

Information and Communication Technology

Grade 9 Workbook

Educational Publications Department



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The National Anthem of Sri Lanka

Sri Lanka Matha

Apa Sri Lanka Namō Namō Namō Namō Matha

Sundara siri barinee, surendi athi sobamana Lanka

Dhanya dhanaya neka mal palaturu piri jaya bhoomiya ramya

Apa hata sepa siri setha sadana jeewanaye matha

Piliganu mena apa bhakthi pooja Namō Namō Matha

Apa Sri Lanka Namō Namō Namō Namō Matha

Oba we apa vidya

Obamaya apa sathya

Oba we apa shakthi

Apa hada thula bhakthi

Oba apa aloke

Apage anuprane

Oba apa jeevana we

Apa mukthiya oba we

Nava jeevana demine, nithina apa pubudukaran matha

Gnana veerya vadawamina regena yanu mana jaya bhoomi kara

Eka mavakage daru kela bevina

Yamu yamu vee nopama

Prema vada sema bheda durerada

Namō, Namō Matha

Apa Sri Lanka Namō Namō Namō Namō Matha

ஈபி வெலு லீக மலகனெ டுரவெர்
லீக தீவசெகி வெசெனா
லீக பாரகி லீக ருடீரெச வெ
ஈப கெச துல டுலனா

லீகலீகி ஈபி வெலு சூசூரூ சூசூரூசூர்
லீக ரெச லீகி வரகெனா
லீகலீகி லீக ஈப மெம தீவசூ
சூசூரூ சூசூரூ டுல வெ

சூசூரூ ம மெந் கரூனா குனெகி
வெலூ சூசூரூ டுல
ரூந் மீனி மூலு னா வ லீக ம ட சூசூரூ
கிசூ கரூ னாம டுரனா

ஈபனீடு சூசூரூசூர்

ஒரு தாய் மக்கள் நாமாவோம்
ஒன்றே நாம் வாழும் இல்லம்
நன்றே ஁டலில் ஁டும்
ஒன்றே நம் குருதி நிறம்

஁தனால் சகூதரர் நாமாவோம்
ஒன்றாய் வாழும் வளரும் நாம்
நன்றாய் இவ் இல்லினிலே
நலமே வாழ்தல் வேண்டுமன்றோ

யாவரும் ஁ன்பு கருணையுடன்
஁ற்றுமை சிறக்க வாழ்ந்தீடுதல்
பொன்னும் மணியும் முத்துமல்ல - ஁துவே
யான்று மழியாச் செல்வமன்றோ.

஁னந்த சமரக்கூகூன்
கவிதையின் பெயர்ப்பு.



Being innovative, changing with right knowledge
Be a light to the country as well as to the world.

Message from the Hon. Minister of Education

The past two decades have been significant in the world history due to changes that took place in technology. The present students face a lot of new challenges along with the rapid development of Information Technology, communication and other related fields. The manner of career opportunities are liable to change specifically in the near future. In such an environment, with a new technological and intellectual society, thousands of innovative career opportunities would be created. To win those challenges, it is the responsibility of the Sri Lankan Government and myself, as the Minister of Education, to empower you all.

This book is a product of free education. Your aim must be to use this book properly and acquire the necessary knowledge out of it. The government in turn is able to provide free textbooks to you, as a result of the commitment and labour of your parents and elders.

Since we have understood that the education is crucial in deciding the future of a country, the government has taken steps to change curriculum to suit the rapid changes of the technological world. Hence, you have to dedicate yourselves to become productive citizens. I believe that the knowledge this book provides will suffice your aim.

It is your duty to give a proper value to the money spent by the government on your education. Also you should understand that education determines your future. Make sure that you reach the optimum social stratum through education.

I congratulate you to enjoy the benefits of free education and bloom as an honoured citizen who takes the name of Sri Lanka to the world.

Akila Viraj Kariyawasam
Minister of Education

Foreword

The educational objectives of the contemporary world are becoming more complex along with the economic, social, cultural and technological development. The learning and teaching process too is changing in relation to human experiences, technological differences, research and new indices. Therefore, it is required to produce the textbook by including subject related information according to the objectives in the syllabus in order to maintain the teaching process by organizing learning experiences that suit to the learner needs. The textbook is not merely a learning tool for the learner. It is a blessing that contributes to obtain a higher education along with a development of conduct and attitudes, to develop values and to obtain learning experiences.

The government in its realization of the concept of free education has offered you all the textbooks from grades 1-11. I would like to remind you that you should make the maximum use of these textbooks and protect them well. I sincerely hope that this textbook would assist you to obtain the expertise to become a virtuous citizen with a complete personality who would be a valuable asset to the country.

I would like to bestow my sincere thanks on the members of the editorial and writer boards as well as on the staff of the Educational Publications Department who have strived to offer this textbook to you.

W. M. Jayantha Wickramanayaka,
Commissioner General of Educational Publications,
Educational Publications Department,
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2019.04.10

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1

Preparation of Computer Specifications

Activity 1.1



Select the most suitable expression from the list of expressions given, to fill the blanks.

List of expressions

- | | |
|-----------------------|----------------------|
| ① Server computer | ④ Laptop computer |
| ② Desktop computer | ⑤ Mobile smart phone |
| ③ All-in-one computer | ⑥ Tablet computer |

- The can be used in a single location such as home or office.
- The is dedicated to provide respective services in a network.
- The has a comparatively large screen and can be taken from place to place
- Mobile computers, the student can use for and surfing Internet reading, storing information, refer electronic dictionaries are (i) and (ii)
- The cannot be taken from place to place, use least space and have several peripheral devices connected to the monitor.

Activity 1.2



Name the peripheral devices in the image below. Use the number for the expressions given in the list.

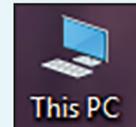
- | | | |
|------------|--------------|--------------|
| ① Monitor | ④ Head phone | ⑦ Mouse |
| ② Printer | ⑤ Scanner | ⑧ Web camera |
| ③ Keyboard | ⑥ Speaker | |



Activity 1.3



Right click on the "This PC" icon and select "Properties" to check the specifications of the processor.



System

Control Panel > All Control Panel Items > System

Control Panel Home

View basic information about your computer

Windows edition
Windows 10 Pro
© 2017 Microsoft Corporation. All rights reserved.

System

Processor: Intel(R) Core(TM) i5-5200U CPU @ 2.20GHz 2.20 GHz

Installed memory (RAM): 4.00 GB

System type: 64-bit Operating System

Pen and Touch: No Pen or Touch Input

Computer name, domain, and workgroup settings

Computer name: DESKTOP-OJ6G388

Full computer name: DESKTOP-OJ6G388

Computer description:

Workgroup: WORKGROUP

Main memory
4 GB

Manufacturer - (Intel)
CPU type - (Core i5)
CPU speed - (2.2 GHz)

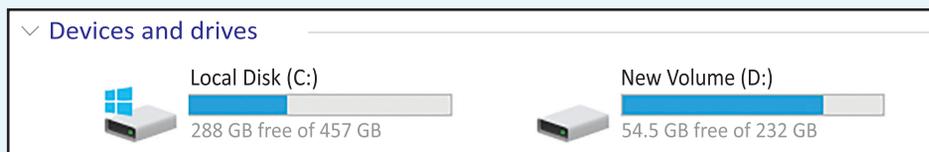
Examine the processor of a few computers and complete the table given below.

Name of manufacturer	Type of processor	Speed (in units)

Activity 1.4



Calculate the capacity of the hard disk. To check the hard disk capacity, double click on the icon 'This PC'. Hard disk is shown as "Local Disk" under "Devices and Drives". Sometimes local disk is divided into two as local disk C: and local disk D:. The capacity for both are taken together to calculate the hard disk capacity.



Compare the hard disk capacity of several computers.

Activity 1.5



Examine the capacity of the Random Access Memory (RAM) in a few computers and compare them.

Activity 1.6



Study the specifications given in the following table. Answer the questions that follow.

Central Processing Unit	Intel® Core™ i7 3.70 GHz
Random Access Memory	4 GB
Hard disk capacity	2 TB
Computer screen	18.5"
Computer system	Windows 10
Guarantee period	3 years
Price	Rs 75000.00

1. State 3 technical specifications of the computer.
2. Give 2 non-technical specifications when buying a computer.
3. Give the speed of the processor.
4. State the type of the processor.
5. Find the capacity of the main memory.
6. Give the capacity of the hard disk.
7. State the size of the screen.
8. Compare the technical specifications given above with those of some other computer in your school or in another place.

Activity 1.7



By considering the important points in buying a computer, fill in the blanks in the statements given below by selecting the relevant term from the given list.

1. The speed of the processor is given in
2. It is better to select a monitor in size and consumes electricity.
3. The capacity of a main memory is given in
With an extended period of warranty, the cost of a computer
4. The capacity of a hard disk is measured in
5. The capacity of main memory is than the capacity of a hard disk.

List of expressions

(less, GB, large, GHz, Terra Byte (TB), less, goes up)

Activity 1.8



Given below are technical specifications about two computers A and B. Compare them and answer the questions that follow.

Specifications	Computer A	Computer B
Processor	Intel® Core™ i3 2.40 GHz	AMD® Core 2.0 GHz
Main memory capacity	4 GB	2 GB
Hard disk capacity	1 TB	500 GB
Size and type of monitor	19.5" LED	17 " CRT
Operating system	Windows 10	Ubuntu
Period of warranty	1 Year	3 Years
Price	Rs. 65000.00	Rs. 58000.00

1. Who is the manufacturer of the processor in the computer B?
2. Which computer has a main memory with a higher capacity?
3. Which computer has the larger screen?
4. Which computer has a hard disk with a lesser storage capacity?
5. Give three possible reasons for computer A to cost more.
6. State two non-technical specifications.

Activity 1.9



Classify the peripherals that can be connected to the USB port as input, output and storage.

Input devices	Output devices	Storage devices

Activity 1.10



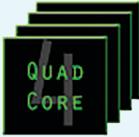
Refer Figure 1.19 in textbook to find answers to the following questions.

- a. List out technical specifications other than those mentioned.
- b. List out other non-technical specifications than the ones mentioned.

Activity 1.11



- In order to prepare specifications for a computer you wish to purchase, complete the given table on the next page using the relevant data from the following table.

