



FOURTH EDITION

KEYBOARD

Computer Science with Application Software
FOR GRADE 8

**TEACHING
GUIDE**

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Introduction:

In this ever-evolving world, computers have become an integral part of our daily lives, shaping the way we learn, communicate, and explore the world around us. This teacher's guide is designed to empower educators and engage young learners. It is a valuable tool for teaching computer concepts. Our teacher's guide for Keyboard 8 features:



Resource Pack for Teacher's Support

Equip educators with the tools they need to inspire and guide students effectively.



Sample Lesson Plans

Step-by-step lesson plans to ensure seamless classroom delivery, enhancing student comprehension.



Extended Activities

Dive deeper with enriching activities that encourage exploration and critical thinking.



Digital Content - Videos

Access engaging videos that bring complex concepts to life, making learning interactive and enjoyable.



Digital Content - Additional Assessments

Gauge student understanding with extra assessments, fostering a well-rounded evaluation.



Answer Key

Find clarity with a comprehensive answer key for end-of-chapter questions.



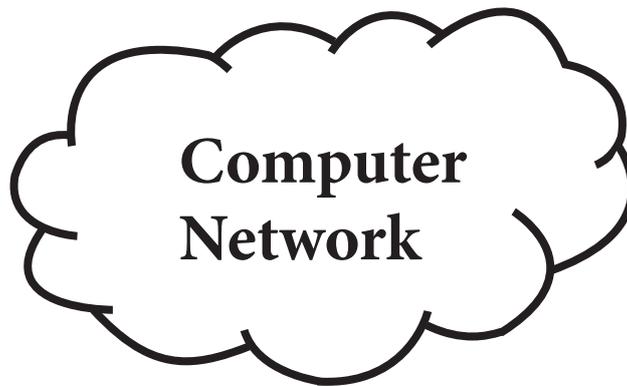
Worksheet Pack

Each chapter includes a diverse range of worksheets to reinforce learning and assess progress.

This guide is a collaborative effort, drawing insights from educational experts and the latest pedagogical approaches. It's an invaluable companion for educators embarking on the journey of nurturing young minds in the realm of computer education.

**Word Cloud**

Write what comes to your mind when you hear about the term Computer Network





KWL chart

KNOW	WONDER	LEARNT
<p>Share your knowledge about word processing software and presentation software.</p> <p>MS Word</p> <p>MS PowerPoint</p> <p>Have you heard about MS Excel?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>If yes, what do you already know?</p>	<p>What do you think spreadsheet software will be about? Tick any of the following.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Data collection tool <input type="checkbox"/> Picture representation tool <input type="checkbox"/> Data organization tool <input type="checkbox"/> Typing software <input type="checkbox"/> Presentation tool <input type="checkbox"/> Data analysis tool <input type="checkbox"/> Used for calculating data <input type="checkbox"/> Editing tool <p>Draw a word cloud representing your understanding when you think about Spreadsheet software.</p>	<p>Share briefly what you have learned about the Spreadsheet software?</p>



KWL chart

KNOW	WONDER	LEARNT
<p>Share your knowledge about the following concepts.</p> <p>Algorithms</p> <p>Why are they helpful?</p>	<p>What do you think you will learn in this chapter?</p> <p>Select all that apply</p> <ul style="list-style-type: none"> <input type="checkbox"/> Detail learning of computational thinking and concepts <input type="checkbox"/> Computer programming basics <input type="checkbox"/> Flowcharts <input type="checkbox"/> Game development <input type="checkbox"/> Sequence statements <input type="checkbox"/> Logical operators <input type="checkbox"/> Loops <input type="checkbox"/> Conditional statement <p>Briefly share what you are looking forward to learning.</p>	<p>Share briefly about the concepts you learned.</p>



