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CLASS
6

सरल सुगम

Information and Communication Technology in Education - Teacher's Manual

Teacher's Manual

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ICT

Information and Communication Technology in Education



STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING
Varun Marg, Defence Colony, New Delhi – 110024

Teacher's Manual

**CLASS
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ICT

Information and Communication Technology in Education



स्वाध्यायान्ता प्रमदः

STATE COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING
Varun Marg, Defence Colony, New Delhi – 110024

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FOREWORD

Dear Teacher,

The ICT in Education Textbook is an innovative effort to make teaching and learning process interesting and enjoyable. The realization of the ICT Curriculum through the book solely depends on its implementation by teachers. The ICT in Education is a progressive curriculum with varied themes aimed at empowering students with ICT Tools that can aid their process of learning. The textbook has been developed in such a way that would promote the process of 'Learning by Doing'.

A teacher needs to be well prepared to generate curiosity and interest in students. The Teacher's Manual for the textbook has been developed to convey the principle and pedagogy to ensure effective learning. The Manual has been developed to facilitate the teaching process. It contains all the relevant information that is required for an effective teaching process.

The Manual consists of Chapter wise teaching Methodology that encompasses information about the tool, installation guidelines, and suggested teaching methodology along with Activity wise mapping of Life Skills, Intelligence and the relation with other academic subjects to make teaching a satisfying experience. The Life skills and Intelligence have been defined along with the method of Assessment to keep teacher informed of the implementation.

I am sure the Teacher's Manual will surely help you in transacting the learning in a cherished manner and will surely enrich your teaching experience.

I wish you "Happy Teaching" and enlightened learning.

Dr. Sunita S. Kaushik

Director, SCERT



PREFACE

Dear Teacher,

Realizing the importance of ICT in education, an innovative effort in terms of preparing a curriculum and its implementation through a unique text book has been made by SCERT, Delhi. Leaving no stone unturned ,this Teacher’s Manual has been developed to help teacher in making the teaching process innovative and fun filled.

The aim of this manual is not merely to transfer the information, but it is to improve the quality of education. It has been designed keeping in view the challenges faced by the teacher in their day to day work thus, ensuring the professional development of In- Service teachers.

The manual is designed keeping in mind the theory and practical practices at the same time providing useful information related to the tools to be taught. We hope this manual would prove helpful in making teaching a delightful experience for you. Thus, generating interest and enthusiasm in students to learn and experiment with ICT tools.

We are thankful to all those who conveyed their inputs and contributed in the development of the manual.

We wish our readers a happy journey to the exciting realm of ICT in education.

Dr. Nahar Singh
Joint Director, SCERT

ABOUT THE TEACHER'S MANUAL

ICT IN EDUCATION CURRICULUM – AN INTRODUCTION

Information and communication technology pertains to a “diverse set of technological tools and resources used to communicate, create, disseminate, store and manage information”. These technologies include computers, internet, the broadcasting technologies (radio and television) and telephony. ICT (Information and Communication Technology) is one of the latest advancements in the evolutionary history of mankind which touches almost all the spheres of life with its wide spectrum of influence.

The importance and impact of ICT in Education was clearly reflected in the National Curriculum Framework 2005. And significance of ICT in Education has led to a major paradigm shift in education by imparting instructions for collaborative learning, multidisciplinary problem solving and promoting critical and creative thinking skills.

In this regard, the National policy of Information and Communication Technology in School Education aims at preparing youth to participate creatively in the establishment, sustenance and growth of knowledge society leading to all round socio – economic development of the nation and global competitiveness.

The ICT in Education curriculum for Delhi State is developed based on Curricula for ICT in Education for School System v1.02, Central Institute of Educational Technology, NCERT. It is organized into four Learning strands as per Curricula for ICT in Education developed by CIET (NCERT):

- Connecting with the World

- Connecting with each other
- Creating with ICT
- Interacting with ICT

The curriculum developed is a sincere effort to introduce students to a dynamic and immensely popular field of ICT, exposing them to a wide range of information and resources at the same time motivating them to explore and participate. It can not only support learning, but also introduce them to diverse activities which challenge their intellect and imagination. **Thus, the ICT in Education curriculum aims to equip the students with the sound knowledge of ICT tools that would nurture in them the sense of creativity and promote innovation.**

To ensure the implementation of the ICT in Education curriculum and realization of its aim in its true sense a Textbook has been developed that takes care of a 21st century learner with the following features:

- Development of life skills like creative thinking, critical thinking, problem solving, interpersonal relationships, communication skills, collaboration etc.
- Integration with real life scenarios
- Integration with other academic subjects (Interdisciplinary approach)
- Inclusion of Values and Ethics
- Inclusivity: Gender sensitization and Inclusion of the differently able.

INTRODUCTION TO THE ICT IN EDUCATION TEXTBOOK

Teaching is certainly the noblest profession of all. A teacher has the ability to mould the behavior of a child by generating the curiosity to learn more. Only a curious mind has the necessary appetite to explore new avenues. A teacher goes through multiple challenges while teaching. This book is a sincere effort to ensure

enjoyable learning for the students by encouraging constructivism¹ in them.

It aims to enable students creatively interact with a wide variety of hardware, software applications, devices and tools, nurturing their inquisitiveness and imagination, enabling them to access a wide variety of information and resources and helping them to solve problems.

LEARNING OUTCOMES

By the end of Class VI, the student will be able to:

- Develop a basic understanding of the ICT environment
- Use search engines to gather information online
- Draw 2D shapes using Logo/My Turtle
- Create a poster using Paint/Tux Paint
- Analyze basic data using spreadsheet, add & calculate averages using spreadsheet
- Create mind maps using VUE Installer
- Use word processor for writing & formatting text
- Create, edit & save an audio file using Audacity
- Click & edit photographs using Mobile phone, create videos using mobile phone
- Use digital maps to navigate

FEATURES OF THE TEXTBOOK

- The content is developed in the national language Hindi to ensure a mass appeal making it easy to understand for one and all.

1. The process of constructing knowledge by own experiences.



- The writing style is Narrative. Different characters have been used that introduce concept and take the learner through. The text is designed in the form of conversation between the characters to make it interesting and attractive for the students.
- The language used in the Textbook is simple. Everyday sentences and words have been used in the textbook to make it effective. An effort has been made to explain the concepts through diagrams and Figures and hence less of text.
- The Content is Outcome Based. Every chapter has a set of Learning Outcomes which define the skills that a student will acquire on the completion of a chapter.
- Incidental learning² is promoted by Integrating ICT with regular academic subjects to enhance understanding of the concepts thus in the process appreciating and mastering the usage of ICT Tools.
- Real life activities have been used to help children relate to the usage of ICT tools in daily life.
- Every activity follows Practice sessions (Practice) that will encourage reflective thinking³ among students.
- Points to remember has been included to ensure reinforcement
- Do It Yourself activity at the end of the chapter will keep students interested and nurture their imagination, which will generate curiosity and prompt the students to innovate.
- The Assessments are planned to promote SELF and PEER REVIEW to:
 - Strengthen concepts.

2. Learning while performing activities

3. To be able to find solutions on the basis of acquired knowledge or add on to prior knowledge.

- Promote Collaboration.
- Nurture Confidence.
- The Self-Assessment section allows a student and her/his peer to assess herself/himself. The highest achievement would be when a student is able to help others thus enhancing Interpersonal relationships and communication skills.

The focus is on student centric learning⁴ and thus promoting “Learning by Doing”. The student is not merely taught but guided in such a way that she/he learns by herself/himself while performing various activities, simultaneously nurturing the critical thinking, creative thinking, decision making and Problem Solving life skills.

Sapna Yadav

Sr. Lecturer, SCERT

4. Students become active participants rather than passive receivers.

CONTENT

	CHAPTER NAME	PAGE NO.
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Chapter 3	Internet & ICT Environment	38 - 48
Chapter 4	Data Representation & Processing 01	49 - 67
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	Parameters of Learning	123 - 130

Graphics & Animation

Learning to ICT Environment, Sketch, Paint & Create Digital Art

(ICT की सहायता से चित्रकारी कैसे करें)



GENERAL OBJECTIVES:

- Develop Cognitive, problem solving and creative skills.
- Make students computer and ICT literate
- Give wings to the creativity of the students by introducing “My Paint” application.

SPECIFIC OBJECTIVES:

- Development of basic understanding of ICT environment
- Introducing sketching and painting through different brushes
- Information of mixing of different colours

TOOLS USED: Operating System, My Paint Application-1.2.0

HARDWARE REQUIREMENT: Computer System, Projector

INTRODUCTION

In today's fast pace digitised world, it's necessary to make student technological literate and equipped with the knowledge of ICT so that they will not be left behind.

ICT stands for Information and Communication Technology. It is a collaboration of various information and communication technologies through which data can be processed or manipulated in a very effective and better way to produce, store as well as transmit any kind of information anywhere with a blink of the eye.

Different types of hardware like computer system, smart phones etc. and software like Operating systems, application software etc. can be used in ICT.

Computer is an electronic device which perform a variety of task in accordance with the set of instruction called program.

According to the Oxford English Dictionary, the first known use of the word "computer" was in 1613 in a book called The Yong Mans Gleanings by English writer Richard Braithwait: "I haue [sic] read the truest computer of Times, and the best Arithmetician that euer [sic] breathed, and he reduceth thy dayes into a short number." This usage of the term referred to a person who carried out calculations or computations. The word continued with the same meaning until the middle of the 20th century. From the end of the 19th century the word began to take on its more familiar meaning, a machine that carries out computations. [1]

(references: <https://en.wikipedia.org/wiki/Computer>)

Computer has seen lots of developmental phases from ancient Abacus to Modern Day computer. Main developmental phases are shown below:

Abacus->Napier's Bone->Pascaline->Leibniz Calculator->Jacquard'd Loom->Difference Engine->Analytical Engine->Modern Day Computer

Charles Babbage an English mechanical engineer and polymath originated the concept of a programmable computer that's why he has been considered as Father of Computer.

All the software can be divided into two main categories:

System Software:

Software which is essential for the computer system's working is known as System Software. For e.g. Operating System, Language Processor etc.

Application Software:

Application Software is a set of programs designed to carry out a specific task like word processor, spreadsheet program, presentation tools, railway reservation software etc.

In this chapter we will introduce basic working in OS like Windows and Application software like MyPaint application.

Based on the money paid to buy the licence of the software and the source code availability, all the software can be divided in two categories:

Proprietary Software:

Licence software for which money needs to be paid to procure the license of the software for the use. Moreover source code will not be available for further modification. For e.g. Microsoft's product like Windows, MS-Office, Photoshop etc.

Open Source Software:

Software which is freely available on the internet for use along with source code for further modification and distribution.

For e.g. Linux O.S, GIMP, MyPaint etc.

INSTALLATION GUIDELINES:

It's assumed that any one OS is already installed on the PC.

MyPaint application installation Guidelines:

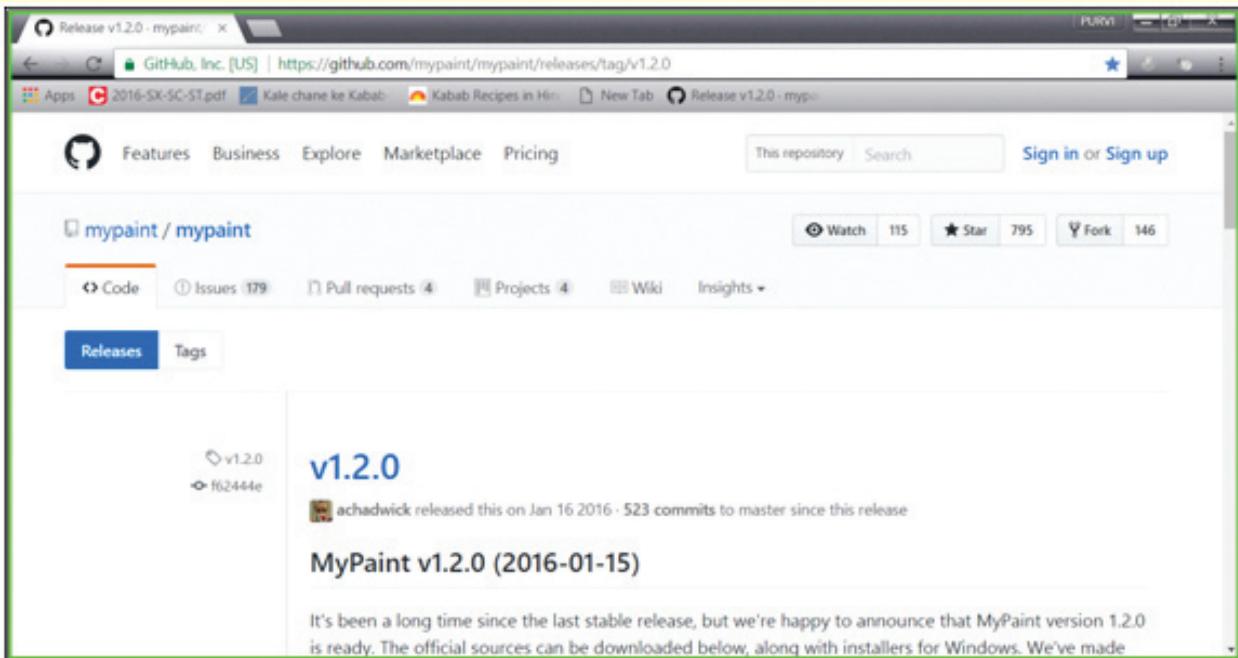
STEP-1

MyPaint's latest version can be downloaded from GitHub releases page. In this chapter, My Paint Application-1.2.0 has been taken into consideration.

To achieve the same, type the following URL in the browser and Press Enter Key

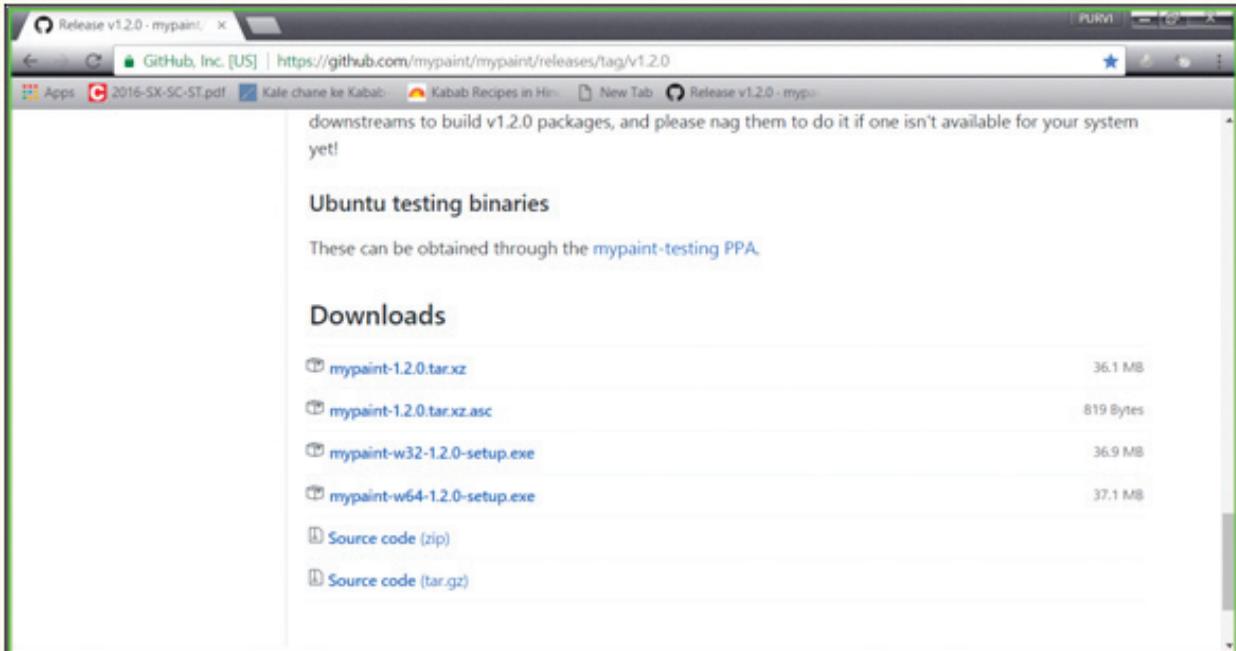
<https://github.com/mypaint/mypaint/releases/tag/v1.2.0>

My Paint's releases page will appear as shown below:



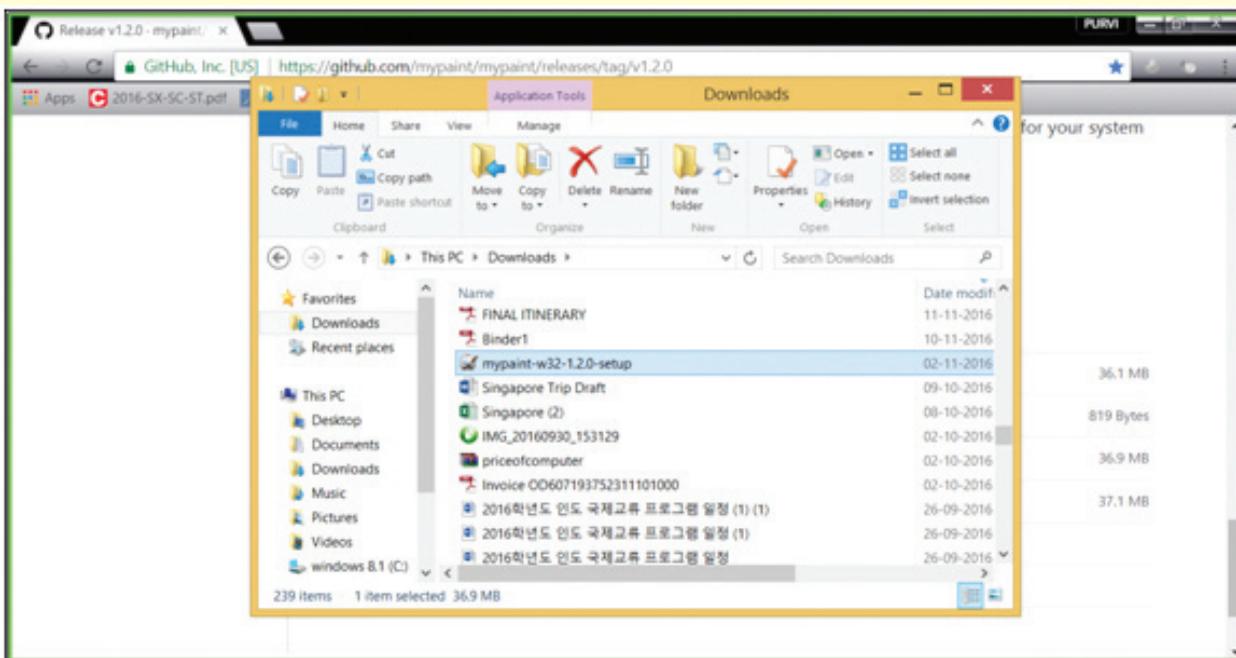
This page also contains an archive of all the historical releases, which can be seen while scrolling the page down.

Select the suitable version and start downloading by single click on the desired exe file.



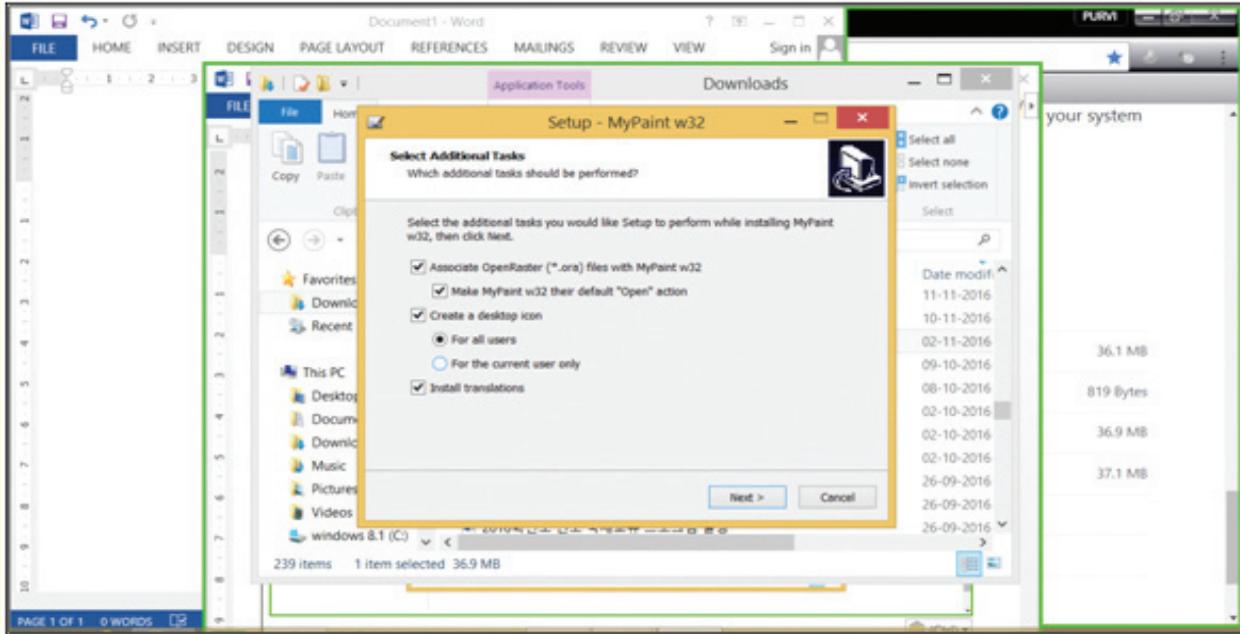
STEP-2

Within few minutes (depending upon internet speed), required setup will be downloaded in "Downloads" folder.



STEP-3

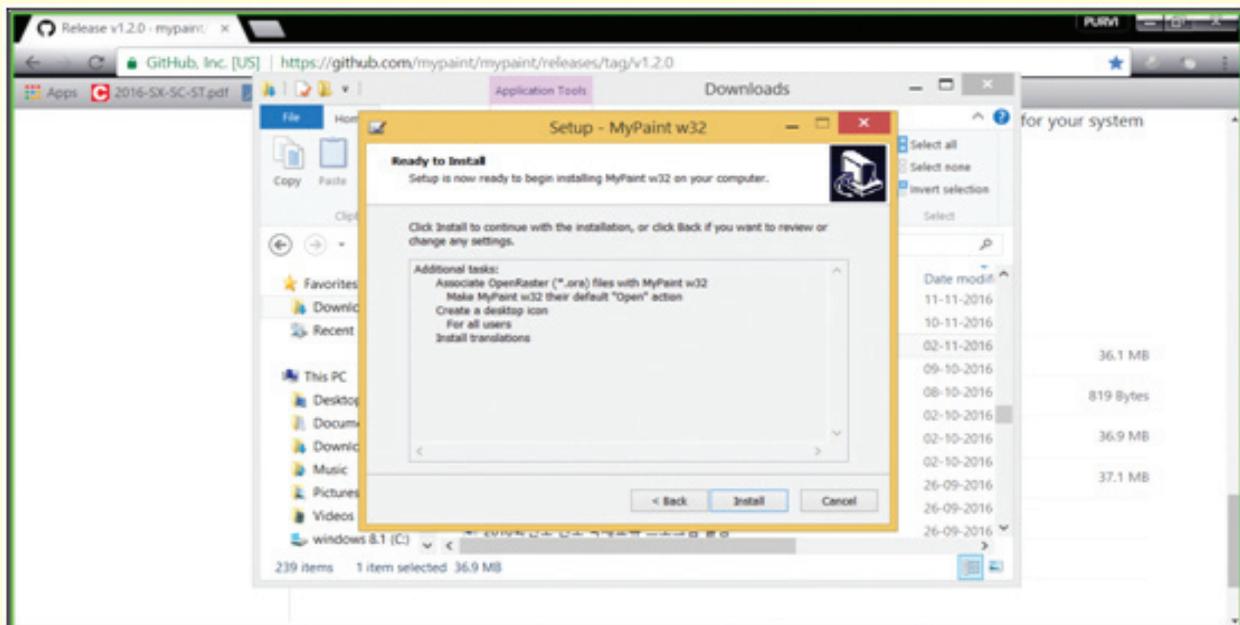
Double click on the setup file to start the installation wizard, as shown below:



Click on the Next button to go on next step.

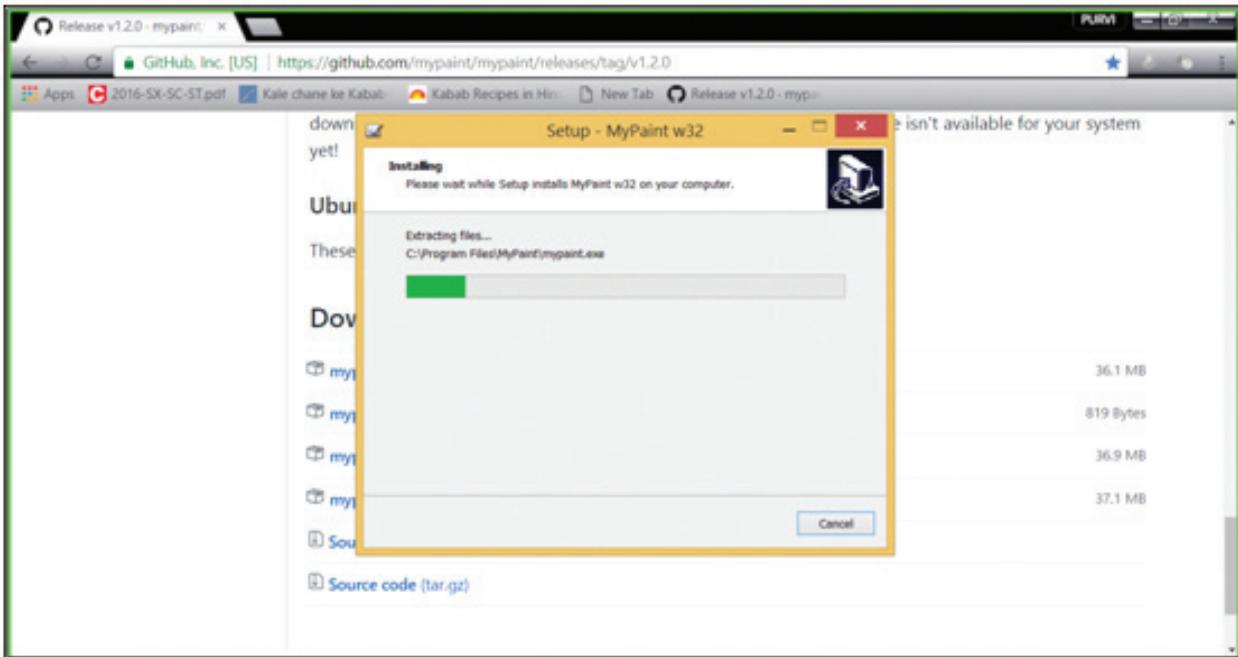
STEP-4

Click on the Install button to start installation.



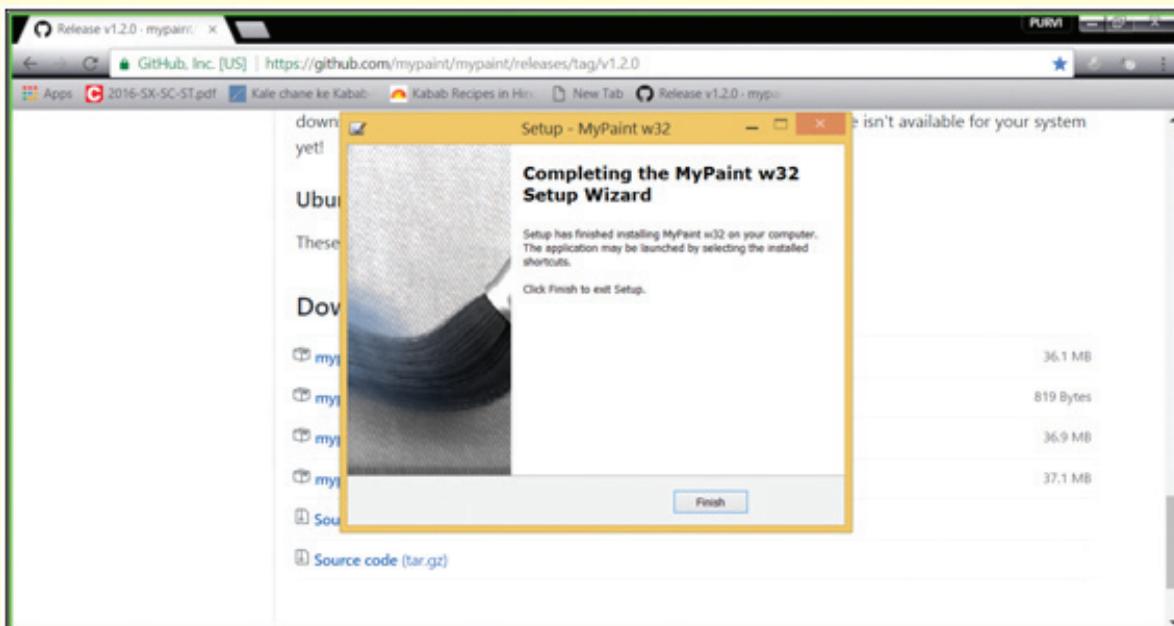
STEP-4

A progress bar will show the status of the installation.



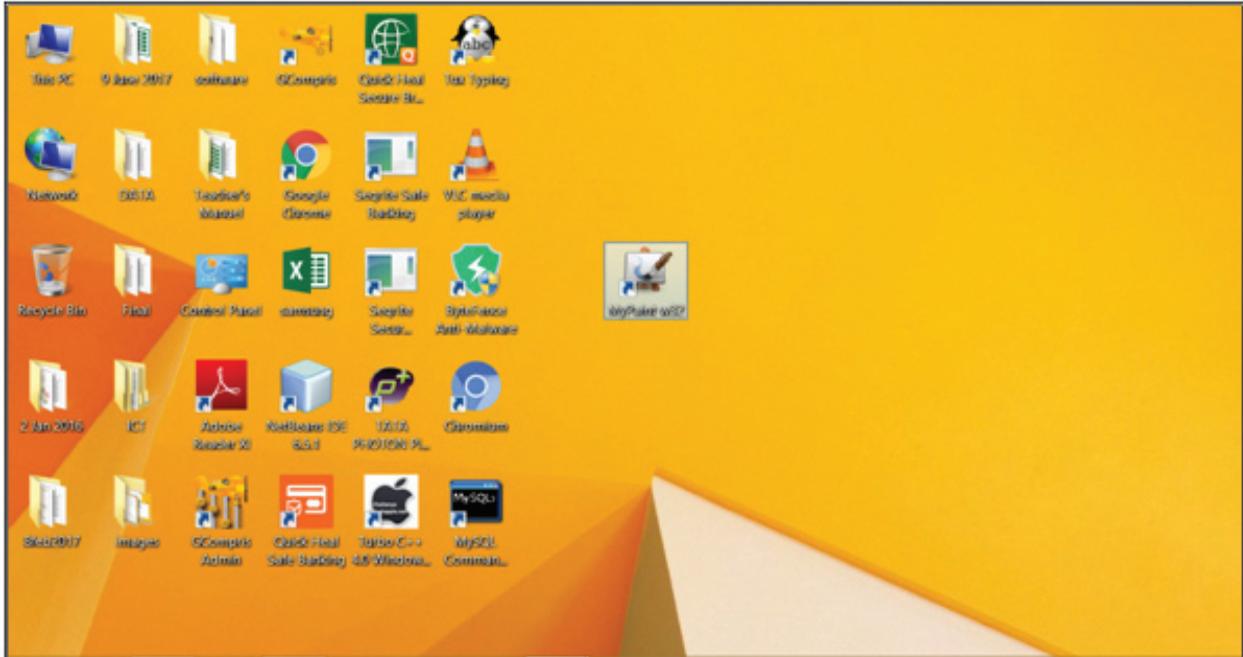
STEP-5

At the end, click on the "Finish" button. Setup wizard will disappear.

