Information and Communication Technology

Teachers' Guide
Grade 8

(Effective from 2018)

Department of Information Technology
National Institute of Education
Maharagama
Sri Lanka

www.nie.lk

Information and Communication Technology
Grade 8 – Teacher's Guide

CONTENTS

Message from the Director General

With the primary objective of realizing the National Educational Goals recommended by the National Education Commission, the then prevalent content based curriculum was modernized, and the first phase of the new competency based curriculum was introduced to the eight year curriculum cycle of the primary and secondary education in Sri Lanka in the year 2007

The second phase of the curriculum cycle thus initiated was introduced to the education system in the year 2015 as a result of a curriculum rationalization process based on research findings and various proposals made by stake holders.

Within this rationalization process the concepts of vertical and horizontal integration have been employed in order to build up competencies of students, from foundation level to higher levels, and to avoid repetition of subject content in various subjects respectively and furthermore, to develop a curriculum that is implementable and student friendly.

The new Teachers' Guides have been introduced with the aim of providing the teachers with necessary guidance for planning lessons, engaging students effectively in the learning teaching process, and to make Teachers' Guides will help teachers to be more effective within the classroom. Further, the present Teachers' Guides have given the necessary freedom for the teachers to select quality inputs and activities in order to improve student competencies. Since the Teachers' Guides do not place greater emphasis on the subject content prescribed for the relevant grades, it is very much necessary to use these guides along with the text books compiled by the Educational Publications Department if, Guides are to be made more effective.

The primary objective of this rationalized new curriculum, the new Teachers' Guides, and the new prescribed texts is to transform the student population into a human resource replete with the skills and competencies required for the world of work, through embarking upon a pattern of education which is more student centered and activity based.

I wish to make use of this opportunity to thank and express my appreciation to the members of the Council and the Academic Affairs Board of the NIE the resource persons who contributed to the compiling of these Teachers' Guides and other parties for their dedication in this matter.

Dr. (Mrs.) Jayanthi Gunasekara

Director General

National Institute of Education

Curriculum Committee

Guidance and Approval	Academic Affairs Board National Institute of Education
Subject Coordinator	Mrs. M.N.P. Maddumage Lecturer, National Institute of Education

Resource Contributions

Mr. D.Anura Jayalal *(M.Sc., PG in Ins Design, PGDE, B.Sc.)*	Director, Department of IT National Institute of Education
Mr. S. Shanmugalingam (*M.Sc., PGDE*)	Senior Lecturer, Department of IT National Institute of Education
Mrs. M.N.P. Maddumage (*PGDE, B.A.*)	Lecturer, Department of IT National Institute of Education
Mrs. G.D.W.M. Ariyarathna (*M.Sc., B.Sc.*)	Asst. Lecturer, Department of IT National Institute of Education
Dr.P.M.T.P.Sandirigama (*Ph.D*)	Senior Lecturer, University of Peradeniya
Dr.H.L.Premarathne (*Ph.D*)	Senior Lecturer, University of Colombo
Dr. B.Riskhan (Ph.D, M.Ed, B.Sc, PGDE)	Mahaweli National College of Education Polgolla
P.N.W.A.L.K.Premarathne (*M.Sc., B.Sc.*)	Teacher, Girls High School, Kandy
M. Indrapalan *(M.Sc)*	Teacher, Manipay Hindu College
Dinusha Wijayasena *(PGDE, B.Sc.)*	Teacher, Ave Maria Convent, Negombo
A.P.N.De Silva *(PGDE, B.Sc.)*	Teacher, MR/J.R.S. De Almeda M.V, Akkuressa
P.H.Sirani *(PGDE, B.Sc.)*	Teacher, MR/Athuraliya M.V.
S.Sarveswaran *(B.IT, B.Ed.)*	Teacher, V/Saivapragasa, Ladies Collage, Vavuniya
K.B.I.Wijayaratne *(PGD (IT))*	IT Instructor, Mayurapada Central Collage
A.G.G.U. Premalal *(PGDE, B.Sc.)*	Teacher, KG/Basnagala MV, Nooriya
N.D. Samarasinghe *(PGD (IT), PGDE, B.Sc.)*	Centre manager, CRC, B/Ananda MMV, Haldummulla
Y.D.V. Pathirana	Retired Instructor
P.Premila *(M.A.,PGD(Computer Science), PGDE, B.Sc.)*	Teacher, Royal Collage, Colombo 07
A.M. Vazeer *(Dip in ICT)*	Centre manager, CRC, kahagolla M.M.V. Diyatalawa
K. Panditharathna *(Ph.D)*	Maliyadeva Collage, Kurunegala

Introduction

Information and Communication Technology has been identified worldwide as a tool that can be used to improve productivity, efficiency and effectiveness of organizational work and the daily activities of individuals. Therefore, providing an adequate level of ICT knowledge and skills, at different levels of education, is important for the students to progress and contribute towards national development.

The current Sri Lankan Secondary Education System has been substantially exposed to ICT through various programs including CAL, ICT for GCE (O/L), GIT at grade 12 and ICT as a component in A/L Technology stream. Consequently, to maintain the progression in competencies, the need has arisen now for implementation of learning ICT subject from grade 6 to 9.

As grade 6 to 9 is a formative study period, it is desirable to arouse curiosity and motivation by teaching students more practical areas than theoretical aspects of computing. Therefore, a balance between theory and practical areas is achieved. To achieve this balance, the latest technologies have been included in the content.

It has been the focus of the curriculum committee to make this balance of competencies in theory and practice in order to lay a foundation for higher studies in ICT, to apply the competencies of day to day practical situation, to improve ICT literacy and to expose them to international standards.

National Goals

1. Based on the concept of respecting human values and understanding the differences between the Sri Lankan multi-cultural society, building up the nation and confirming the identity of Sri Lanka by promoting national integrity, national unity, national coherence and peace

2. While responding to the challenges of the dynamic world, identifying and conserving the National heritage.

3. Creating an environment which comprises of the conventions of social justice and the democratic life to promote the characteristics of respecting the human rights, being aware of the responsibilities, concerning each other with affectionate relationships.

4. Promoting a sustainable life style based on the people's mental and physical well-being and the concept of human values

5. Promoting the positive feelings needed for balanced personality with the qualities of creative skills, initiative, critical thinking and being responsible

6. Through education, developing the human resources, needed for the progress of the well-being of an individual, the nation   as well as the economic growth of Sri Lanka.

7. Preparing the people for the changes that occur in a rapidly changing world by adapting to it and controlling them; developing abilities and potentialities of people to face the complex and unexpected occasions.

8. Sustaining the skills and attitudes based on justice, equality, mutual respect which is essential to achieve a respectable place in the international community.

National Education Commission Report (2003).

Basic Competencies

The competencies promoted through the education mentioned below might help to achieve the above mentioned National Goals.

1. **Competencies in Communication**

   This first set of competencies is made up of four subsets - Literacy, Numeracy, Graphics and information communication skills:

   Literacy: Carefully listening, speaking clearly, and Reading for comprehension, writing clearly and accurately.

   Numeracy: Using numbers to count, calculate, code and to measure, matter, space and time

   Graphics: Making sense of line and form, expressing and recording essential data, instructions and ideas with line, form, colour, two and three-dimensional configurations, graphic symbols and icons

   ICT Competencies:
   Knowledge on computers, and the ability to use the information communication skills learning or work as well as in the private life

2. **Competencies relating to the Personality Development**
   - Generic skills such as creativity, divergent thinking, initiative, decision making, problem-solving, critical and analytical thinking, team work, inter-personal relationships, discovering and exploring
   - Values such as integrity, tolerance and respect for human dignity
   - Cognition

3. **Competencies relating to the Environment**

   This is the second set of competencies related to the Social, Biological and Physical Environments.

   Social Environment: Awareness, sensitivity and skills linked to being a member of society, social relationship, personal conduct, general and legal conventions, rights, responsibilities, duties and obligations.

   Biological Environment: Awareness, sensitivity and skills linked to the living world, man and the ecosystem, the trees, forests, seas, water, air and plant -life, animal and human life.

Physical Environment: Awareness, sensitivity and skills relating to space, energy, fuels, matter, materials and their links with human living, food, clothing, shelter, health, comfort, respiration, sleep, relaxation, rest, wastes and excretion, media of communication and transport. Included here are the skills in using tools to shape and for materials for living and learning

4.   Competencies relating to preparation for the world of work

Employment related skills to maximize their potential and to enhance their capacity to contribute to economic development; to discover their vocational interests and aptitudes; to choose a job that suits their abilities and to engage in a rewarding and sustainable livelihood.

5.   Competencies relating to religion and ethics

This fourth set of competencies laden with values and attitudes. It is essential for individuals to assimilate values, so that they may function in a manner consistent with the ethical, moral and religious modes of conduct, rituals, practices in everyday living, selecting the most appropriate.

6. Competencies in play and use of leisure

Competencies that link up with pleasure, joy, emotions and such human motivations. These find expression in play, sports, athletics and leisure pursuit of many types. These also link up with such values as cooperation, team work, healthy competition in life and work. Here are included such activities as are involved in aesthetics, arts, drama, literature, exploratory research and other creative modes in human living.

7. Competencies relating to 'Learning to learn'

These competencies flow directly from the nature of a rapidly changing, complex and interdependent   and crowded world whatever one learns, that learning will need updating and review. This requires that one should be aware of, sensitive and skillful in sustained attention, and be willing to persevere and attend to details that matter in a given situation.

Objectives of the Subject

This syllabus enables students to:

- Develop basic skills useful to access ICT resources.
- Inculcate basic good practices in the use of ICT resources
- Inculcate basic computer literacy and develop a base for further pursuit of Information Technology and Communication Technology studies.

Proposed number of periods for each units

Term	Competency Level	Number of periods
1st Term	1.1, 1.2	05
	2.1, 2.2,	04
	3.1	01
2nd Term	3.1,	05
	4.1, 4.2	05
3rd Term	4.2,	02
	5.1	05
	6.1, 6.2	03
Total		30

| | | **Grade 8 Syllabus** | | |
| | | **Information and Communication Technology** | | |
Competency	Competency Level	Content	Learning Outcomes	Duration/ Periods
1. Investigates how instructions and data are represented in the computer	1.1. Converts decimal numbers to binary numbers and vice versa	• Introduction to Number Systems o Decimal and Binary Number System o Conversion from Decimal to Binary o Conversion from Binary to Decimal	i. Describes Number systems with 10 and 2 as the base ii. Converts decimal integers to binary and vice versa	03
	1.2. Appreciates the working logic (binary concept) in computers	• Method of data representation using 0 and 1 • Binary data flow among the computer components	i. Represents positive decimal integers in binary ii. Explains the method of displaying a character (Alpha numeric symbolic)/ image on the monitor using a bitmap	02
2. Uses computers efficiently and effectively with operating system	2.1. Uses Operating System for configuring and applying settings	• Regional settings: Date, Time, Currency, Number format • File properties • File Search	i. Makes settings: Date, Time, Currency, Number format ii. Sets File properties: read-only, hidden, location, size iii. Searches files with extension	02
	2.2. Explores basic troubleshooting of computers and maintenance procedures (hardware and software)	• Troubleshooting of simple computer faults • Hardware issues (keyboard, mouse, power cable, network cable, VGA cable) • Sound output issues (speaker connectivity, check the volume) • Ports connectivity (PS/2, USB, Micro USB, VGA, HDMI, Parallel, RJ45, Memory Card Reader) • Troubleshooting and resolving of relevant computer software issues • Corrupt software • Blank desktop	i. Troubleshoots and resolves relevant hardware issues ii. Troubleshoots and resolves relevant software problems	02

3. Use of word-processing software in day today activities	3.1. Uses basic functions of word processing software in creating a document	• Create, open, save and close a document • Formatting of Text • Inserting files/objects (text, picture, shapes, clip art, word art etc.) • Inserting a table • Spelling and grammar check • Lists	i. Creates a formatted document using word processing software	06
4. Uses flow chart to solve simple problems with sequence, selection and develop programs (Using Scratch)	4.1. Analyzes the problem	• Identification of input, process and output steps • Identification of applications created for mobile and smart devices • Documentation of solution using flow charts	i. Analyzes the problems in simple day to day life ii. Explains the problem with a block diagram iii. Describes applications in mobile and smart devices	02
	4.2. Uses control structures to develop simple programs	• Introduction to simple algorithm and control structures of Selections • Developing simple programs (Sequence and Selection) using visual supports of programming language (using an Interface)	i. Describes control structures (selection only) ii. Applies control structures to solve simple day to day problems	05
5. Uses a software package for physical computing to implement programming logic	5.1. Uses a simple hardware device to implement physical computing	• Components of physical computing device • Controllable devices • Turning on/off LEDs • Design LED patterns with simple programs	i. Writes a program to operate external circuits using two logic levels (yes/no, on/off) ii. Implements programs on physical devices. Example: Turning On/Off the LEDs with passing values	05

6. Explores educational information using the Internet	6.1 Searches information on the Internet	• Search Engines: Google, Yahoo etc. • Educational browsers	i. Identifies Search Engines ii. Searches information using the Internet	01
	6.2. Creates websites with advanced features	• Tags, Elements, Attributes, Text formatting etc. • Advanced features in hyperlinks	i. Designs websites as per specifications ii. Develops websites as per design	02
Total				30

Learning Teaching process

Information and Communication Technology is rapidly changing subject and student eager to use latest technology. Provide actual hand on experience for each student using practical exercises. Allow them to convince theoretical basis through practical exercises.

It is essential that the proposed method of teaching should be student-centered as this subject is essentially practice-oriented. There is need for special attention to be paid to the encouragement of the student for self-study. Guide the student to apply achieved ICT competencies to improve the learning process of other subjects.

Primitive social values and legal constraints related to the subject carry with them the imperatives of a sense and spirit of self-discipline. It is essential that the learning-teaching evaluation process is so organized as to highlight the importance of computer use.

Students should be motivated and inspired to attend group activities to learn new things and collaborative activities to share and convince their findings with others through ICT and manual mediums.

Competency 1 : Investigates how instructions and data are represented in the computer

Competency Level 1.1: Converts decimal numbers to binary numbers and vice versa

Time : 03 periods

Learning Outcomes:

- Describes Number systems with 10 and 2 as the base
- Converts decimal integers to binary and vice versa

Contents:

- Introduction to Number Systems
- Decimal and Binary Number System
- Conversion from   Decimal to Binary
- Conversion from Binary to Decimal

Concepts and terms to be highlighted:

- Number system
- Binary Numbers
- Decimal Numbers
- Decimal number system has base 10 as it uses 10 digits from 0 to 9
- Binary number system has base 2 as it uses 2 digits which are 0 and 1
- Conversion of decimal and binary numbers

Guidance for lesson plans:

- Place value of decimal numbers
- Construct binary numbers system using above structure
- Discuss how to convert decimal numbers to binary numbers
- Discuss how to convert binary numbers to decimal numbers

Guidance for assessments and evaluations:

- Give enough questions to get familiar with the decimal to binary and binary to decimal conversions

Quality inputs:

- Abacus, Internet facility, Presentations on Number systems
- https://www.includehelp.com/computer-number-systems.aspx

Reading Material

Decimal numbers and Place value

Decimal number system has only ten (10) digits from 0 to 9. Every number (value) represents with 0,1,2,3,4,5,6, 7, 8 and 9 in this number system. The base of decimal number system is 10, because it has only 10 digits.

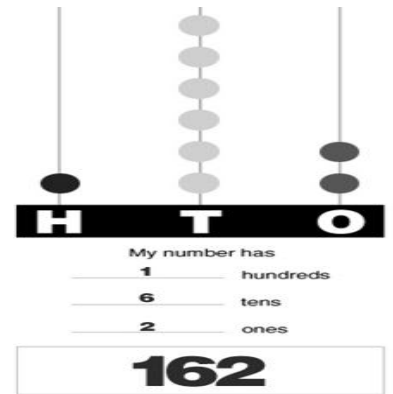The abacus can use to identify placement values.

.

My number has
1	hundreds
6	tens
2	ones

162

Fig 1.1. 1 Placement values of number 162

Binary Numbers

Binary number system has base 2 because it uses two digits of 0 and 1 in binary number system.

Binary Base = 2

	Column 8	Column 7	Column 6	Column 5	Column 4	Column 3	Column 2	Column 1
Base^{exp}	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
Weight	128	64	32	16	8	4	2	1

$2^0 = 1$
$2^1 = 2$
$2^2 = 2 * 2 = 4$
$2^3 = 2 * 2 * 2 = 8$
$2^4 = 2 * 2 * 2 * 2 = 16$
$2^5 = 2 * 2 * 2 * 2 * 2 = 32$
$2^6 = 2 * 2 * 2 * 2 * 2 * 2 = 64$
$2^7 = 2 * 2 * 2 * 2 * 2 * 2 * 2 = 128$

Fig 1.1. 2 Placement values of Binary numbers

Conversion from Decimal to Binary

1. Divide the number by 2.

2. Get the integer quotient for the next iteration.

3. Get the remainder for the right side

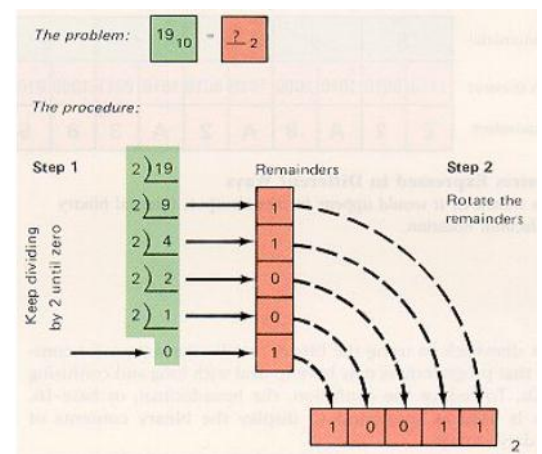4. Repeat the steps until the quotient is equal to 0.

.

Fig 1.1. 3 Conversion of Decimal 19 to Binary

6

Conversion from Binary to Decimal

1. Write down the binary number.

2. List the powers of two from right to Left.

3. Write the digits of the binary number below their corresponding powers.

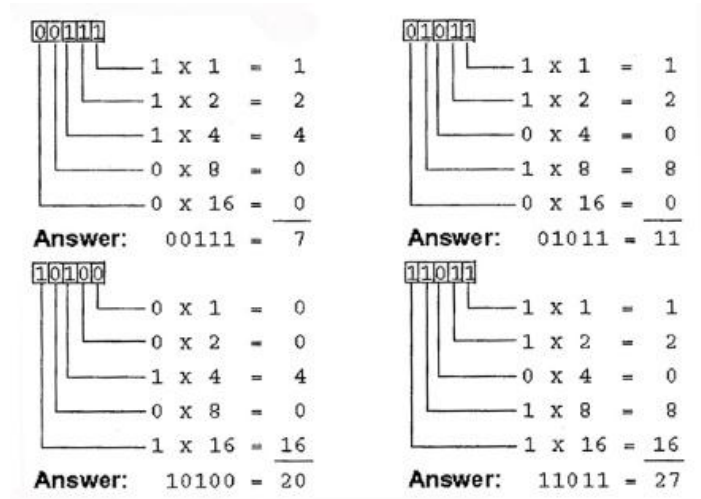4. Connect the digits in the binary number with their corresponding powers.

```
00111
        1 x 1  =  1
        1 x 2  =  2
        1 x 4  =  4
        0 x 8  =  0
        0 x 16 =  0
Answer:    00111 =  7
```

```
01011
        1 x 1  =  1
        1 x 2  =  2
        0 x 4  =  0
        1 x 8  =  8
        0 x 16 =  0
Answer:    01011 = 11
```

```
10100
        0 x 1  =  0
        0 x 2  =  0
        1 x 4  =  4
        0 x 8  =  0
        1 x 16 = 16
Answer:    10100 = 20
```

```
11011
        1 x 1  =  1
        1 x 2  =  2
        0 x 4  =  0
        1 x 8  =  8
        1 x 16 = 16
Answer:    11011 = 27
```

Fig 1.1. 4 Conversion from Binary to Decimal

5. Write down the final value of each power of two

Competency 1: Investigates how instructions and data are represented in the computer

Competency Level 1.2: Appreciates the working logic (binary concept) in computers

Number of Periods: 02 periods

Learning Outcomes:

- Represents positive decimal integers in binary
- Explains the method of displaying a character (Alpha numeric symbolic)/ image on the monitor using a bitmap

Contents:

- Method of data representation using 0 and 1
- Binary data flow among the computer components

Concepts and terms to be highlighted:

- Data representation
- Binary data Flow

Guidance for lesson plans:

- How computers see the world
- Bits and bytes and binary
- Representing data
    - Representing text in Computer
    - Representing images in Computer
    - Bitmaps
    - Representing colours in image
      Representing sound in computer

Guidance for assessments and evaluations:

- By using a computer as a model explain how and at which point computer will do the binary conversion of input numbers. Can do this as part of a drama, and they can show how and which data traverse through one point to another.

