOU KNOW

A Background can also be imported from the images downloaded from the web.

Create a scene of a football field as per the following instructions:

(a) Select Football field as a background.

(b) Choose the sprite— Football.

(c) Choose the players of two opponent teams.

(d) Place the football and players in the field.

(e) Paint a score board.
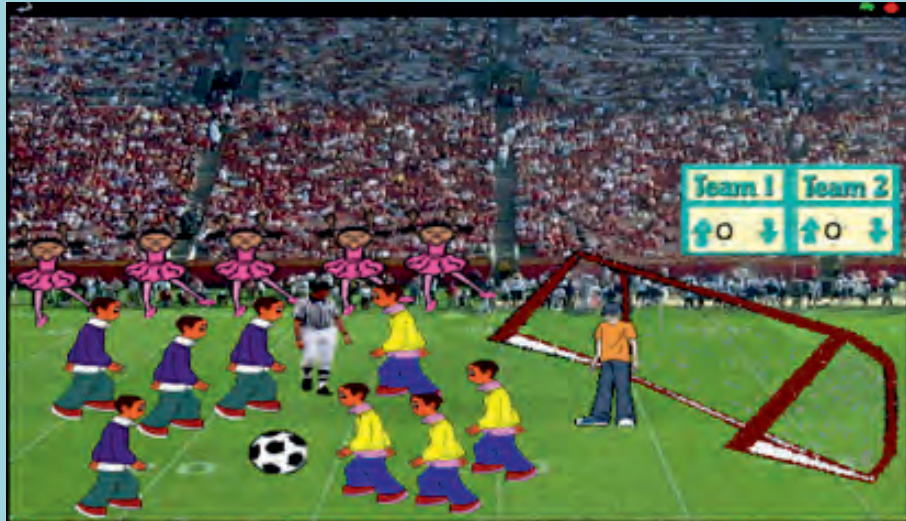
SAVING A PROJECT

It's a good practice to get in the habit of saving the project early and often. When we save a project, we have two choices – **Save As and Save.**

We use the **Save As** option when we are saving a project under different name.

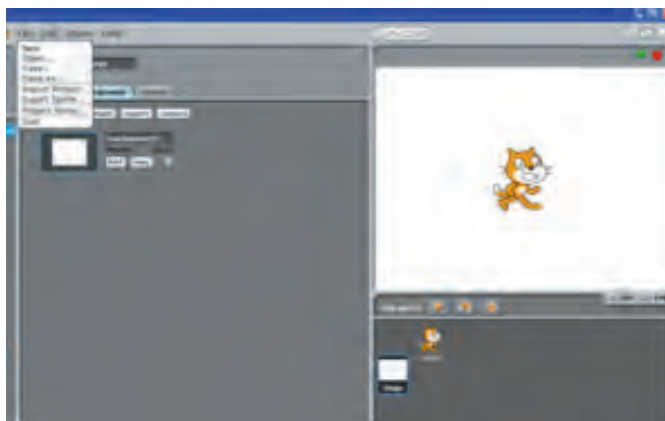The steps involved are –

Step 1. Click the File menu.

Step 2. Click the Save As… option.

DO YOU KNOW

In Scratch, a file gets saved with the extension .SB.
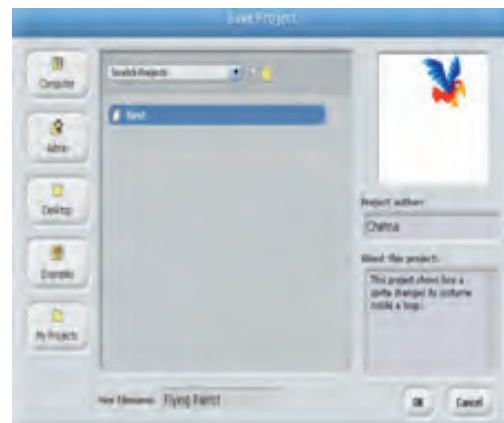
Step 3. Select the location and enter a New Filename.

Step 4. Enter your own name in the field Project author.

Step 5. Enter some descriptive information about the project in the field about the project.

Step 6. Click the OK button.

OPENING A PROJECT

After saving the project, the next step is to learn is how to open an existing project.