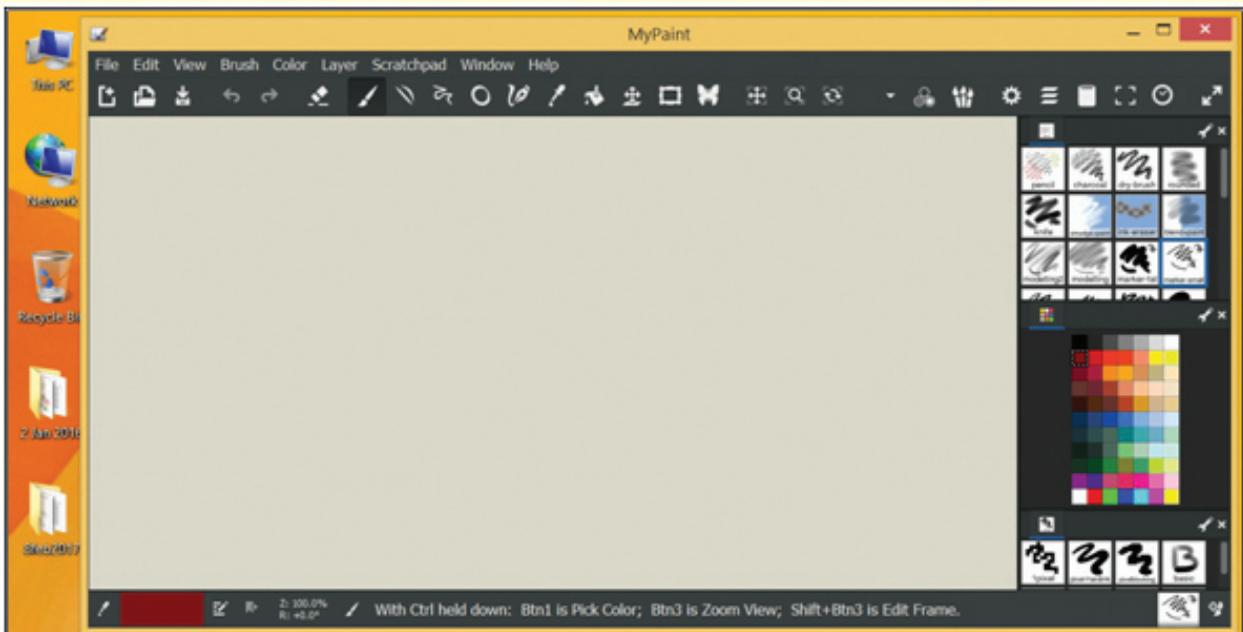


NOTE:

Observe the MyPaint shortcut icon appeared on the desktop screen.



Double click on the MyPaint's shortcut icon. MyPaint's application window will open as shown below:



ALTERNATIVE SOFTWARE : MS-Paint, Tux Paint etc.

NO OF PERIODS: 6

Topic	Theory & Demo	Hands On	Assessment	Total
ICT Environment	1	1	1	3
My Paint	1	1	1	3

SUGGESTED TEACHING METHODS

Teachers are advised to make their teaching more dynamic and result oriented by incorporating multidisciplinary approach. It's the need of the hour to have a holistic approach while teaching so teachers may explain any topic through daily life examples so that students find it easy to relate and feel connected.

Teacher may use following methodologies:

- Introducing computer and My Paint application through "Live Demonstration".
- Demonstration through online/offline videos if possible
- Classroom discussion involving the need of computer in our day to day life
- Teaching through role play
- Assignments & Practice Sessions

ACTIVITY WISE MAPPING (SKILLS, INTELLIGENCE, INTERDISCIPLINARY)

Topic: Graphics and Animation		Duration: 6 periods	
Activity and Aim	Skills related to the Subject	Multiple Intelligences Incorporated	Interdisciplinary
<p>Activity 1: Introduction of 'Computer System', 'Hardware', 'Software' and 'ICT' through class discussion.</p> <p>Aim: To introduce the Students to basic concepts of computer system</p>	Cognitive skill	Spatial visualization	Language (Hindi/ English), Drawing-Painting, General Knowledge, Environmental Education, Sports
<p>Activity 2: Introduction of Operating System, basic working in an O.S, creating folders and creating and saving file in the folder.</p> <p>Aim: To introduce the Students to basic concepts of O.S and main steps to start working in an O.S by creating folders and files.</p>	Cognitive skill	Spatial visualization	
<p>Activity 3: Introduction of Primary and Secondary storage unit.</p> <p>Aim: To introduce the Students to basic concepts of temporary and permanent storage units of computer</p>	Cognitive skill	Spatial visualization	

<p>Activity 4: Helping Roshan in segregating few hardware and software mixed together and keeping them in separate Amirah.</p> <p>Aim: To help students in understanding the hardware/software with more clarity.</p>	<p>Problem solving skill</p>	<p>Spatial visualization, Logical Reasoning Intelligence</p>	
<p>Activity 5: Introduction of My-Paint application, main components of My-Paint window, working with different type of brushes, making different shapes and scenery through various tools/brushes available on the toolbar.</p> <p>Aim: To introduce the students to MyPaint application and basic steps to work in MyPaint application.</p>	<p>Cognitive skill, Problem solving skill, Creative/Aesthetic Skills</p>	<p>Spatial visualization, Naturalistic Intelligence</p>	
<p>Activity 6: Finding out differences in between two pictures.</p> <p>Aim: To strengthen the student's minute observation skills and analytical skills.</p>	<p>Observation skills, Analytical skills, Problem solving skill</p>	<p>Logical Reasoning Intelligence</p>	

<p>Activity 7: To give a title to the picture given based on the water pollution.</p> <p>Aim: To enhance creative and visualization skills of the students and make them aware of the environmental ethics that we should not disturb aquatic animals by our unnecessary activities.</p>	<p>Ethical Skill, Critical thinking skill</p>	<p>Naturalistic intelligence, Linguistic Intelligence</p>	
<p>Activity 8: Making some imaginary patterns in MyPaint application.</p> <p>Aim: To encourage students to explore the options in MyPaint to draw various shapes and patterns.</p>	<p>Creative/aesthetic skill</p>	<p>Spatial visualization</p>	
<p>Activity 9: Matching up flags designed in MyPaint with its country.</p> <p>Aim: To give the students an idea of how 'Shapes tool' can be used to draw various flags and additionally recognition of correct flags related to the given countries.</p>	<p>Creative/aesthetic skill</p>	<p>Logical Reasoning Intelligence</p>	

<p>Activity 10: Creation of Olympic rings in MyPaint. Aim: To introduce the students to Olympics and its symbol.</p>	<p>Problem solving skill, Critical thinking skill</p>	<p>Kinesthetic Intelligence</p>	
<p>Activity 11: Story creation by creating small-small related scenes in MyPaint with brief description. Aim: To enhance visualization, thinking and expression skills in the students and to enable them in streamlining their thought and express scenes in progression.</p>	<p>Communication Skill, Creative/aesthetic skill, Critical thinking skill</p>	<p>Linguistic Intelligence, Interpersonal Intelligence</p>	

CRITICAL THINKING ENHANCEMENT

(Suggested Activities)

Teachers should encourage critical thinking enhancement with the help of some activities like:

- Story creation containing scenes with brief description.
- While discussion, visualizing and drawing of a natural landscape containing all greenery, flowers, flowing river, different weathers, students can be made aware about very important environmental issues like 'Global warming' also, so that the students can start taking care of the Environment.

REFERENCES

<https://en.wikipedia.org/wiki/Computer>

<https://github.com/mypaint/mypaint/releases/tag/v1.2.0>

ANSWER KEY

- I. l y k u h d k s d k w e 'A' e a f n , x , f o " k , l s l E c f / k r f p = d k w e 'B' e a y x k u k
 F k y s d u d n H e d h o t g l s m l l s d k w e 'A' l s l E c f U k r f p = d k w e
 'B' e a x y r y x x , g a m l d h l g k r k d f j , r k d o k s d k w e 'A' f n , x ,
 f o " k , d k s d k w e 'B' e a f n , l g h f p = l s f e y k l d a

d k w e 'A'	d k w e 'B'
M d V k W	
y S V k W	
i s u M b o & g k M s j	
i k e V k W	
f o u n t & l k W o s j	

II. c g f o d Y i k i z u

1. d
2. b
3. c
4. d

III. **fj Dr LFku Hjka**

- a. Information and Communication Technology
- b. File
- c. Primary Storage Unit
- d. Classical and Experimental

IV. **l gh okD; ds vks l gh (√) rFlk xy r ds vks xy r ½½dk fpUg yxk; A**

- a. √
- b. √
- c. x
- d. x
- e. √

V. **y?kqmkj h; izuA**

A. **dE; Wj dh i fjHk'k nA**

Ans. dE; Wj , d byDVWd ; æ gS t k l p u k d k l æ g h r (Storage) d j d \$ m l d k t k M & r M (Manipulation) d j u s e a g e k j h e n n d j r k g S , o a m l d k f n , x , v k s k d s v u d i k j f o H u i z l k j d s d k e d j l d r k g A

B. **gekjnsud thou ds d k Z p k j { k = c r k ; s t g k i j C o m p u t e r ½ d E ; W j ½ d k m i ; k x c g r k r l s g k r k g A**

Ans. gekjnsud thou ds d k { k = t g k i j d E ; W j d k m i ; k x c g r k r l s g k r k g A

- & $\frac{1}{4}$ oal $\frac{1}{2}$ Storage.
- f'kk ds {k= ea iHodkjh v \int eukj t d rjhds l s Kku iHr djuka
- gkLi Vy eafcekj; kadk irk yxkusea v \int ejht kadk bykt +djusea
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- bZsy] pSV α] fofM; k dkW \int fl α l s fe=k Q kol k; d l a dZ, oaifjokj l s l EcUk LFkfi r djuka
- c \int da eal fo/kt ud rjhds l s eek dk yu&nsuA
- ; k=k $\frac{1}{2}$ syo@golbZ@l Me $\frac{1}{2}$ dh t kudkjh v \int fVdV c \int daA
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- foKku ds {k= ea u; h [kt v \int rdulfd; kadk t kuis v \int l e>usea
- v \int WZv \int fMt kbZi ds {k= ea

C. v \int dkj ds v \int kkj ij dEI; Wj fdruh rjg ds gk l drsg \int ule crk a

Ans. v \int dkj ds v \int kkj ij dEI; Wj rhu rjg ds gk l drsg \int
 Me $\frac{1}{2}$ Vk \int yS V \int i kV \int

D. v \int WjSV α fl LVe ij l f'kr fVi. kh fyf[k A

Ans. v \int WjSV α fl LVe (O.S. Operating System) ; g mi; k \int drkZ (User) v \int
 dEI; Wj ds chp dh dMh gSt k; wj l svks'k ydj dEI; Wj rd ig \int krh
 gSv \int dEI; Wj ds m \int kj dks; wj rd ig \int krh g \int ; g i k \int te dk l dg gS
 t k dEI; Wj ds cfu; kh l pkyu ds fy; s v \int o'; d g \int rk g \int ; g l c igys
 'lq gkdj nwjs i k \int te dks f \emptyset ; k'khy gkus ds fy, l q k \int ; ek \int y cukrk
 g \int

E. ICT dh l f{kr Q k[; k dfj, A

Ans. ICT dk eryc gkrk gSbuQkZku v[; dE; fud[ku VDUkykWA ICT vud l puk v[; l adZrdulfd; kdk l ekxe gSft l dh enn fofHku l pukvka dks , d cgrj v[; iHkodkj rhds l s [kt dj iZrq fd; k t k l drk gA

VI. nk?ZmUkj; i zuA

A. dE; Wj dh dk; Zzkyh dk CykW fp= l sl e>k A

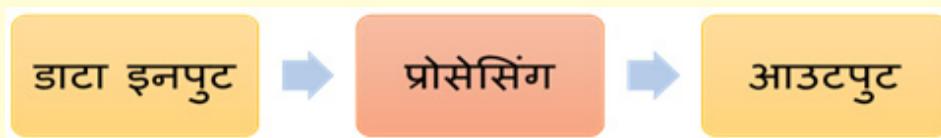
Ans. dE; Wj eq; r%rhu Hkx ea c[k gkrk g&

buiV ; fuV (Input Unit) %bl Hkx l s dE; Wj ea MKk , v[v[; vks k fn; k t k l drkSt \$ s dh kMZ (Keyboard) ekml vknA

vkmiV ; fuV (Output Unit) %iH LM MKk vkmiV ; fuV ij gh fn [kbZ nrkg \$ t \$ s dh ekWVj] fi v[; vknA

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dE; Wj dh dk; Zzkyh dk CykW fp=



B. fuEufyf[kr eaHm crk A

I. gkM[s j v[; l k[Wos j

Ans. gkM[s j Hkrd , oa okLrfod mi dj. k ft udks ge ns[k dj v[; Nwdj

eglw dj l rs g\$ mudks gkM\$ j dgrs g\$ mngj.k ds fy, % ekWVj] ekml | dhckM\$ gkMMLd] l hMh isu Mbo , oal pkj mi dj.k t\$ s dh dEI; Wj] y\$VKM] ekckby Qku] VcyV vkfna

l kWos j , ds iske dk lew t k l pkj mi dj.k dks f0; k kly cukrsg& mudks l kWos j dgrs g\$ t\$ s fd vkWj\$Vx fl LVe foMkt & Windows, fyudl & Linux i\$Vx l kWos j] vWQl l kWos j] vlsj t h vki su vWQl %openoffice.org, M.S. Office 1/2 x\$e\$ l kWos j] Qk\$ks , fM\$Vx l kWos j t lei (gimp, photoshop) vkfna

II. Qkbyl v\$ QkMj

Ans. Qkby (File) %fdl h Hh fo"k; l sl Ecf/kr l kjh l puk; k M\$K dks, d t xg ij l xzgr fd; k t k l drk g\$ ft l dks Qkby dgrs g\$

QkMj (Folder) , d fo"k; dh l kjh Qkbyl dks, d t xg ij cgrj l g{k v\$ cgrj burt ke dh ot g l sl xzgr fd; k t k l drk g\$ ft l dk QkMl Z dgrs g\$

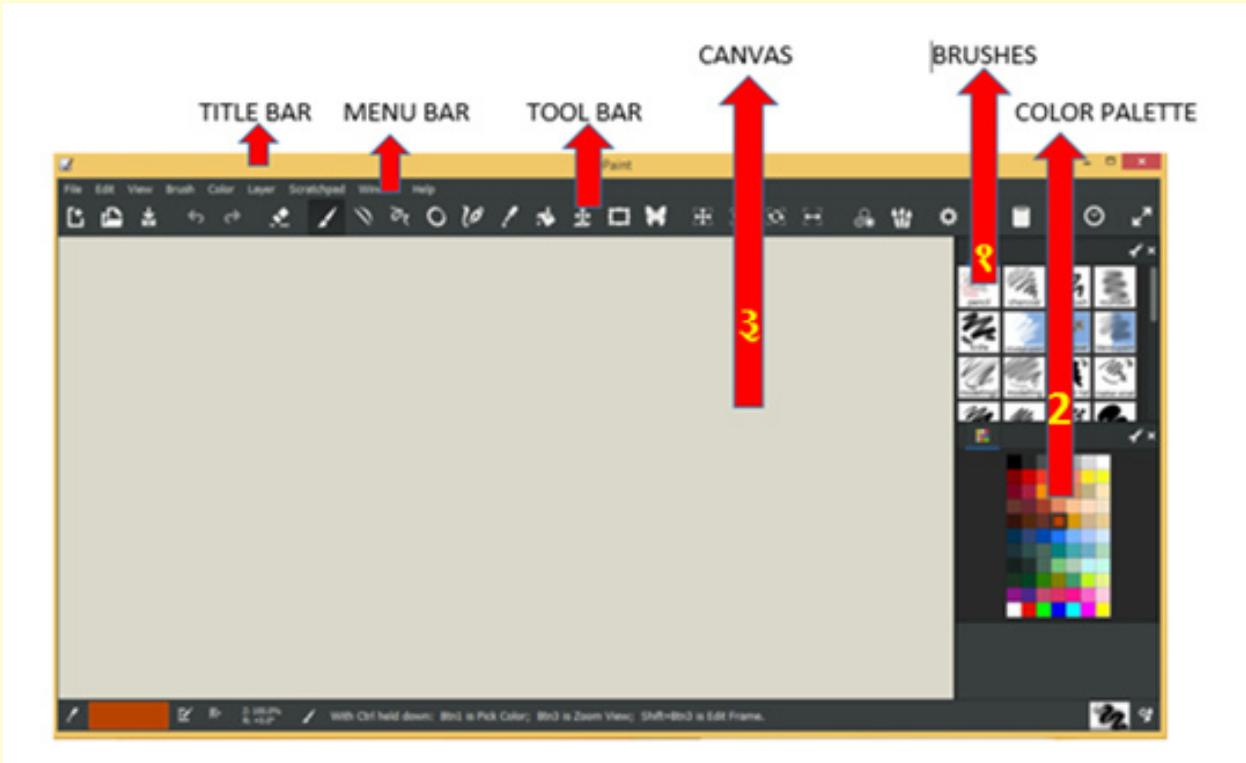
III. i\$bejh LVkst ; fuV v\$ l \$Mjh LVkst ; fuV

Ans. i\$bejh LVkst ; fuV dEI; Wj eal puk igysvLFk; h: i l sl xg gkrh g\$ 1/2 LFk; h l xg 1/2 ft l dks ch eat : jr ds vud kj ge LFk\$Z cuk l drs g\$; g nkrjg dh g\$ l drh g\$ RAM (Random Access Memory) & ROM (Read Only Memory)

l \$Mjh LVkst ; fuV 1/2 LFk\$Zl xg 1/2; gk ij l puk LFk\$Z: i l sl xg gkrk g\$ t \$ s fd Hard Disk, CD, DVD, Pen Drive etc.

C. ulpsfn, x, My Paint dh LØhu ds dākuvl dk uk fy[k A

Ans.



D. My Paint eaMba djusdseyHw LVl dksfy[k

Ans. LVi 1- czk l D'ku l seuplgk czk pousdsfy; sczk dsÅij ekml iWwj ykdj ck; cVu dksnck, Å

LVi 2- jxk ds l D'ku l seuplgk jx pousdsfy; sjx ds Åij ekml iWwj ykdj ck; cVj dksnck, Å

LVi 3- vc dsiol dsÅij euplgh t xg ij ekml iWwj ykdj ml ds ck; cVj dksnck, sj[kdj euplgh fn'k ea [kp dj ekml ds cVj dks NkM-nj euplgh js[k f[kp pph gkxh

Programming 01

Learning to Create with LOGO Programming.

(LOGO dh l gk, rk l s Programming)

GENERAL OBJECTIVES:

- To develop Thinking Skills.
- To develop self-awareness while teaching programming.
- To aid the understanding of Mathematical shapes and basic calculations. (Using BODMAS).

SPECIFIC OBJECTIVES:

The student will attain the ability to :

- Understand the concept of Program.
- Demonstrate the possibilities of movement.
- Visualise space, and shapes through movement and vice versa.
- Demonstrate instructions that simplify the task; using repeat
- Visualise the construction of a shape through a set of repeating instructions.
- Perform simple mathematical calculations.

TOOLS USED: MSW Logo

HARDWARE REQUIREMENT: Computer System, Projector

INTRODUCTION

Seymour Papert is known as the "father of Logo". The Logo programming language was developed in the 1960s, and has been included in the curriculum to introduce basic programming concepts. It has been popular as a language for the teaching of mathematical ideas to children through computer programming. The onscreen cursor Turtle usually displayed as a triangle or a turtle is moved and turned through simple commands thus helping student understand Basic geometrical ideas (2 -D) through Hands on activities.

As per Wikipedia, "Turtles are a class of educational robots designed originally in the late 1940. These devices are traditionally built low to the ground with a roughly hemispheric (sometimes transparent) shell and a power train capable of a very small turning radius. The robots are often equipped with sensor devices which aid in avoiding obstacles and, if the robot is sufficiently sophisticated, allow it some perception of its environment. Turtle robots are commercially available and are common projects for robotics hobbyists."

LOGO IN 21ST CENTURY

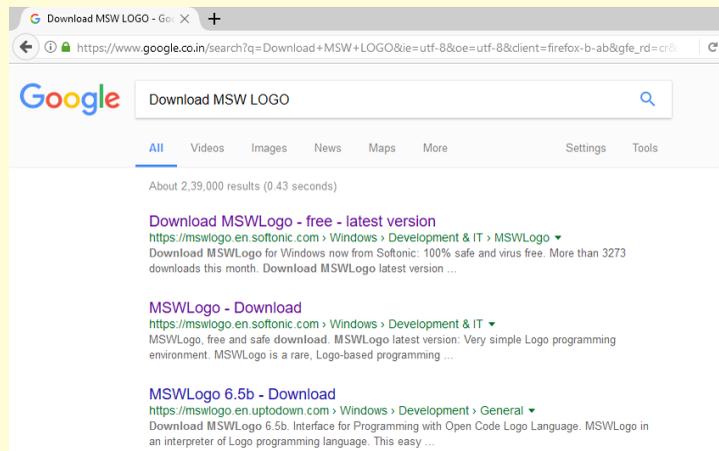
In 2004 a new Logo programming environment called Scratch emerged from the Lifelong Kindergarten Group at the MIT Media Lab. Following from the popularity of Scratch, blocks programming has become widespread and is used in a number of other Logo applications including Turtle Art, Scratch for Arduino, Snap!, and StarLogo TNG .

INSTALLATION GUIDELINES:

MSW LOGO is a free software and hence can easily be downloaded from the Internet. You can follow the following steps to Install MSW LOGO on your PC:

STEP-1

Use Google to find sites that allow downloading of MSW LOGO

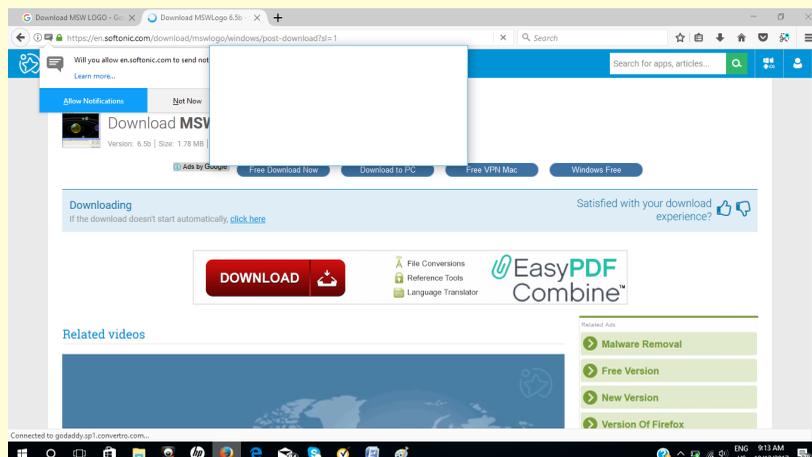


STEP-2

Choose anyone option, we are using the first option i.e. <https://mswlogo.en.softonic.com/>

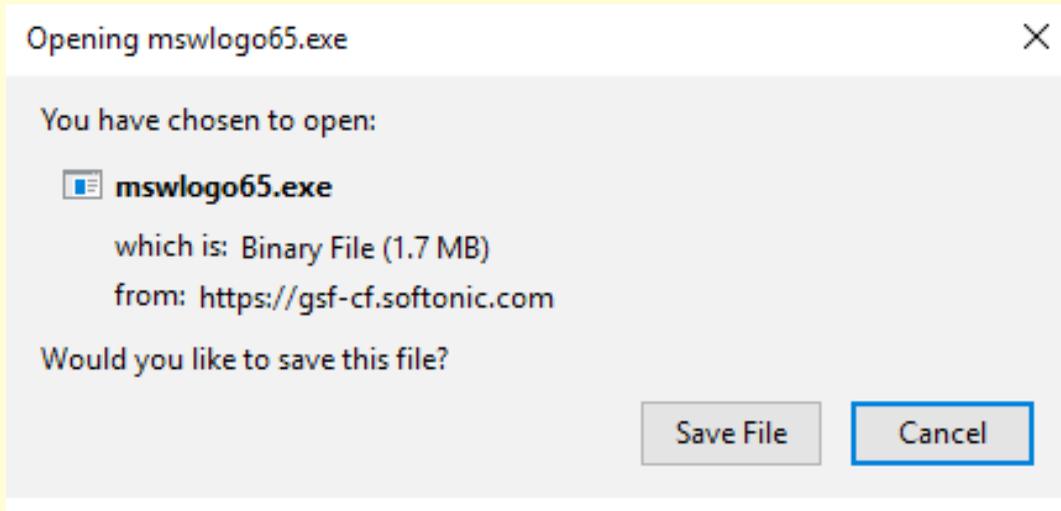
STEP-3

Click Download



STEP-4

The following dialog box appears:

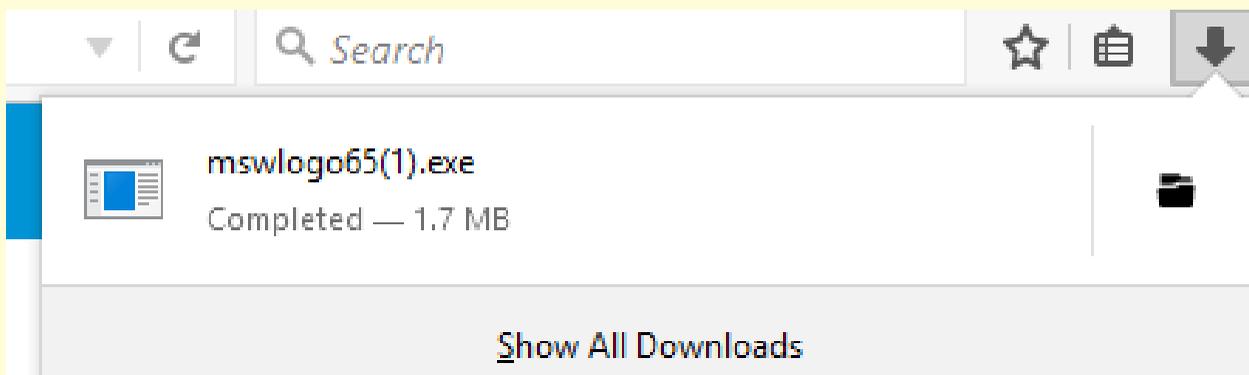


STEP-5

Click on Save File

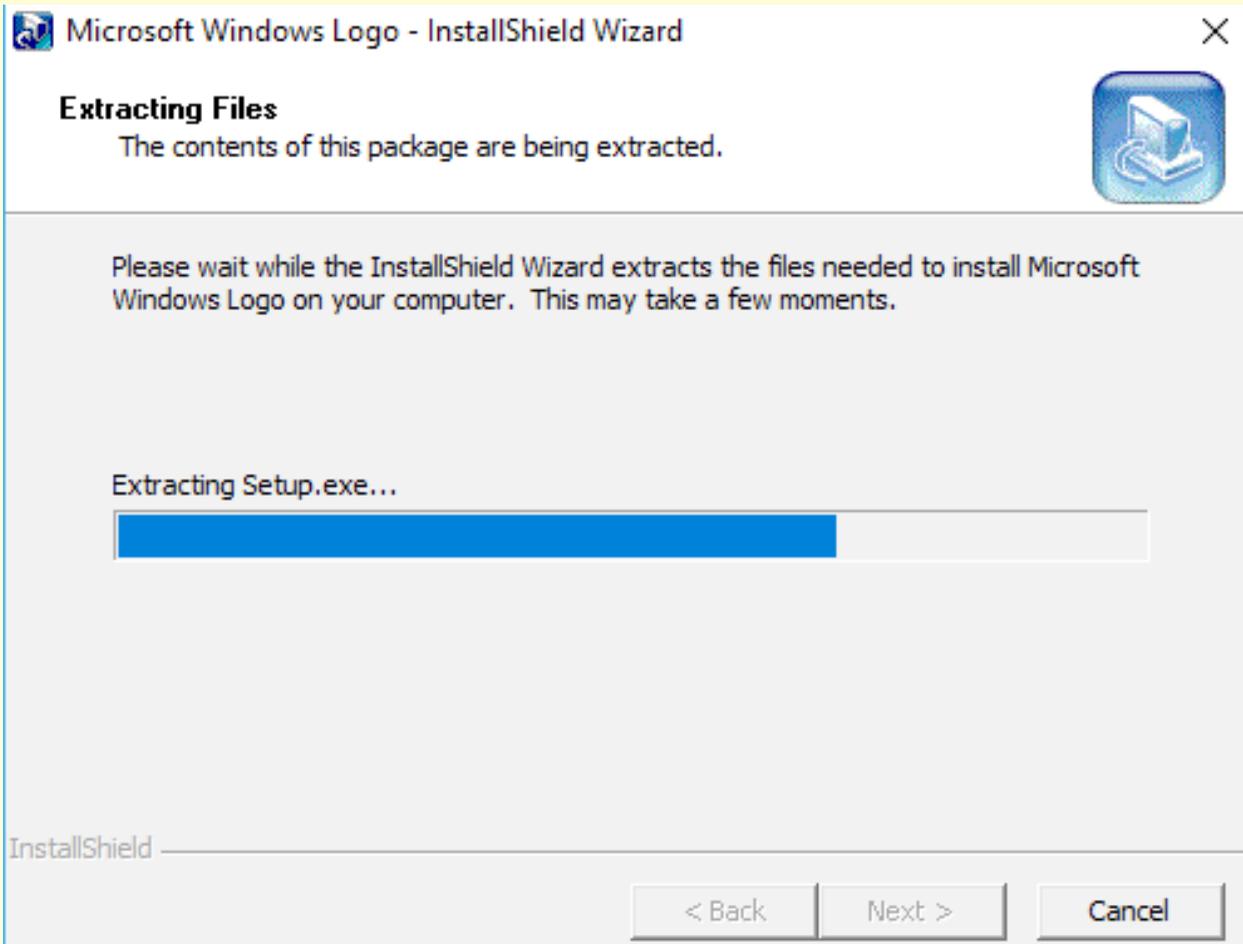
STEP-6

The file is downloaded and can be accessed from the Downloads folder

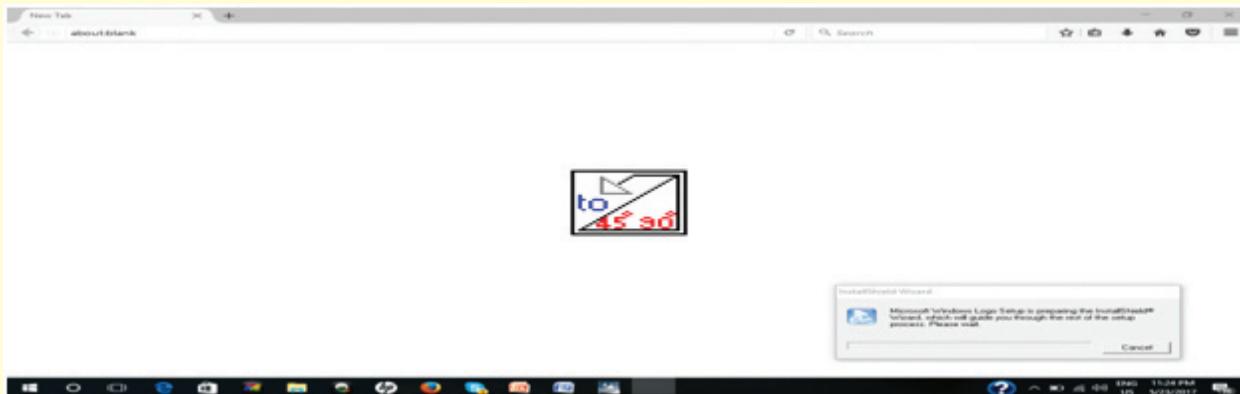


STEP-7

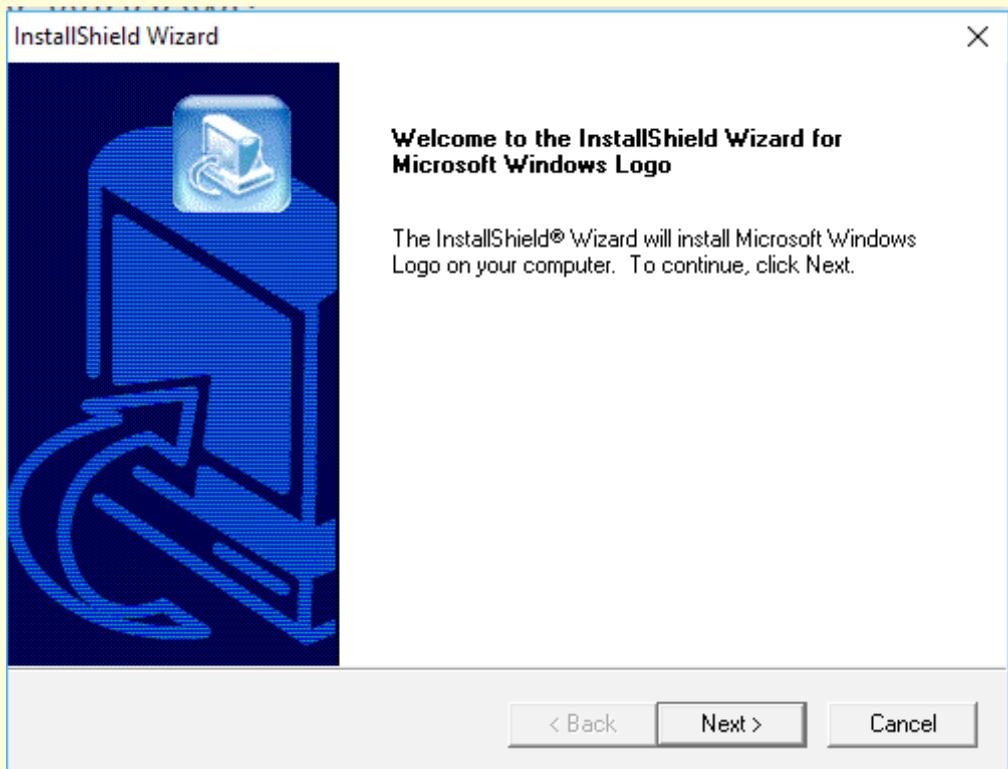
Click on the file , and follow the steps