Quality inputs:

- Bit and byte size model using bulbs
- Manually created simple bitmap image by using black and white papers.
- https://www.quora.com/How-does-the-computer-understands-images-and-audios
- https://www.cs.cmu.edu/~fgandon/documents/lecture/uk1999/binary/HandOut.pdf

Reading Material

How computers see the world

Computers are machines that do stuff with information. They let you view, listen, create, and edit information in documents, images, videos, sound, spreadsheets and databases.

To make computers easier to build and keep them reliable, everything is represented using just two values.

You may have seen these two values represented as 0 and 1, but on a computer they are represented by anything that can be in two states.

Bits and binary

Computers use binary - the digits 0 and 1 - to store data. A binary digit, or bit, is the smallest unit of data in computing. It is represented by a 0 or a 1.

Binary numbers are made up of binary digits (bits),

      eg the binary number **1001**.

Computers use electrical signals that are on or off, so they have to see everything as a series of ones and zeros. This data is represented as a sequence of 1s and 0s (on and off).

Fig 1.2. 1 Binary number 10101000 is represented as a sequence of 1s and 0s (on and off).

All data that we want a computer to process needs to be converted into this binary format.

Bits and bytes

Bits can be grouped together to make them easier to work with.

- **Nibble** - 4 bits (half a byte)
- **Byte** - 8 bits (A group of 8 bits is called a byte)
- **Kilobyte** (KB) - 1000 bytes
- **Megabyte** (MB) - 1000 kilobytes
- **Gigabyte** (GB) - 1000 megabytes
- **Terabyte** (TB) - 1000 gigabytes

Computer uses 8 bits (I byte) to represent a number or a character.

Representing data

All data inside a computer is transmitted as a series of electrical signals that are either **on** or **off**.

Therefore, in order for a computer to be able to process any kind of data, including text, images and sound, they must be converted into binary form

Fig 1.2. 2 when data, including text, images and sound, converted into binary

Representing text in Computer

When any key on a keyboard is pressed, it needs to be converted into a binary number so that it can be processed by the CPU and the typed character appears on the screen.

Fig 1.2. 3 Conversion of The letter 'A' into binary
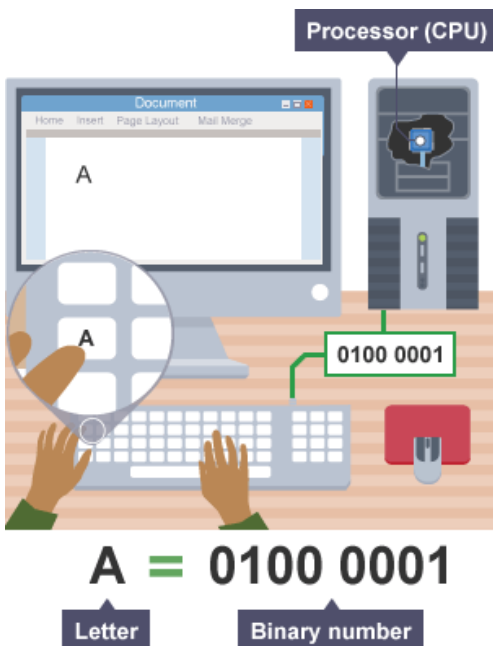
The letter 'A' has the binary number 0100 0001 (this is the denary number 65)

A code where each number represents a character can be used to convert text into binary. One code we can use for this is called ASCII. The ASCII code takes each character on the keyboard and assigns it a binary number. For example:

- the letter 'a' has the binary number 0110 0001 (this is the denary number 97)
- the letter 'b' has the binary number 0110 0010 (this is the denary number 98)
- the letter 'c' has the binary number 0110 0011 (this is the denary number 99)

10

ASCII code can only store 128 characters, which is enough for English language but not enough for some other languages. If you want to use larger alphabets such as Japanese, Chinese and Mandarin then more characters are needed. Therefore another code, called Unicode, was created. This meant that computers could be used by people using different languages.

Representing images in Computer

Graphics on a screen are made up of tiny dots called pixels. The more pixels on the screen, the higher the resolution and the better the quality of the picture will be. The higher the image resolution, the more memory is needed to store the graphic.

Increase resolution will increase the picture quality (clearness)
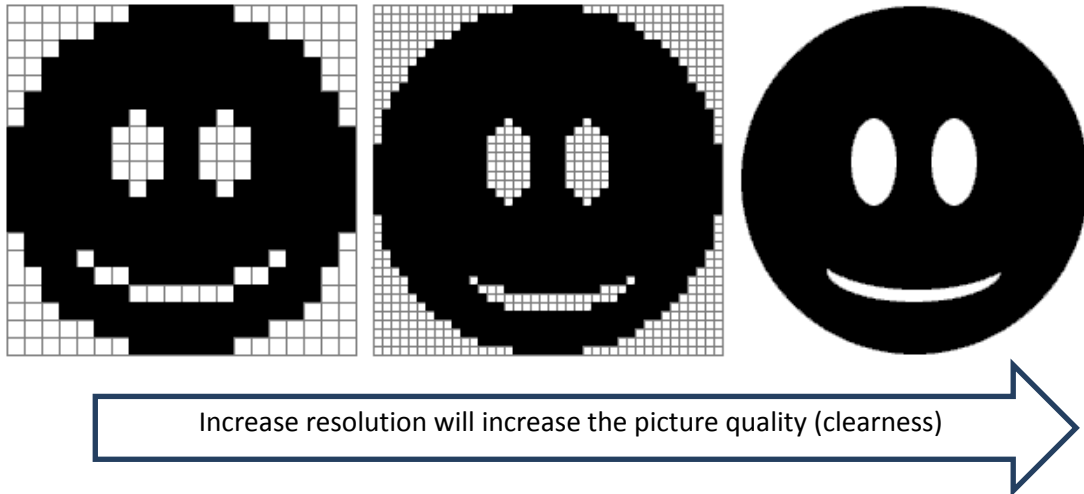
Fig 1.2. 4   the higher the resolution and the better the quality of the picture will be

Bitmaps

Bitmap images are organized as a grid of colored squares called pixels. When zooming in or enlarging a bitmap image, the pixels are stretched and made into larger blocks. This is why bitmap images appear as poor quality when enlarged too much.

Common bitmap image file types include JPEG, GIF and PNG.

If we say that 1 is black (or on) and 0 is white (or off), then a simple black and white picture can be created using binary.

This example shows an image created in this way:

0	0	0	1	1	0	0	0
0	0	1	0	0	1	0	0
0	0	1	0	0	1	0	0
0	1	0	0	0	0	1	0
0	1	1	1	1	1	1	0
0	1	0	0	0	0	1	0
1	0	0	0	0	0	0	1
1	0	0	0	0	0	0	1
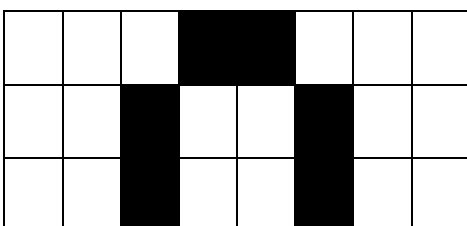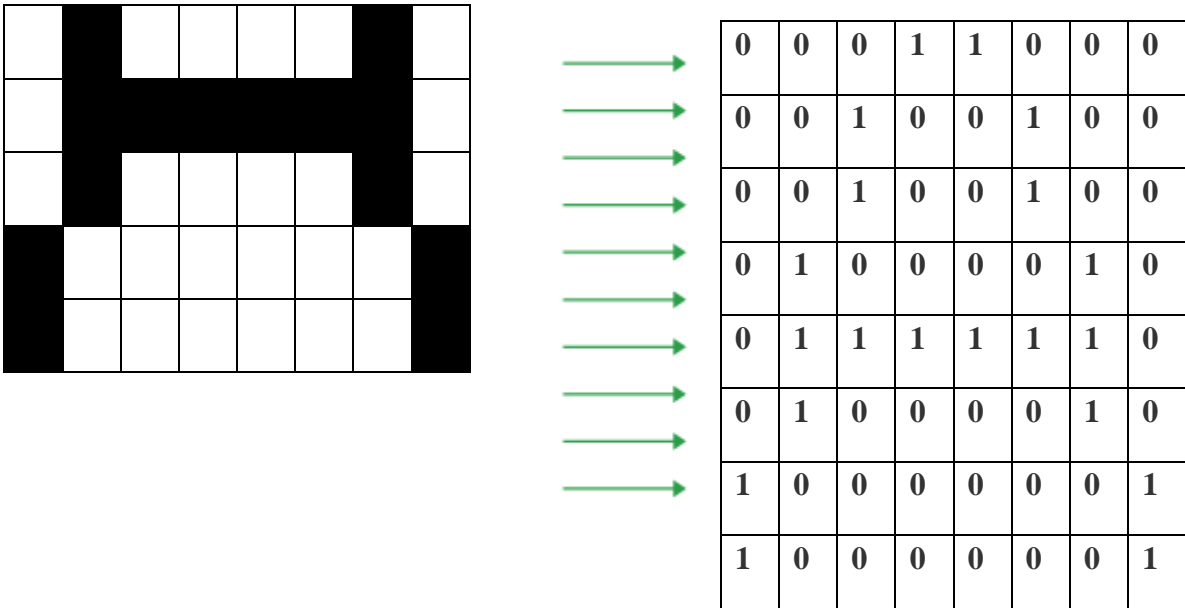
Representing colors in image

The system described so far is fine for black and white images, but most images need to use colours.

- 1 bit per pixel (0 or 1): two possible colors
- 2 bits per pixel (00 to 11): four possible colors
- 3 bits per pixel (000 to 111): eight possible colors
- 4 bits per pixel (0000 – 1111): 16 possible colors
- 16 bits per pixel (0000 0000 0000 0000 – 1111 1111 1111 1111): over 65 000 possible colours

Representing sound in computer

Sound needs to be converted into binary for computers to be able to process it. To do this, sound is captured, usually by a microphone, and then converted into a digital signal.

A sound wave like this can be sampled (get value at the time) at each time sample point:
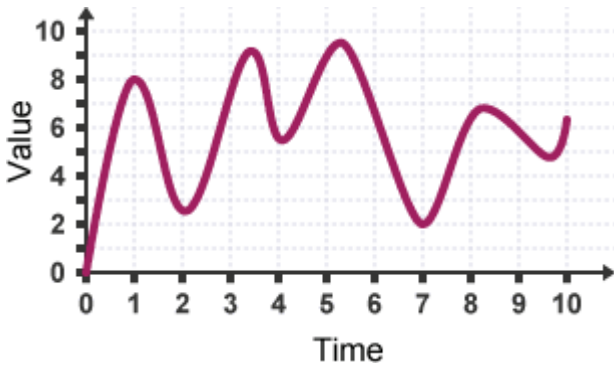
Fig 1.2.5   sound wave .

Time	1	2	3	4	5	6	7	8	9	10
value	8	3	7	6	9	7	2	6	6	6
Binary value	1000	0011	0111	0110	1001	0111	0010	0100	0110	0110

Competency 2:   Uses computers efficiently and effectively with operating system

Competency Level 2.1: Uses Operating System for configuring and applying settings

Number of Periods: 01 period

Learning Outcomes:

- Makes settings: Date, Time, Currency, Number format
- Sets File properties: read-only, hidden, location, size
- Searches files with extension

Contents:

- Regional settings: Date, Time, Currency, Number format
- File properties
- File Search

Concepts and terms to be highlighted:

- Settings on operating system
- Sets file properties
- File extension

Guidance for lesson plans:

- Provide instructions to access the Regional settings in the computer
- Discuss on files properties
- Provide instructions to identify file extensions
- Group the students and provide them various types of files and ask the group them and present their findings

Guidance for assessments and evaluations:

- Divide the class into groups and provide assignments, to make the regional settings on a computer and collect various files and group them according to the types present them

Quality inputs:

- Computers, Internet facility, a collection of different types of files
- https://www.cnet.com/how-to/windows-10-settings-menu-the-time-language-tab/

Reading Material

How to Change Country or Region Home Location in Windows 10

To Change Your Country or Region Home Location in Settings

1. Open Settings, and click/tap on the Time & language icon.

2. Click/tap on Region & language on the left side, select your Country or region (ex: Sri Lanka) on the right side. (See screenshot below)
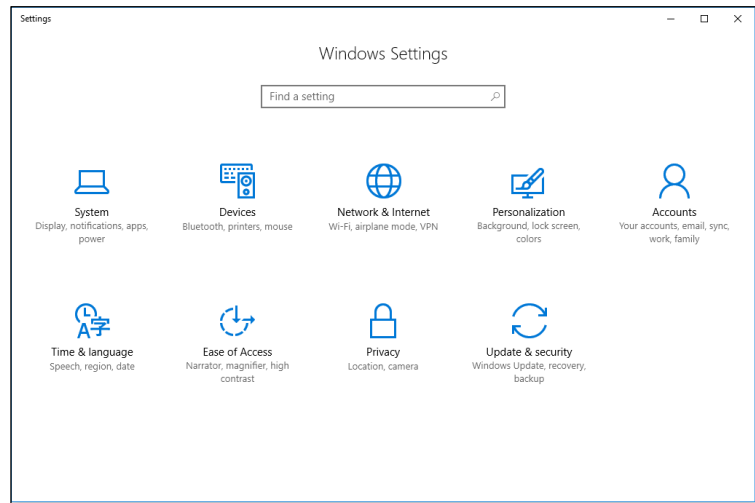
3. You can now close Settings if you like.
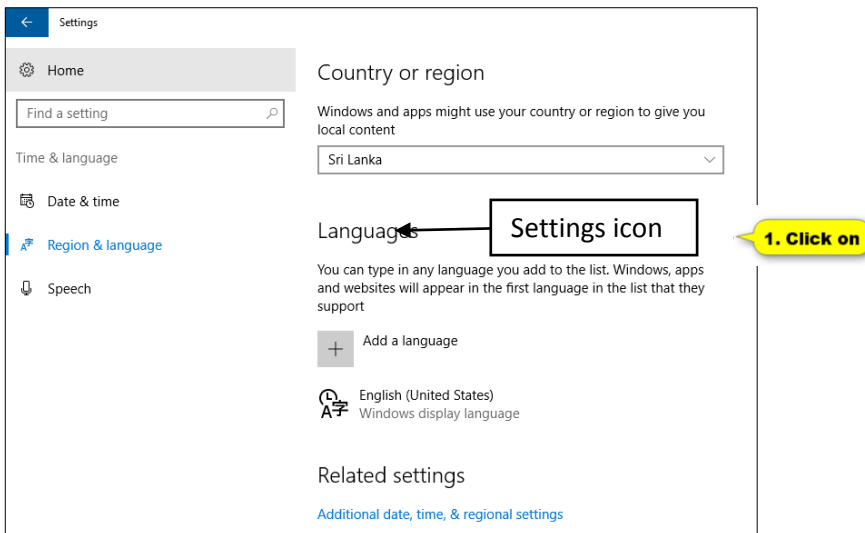

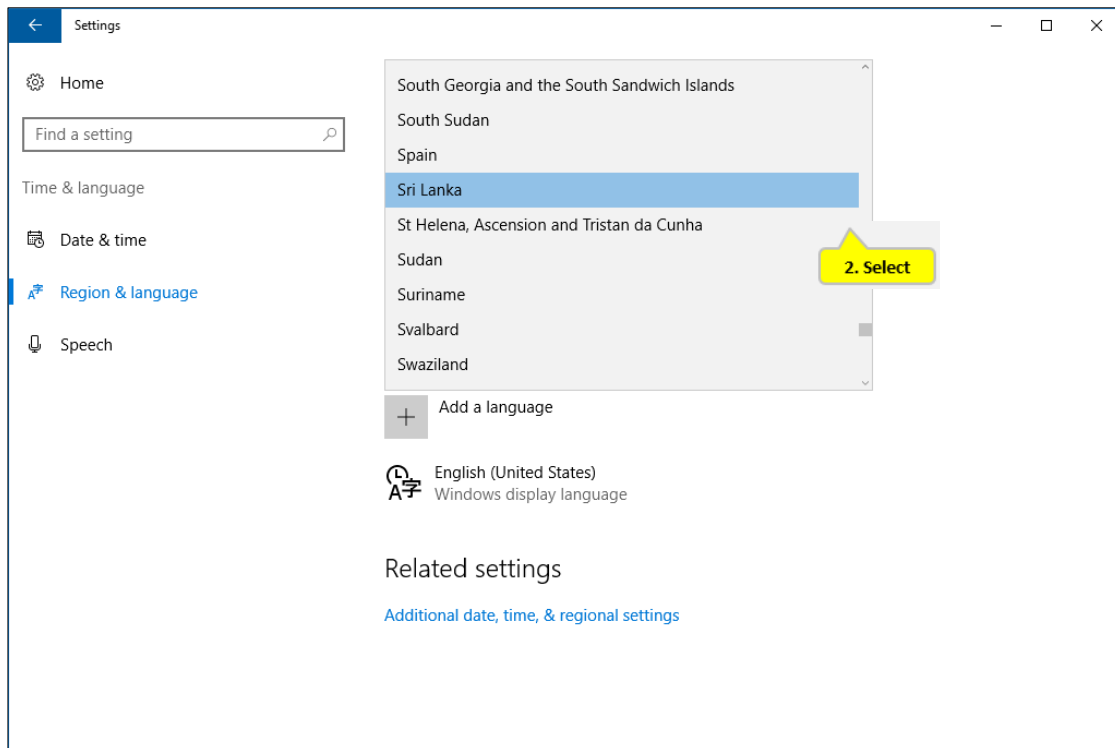*Fig 2.1. 1 The window of the settings*

Fig 2.1. 2 Country or region and Language setting window

Fig 2.1 3 selecting the country

How to Change Date and time in Windows 10

To Change Your Date and Time in Settings

1. Open Settings, and click/tap on the Time & language icon.
2. Click/tap on Date & Time on the left side, select your Time Zone (ex: Sri Jayewardenepura) on the right side. (See screenshot below)
3. Click on the Date and Time Formats
4. Change date and time
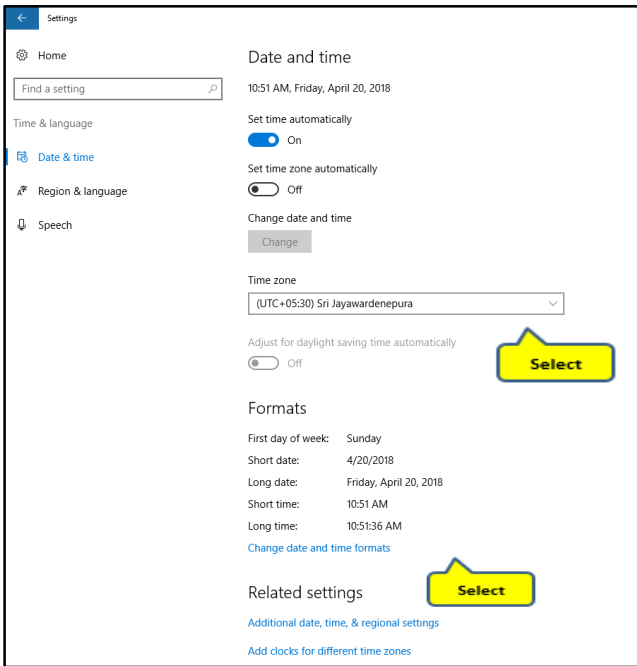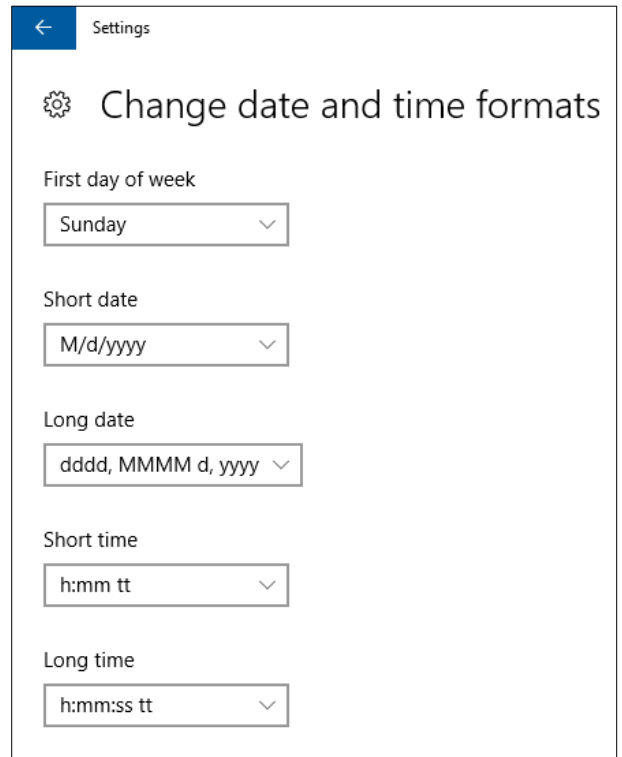5. You can now close Settings if you like.