MS Excel: sample sheets

	A	B	C	D	E	F	G	H	I	J	K
1	First Name	Last Name	Full Name	Age	English	Math	Science	Total	Remarks		
2	Ali	Azlan		13	45	30	45		Good work		
3	Faiza	Babar		13	25	30	20		Needs more practice		
4	Hira	Muneer		13	48	45	40		Great job done		
5	Ahmed	Khan		14	49	48	48		Super! Keep it up		
6	Shariq	Faraz		13	20	25	35		Needs more practice		
7	Aiman	Arsalan		13	46	20	32		You can do a lot better		
8	Ateeq	Ahmed		12	37	37	37		Good work, needs more practice		
9											
10	Total										
11											
12	Max_score in English										
13	Max_score in Math										
14	Max_score in Science										

	A	B	C
1	Parameter	Number Type	Data
2	Student ID	General	1765
3	Ticket ID	Number	1234
4	Total account balance	Currency	501234
5	Total Expense	Accounting	672859
6	Independence Day	Short Date	8/14/2023
7	Defence Day	Long Date	9/6/2023
8	Meeting Time	Time	8:30
9	Annual result	Percentage	0.67
10	Pieces of cake eaten	Fraction	0.833
11	Speed of light	Scientific	300000000

	A	B	C	D	E	F
1	State	Year 1990	Year 2000	Year 2010	Year 2020	
2	Alabama	4040389	4447207	4779736	5024279	
3	Alaska	550043	626933	710231	733391	
4	Georgia	6478149	8186653	9687653	10711908	
5	Florida	12938071	15982571	18801310	21538187	
6	Illinois	11430602	12419927	12830632	12812508	

	A	B	C	D	E	F	G
1	Income	Jan	Feb	Mar	April	May	June
2	Salary	\$1,800.00	\$1,800.00	\$1,800.00	\$1,800.00	\$1,800.00	\$1,800.00
3							
4	Expenses						
5	Rent	\$350	\$350	\$350	\$350	\$350	\$350
6	Phone bill	\$25	\$30	\$29	\$15	\$35	\$25
7	Car Fuel	\$90	\$85	\$70	\$65	\$30	\$91
8	Gas Bill	\$50	\$50	\$45	\$50	\$47	\$50
9	Electricity	\$70	\$65	\$75	\$73	\$60	\$80
10	Food	\$200	\$350	\$500	\$250	\$700	\$340

1

Emerging Technologies

Lesson plan

This is an overall lesson plan for the entire chapter. Depending on the number of periods, the ideas from this lesson plan can be used to make multiple lessons.

Resources: Projector, laptop, textbook, teaching' guide.

Pre-requisite: Students have been introduced to the idea of Emerging technologies including: AR, VR, AI, 3D printing, etc.

Introduction:

Begin the lesson by showing students an image of evolution of mobile phones from the first mobile phone to contemporary smartphones. Use the Internet to find such an image. Ask students to ponder over the image and share their ideas. Record these responses. Building on these responses, support student recall by asking students their understanding of the term Emerging Technology. Expected responses can be: “Evolution of technology”, “Robotics”, “New technology”. Moving forward, ask students: “how do you think emerging technologies have helped us?” or “how emerging technology makes our work faster and more efficient?”

Explanation:

Explain to the students various emerging technologies given in the textbook. You can divide the topics to be covered into in two sessions. It is strongly recommended that before starting the lesson, teachers thoroughly read through the chapter. To ensure that students fully grasp these concepts, it is recommended to explain them using ample examples and video resources.

Topics to be covered in first session

- 3D imaging – pg 1
- Holographic imaging – pg 2
- distributed applications – pg 2
- 3D printing – pg 2
- Virtual reality – pg 2
- Augmented reality – pg 3
- Artificial Intelligence – pg 3

At the end of session 1, form student pairs or groups and assign them In the Lab pg 11 as homework. Ask them to collaborate and research on the task and prepare a presentation on it in the next class.

Topics to be covered in second session:

- 5G technology – pg 6

- Robotics and its applications – pgs 7-8
- Machine learning and its applications – pgs 8-9
- Blockchain – pg 9

It is recommended for teachers to use the lesson PowerPoint presentation resource file (on digital portal) while explaining these concepts. The lesson resource file briefly describes the same concepts covered in the chapter. Teachers must encourage students to read through the textbook in their own time.

Depending on the class time, at the end of the second session, divide students into pair or groups and ask them to work on In the Lab exercise given on pg 11.