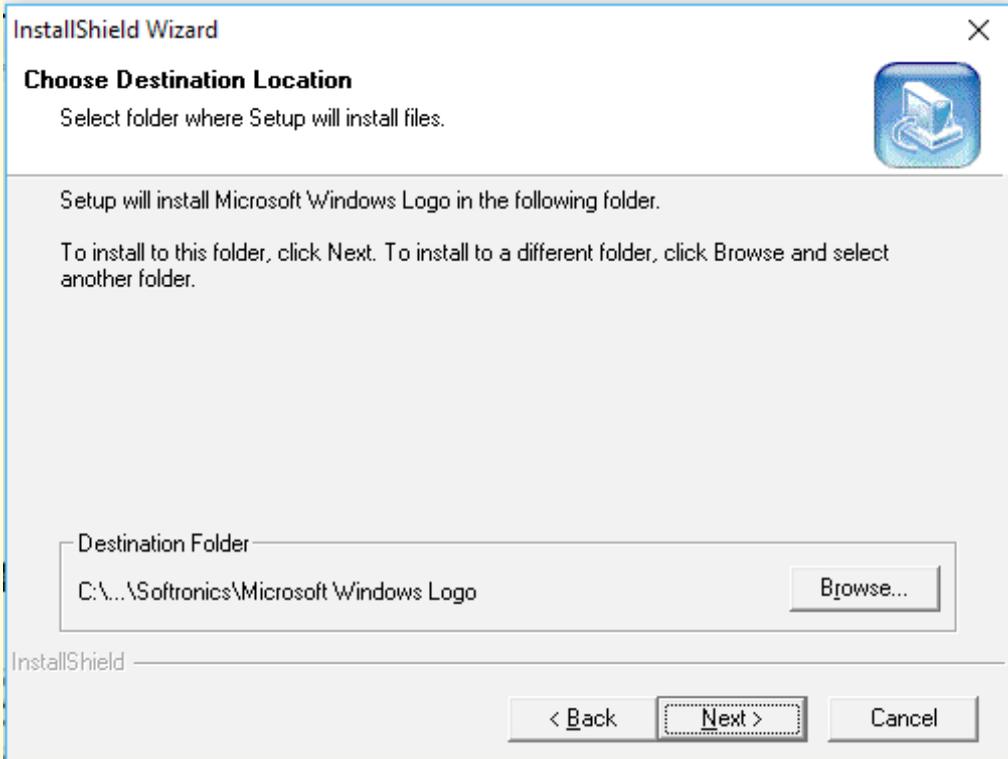
STEP-8



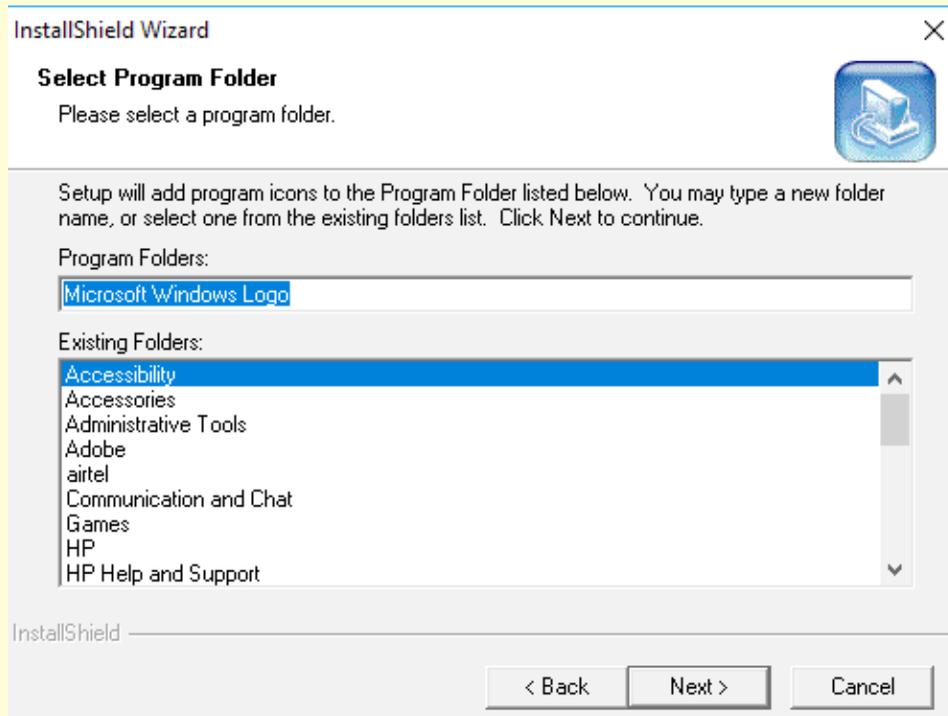
STEP-9



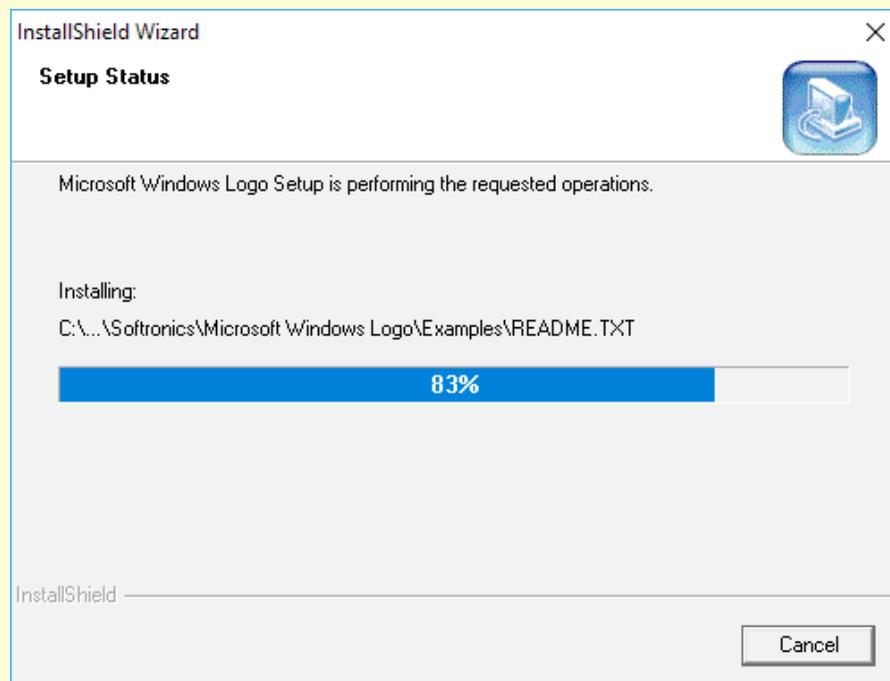
STEP-10



STEP-11



STEP-12



MSWLOGO will be installed in your system.

ALTERNATIVE SOFTWARE

UCB LOGO

Also called Berkeley Logo, this version was developed by Brian Harvey and colleagues at the University of California Berkeley. Versions are available for Linux, Windows, and MacOS.

MSW LOGO

Based on UCBLogo, this version by George Mills is for Windows.

FMS LOGO

It is an updated version of MSW Logo.

TERRAPIN LOGO

It is descended from Logo for Apple, which was developed by the Logo group at MIT and released by Terrapin Software in 1980. It has been continuously updated and is now available for Windows and MacOS. It is commercial software.

REFERENCES

<http://el.media.mit.edu/logo-foundation/index.html>

NUMBER OF PERIODS ALLOCATED:

Theory & Demo	Hands On	Assessment	Total
2	3	1	6

SUGGESTED TEACHING METHODS

The transaction should be such that students are not mere receivers but active participants expressing their interpretations and responding to fellow students' concerns. Since Programming nurtures a students' thinking skills, it is important that the classroom sessions involve exchange of ideas that would lead to generation of new programs besides the one mentioned in the classroom.

CLASS DISCUSSION (IN SMALL GROUPS OF 4 TO 5 STUDENTS) :

Students should be informed that through programming students can instruct the computers through sequential instructions to which the computer would respond. Real life examples such as :

Setting an alarm in a mobile.

Making Tea

Coming to School etc can be discussed to inform about importance of sequential execution of instructions

The teacher is suggested to:

- Decide how to arrange seating for discussion
- Identify the goal of the discussion and communicate it clearly
- Pose meaningful, open-ended questions.
- Keep track of discussion progress

ROLE PLAY: Role play is an informal dramatization in which student acts out a suggested situation. The teacher can ask one student to behave like a turtle and other to verbally give command to which the student acting as a Turtle will respond to. This will surely grab the attention of all the students and they will be able to appreciate their role as programmers and the programming language as well.

The teacher is suggested to:

- Describe the situation to be role played (Eg: draw a square)
- Select role players (A turtle and a programmer)
- Give instructions to role players (Explain the behaviour expected by the role players)
- Start the role play
- Discuss what happened

BUZZGROUPS: The class can be divided into teams .Teacher can discuss a program by writing the commands and asking each team to judge whether the command written by the teacher is correct or not with justification for which the team gets points.

The teacher is suggested to:

- Decide the teams.
- Inform about the rules.
- Maintain a scoreboard.
- Informing about the correctness or error in the response.
- Declare a winner and appreciate the efforts of all the students.

ACTIVITY WISE MAPPING (SKILLS,INTELLIGENCE,INTERDISCIPLINARY)

Activity	Skill(s) developed	Intelligence developed	Interdisciplinary
Activity 1: Solving a Maze	Decision making and fine motor skills.	Spatial Visualization	Mathematics
Activity 2: Execute FD 80, BK 10, LT 90 , RT 45 command and draw Output on the screenshot provided.	Problem Solving Skill	Spatial Visualization	
Activity 3: To draw a square using LOGO commands.	Problem solving skill, Critical thinking skill	Spatial Visualization, Logical reasoning	
Activity 5: Using Repeat command to draw a square.	Problem solving skill, Critical thinking skill	Spatial Visualization, Logical reasoning	
Activity 6: To draw a hexagon using LOGO commands.	Critical thinking skill, Decision Making skill	Spatial Visualization, Logical reasoning	
Activity 7: To calculate Area and Perimeter of a square.	Problem Solving Skill	Spatial Visualization, Logical reasoning	
Activity 8: To solve a mathematical expression and justify the answer.	Critical thinking Skill	Spatial Visualization, Logical reasoning	

CRITICAL THINKING ENHANCEMENT

Teacher is urged to adopt any innovative method to ensure that the students always remain interested.

Though the textbook contains planned activities and practice exercises, following suggested activities can also be taken up by the teacher.

1. LOGO program to draw a HUT. (Merging 2 shapes)

Solution : REPEAT 4 [FD 60 RT 90]

FD 60

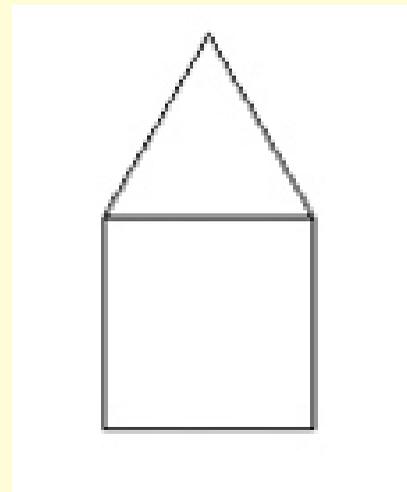
RT 30

FD 60

RT 120

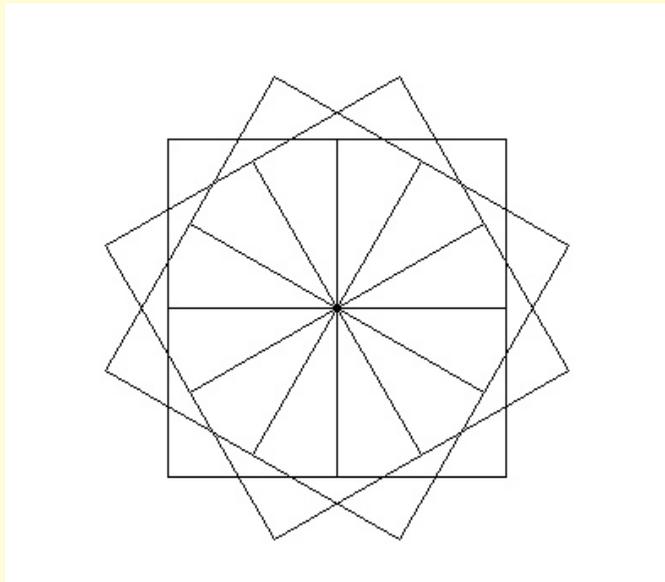
FD 60

HT

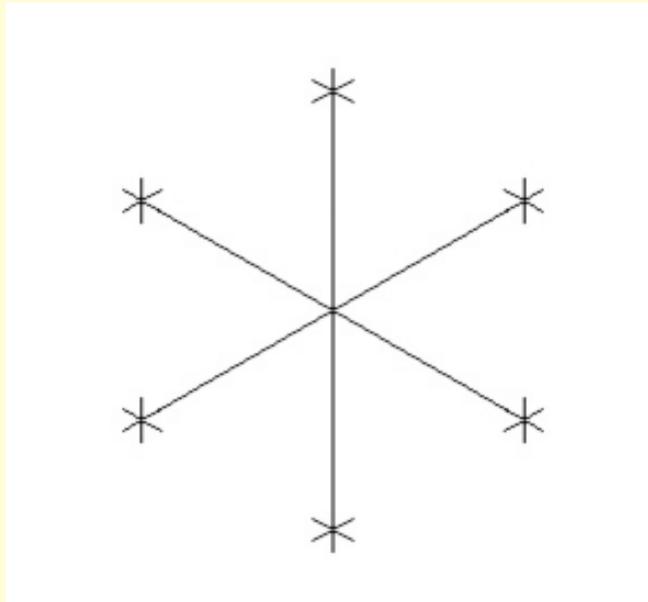


2. LOGO Program to draw the following pattern:

REPEAT 12 [REPEAT 4 [FD 100 RT 90] RT 30]



3. LOGO Program to draw the following pattern:



```
REPEAT 6 [FD 100 REPEAT 6 [FD 10 BK 10 RT 60] BK 100 RT 60]
```

Allowing students to experiment with LOGO commands would surely be fun. They might not draw a perfect shape but surely would learn a lot through their own experiences. Kindly appreciate their efforts as it will build their self-confidence and inspire them to learn more.

REFERENCES

Mindstorms Children, computers and powerful ideas, by Seymour Papert

www.logofoundation.org

<http://cis.csuohio.edu/~paul/logo.pdf>

ANSWER KEY

1. **cgfodYih izu**

1. LOGO es Horizontal line $\frac{1}{4}$ krt js $\frac{1}{2}$ cukus ds fy, dki lk command mi ; Pr gS



- a) RT 45
FD 100
- b) RT 90
FD 90
- c) FD 100
RT 90
- d) LT 70
FD 100

Ans. (b)

2. LOGO `fd` command `150`(calculations) `ht` `rt` `90`

- a) EXECUTE
- b) REPEAT
- c) PRINT
- d) LEFT

Ans. (c)

3. Turtle `setxy` `100`; `setxy` `200`

- a) INCH
- b) CENTIMETER
- c) STEPS
- d) PIXEL

Ans. (d)

4. LOGO `print` `100`

- a) PROGRAMMING LANGUAGE
- b) PROGRAM
- c) COMMAND
- d) INSTRUCTION

Ans. (a)

5. RT command dk iz ~~lx~~ fdl fy, fd; k t krk gS

- a) Move turtle
- b) Turn Turtle Right
- c) Run Turtle
- d) Hide Turtle

Ans. (b)

II. fj Dr LFku Hjs

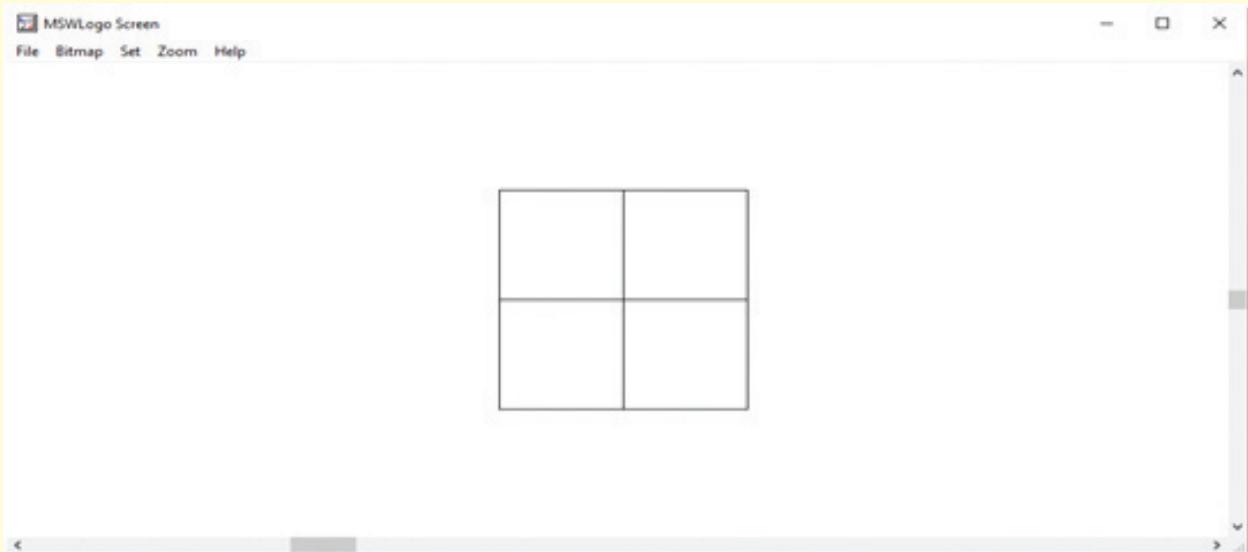
- a. Computer dh LØhu ij l cl s Nk's iz dk' kr ghus okys oxZ dk Pixel dgrs gS
- b. HOME command Input Box esType djus l sTurtle LØhu ds chpachp igp t krk gS
- c. Øekud kj fy [k instructions dk Program dgrs gS
- d. Command dk pykus ds fy, EXECUTE button ; kKeyboard l sENTER nck k t krk gS

III. l gh okD; ds vks l gh(✓) rFlk xyr ds vks(x) dk fplg yxk

- a. LOGO l sT; kfevr vkÑfr ugha culbZt k l drh gS (X)
- b. PRINT 4-2+3 or PRINT 4-(2+3) dk t ok-1 gS (X)
- c. REPEAT command l s vkÑfr nks ckj cu t krh gS (X)
- d. dE; Wj l s dk yus ds fy, ge Programming Language dk iz ~~lx~~ djrs gS (✓)
- e. ST command dk iz ~~lx~~ Turtle dk fn [kus ds fy, fd; k t krk gS (X)

IV. n?ZmÜkj; izuA

1. ulps fn, x, snapshot dks /; ku l s ns[kdj] bl s cukus ds fy, LOGO command fy [k]



(Hint : Square cukus ds fy, REPEAT command 4 ds cnys3 kj pyk avk cph
gZvk[k]hcommand t kfd FD 100 RT 90 er fy[k] doy FD 100
REPEAT command ds k n fy[k] bl Øe dks 4 kj fy[k])

Ans. REPEAT 4 [REPEAT 3[FD 100 RT 90]FD 100]

Internet & ICT Environment

Learning to Navigate the Web

(वेब पर जानकारी कैसे जाने)

GENERAL OBJECTIVES:

- Develop Cognitive, problem solving and creative skills.
- Make students Internet and ICT literate.
- Help students in connecting to the world through Internet.

SPECIFIC OBJECTIVES:

- Development of basic understanding of Internet and WWW.
- Introducing browser and its basic functionality.
- Familiarize with a web page and its layout.
- Familiarize with the structure, URL and navigation of a website.
- Knowing about search engine and their role.
- Searching for text and images from the web.
- Familiarizing with copyright and safe search

TOOLS USED: Browsers (Google Chrome, Internet explorer, Firefox etc.)

HARDWARE REQUIREMENT: Computer System, Projector

OTHER REQUIREMENTS: Internet connection through any ISP (Internet Service Provider) like MTNL, TATA, Reliance, Vodafone, Airtel etc.

INTRODUCTION

It's an era of networking! Almost everyone and everything is connected through one way or the other, hats off to the technology. We have never been so much linked as we are today. With the explosive use of internet and networking everywhere, it is highly required for the students to know the basic concepts of internet so that they can be connected to the whole world.

Internet is a network of networks i.e many computers across the globe are connected together to form internet.

The history of the Internet begins with the development of electronic computers in the 1950s. Initial concepts of packet networking originated in several computer science laboratories in the United States, United Kingdom, and France. The US Department of Defense awarded contracts as early as the 1960s for packet network systems, including the development of the ARPANET. The first message was sent over the ARPANET from computer science Professor Leonard Kleinrock's laboratory at University of California, Los Angeles (UCLA) to the second network node at Stanford Research Institute (SRI).

Access to the ARPANET was expanded in 1981 when the National Science Foundation (NSF) funded the Computer Science Network(CSNET). In 1982, the Internet protocol suite (TCP/IP) was introduced as the standard networking protocol on the ARPANET.

The ARPANET was decommissioned in 1990. Limited private connections to parts of the Internet by officially commercial entities emerged in several American cities by late 1989 and 1990,[5] and the NSFNET was decommissioned in 1995, removing the last restrictions on the use of the Internet to carry commercial traffic.

INSTALLATION GUIDELINES:

It's assumed that any one OS is already installed on the PC so one browser will be there already on the PC, i.e. if the O.S is windows so internet explorer browser will be there on the PC.

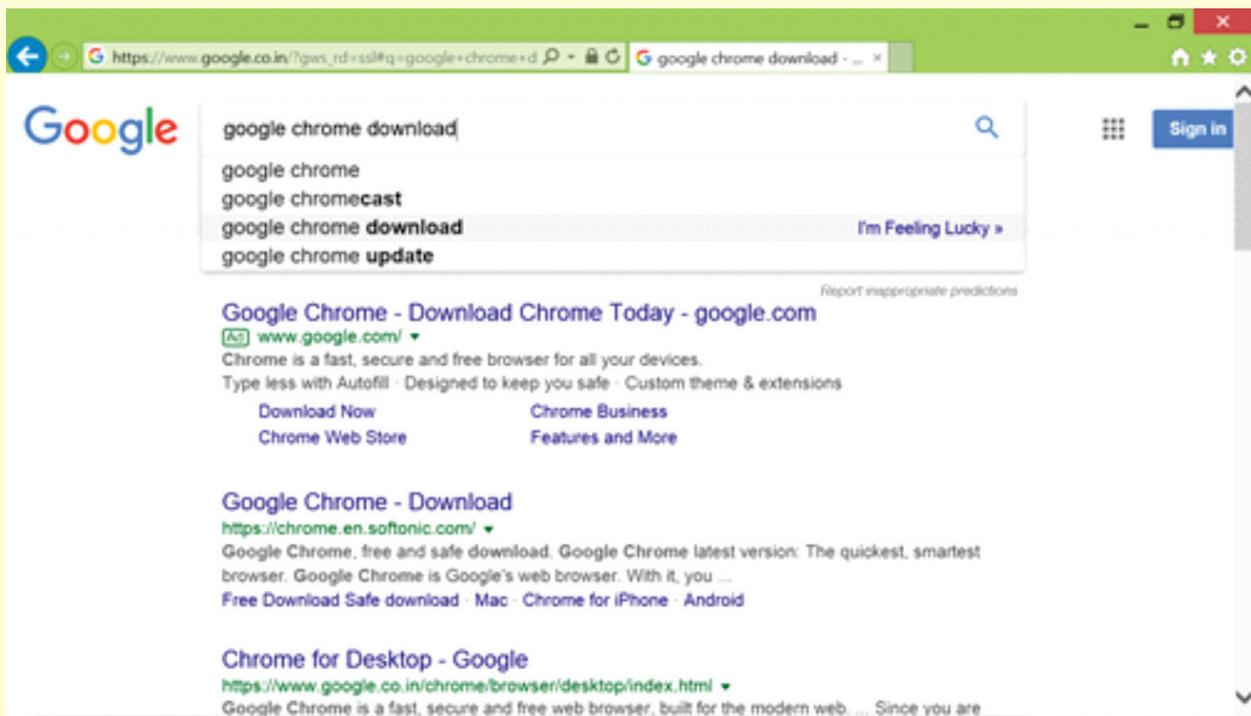
Google Chrome application installation Guidelines:



STEP-1

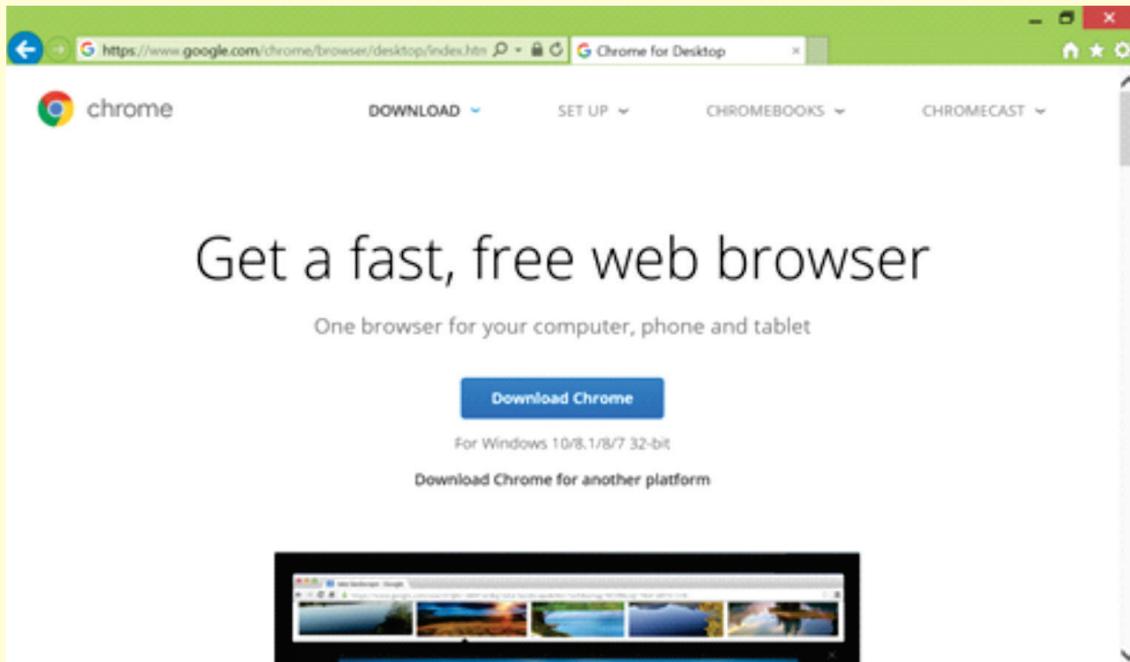
Open internet explorer by clicking on its icon which will be present either on the desktop or on taskbar:

Type Google Chrome download in the search box as shown below:



STEP-2

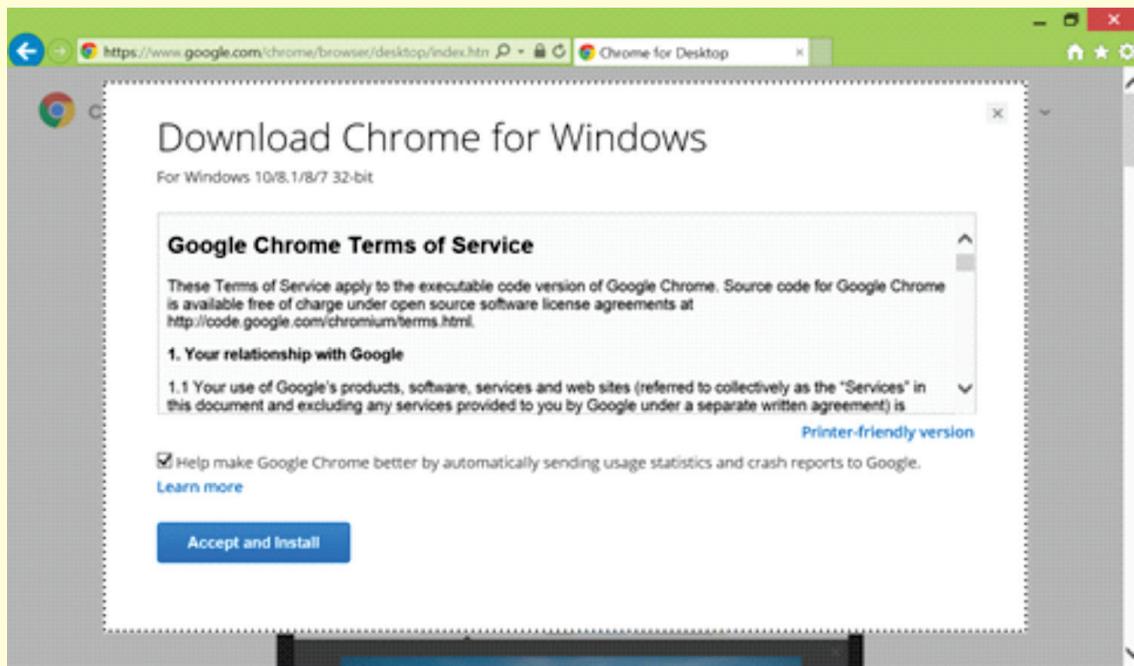
Many options will be available related to the search, select the suitable link (here first link is being clicked), download page will appear as shown below:



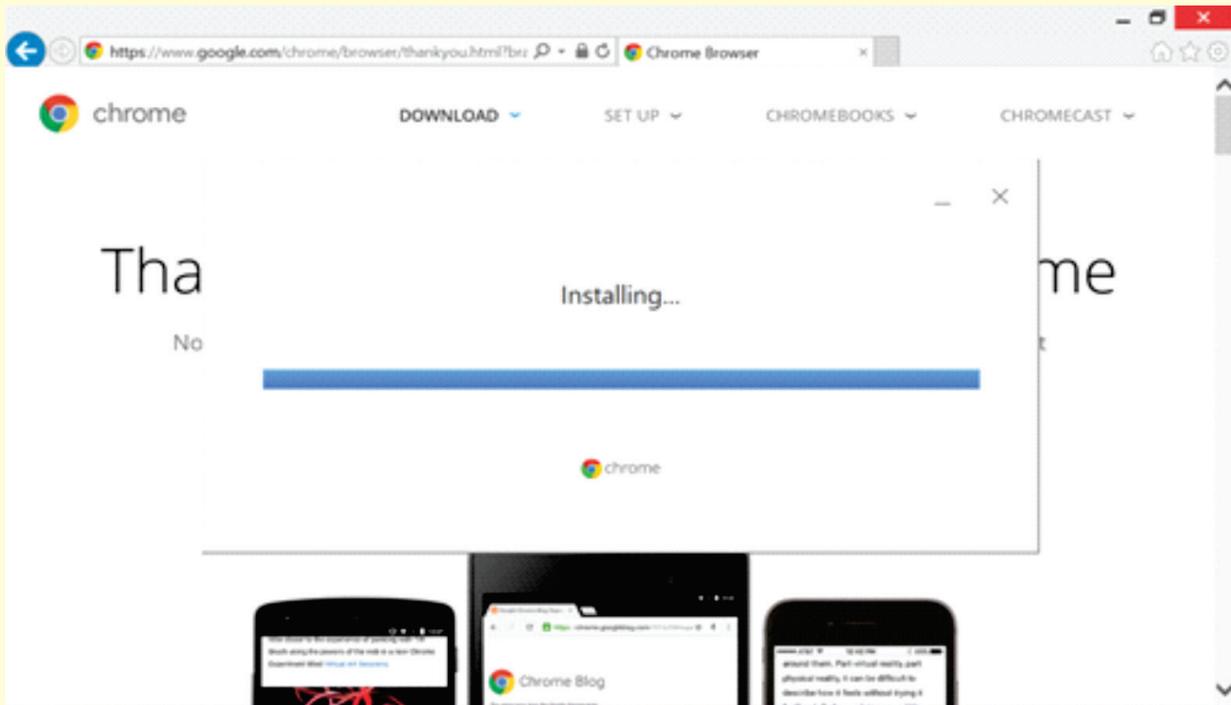
Click on the Download Chrome button.