Fig 2.1. 4 selecting time zone

Fig 2.1. 5 selecting date and time format

How to Change Currency in Windows 10

To Change Your Currency in Settings

1. Open Settings, and click/tap on the Change date, time or number formats icon.

2. Click on the Additional Settings button on the Region window

3. Select the Currency tab, type a Currency symbol (ex. Rs.) and tap on the Apply button and OK button
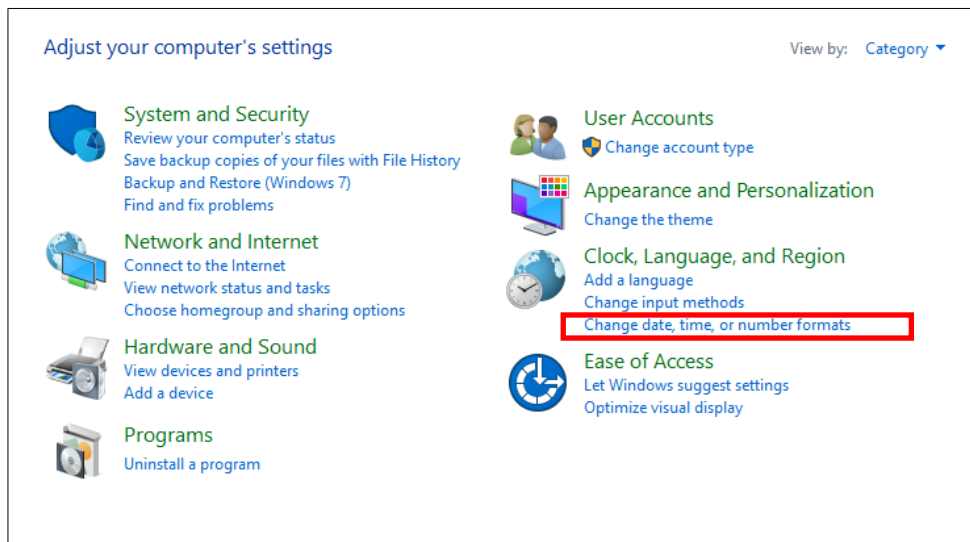
4. You can now close Settings if you like.
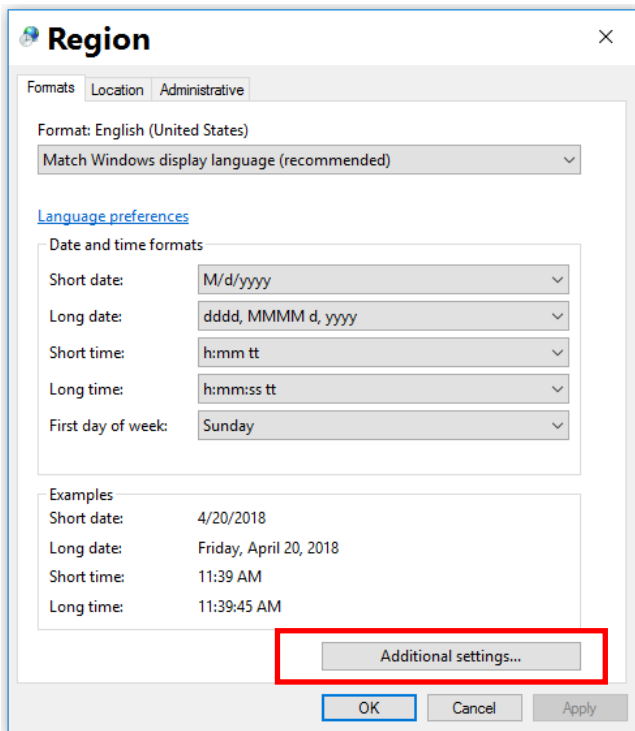
1

Fig 2.1. 6 The window of settings

17

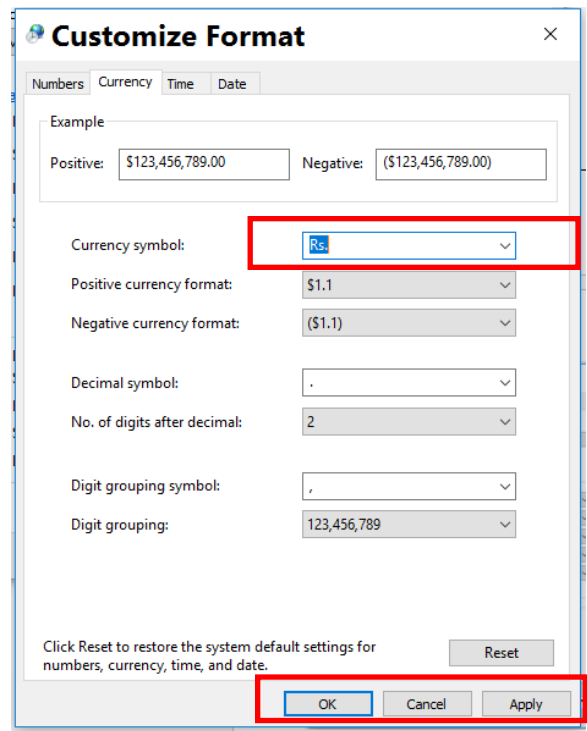*Fig 2.1. 7 The window of date and time selecting*

Fig 2.1. 8 The window of currency selecting

How to Change Number Formatting in Windows 10

To Change Your Number Formatting in Settings

1. Open Settings, and click/tap on the Change date, time or number formats icon.

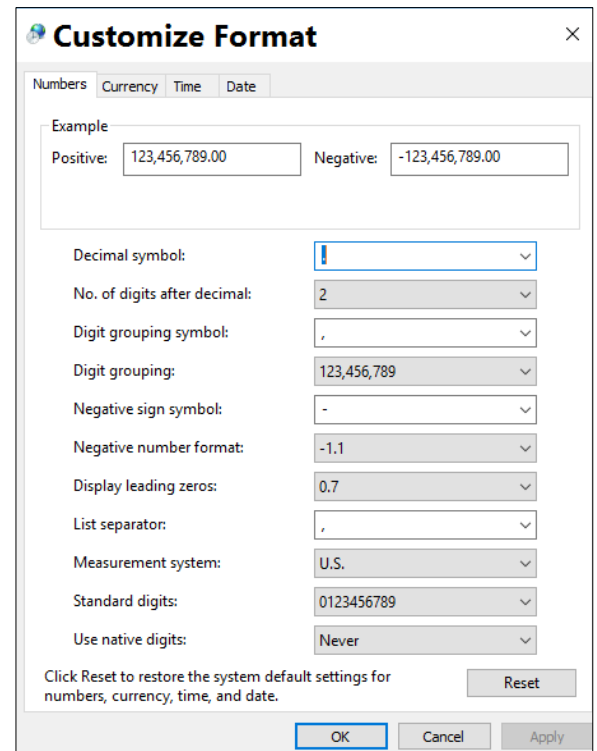2. Click on the Additional Settings button on the Region window

Fig 2.1. 9 The window of number formatting

3. **S**elect the Numbers tab, type a Decimal symbol (ex ".") , do necessary changes for other tap on the Apply button and OK button.

4. You can now close Settings if you like.

Sets file properties

Hiding a file

1. Open File Explorer.
2. Navigate to the file or folder you want to hide.
3. Right-click the item and click on Properties.
4. On the General tab, under Attributes, check the Hidden option.
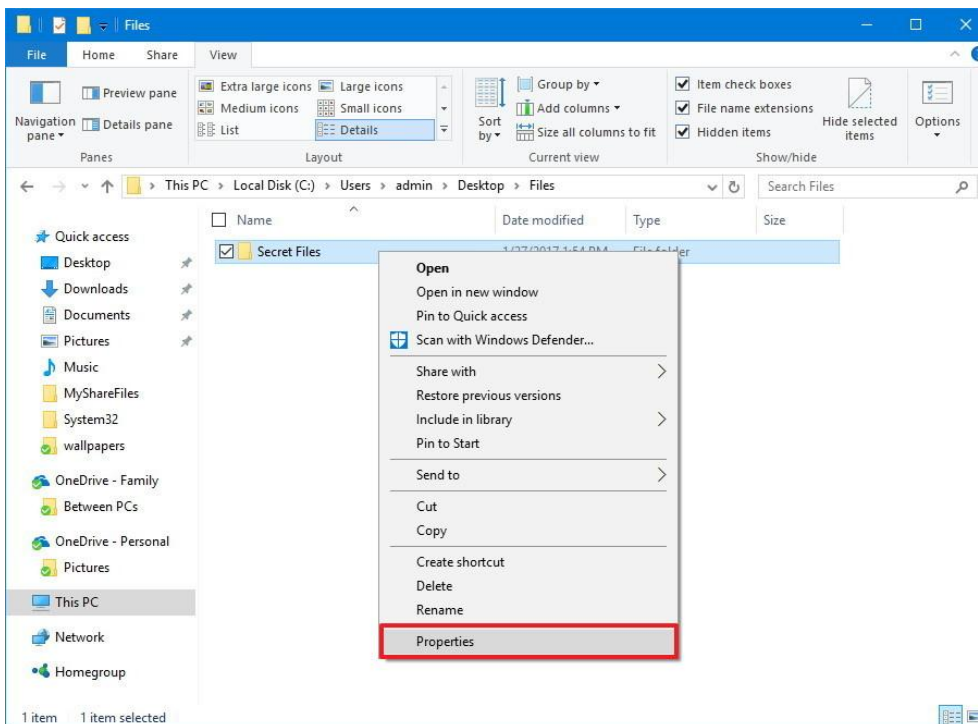5. Click Apply.

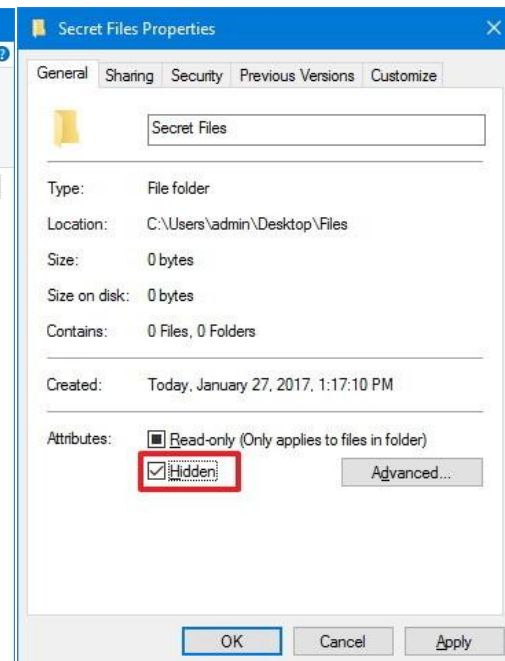*Fig 2.1.10 the window of file explorer*

Fig 2.1. 11 window of secret files properties

6. If you're hiding a folder with files and subfolders, make sure to select the Apply changes to this folder, subfolders, and files option.

7. Click OK.

Fig 2.1.11 The window of Confirm Attribute Changes

8. Click OK again to complete the task.

Making hidden files and folders visible again

Open File Explorer, click on the View tab and make sure to check the Hidden items option. Then you can browse your hidden items as you would normally do with other content.

Type the complete path to the hidden folder or file you want to open and press Enter. For example: C:\Users\admin\Desktop\Files\Secret Files\My School.ppt
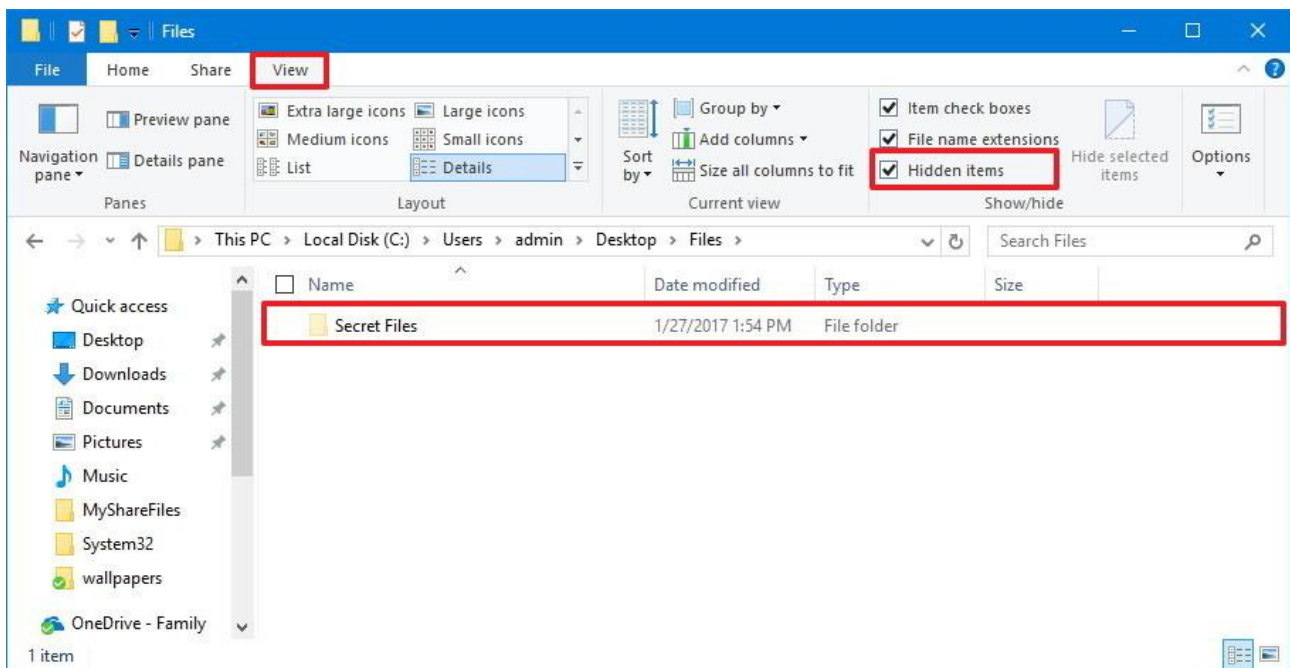

Fig 2.1. 12 making hidden files and folders visible again

File Search

Search by File Extension, Date and Size in Windows

1. Open File Explorer and click in the Search box.
2. Search Tools will appear at the top of the Window which allows the choosing of a Type, a Size, Date Modified, Other Properties and Advanced search.
3. Alternatively, type the search criteria into the box in the top right of the screen and press Enter.

Example searches are:

1. File name – Ex : ICT Grade 8
2. Size - Ex : 25MB
3. Type - Ex : .pdf
4. Date Created – 2017/10/23
5. Date Modified – 2017/11/22
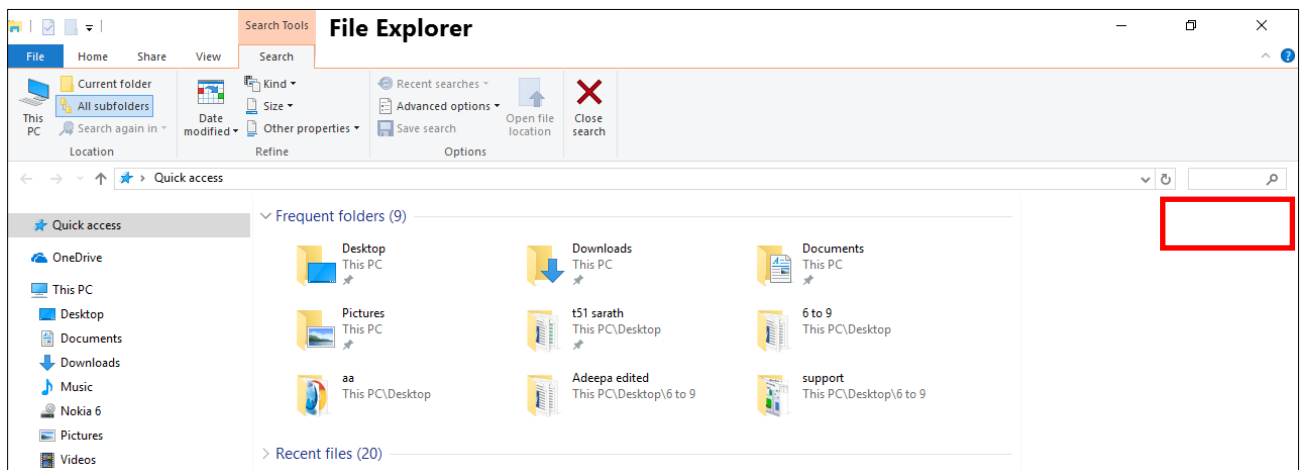6. Author - CHAMARI
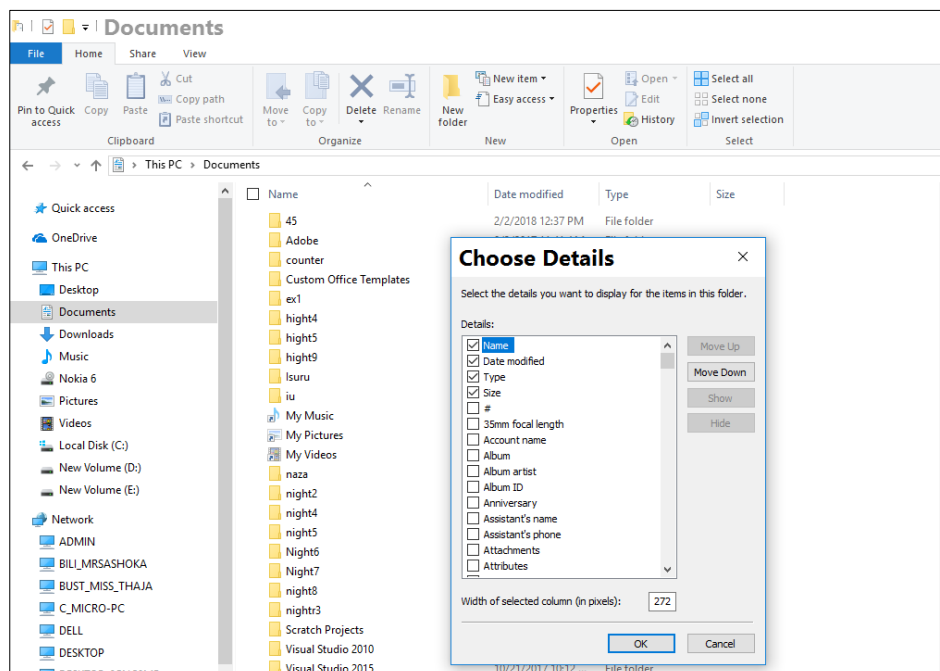7. Location - Colombo

Fig 2.1. 13 Window of file explorer

21

Fig 2.1.14 choosing details

Competency 2 : Uses computers efficiently and effectively with operating system

Competency Level 2.2.: Explores basic troubleshooting of computers and maintenance procedures (hardware and software)

Number of Periods : 02 periods

Learning Outcomes:
- Troubleshoots and resolves relevant hardware issues
- Troubleshoots and resolves relevant software problems

Contents:
- Troubleshooting of simple computer faults
- Hardware issues (keyboard, mouse, power cable, network cable, VGA cable)
- Sound output issues (speaker connectivity, check the volume)
- Ports connectivity (PS/2, USB, Micro USB, VGA, HDMI, Parallel, RJ45, Memory Card Reader)
- Troubleshooting and resolving of relevant computer software issues
- Corrupt software
- Blank desktop

Concepts and terms to be highlighted:
- Troubleshooting
- Computer faults
- Hardware issues
- Ports connectivity
- Corrupt software
- Blank desktop

Guidance for lesson plans:
- Explain the troubleshooting
- Provide instructions to identify hardware and software issues on the computer
- Guidelines for Troubleshooting and resolving of relevant computer hardware and software issues
- Group the students, provide them different types of software and hardware issues and ask them to solve using the knowledge gained.