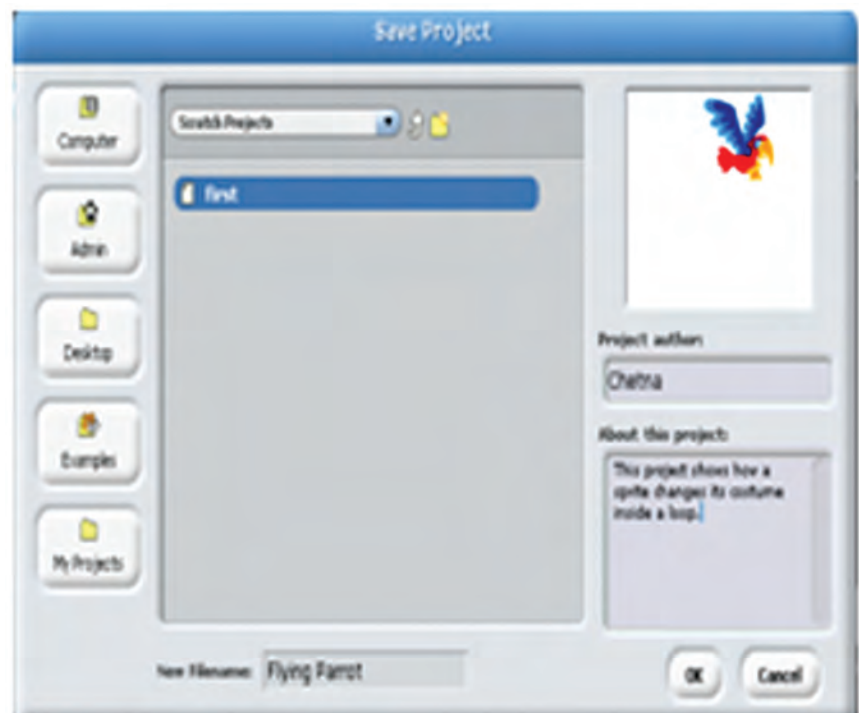The steps to open an existing project are-

Step 1. Click on the File menu.

Step 2. Click the Open… option.

Step 3. Select the location and the desired file.

Step 4. Click the OK button.

The desired file gets opened.


SHARING PROJECTS

We know that one of the features of Scratch is to share our projects with others on the internet. If we have developed a project that we would like to share online, then we can upload the project from within the Scratch screen.
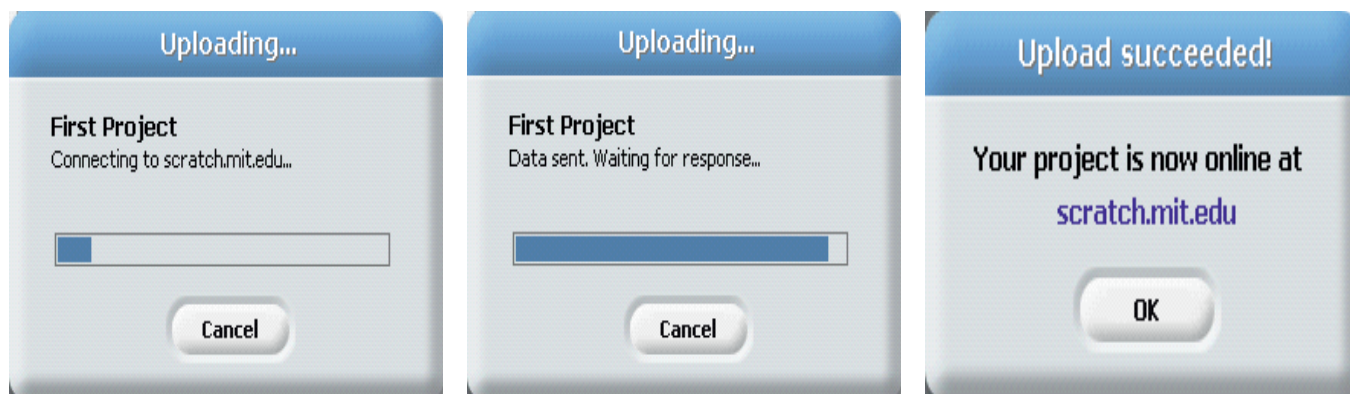
The Steps to upload projects are –

Step 1. Click the Share menu.