Digital content:

Videos may be assigned before studying the relevant topic or after the topic is complete as a reinforcement.

List of videos:

1. Internet of things

Assessments: There is a specialised assessment section of objective questions based on the entire chapter. It can be assigned to students in part after completing specific topics in class or as a whole at the end of the chapter. It can be used for reinforcement of concepts as home task or as marked assessment.

Classwork:

Objective type questions given on pg 10. In the Lab given on pg 11

Homework:

Descriptive type questions, application based questions, Group project

Conclusion:

Provide a brief recap of all the concepts explained in the class. Scaffold student learning by elaborating the concepts that students find challenging to grasp.

Assessment:

Use formative assessment to gauge student understanding of various concepts. Alternatively, discuss Objective Types Questions in class given on pg 10 of the textbook. By the end of the lesson, students will have achieved the following learning outcomes:

1. Understand the concept of emerging technologies
2. Explain various emerging technologies such as: AI, VR, AR, 3D imaging, 3D hologram, etc.
3. Explain robotics, its types and applications in various industries
4. Understand the evolution of 5G technology
5. Understand Block chain and its working



Answer to Exercise



Objective Type Questions

1. Choose the correct answer

a) Evolution	b) true	c) wireless data
d) short messaging service	e) digital	



Descriptive Type Questions

- a. The term emerging technology refers to new technologies or the evolution of existing technologies. This term is used to describe it covers technologies that are currently being developed or are in the process of development within the next five to ten years. In simpler words, technology that are created and evolving towards their true potential or those expected to be created to have significant social and economic impacts.
- b. The term artificial intelligence is used to describe systems that simulate human intelligence. Such systems are designed to run on AI algorithms to create expert systems which are capable of decision making.

c.

4G	5G
4G refers to fourth generation of technology	5G refers to fifth generation of technology
4G LTE has peak speed of 1GB per second	5G technology can theoretically achieve peak speed of 20GB per second
The high-data transfer rates of 4G technology enabled video with minimal buffering and gave rise to many connected devices	5G technology has higher speeds and slower delays than 4G and are expected to massively extend IoT and robotics

- d. Computer Assisted Translation or CAT are the tools that help to translate content from one language to another. It translates the meaning of written language to another language as desired by the human. Google translator is an example of CAT software.

- e. The evolution of telecommunication has taken various forms over the years. Today we live in a fast-connected world where it is easier to reach out to someone or get things done in no time. However, the means of communication has not always been this simple as we see and experience it today. The mobile technology that we see today dates back to the time when people would use cordless phones and could make voice calls to one country only and that too with poor voice quality. This referred to as first generation or 1G technology. With the passage of time, we experienced the SMS technology that made communication much more faster and efficient, the SMS era is known as 2G or second generation of mobile telecommunication. The move to third generation or 3G introduced us to mobile internet and led to the launch of smartphones making communication more accessible and efficient. Then came 4G that we experience today. It allowed us mobile video consumption through its ability to support data transfers at higher rates. The technology that is evolving and expected to take over the world of communication is the fifth generation of 5G technology. It can allow a peak speed of 20GB per second as opposed to 4G, that allows peak speeds of 1GB per second only.
- f. Robotics refers to the field of engineering that deals with conception, design, construction and operation of robots. Robots are designed to aid human beings in various aspects of life. They have the capability to eliminate dangerous and life-threatening jobs for humans due to their capability of working in hazardous environments with a great level of precision and lesser chances of error. With the passage of time, the use of robotics has spanned across various industries such as:
- a. Security
 - b. Space exploration
 - c. Underwater exploration
 - d. Entertainment
 - e. Health
 - f. Education
 - g. Military
 - h. Food production
 - i. Customer service
- g. Machine learning is a sub-field of Artificial Intelligence and computer sciences that uses data and algorithms to learn in the same way as humans do. Based on these learnings, the system then becomes capable of making decisions and predictions similar to humans. Spam detection is an example of ML. Our email agents such Gmail or Hotmail are trained through spam classifier algorithms to classify emails and move them in spam or inbox folder. This sorting makes it very easy for us to focus on emails that actually matter while sending all unimportant emails to the spam folder.
- h. Blockchain technology is a digital record keeping system that is decentralized and distributed across a network of computers. It is used to track and verify digital transactions. As opposed to bank, blockchain technology records and verifies each transaction on multiple computers. It makes it impossible for anyone to alter the record of transactions without being detected; making transactions more robust and secure.