Guidance for assessments and evaluations:
- Randomly remove cables of each computer and separate hardware component of each computer.
- Divide the class into groups and provide assignments to find and resolve each hardware issues on computer.

Quality inputs:
- Computer hardware , Internet facility, Relevant software
- https://www.computerhope.com/jargon/t/troushoo.htm

Reading Material

Troubleshooting

Troubleshooting is the process of figuring out how to solve a computer problem.

Computer troubleshooting overview

Following these steps can help identify or solve most computer problems.

1. Is the computer turning on?
2. Any Error messages?
3. Reboot the computer
4. Has any new hardware or software been added?
5. Has the computer moved?
6. Have there been any power outages or electrical storms?
7. Reconnect and check power cords
8. Update drivers or install latest patches
9. Scan for malware and viruses
10. When was the computer last running with no problems?
11. Other computer hardware and software troubleshooting

Hardware issues

- Keyboard
- Mouse
- power cable
- network cable
- VGA cable

Sound output issues

- Speaker connectivity
- Check the volume

Ports connectivity

- PS/2
- USB
- Micro USB
- VGA
- HDMI
- Parallel
- RJ45
- Memory Card Reader

Fig 2.2. 1 Power cord connection

Resolving of relevant computer hardware issues

  i. Make sure the device is connected to the computer. If not, connect it to the computer.
 ii. If using a wireless device, try changing the batteries.
iii. Ensure that all cables are properly connected.
 iv. Turn off and turn on the device again.
  v. Restart the computer
 vi. Check the volume

Computer software issues

  i. Blue Screen of Death (BSoD)
 ii. Missing DLL File
iii. Applications That Won't Install
 iv. Applications Run Slowly

  v. Abnormal Applications Behavior
 vi. Unable to install a software program
vii. Error during installation

Troubleshooting and resolving of relevant computer software issues

    i.   Verify software volume control settings

    ii.   Update drivers or install latest patches

   iii.   Scan for malware and viruses

Corrupt software

When software is not installed correctly or due to malware program they can become corrupt. When software becomes corrupt, it cannot be opened without errors and in some cases, may not be able to be recovered or fixed without the file being replaced by a backup.

Blank desktop

If the computer is on but the screen is blank, there may be an issue with the connection between the computer and the screen. First, check to see if the monitor is plugged into a power point and that the connection between the monitor and computer hard drive is secure. If the problem is on a laptop, then you may need to get a professional to fix it as some of the internal wires may be worn.

Competency 3   **:** Use of word-processing software in day today activities

Competency Level 3.1: Uses basic functions of word processing software in creating a
document

Time   **:** 6 periods

Learning Outcomes:

- Creates a formatted document using word processing software
  - Applies suitable text formatting
  - Manipulates graphics and draws simple shapes
  - Creates tables to insert data
  - Formats tables
  - Edits tables
  - Checks spelling and grammar of a document

Content

- Create, open, save and close a document
- Formatting of Text
- Inserting files/objects (text, picture, shapes, clip art, word art etc.)
- Inserting a table
- Spelling and grammar check
- Lists
- Formatting text
- Graphics: Insertion and formatting
- Shapes : Insertion and formatting
- Insertion of tables
- Column width and height
- Deletion, insertion, splitting and merging of cells
- Spelling and grammar checking

Concepts and terms need to be highlighted:

- Outline of facilities available: Creation, editing, storing, sharing, use of graphics, copies
- Familiarization of the user interface
- Short-cuts for menu sequences: to open, close, save, copy, cut, paste, undo, redo
- Various types of formatting: Text (fonts, boldface, italics..), paragraph (center, right and left alignment, justification, bullets and numbers), page (margins, orientation)
- Adjustment of column width: exact fit
- Continuation of title headings to succeeding pages
- Merging of cells as the final editing
- Limitations in built-in spellchecker and grammar checker.

Guidance for lesson plans:

- Discussion of the use of the software for its basic operations.
- Discussion and demonstration of basic operations.
- Different ways of opening a word processed document: through the software, by double clicking the document, through right-clicking.
- Teacher demonstration of the tools of formatting.
- Provide Activity sheets created to cover formatting techniques.
- Provide meaningful exercises to enable them to learn in context.
- Teacher demonstration of the tools for tables.
- Provide Activity sheets created to cover working with tables.
- Provide meaningful exercises to enable them to learn in context.
- Provide documents with spelling mistakes to be typed.
- Apply spell-checker to correct mistakes.

Guidance for assessments and evaluations:

- Opening of a saved document on the hard disk.
- Editing the document.
- Saving in given formats.
- Provide unformatted text in soft form to carry out specified formatting.
- Provide already done documents to recreate them using software.
- Provide a hard copy of a tabulated data with formatting like merged cells etc.
- Provide soft copies of documents with spelling mistakes to be corrected.
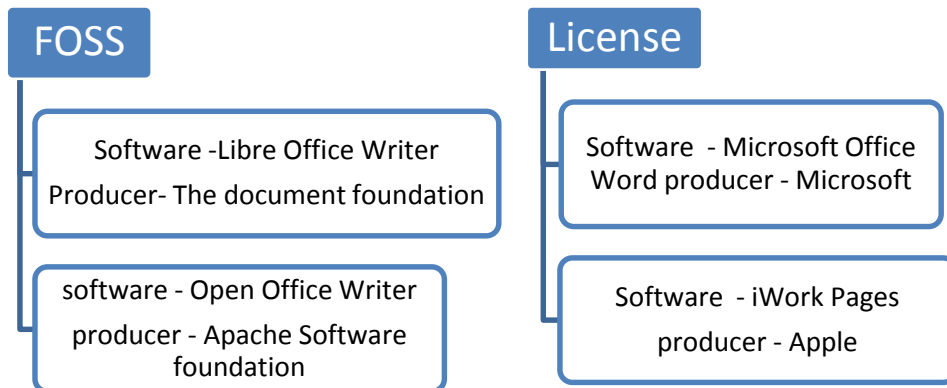
Quality inputs:

- Computer with word processing software
- https://www.tutorialspoint.com/word/word_explore_window.htm

Reading Material

Word Processing Software

Several popular word processing software are available. Some need to be purchased (Licensed) and some are Free and Open Source Software (FOSS).

Eg:

FOSS	License
Software -Libre Office Writer Producer- The document foundation	Software - Microsoft Office Word producer - Microsoft
software - Open Office Writer producer - Apache Software foundation	Software - iWork Pages producer - Apple

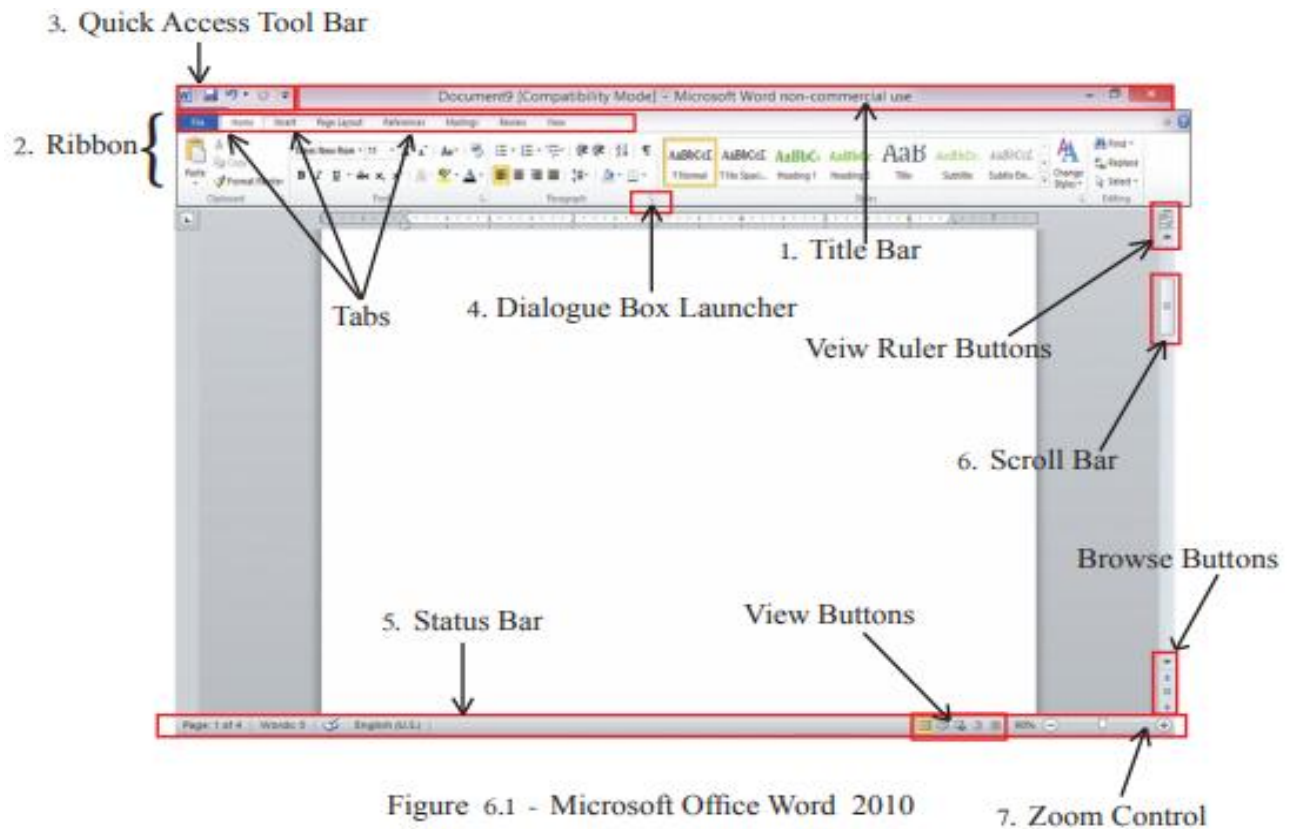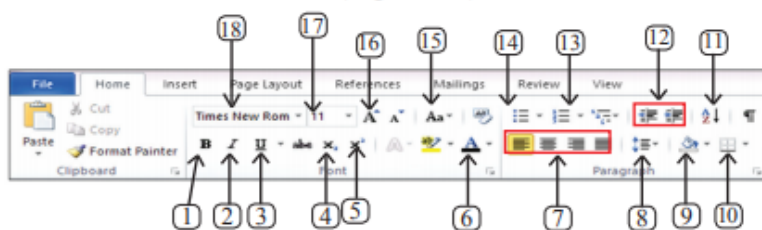**Get familiar with Word Processing Software**

Figure 6.1 - Microsoft Office Word 2010

1 Title Bar - The top most bar on a Microsoft Office word 2010 window is the Title Bar. The name of the opened document will appear h

2 Ribbon - The special feature of the ribbon is that the items are shown as Icons. Features of the ribbons (File, Home, Insert etc.) are called Tabs.

Some features of the Home tab shown below

1. Bold
2. Italic
3. Underline
4. Subscript
5. Superscript
6. Font color
7. Alignments
8. Line spacing
9. Shading

10. Border
11. Sort
12. Indentation
13. Numbering
14. Bullets
15. Change case
16. Grow font
17. Font Size
18. Font Name

Fig 3.1 2 Some features of the Home tab

3. Quick Access Tool Bar - (Figure 6.4) -Quick Access Tool Bar contains quick (frequently using) commands such as opening a new document, saving or opening a document, Zooming, Undo, Redo, etc.
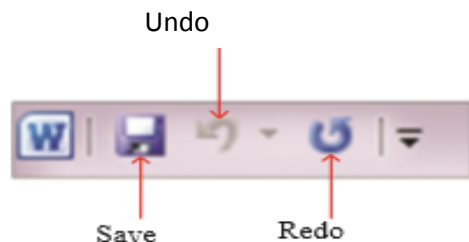

Fig3.1.3 Quick Access Tool Bar

4. **Dialogue Box launcher** -   Dialogue Box launcher shows additional tools. Dialogue boxes can be opened by clicking the arrow at the right hand side of the group name. Apart from the tools which appear in the Ribbon, Dialogue boxes provide several other useful tools in document preparation.

5. **Status Bar** - This is at left bottom of Microsoft Word window. This shows the number of pages and words of the document, language used, view buttons, etc.

6. **Scroll Bar** - used to go up and down of the document.

7. **Zoom** - Zoom can adjust the size of the pictures on the screen. This does not affect the original document.

8. **View Buttons**

   a. **Reading** - In Microsoft Word the "Reading view" allows you to view (not edit) a document in full screen without any of the toolbars. To exit Full Screen Reading press the escape key.
   b. **Normal view** - The Normal view is the default view of the program.
   c. **Web Layout** - In Microsoft Word the Web Layout shows your document in a full-screen with all the toolbars and the ability to edit.
   d. **Outline view** - makes viewing complex documents easier by giving summarized view with headings and hide paragraphs denote4d with a "+" symbol.

Create a document

Even though there is a new page when Word software is open, the user has to get a new page for another document.

File → New → Blank   Document

(Ctrl + N) → Blank   Document

Open a document

The user may need to open a file saved in the computer or in an external storage medium. To open a document

- Select 'File → Open' or press (Ctrl+O) from the key board
- Select the saved file in the 'Look in' location in the open dialog box.
- Select the document from the window
- Click 'Open' button.

Close a document

It is a good practice to close the document if it is unwanted, opened files will be a disturbance for the performance of the computer.

- Select 'File → Close'
- (Ctrl + W)
- Select small cross which appears on the top right corner of the title bar.

Save a document
It is essential to save the document in a proper place with a proper name. This enables the user to find the saved document easily.

- Select File → Save or press (Ctrl + S) from the key board
- select a saving location using 'Save in'
- type a proper name for the document in 'File name'
- click 'save' button

Saving the file by another name
Once the user save the document by giving a name, it is called 'File'. The user can save the file by another name in another place. Then the user will get two files by the existing name and the new name.

- Select   File → Save as
- Select a Saving Location from 'Save in'
- Type a proper name for the document in 'File name'
- Click Save button

Text formatting
User is able to perform the following;

- Change Font Size.

Select the text → go to Home tab → Font group → select desired font size from the "font size" drop down list.

- Change Font Style - Make letters Bold or Italic.

Select the text → go to Home tab → Font group → select desired font style from the "font" drop down list.

- Underline letters.

Select the text → go to Home tab → Font group → select "U". Or Select the text →(ctrl + U)

- Use different types of fonts in different languages.

Select the text → go to Home tab → Font group → select desired language-font from the "font" drop down list.

- 5. Change font color.

Select the text → go to Home tab → Font group → select desired color from the drop down list next to "Font color" icon.

Paragraph formatting

Text alignment

i   Left Align

ii   Center Align   Select the text → click Home tab →

paragraph group →   select desired alignment

iii Right Align   Line and Paragraph spacing

iv Justify

Inserting Shapes

This will allow you to add variety of shapes, such as boxes, circles, and arrows, to your document. To insert a shape

Click on position where you want to insert a shape.

- Select Insert tab → Illustration group → Shapes option → select the desired shape from the gallery
- The cursor changes to + sign. Click, hold and drag the mouse to draw the shape.
- You can also enter text inside the shape by selecting "Add text" option from the context menu.
- To format this text can use
  - o   Options in the font group on the HOME tab
  - o   Options on the DRAWING TOOLS on the FORMAT tab
- When you select some shapes, you may get yellow handles. These can be used to modify the shape.

- Word allows to control which shape should appear on top, when there is more than one shape inserted.

o Right click on the shape you want to move.
o From the context menu, select the desired option, like "bring to front" or "Send to back" or any of their sub menu options / select the shape, and on the format tab, use the "bring forward Or "Send backward" command options in the arrange group.

Inserting pictures

- Place the cursor at the position where you want to insert the picture.
- Click the insert tab, and click the pictures button in the illustration group.
- Then insert picture dialog box opens
- from this select the folder which contains the image you need
- Select the desired image and click insert button.
- To insert a picture from the internet
- Click insert tab
- Click online pictures button in the illustration group.
- Then search the image that you want, by using the search engine opens.
- Select the picture and click insert button.

Formatting a picture

When click on the picture you inserted, a new format tab appears under picture tools. This tab has number of options to change the style and appearance of your image.

- Crop image – removing unwanted parts of an image.
  o Select the image
  o Click the format tab appears under picture tools.
  o In the size group, click the crop command.
  o The cropping handles will appear around the image. Click, hold and drag a handle to crop the unwanted part of the image.

- Appearance of the image
  o These options are available in the adjust group and the picture style group on the format tab.
  o Adjust group – Corrections, color, artistic effects

- Picture style group – frames, borders etc…

- Wrap text
  - Text-wrapping is a feature which automatically starts a new line when a word in sentence reaches a border (of a picture, or a text box), there are different options available ….
  - Select the image
  - Click format tab that appears under picture tools. In the arrange group click the wrap text command
  - Or select wrap text opting from the context menu which appears when right click on the image.

Inserting word art

Word art gallery includes different styles that can be applied to any text.

- Place the cursor at the position where you want to insert the word art.
- Click the INSERT tab.
- Click word art button in the text group and select a word art style. A placeholder appears in the document.
- Type the text you want to appear in word art.

- <u>Formatting word art</u>

  - Use the options available on the FORMAT tab under DRAWING tools. Under this section you can change
    - Text fill
    - Text outline
    - Text effects
- <u>Inserting text boxes</u>

Text box can be used if you want to draw attention to specific text.

- Place the cursor at the position where you want to insert the text box.
- Click insert tab, text box command in the text group / Select Insert tab → Illustration group → Shapes option → select the text box from the gallery
- Draw the text box.
- Blinking cursor will appear inside the text box, then you can type the text that you want to appear in text box.

- <u>Formatting a text box</u>

  - Change shape – Format tab → Insert shapes group → select edit shape command → select change shape option in the menu and select desired shape.
  - Change shape fill color.
  - Change shape outline.

- Add shape effects such as shadows, glows etc.. listed under shape effects option
- Changing shape of the text – FORMAT tab →word Art style group → text effects option → transform option → select an effect from the sub menu.
-

Inserting a table

There are different ways to insert a table

- Using grid
  - Insert tab → Tables group → table option
  - Table grid appears → drag the mouse to select number of rows and columns → click the mouse button → empty table will insert into the document.

- Using the insert table option
  - Insert tab → Tables group →insert table option→ Insert Table dialog box will appears→ enter the number of rows and columns → click ok → empty table will insert into the document.

- Using quick tables
  - Insert tab → Tables group → Quick Table option → select the desired template → a table with selected template inserted → Enter your data into the table.

- Drawing a custom table
  - Insert tab → Tables group → draw table option→click and drag the mouse to draw rows and columns as you want.

- Converting text to a table
  - Select the text
  - Insert tab → Tables group → select convert text to table option → select the number of rows and columns → click ok → selected text will appear in a table.

Modifying a table

- Insert rows / columns / cells
  - Click the cell, row, column where you want to insert a new blank row / column / cell.
    Right click, select insert in the context menu, and then select appropriate insert option.