STEP-3

Next window will appear as shown below, click on "Accept and Install" button.

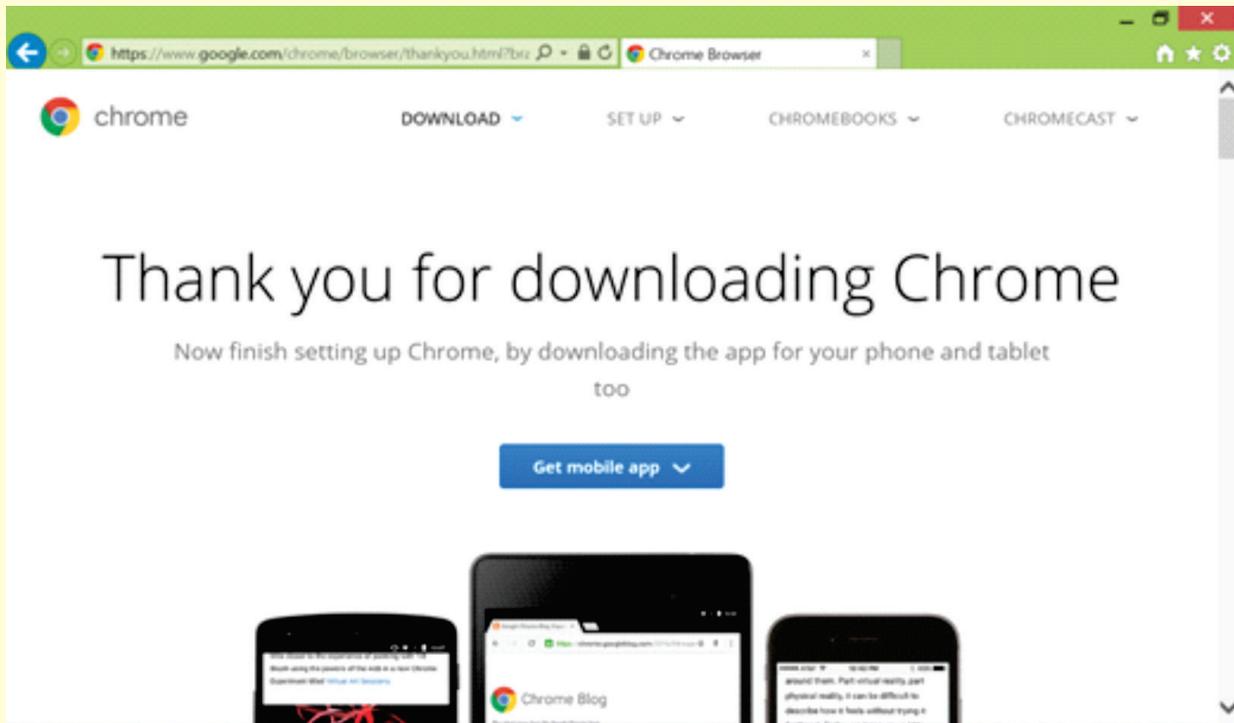


Installation will start as shown below:



STEP-4

At the end, following screen will be shown:

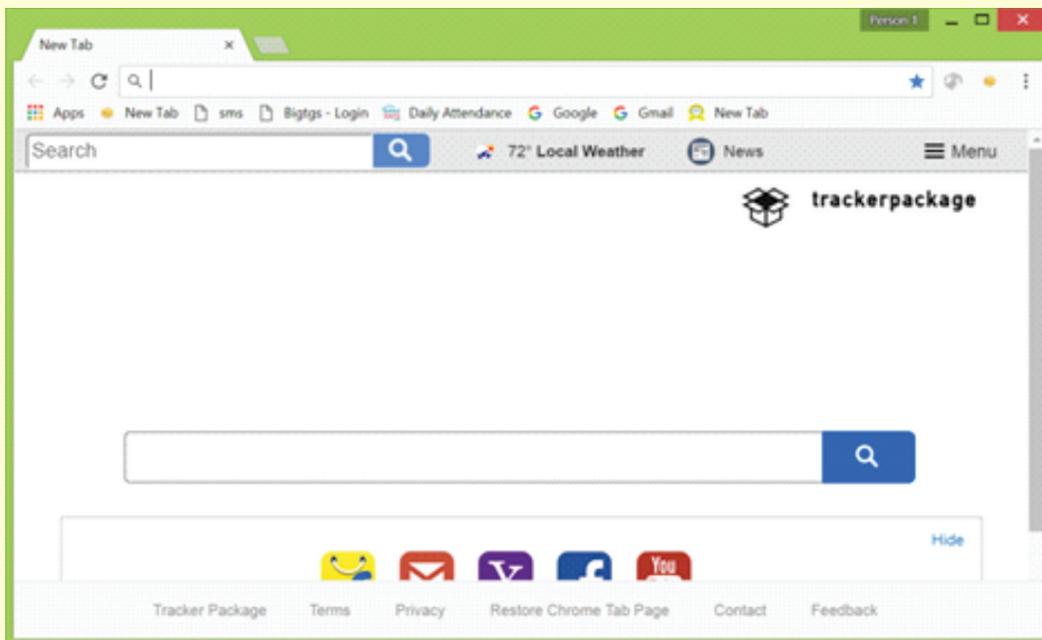


NOTE:

Observe the Google Chrome icon appeared on the desktop screen.



Double click on the Google Chrome’s shortcut icon. Google Chrome window will open as shown below:



Now get, set and go.....

ALTERNATIVE BROWSERS

Internet explorer, Firefox etc.

NO OF PERIODS: 6

Topic	Theory & Demo	Hands On	Assessment	Total
Learning to Navigate the Web	2	3	1	6

SUGGESTED TEACHING METHODS:

When it comes to the usage of technology/networking, undoubtedly kids are better than us. Due to their high interest in the subject, students may have a number of queries. Therefore it is recommended that the teacher should try to explain each and every topic with demonstrations & practical means and try to satisfy their queries and create an environment for critical thinking.

Teacher may adopt following methodologies:

- Active and open Discussion
- Live Demonstration
- Hands on practice
- Team based activities
- Peer group assessment
- Worksheet evaluation

ACTIVITY WISE MAPPING (SKILLS, INTELLIGENCE, INTERDISCIPLINARY)

Topic: Internet & ICT Environment		Duration: 6 periods	
Activity and Aim	Skills related to the Subject	Multiple Intelligences Incorporated	Interdisciplinary
<p>Activity 1: Mentioning various activities related to different task which can be accomplished on the internet.</p> <p>Aim: To help students in understanding the use of internet in various areas of our daily life.</p>	<p>Observation skills, Analytical skills, Problem solving skill</p>	<p>Spatial visualization, Logical Reasoning Intelligence</p>	<p>Languages (Hindi/ English), Sports</p>
<p>Activity 2: Matching up different browsers with its right icon.</p> <p>Aim: To strengthen the student's minute observation skills and analytical skills.</p>	<p>Observation skills, Analytical skills, Problem solving skill</p>	<p>Logical Reasoning Intelligence</p>	
<p>Activity 3: To find out different browser names hidden in the grid.</p> <p>Aim: To further strengthen the student's minute observation skills and analytical skills.</p>	<p>Observation skills, Analytical skills, Problem solving skill</p>	<p>Logical Reasoning Intelligence</p>	

<p>Activity 4: To open Olympic game's website and write the steps of the same in the box given.</p> <p>Aim: To increase the interest level of the students in sports along with learning to explore the internet.</p>	<p>Problem solving skill, Kinesthetic Intelligence</p>	<p>Spatial visualization, Logical Reasoning Intelligence</p>	
<p>Activity 5: To open few given popular websites and mention their URL in the space given.</p> <p>Aim: To give the students an idea of how 'Shapes tool' can be used to draw various flags and additionally recognition of correct flags related to the given countries.</p>	<p>Problem solving skill, Critical thinking skill</p>	<p>Spatial visualization, Logical Reasoning Intelligence</p>	
<p>Activity 6: To match founder's name with their company's logo.</p> <p>Aim: To let the students remember the founder of the company in a fun way.</p>	<p>Problem solving skill, Critical thinking skill</p>	<p>Spatial visualization, Logical Reasoning Intelligence</p>	

CRITICAL THINKING ENHANCEMENT

(SUGGESTED ACTIVITIES)

Teachers should encourage critical thinking enhancement with the help of some thought provocation discussion like:

- How our thoughts can be communicated to others sitting faraway place?
- Can we actually see and talk like we do in reality through internet? etc.

REFERENCES
https://en.wikipedia.org/wiki/History_of_the_Internet

ANSWER KEY

1. I R, e dks dkye 'A' ea bWjuV ds mi ; kx fy[k dj ml l sl EcfUkr fp=
 dkye 'B' ea yx luk FkA y fdu t Ynck t he aml l s dkye 'A' l EcfUkr fp=
 dkye 'B' ea xyr yx x, ga ml dh l gk rk dfj, rkd ols dkye 'A' ea
 fn, x, bWjuV ds mi ; kx dks dkye 'B' ea fn, l gh fp= feyk l dA

dkye 'A'	dkye 'B'
pSVx	
l fpx	
[kjlnkjh	
fVdV vkj{k k	

II. **cgfodYih izu**

1. b
2. d
3. d
4. b
5. a & c

III. **fjDr LFku Hjka**

- a. World Wide Web
- b. Address
- c. Webpage
- d. Google Chrome, Internet Explorer

IV. **l gh okD; ds vks l gh (√) rFlk xyr ds vks xyr (x) dk fpUg yxk; A**

- a. X
- b. √
- c. X
- d. √
- e. X

Data Representation & Processing 01

Learning to work with Spreadsheets

(Spreadsheets dik iz kx l h[kul)

GENERAL OBJECTIVES:

- To develop Problem solving and Decision making skills.
- To understand the importance of storing data and information.
- To store data systematically using spreadsheets.
- To be able to efficiently perform calculations and apply functions to summarize data.

SPECIFIC OBJECTIVES:

The student will attain the ability to :

1. Familiarise with different forms of data and the different types in which it can be captured .
2. Identify data elements and methods of organising it from given data sets.
3. Work with spreadsheets to input, order and analyse data–text and numeric.
4. Analyse different data sets and share findings.

TOOLS USED: Spreadsheet

HARDWARE REQUIREMENT: Computer System, Projector

INTRODUCTION

The process of storing data is important both for the purpose of producing new data and referring previous data for solving a problem. Data can be stored either as a text document or as a spreadsheet.

A spreadsheet can be defined as an electronic document which stores data in tabular form i.e. data is arranged in rows and columns format which facilitates quick reference and application of formulas and functions.

As per Wikipedia, VisiCalc was the first spreadsheet program followed by Super Calc, LOTUS 1-2-3, Excel 1.0 and its versions subsequently followed.

INSTALLATION GUIDELINES:

MS Excel is a proprietary software¹. It is part of the Microsoft Office suite. Hence, it requires a product key, a disc is no more required to start installing Office. Thus, making installation of Office simpler.

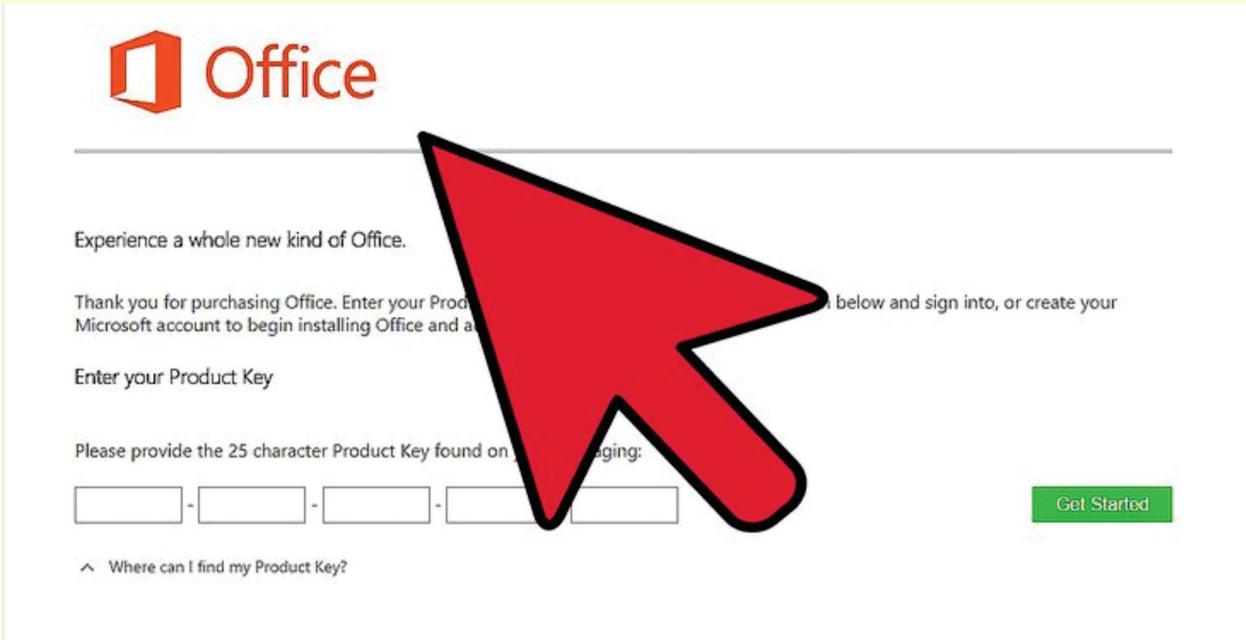
NOTE:

- To install Office 365 or Office 2013, we just need to download the files.
- For installing Office 2010, we can use the DVD or download an installer.

¹ A proprietary software needs to be purchased. It can be bought from an online store or from a local computer retailer.

STEP-1

Visit the Office Setup page. Open office.com/setup in your web browser.



STEP-2

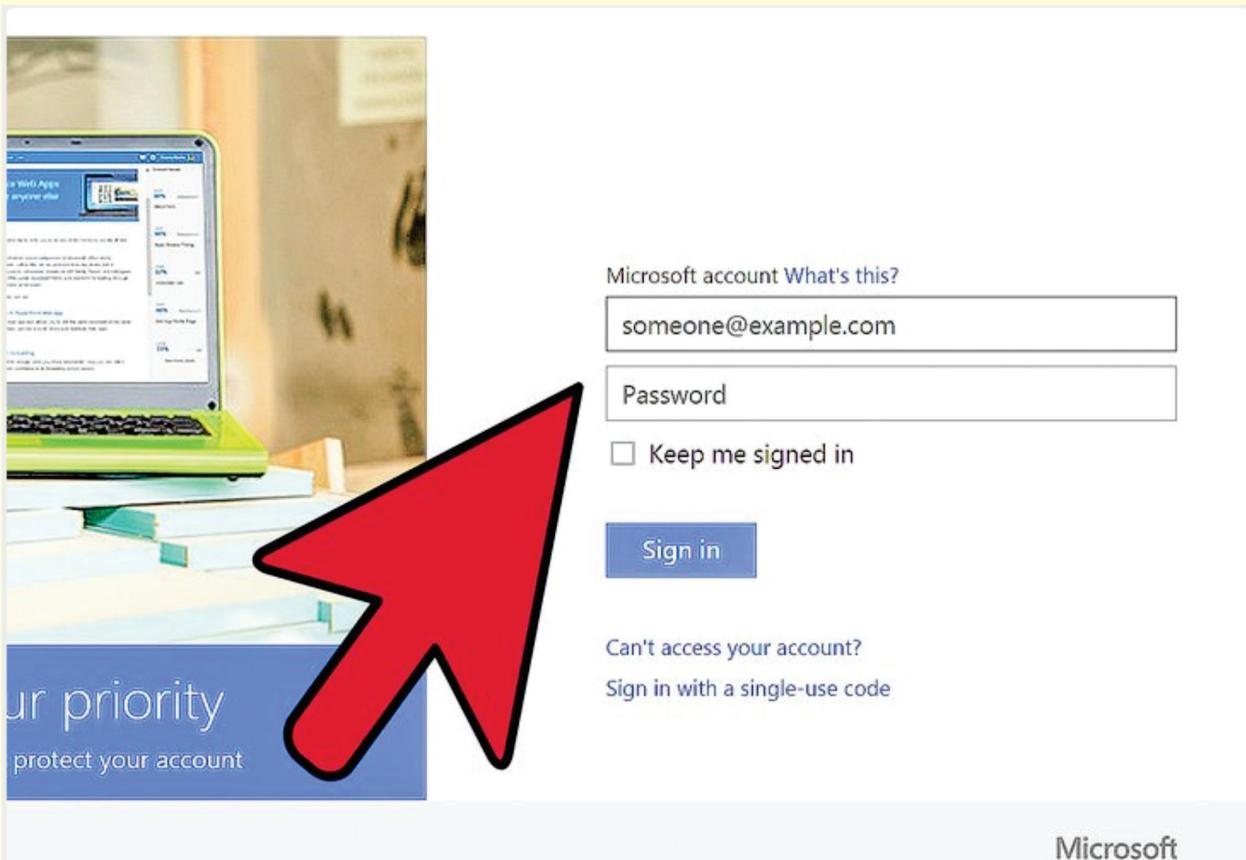
Enter your Office product key. This can be found on the card that comes with the retail purchase, or in the confirmation email or Microsoft Account page in case it is purchased online.



STEP-3

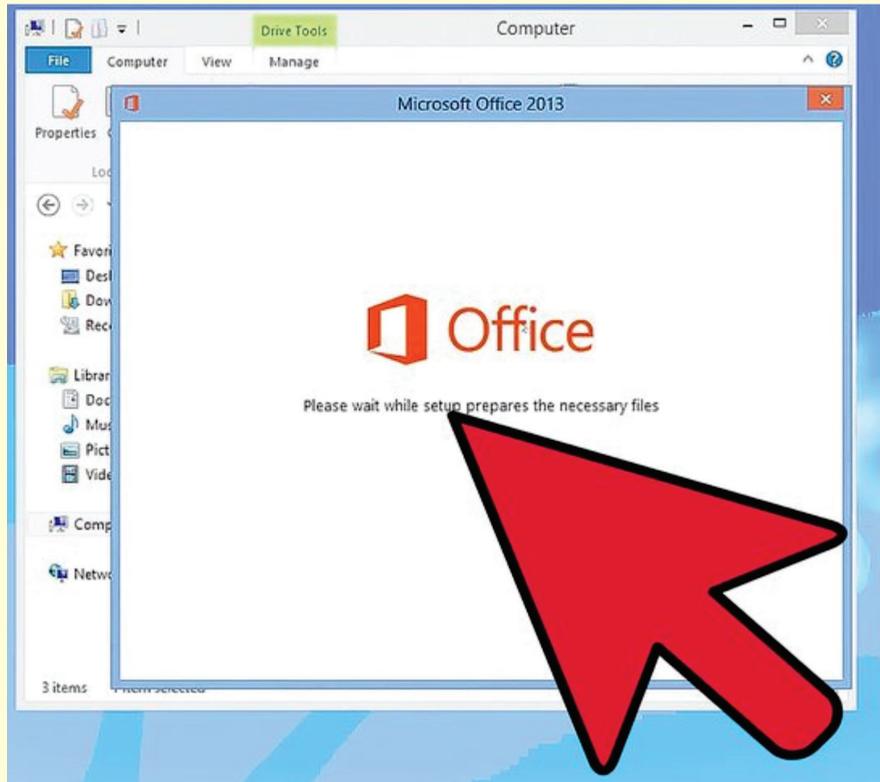
Sign in with Microsoft Account. If we don't have one, we can create one for free. This will tie Office with our Microsoft Account, which will let us download again in the future without entering the key.

- We can start the download process again at a later date by visiting office.com/myaccount



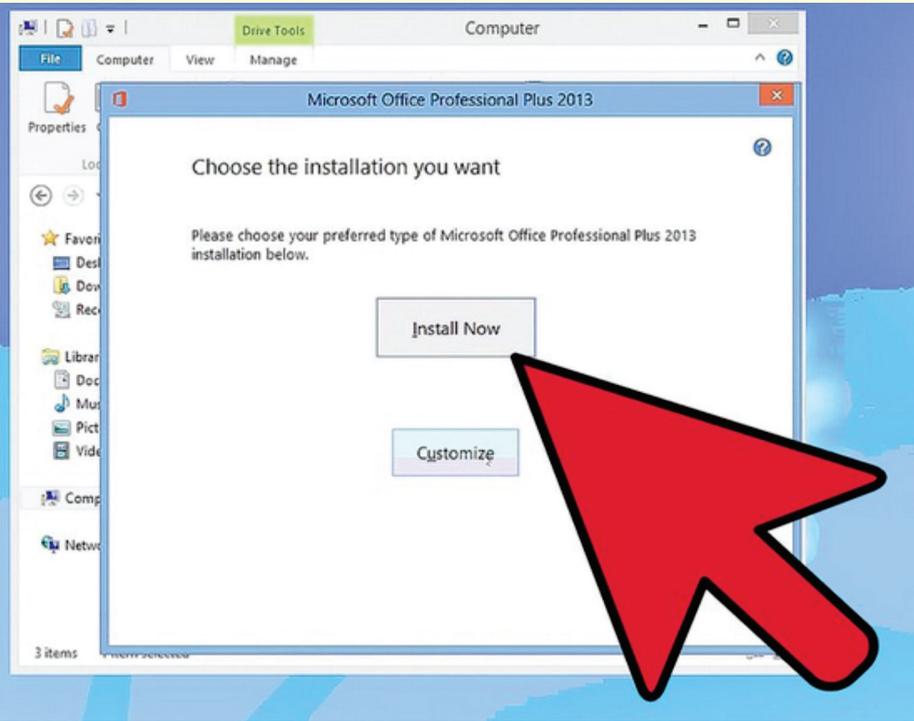
STEP-4

Click the "Install" button. The Office installer will be downloaded to our computer.



STEP-5

Click Run to start the installation.



STEP-6

Follow the prompts in the installer. You can click Next to move through the installer. You will be given the choice of themes, and a chance to take a quick tour.

STEP-7

Finish the installation. Click All done! to close the installer.

MS Office will be installed in your system and MS Excel is ready for use.

Source:

<http://www.wikihow.com/Install-Microsoft-Office>

ALTERNATIVE SOFTWARE

- Apple Numbers

Numbers is a spreadsheet application developed by Apple Inc. as part of the iWork productivity suite alongside Keynote and Pages. Numbers is available for iOS, and Mac OS X v10.4 or newer.

- OpenOffice.org Calc

OpenOffice Calc is the spreadsheet part of the OpenOffice software package. Calc is similar to Microsoft Excel, with almost the same abilities. Calc is capable of opening and saving spreadsheets in Microsoft Excel's file format.

- Google Spreadsheet

Google Spreadsheets is a Web-based application that allows users to create, update and modify spreadsheets and share the data live online.

NO OF PERIODS: 6

Theory & Demo	Hands On	Assessment	Total
3	5	1	9

SUGGESTED TEACHING METHODS:

While teaching Spreadsheet, to ensure maximum retention the following methods are suggested :

DEMONSTRATION:

It is the process of a practical exhibition to explain a process or various components of a software user interface.

The teacher is suggested to:

- Plan and prepare the concept to be demonstrated.
- Arrange the hardware and software required.
- Introduce the concept.
- Demonstrate
- Summarize
- Ask Questions to confirm learning

SITUATION ANALYSIS AND CASE STUDIES :

Situation Analysis allows students to explore problems and safely test solution and Case studies are powerful catalysts for thought and discussion.

The teacher is suggested to:

- Put forth a problem for students' analysis.
- Gather input .

- Gather solution justifying the concept being taught.
- Implement the solution on the computer system.
- Discuss the utility.

Daily life problems such as:

1. Preparing a bill
2. Calculating the Area to be covered with grass of two lawns.

The teacher can adopt any method of her/his choice to ensure effective transfer of learning and make learning meaningful.

Activity	Skill(s) developed	Intelligence Developed	Interdisciplinary
Activity 1: Identifying datatype of data used in an Aadhar Card.	Critical Thinking	Logical Reasoning Intelligence	Social Science
Activity 2: Storing data in a spreadsheet	Problem Solving Skill	Logical Reasoning Intelligence	
Activity 3: Sorting a List	Problem solving skill, Critical thinking skill	Logical Reasoning Intelligence	
Activity 4: Using Spreadsheet to prepare a budget for Sports related material.	Problem solving skill, Critical thinking skill, Creative Thinking	Logical Reasoning Intelligence	Mathematics
Activity 5: Applying Aggregate functions namely SUM () MIN(), MAX(), COUNT(), AVERAGE() on the budget to summarize data.	Critical thinking skill, Problem Solving, Decision Making skill	Logical Reasoning Intelligence	

CRITICAL THINKING ENHANCEMENT

Teacher should promote the habit of experimenting and promote self learning among students.