Device	Type	Speed	Price
Processor		2.4 GHz	4000.00
		3.2 GHz	6000.00
		1.8 GHz	8000.00
		2.4 GHz	10000.00
		1.6 GHz	12000.00
		2.2 GHz	14000.00
Hard disk	HDD 	500 GB	3000.00
		1 TB	5000.00
	SSD 	120 GB	4000.00
		240 GB	6000.00
Monitor		17"	15000.00
		19"	17000.00
		21"	20000.00

Memory		512 MB	2000.00
		1 GB	3000.00
		4 GB	6000.00
Video Graphic Adapter (VGA)	Onboard 	VGA	No extra cost
		DIV	No extra cost
		HDMI	No extra cost
	Separate 	VGA	1000.00
		DIV with VGA	1500.00
		HDMI with VGA and DVI	2000.00
Sound card	Onboard		No extra cost
	Separate 		800.00

Item	Specifications	Price
Processor		
Capacity of main memory		
Hard disk capacity		
Size of monitor		
Video Graphic Adapter		
Sound card		
Warranty		
Total		

2. Fill in the table below with the lowest values.

Peripheral unit	Specifications	Price
Processor		
Main memory capacity		
Hard disk capacity		
Size of monitor		
Video Graphic Adapter	Separate	
Sound card	Separate	
Warranty	1 year	
Total		

3. Compare the given technical specifications for 2 computers A and B with the requirements. Select the better computer for purchase.

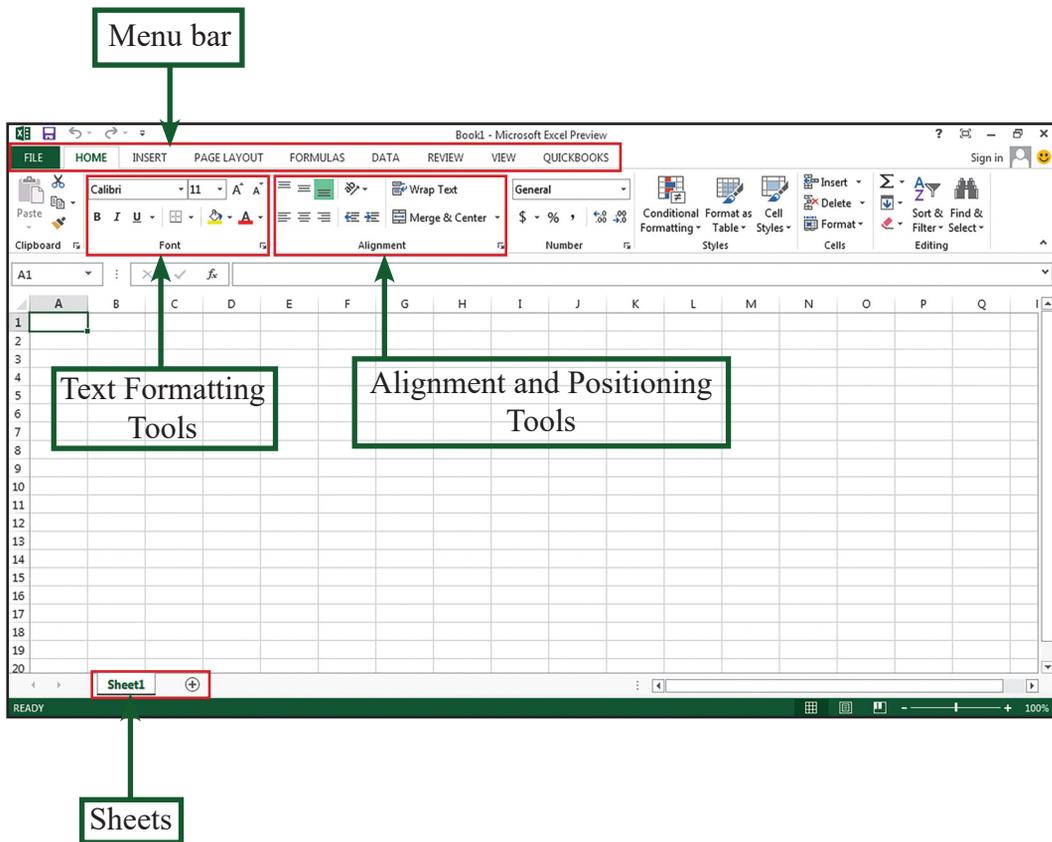
Item	Required specification	Computer - A	Computer - B
Processor	Quad Core 1.6 GHz	Dual Core 2.8 GHz	Quad Core 1.8 GHz
Main memory capacity	4 GB	2 GB	4 GB
Hard disk capacity	2 TB	1 TB	2 TB
Size of monitor	19"	21"	19"
Audio/video adapter	separate	onboard	separate
Sound card	separate	separate	onboard
Computer system	Windows 8	DOS	Windows 10
Guarantee	3 Years	2 Years	3 Years

4. With the assistance from your teacher, find the market price of the components for the computer you have selected above. Hence calculate the total price of the computer.

2

Electronic Spreadsheets

Open the spreadsheet software installed in your computer. Get to know a few tools on the Graphical User Interface.



Activity 2.1



Let us work on spreadsheet

When a spreadsheet software is opened, a worksheet appears.

1. To open a new worksheet, click on 'New sheet'



2. To give a different name for the worksheet:

- Take mouse to and right click on it.
- Select re-name. Type name and press 'Enter'.

3. To remove worksheet:

- Right click mouse on name of worksheet. Select 'Delete'.

Activity 2.2



Enter data into worksheet

A children's society decided to collect funds to purchase sports items for its students. They issued cards to fill boxes for the purpose.

The details about the money collected during the weekend, money collected by each student, the balance after deducting Rs. 50/= at the printing cost are entered to a worksheet. The worksheet is shown in the following page.

	A	B	C	D	E	F	G
1	No	Name	Saturday	Sunday	Total	Printing	Balance
2	1	Sugath	Rs 250.00	Rs 340.00	Rs 590.00	Rs 50.00	Rs 540.00
3	2	Neela	Rs 450.00	Rs 423.00	Rs 873.00	Rs 50.00	Rs 823.00
4	3	Prabath	Rs 300.00	Rs 567.00	Rs 867.00	Rs 50.00	Rs 817.00
5	4	Mahesh	Rs 200.00	Rs 345.00	Rs 545.00	Rs 50.00	Rs 495.00
6	5	Shereen	Rs 290.00	Rs 234.00	Rs 524.00	Rs 50.00	Rs 474.00
7	6	Kaveesha	Rs 500.00	Rs 100.00	Rs 600.00	Rs 50.00	Rs 550.00
8	7	Lankesh	Rs 650.00	Rs 77.00	Rs 727.00	Rs 50.00	Rs 677.00
9	8	Jagath	Rs 350.00	Rs 45.00	Rs 395.00	Rs 50.00	Rs 345.00
10	9	Suresh	Rs 200.00	Rs 123.00	Rs 323.00	Rs 50.00	Rs 273.00
11	10	Sagarika	Rs 150.00	Rs 432.00	Rs 582.00	Rs 50.00	Rs 532.00
12	11	Menaka	Rs 130.00	Rs 234.00	Rs 364.00	Rs 50.00	Rs 314.00
13	12	Gayan	Rs 455.00	Rs 265.00	Rs 720.00	Rs 50.00	Rs 670.00
14	13	Pabath	Rs 230.00	Rs 324.00	Rs 554.00	Rs 50.00	Rs 504.00
15	14	Hemash	Rs 160.00	Rs 245.00	Rs 405.00	Rs 50.00	Rs 355.00
16	15	Kanthi	Rs 150.00	Rs 320.00	Rs 470.00	Rs 50.00	Rs 420.00

Let us create the spreadsheet shown above:

- Step 1 - On Sheet 1, type the titles as No, Name, Saturday and Sunday and other relevant information.
- Step 2 - Change the name of the worksheet as “Weekend Collection”.
- Step 3 - Save worksheet in your computer.

Let us save the file

- Select File → Save.
- From ‘Save in’, select a suitable location.
- Type a suitable file name as "Collection".
- Click "Save" button.

At the end of each action, save the document.

Activity 2.3



Find total collection during the weekend from each child

- In spreadsheets, formulas are used in calculations.
- "=" Symbol is used before any formula.
- In a formula, cell name (instead of cell contents) is used.
- Symbols such as +, -, *, / on keyboard are used in calculations between cells.
- The result is displayed by clicking the 'Enter' key after each formula.

Step 1 - In cell E1, type "Total"

Step 2 - Click E2 cell, which is in front of the name of the first student.

	A	B	C	D	E	F
1	No	Name	Saturday	Sunday	Total	
2	1	Sugath	250	340		



Step 3 - Type the formula below in the cell and click 'Enter'.

=C2+D2

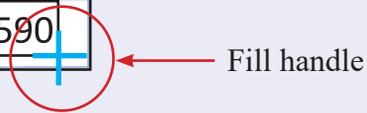
The formula used to obtain the first result can be copied accordingly in order to obtain the total for other students:

Method 1

Step 1 - Click the cell with the total already obtained.

Step 2 - Move the mouse pointer to the right hand side corner at the bottom of the square. A small cross known as 'Fill handle' will be displayed now.

Saturday	Sunday	Total
250	340	590



Step 3 - Click the mouse on the 'File Handle'. Keeping the mouse clicked drag to E 16; the last student and release.

Step 4 - Then the total of each student will be obtained separately.

Method 2

Step 1 - Click on cell with first total.

Step 2 - Click 'Home' → 'Copy' in the menu.

Step 3 - Keeping mouse clicked, select cell range for totals.

Step 4 - Click 'Home' → 'Paste' on menu.

Step 5 - The total for each student appears.

Step 6 - Once complete, save the document.

Activity 2.4



Find balance after deducting Rs 50/= from each student

Step 1 - In cell F1, type "Printing". In cell G1, type "Balance". In column F, the cell after "Printing" type 50. Use "Fill Handle" and cover the rest of the list.

F
Printing
50
50
50
50
50
50
50

Step 2 - Click mouse on cell G2. Type the formula given below and press Enter.

=E2-F2

Step 3 - To find the balance for other students, use “Fill Handle” or 'Copy → Paste'

Save the file after each activity.

Activity 2.5



Let us format the worksheet

Some formatting have been done to the above document. They are as follows;

1. There is a border around the cells.
 - Select cell range to add border by clicking the mouse (A1:A16).
 - In menu, under 'Home' ribbon, click on Borders  and select all borders.
2. The cells are coloured to make them clearer.
 - Use the mouse to select the cell range to add colours.
 - In Menu, under 'Home', Click on 'Fill color'  to select suitable colours.
3. Boldface headings.
 - Select the headings. In Menu, under 'Home', Click on .

4. Date and Information in the cells are aligned.

- To align, select cell range for alignment using the mouse.

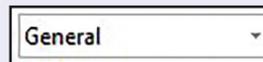
- In Menu, under 'Home', Click on the tools for alignment.



5. Use the number format to show the data as currency unit.

- Select the cell range for number formatting using the mouse.

- In Menu, under 'Home', click on the tool and select 'Currency'.



- At the end of each action, save the document.



Note - If the currency unit is not in 'Rupees, follow the steps given below;

Control panel → 'Region' → 'Formats' → 'Additional settings' → 'Currency'. Change the Currency symbol in the currency ribbon to Rs. and select 'Apply' and then 'Ok'

Create a new worksheet

Obtain a new worksheet and create the following document. Use formula for calculations. Do the necessary formatting.