DO YOU KNOW

To upload a project on the internet, we must first sign up for a **user account** on the Scratch website www. scratch.mit.edu
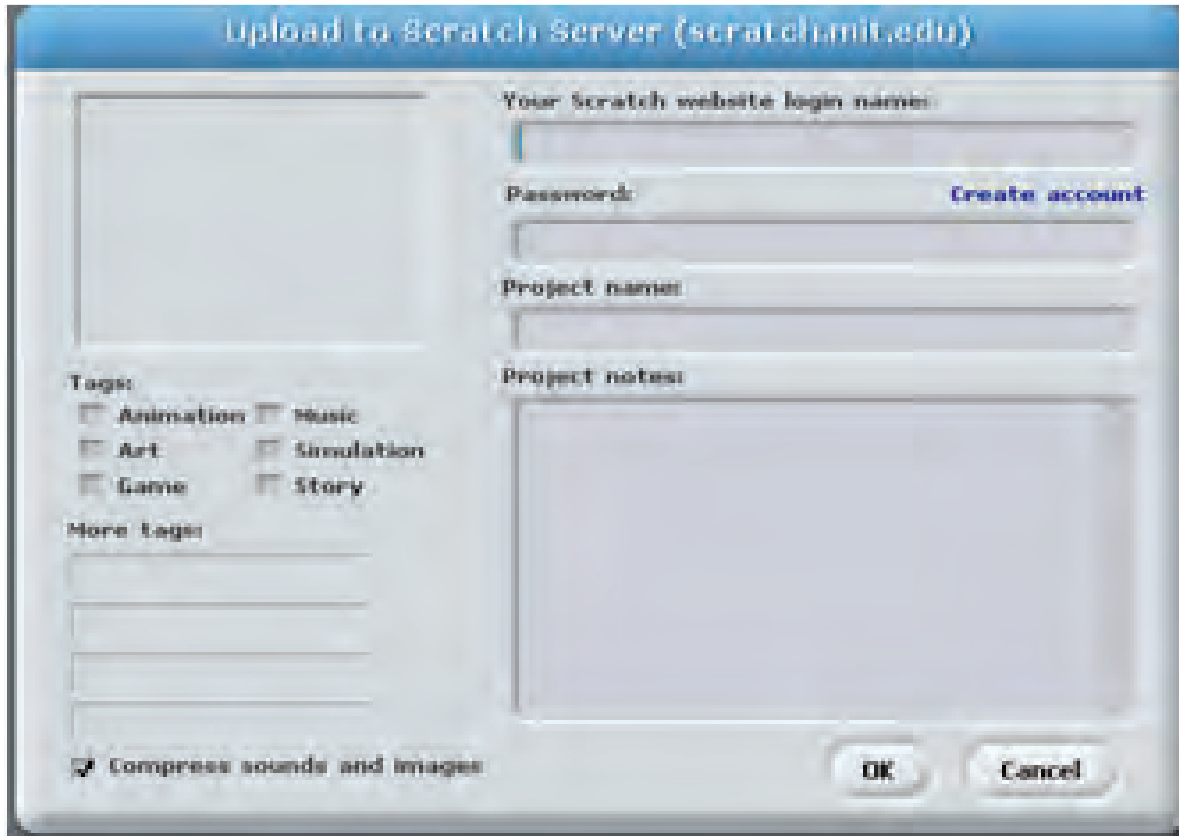
Step 2. Fill the required details and click the OK button. The following boxes will appear:

The project gets uploaded on the website for others to see.

DO YOU KNOW

A project cannot be uploaded if it is over 10mb. To lower the file size, check the **Compress Sounds and Images** box in the bottom left corner of the upload screen.
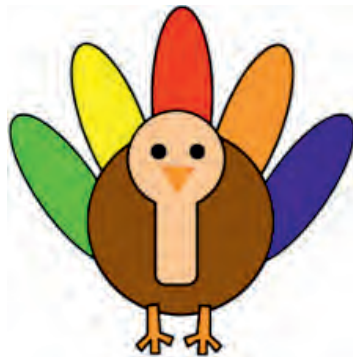
Assessment Activity

1. Create a park scene. You can add more sprites to this scene.

2. Paint two costumes of peacock

3. Draw the Water cycle as shown in the screenshot. Label the process

4. Write the function of the following tools:

Duplicate: _____

Delete: _____

Grow: _____

Shrink: _____

5. What happens when you click on the following in the costumes tab:

   (i) Edit Button _____

   (ii) Copy Button _____

   (iii) X Button _____

6. How will you rename a costume? _____

7. What happens, when you perform following actions in sprite infopane:

   1. Drag the blue line on the thumbnail _____

   2. Double-click on the thumbnail _____

   3. Drag the sprite in the presentation mode when the sprite is at the lock state _____

8. What is the difference between the x & y coordinates seen below the stage and at current sprite info?

   _____