    OR
  - Click the cell, row, column where you want to insert a new row / column / cell → layout tab → rows and columns group → select insert option → select required option in the drop down menu

35

- Delete rows / columns / cells
    - Click the cell, row, column where you want to delete an existing row / column / cell.
    - Right click, select delete in the context menu, and then select the appropriate delete option from the delete dialog box
    OR
    - Click the cell, row, column where you want to delete an existing row / column / cell → layout tab → rows and columns group → select delete option → select required option in the drop down menu

- Merging cells
    - Select the cells to be merged → layout tab → in the merge group, click the merge cells option.

- Splitting cells
    - Select the cell to be split → layout tab → in the merge group, click the split cells option → split cells dialog box appears → specify the number of rows and columns → click OK.

Formatting a table

- Table styles
    - Click on the table or select the table → Design tab → table styles group → select the style want to apply.

- Changing row height / column width
    - Click in the row or column to be change.
    - Click layout tab → in the cell size group → click table row height / table column width scroll box → change the width / height as desired.
    -

- Applying borders
    - Select the cells / table to apply a border → design tab → borders group, click the borders drop down menu arrows→ select the border.

        OR

- Select the cells / table to apply a border → design tab → borders group, click the borders drop down menu arrows → click borders and shading → select border setting , line style , line color, line width , shading from the shading tab and click ok.

Creating lists

- Bulleted list – usually uses when the order of items in the list does not matter.
    - Select the list → home tab → Paragraph group → click bullets drop down menu → select a bullet from the bullet gallery.

- Numbered list – usually uses when the order of items is important.
  - Select the list → home tab → Paragraph group → click numbers drop down menu → select a number style from the gallery.

Spelling and grammar check

- **Grammar Mistakes** – A blue wavy line indicates grammatical mistakes.

Spelling & Grammar tool allows you to check and deal with Spelling & Grammar mistakes in an entire or in a part of the document.

- **Spelling mistakes –** A red wavy line indicated misspelled word.
  - Place the cursor at the position where you want to start spelling check.
  - Click REVIEW tab → Proofing group → click Spelling & Grammar button → the Spelling task pane will appear on the right side of the document window
  - Misspelled word is highlighted and the suggestions are displayed in the suggestions box.
    - Click the correctly spelled word in the suggestions box
    - Click change to change the word, or click change all to change the word in the entire document.
    - Click ignore if no correction is needed, or click ignore all to continue checking the document but leaving all instances of the selected word unchanged throughout the document.
    - Click add to, include the selected word into the dictionary as a new word.
    - When spelling check is completed a message will appear by saying the corrections are done, by clicking OK the message you can continue to the document.

- **Thesaurus** - this will provide list of synonyms for a given word, and can replace a word with a similar word provided in the list.
  - Select the word you want to get synonyms.
  - Click REVIEW tab → click Thesaurus in the proofing group → Thesaurus task pane appears to the right of the document window.
  - Select a word from the list of synonyms→ move mouse over it, click insert or copy from the drop-down list →replace selected word with it.

- **Change case –** Change the appearance (Capital, Simple) of already typed text.
  - Select the text for which you want to change the case →Click Home tab → click Change Case in the Font group → select the desired option.
    - **Sentence case** - To capitalize the first letter of a sentence and leave all other letters as lowercase, click.
    - **Lowercase** - exclude capital letters from your text, click.
    - **UPPERCASE** - capitalize all of the letters, click.
    - **Capitalize Each Word** - capitalize the first letter of each word and leave the other letters lowercase, click.
    - **tOGGLECASE** - change lowercase characters to uppercase and uppercase characters to lowercase.

Competency: 4 Uses flow chart to solve simple problems with sequence, selection and develop programs (Using Scratch)

Competency Level 4.1: Analyzes the problem

Time: 2 periods

Learning Outcomes:

- Analyzes the problems in simple day to day life
- Explains the problem with a block diagram
- Describes applications in mobile and smart devices

Content:

- Identification of input, process and output steps
- Identification of applications created for mobile and smart devices
- Documentation of solution using flow charts

Concepts and terms need to be highlighted:

- Analyzes the problem
- Block diagram
- Identification
- Flow chart

Guidance for lesson plans:

- Discuss with students about control structure (Sequence, selection, Iteration) Divided the students in groups and ask a problem that they face and analysis and solve. Ask the students group to represent the problem with flow chart.

Guidance for assessments and evaluations:

- Give a problem to the student group to analysis and ask the students groups to represent the problem with flowchart.

Quality inputs:

- Activity Sheet
- https://www.tutorialspoint.com/programming_methodologies/programming_methodologies_flowchart_elements.htm

Reading Material

Represent the analytical thinking (only sequence, Selection) with flow chart

All make decisions on a daily basis. What should I have for breakfast? Where should I go this weekend? Every time we make a decision over base it on some criterion. After making this decision, over act on it. Thus decision-making is a two-step process – first deciding what to do based on a criterion, and secondly taking an action

The selection control structure allows one set of statements to be executed if a condition is true and another set of actions to be executed if a condition is false.

Traffic lights alternate the right of way accorded to users by displaying lights of a standard color (red, amber (yellow), and green)

    The green light allows traffic to proceed in the direction denoted.

    The amber (yellow) light warns that the signal is about to change to red.

    The Red light do not allows traffic to proceed in the direction denoted.

    If the red light appears drivers stop the vehicles otherwise go. Every signal on the road directs the vehicles in correct way. It is one of the selection examples.

Fig 4.1.1 Color lights

Selection is used to execute different statements depending on cretin condition. The following flowchart symbol is for the selection.
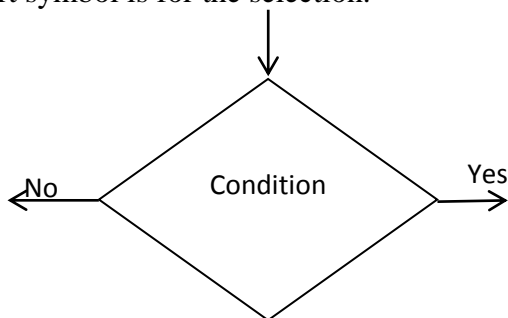
Fig 4.1.2 Flow chart symbol for the selection

Example 1:

Go to school through highway road.

Go to the road.

See the signal

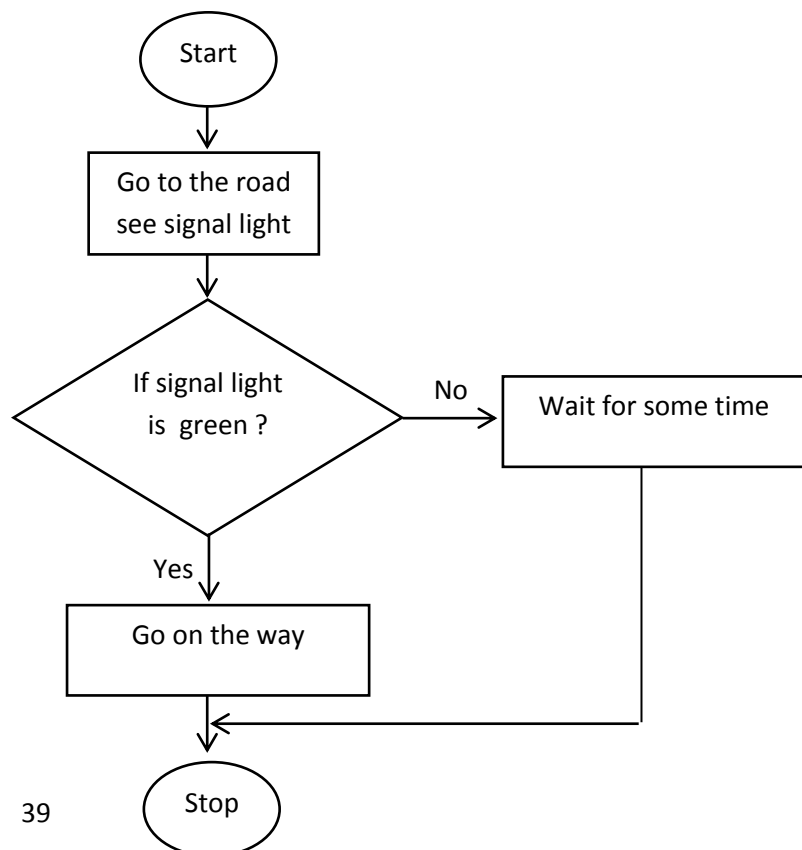If signal light is Green, go on the way

Otherwise wait for some time.

39

Fig 4.1.3 Flowchart for the Example 1

Example 2:

One of the real time problem for students is do homework. For many kids, homework is the biggest problem, which they usually leave to the very last minute to get done. First analysis How to solve this problem them shelf, then draw a flow chart of the solution of the problem.

Go to house.

Check, do you have homework.

If it no, laying or studying
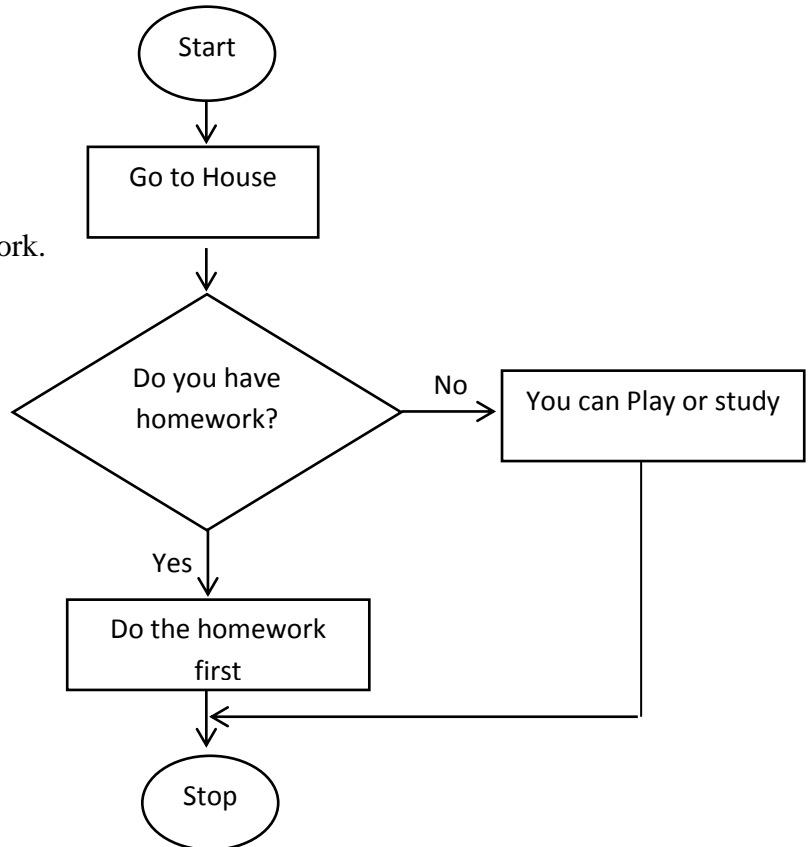
Otherwise, start to do the homework.

Fig 4.1.4 Flowchart for the Example 2

Example 3:

If a given marks is greater than 50,

displays "Pass" or "Fail"

Get the Marks

Check whether it is greater than 50

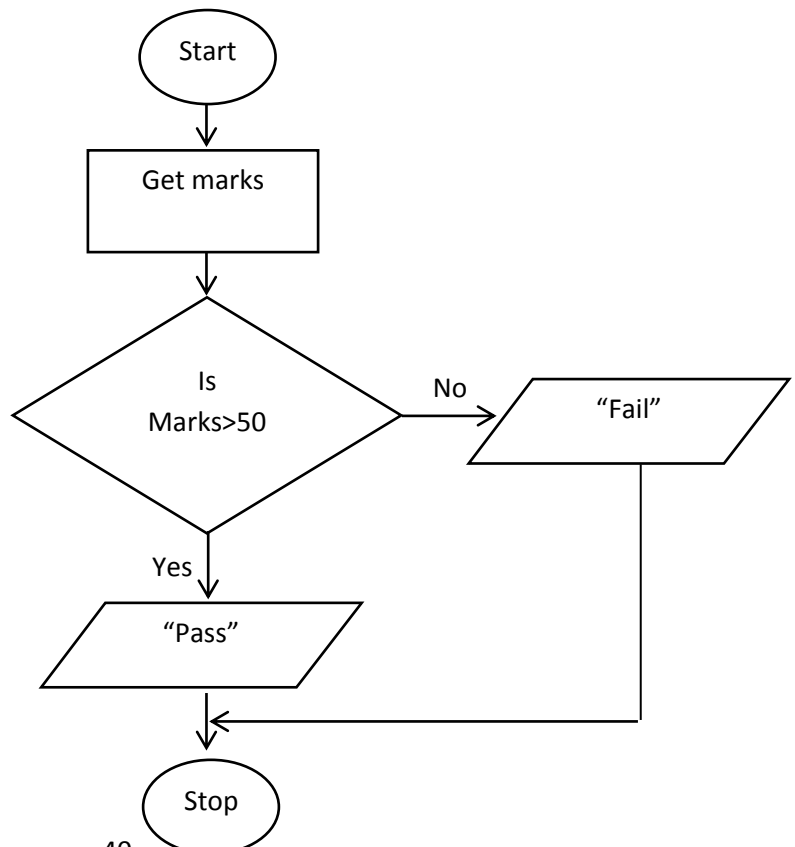If it Grater than 50 display "Pass"

Otherwise display "Fail"

40

Fig 4.1.5   Flowchart for the Example 3

Example 4:

If a given marks is greater than 50, Draw Green Line or Draw Red Line

Get the Marks

Check whether it is greater than 50

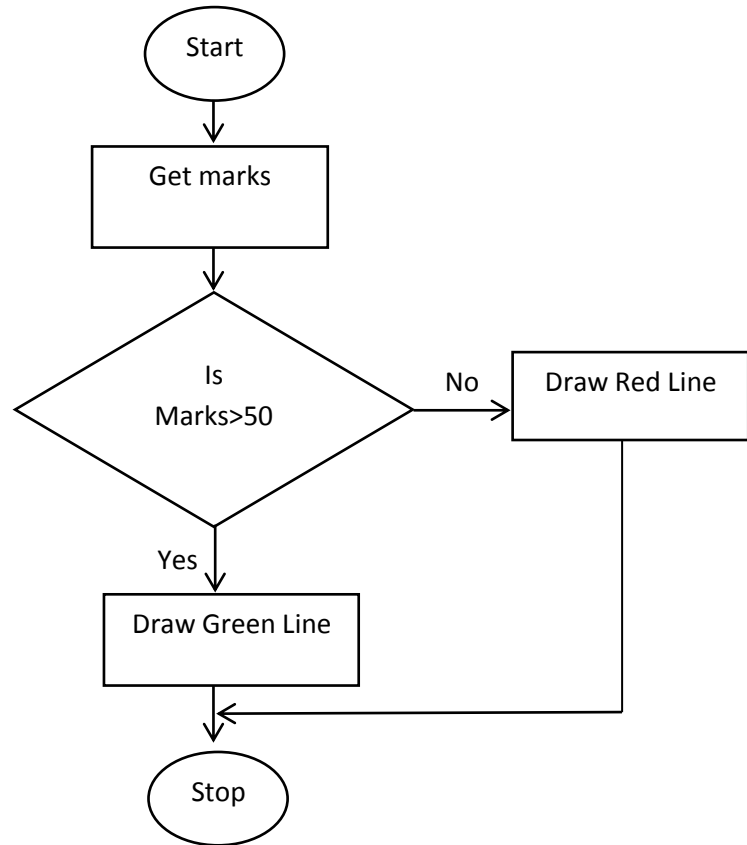If it Grater than 50 Draw Green Line

Otherwise Draw Red Line

```
                                    ┌─────────┐
                                    │  Start  │
                                    └─────────┘
                                         │
                                         ▼
                                  ┌──────────────┐
                                  │  Get marks   │
                                  └──────────────┘
                                         │
                                         ▼
                                      ╱─────╲
                                     ╱  Is    ╲        No   ┌──────────────┐
                                     ╲ Marks>50╱ ─────────> │ Draw Red Line│
                                      ╲─────╱               └──────────────┘
                                         │                          │
                                   Yes   │                          │
                                         ▼                          │
                                  ┌──────────────────┐              │
                                  │ Draw Green Line  │              │
                                  └──────────────────┘              │
                                         │ <───────────────────────┘
                                         ▼
                                    ┌─────────┐
                                    │  Stop   │
                                    └─────────┘
```

Fig 4.1.6 Flowchart for the Example 4

41

Competency: 4 Uses flow chart to solve simple problems with sequence, selection and develop programs (Using Scratch)

Competency Level: **4.2**. Uses control structures to develop simple programs

Time: 5 periods

Learning Outcomes:

- Describes control structures (selection only)
- Applies control structures to solve simple day to day problems

Content

- Introduction to simple algorithm and control structures of Selections
- Developing simple programs (Sequence and Selection) using visual supports of programming language (using an Interface)

Concepts and terms need to be highlighted:

- Control Structure
- Sequence
- Selection
- Algorithm
- Scratch Program
- Scratch Program selection

Guidance for lesson plans:

- Discuss how to face a problem with control structure (Selection).
- Discuss Control structure(Sequence, Selection, Repetition)
- Divide the class into groups and give a scenario to Analysis
- Ask the groups to do a Scratch program of the above scenario.

Guidance for assessments and evaluations:

- Assign each group for the following activity
  - Write a suitable scenario for a selection control structure.
  - Solve the problem with algorithm
  - Draw the flowchart and do Scratch

Quality inputs:

Scratch program, Task sheet

- https://scratch.mit.edu/download
- https://www.youtube.com/watch?v=0aCYwtQFV0c

Reading Material

Selection is a very important concept in programming. Using selection statements, we can get our programs to make decisions. Decision-making by a computer is based on the same two-step process. In scratch, decisions are made with the if blocks, and if else blocks. When processing an if statement, the computer first evaluates some criterion or condition. If it is met, the specified action is performed. Here are the blocks for the selection.

Fig 4.2. 1 Blocks for the selection

Example 1:

If a given marks is greater than 50, Draw Green Line or Draw Red Line.

The above scenario is already analysis with flow chart. The following blocks are design in scratch.