- File → New → Blank Workbook → Create

	A	B	C	D	E	F	G	H	I	J	K
1	ABC Stationaries Stock information										
2	Item No	Item	Stock	Sold	Balance	Replacement 1	Total	Packeted	No of Packs	Packets per week	Grand total
3	1	Pencils	80	23	57	100	157	10	15.7	7	109.9
4	2	Pens	45	43	2	150	152	10	15.2	7	106.4
5	3	Erasers	45	23	22	300	322	10	32.2	7	225.4
6	4	Books	34	43	-9	200	191	10	19.1	7	133.7
7	5	Bags	67	23	44	50	94	10	9.4	7	65.8
8	6	Colours	87	54	33	300	333	10	33.3	7	233.1
9	7	Bottles	67	23	44	250	294	10	29.4	7	205.8
10	8	Boxes	54	64	-10	200	190	10	19	7	133
11	9	Toffees	78	43	35	300	335	10	33.5	7	234.5
12	10	Baloon	90	56	34	400	434	10	43.4	7	303.8
13											

Formula for calculations

- ▲ Balance = Stock - Sold
=C3-D3
- ▲ Total = Balance+Replacement1
=E3+F3
- ▲ No. of packets = Total/Packeted
=G3/H3
- ▲ Grand Total = Number of Packets * Packets per week
=I3*J3

Tools for formatting ;

1. Boldface
2. Alignment
3. Adding colours to cell range
4. Using borders
5. Inserting a row above the worksheet. Data and information are center aligned.

Inserting row/column and merge and center

1. Click the right mouse button on column/row. Click 'Insert' → 'Enter row'.
2. In the new row obtained on the top, type the text you want and click 'Merge and Center'. 

This tool enables merge two or more cells and center align the entered data.

Activity 2.6



Let us create a mark sheet

MarkSheet 2018									
No	Name	Subject 1	Subject 2	Subject 3	Subject 4	Subject 5	Total	Average	
1	Kasun	56	45	24	78	89	292	58.4	
2	Seetha	ab	45	ab	98	87	230	76.667	
3	Kanthi	ab	ab	78	59	87	224	74.667	
4	Gayani	89	76	76	76	76	393	78.6	
5	Deepal	78	77	67	96	ab	318	79.5	
6	Naseem	67	ab	ab	56	69	192	64	
7	Thanuka	56	45	24	78	89	292	58.4	
8	Bimalka	ab	67	23	56	ab	146	48.667	
9	Thiwanga	54	65	78	65	ab	262	65.5	
10	Pradeepa	56	45	24	78	ab	203	50.75	
Maximum Marks		89	77	78	98	89			
Minimum Marks		54	45	23	56	69			
No of Present Students		7	8	8	10	6			
No of Students in class		10	10	10	10	10			

Tools for formatting;

1. Boldface letters and numbers
2. Alignment
3. Add colours to cell ranges
4. Adding borders
5. Inserting a row on the top of the worksheet, centre aligning and merging data in a cell range
6. Orientation - changing direction of letters

Orientation - changing direction of letters

Step 1 - Before orientation, space between columns and rows need increasing.

To increase the space drag mouse as shown, among column and rows. If it is a column, drag the clicked mouse to right. If it is a row, drag the clicked mouse down.

	A	B	C
1			

	A
1	
2	
3	
4	

- Step 2 - Select cells to be changed orientation. Click on arrow for orientation icon.  Select required direction.
- Step 3 - Change the name of the worksheet to “Mark Sheet”.
(Sheet 1 → Mark Sheet)
- Step 4 - Save the created workbook as "First term marks - 1" and close the workbook.

Activity 2.7



Using functions

To calculate the values in a range of cells, functions are used. After the "=" symbol, to begin a formula, the function is included. Then the cell range is included within brackets. To indicate that it is a cell range, the names of the first cell and the last cell are written within and the symbol ":".

Let us identify a few such functions;

To calculate the total sum in a cell range
= sum(first cell:last cell).

To find the average in a cell range,
= average(first cell:last cell).

To count the cells with numbers only
= count(first cell:last cell).

To count cells with data in a cell range, use
= counta(first cell:last cell).

Let us use the relevant functions in the worksheet created above.

Open “Mark Sheet 1” that you created and saved earlier.

- File → Open → First term marks - 1 → Open

Use the following functions, complete the Mark sheet 1.

=sum(C3:G3)

=average(C3:G3)

=max(C3:C12)

=min(C3:C12)

=count(C3:C12)

=counta(C3:C12)

Saving preserved file in a different name

- Select 'File' → 'Save as'
- Select a saving location from 'Save in'.
- In front of file name, type a suitable name "First term mark - 2"
- Click 'Save' button.

Activity 2.8



Sorting

MarkSheet 2018								
No	Name	Subject 1	Subject 2	Subject 3	Subject 4	Subject 5	Total	Average
3	Gayani	89	76	76	76	76	393	78.6
4	Deepal	78	77	67	96	ab	318	79.5
5	Kasun	56	45	24	78	89	292	58.4
6	Thanuka	56	45	24	78	89	292	58.4
7	Thiwanga	54	65	78	65	ab	262	65.5
8	Seetha	ab	45	ab	98	87	230	76.667
9	Kanthi	ab	ab	78	59	87	224	74.667
10	Pradeepa	56	45	24	78	ab	203	50.75
11	Naseem	67	ab	ab	56	69	192	64
12	Bimlaka	ab	67	23	56	ab	146	48.667
Maximum Marks		89	77	78	98	89		
Minimum Marks		54	45	23	56	69		
No of Present Students		7	8	8	10	6		
No of Students in class		10	10	10	10	10		

Sorting data according to total marks obtained

MarkSheet 2018								
No	Name	Subject 1	Subject 2	Subject 3	Subject 4	Subject 5	Total	Average
1	Bimlaka	ab	67	23	56	ab	146	48.667
2	Deepal	78	77	67	96	ab	318	79.5
3	Gayani	89	76	76	76	76	393	78.6
4	Kanthi	ab	ab	78	59	87	224	74.667
5	Kasun	56	45	24	78	89	292	58.4
6	Naseem	67	ab	ab	56	69	192	64
7	Pradeepa	56	45	24	78	ab	203	50.75
8	Seetha	ab	45	ab	98	87	230	76.667
9	Thanuka	56	45	24	78	89	292	58.4
10	Thiwanga	54	65	78	65	ab	262	65.5
Maximum Marks		89	77	78	98	89		
Minimum Marks		54	45	23	56	69		
No of Present Students		7	8	8	10	6		
No of Students in class		10	10	10	10	10		

Sorting data in the alphabetical order (A.....Z) / (ZA)

Data can be sorted according to our requirements. First, the cell range needs selecting. Select all cells in range leaving out only the cells with the titles.

Next, click 'Sort Filter'  in the 'Home' menu.

Select 'sort A to Z' or 'sort Z to A'.

Activity 2.9



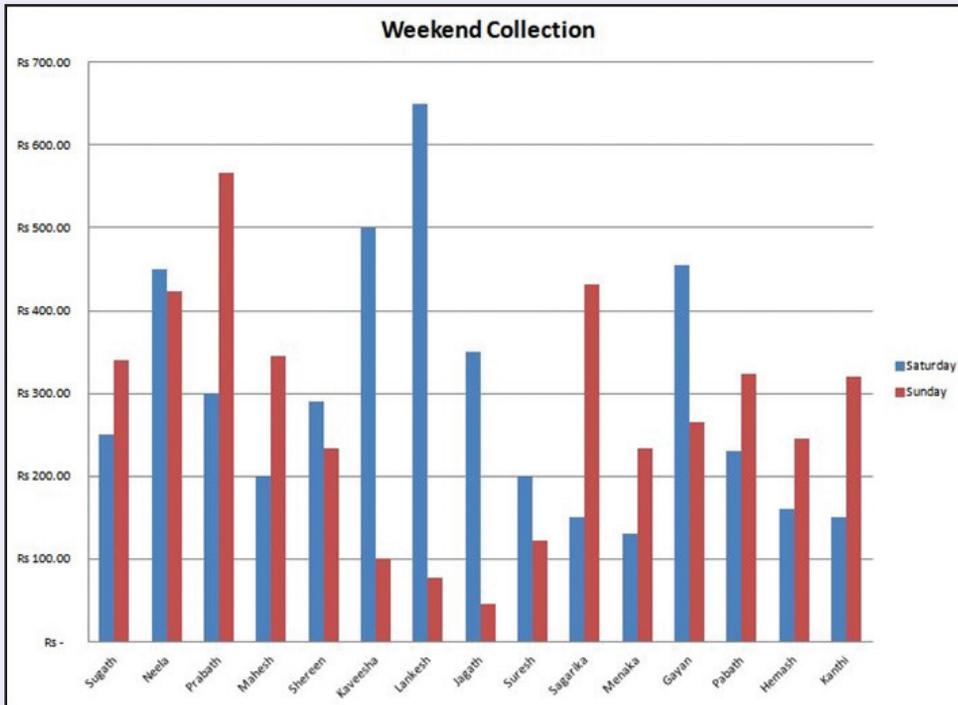
Step 1 - Open the document “Collection” created in Activity 2.2.

Using the information in this document, select the required cell range to create graphs.

	A	B	C	D	E	F	G
1	No	Name	Saturday	Sunday	Total	Printing	Balance
2	1	Sugath	Rs 250.00	Rs 340.00	Rs 590.00	Rs 50.00	Rs 540.00
3	2	Neela	Rs 450.00	Rs 423.00	Rs 873.00	Rs 50.00	Rs 823.00
4	3	Prabath	Rs 300.00	Rs 567.00	Rs 867.00	Rs 50.00	Rs 817.00
5	4	Mahesh	Rs 200.00	Rs 345.00	Rs 545.00	Rs 50.00	Rs 495.00
6	5	Shereen	Rs 290.00	Rs 234.00	Rs 524.00	Rs 50.00	Rs 474.00
7	6	Kaveesha	Rs 500.00	Rs 100.00	Rs 600.00	Rs 50.00	Rs 550.00
8	7	Lankesh	Rs 650.00	Rs 77.00	Rs 727.00	Rs 50.00	Rs 677.00
9	8	Jagath	Rs 350.00	Rs 45.00	Rs 395.00	Rs 50.00	Rs 345.00
10	9	Suresh	Rs 200.00	Rs 123.00	Rs 323.00	Rs 50.00	Rs 273.00
11	10	Sagarika	Rs 150.00	Rs 432.00	Rs 582.00	Rs 50.00	Rs 532.00
12	11	Menaka	Rs 130.00	Rs 234.00	Rs 364.00	Rs 50.00	Rs 314.00
13	12	Gayan	Rs 455.00	Rs 265.00	Rs 720.00	Rs 50.00	Rs 670.00
14	13	Pabath	Rs 230.00	Rs 324.00	Rs 554.00	Rs 50.00	Rs 504.00
15	14	Hemash	Rs 160.00	Rs 245.00	Rs 405.00	Rs 50.00	Rs 355.00
16	15	Kanthi	Rs 150.00	Rs 320.00	Rs 470.00	Rs 50.00	Rs 420.00

Graph 1

Weekend collection of each child is shown in a column graph.