Though the textbook contains planned activities and practice exercises, following suggested activities can also be taken up by the teacher:

1. Identification of datatype on the basis of the alignment or format and change the format using Format cells Dialog.

Example:

Name	Date of Birth	Scholarship
Sanyam	12-12-2000	5000
Rahul	04-05-2005	12000

It can be explained that :

- Name being Text is left aligned.
- Date of Birth has a format DD-MM-YYYY.
- Scholarship is a numeric value hence the data is right aligned.
- If it is required that the Scholarship column should only contain values that have maximum 2 decimal places such as:

5000.00

The following steps can be followed:

STEP-1

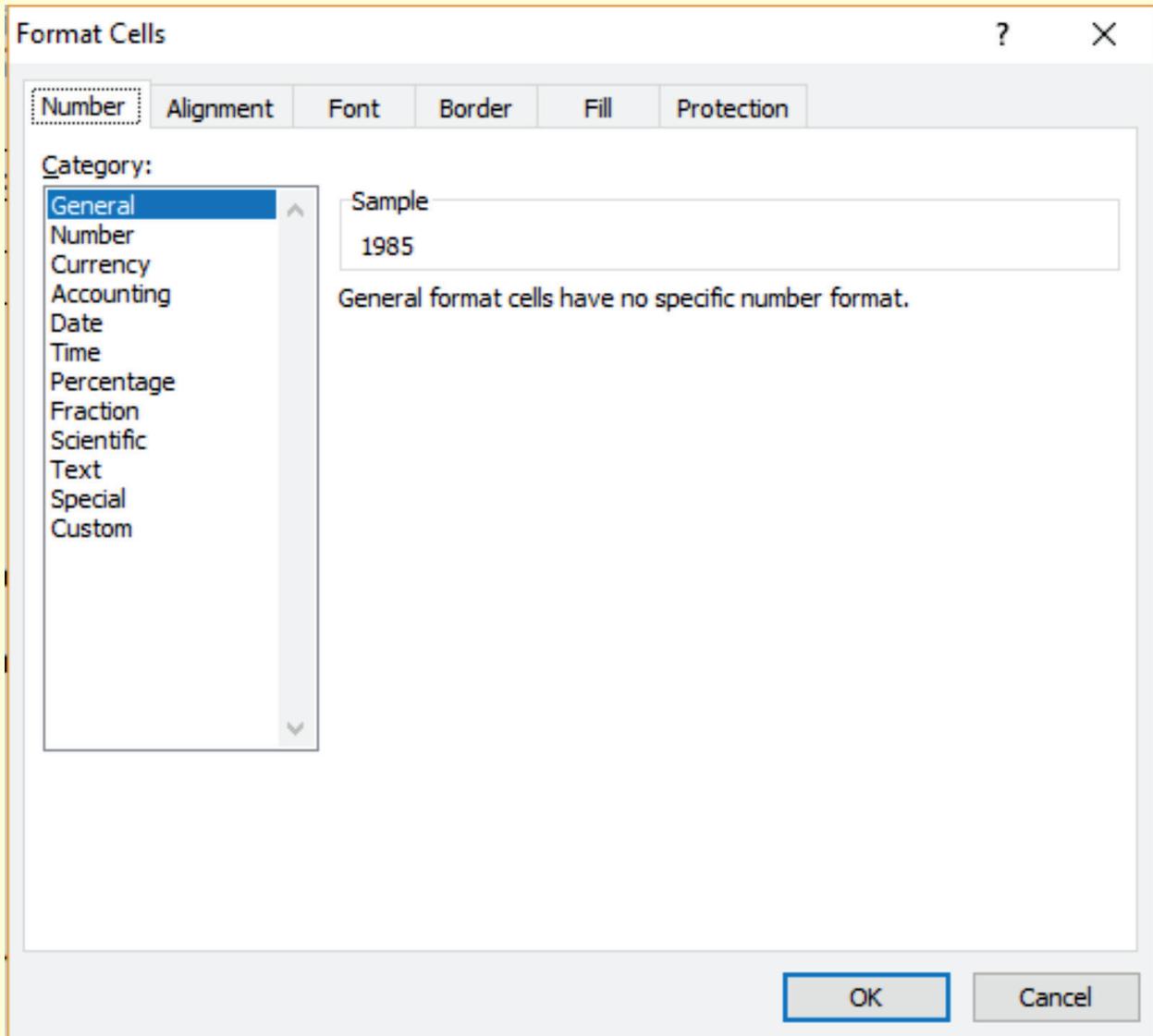
Right click the cells containing or likely to contain Scholarship.

STEP-2

Choose Format cells

STEP-3

The Format cells dialog appears:

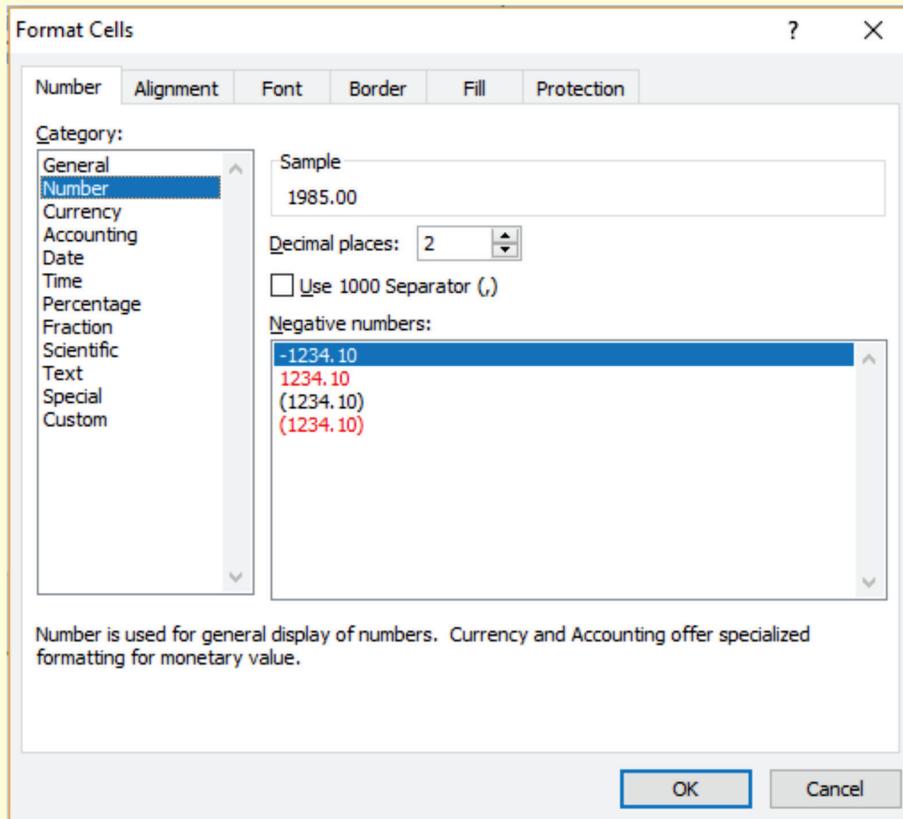


STEP-4

Choose the tab intended to change, in this case Number as shown above.

STEP-5

Click Numbers and set decimal places as shown below:



As evident the Alignment, Font, Border, Fill and Protection can also be set using the Format cells dialog.

2. Consider the following data related to the North eastern states of India:

	A	B	C	D	E	F
1	States	Population (as per Census 2011)	Area(Sq Km)	Population%	Area%	Person(per Sq Km)
2	Arunachal Pradesh	13,83,727	83,743	0.11%	2.55%	16.52
3	Assam	3,12,05,576	78,438	2.58%	2.39%	397.84
4	Meghalaya	29,66,889	22,429	0.25%	0.68%	132.28
5	Manipur	25,70,390	22,327	0.21%	0.68%	115.12
6	Mizoram	10,97,206	21,081	0.09%	0.64%	52.05
7	Nagaland	19,78,502	16,579	0.16%	0.50%	119.34
8	Tripura	36,73,917	10,486	0.30%	0.32%	350.36
9	Sikkim	6,10,577	7,096	0.05%	0.22%	86.05

Source: http://www.mha.nic.in/northeast_new

Sort the above list in descending order of Person (per Sq Km)

STEP-1

Select the worksheet either by dragging the mouse or using Shift+ arrow key

States	Population(as per Census 2011)	Area(Sq Km)	Percentage All India		Person(per Sq Km)
Arunachal Pradesh	13,83,727	83,743	0.11%	2.55%	16.52
Assam	3,12,05,576	78,438	2.58%	2.39%	397.84
Meghalaya	29,66,889	22,429	0.25%	0.68%	132.28
Manipur	25,70,390	22,327	0.21%	0.68%	115.12
Mizoram	10,97,206	21,081	0.09%	0.64%	52.05
Nagaland	19,78,502	16,579	0.16%	0.50%	119.34
Tripura	36,73,917	10,486	0.30%	0.32%	350.36
Sikkim	6,10,577	7,096	0.05%	0.22%	86.05

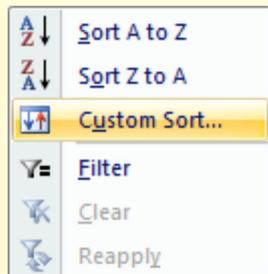
STEP-2

Choose from the Home Tab



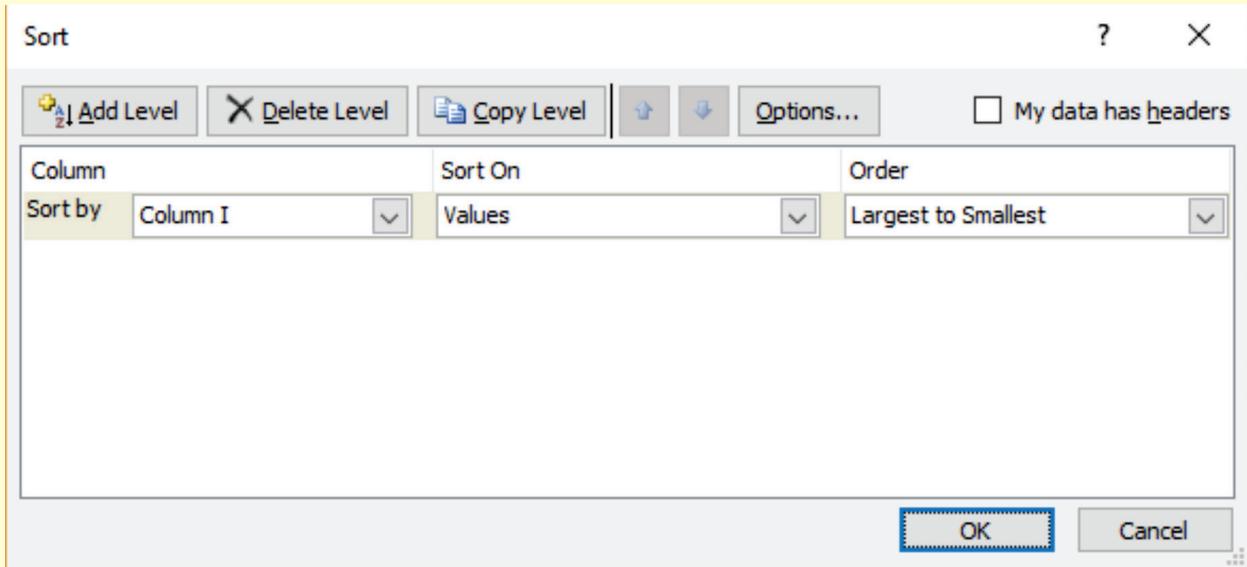
STEP-3

From the drop down box choose Custom Sort.



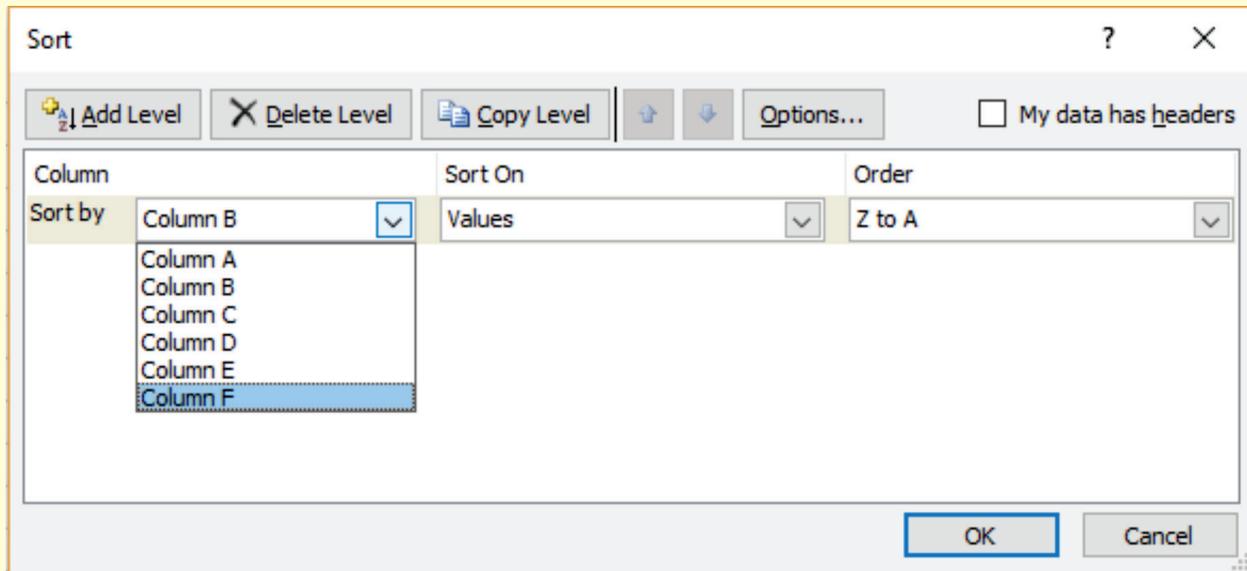
STEP-4

The following dialog is displayed:

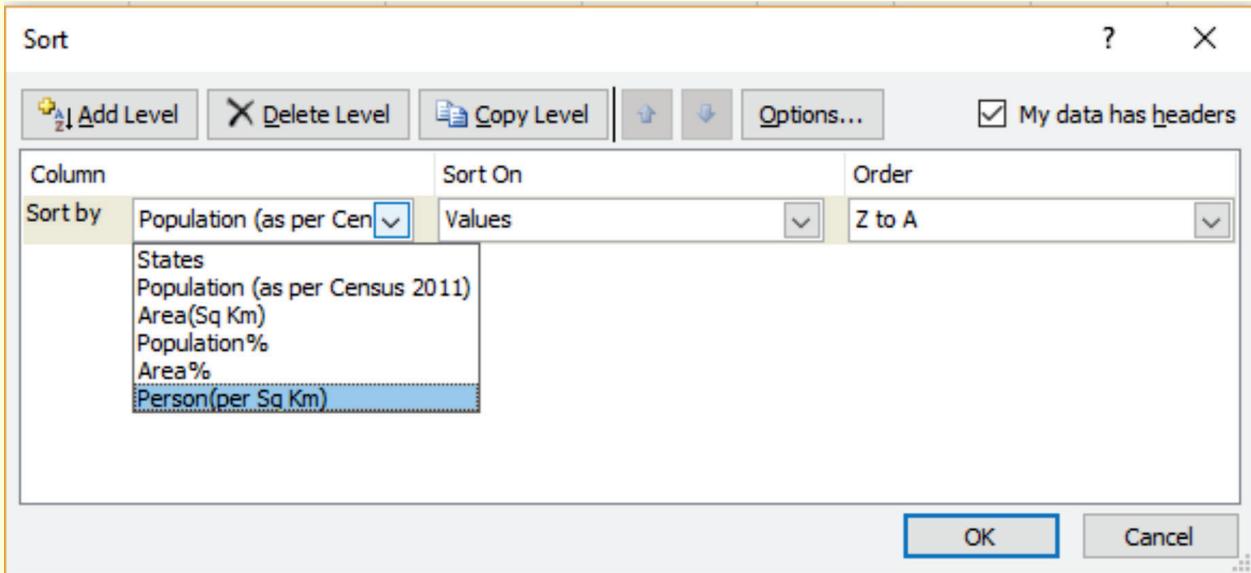


STEP-5

Choose the column name from the Column-> Sort by, selection box(Combo box) as shown below:

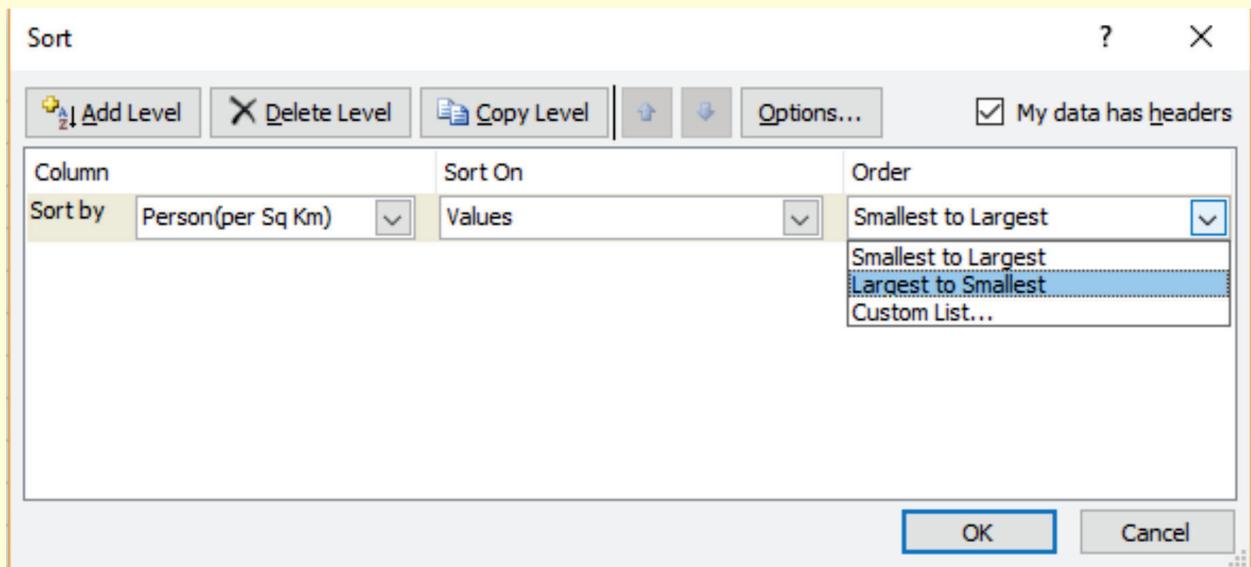


If we select my data has headers then the Dialog box displays column headings instead column label i.e. A,B,... as shown below:



STEP-6

Choose Order-> Largest to Smallest as shown in the above dialog.



STEP-7

The List is sorted on the basis of Person(per Sq Km)

	A	B	C	D	E	F
1	States	Population (as per Census 2011)	Area(Sq Km)	Population%	Area%	Person(per Sq Km)
2	Assam	3,12,05,576	78,438	2.58%	2.39%	397.84
3	Tripura	36,73,917	10,486	0.30%	0.32%	350.36
4	Meghalaya	29,66,889	22,429	0.25%	0.68%	132.28
5	Nagaland	19,78,502	16,579	0.16%	0.50%	119.34
6	Manipur	25,70,390	22,327	0.21%	0.68%	115.12
7	Sikkim	6,10,577	7,096	0.05%	0.22%	86.05
8	Mizoram	10,97,206	21,081	0.09%	0.64%	52.05
9	Arunachal Pradesh	13,83,727	83,743	0.11%	2.55%	16.52

The List is sorted.

Allowing students to explore directs them towards self learning. As a teacher you just have to plant the seed of curiosity. It will instill confidence in them and inspire them to learn more.

References:

<https://en.wikipedia.org/wiki/VisiCalc>

<http://wiki.kidzsearch.com/wiki/Spreadsheets>

ANSWER KEY

11. **cgfodYih izu**

1. fdl h Hh Hk'k ds v{kj ; k v{kj , oavala ds ey l s t k M'k curk gSml s
fdl izkj dk M'k dgrs gS

- a) Text
- b) Numeric
- c) Audio
- d) Video

Ans. a)

2. **ulpsfn, x, cell Addresses eal sl ghcell Address igpkus**

- a) F8
- b) 8F
- c) F__8
- d) **dkZHh xyr ughgS**

Ans. a)

3. Formula ges'kk fdl fpUg l s 'kq gkrk gS

- a) &
- b) %----
- c) =
- d) #

Ans. c)

4. Spreadsheet esData dS sorganize fd; k t krk gS

- a) Paragraphs
- b) Rows and columns
- c) Graphs
- d) Images

Ans. b)

5. AutoSum fdl TAB ij ik k t krk gS

- a) HOME
- b) INSERT
- c) FORMULAS
- d) DATA

Ans. a)

II. fjDr LFku HjkA

- a) gj oLrqdsAttributes fd , d r; Value gkrh gSft l sData dgrs gS
- b) ge rkh[kDD-MM-YYYY ds QkV eafy[krs gS
- c) xkus ; k vlok +dh fj dMx Audio Data dgykrs gS
- d) Row 1 esHeading fy[kus ds dlj . k ml sHeader row dgrs gS
- e) Fill Handle ij cursor (dl 7) j[krs gSrk og + eacny t krk gS

III. l gh old; ds vks l gh (✓) rFk xyr ds vks xyr (x) dk fpUg yxk A

- a) Cell address Formula Bar eafn[krk gS (X)
- b) Min() and Max ()Numeric Mk ij dle djrs gS (✓)

- c) Sorting $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{6}$; $\frac{1}{7}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$ (X)
- d) Formula $\frac{1}{2}$ Fill Handle $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{6}$; $\frac{1}{7}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$ (✓)
- e) Spreadsheet $\frac{1}{2}$ data worksheet $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{6}$; $\frac{1}{7}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$ (✓)

NOTE:

The following questions can be answered after carefully going through the chapter in the Textbook. The teacher is requested to urge students to write answers to the following questions in their own words.

IV. $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{6}$; $\frac{1}{7}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$

- 4. Spreadsheet $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{6}$; $\frac{1}{7}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$
- 5. Worksheet $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{6}$; $\frac{1}{7}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$
- 6. Cell $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{6}$; $\frac{1}{7}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$
- 7. Fill handle $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{6}$; $\frac{1}{7}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$

V. $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{6}$; $\frac{1}{7}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$

- 1. $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{6}$; $\frac{1}{7}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$
- 2. Ankita $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{6}$; $\frac{1}{7}$; $\frac{1}{8}$; $\frac{1}{9}$; $\frac{1}{10}$

Class	Strength
VI – A	35
VI – B	42
VII – A	26
VII – B	29
VIII – A	38
VIII – B	40

3. fuEu izukadsmUkj nA

Month	MaximumTemperature
January	8
February	15
March	18
April	30
May	41
June	43
July	40
August	38
September	36
October	29
November	26
December	20

- Maximum vs Minimum Temperature fudkyus dssteps fy [kA
 - Average fudkyus dssteps fy [kA
4. Data spreadsheet estore djus ds ykk fy [kA

Data Representation and Processing 02

LEARNING TO CREATE MIND MAPS

GENERAL OBJECTIVES:

- Develop cognitive, problem solving and creative skills.
- Make Students to appreciate the uses of Mind Map as an aid to learning.

SPECIFIC OBJECTIVES:

- Represent Ideas and Processes Using Mind Maps & Semantic relationship.
- Create Mind Maps to explore an idea Process.
- Make a presentation of Mind Map.

TOOLS USED: VUE Installer

HARDWARE REQUIREMENT: Computer System

INTRODUCTION

Mind Map is an effective graphical technique which can help to increase retention by the use of word, picture, colour, place and skills.

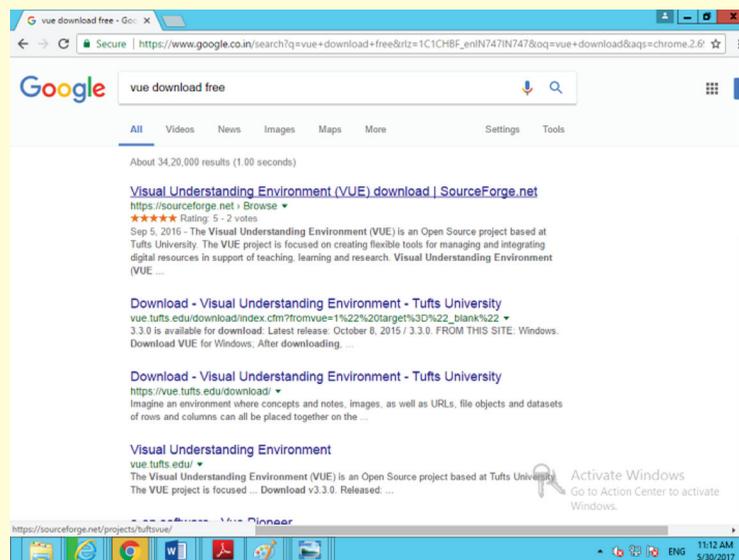
“Although the term "mind map" was first popularized by British popular psychology author and television personality Tony Buzan, the use of diagrams that visually "map" information using branching and radial maps traces back centuries. These pictorial methods record knowledge and model systems, and have a long history in learning, brainstorming, memory, visual thinking, and problem solving by educators, engineers, psychologists, and others. Some of the earliest examples of such graphical records were developed by Porphyry of Tyros, a noted thinker of the 3rd century, as he graphically visualized the concept categories of Aristotle. Philosopher Ramon Llull (1235–1315) also used such techniques.”

INSTALLATION GUIDELINES

Mind map is free software and hence can easily be downloaded from the internet. You can follow the following steps to install MIND MAP on your PC:

STEP-1

Use Google to find sites that allow downloading of Mind Map



Picture 7.1

STEP-2

choose anyone option, we are using the first option i.e. <https://sourceforge.net/projects/tuftsvue/>

STEP-3

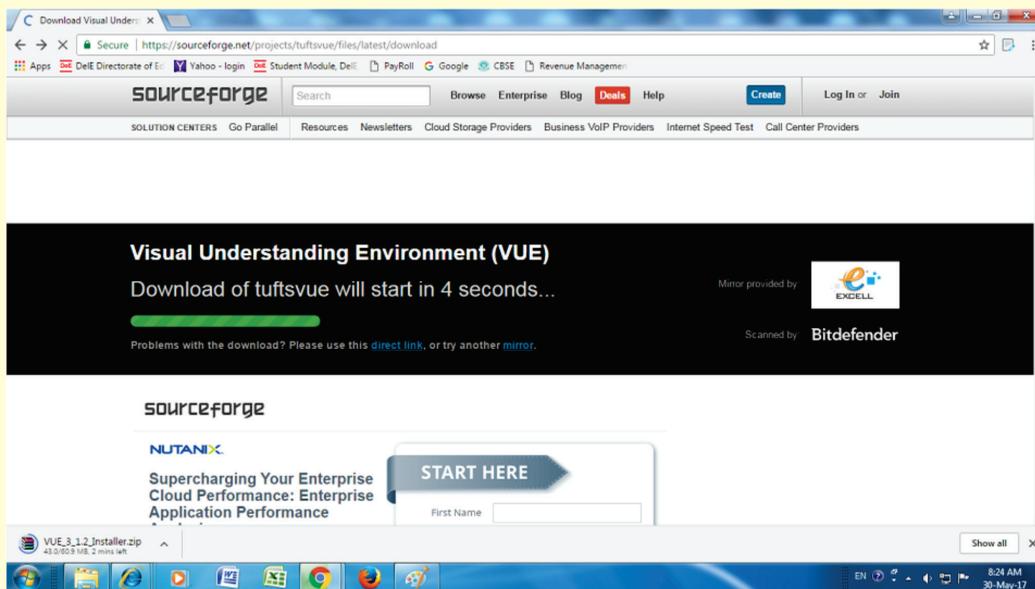
Click Download



Picture 7.2

STEP-4

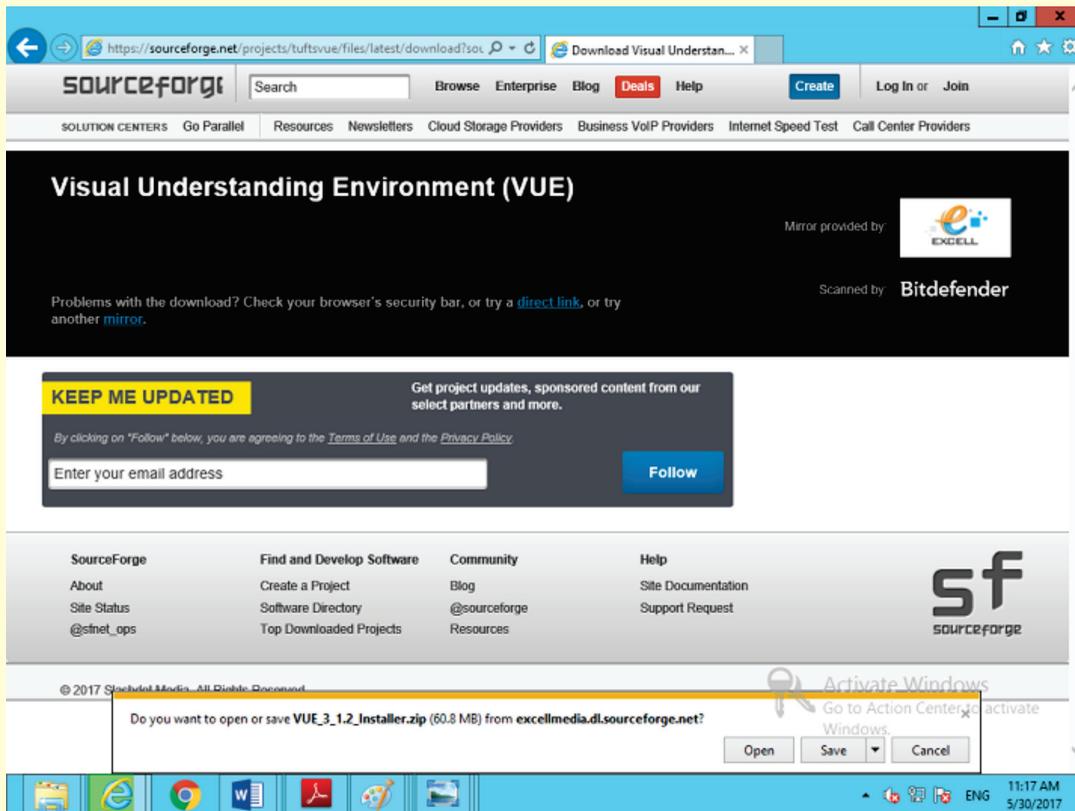
This file is downloaded and make a zip file.



Picture 7.3

STEP-5

Click on save file



Picture 7.4

STEP-6

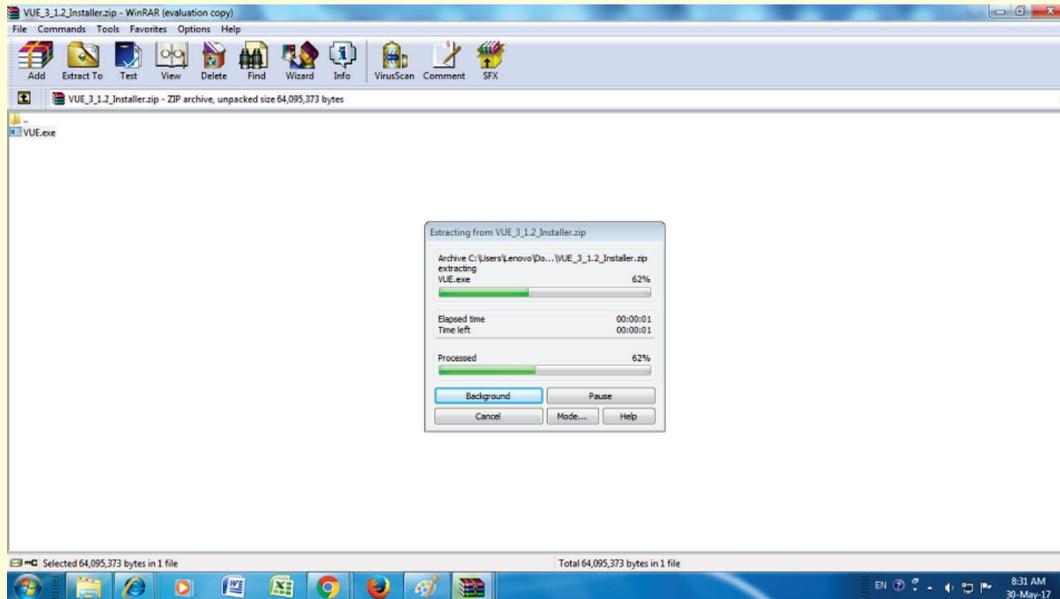
This file is downloaded and can be accessed from the download folder.