Application Based Questions

- a. To improve the efficiency while maintaining similar number of workers, the company would need to make use of robotics technology that can automate various tasks:
- i. Automatic conveyer system: to automatically move bottles through different workstations during the process
 - ii. Packaging systems: the robot based packaging system can speed up the work of picking up bottles, placing them and sealing the bottles. Since this a monotonous task, a robotic system would be able to accomplish it without fatigue and with greater precision and efficiency.
 - iii. The other tasks such as filling up and labeling can also be done through automation and robot technology thereby increasing work efficiency and decreasing human error.
- b. To efficiently classify waste, machine learning algorithms can be used to train the AI system to analyze the seven types of waste through images or data collected from waste samples. Once the system is trained, it will be able to classify all seven kinds of waste based on visual cues.



In the Lab

Encourage students to use internet search techniques to research on the topic and prepare a presentation.



Group Project

Students should be encouraged to use internet to formulate a response for this question. However, a sample response is given below:

To develop an AI system that can help in cleaning ocean waste from plastic waste, it should comprise of the following:

1. A data collection unit to gather relevant data available on plastic waste.
2. To train the AI system, it is important to tag the collected data by labelling instances of plastic waste so that the system can recognize it
3. Use AI techniques such as machine learning or computer vision to develop the system and train the system using the tagged dataset.
4. Use underwater robot technology to implement the AI system for cleaning operations.
5. Monitor the performance of the system and make improvements where needed.

Lesson plan

Recommended number of periods is two. The teachers are advised to break down the lesson plan as per the class needs and availability of the resources.

Resources: Projector, laptop, Word Cloud, textbook, teaching guide.

Pre-requisite: Not required

Introduction:

Start the lesson by providing students with “Word Cloud” sheet provided in the resource folder. Give them 2 minutes to brainstorm and write on the sheet about their understanding of Computer Network. After they are done, gather their responses. Expected responses can be “group of computers”, “Internet”, “more than one computer”, etc. It is recommended that teachers should keep a printout of the Word cloud ready before starting the class so that class time can be used efficiently in delivering the lesson only.

Explanation:

Explain in detail various concepts related to computer networks to students. It is recommended that the chapter should be explained in two sessions.

Topics to be covered in first session:

- Computer network – pg 13
- Nodes – pg 13
- Communication Media – pg 13-14
- Peer to Peer – pg 14
- Client server – pg 15

Topics to be covered in second session:

- Network topology and its types – pg 15-16
- Types of computer network – pg 16-17
- Types of physical transmission media – pg 20-21
- Data analytics, LiFi, IoT – pg 22

Digital content:

Videos may be assigned before studying the relevant topic or after the topic is complete as a reinforcement.

List of videos:

1. Computer Networking

Assessments: There is a specialised assessment section of objective questions based on the entire chapter. It can be assigned to students in part after completing specific topics in class or as a whole at the end of the chapter. It can be used for reinforcement of concepts as home task or as marked assessment.

Classwork:

Objective type questions given on pg 22.

Homework:

Descriptive type questions, application based questions, Group project

Conclusion:

Provide a brief recap of all the concepts explained in the class. Scaffold student learning by elaborating the concepts that students find challenging to grasp.

Assessment:

Use formative assessment to gauge students' understanding of various concepts. Alternatively, discuss Objective Types Questions in class given on pg 22 of the textbook. By the end of the lesson, students will have achieved the following learning outcomes:

1. Define computer network
2. Understand various types of communication media; guided and unguided
3. Familiarize with various network topology and their pros and cons
4. Understand and list various types of computer networks
5. Familiarize with various types of transmission media



Answer to Exercise

Objective Type Questions

1. Choose the correct answer

a) 1950	b) network interface card	c) guided media
d) Mesh	e) LAN	



Descriptive Type Questions

a. Define the following:

Computer Network: a computer network is a group of devices, computers or other electronic devices that are connected and can communicate to each other.