Create column graph

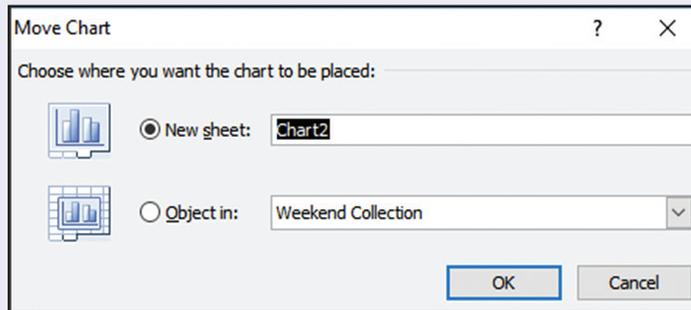
Step 1 - Select the cell range by clicking the mouse on B2:D16.

Step 2 - Click on  in Insert ribbon.

Step 3 - Select a suitable graphs from the list and click on it.

Graphs are always created on the worksheet in which the relevant information is available. Therefore, the graphs have to be taken to “Chart Sheets”. Follow the steps given below for that;

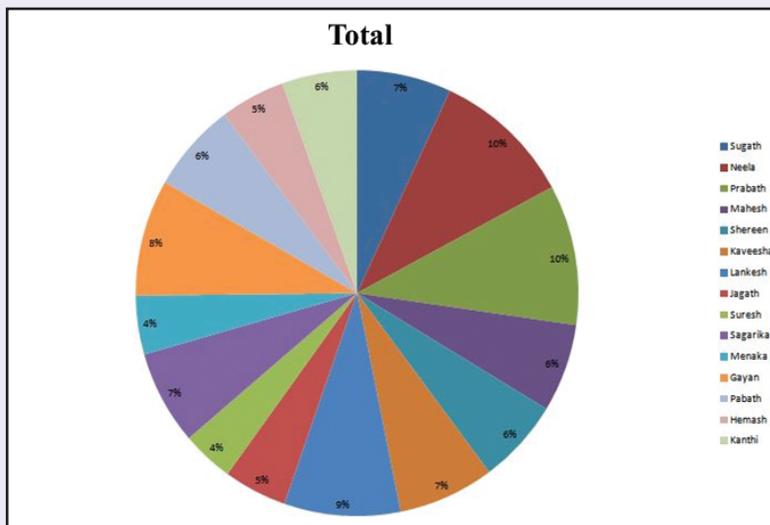
- Step 1 - Click on graph created in the worksheet.
- Step 2 - Click on "Move Chart Location" in the 'Design' ribbon
- Step 3 - In the Move Chart dialogue box, click New Sheet → OK.



- Step 4 - To add a title to the graph.
In the 'Design' ribbon use 'Quick Layout'.
- Step 5 - Select 'Change colours' to add colours to the graph.

Graph 2

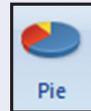
The graph below shows the collection of each child as a percentage in a Pie chart.



Let us create a pie chart

The cell range for pie chart is the cell range of names (B2:B16) and the total (E2:E16). These cell ranges are not adjoining. Let us select the cell ranges first.

- Step 1 - Select cell range (B2:B16) with the names of the children.
- Step 2 - Pressing the ctrl key on keyboard, select the cell range for totals (E2:E16)
- Step 3 - Click on Pie chart tool in the Insert ribbon.
- Step 4 - Select a suitable graph form the list and click on it.
- Step 5 - Take graph to another graph sheet.
- Step 6 - Do the necessary formatting. Save the document and close it.



Activity 2.10



Create graphs using other information in the table.



Note well : Before crating graphs using information in First term marks 2 enter marks for absent students as well.

3

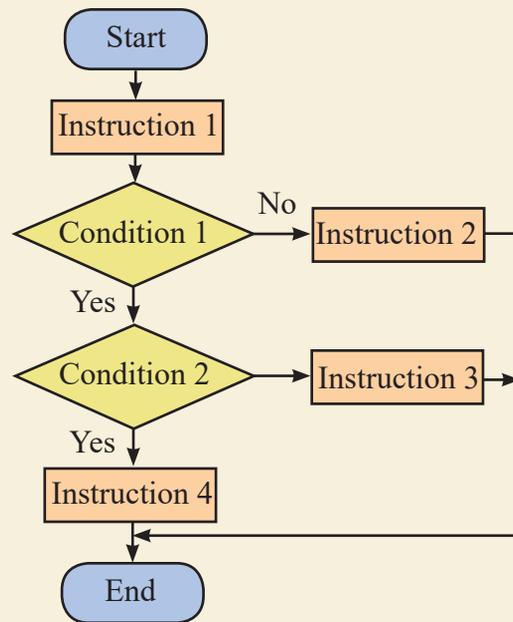
Programming

Activity 3.1



By referring to the flowchart, indicate whether the given statements are 'true' or 'false'.

- a) Condition 1 in the flowchart is executed first. (True/ False)
- b) Instruction 1 does not execute under any condition. (True/ False)
- c) Condition 1 is executed after Instruction 1. (True/ False)
- d) Execution of Instruction 3 depends only on condition 2. (True/ False)



- e) For Instruction 4 to be executed, both condition 1 and condition 2 must be true. (True/ False)
- f) Whatever the outcomes of the conditions may be, Instruction 1 and one another instruction will be executed. (True/ False)

As mentioned in the Information and Communication Technology, Grade 7 Reading book, download the scratch software from <http://www.scratch.mit.edu>

Activity 3.2



Consider that, a school has four houses namely Metta, Karuna, Muditha and Upeksha. A flowchart to assign students to their houses is given below. Houses are assigned based on the remainder after dividing the admission number by 4.

Remainder	House
0	Metta
1	Karuna
2	Muditha
3	Upeksha

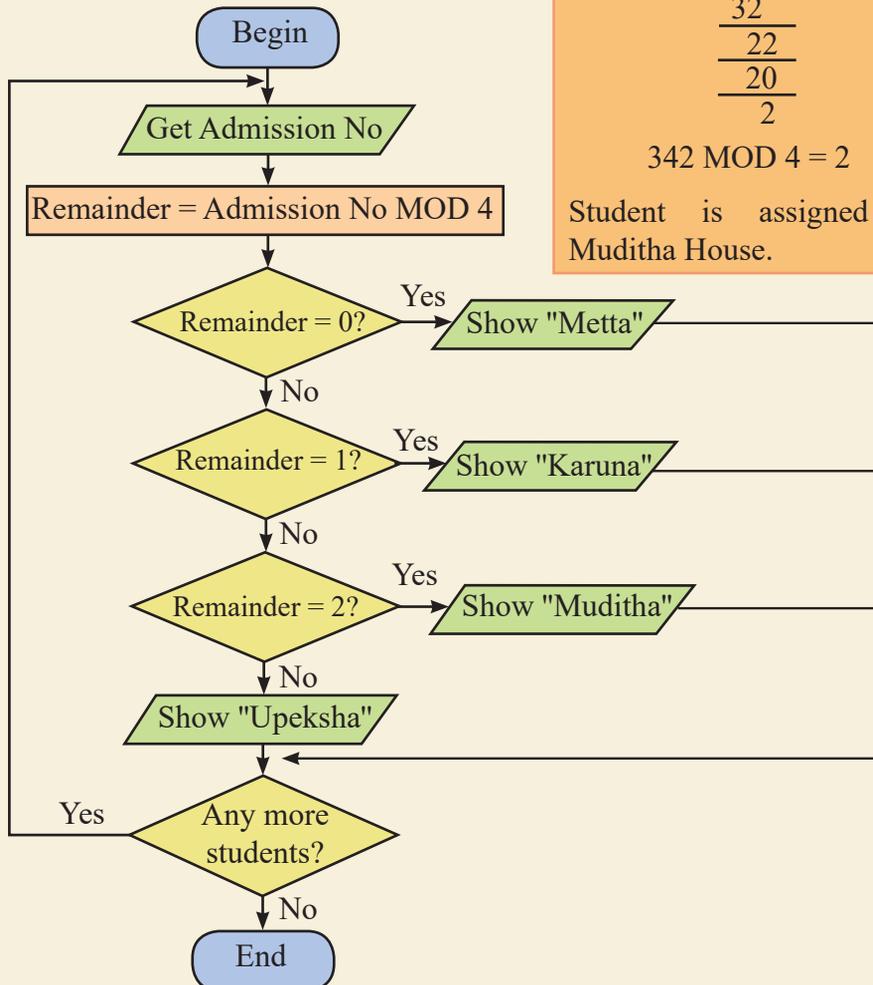
Here, the remainder is obtained by dividing the Admission No. by 4.

e.g. - Admission No. = 342

$$\begin{array}{r} 85 \\ 4 \overline{)342} \\ \underline{32} \\ 22 \\ \underline{20} \\ 2 \end{array}$$

$$342 \text{ MOD } 4 = 2$$

Student is assigned to Muditha House.



Answer the following questions.

1. A number that cannot exist as a remainder

- 1) 0 2) 2 3) 3 4) 4

2. A suitable remainder for a student assigned to Upeksha House is:

- 1) 3 2) 2 3) 1 4) 0

3. How many conditions are there in this flowchart?

- 1) 1 2) 2 3) 3 4) 4

The Scratch program to divide all students in the school into houses is shown below. Connect with arrows the instructions relevant for blank spaces.

The image shows a Scratch script on the left and four 'say' blocks on the right. The script starts with 'when green flag clicked', followed by 'ask How many students? and wait', 'set Number of students to answer', and a 'repeat' loop for 'Number of students'. Inside the loop, it asks 'What is the admission number? and wait', sets 'Remainder to answer mod 4', and uses a series of 'if-then-else' blocks to check for remainders 0, 1, and 2. The 'say' blocks on the right are: 'say Muditha House for 2 secs', 'say Metta House for 2 secs', 'say Karuna House for 2 secs', and 'say Upeksha House for 2 secs'.

Activity 3.3

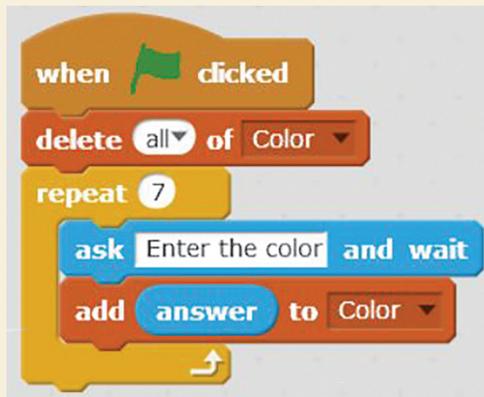


Develop a Scratch program to divide the students in your school into houses.

Activity 3.4



1. Develop a program with an array to enter 5 subjects learnt in Grade 9.
2. Construct a suitable program based on an array to output seven days of the week. Name the Array as “day”.
3. Find answers based on the array called “color” shown below.