STEP-7

Click on the file and follow steps

STEP-8

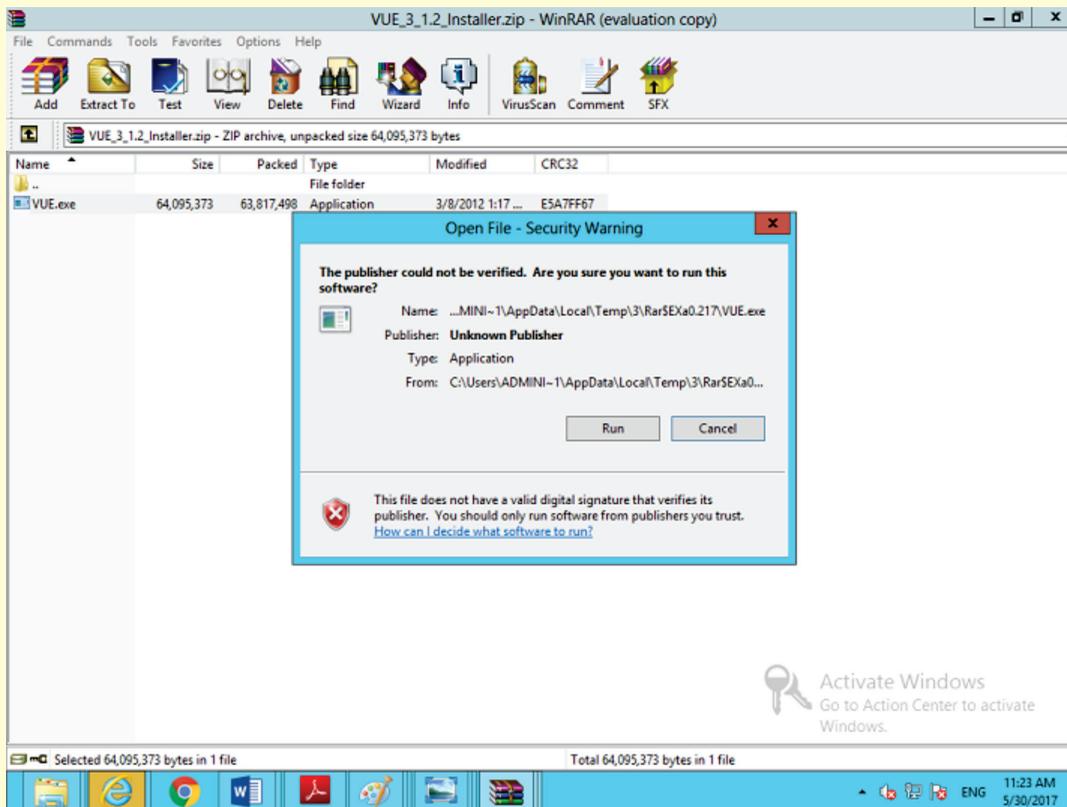
Click on zip file and extract.



Picture 7.5

STEP-9

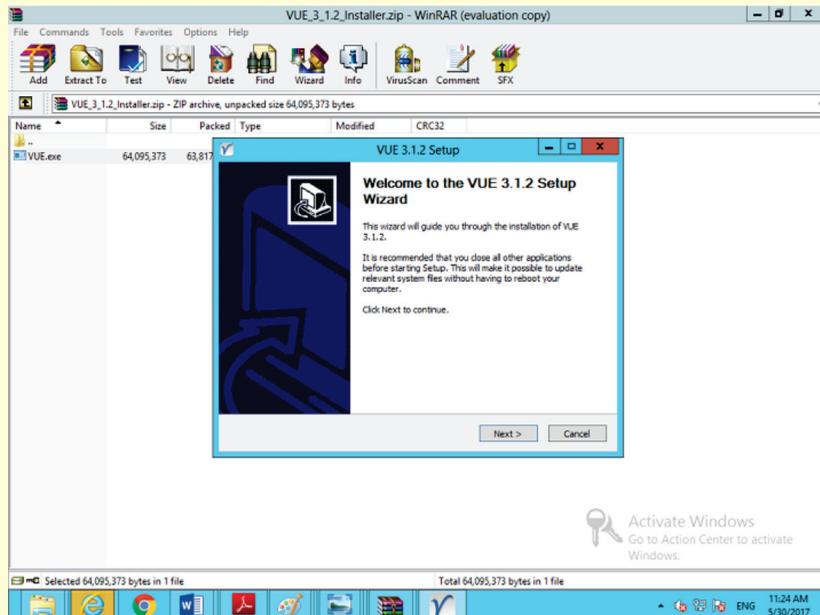
Click on "Run" button.



Picture 7.6

STEP-10

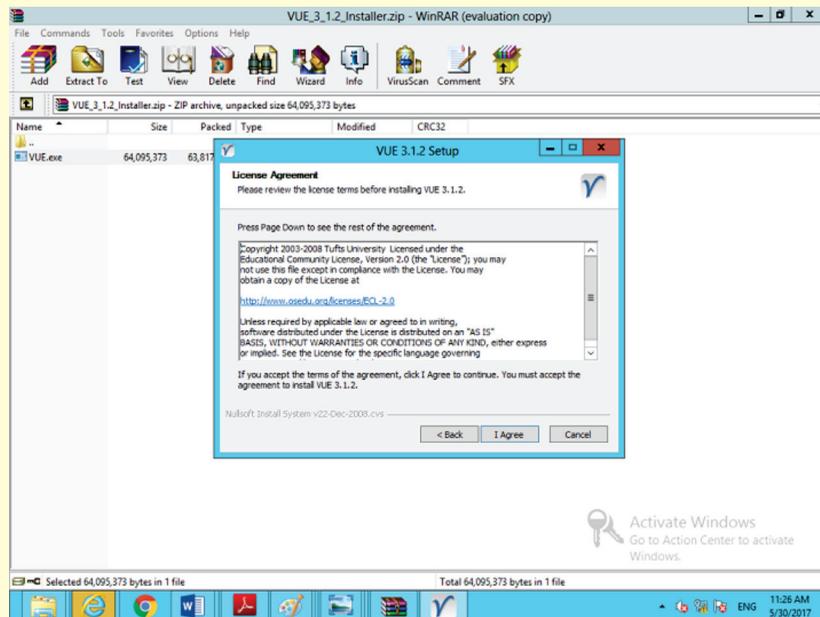
Click on “Next” button.



Picture 7.7

STEP-11

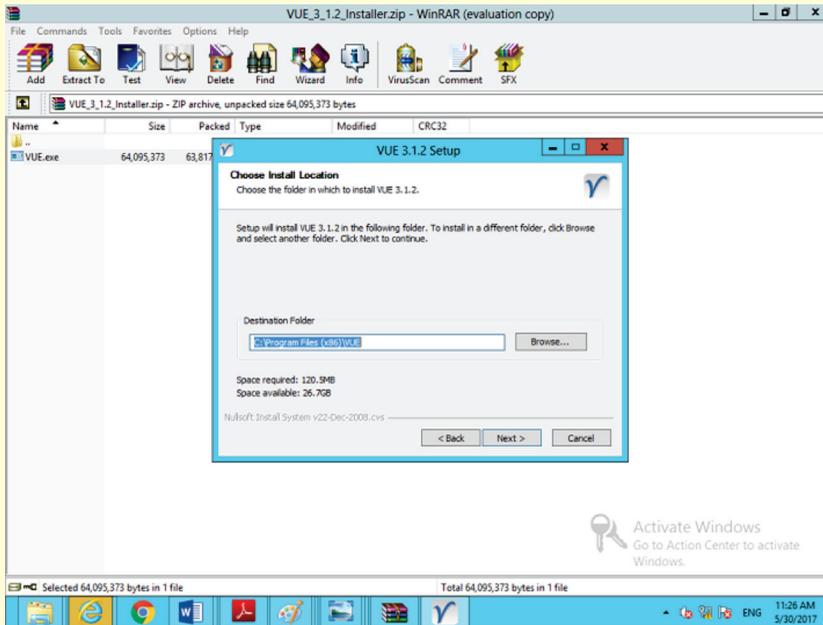
Click on “I agree” button.



Picture 7.8

STEP-12

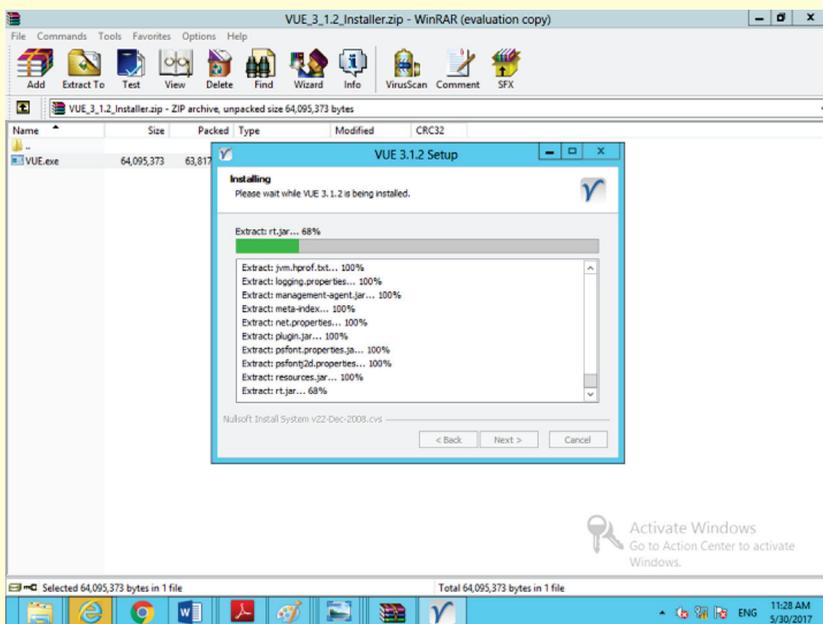
Click on "Next" button.



Picture 7.9

STEP-13

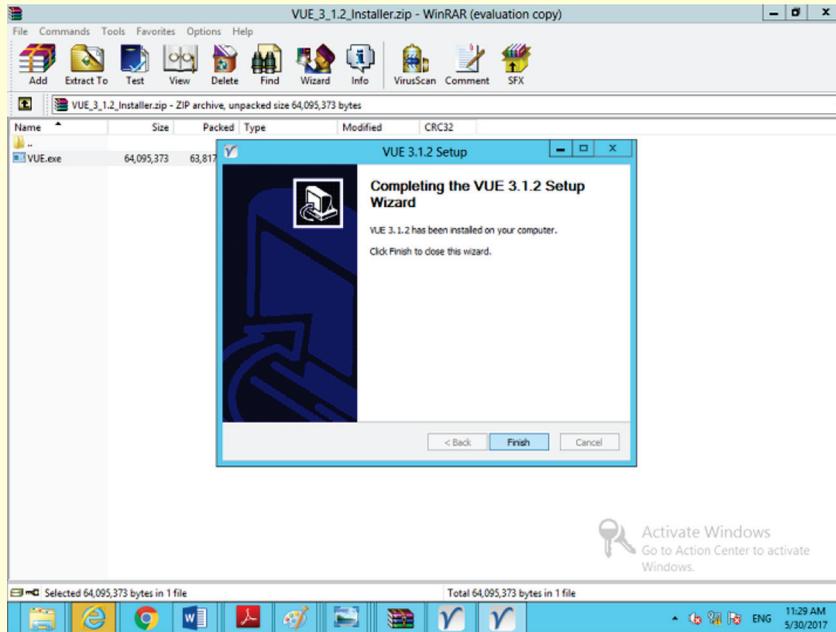
Again Click on "Next" button.



Picture 7.10

STEP-14

Click on "Finish" button.

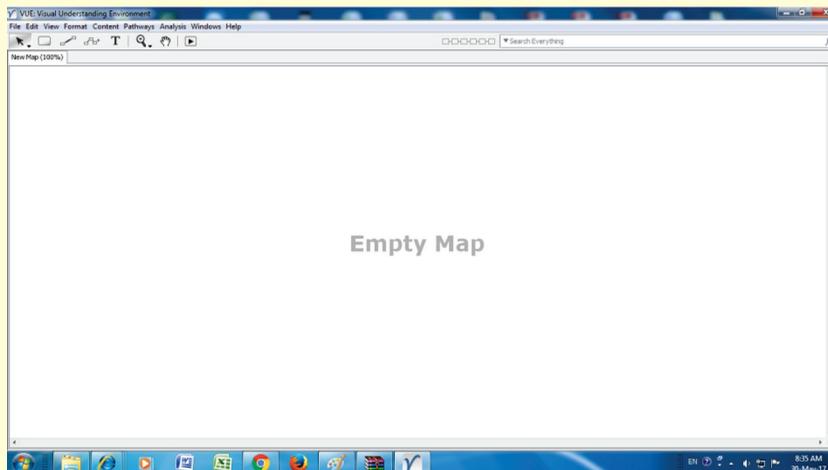


Picture 7.11

Mind Map will be installed in your system.

STEP-15

Click on Mind Map Software.



Picture 7.12

ALTERNATIVE SOFTWARE:

- 1) Mindjet (Windows/Mac/iOS): Mind Manager is a commercial mind mapping software application developed by Mindjet.
- 2) XMind (Windows/Mac/Linux): XMind is a mind mapping and brainstorming software, developed by XMind Ltd.
- 3) Freemind (Windows/Mac/Linux): It developed by Jörg Müller, Daniel Polansky, Petr Novak, Christian Foltin, Dimitri Polivaev, et al.
- 4) Coggle (Webapp) :Coggle is a freeware mind-mapping web application. Coggle will automatically assign different colors to your branches. It is developed by COGGLE.

NO OF PERIODS: 3

Topic	Theory & Demo	Hands On	Assessment	Total
Mind Map	1	1	1	3

SUGGESTED TEACHING METHODS:

Pre-class:

- 1) **Planning:** Whether its lesson plans, design of your class curriculum for the school year or planning an assignment timeline, Mind Maps give you a clear and visual overview of what needs to be covered.
- 2) **Organizing:** If you're the type of person who regularly jots down ideas and thoughts, Mind Maps are the perfect tool to create structure and organization of a topic.

In-class:

3. **Teaching:** Online Mind Maps can be used in class to brainstorm and develop logical thinking. This will encourage students to participate but also to fully understand a topic and creating connections by a mind map.

4. **Hand-outs:** Mind Maps that have been created online can easily be printed and shared with students. Students can prepare class notes by using mind map.
5. **Presentations:** Presentation is another brilliant method to develop student's communication skills. Mind Maps act as visual information providers and encourage the audience to engage with the material that is being presented. Mind map can Easily create an interactive online notes with this free Mind Mapping tool .
6. **Creativity:** Students can use mindmaps to represent any topic.
7. **Learning:** Mind Maps have been embraced in the realm of education as a learning tool which help students reinforce knowledge by making connections between different subjects and program.

ACTIVITY WISE MAPPING: (SKILLS, INTELLIGENCE, INTERDISCIPLINARY)

Activity And Aim	Skills	Multiple Intelligences Incorporated	Interdisciplinary
Activity 1. To Create link and Node in Mind Map. Aim: To improve the knowledge and brain storming of students.	Cognitive, Problem Solving, Decision Making	Spatial Visualization, Interpersonal	Science (Environment)
Activity 2. Learn, How to save Mind Map created in Activity 1. Aim: To encourage the students for learning the tool.	Problem Solving, Decision Making	Spatial Visualization.	
Activity 3. In Activity 2, To open saved file. Aim: To improve thinking of students.	Creative /Aesthetic	Logical Reasoning	

<p>Activity 4. To change shape of Node by Using Formatting Palette.</p> <p>Aim: To introduce the students to various “Formatting Palette” option available in impress.</p>	Creative /Aesthetic	Logical Reasoning	
<p>Activity 5. To changes the color of Node.</p> <p>Aim: To check the clarity of students about various “Node color” option available in impress.</p>	Creative /Aesthetic	Logical Reasoning	
<p>Activity 6. To changes the color of Link.</p> <p>Aim: To check the students performance about various “Link color” option available in impress.</p>	Creative /Aesthetic	Logical Reasoning	
<p>Activity 7. To change the Font Size in Mind Map.</p> <p>Aim: To improve the writing</p>	Cognitive, Problem Solving	Spatial Visualization, Interpersonal	

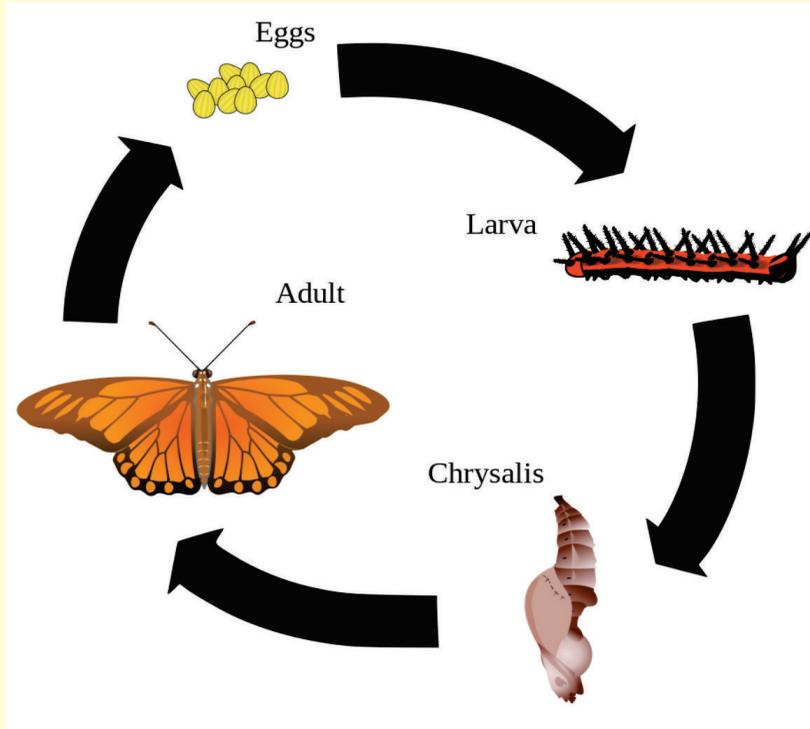
CRITICAL THINKING ENHANCEMENT:

SUGGESTED ACTIVITIES:

1. Create a mind map for the life cycle of a Butterfly

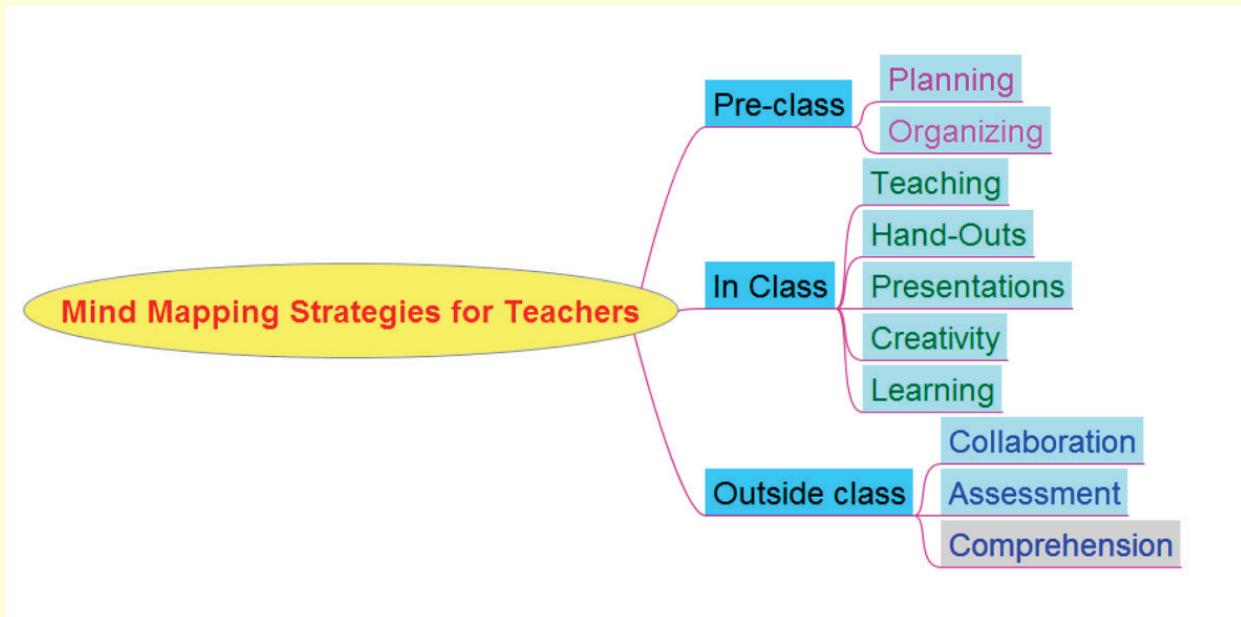
Ans.

Butterfly Life Cycle



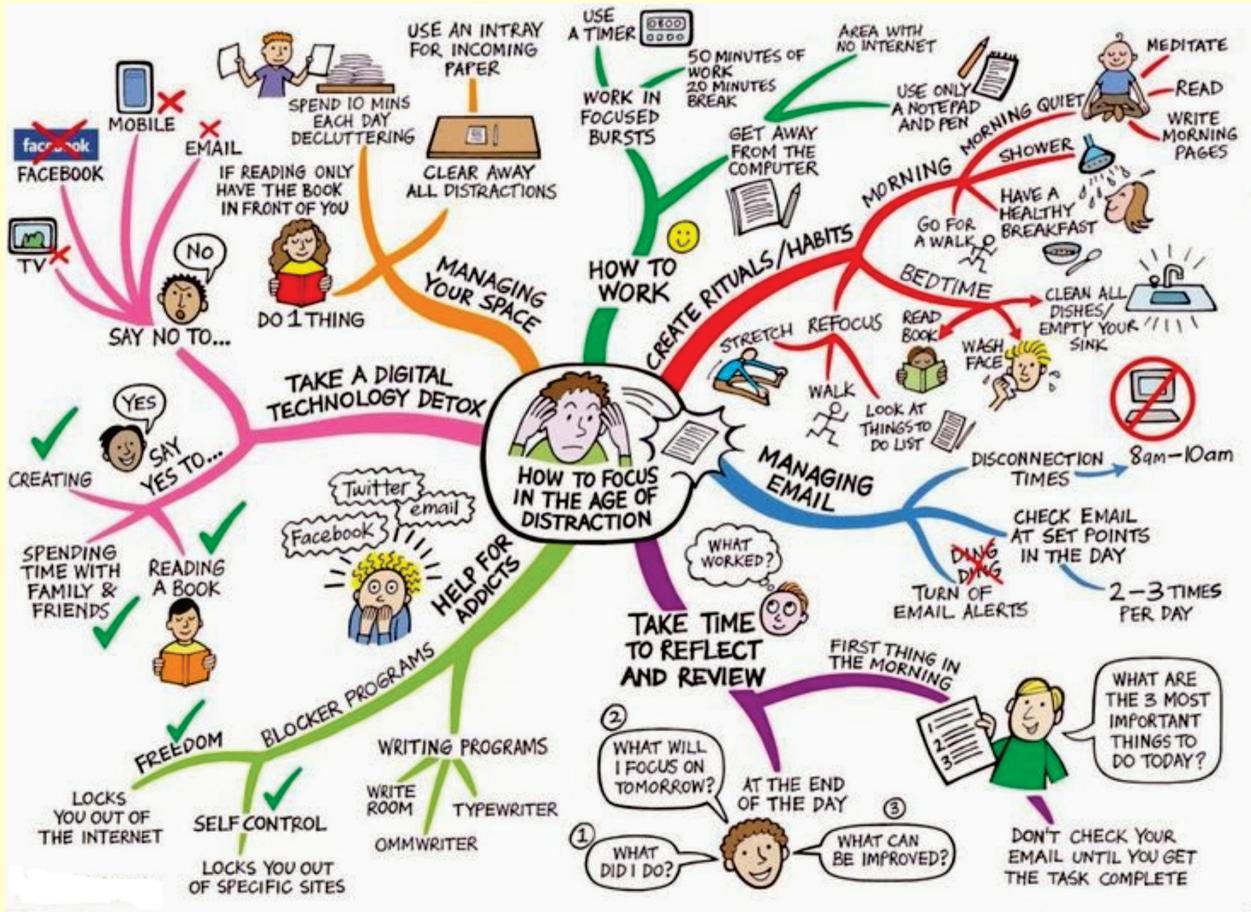
2. Create a Mind Mapping Strategies for Teachers:

Ans.



3. Create a mind map of Age of distraction:

Ans.



References:

References:

- <https://www.mind-mapping.org>
- <https://www.youtube.com>
- vue.tufts.edu
- www.freewaregenius.com
- <https://en.wikipedia.org>

ANSWER KEY:

1. Multiple choice question:

1. B
2. C
3. A

2. Fill in the blanks:

1. Fill
2. Line
3. 0 pixel,6 pixel
4. Invisible ,Visible

3. True/ False:

1. (√)
2. (√)
3. (X)
4. (√)
5. (X)

Data Representation and Processing 06

Learning to Create, Edit and Format Text Files.

GENERAL OBJECTIVES:

- Develop Collaboration skills, Communication skills and Ethical skills.
- Develop the students' thinking skills.
- Promoting students to access different tools.

SPECIFIC OBJECTIVES:

- Input text and save text in a word processor.
- Format a document in a word processor
- To organize data using Table
- Printing Documents

TOOLS USED: Word Processor

HARDWARE REQUIREMENT: Computer, Printer

Word Processor are descended from the Friden Flexo Writer which had two punched tape stations and permitted switching from one to the other. By 1971, word processing was recognized by the New York Times as a “buzz word”. It has been popular as software for learning to create, edit and format text.

As per Wikipedia, “The Word Processor was stand-alone office machine in the 1960s, combining the keyboard text-entry and printing functions of an electric type writer, with a recording unit, either tape or floppy disk with a simple dedicated computer processor for the editing of text.” Word Processing was one of the earliest applications for the personal computer in office productivity and was the most widely used application on personal computers until the World Wide Web rose to prominence in the mid 1990's.

INSTALLATION GUIDELINES

Following steps need to be followed to install MS Office (as also demonstrated in Chapter 4: Programming 01)

1. Visit the office setup page.
2. Enter your office product key.
3. Sign in with your Microsoft Account.
4. Click the install button
5. Follow the prompts in the installer.
6. Stay online which office installs.
7. Finish the installation.

ALTERNATIVE SOFTWARES:

1. Open office.org writer
2. Libre office writer

3. Abiword

4. Kword

NO. OF PERIODS:

Theory & Demonstration	Hands on	Assessment	Total
3	6	1	10

SUGGESTED TEACHING METHODS:

Teacher may use any of the following methodology:

Story Writing: The teacher is suggested to show story books or magazines and explain the various formatting options used to make the story book attractive.

- Tell students to write a story via this their thinking skills will be developed.
- Give instructions (e.g.: word limit etc)
- Ask them to type using the word processor using various formatting options.

Demonstration and guided practice: The teacher should give the demonstration to the students to make them familiar with the User Interface of the word processor and explaining various tools.

The teacher is suggested to

- To give demo to the students with the help of activities which are given in the textbook.
- Give instructions and guide them to do that particular activity.
- Monitor the students' learning by observing the execution of the Practice and activity
- Sessions given in the chapter.

ACTIVITY WISE MAPPING

Activities	Skills	Intelligence	Interdisciplinary Approach
Activity 1: Using On Screen Keyboard to write in hindi.	Critical Thinking Skills	Spatial Visualization	Hindi
Activity 2: Saving a word document	Critical Thinking	Logical Reasoning	
Activity 3: Opening a word document.	Problem Solving	Logical Reasoning	
Activity 4: Typing Introduction and applying Alignment	Self Awareness, Creative Thinking	Logical Reasoning	English
Activity 5: Typing a paragraph on "Pollution" and using Bold, Italic and underline.	Creative Thinking	Logical reasoning	Social Studies
Activity 6: Writing a paragraph on Gram Sabha and using Find and Replace.	Problem Solving and Decision making Skills	Logical reasoning	Social Studies
Activity 7: Using Tables to represent information	Critical Thinking	Spatial Visualization	
Activity 8: Typing a leave Application	Self Awareness	Intrapersonal	English
Activity 9 : Printing a File	Critical Thinking	Interpersona	

CRITICAL THINKING ENHANCEMENT

(SUGGESTED ACTIVITIES)

Teachers should encourage critical thinking enhancement with the help of some activities like:

- Writing an article on a topic.
- Preparing a menu for a restaurant
- Preparing a travel itinerary.

References:

- Microsoft Office 2016 for beginners
- Microsoft Word 2016 for beginners

ANSWER KEY:

I. Tick (✓) the correct option:

- i
- iii
- ii
- ii
- iii
- ii
- ii
- iii
- iii
- ii

II. fill in the blanks:

- a. Bold
- b. Italic
- c. Underline

- d. Ctrl +P
- e. Three
- f. Typing
- g. Left
- h. Control Panel
- i. Nine

III. True or False:

- i. True
- ii. False
- iii. True
- iv. False
- v. False

IV. Short answers:

1. Word processor is a software where we create, store the document and print them.
2. Menu bar is a horizontal bar located at the top of the screen below the title bar containing drop-down menus. There are nine menus in word window. Their names are as follows:
 - a. File
 - b. Home
 - c. Insert

- d. Design
- e. Page layout
- f. Mailings
- g. Review
- h. View

3. Find & Replace Option exist in Home Tab. Through Find option we can find the words in certain paragraph. And from Replace option we can replace the words from one word to another.

4. Clipboard command is a way to transfer the content, text from one location to another. It is a short term data storage. Clipboard commands are as follows:

- a. Cut command (Ctrl + X)
- b. Copy command (Ctrl + Y)
- c. Paste command (Ctrl + V)

5. The steps for writing a formal letter is given below:

- 1) Click on File menu.
- 2) Click on new button
- 3) Then click on adjacency letter.
- 4) One formal letter format will appear.
- 5) Then fill the details according to that format.
- 6) After this a letter will be created via following these steps.

6. Keyboard is an input device. It is used in typing certain paragraphs or text. A keyboard contains certain standard function keys such as Escape key, tab and cursor movement keys, alphabet keys and numeric keys.

There are four types of keyboard layouts used worldwide:

- a. QWERTY
- b. AZERTY
- c. QWERTZ
- d. HCESAR

V. Long Answers:

1. Adjustment of lines in certain paragraph is known as alignment. There are four types of alignment which are as follows:
 - I. Left Alignment: when all lines or text of a paragraph will be adjusted to left margin is known as Left Alignment.
 - II. Right Alignment: when all lines or text of a paragraph will be adjusted to right margin is known as Right Alignment.
 - III. Center Alignment: when all lines or text of a paragraph will be adjusted to center margin is known as Center Alignment.
 - IV. Justify Alignment: When all the lines of a paragraph or a text get expanded against both the margin (left & right) is known as Justify Alignment.
2. The following steps for checking Spellings & Grammar which are given below:
 - Click on Review Menu.
 - Then, click on Spellings & Grammar option.
 - Now one dialog box appears through which you can check the spellings.

3. Through table category group we can create table.

- Click on Insert Tab.
- Then click on table button in a table category group.
- Select the number of rows and number of columns through table button.

We can also change the style of a table through table button. When you select the no. of rows and no. of columns. Then you can change the style of a table through table styles group.

Audio Visual and Communication

Learning to Create Audio File for Communication

GENERAL OBJECTIVES:

- Develop cognitive, communication skill, collaboration skill, problem solving and creative skills.
- Make Students to appreciate the uses of Audacity as an aid to learning.

SPECIFIC OBJECTIVES:

- Ability to create a library of sound and music.
- Ability to narrate a story and record it using multiple devices.
- Ability to combine sound effects to support the audio narration

TOOLS USED: Audacity 2.1.2

HARDWARE REQUIREMENT: Computer System, Mike, Speaker, Projector.

INTRODUCTION:

Audacity is the name of a popular open source multilingual audio editor and recorder software that is used to record and edit sounds.