Host: all computers connected to a network that participate directly in network communication are called as hosts.

Nodes: it is referred to as connection point among network devices such as routers, printers or switches that can send and receive data from one point to the other.

NICs: Network interface cards are hardware devices consisting of electronic circuits. These ensure a reliable communication is established between two computers. Without a network interface card, a computer cannot be connected to the network.

b. Communication media refers to the media where data signals are transmitted. The communication media is classified into:

a. Guided media

b. Unguided media

The difference between guided media and unguided media are explained below:

Guided Media	Unguided Media
It requires a physical path for transmission	The signal is broadcasted through air or water
It is referred as wired communication or bounded transmission media	It is referred as wireless communication or unbounded transmission media
It provides direction to signal	It does not provide any direction
Example: twisted pair cable, coaxial cable, fiber-optic cable	Example: radio wave, microwave and infrared

- c. Network architecture refers to how computers are organized in a system and how the tasks are allocated between the devices. The difference between Peer2Peer and Client/server architecture is given below:

Peer2Peer	Unguided Media
All the computers connected in the network have equal power and privileges	Nodes are classified as server and client. The server is responsible for providing the client node the memory resources, processing power, etc.
Each peer in the network can share its resources with the other such as memory or power	Client nodes may communicate with one another but they do not share responses.
This architecture is preferred for short networks	This architecture is preferred for large networks

- d. There are four types of network topologies. They are defined below:
- Bus topology: each node is linked to only one other node. The direction of data transmission is one-way.
 - Ring topology: each node is linked to two other nodes; forming a ring. The flow of data is bi-directional. A single node failure can impact the entire network.
 - Star topology: a central server node is linked to multiple client devices. It is more reliable in the sense that data does not have to go through each node.
 - Mesh topology: every node in the network is connected to every other node in the network.
- e. There are 6 types of computer networks. They are:
- Personal area network or PAN
 - Local area network or LAN
 - Wireless local area network WLAN
 - Metropolitan area network or MAN
 - Wide area network or WAN

Type of computer network	Advantages	Disadvantages
Personal area network – PAN	<ul style="list-style-type: none"> Relatively protective and safe Allow connectivity of approximately 10m of range These are restricted to small area 	<ul style="list-style-type: none"> Has limited range The connectivity may be poor at same radio bands
Local area network – LAN	<ul style="list-style-type: none"> Information of all users on a single hard disk of a computer system Since data is managed by server, it is more secure It offers the center to share single internet connection to all users 	<ul style="list-style-type: none"> In case central data repository is not secured by LAN admin, the data can be at potential risk of unauthorized access
Wireless Local area network – WLAN	<ul style="list-style-type: none"> Requires less wiring Lesser cost 	<ul style="list-style-type: none"> Provides coverage to limited area

	<ul style="list-style-type: none"> Provides high data rate due to small coverage 	<ul style="list-style-type: none"> The more the number of devices connected, the lesser the data transfer rates External factors such as rain or thunder may disrupt the communication Due to low data security, there are chances of data being exposed to unauthorized access
Metropolitan area network MAN	<ul style="list-style-type: none"> It is used in communication between banks in a city Used in airline reservations Used in communication in the armed force 	<ul style="list-style-type: none"> Requires many cables to establish a MAN This network is at high risk of access to unauthorized access
Wide area network WAN	<ul style="list-style-type: none"> Allows coverage for a larger geographical area Allows to connect devices such as laptop, desktop, smartphones, etc Works by utilizing radio transmitters and receivers embedded into communication devices 	<ul style="list-style-type: none"> Since it is in touch with various systems, there are high chances of downloading virus that may impact the device and cause data loss The cost of setup is very high
Virtual private network VPN	<ul style="list-style-type: none"> Protects online privacy Bypasses geographical restrictions VPNs are affordable and easier to setup 	<ul style="list-style-type: none"> Slower connection speed Free from online censorship VPN providers monitor all internet activity