4. How many times the above program is repeated when it is executed?
5. How many colors can be assigned to the array “color”?
6. Select the suitable statements and match them with the instructions given below.

a) To delete all the items in the array.



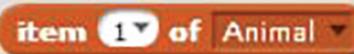
b) Number of items in the array



c) The first item in the array



d) Entering items into the array.



4

Use of Microcontrollers

Activity 4.1



Make a list of equipment in everyday use that can collect data from sensors and controlled by a microcontroller.

e.g. -

- Device to detect people or animals entering to a farm secretly
- Device to detect elephants entering to villages

Activity 4.2



Make a list of advantages of using microcontrollers.

Activity 4.3



Connect the micro:bit module to the computer and use the Block Editor to code the following items using block.

When a new project is obtained, the following two blocks are displayed.

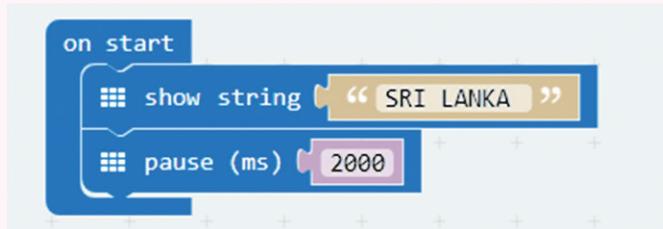


Get 'show string' from 'Basic' and connect it to 'on start' and change it to Sri Lanka.



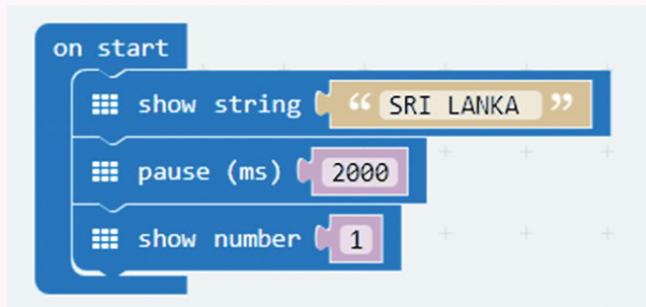
```
on start
  show string "SRI LANKA"
```

Get 'pause' from 'Basic'. Connect it to 'show string' and change it to 2000.



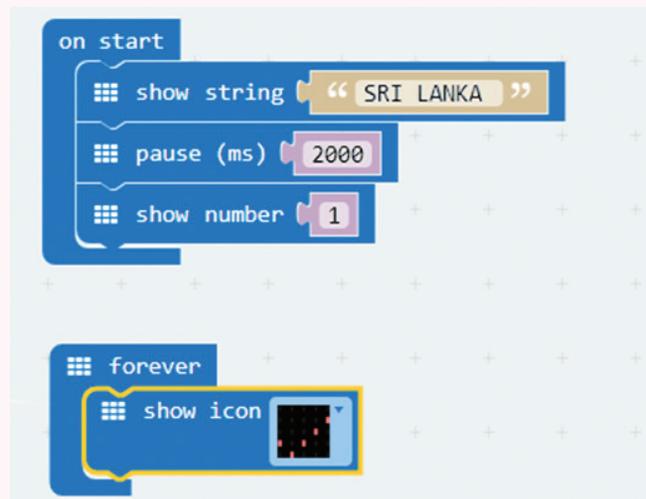
```
on start
  show string "SRI LANKA"
  pause (ms) 2000
```

Get 'show number' from 'Basic'. Connect it to 'pause' and change it to 1.



```
on start
  show string "SRI LANKA"
  pause (ms) 2000
  show number 1
```

Get 'show icon' from 'Basic'. Connect it to 'forever' and change to the symbol '√'



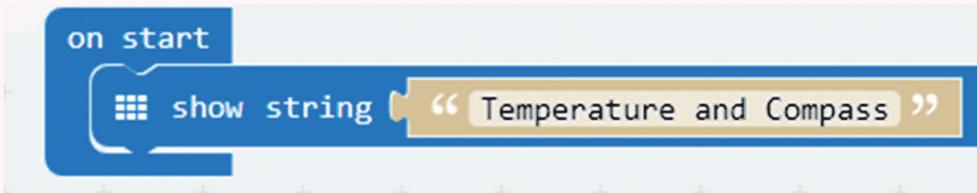
```
on start
  show string "SRI LANKA"
  pause (ms) 2000
  show number 1

  forever
    show icon
```

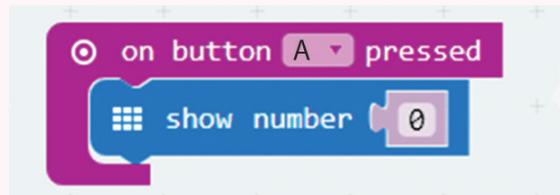
Download the codes to the computer arranged above, install them in the micro:bit module and observe the objects.

Experiment 2 - Connect to the micro:bit module and use the micro:bit Block Editor to do the coding using the blocks.

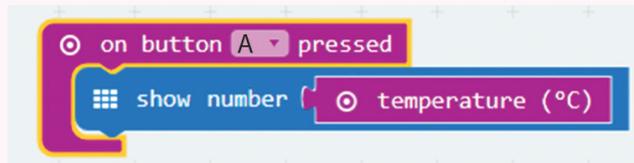
Get 'show string' into 'on start'. Change to temperature and compass.



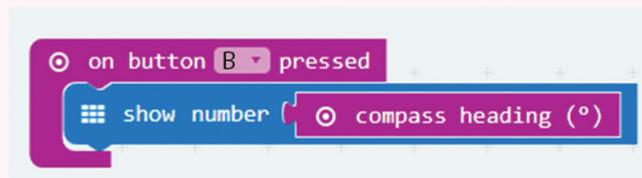
Get 'on button A pressed' in the Input menu and include the Block 'show number'.



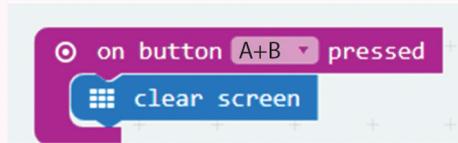
Get 'Temperature' from the Input menu into 'show number'.



Get 'on button A pressed' from the Input menu and change it as B. Get 'show number' into it. Next, get 'compass heading' from the Input menu and include it in 'show number'.

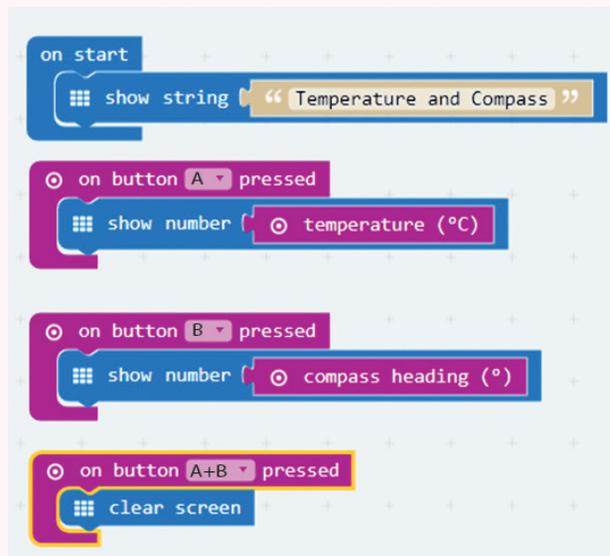


Get 'on button A pressed' from the Input Menu and change it to A+B. Include 'clear screen' into it by getting from Basic Menu.



The arrangement is as shown below;

Download the above coding. Install in micro:bit module. Observe the output by pressing the buttons A and B separately and both buttons together.



Activity 4.4



Entering data into microcontroller chip in Arduino Board

The Arduino board must be connected to the computer as shown. Enter the programs constructed using the Arduino programming language into the microcontroller chip of the Arduino board.

Arduino Programming Language is an Open Source software and the user is allowed to modify the program decoding to his/her requirements.



The cable connecting the Arduino Board to the computer has USB at one end and miniUSB at the other. The USB is connected to the computer and the miniUSB is connected to the Arduino Board.

Software used to program the microcontroller chip in the Arduino Yuno Board

The software known as Arduino is used for the purpose. It can be downloaded from the website www.arduino.cc when it is installed in the computer it can be seen as given below.

```
void setup() {
  // put your setup code here, to run once:
}

void loop() {
  // put your main code here, to run repeatedly:
}
```

The Arduino Yuno board can be connected to the computer using a USB cable and the codes constructed using the Arduino software can be uploaded to the microcontroller chip in the Arduino Yuno board. Then the outputs are produced through the pins in the board according to the codes.

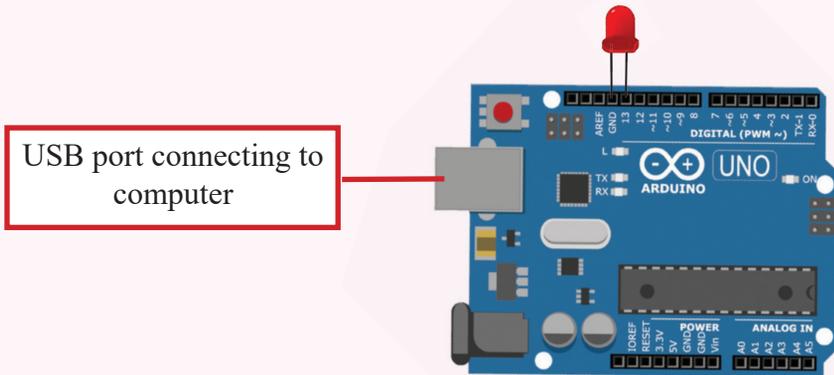
Activity 4.5



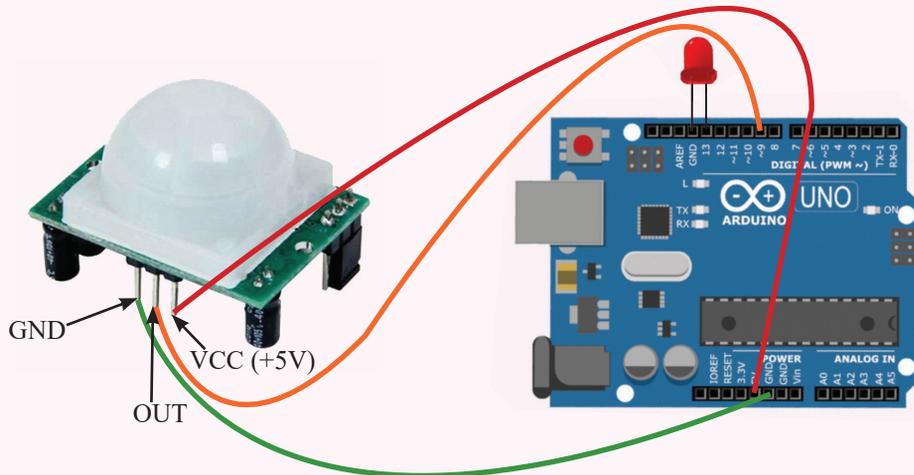
Connect the Arduino Board with the peripherals as shown.