“Audacity is a free open source digital audio editor and recording computer software application, available for Windows, OS X, Linux and other operating systems. Audacity was started in the fall of 1999 by Dominic Mazzoni and Roger Dannenberg at Carnegie Mellon University and was released on May 28, 2000 as version 0.8.

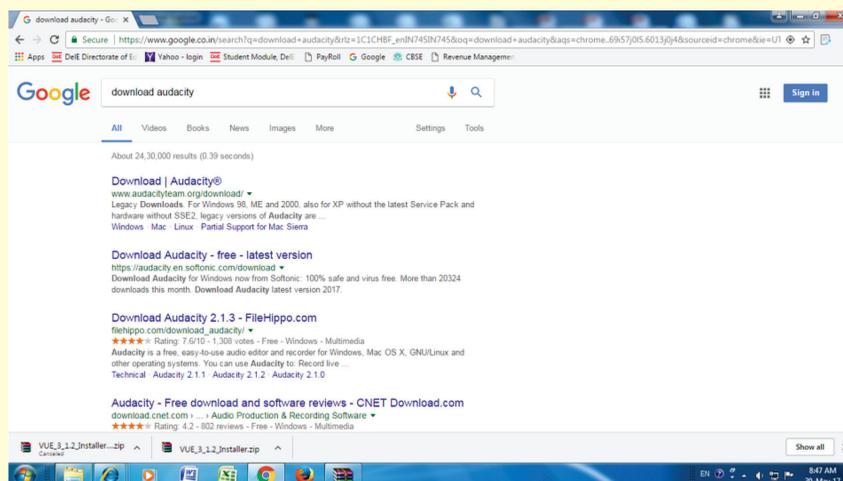
As of October 10, 2011, it was the 11th most popular download from Source Forge, with 76.5 million downloads. Audacity won the Source Forge 2007 and 2009 Community Choice Award for Best Project for Multimedia. In March 2015 hosting was moved to FossHub and by March 20, 2017 it had exceeded 35.6 million downloads.”

INSTALLATION GUIDELINES:

Audacity is free software and hence can easily be downloaded from the internet. You can follow the following steps to install Audacity on your PC:

STEP-1

Use Google to find sites that allow downloading of Audacity



Picture 5.1

STEP-2

Choose anyone option, we are using the third option i.e. http://filehippo.com/download_audacity/

STEP-3

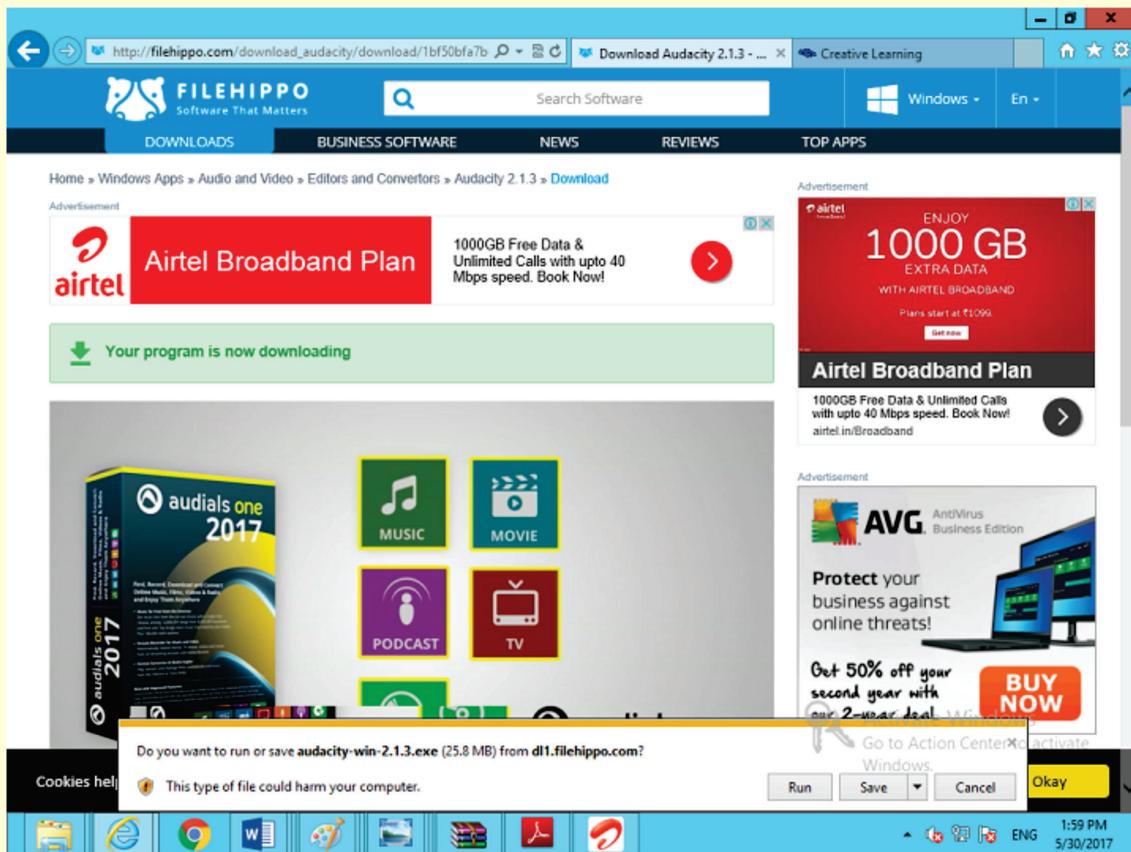
Click Download



Picture 5.2

STEP-4

Click on Save Button



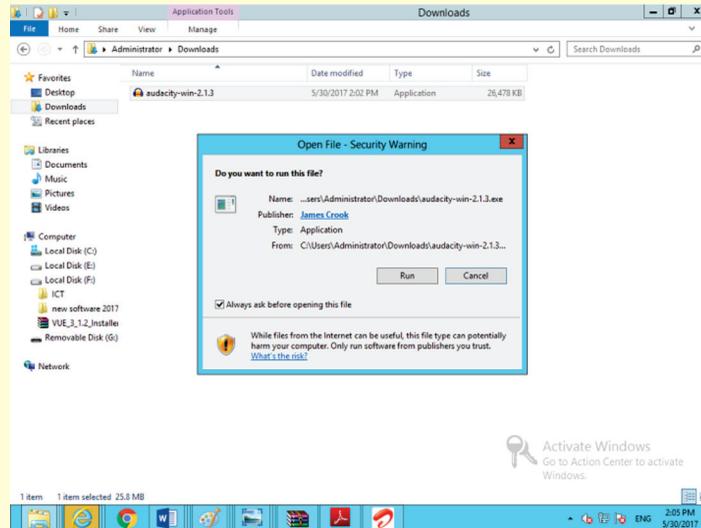
Picture 5.3

STEP-5

This file is downloaded and can be accessed from the download folder.

STEP-6

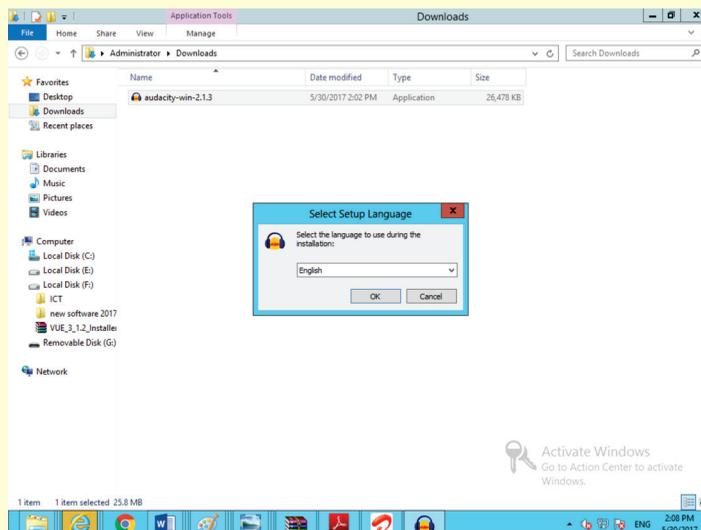
Click on the file and follow steps



Picture 5.4

STEP-7

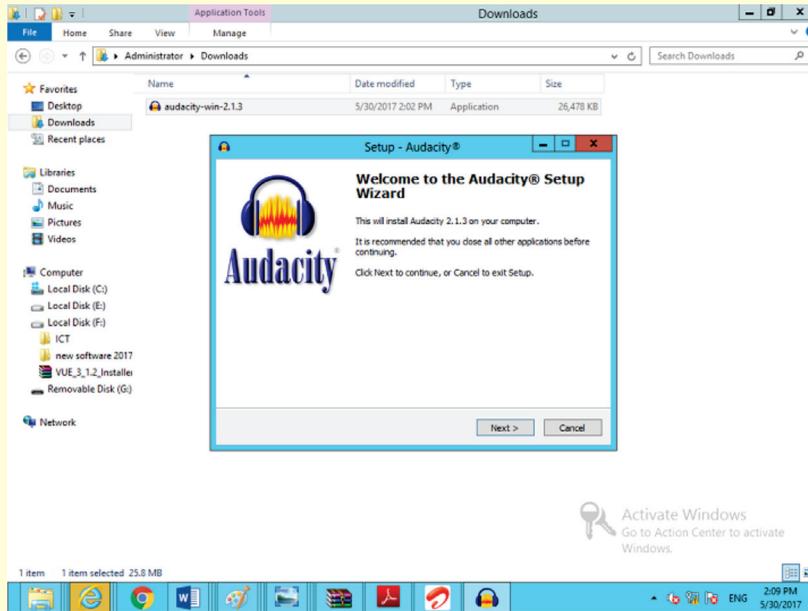
Click on "OK" button.



Picture 5.5

STEP-8

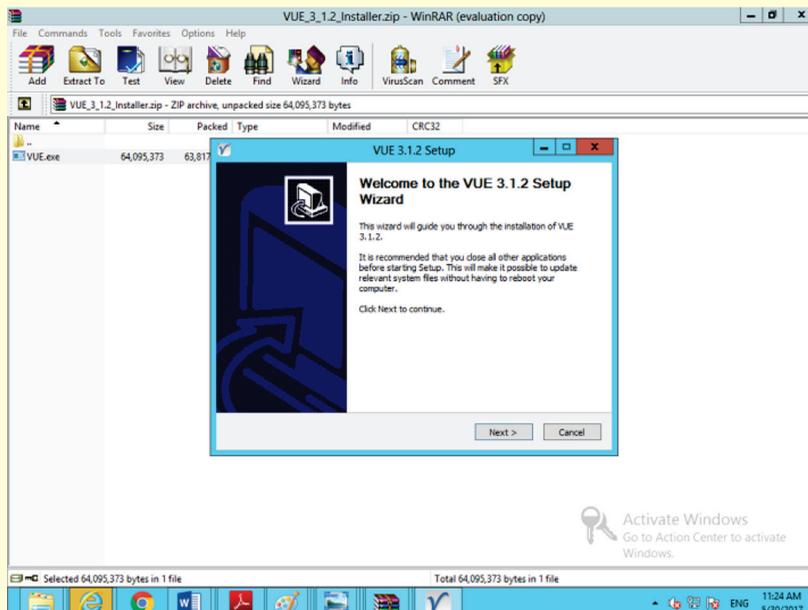
Click on "Next" button.



Picture 5.6

STEP-9

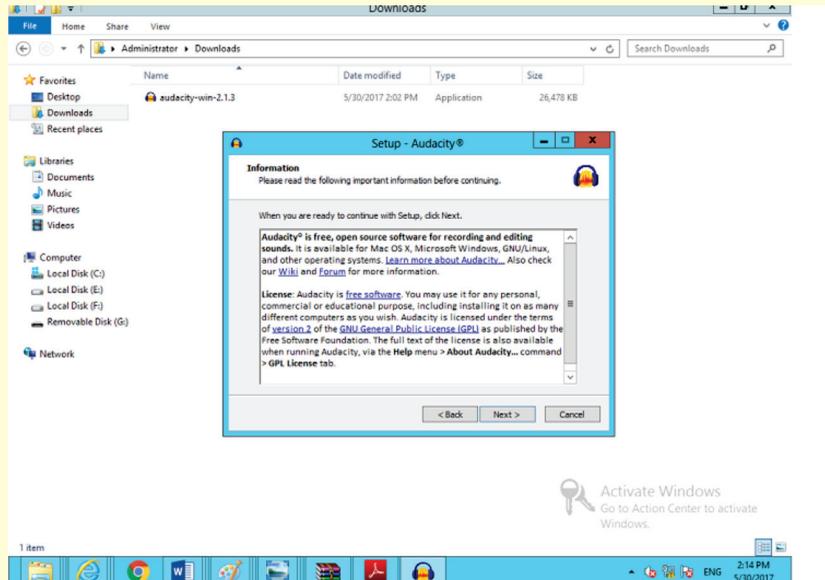
Again Click on "Next" button.



Picture 5.7

STEP-10

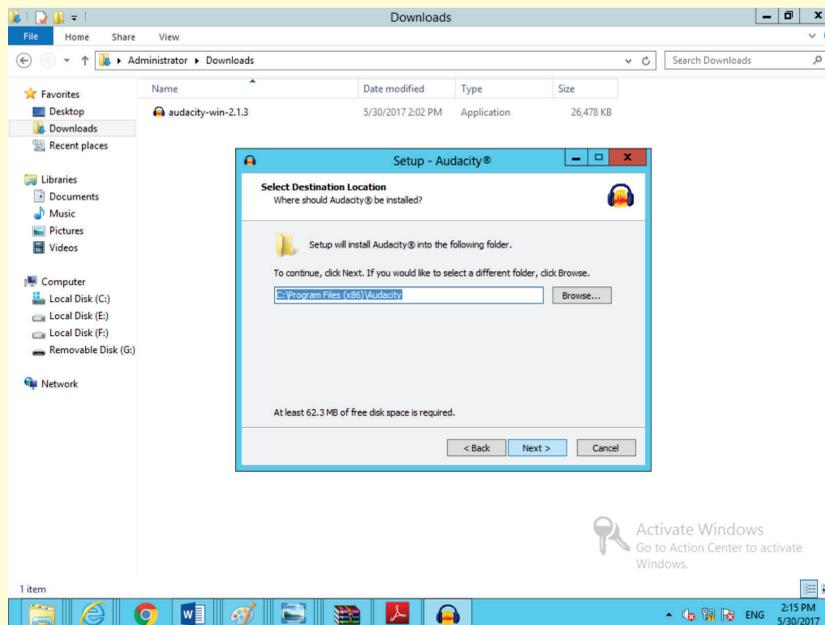
Again Click on “Next” button.



Picture 5.8

STEP-11

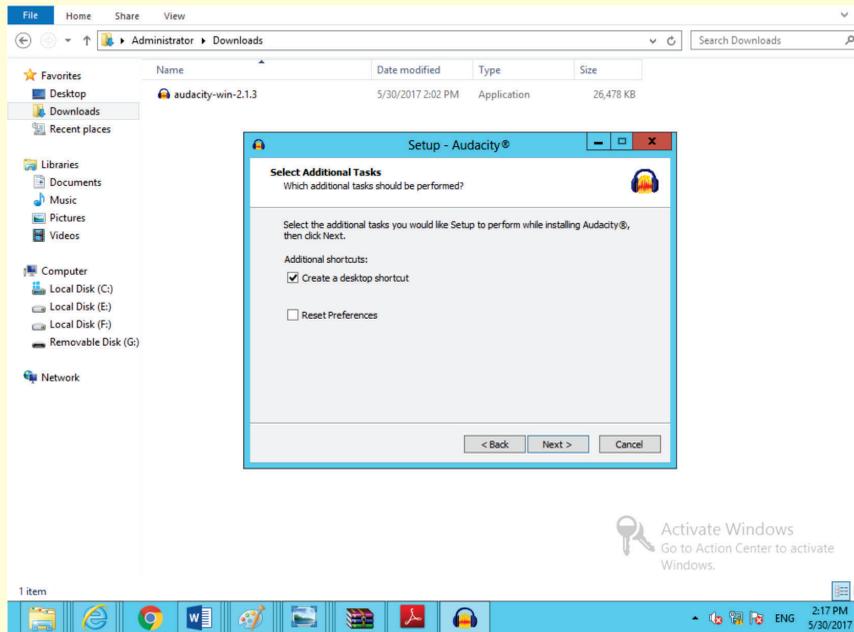
Again Click on “Next” button.



Picture 5.9

STEP-12

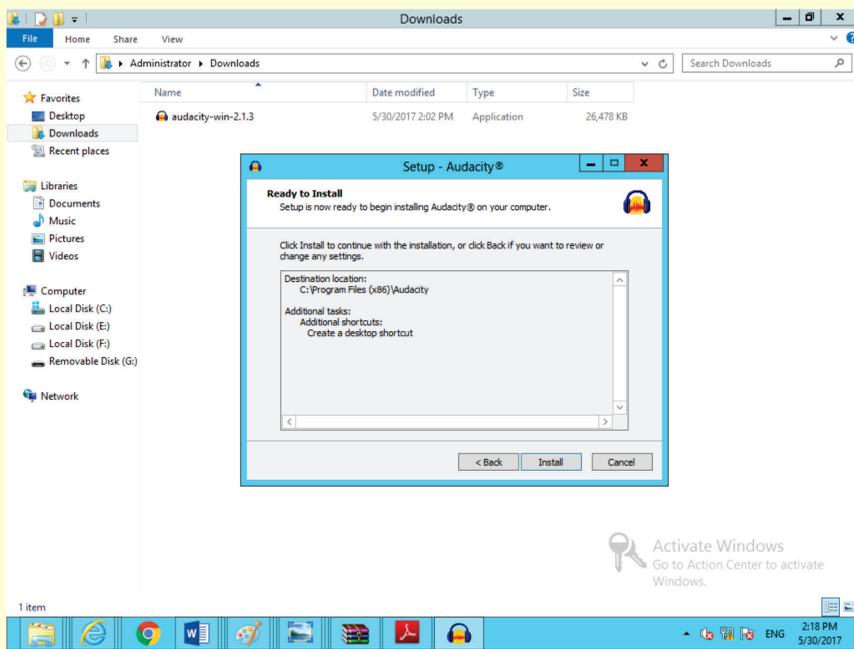
Again Click on “Next” button.



Picture 5.10

STEP-13

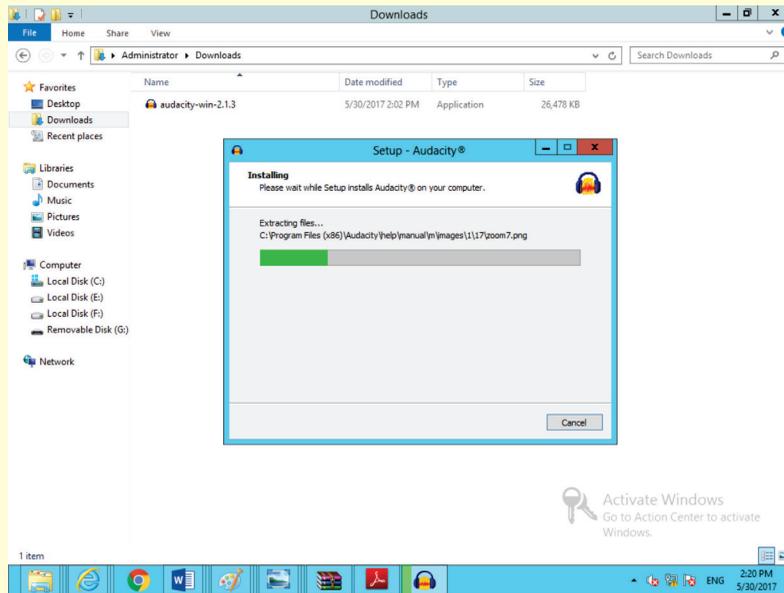
Click on “Install” button.



Picture 5.11

STEP-14

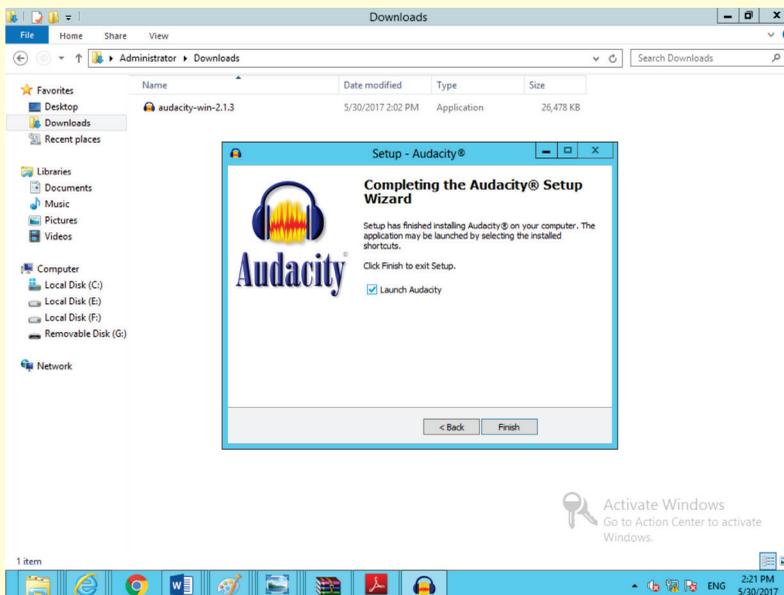
Now Audacity software is installing.



Picture 5.12

STEP-15

Click on “Finish” button.

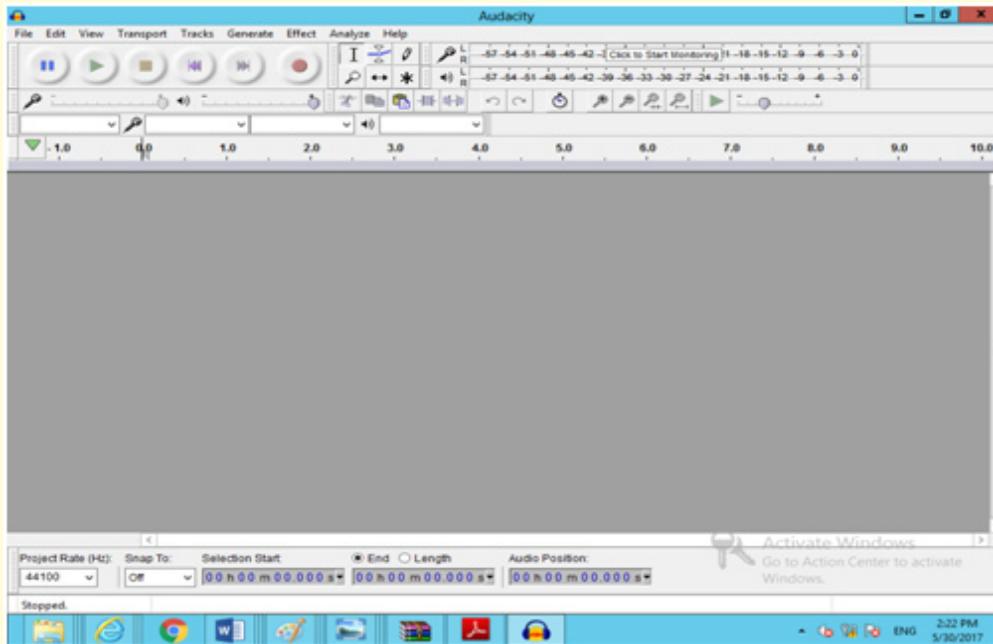


Picture 5.12

Audacity will be installed in your system.

STEP-16

Click on Audacity Software.



Picture 5.14

ALTERNATIVE SOFTWARE:

- 1) **WavePad:** WavePad Audio Editor Software is an audio and music editor for Windows and Mac (also available for IOS and Android). It lets users record and/or edit music, voice and other audio recordings. Wave pad develop by NCH.
- 2) **Ocenaudio:** This software is based on Ocean Framework, a powerful library developed to simplify and standardize the development of audio manipulation and analysis applications across multiple platforms.
- 3) **Wavosaur:** Audio editing software is software which allows editing and generating of audio data.
- 4) **Sound Forge Audio Studio:** Sony Sound Forge (formerly known as Sonic Foundry Sound Forge) is a digital audio editing suite by Magix Software GmbH which is aimed at the professional and semi-professional markets.

NO OF PERIODS: 4

Topic	Theory & Demo	Hands On	Assessment	Total
Audio Visual And Communication	1	2	1	4

SUGGESTED TEACHING METHODS:

It is suggested that the teacher attempts to:

- Consider student learning first: students are learning composition techniques, and developing listening skills
- Relates to real-world career options in composing and recording
- Ensures that the creative process involves constant reflection and decision-making
- Allows students to be in control of their learning, as students choose their environment and the sounds they record
- Instills Life and Career Skills, specifically being flexible in adapting to varied roles (performer, producer, sound engineer); incorporating feedback effectively, and dealing positively with praise, setbacks and criticism; and initiative and responsibility (learning the music beforehand to not let the group down).

ACTIVITY WISE MAPPING:

(SKILLS, INTELLIGENCE, INTERDISCIPLINARY)

Activity And Aim	Skills	Multiple Intelligences Incorporated	Interdisciplinary
Activity 1. Learn, How to save a story by recording in your voice. Aim: To improve visual awareness and effective communication.	Cognitive, Communication	Spatial Visualization , Naturalistic	English (Poem) History (The Great person of India)

<p>Activity 2. To save voice recorded in activity 1. Aim: To encourage the students for learning the tool.</p>	Creative/Aesthetic	Logical Reasoning	
<p>Activity 3. To open you're saved file. Aim: To improve thinking of students.</p>	Creative/Aesthetic	Logical Reasoning	
<p>Activity 4. To combine Audio file. Aim: To collaborate and make co-operation between peers group.</p>	Team/Collaboration , Communication	Linguistic, naturalistic	

CRITICAL THINKING ENHANCEMENT:

SUGGESTED ACTIVITIES:

1. Record a song on clean India movement which could be played publicly on radio.
2. Record a story for Indian Army which describes their sacrifices, their hard work and their love for our country.
3. Record a moral story on Dr. Abdul Kalam.
4. Record a story which describes mother's love.

References:

<http://www.webopedia.com>
www.audacityteam.org
<https://audacity.en.softonic.com>
<https://www.hippo.com>
<https://sourceforge.net>
<https://en.wikipedia.org>
<https://kerileebeasley.com>
<https://meantechtools.wikispaces.com>

ANSWER KEY:

I. Multiple choice questions:

1. b
2. c
3. a

II. Fill in the blanks:

1. Record Button
2. Stop Button
3. Play
4. Audacity Team

III. True/ False:

1. (X)
2. (√)
3. (X)
4. (√)

Google Earth

GENERAL OBJECTIVES:

- To develop cognitive, problem solving and creative skills.
- To make students IT literate.
- To make students at ease for the use of ICT in their day to day life.

SPECIFIC OBJECTIVES:

- Understanding of Maps and Globes in the students.
- Awareness about the benefits of Virtual Globe.
- Acquaintance with the coordinates, resolution and directions etc.
- Knowledge about Satellite images and their usage.

TOOLS USED: Google Earth

INTRODUCTION:

Since ancient times human beings have been curious about their surroundings and exploring nearby areas as well as distant parts of the worlds. It has been their hobby and need both. Today ICT has come up with such software tools which help us to explore not only our nearby areas but whole earth. Now it has become inevitable in so many situations like – to study the topography, planning the cities and need of knowledge about a place, if someone is new to that area and strategic planning etc. One such software tool for all the needs mentioned above is 'Google Earth'. 'Google Earth' is a computer program that renders a simulacrum of the

Earth based on satellite imagery. Some tools and facilities, available in Google Earth are given as: Street view, Historical Imagery, Searching for places, Tours, Recording a tour etc. and exploring even Moon and Mars. It allows users to search for addresses for some countries, enter coordinates, or simply use the mouse to browse to a location. It is also very important to know that every image created from Google Earth using satellite data provided by Google Earth is a copyrighted map whereas Google allows non-commercial personal use of the images as long as copyrights and attributions are preserved.

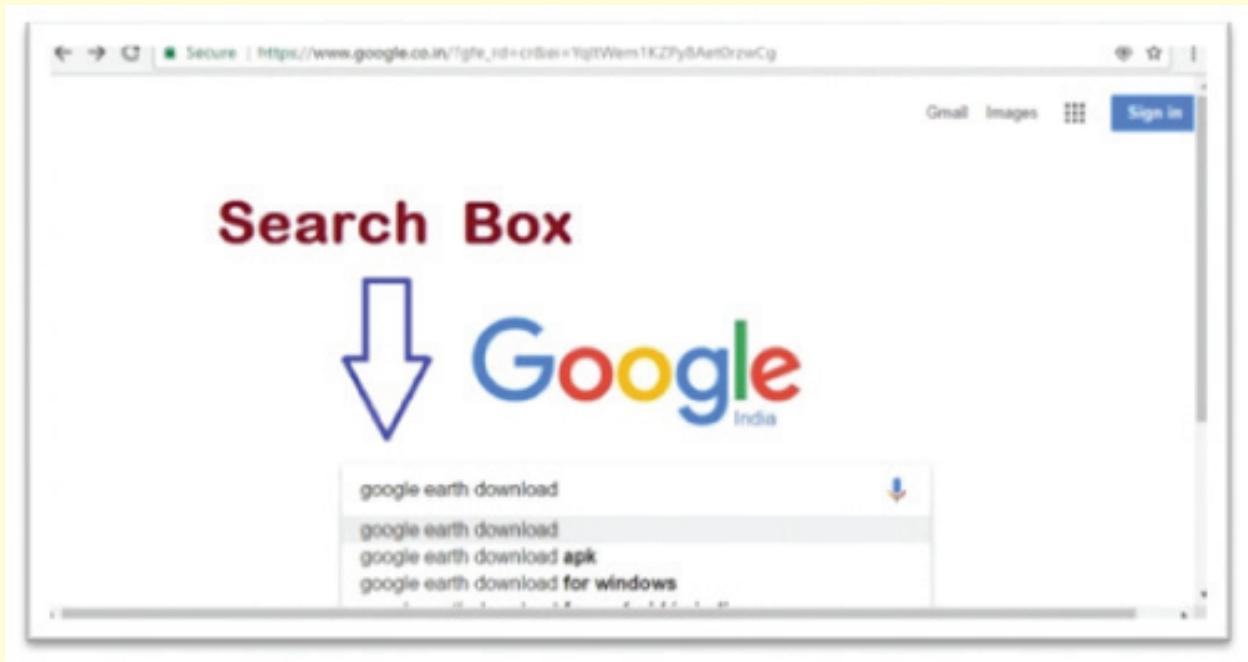
STEPWISE INSTALLATION GUIDE:

STEP-1

Open the home page of a search engine in any of the browsers available in your PC.