Fig 4.2.3   output for the Example 1

Fig 4.2. 2 Block for the Example 1

Example 2:

If a given marks is greater than 50, displays "Pass" or "Fail**.**
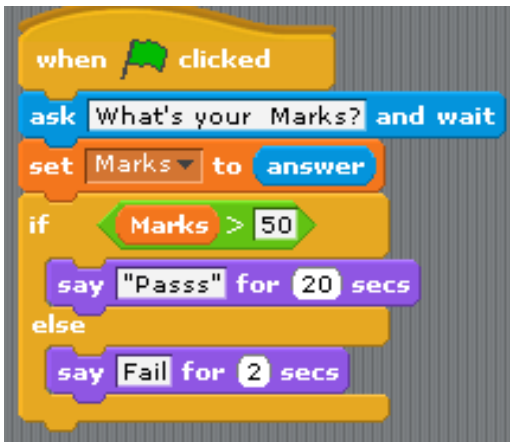
Fig 4.2. 4 Block for the Example 2
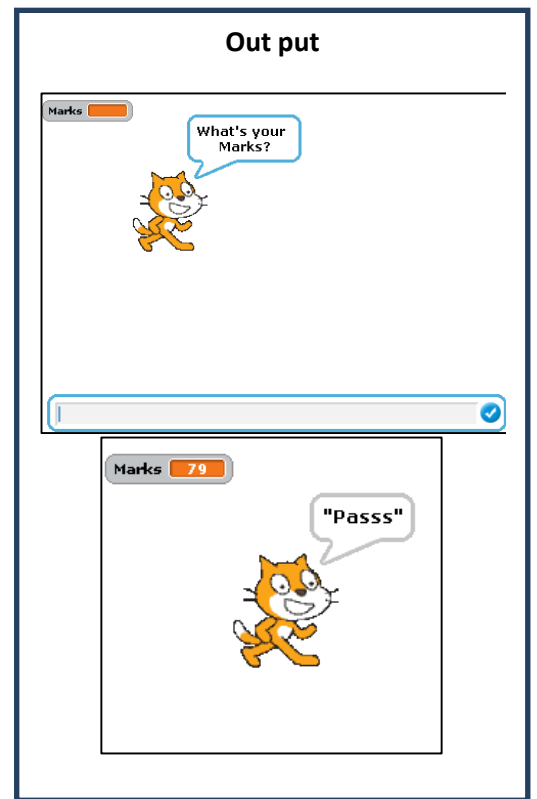
Fig 4.2.4 output for the Example 2

Example 3:

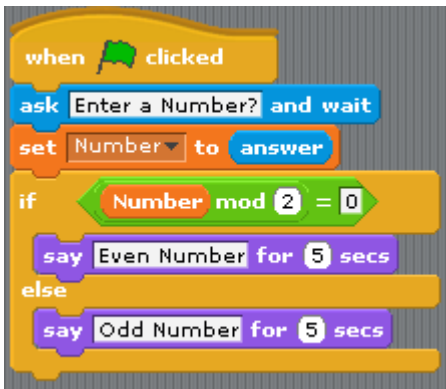If a given number is Odd, displays "Odd Number "or display "Even Number"**.**
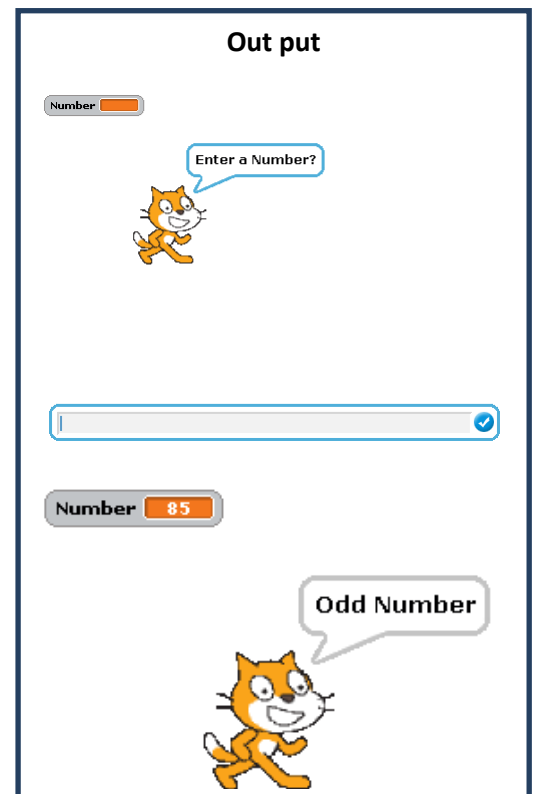

Fig 4.2. 5 Block for the Example 3

44

Fig 4.2.6 output for the Example 3

Competency: **5** Uses a software package for physical computing to implement programming logic

Competency Level: **5.1**.Uses a simple hardware device to implement physical computing

Time: 5 periods

Learning Outcomes:

- Writes a program to operate external circuits using two logic levels (yes/no, on/off)
- Implements programs on physical devices. (Example: Turning On/Off the LEDs with passing values)

Content

- Components of physical computing device
- Controllable devices
- Turning on/off LEDs
- Design LED patterns with simple programs

Concepts and terms need to be highlighted:

- Observe different types of microcontroller circuit
- Writes basic component of microcontroller circuit
- Writes a program to operate external circuits using two logic levels (yes/no, on/off)
- Implements programs on physical devices. Example: Turning On/Off the LEDs with passing values

Guidance for lesson plans:

- Collect information about different microcontroller circuit
- Explain the Micro bit circuit and it's components
- Writes programs to display different texts and values with LED lights on and off
- Display different value according to the pressing the button on the circuit

Guidance for assessments and evaluations:

- Write a code for Micro Bit circuit to display own name when a button pressed.
- Write programs to display different values for different two button combinations

Quality inputs:

- Computer, Micro Bit circuit and USB connecting cable, downloaded software from the Internet
  - https://makecode.microbit.org/
  - https://microbit.org/guide/
  - https://www.youtube.com/watch?v=Wuza5WXiMkc
  - https://www.youtube.com/watch?v=cJRrTxgLRIc

Reading Material

Different types of micro controller circuits
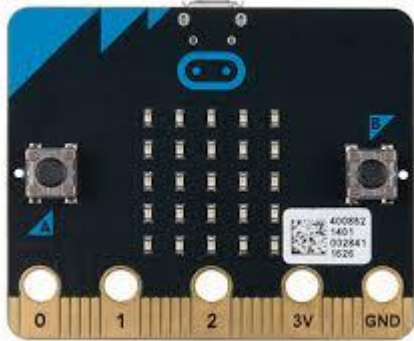
- Micro Bit circuit

Fig 5.1. 1   Micro Bit circuit

Features

- 25 individually-programmable LEDs

- 2 programmable buttons

- Physical connection pins

- Light and temperature sensors

- Motion sensors (accelerometer and compass)

- Wireless Communication, via Radio and Bluetooth

- USB interface

- Arduino UNO Board

Fig 5.1. 2 Arduino UNO Board

Features

- Microcontroller: ATmega328P
- 32 KB of Flash memory
- Operating Voltage: 5V
- Input Voltage (recommended): 7-12V
- Input Voltage (limits): 6-20V
- Digital I/O Pins: 14 (6 pins provide PWM output)
- Analog Input Pins: 6
- DC Current per I/O Pin: 40 mA
- DC Current for 3.3V Pin: 50 mA.

- Boards with Atmel Micro processors

Fig 5.1.3 Boards with Atmel Micro processors

Coding with Micro Bit microcontroller circuit

Open the editor using the following web site to create coding for Micro Bit circuit.

https://makecode.microbit.org/

When the MakeCode editor is open with the above address, make a desktop link dragging the address bar icon to the desktop. Then it will create a desktop icon.

The next time you may not need to have Internet connection for the Micro Bit editor. Simply, you can open the editor by clicking on the desktop icon.

The editor MakeCode is an **HTML5 web application**. It automatically caches locally in the hard disk when first viewed in your browser. After the web app has loaded you will have everything in your hard disk that you need to continue working without an Internet connection.

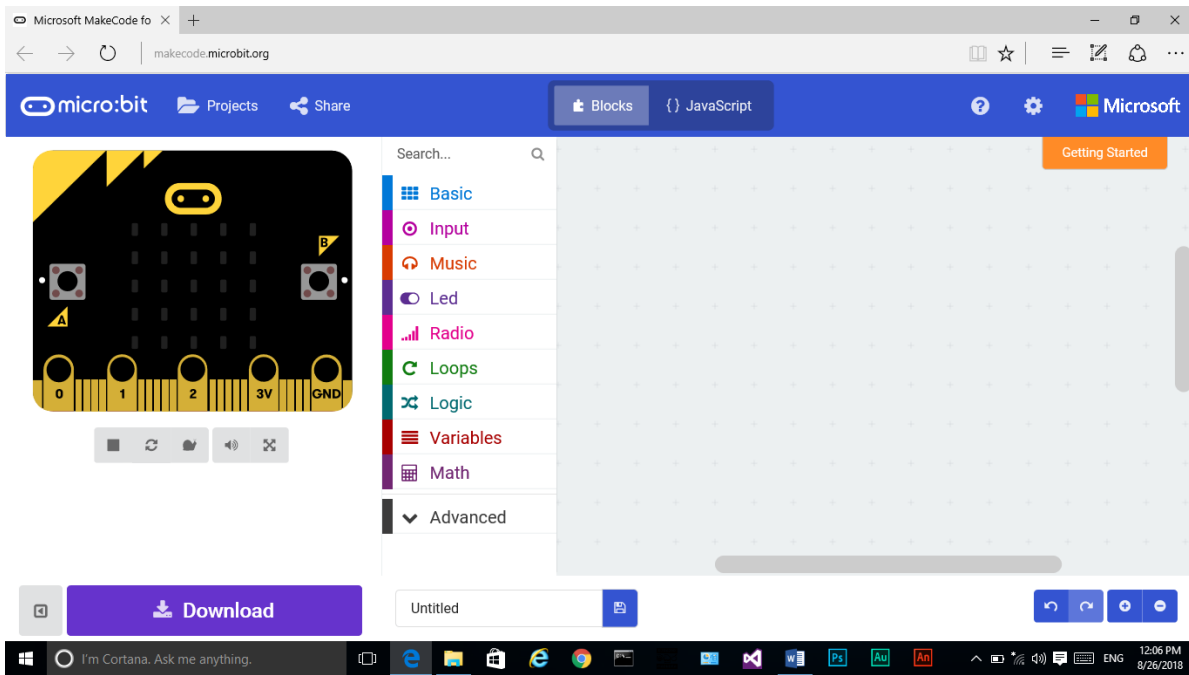You may have following screen with the editor.

Fig 5.1.4 screen with the Micro Bit editor

There are two modes in editor Blocks and JavaScript(). Do not select JavaScript(). It is difficult for beginners.

The editor provides several control blocks. They have categories in to several groups as follows.

Basic, Input, Music, Led, Radio, Loops, Logic, Variables and Math

The following groups are available under the Advanced option.

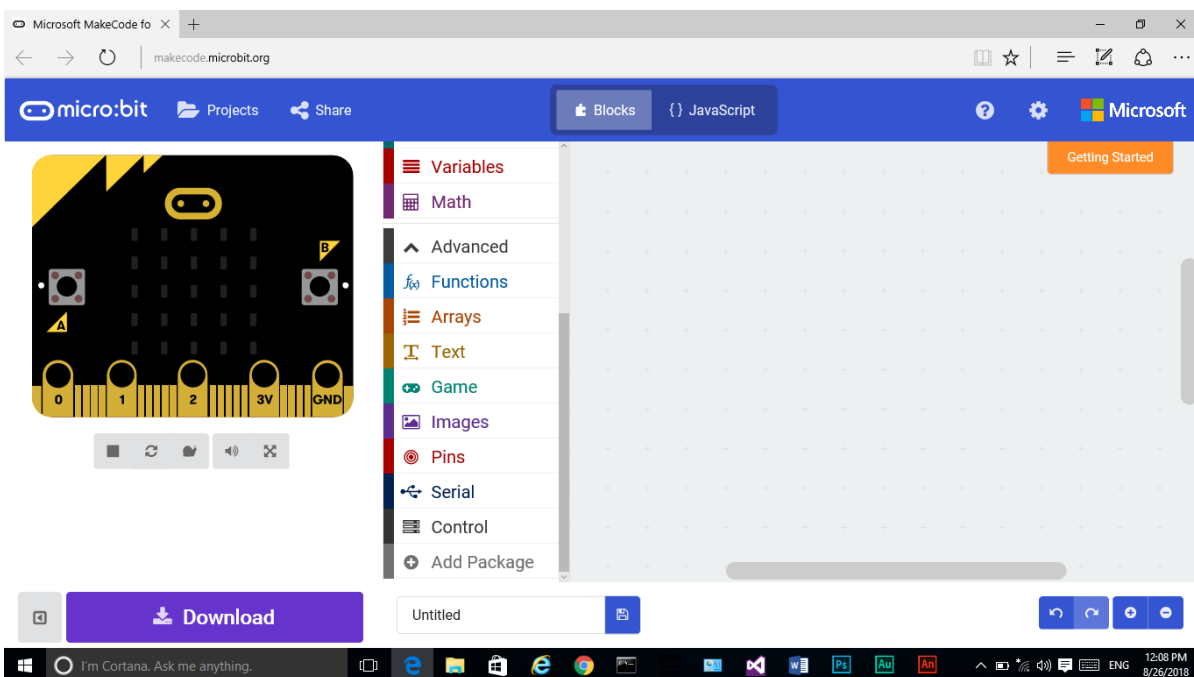They are Functions, Arrays, Text, Game, Images, Pins, Serial and Control.

Programming Micro Bit Circuit

Fig 5.1. 4 Groups available under the Advanced option

There are several control blocks under each group.
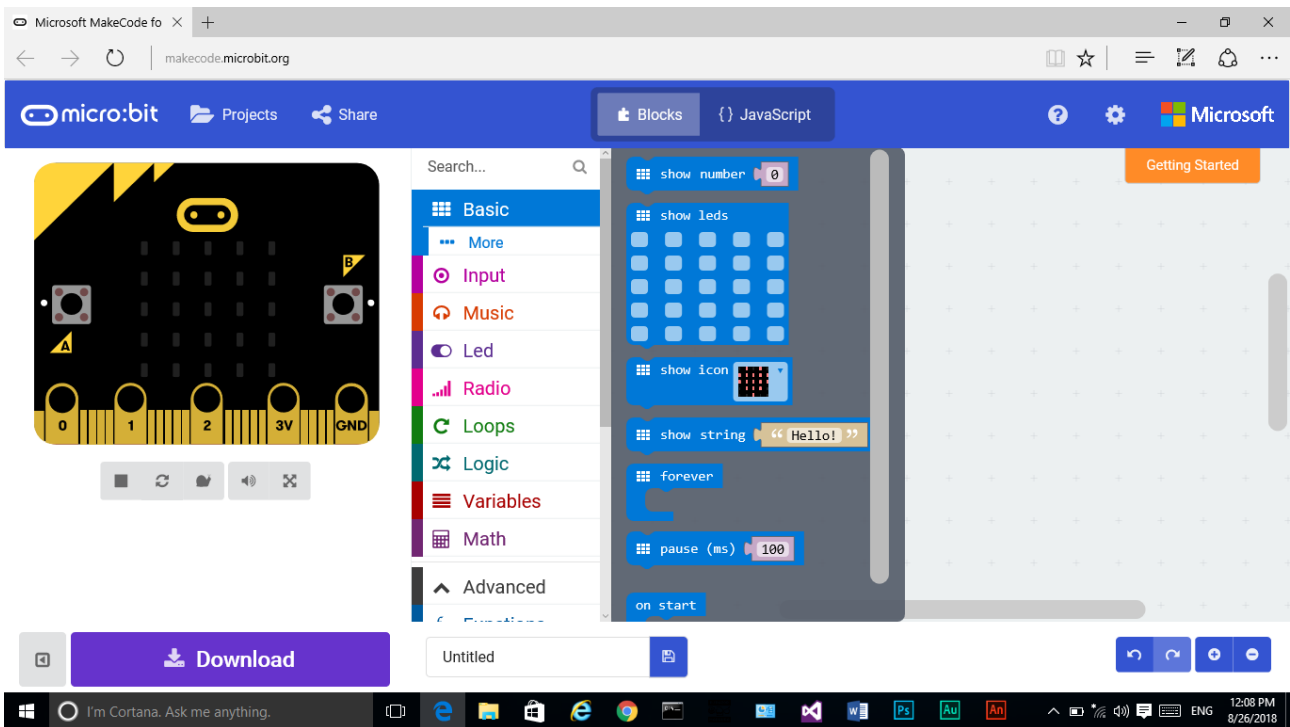
Control Blocks in the Basic category

Fig 5.1. 5 Control Blocks in the Basic category

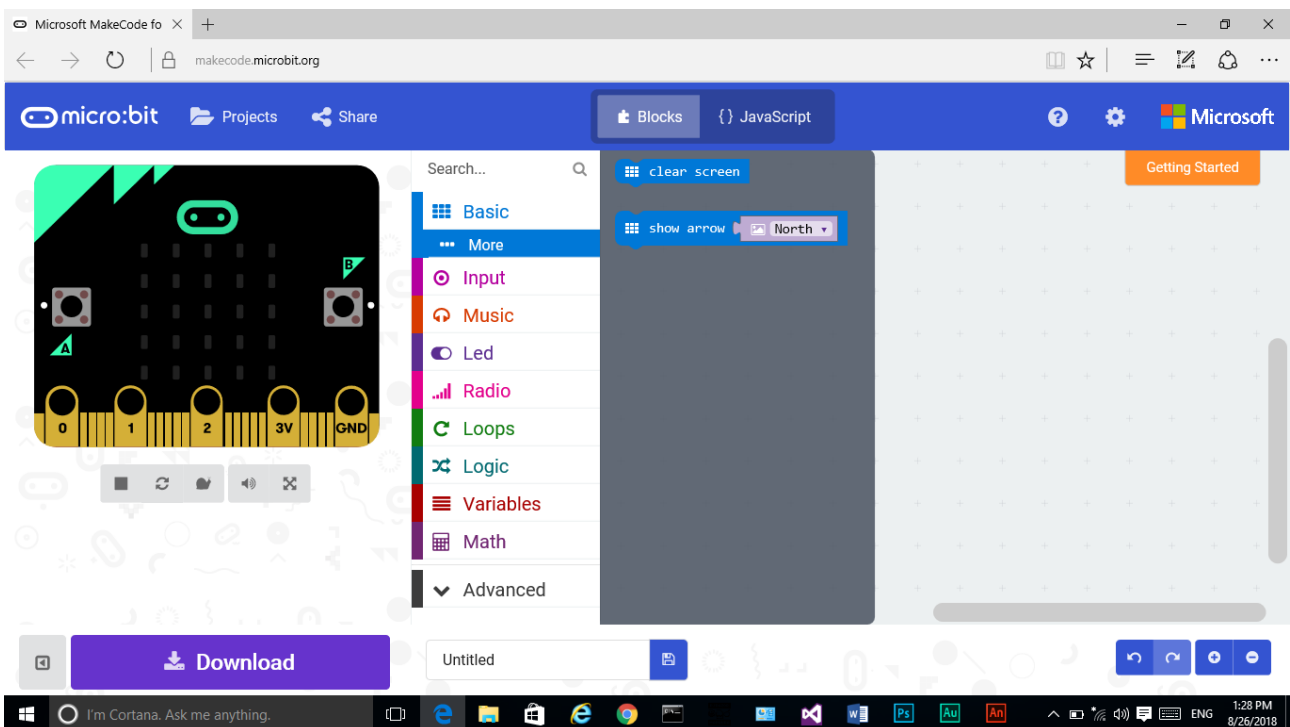There are more blocks under "… more" button. They are displayed below.

Fig 5.1. 6　Blocks under the "…more" button
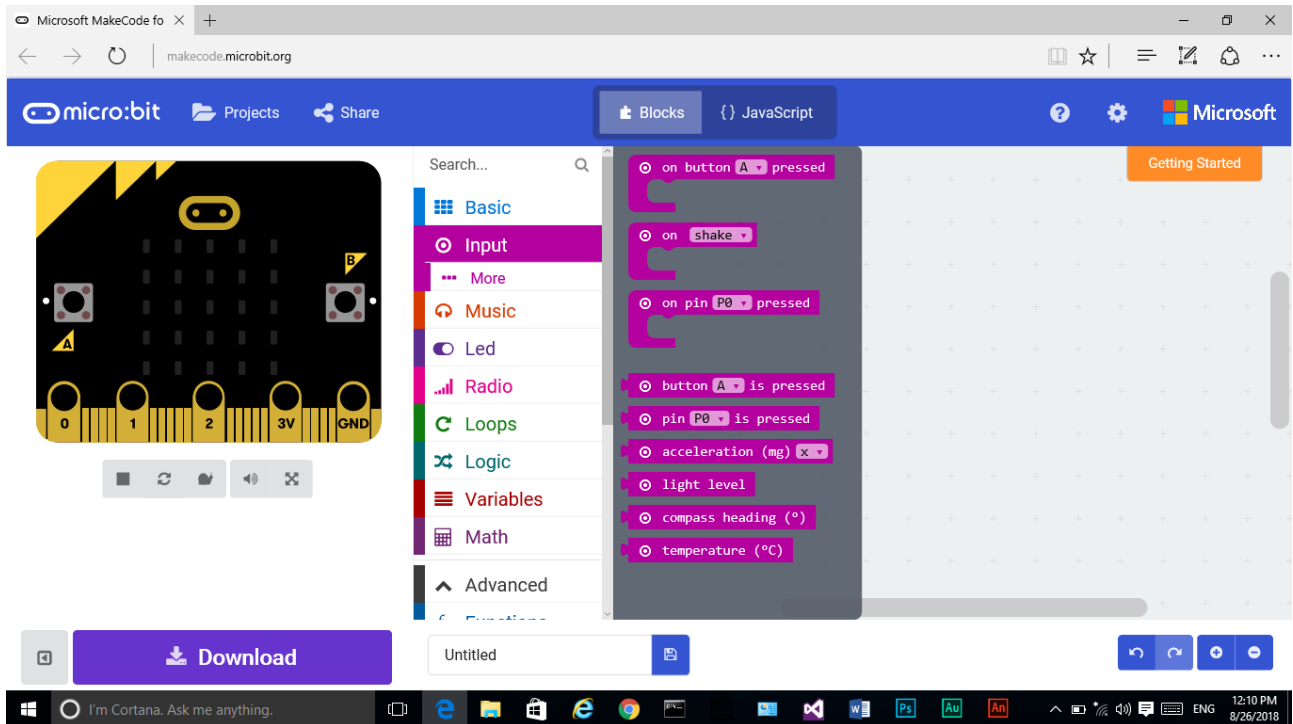
Control Blocks in the Input category

Fig 5.1. 7 Control Blocks in the Input category

Similarly there are several control block under each category.