Step 1 - Connect the LED bulb

LED bulb is connected to the GND and the 13th pin.



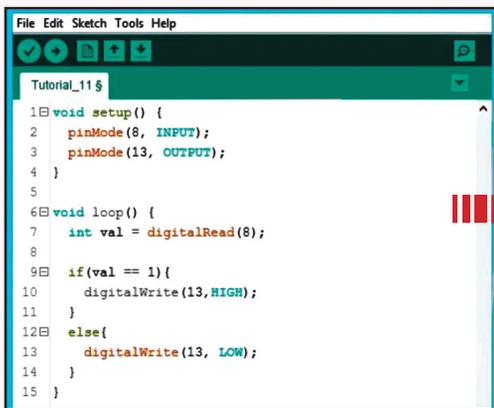
Step 2 - Connect the PIR sensor as shown in the image below;



In PIR is a sensor,

- GND pin connected to the GND port in power section.
- OUT pin is connected to the 9th pin of the Digital Section.
- VCC pin is connected to VCC in the power section.

Contract the cording given below in the Arduino software, upload and observe.



```
File Edit Sketch Tools Help
Tutorial_11 $
1 void setup() {
2   pinMode(8, INPUT);
3   pinMode(13, OUTPUT);
4 }
5
6 void loop() {
7   int val = digitalRead(8);
8
9   if(val == 1){
10    digitalWrite(13,HIGH);
11  }
12  else{
13    digitalWrite(13, LOW);
14  }
15 }
```



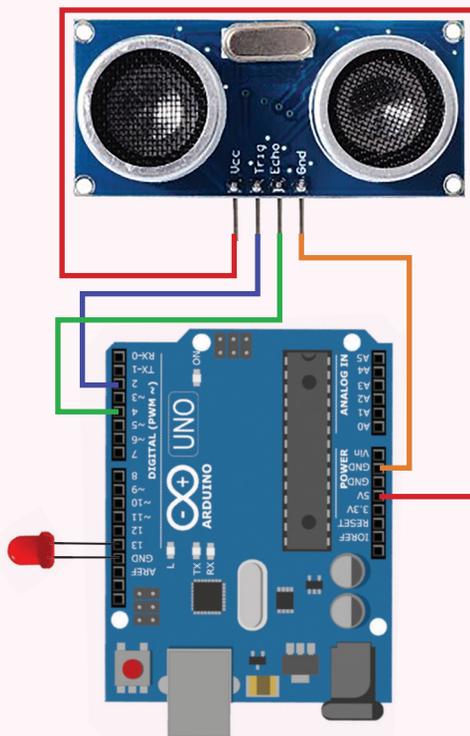
```
void setup() {
  pinMode(8, INPUT);
  pinMode(13, OUTPUT);
}
void loop() {
  Int val=digitalRead(8);

  If(val= =1) {
    digitalWrite(13, HIGH);
  }
  else{
    digitalWrite(13, LOW);
  }
}
```

Activity 4.6



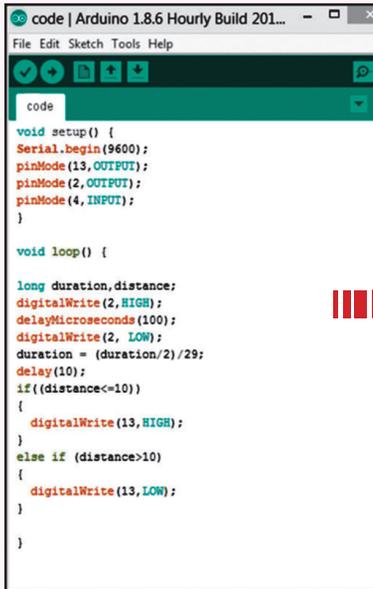
Connect the Arduino Board with the ultrasound wave sensor as shown below;



In this ultrasound wave sensors,

- GND pin in the Board is connected to the GND port in the power section.
- TRIGGER pin in the Board is connected to the 2nd pin of the Digital section.
- ECHO pin in the Board is connected to the 4th pin of the in Digital section.
- VCC pin in the Board is connected to the 5V port.
- The LED bulb is connected to the GND port and the 13th pin.

Connect the Board to the computer. Do the coding shown. Upload the code to the Board and study the procedure.



```
code | Arduino 1.8.6 Hourly Build 201... - □ ×
File Edit Sketch Tools Help
code
void setup() {
  Serial.begin(9600);
  pinMode(13,OUTPUT);
  pinMode(2,OUTPUT);
  pinMode(4,INPUT);
}

void loop() {
  long duration,distance;
  digitalWrite(2,HIGH);
  delayMicroseconds(100);
  digitalWrite(2,LOW);
  duration = (duration/2)/29;
  delay(10);
  if((distance<=10))
  {
    digitalWrite(13,HIGH);
  }
  else if (distance>10)
  {
    digitalWrite(13,LOW);
  }
}
```



```
void setup() {
  Serial.begin(9600);
  pinMode(13,OUTPUT);
  pinMode(2,OUTPUT);
  pinMode(4,INPUT);
}

void loop() {
  long duration, distance;
  digitalWrite(2,HIGH);
  delayMicroseconds(100);
  digitalWrite(2,LOW);
  duration=pulseIn(4,HIGH);
  distance=(duration/2)/29;
  delay(10);
  if((distance<=10))
  {

    digitalWrite(13,HIGH);
  }
  else if(distance>10)
  {

    digitalWrite(13,LOW);
  }
}
```

Distance = (duration/2)/29

The distance between the obstacle and the sensor is shown in centimeters.

5

Computer Networks

Activity 5.1



Identifying the main components in the school's network

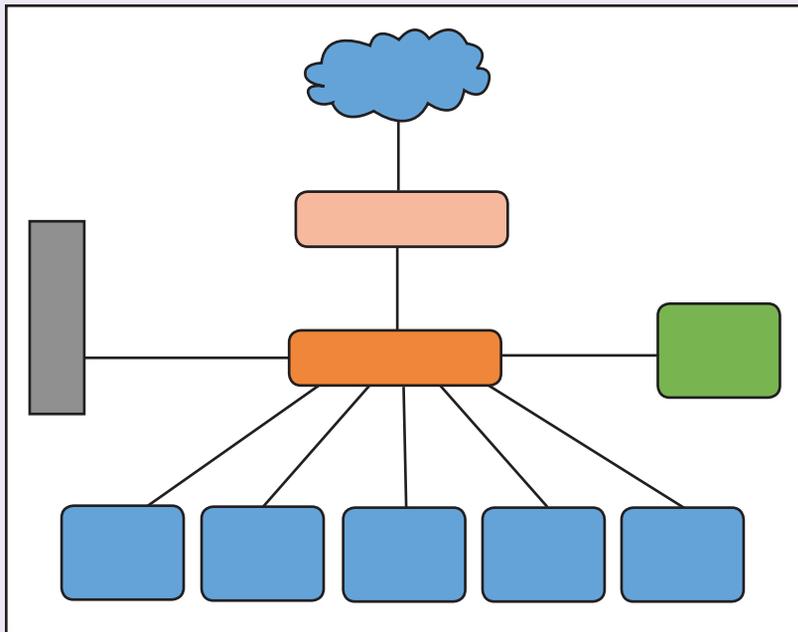
1. With the assistance from your teacher, inspect the computers in the computer laboratory and identify those that are networked and the devices and how they are connected.
2. Complete the table below with information collected about the computers and the devices in the computer laboratory.

Hardware	Available or not		Numbers	Wired or Wireless	Function (briefly)
	Have	Haven't			
Computers					
Server computers					
Switches					
Routers					
Printers					
Scanners					
Multimedia projectors					
Other					

Activity 5.2



Given below is a block diagram of a computer network showing how the computer and the devices are connected.



The table below indicates the details of the connected hardware;

Devices connected	Code
A few computers	C1, C2, C3...
Switch	S
Router	R
Printer	P
Internet	I
Server	SVR

Identify the hardware to match the code given. Indicate the correct code of the hardware in the diagram above.

Activity 5.3



Select the most suitable word from those in the box to fill the blanks in the statements 1 - 10 given below.

server, wired, network, networking system, fiber optics, cables, Internet, computer network, communication, resources, social networks, wireless, Wi-Fi, instant messaging

1. Inter-connection between and among people or a number of systems is identified as a
2. Connecting together two or more computers and peripherals is identified as a
3. The main aim of networking computer is for communication to share
4. A benefit in computer networking is the facility to use the
5. There are two types of media to connect computers. They are: and connections.
6. Wireless computers use the technology.
7. enables communication among users in a network.
8. The enables connect printers, files and software for sharing purposes.
9. Modern day computers also have built-in facilities for
10. are used to connect computers for networking.

Activity 5.4



Select from B, the most suitable expression to match each expression in A. Write the number of the matching expression in the blank alongside B.

A	B	
1. RJ45	switch	.....
2. Main objective of computer networking	twisted pair cable	.....
3. Command Line Interface	Ability to store important information in a folder in the Internet	.....
4. Allows for direct and efficient communication between the computers in the network and other peripherals	connecting one computer network to another network or to the Internet	.....
5. Bluetooth	network	.....
6. The computer that provide the central access to resources	port used to connected cables in wired networking	.....
7. Is used as a medium in computer networking	communication	.....
8. Router	used to send messages in the network	.....
9. Is a benefit of networking computers	server	.....
10. An interconnected group of people, items or a systems	used for wireless connection between computer devices	.....

Activity 5.5



Sharing file folder

- Consider an instance of sharing pictures, lessons, photographs, songs, video clips and the like among friends.
- To make this activity easy, let us first create folder named “Students Files” in the C drive of the hard disk.

(You may select a name of your choice for the file).

- Copy into this folder, all pictures, photographs, songs, video clips and other files for sharing purposes.

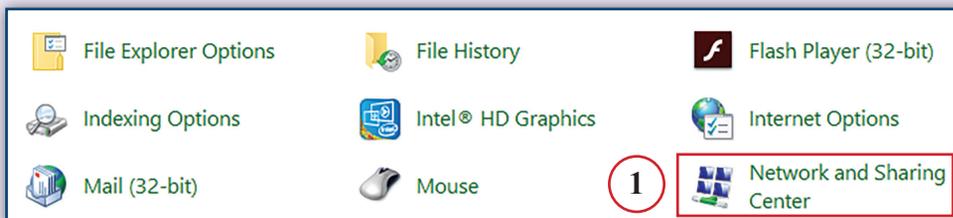


Note well : Login to the computer using an Administrator Account. The states of your account may not allow you for certain settings.

Therefore, your teacher will demonstrate this activity. The Operating system used for this activity is Windows 10.

- Now, let us set the “Students Files” for sharing in the network.
- Follow the given procedure to change settings in the operating system.