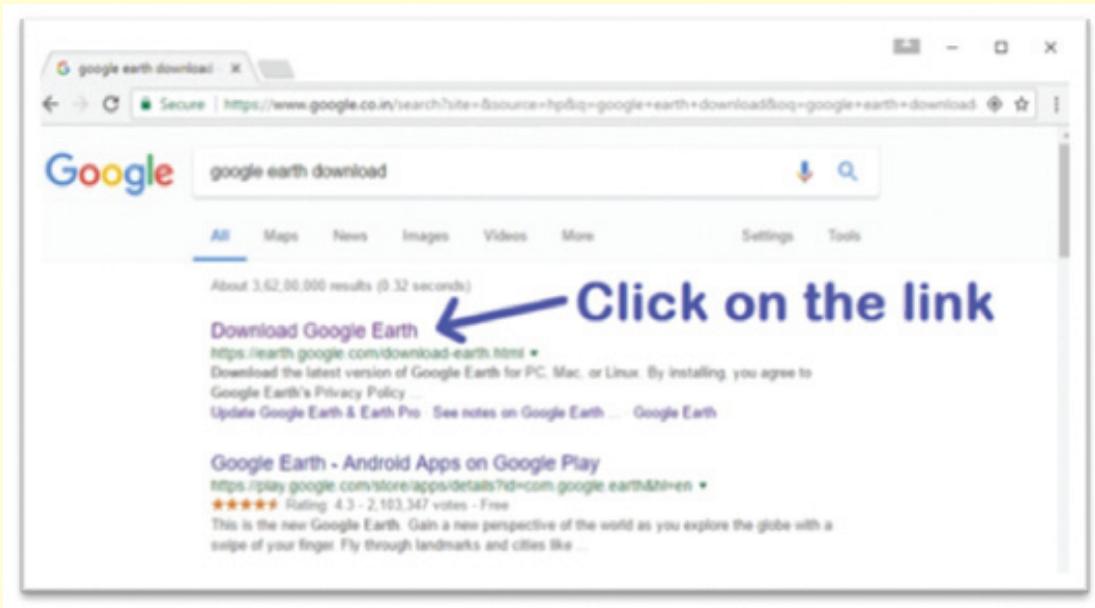
STEP-2

Type 'Google Earth Download' in the search Box (see image) and press 'Enter'.



STEP-3

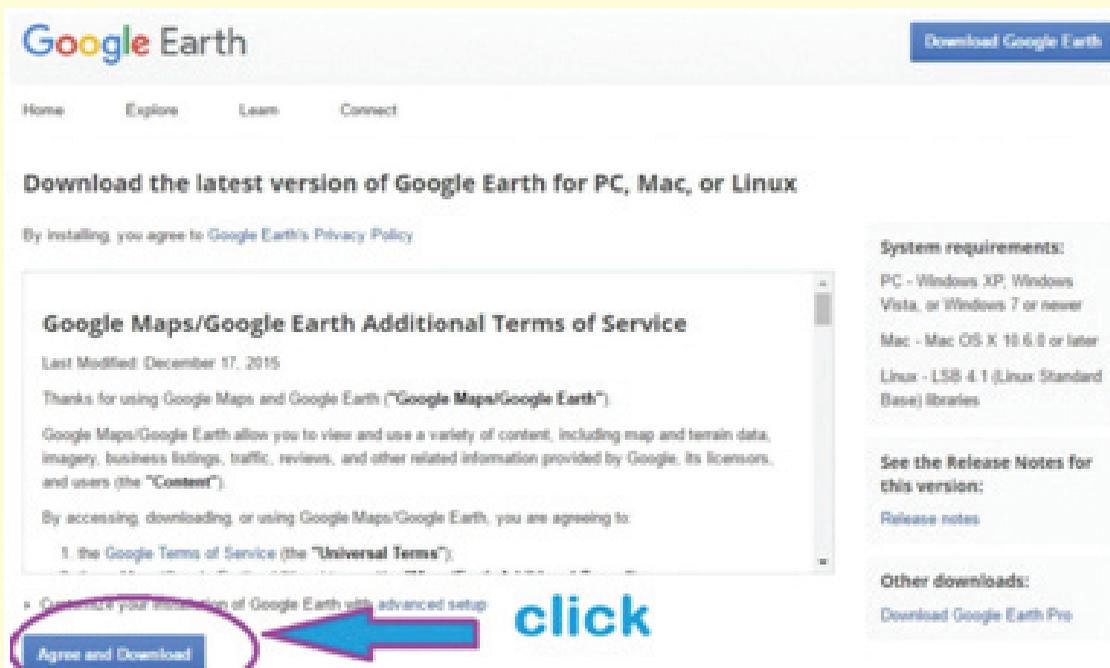
Click on the Link from the site <http://earth.google.com> .



STEP-4

After reading the Terms and Conditions click on 'Agree and Download'.

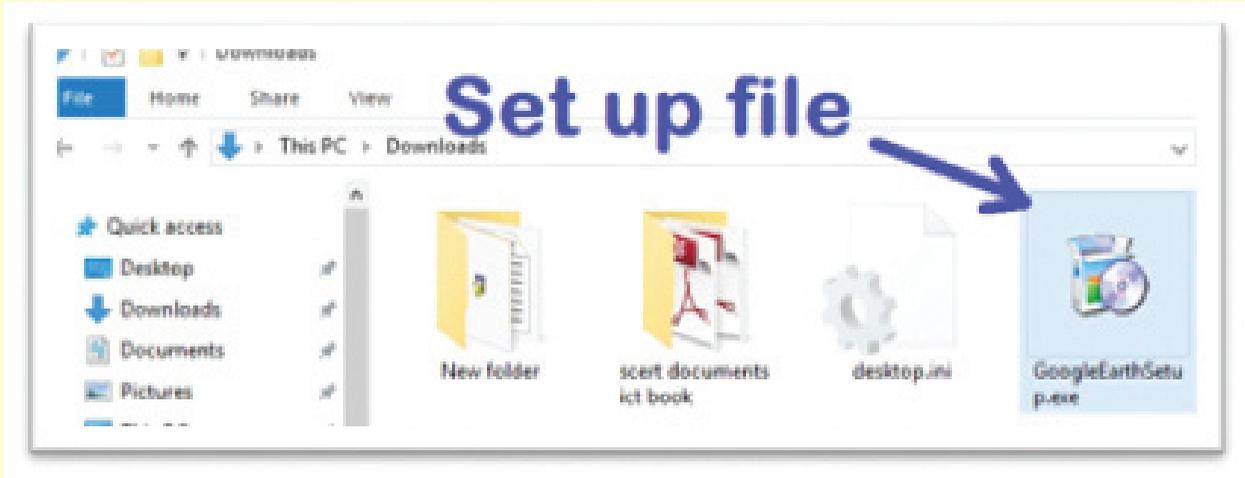
Set up file will be downloaded in your PC.



STEP-5

Click on the setup file and follow the steps thereafter.

After installation just click on the icon of the software and get ready to explore the world.



ALTERNATIVE SOFTWARES

There are so many other softwares also like Google Earth available on the net which perform similar job like it. Some of them are given as –

- Nasa World Wind
- Marble
- Earth Browser
- Flash Earth
- Here Maps etc.

NO OF PERIODS:

Topic	Theory, Demo and Hands On	Assessment	Total
Google Earth	1	1	2

SUGGESTED TEACHING METHODS

CLASS ROOM DISCUSSIONS

Involving the need of such technology by giving students examples of situations where such softwares can be helpful for them and discussing about the scope of explorations with the help of such softwares.

CITING EXAMPLES FROM OTHER SUBJECTS

As in Social Studies, students can be asked about the Topography of North India and about the differences between the geographical conditions of two distant countries.

CASE STUDIES

Students can be asked to study the gradual changes during the course of time in a particular area and describe the possible environmental impact of those changes.

EDUCATIONAL GAMES

1. Make five teams and assign them name of a continent then ask them to count the countries in a particular continent assigned to them
2. Assign name of a state to every student and ask them to find, note and tell that which of them is situated at highest altitude and which one at lowest.

BRAIN STORMING:

1. Ask students to write as much usage of the software as they can and praise the students with maximum outcomes.
2. Give them situations or problems where they can be benefited with the help of this software.

ACTIVITY WISE MAPPING (SKILLS, INTELLIGENCE, INTERDISCIPLINARY)

Topic: Google Earth		Duration: 2 periods	
Activity and Aim	Skills related to the Subject	Multiple Intelligences Incorporated	Interdisciplinary
Activity 1: To search different continents and countries on a virtual map.	Cognitive skill, Problem solving skill,	Spatial visualization, Naturalistic intelligence, Linguistic Intelligence	English (Reading), Social science (Geography, polity and History), Science etc.
Activity 2: To show India Gate in Delhi and White House in America.	Cognitive skill,	Spatial visualization, Naturalistic intelligence, Linguistic Intelligence	
Activity 3: To get the way to India gate from Chandni chowk.	Cognitive skill, Problem solving skill, Critical thinking skill	Spatial visualization, Naturalistic intelligence, Linguistic Intelligence	
Activity 4: To find India Gate and to get its 3D view.	Cognitive skill, Problem solving skill, creative/Aesthetic skill	Spatial visualization, Naturalistic intelligence, Linguistic Intelligence	
Activity 5: To get the view in 2016 and in 2001 of Shastri Park Metro Depot and Shastri Park IT Park.	Cognitive skill,	Spatial visualization, Naturalistic intelligence, Linguistic Intelligence	

CRITICAL THINKING ENHANCEMENT.

Teachers should provoke critical thinking enhancement with the help of some activities. An activity for example is given below:

Suppose, a student goes somewhere with his/her family for outing in an area which is new to all of them, then how can they find their way with the help of this software?

SUGGESTED ACTIVITIES

- i. Open google earth and show the image of our school.
- ii. Find the approximate distance of National Science Centre from your school.
- iii. Find and write the names of 10-10 places on the eastern and western coast line of India respectively.
- iv. Show the image and name the states sharing border with Madhya Pradesh.
- v. Take a virtual tour of Gate way of India, Mumbai on virtual globe and describe it including description about some nearby areas of tourism importance.
- vi. On the digital Globe show these areas:
 - Palk Strait
 - Aral Sea
 - Paris
 - Telangana
 - Chad

References:

www.Google.com

Google Earth

www.wikipedia.org

GOOGLE EARTH (ANSWER KEY)

I. Multiple choice questions

1. C

2. C
3. D
4. B
5. A

II. Fill in the Blanks.

- a. Street view
- b. Get direction
- c. Google
- d. Peg man
- e. Mars, Moon

III. True/False statements.

- a. (X)
- b. (√)
- c. (X)
- d. (√)
- e. (X)

IV. Match the column A with column B.

- A. 4
- B. 5
- C. 1
- D. 3
- E. 2

Answers to the questions of short answer type and long answer type should be written by students on their own. Teacher too may help the students, if he feel like doing so.

ASSESSMENT

The importance of Assessment cannot be overlooked as they serve as a means to monitor the learning of students. Monitoring the learning allows the teacher to take remedial action if necessary or adopt different methods and mediums to make learning enjoyable and thus a cherished experience.



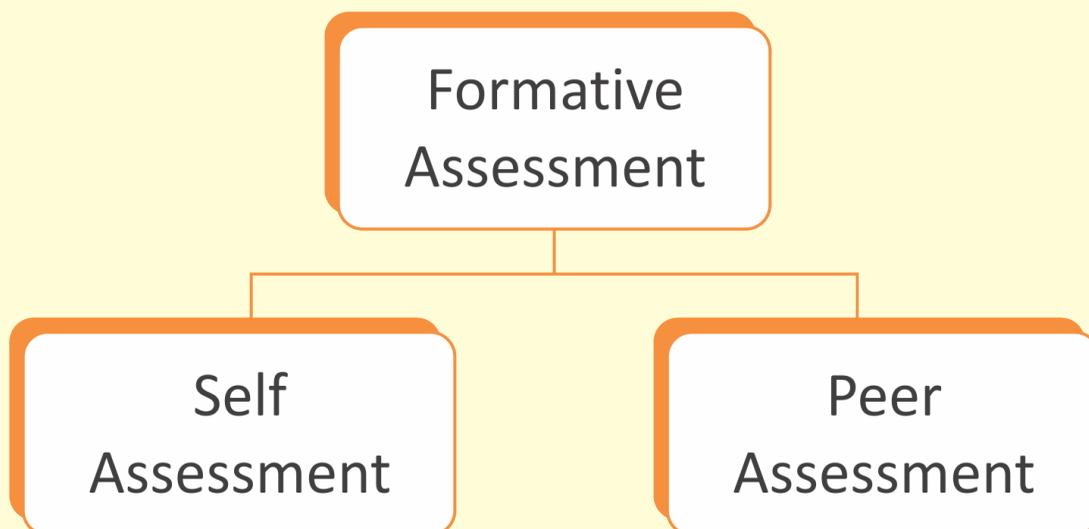
FORMATIVE ASSESSMENT :

To ensure that there is a step by step growth in the student understanding and learning. The ICT Textbook consists of:

- Activities
- Practice sections

which helps the teacher to perform Formative Assessment. Thus allowing the teachers to identify problems if any in the early stages of learning.

The Formative Assessments in the textbook help in making the summative evaluation meaningful. The Assessment at the Activity and Practice level has been compiled under the following two components:



SELF ASSESSMENT

What it means?

It is the assessment or evaluation of oneself in terms of actions, attitudes, or performance.

Who will assess?

It will be done by the student her/himself.

How will it help?

- It helps in facilitating the student as he/she assesses his/her abilities.
- Promotes Self improvement.
- Inculcates Self Confidence.
- Promotes essential Life Skills of Self Awareness.



PEER ASSESSMENT

What it means?

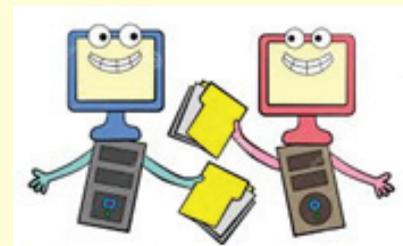
The dictionary meaning of Peer is "A person of the same kind". Peer assessment here means the assessment by the classmates for this purpose a small group of students can be created who would monitor each other's work during the practical sessions..

Who will assess?

The peer group will be responsible for assessing the achievement of the fellow student.

How will it help?

- Enables children to provide each other with valuable feedback on work so that they can learn from and support each other.



- The opportunity to discuss, explain and challenge each other adds a valuable dimension to learning overall.
- Focuses on the development of student's judgment skills.
- Promotes essential Life Skills of Managing Emotions, Coping with Stress, Empathy and Interpersonal Relationship.

Each chapter has a Self – Assessment sheet that will be graded by the student and any one of her/his peer from the peer group. The Grade scheme is as follows:

Grade	Remedial Remarks	Conversion
D	Need Teacher's Help	1
C	Requires occasional peers' help	2
B	Can work independently.	3
A	Is able to help others.	4

The student and her/his peer (identified by the teacher) will assign a grade on the basis of the proficiency of the student. The grade will be converted to marks as given in the above table by the teacher.

SUMMATIVE ASSESSMENT :

Learning Objectives and Learning Outcomes at the end of each chapter have been included to ensure Summative Assessment. Summative Assessment serves as a means to identify whether the Learning objectives have been achieved in reality.

To ensure a responsible assessment the Teacher needs to clarify that the student and the peer group is liable to provide feedback and explanation for her/his evaluation. In case of any dispute the teacher needs to take up the role of an arbitrator.

SCHEME OF EVALUATION

The session will consist of 2 Term examinations and the Assessment should be conducted as follows:

TERM I : 50 MARKS (THEORY: 20 MARKS + PRACTICAL: 30 MARKS)

TERM II : 50 MARKS (THEORY: 20 MARKS + PRACTICAL: 30 MARKS)

TOTAL : 100 MARKS

SYLLABUS FOR TERM ASSESSMENT	
TERM I	TERM II
Chapter Name	Chapter Name
Graphics and Animation	Data Representation and Processing 02
Programming 01	Data Representation and Processing 03
Internet & ICT Environment	Audio Visual Communication
Data Representation and Processing 01	Software Application

SUGGESTED BLUE PRINT-ICT

THEORY

Time: 1½ Hours

Marks: 20

S.No.	Typology of Questions	Very Short Answer (VSA) (1 mark)	Short Answer-I (SA-I) (2 marks)	Short Answer-II (SA-II) (3 marks)	Long Answer-III (LA-III) (5 marks)	Total Marks	% Weightage
1.	Knowledge Based	4	-	-	-	4	20
2.	Conceptual Understanding	2	1	-	-	4	20
3.	Reasoning Based	2	-	1	-	5	25
4.	Skill based	2	-	-	1	7	35
	Total Marks (Questions including sub parts)	10 (10)	02 (01)	03 (01)	5 (01)	20 (13)	100

DESIGN OF THE QUESTION PAPER

THE QUESTION PAPER SHOULD CONTAIN 2 SECTIONS:

A. Objective : 10 marks

The Objective section may consist of any of the following type of questions:

1. MCQ Type questions
2. Fill in the Blanks
3. Full Forms
4. True/False
5. Match the following
6. Give one Word

B. Subjective : 10 marks

The subjective section may consist of :

- 1 Short Answer Question (2 marks each)
- 1 Short Answer Question (3 marks each)
- 1 Long Answer Question (5 marks each)

PRACTICAL

Time: 2 Hours

Marks: 30

S.No.	Typology of Questions	Marks
1.	Hands on Experience	15
2.	Compiled Self and Peer Assessment	04
3.	Exhibition of Portfolios	06
4.	ICT Know how	5
	Total Marks	30

DESIGN OF A PRACTICAL QUESTION PAPER

Practical Question paper should be designed as per the syllabus for the term.

(A) HANDS ON SKILLS

15 Marks

Teachers are suggested to create 4 set of Practical papers consisting of a distinct complex problem to be demonstrated on the Computer System by using the various ICT Tools taught during the Term.

For example:

1. Creating a Underwater Scene/Playground etc.
2. Creating Geometrical shapes in LOGO.
3. Searching for images on moral values/events/Processes etc. from the Internet and saving it in a folder at a location specified by teacher. (For example: C:\My Data)
4. Finding of profit and loss on the basis of Cost Price and Selling Price and then finding Maximum Profit/Loss , Average Selling Price etc.

(B) COMPILED SELF AND PEER ASSESSMENT

4 Marks

The Student's Textbook for ICT in Education comprises of Self Assessment Sheet after every chapter along with Grading Scheme as mentioned above. The teacher needs to find the average score for all the chapters of the term.

An example Sample self Assessment Sheet of Chapter 4 is given as follows:

S. No.	ACTIVITY	STUDENT ASSESSMENT	PEER ASSESSMENT		Average of Student Assessment and Peer Assessment
			Name of the Peer		
1	Identifying datatype of data used in an Aadhar Card.	A (4)	Anu	C (2)	3

2	Storing data in a spreadsheet	B (3)	Mazhar	B (3)	3
3	Sorting a List	A (4)	Gundeep	A (4)	4
4	Using Spreadsheet to prepare a budget for Sports related material.	A (4)	Sheena	D (3)	3.5 = 3
5	Applying Aggregate functions namely SUM(), MIN(), MAX(), COUNT(), AVERAGE() on the budget to summarize data.	C (2)	James	B (3)	2.5 = 2
				Total :	15
	Average	$15/5 = 3$			

STEP-1

Convert grades into marks as per the conversion provided in the Grading Scheme given above.

STEP-2

Find Average of Student assessment and Peer Assessment for each activity and enter it in the extreme right of the Self assessment sheet in front of each activity as shown above.

Average is calculated as $\text{Student Score} + \text{Peer Score} / 2$. In case the value is 3.5 keep the floor value i.e 3, don't round it off to 4.

STEP-3

Find Grand Total of the values obtained by Step 2. It is 15 in the above case.

STEP-4

Find Average = $\text{Grand Total} / \text{Number of activities} \Rightarrow 15 / 5 = 3$, where 5 is the total number of activities Hence, Score for Chapter – 4 is 3.

STEP-5

By following the above method find Score for each chapter.

STEP-6

Find Average score for all the Chapters in the Term to be entered as Compiled Self and Peer Assessment for Practical Examination.

Let us assume that a Student has obtained the following Score:

Chapter	Score
Chapter 1	3
Chapter 2	2
Chapter 3	4
Chapter 4	3 (as calculated above)

Average Score for the Term (all chapters) = $3+2+4+3 / 4$ (Number of Chapters) = $12/4 = 3$, is the Compiled Self and Peer Assessment

(C) EXHIBITION OF E-PORTFOLIOS

6 Marks

Teachers should maintain each student's work in a designated folder in the computer system .Marks should be given for an effective presentation by each student. The marks distribution should be as follows:

	Marks
Introduction to the activity	2
Options used	2
Any other real life situation where the activity can be helpful.	2
Total	6

This will nurture a student's confidence and improve communication skills.

(D) ICT KNOW HOW

5 Marks

Teachers should ask at least 5 questions covering the Hands on assigned during practical examination and the ICT Tools taught as per syllabus.

SAMPLE QUESTION PAPER

CLASS : VII

SUBJECT : ICT

Time : 1.5 hrs

1 e; %1-5 ?k/s

Maximum Marks : 20

vf/kdre val %20

General Instruction

l kkl; funzk

(i) All Questions are Compulsory.

l Hh izu vfuok ZgA

(ii) Question paper is divided into 4 sections.

izu i= dks plj Hxk ea cl/k x; k gA

Section A – Multiple Choice Questions (1 mark each)

Section B – Very Short Answer (2 marks each)

Section C – Short Answer (3 marks each)

Section D – Long Answer (5 marks each)

(iii) All questions of that particular section must be placed in the correct order.

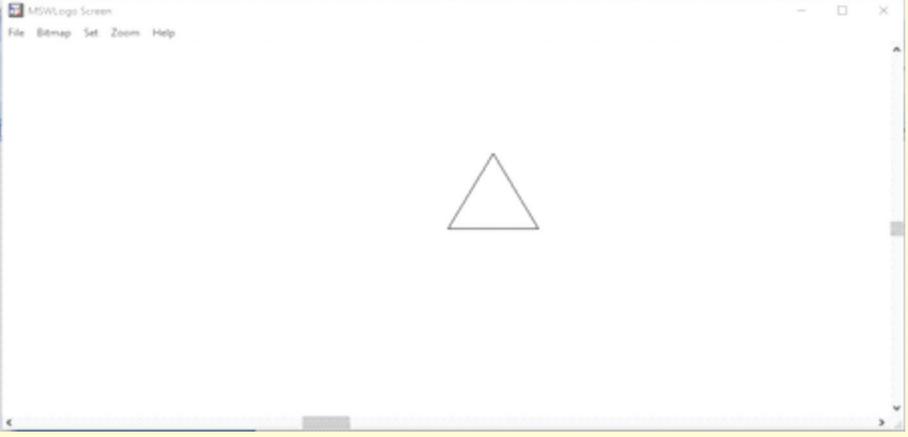
gj Hx ds izu dks Øeku kj dja

(iv) Please check that this question paper contains 6 questions.

Ñi; k tlp yafd izu i= eady 6 izu gla

1.	Multiple Choice Question: cgfoYih; izu	3
	<p>a. Which of the following methods can be used to communicate with our friends?</p> <p>1- ge vi us fe=kal sl idZfuEufyf[kr fdl mi k; l s dj l drsgA</p> <p>a. E-Mail (bZey)</p> <p>b. Chatting (pSVx)</p> <p>c. Video Conferencing (fofM; k dWYsl x)</p> <p>d. All of the above (rhuk mi k; a, b, c)</p>	
	<p>b. RT command is used to _____</p> <p>RT command dk iz kx fdl fy, fd; k t krk gS</p> <p>a. Move turtle</p> <p>b. Turn Turtle Right</p> <p>c. Run Turtle</p> <p>d. Hide Turtle</p>	
	<p>c. Keyboard is an example of</p> <p>dhckWmnlkj.k g&</p> <p>a. Output ; fuV dk</p> <p>b. Input ; fuV dk</p> <p>c. C.P.U dk</p> <p>d. fdl h dk Hh ugha</p>	

2.	<p>Fill in the blanks :</p> <p>a. We write Date in _____ format.</p> <p>b. We type the address of a website on _____ bar of web browser.</p> <p>c. Computer is an _____ device.</p> <p>d. _____ command of LOGO is used for calculations.</p>	
3.	<p>State whether the following statements are true or false.</p> <p>a. The last page of a website is known as Home page.</p> <p>b. Min() and Max() work on Numeric data.</p> <p>c. Secondary Memory stores data temporarily.</p> <p>d. Mozilla Firefox is a web browser.</p>	3

4.	Write the usage of URL. ; w kj-, y- dk iz kx fy [kA	2
5.	Explain the importance of Operating System. vWj sVx fl LVe dk egRo fy [kA	3
6.	Draw a block diagram of the computer. dE; Wj dh dk; Zz kyh dk CyM fp= l s l e>k, a	5
	<p>Or</p> <p>; k</p> <p>fuEu Triangle cukus ds fy, LOGO command fy [kA</p>  <p>The screenshot shows a window titled 'LOGO Logo Screen' with a menu bar containing 'File', 'Bitmap', 'Set', 'Zoom', and 'Help'. The main area of the window is white and contains a simple black outline of a triangle centered on the screen.</p>	

PARAMETERS OF LEARNING

LIFE SKILLS



The ICT in Education textbook has made an effort to inculcate Life Skills by designing the content in such a way that during the process of learning students are provided examples, activities that help to instill the Life Skills in them. It becomes the teacher's responsibility to convey the life skills to the students while teaching in such a way that they understand their importance.

Children learn their Life Skills from parents, teachers and significant others who act as their role model. They gradually learn to use a particular skill effectively in diverse situation to cope with challenges of life.

Life skills education involves a dynamic teaching process. The methods used to facilitate this active involvement includes working in small groups and pairs, brainstorming, role plays, games and debates etc. which have been defined in the teaching methodology section of the document for various chapters , also the Teacher's Manual maps the individual activities of the chapters with the Life Skills for reference.

A 21st century learner should be prepared and well equipped to deal with challenges and demands of everyday life.

"Life Skills are a set of identified skills that prepare a child to handle any type of situation with a positive frame of mind."

The Ten core Life Skills as laid down by WHO are:

- 1. Self-awareness** : Self-awareness includes recognition of 'self', our character, our strengths and weaknesses, desires and dislikes. Developing self-awareness can help us to recognize when we are stressed or feel under pressure. It is often a prerequisite to effective communication and interpersonal relations, as well as for developing empathy with others.

Skill can be defined as the ability to do a work efficiently.

2. **Empathy :** To have a successful relationship with our loved ones and society at large, we need to understand and care about other peoples' needs, desires and feelings. Empathy is the ability to imagine what life is like for another person. Without empathy, our communication with others will amount to one-way traffic. Worst, we will be acting and behaving according to our self-interest and are bound to run into problems.
3. **Critical thinking :** is an ability to analyze information and experiences in an objective manner. Critical thinking can contribute to health by helping us to recognize and assess the factors that influence attitudes and behaviour, such as values, peer pressure and the media.
4. **Creative thinking :** is a novel way of seeing or doing things that is characteristic of four components – fluency (generating new ideas), flexibility (shifting perspective easily), originality (conceiving of something new), and elaboration (building on other ideas).
5. **Decision making:** helps us to deal constructively with decisions about our lives. This can have consequences for health. It can teach people how to actively make decisions about their actions in relation to healthy assessment of different options and, what effects these different decisions are likely to have.
6. **Problem Solving:** helps us to deal constructively with problems in our lives. Significant problems that are left unresolved can cause mental stress and give rise to accompanying physical strain.
7. **Effective communication:** helps us to deal constructively with problems in our lives. Significant problems that are left unresolved can cause mental stress and give rise to accompanying physical strain.
8. **Interpersonal relationship:** skills help us to relate in positive ways with the people we interact with. This may mean being able to make and keep friendly relationships, which can be of great importance to our mental and social well-being. It may mean keeping, good relations with family members,

which are an important source of social support. It may also mean being able to end relationships constructively.

9. **Coping with stress:** means recognizing the sources of stress in our lives, recognizing how this affects us, and acting in ways that help us control our levels of stress, by changing our environment or lifestyle and learning how to relax.
10. **Coping with emotion:** means involving recognizing emotions within us and others, being aware of how emotions influence behaviour and being able to respond to emotions appropriately. Intense emotions like anger or sadness can have negative effects on our health if we do not respond appropriately.

Life Skills help a child deal with the following (WHO):

- Demands of modern life
- Poor parenting
- Changing family structure
- Dysfunctional relationships
- New understanding of young people's needs
- Decline of religion
- Rapid sociocultural change

Besides the above, Cognitive skills and Aesthetic Skills are also mentioned during Activity wise Mapping their description are as follows:

Cognitive skill is related to the understanding of concepts and the ability to think and reason and thus is an umbrella term including all thought and reason related skills.

Aesthetic Skill involves the appreciation of art and knowledge of finer details involved.

Effective acquisition and application of Life Skills can influence the way one feels about others, ourselves and will equally influence the way we are perceived by others. It contributes to perception of self confidence and self esteem.

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http://www.who.int/mental_health/media/en/30.pdf

www.cbse.nic.in/cce/life_skills_cce.pdf

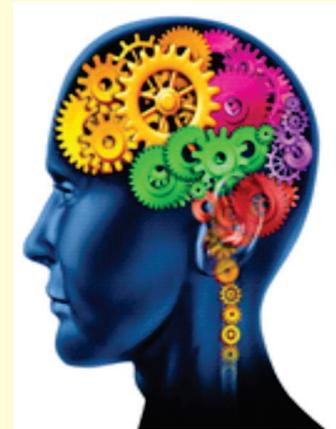
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INTELLIGENCE

It's the ability to acquire and apply knowledge and skills.

Intelligence has been defined in many different ways including as one's capacity for logic, understanding, self-awareness, learning, emotional knowledge, planning, creativity, and problem solving. It can be more generally described as the ability to perceive information, and to retain it as knowledge to be applied towards adaptive behaviors within an environment or context.



Howard Gardner of Harvard has identified following seven distinct intelligences which have been mapped with each activity chapter wise and defined below for the teacher's reference,

Visual-Spatial - think in terms of physical space, as do architects and sailors. Very aware of their environments. They like to draw, do jigsaw puzzles, read maps, and daydream. They can be taught through drawings, verbal and physical imagery. Tools include models, graphics, charts, photographs, drawings, 3-D modeling, video, videoconferencing, television, multimedia, texts with pictures/charts/graphs.

Bodily-kinesthetic - use the body effectively, like a dancer or a surgeon. Keen sense of body awareness. They like movement, making things, touching. They communicate well through body language and be taught through physical activity, hands-on learning, acting out, role playing. Tools include equipment and real objects.

Musical - show sensitivity to rhythm and sound. They love music, but they are also sensitive to sounds in their environments. They may study better with music in the background. They can be taught by turning lessons into lyrics, speaking rhythmically, tapping out time. Tools include musical instruments, music, radio, stereo, CD-ROM, multimedia.

Interpersonal - understanding, interacting with others. These students learn through interaction. They have many friends, empathy for others, street smarts. They can be taught through group activities, seminars, dialogues. Tools include the telephone, audio conferencing, time and attention from the instructor, video conferencing, writing, computer conferencing, E-mail.

Intrapersonal - understanding one's own interests, goals. These learners tend to shy away from others. They're in tune with their inner feelings; they have wisdom, intuition and motivation, as well as a strong will, confidence and opinions. They can be taught through independent study and introspection. Tools include books, creative materials, diaries, privacy and time. They are the most independent of the learners.

Linguistic - using words effectively. These learners have highly developed auditory skills and often think in words. They like reading, playing word games, making up poetry or stories. They can be taught by encouraging them to say and see words, read books together. Tools include computers, games, multimedia, books, tape recorders, and lecture.

Logical-Mathematical - reasoning, calculating. Think conceptually, abstractly and are able to see and explore patterns and relationships. They like to experiment, solve puzzles, ask cosmic questions. They can be taught through logic games, investigations, mysteries. They need to learn and form concepts before they can deal with details.

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