Now let us create a program to programming the Micro Bit circuit.

Example 01

Let us display a text using the LED lights on the Micro Bit circuit.
Select the "On Button A Press" control block under Input group and drag the block to the program area as shown below.
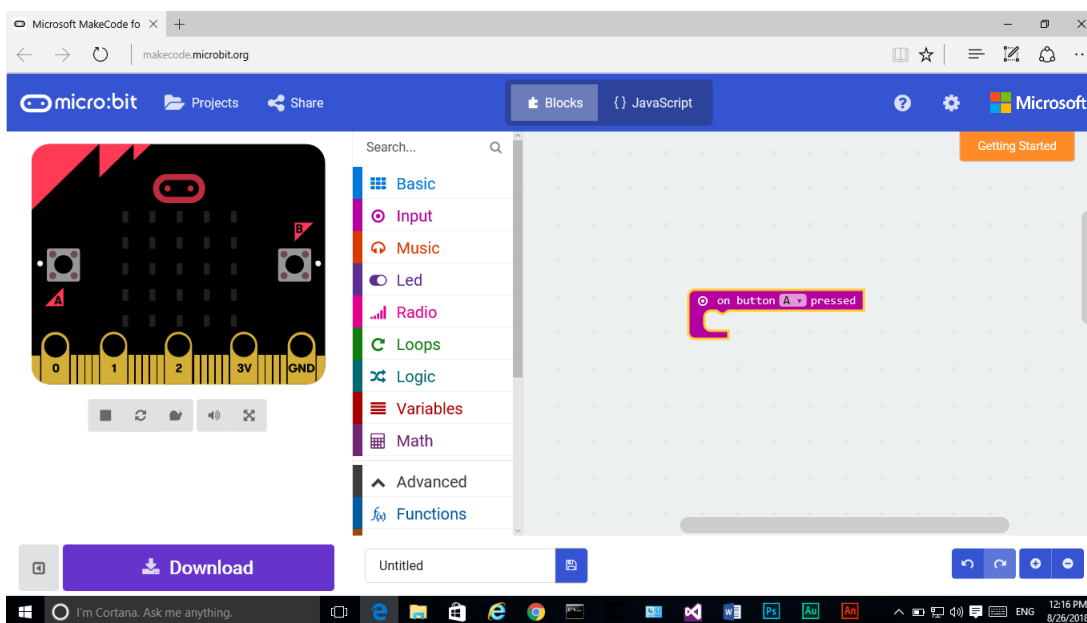

Fig

Fig 5.1. 8 After selecting and dragging the "On Button A Press" control block to the program area

If you click on A at "On Button A Pressed", you will have more button options of B and A+B. Button A is in the left side of the LEDs and Button B is in right side of the LEDs. There A+B means both are pressed.

For this example do not change the button, keep it as A.

Then open the Basic group and select the "Show String" block. Drag the block to the middle of the earlier "On Button A Pressed" block to create the following program.
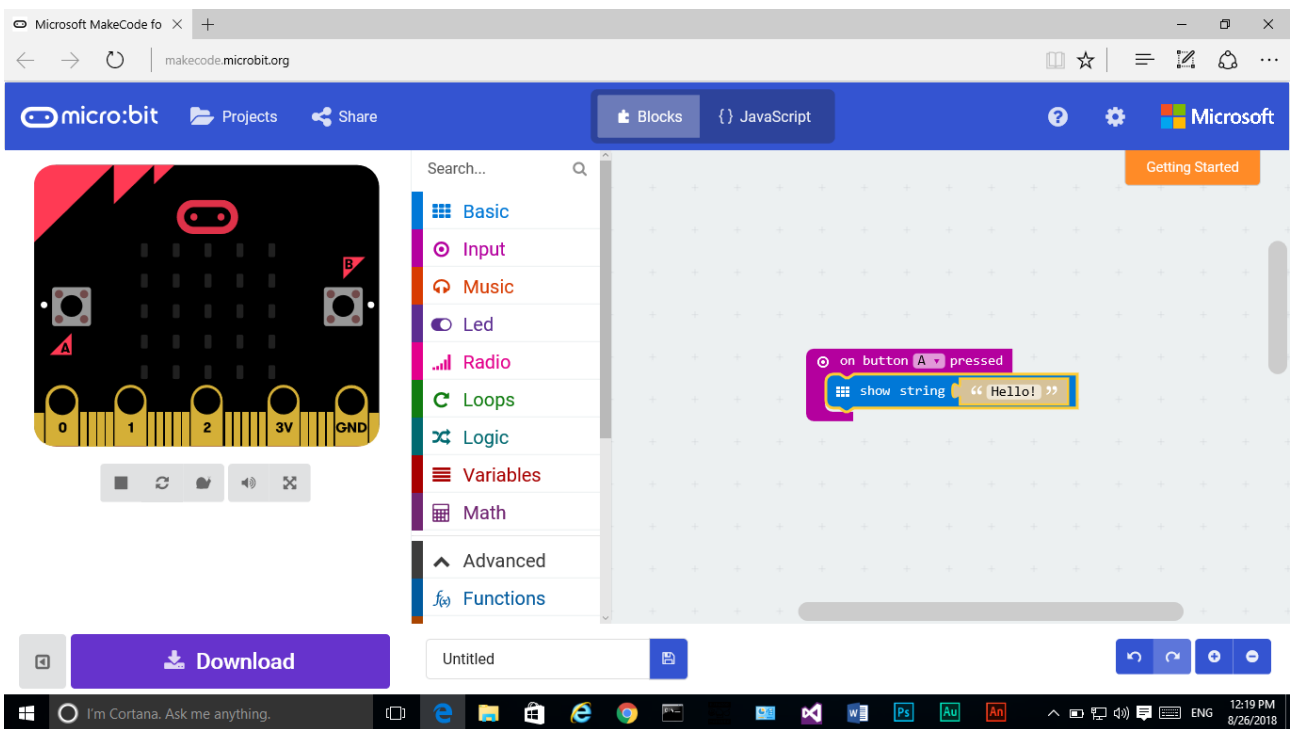

Fig 5.1. 9 After selecting and dragging the "Show String" block to the middle of the "On Button A Pressed" block.

Change the text on the "Show String" block to "ICT Grade 8". Then the program is as follows.
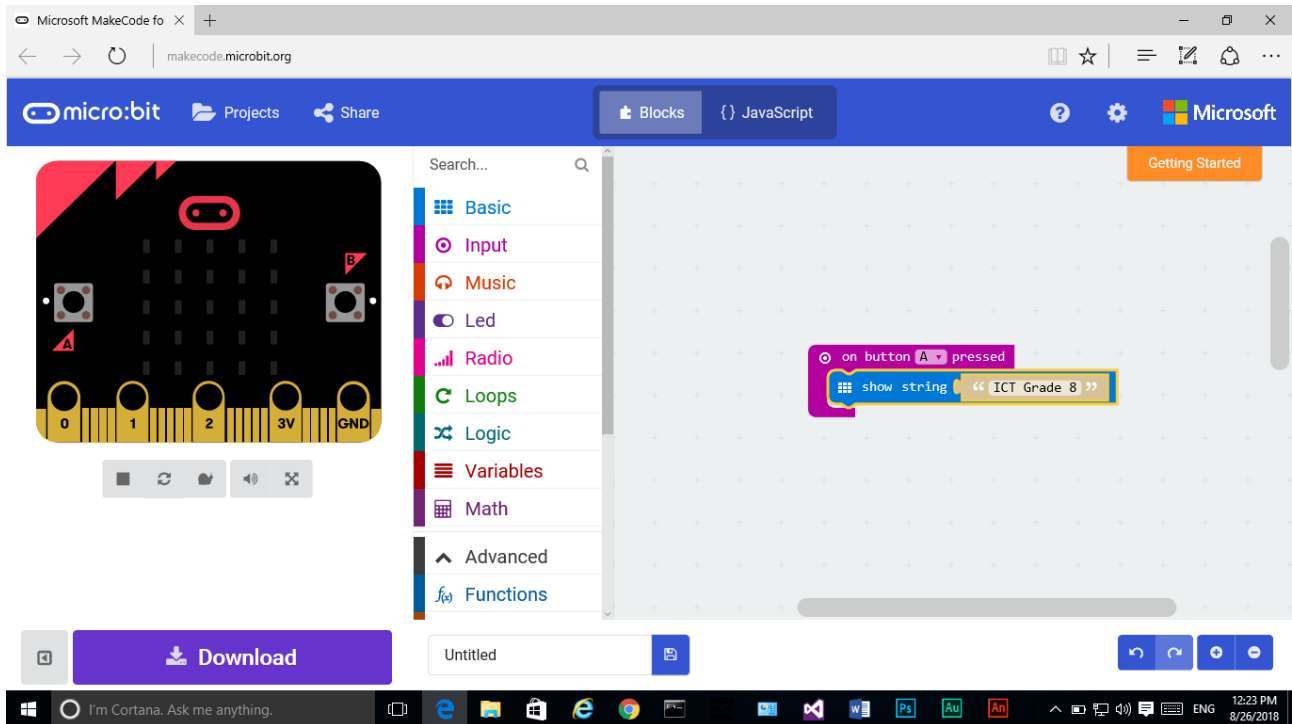

Fig 5.1. 10 After Changing the text on the "Show String" block to "ICT Grade 8".

This simple program is completed. The current name of the program is Untitled and you can rename the program as MyPro01 erasing "Untitled". Click on Download button to save the hex file in the download folder of the computer. The hex file contents digital codes for the graphical representation of the program. Such hex file can upload to the Micro bit circuit. If you check your download folder, you may found new file called "microbit-MyPro01.hex".
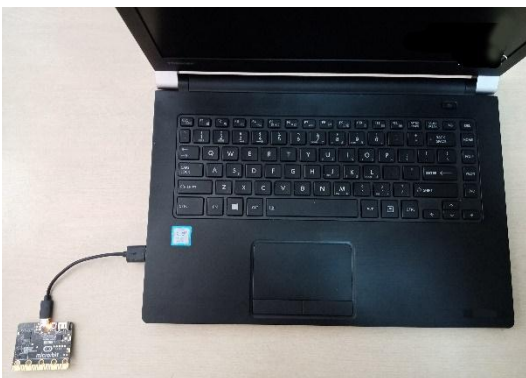

Fig 5.1. 11 When the Micro Bit circuit plugs to the computer through the USB cable

This hex file should upload to the Micro Bit circuit to run the program by the circuit. When the Micro Bit circuit plugs to the computer through the USB cable it shows a folder with two files in a new driver as follows. You may have different drive letter instead G: .
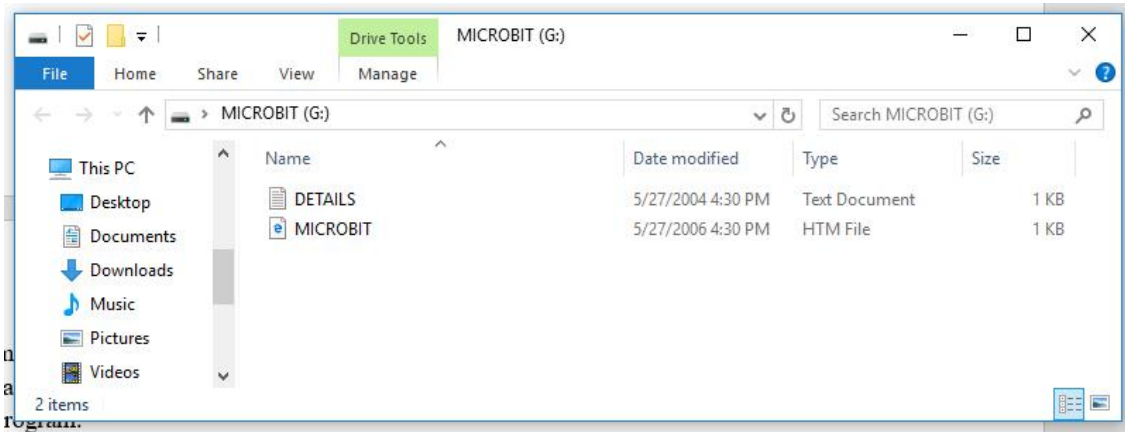
Fig 5.1. 12 Folders showing in a new driver, after plugging the Micro Bit circuit to the computer

If you do not have this folder, unplug the circuit and plug it again. Copy your hex file to this folder. Then you will see LED on Micro Bit circuit is blinking speedily while uploading the hex file.

Then turn the circuit to next side and finds two buttons. Click on the Button A. Then you will see running characters in the LED grid. It says your message "ICT Grade 8"

Example 2: MyPro02

Now modify above program as follows. Writes code to display your name when the button B is pressed. Name the program as MyPro02
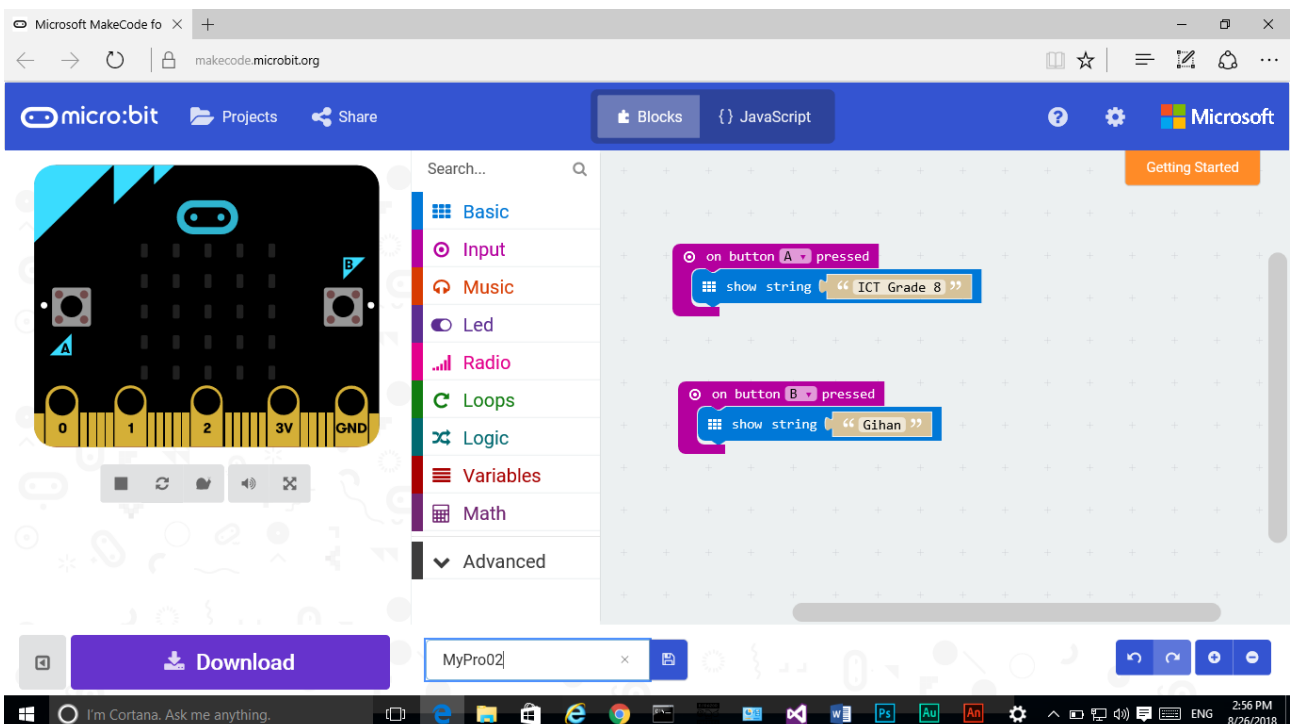
Fig 5.1. 13 Blocks for the Example 02

53

Example 03: MyPro03

In this program another block of "on button pressed" is used. Here, A+B is selected for pressing both buttons at once. Select "show leds" in the Basic category and drag to the middle of the block of "on button A+B pressed".
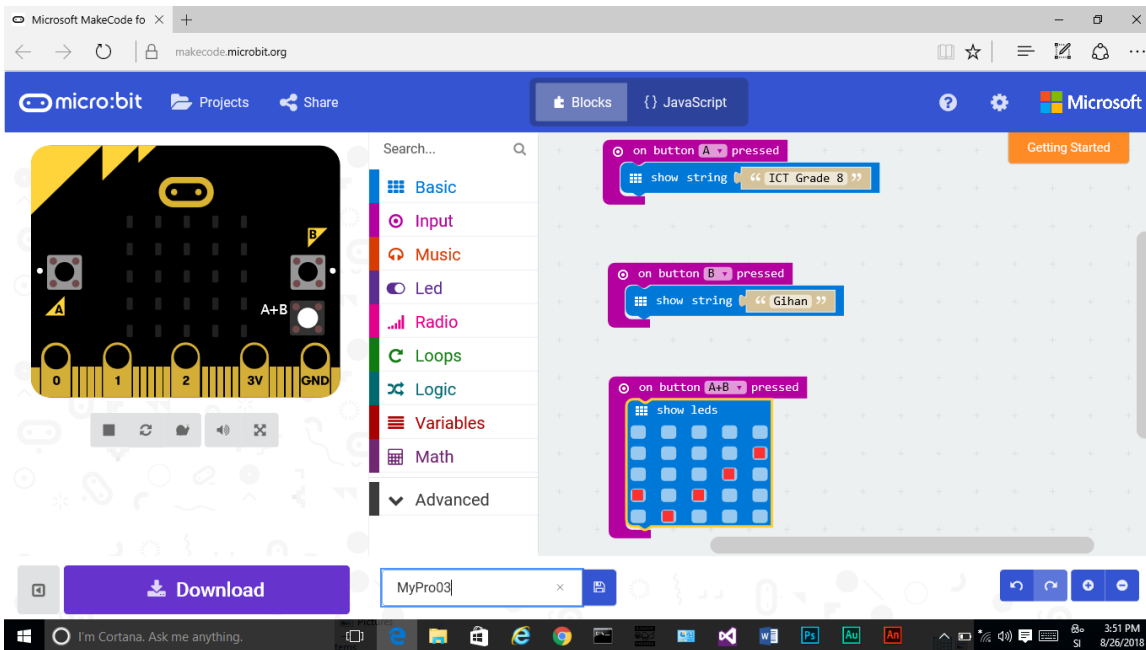
Fig 5.1. 14   Blocks for the Example 03

Upload the program and see the led pattern when both buttons are pressed.