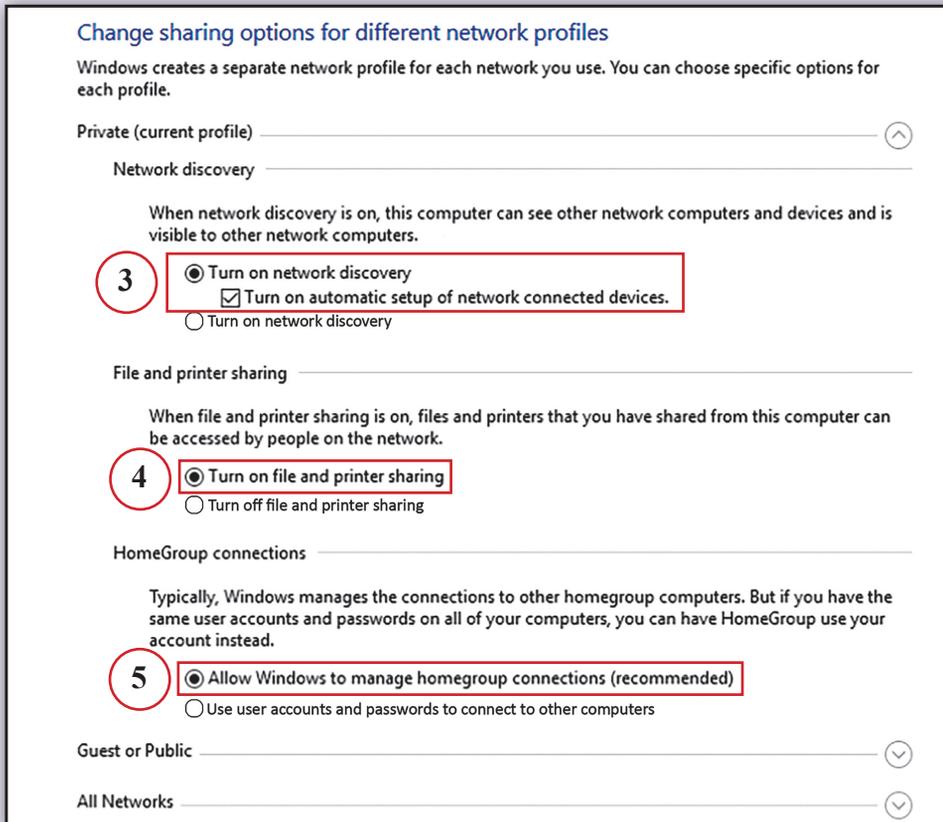
Step 1 - Open ‘Control Panel’. Click “Network Sharing Centre”.



Step 2 - Click 'Change advanced sharing settings'.

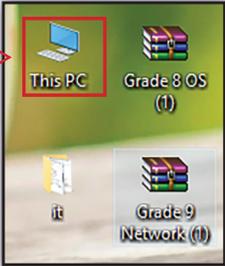


Step 3 - Select options from those given to share files and printer.



Step 4 - Select C Drive in your computer. Follow the given procedure to select "Students Files" in it.

6



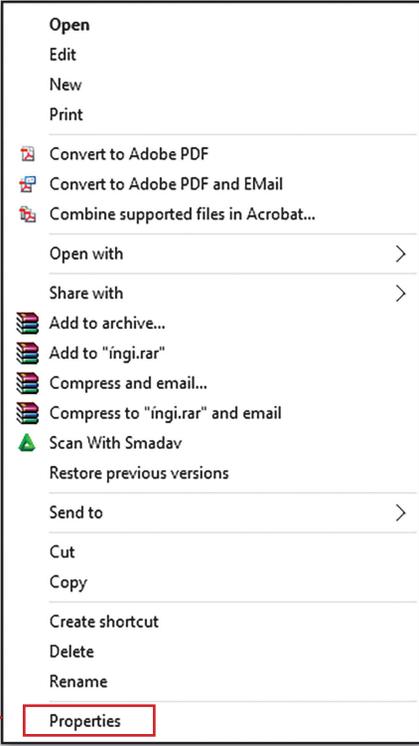
7



Program Files (x86)	5/10/2018 3:35 PM	File folder
Students file	6/15/2018 9:00 AM	File folder
Users	7/13/2017 10:59 AM	File folder
Windows	6/10/2018 2:06 PM	File folder
msdia80.dll	12/2/2006 12:07 PM	Application extens...
Students Files	6/15/2018 2:03 PM	File folder

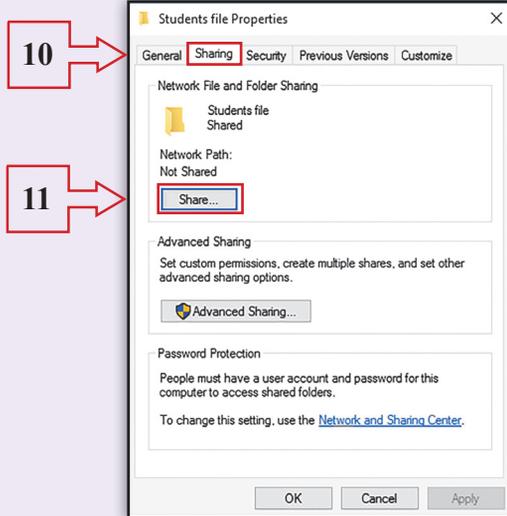
8

Step 5 - Right click on 'Students Files' in C drive and click 'Properties'.

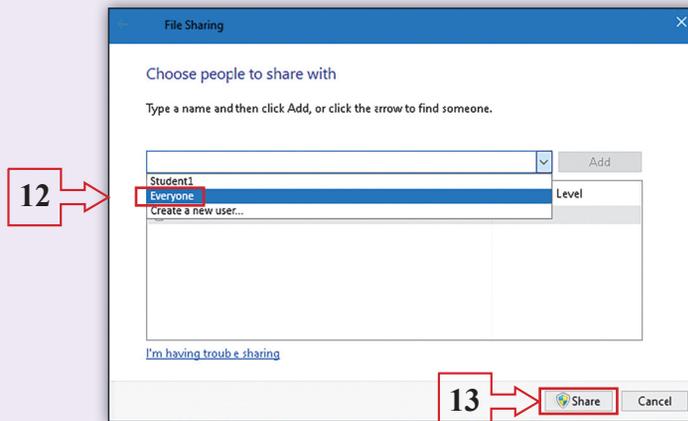


9

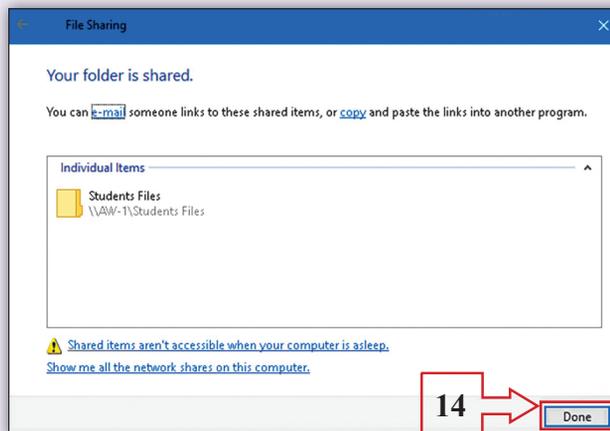
Step 6 - Click the button 'Share' in 'sharing'.



Step 7 - From the list select 'everyone'. Click 'Share'.



Step 8 - Click 'Done' in the dialogue box that appears.



- You have completed the process to share files in ‘Students Files’. Everyone in the network is now able to share all files in the file folder “Students Files”.
- This process facilitates sharing any file in a file folder. A user in the network can also copy files into this folder

Activity 5.6



Sharing printer

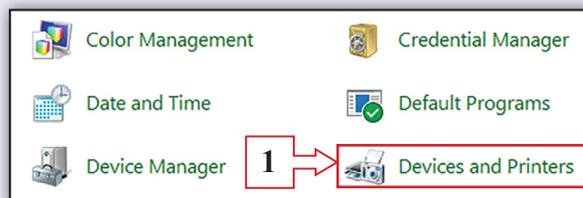
- By sharing a printer allows any user in the network to send files from his/her computer to the printer for printing. However, the printer has to be configured for the purpose.
- The same first three steps in the above process need to be followed in this process which is not mentioned here again.
- A further few steps have to be followed. They are given below:



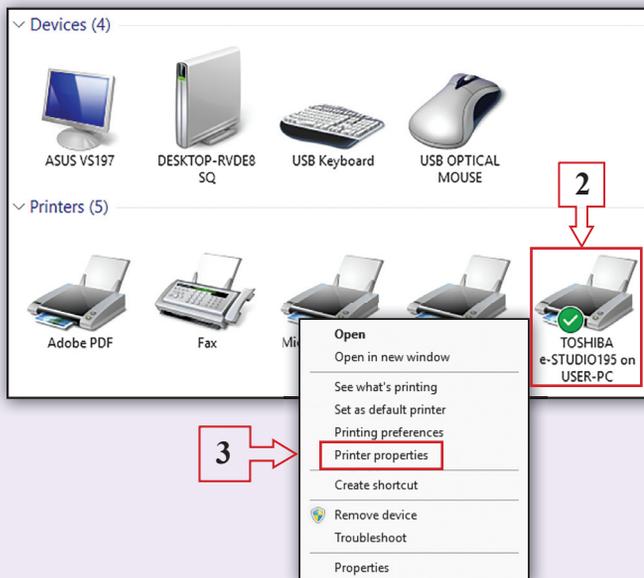
Note well : Login has to be with an Administrator Account. You teacher will help you with the process.

- Set the printer for common use among users in the network.

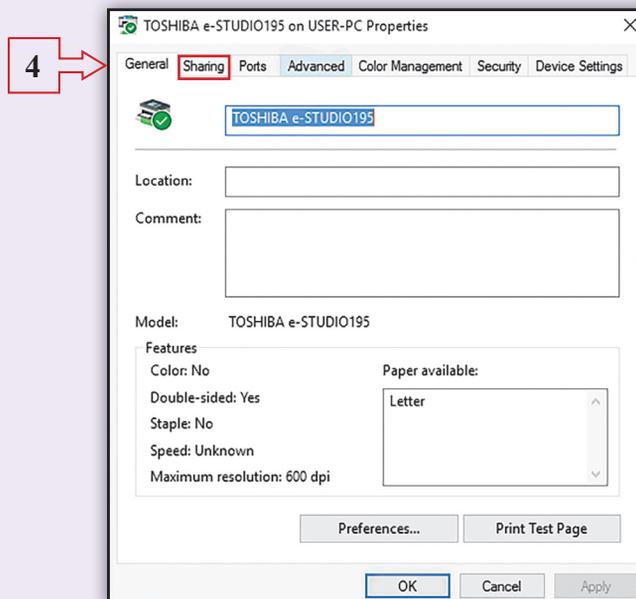
Step 1 - Go to Control Panel, select ‘Devices and Printers’ and click on it.