Example 04 Mypro04

The following program has three blocks. This "on shake" blocks has selected from Input category. The option of "Shake" has changed in the next block with "Screen Up" and "Screen Down".
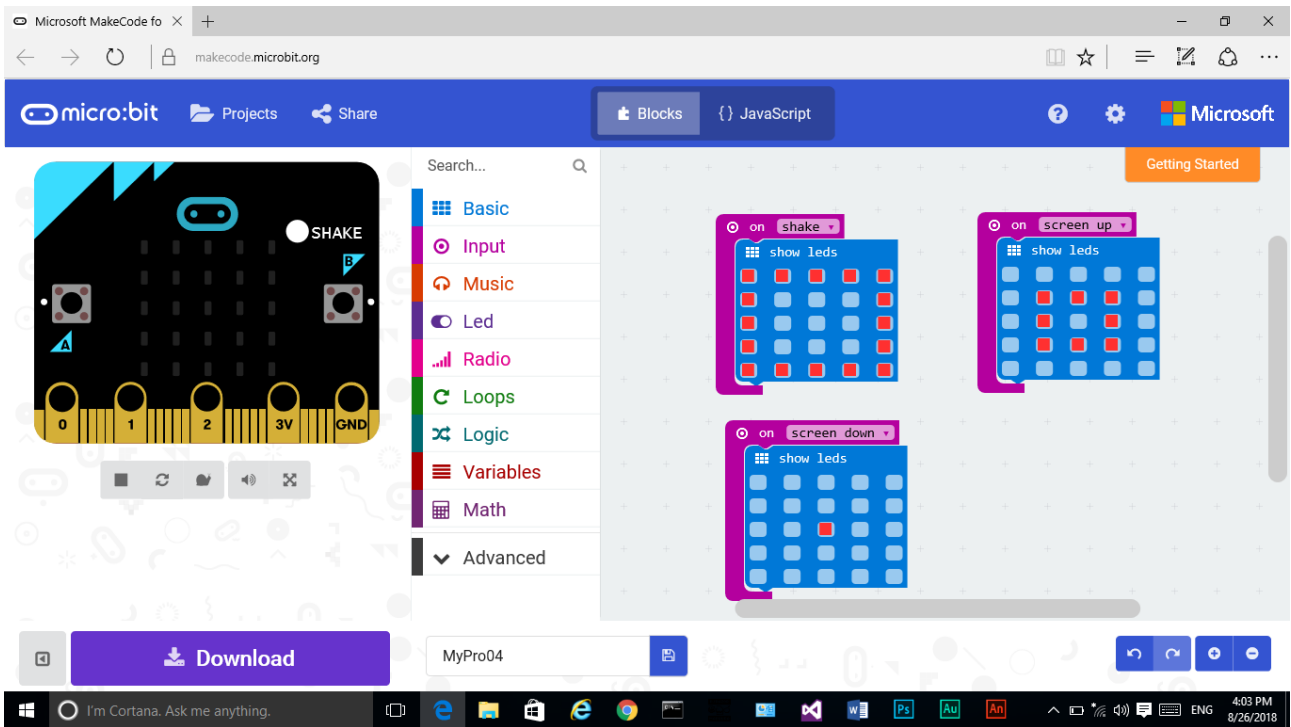
Fig 5.1. 15 Blocks for the Example 04

After upload the program to the circuit shake the micro bit circuit and see the pattern of LEDs. Then up and down the circuit to see the different patterns.

Example 5: MyPro05
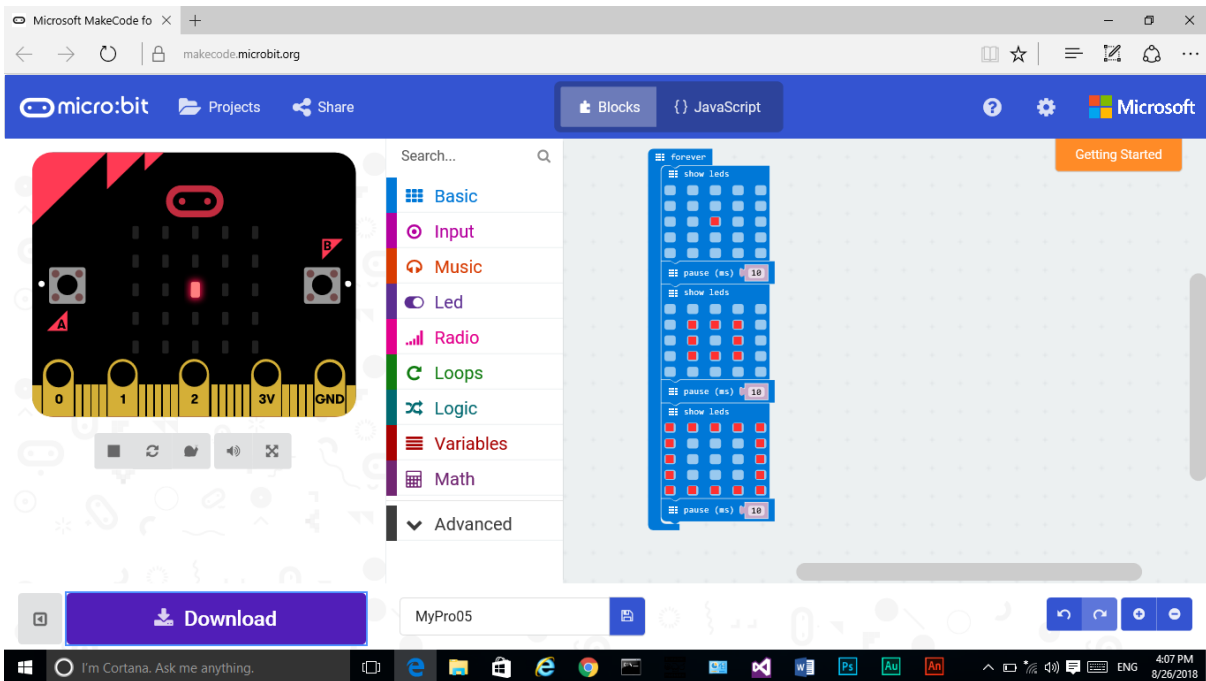
Fig 5.1. 16 Blocks for the Example 05

Following two programs Forever block has used. It is available on the screen when you take a new project. The block of "pause (ms) 100" is available in the Basic category. Here, pause value has changed to 10 milliseconds.
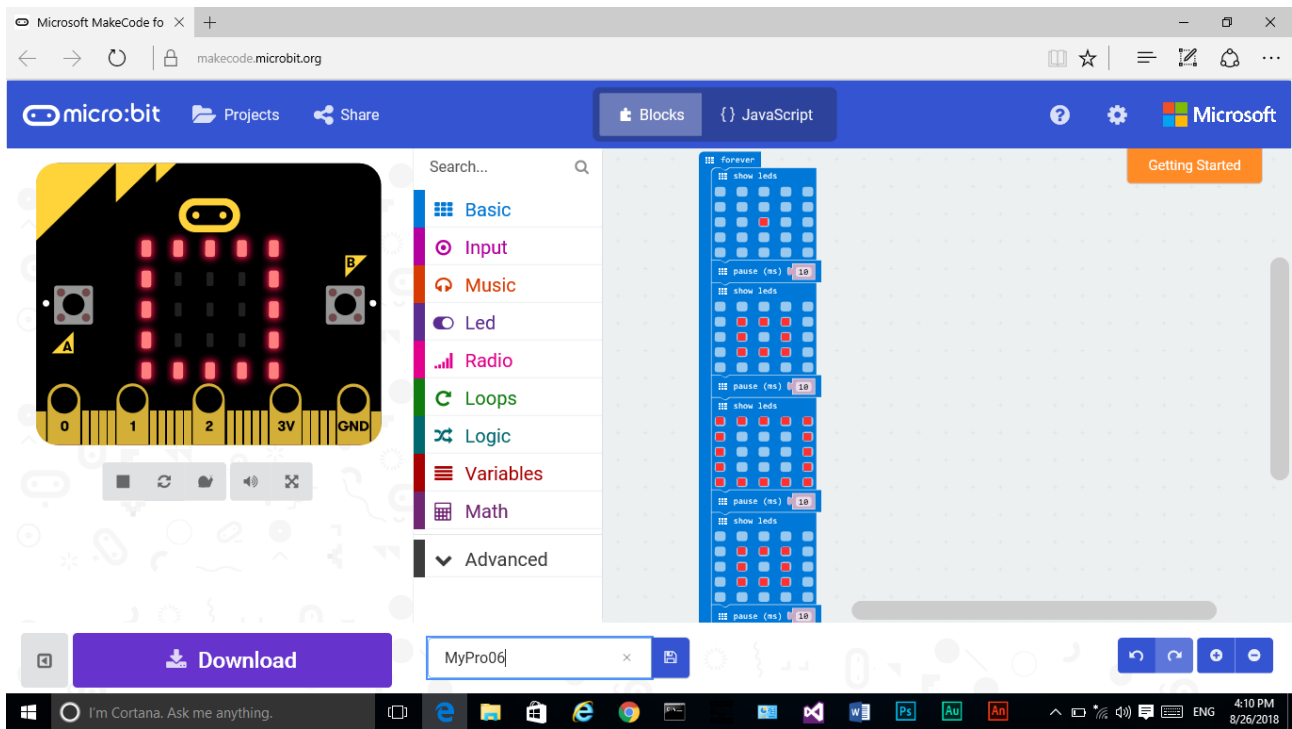
Example 06 : MyPro06

Try to prepare your own patterns of LEDs lights with different time intervals.

Competency: 6 Explores educational information using the Internet

Competency Level 6.1: Searches information on the Internet

Time: 1 period

Learning Outcomes:

- Identifies Search Engines
- Searches information using the Internet

Content

- Search Engines: Google, Yahoo etc.
- Educational browsers

Concepts and terms need to be highlighted:

- Internet
- Search Engines
- Browsers
- Educational browsers
- Website

Guidance for lesson plans:

- Explain Basic of internet.
- Divide the students in groups.
- Provide instructions to search, in a search engine for a given tasks.

Guidance for assessments and evaluations:

- Children could be asked to use a search engine to research information for a new topic or project. They could note down how many results each search brings up. If they word the search term slightly differently, do different results come back? Discuss why this could happen

Quality inputs:

- Computer with internet connection
- https://www.computerhope.com/issues/ch000082.htm
- https://www.techopedia.com/definition/288/web-browser

Reading Material

The internet

The internet is made of computers connected to each other around the world. This is a global network connecting millions of computers. When you use websites and some apps, you are using the internet.

Connecting to the internet

To connect to the internet the following are needed:

- A Computer
- Modem/Telephone Connection, dongle, Wi-Fi Router
- Internet Service Provider (ISP- Ex :- Dialog, Mobitel, Telecom)
- Web browser(Ex :-Google Chrome, Safari, Opera, Internet Explorer, Firefox)

        Or

- Smart Phone with Internet connection

What can you do on the internet?

Of the many things available to do on the internet, you can:

- browse websites
- send and receive email
- download media files, eg Mp3s or video files
- watch streamed video, eg BBC iPlayer, YouTube etc
- check your bank balance and make payments
- buy goods from online shops
- access educational material from your school's Virtual Learning Environment (VLE)
- create, store, edit and share your documents using web-based applications, eg Google Docs
- interact with friends on social networking sites, egBebo, MySpace, Facebook etc
- write a blog
- sign-up to forums and discuss topics that interest you with like-minded individuals
- game with friends
- instant message family and friends
- share photos and videos
- complete free tutorials covering a wide range of subjects

Search engines

The internet is a useful tool that helps you to learn, to share, to communicate and to find entertainment. It has billions of pages filled with information, in the form of words, images, videos and sound. Finding the information you need from these billions of pages can be very difficult. If

you had to look through each page, it would take many years to find the information you seek. Search engines make the task much simpler.

Search engines are programs that are designed to search the internet for us. They search through all the billions of webpages, looking for information that matches what you are seeking. By using a search engine you can find information in seconds.

Eg: **Google, Bing , Yahoo , Ask , AOL**

How search engines work

When you use a search engine to find information, you type in a search term which consists of one or more keywords that are specific to the information you seek.

The search engine would look through all the webpages on the internet and create a list of links (or results) to all pages that contain these keywords. The list is sorted into order, with the most popular (or most visited) results at the top. You can then choose to follow any of the listed links and websites to see what information they contain.

Web browsers

A web browser is software that allows us to see web pages. There are a number of different web browsers, such as:

- Microsoft Edge (new version of Internet Explorer)
- Mozilla Firefox
- Google Chrome
- Safari
- Opera

Some of the browsers listed above also have mobile versions.

Hyperlinks

A hyperlink is what we use to move around the web from page to page. A hyperlink is often underlined, though not always. Hyperlinks can be text, images, buttons, or moving images.

1.   World wide web (www)

The world wide web (www) is a collection of multimedia web pages on the internet that can be displayed on any computer using a browser.

It was invented in 1989 by Tim Berners-Lee while he was working at the European Organization for Nuclear Research - he wanted to find a method by which scientists could combine their knowledge and work collaboratively.

2.   Hyperlinks

These allow the visitor to navigate a website by clicking on text or pictures to move from one page to another. They are usually shown by underlined blue text on the page.

3.   Hypertext Markup Language (HTML)

HTML is the computer language used to create web pages.

4.   Web page

A web page is a single HTML file that contains text, images, audio and video. It is part of a website and has a unique name given to it.

5.   Search engine

When using a search engine such as Google a **simple search** is when you type in a word or phrase to look for. For example, typing in Scotland will give you lots of 'hits' or results.

6.   Connecting to the internet

There are two ways of connecting to the internet: **dial-up** and **broadband**.

Dial-up uses an existing telephone line. The maximum connection speed of the modem is 56kbit. The cost is charged per minute.

Broadband offers a much faster connection and has other advantages over dial-up:

- always connected
- faster downloads
- multiple computers accessing the internet if connected to a LAN
- can use the telephone at the same time as accessing the internet

The user is said to be **online** if they are connected to the internet and **offline** when they are no longer connected to the internet.

1.   Internet service provider (ISP)

An internet service provider (ISP) is a company that provides the connection to the internet. They can also provide email, web space and anti virus software for all their subscribers.

1.   Mobile internet technologies

These are devices that allow you to work without access to a mains power supply, e.g. laptops, PDAs, mobile phones, etc. These devices get access to the internet via wifi or mobile phone networks.

2.   Video conferencing

This allows two or more people, at different sites around the world, to communicate via a computer network, using audio and video. You would need a webcam or digital video camera, speaker, monitor, microphone and video conferencing software at both ends of the computer network.

Competency 6: Explores educational information using the Internet

Competency Level: 6.2 Creates websites with advanced features

Time: 2 periods

Learning Outcomes:
- Designs websites as per specifications
- Develops websites as per design

Content
- Tags, Elements, Attributes, Text formatting etc.
- Advanced features in hyperlinks

Concepts and terms need to be highlighted:
- Tags
- Elements
- Attributes
- links
- Hyperlinks

Guidance for lesson plans:
- Explain Basic of HTML.
- Divide the students in groups.
- Provide instructions to develop a simple website.

Guidance for assessments and evaluations:
- Write HTML Coding for the given context
- Write output (layout) for the given HTML coding

Quality inputs:

- Computer
- Collection of images to use in web pages
- www.nie.lk web site

Reading Material

Basics of HTML

- What is HTML?
  - HTML is the standard markup language for creating Web pages.
  - HTML stands for **H**yper **T**ext **M**arkup **L**anguage
  - HTML describes the structure of Web pages using markup, HTML elements are represented by tags
    Eg: I want to bold this.
     tells the web browser when to stop bolding.

- Each HTML file is broken up into two parts
  - The head contains information about the website.
  - The body contains information about the content of your site. This is what you see when you go to a webpage.

Introduce Basic HTML tags

- Everything in an HTML file is enclosed by </html> and </html>
- Use text editor to write HTML codings
- Create a new HTML file by clicking on File then New in text editor.
- Write your html code.
- Save your new HTML file as follows
- File –> save as –> example1.html –> save
- (here we must type .html extension to inform this is a web page written in html)

- **example 1 : Display without a tag**

<html>

<body>

type your name

</body>

</html>

- **example 2 : Use h1 tag.**

<html>

<body>

<h1>This is the heading 1</h1>

</body>

</html>

•   example 3 : Display name on the web page as a heading

\<html\>

\<body\>

\<h1\>type your name\</h1\>

\</body\>

\</html\>

•   example 4 : Show the different types of headings and compare them.

\<html\>

\<body\>

\<h1\>This is the heading 1\</h1\>

\<h2\>This is the heading 2\</h2\>

\<h3\>This is the heading 3\</h3\>

\<h4\>This is the heading 4\</h4\>

\<h5\>This is the heading 5\</h5\>

\<h6\>This is the heading 6\</h6\>

\</body\>

\</html\>

- Create a new HTML file with the name example2.html

- example 1 : Use paragraph tag.
  ```
  <html>
        <body>
              <p>this is a paragraph</p>
        </body>

  </html>
  ```

- example 2 : Insert multiple paragraphs and see it allows to enter multiple line paragraphs in a web page. Browsers automatically add a blank line before and after a paragraph.

```
<html>
    <body>
        <p> Current Scenario of Internet Everyone is looking to have a wonderful and easy to use website, but it is not easily possible because a perfect website development procedure is needed that makes your website creative from other websites. As we all know that a unique website is able to attract lots of visitors to your website and help you to turn them into potential customers. </p>

        <p> These days, we can say that a website development is one of the most demanding tasks as it includes designing, developing, search engine optimization, creation of content and many more aspects. </p>

        <p> Today in the world of Internet, it is must for every business person to have a website for his business because lots of people are looking to buy products or hire services online as they can save their precious time as well as money.</p>
    </body>
</html>
```

Insert text formatting to a Web page

- Create a new HTML file with the name example3.html

- example 1 : Use text formatting - bold.

    ```
    <html>

    <body>

    <p><b>this text is bold</b></ p>

    </body>

    </html>
    ```

- example 2 : Use text formatting - underline.

    ```
    <html>

    <body>

    <p><i>this text is underlined</i></p>

    </body>

    </html>
    ```

- example 1 : Use text formatting - italic.

    <html>

    <body>

    <p><i>this text is italic</i></p>

    </body>

    </html>

Use more text formatting to a Web page

- Create a new HTML file with the name example4.html

- example 1 : Use **<sub>** element to define subscripted text.

    <html>

    <body>

    <p>Carbon dioxide - CO ₂ is a colourless gas .</p> </body>

    </html>

- example 2 : Use **<sup>** element to define superscripted text.

    <html>

    <body>

    <p>2 ³ means 8 in decimal.</p>

    </body>

    </html>

HTML Elements

An HTML element usually consists of a start tag and end tag, with the content inserted in between:

Eg: The <body> element defines the document body.

It has a start tag <body> and an end tag </body>.

HTML Attributes

All HTML elements can have attributes . Attributes provide additional information about an element. Attributes are always specified in the start tag.

Eg: Attributes usually come in name/value pairs

  like: name="value"

  font color="red"

- example 1 : change font colour.

  <html>

  <body>

  <p>Colour changed</p>

  </body>
  </html>

- example 2 : Change font size.
</html>
  <body>
  <p> Size of the font changed ! </p>
  </body>
</html>

- example 3 : Change the font type.
</html>
  <body>
  <pfont type changed</p>
  </body>
</html>

- example 4 : Change font attributes.
<html>
  <body>
   Different text!

  </body>

</html>

Make a link using HTML

The <a> tag defines a hyperlink, which is used to link from one page to another.

- href attribute of the <a> element indicates the link's destination.
- By default, links will appear as follows in all browsers:
- An unvisited link is underlined and blue
- A visited link is underlined and purple
- An active link is underlined and red

```
<html>
<body>
<p>
This is a link to <a href="http://www.nie.lk/"> NIE- Sri Lanka </a>.
</p>
</body>
</html>
```

The target Attribute

The target attribute specifies where to open the linked page.
The target attribute can have one of the following values:

- _blank - Opens the linked document in a new window or tab
- _self - Opens the linked document in the same window/tab as it was clicked (this is default)
- _parent - Opens the linked document in the parent frame
- _top - Opens the linked document in the full body of the window

This example will open the linked document in a new browser window/tab:

Eg:

```
<html>
<body>
<p>
This is a link to <a href=http://www.nie.lk/ target="_blank"> NIE- Sri Lanka </a>.
</p>
</body>
</html>
```

Link Titles

The title attribute specifies extra information about an element. The information is most often shown as a tooltip text when the mouse moves over the element.

```
<html>
<body>
<p>
This is a link to <a href=http://www.nie.lk/ title="Visit National Institute of Education
– Sri Lanka "> NIE- Sri Lanka</a>.
</p>
</body>
</html>
```

Image as Link

In this example the image Uses as a link which is in the same folder

```
<html>
<body>

<a href="html_images.asp">HTML Images</a>

</body>
</html>
```

Two pages located in the same folder

Make two web pages namely page1.html and page2.html with the following code lines

Page 1

```
<html>
<body>
<h1>Welcome to page 1 !</h1>
<p>Hello. Do you want to view <a href="page2.html">page 2</a> ?</p>
</body>
</html>
```

Page2

```
<html>
<body>
<h1>Welcome to page 2 !</h1>
<p>Hello. Do you want to view <a href="page1.html">page 1</a> ?</p>
</body>
</html>
```