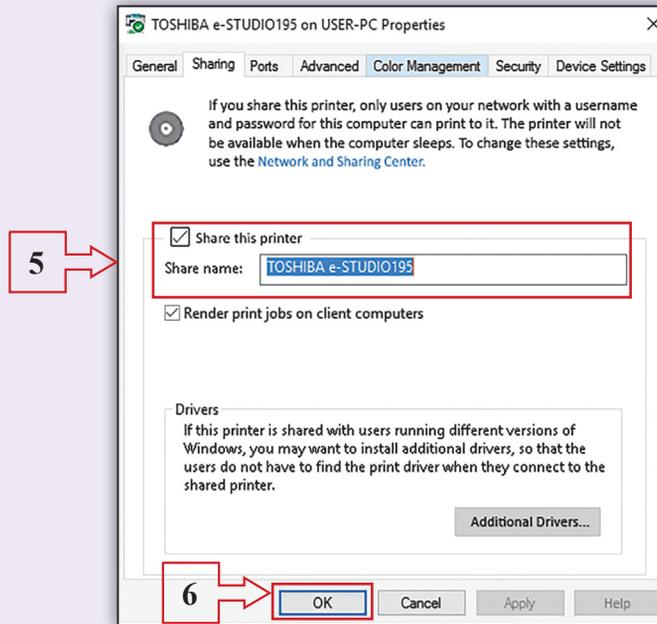
Step 2 - Select the printer connected to the network among the devices shown. In the menu you get, click 'Printer Properties'.



Step 3 - Click 'Sharing' in dialogue box you get.



Step 4 - Select 'Share this printer' in dialogue box. Press 'OK' button.



This completes the process to access the printer in the network. Everyone in the network can now share the printer for printing.

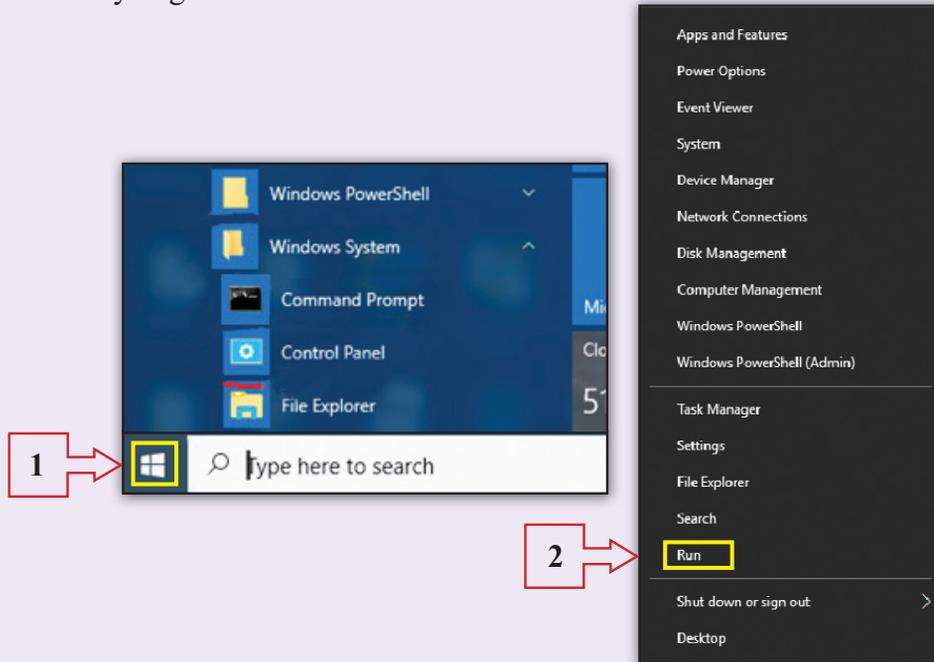
Activity 5.7



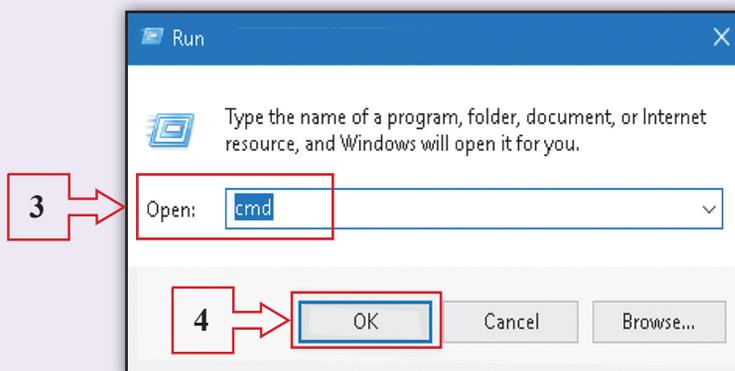
Communication through computer networks

- A user in a computer network can communicate with another user in the same network and any user can also receive a message from any another user in the network. In this, sending messages using the Connect Line Interface (CLI) is used.
- Consider sending the message 'Hello, how are you?' to other users in the network, using the CLI in Windows 10.
- Let us send the message, "Hello! How are you?" to a Friend logged in as student 1. Follow the process given below;

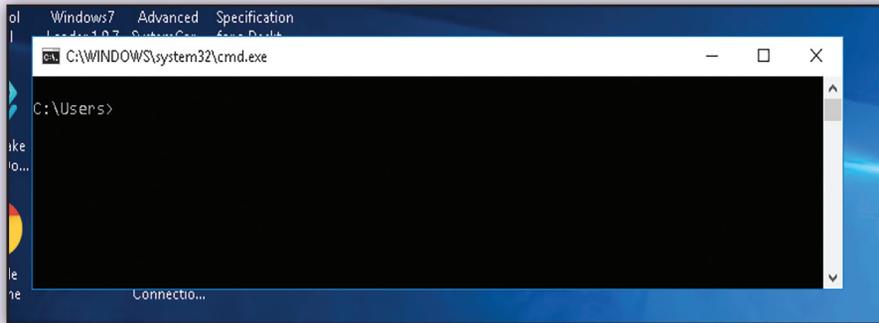
Step 1 - First, get the Command Line Interface on your computer. Follow the procedure given below to get Command Line Interface. Click 'Start' button. On "Windows Systems", right click it in the menu you get. Click 'Run'.



Step 2 - In the dialogue box received, type "cmd" in front of "Open". Click 'OK' button.



You will receive the Command Line Interface.

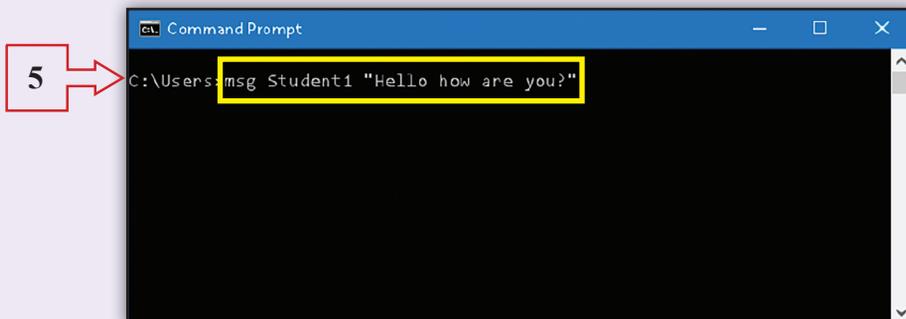


Type 'msg' command on Command line Interface. Type user name to collect the message. Type the message and press 'Enter'. The message will be sent to the user. The steps given below shows the process to send and receive messages.

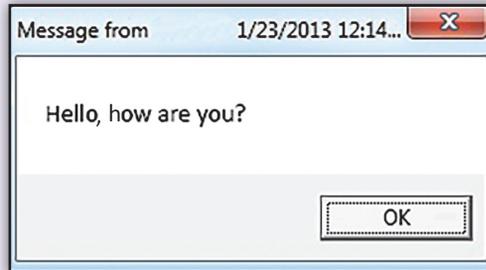
Remember to give correct user name and correct "msg" message. Let us try sending a message.

- Assume that the message is, "Hello, how are you?" and the user name of the receiver is 'student 1'.
- The system of using the msg command is **msg user name message** Therefore, in the command line, you need to type 'msg student 1 hello how are you?'
- The command, user name and message require spaces in between.

Step 3 - On the Command Line, type 'msg student 1 Hello, how are you?' and press 'Enter'.



Your message appears on Student 1's computer screen as follows:



Activity 5.8



Sending a message to all users in the network system

Let us learn how to send the message, 'Hello, how are you?' to all users in the network system.

- The same msg command is used in this case.
- In the previous activity you used the user name of receiver student 1 after msg command.
- However in here, instead of one user, * mark for 'all' is used.
- Therefore, the command you need to type is msg * Hello, how are you?
- Type correctly on the Command Interface and press Enter.
- All users of the network will receive the message. Use this command to send different messages.



Note: The activities were all with Windows 10 system. If you are using Windows 7 or those before it, type 'net send' command instead of 'msg' command.

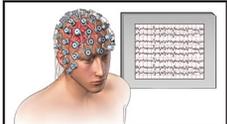
6

ICT and Society

Activity 6.1



- Work in groups.
 - ▲ Make lists to show the use of computers and Information Communication Technologies and their services in your school. Share the information you obtained with other groups.
 - ▲ Given below are a few machines use to diagnose illnesses. Find the instances they are used and label accordingly.

Machine	Use
	Blood pressure testing machine
	ECG - Electrocardiogram machine
	CAT
	Internal examination of brain using Electro Magnetic Rays EEG
	Blood sugar teasing machine

Look around. Find other equipment using Information Communication Technologies. Make lists. Compare lists with others.

Activity 6.2



What steps can be taken to minimize the digital divide in the society?

Activity 6.3



Complete the table below about places in the country that collect e-waste. Collect information from books by talking to elders, or by collecting information using the Internet services.

	Organization	Address	Telephone No.
1			
2			
3			
4			
5			

Activity 6.4



List out e-waste that can be reused.

Activity 6.5



Write True/ False in front of each statement.

1	All e-waste cannot be reused.	
2	E-waste pollutes our environment.	
3	We are not responsible for the damage caused to the environment from e-waste.	
4	To keep surroundings clean, e-waste can be taken dumped in garbage collecting centers.	
5	E-waste can be used to create ornaments.	

Activity 6.6



Read newspapers to find available opportunities for Information Communication Technology related careers. Complete the following Table using the collected information.

	Career	Organizations providing career	Required qualifications	Role
1				
2				
3				
4				
5				

Activity 6.7



Find suitable expressions from “Computer related careers” lesson in the textbook to complete the blanks in the text below.

An entrepreneur, anxious to use information communication technology for business purposes consulted to gather information on the subject. created software required for the business process. Quality regarding the developed software was assured by the The designed attractive advertisements. The businessman also wished to take the business online. For this assisted him. Since it was required to manage all the places in the building from the office networked the business premises.