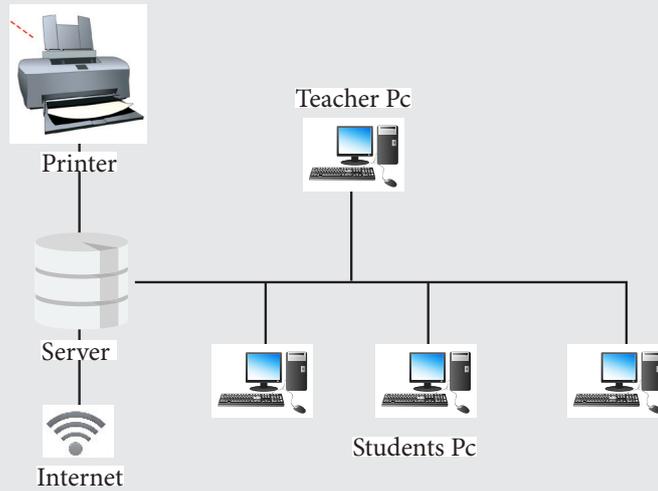
Application Based Questions

For the given situation, a network type that allows coverage to a large geographical area would be most suitable. In this case, Metropolitan Area Network would be a good choice, since it provides coverage to larger areas.

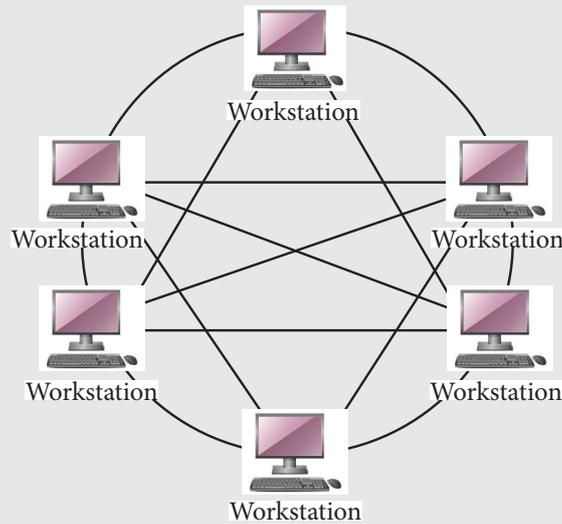


In the Lab

- For this task, ask students to first make a list of all devices present in the lab. Explain them how they are able to connect to internet on their PCs and printer. A sample diagram is given below:



2. A sample diagram for this is given below: Topology: Mesh



Group Project

1. Encourage students to perform this. An outline for creating network diagram is given below.
 - Draw a central device such a router or switch. This will be the main connection point for all devices.
 - Draw 10 computers connected to central device. Name them for identification purposes.
 - Draw 10 printers and label them.
 - From central device draw connections to the 10 printers.
 - Divide 90 computers into the groups of 10. Each group of 10 computers will have access to wireless network point. Draw 9 wireless access points and connect to central device.
 - Connect 10 computers to each access point.
 - Repeat this process for the remaining 8 groups of 10 computers.

3

Spreadsheet Software

Lesson plan

Recommended number of periods is two. The teachers are advised to break down the lesson plan as per the class needs and availability of the resources.

Resources: Projector, laptop, KWL chart, textbook, teaching guide

Pre-requisite: Students have a basic understanding of Operating systems from the previous chapter and are able to identify different OS. Sample folders and sub-folders are created on each computer with some files stored in them.

Introduction:

Start the lesson by providing students with “KWL Chart” provided in the resource folder. Give them 5 minutes to brainstorm and fill the chart. Instruct them to work on “Know” and “Wonder” section of the chart only. The “Learnt” column will be filled by students at the end of the lesson. This activity will help students recall the word processing software and presentation software and share their understanding of spreadsheet software. The teacher would also be able to gauge student understanding of these concepts.

Spend the next five minutes discussing student ideas collaboratively. Explain to them that spreadsheet software are used to display, manipulate and represent data.

Explanation:

After you have gathered student responses and introduced them to the purpose of spreadsheet software, open sample_sheet.xls (see example in the resource pack) on the lab computer. Make sure that you have copied the same file on student computers as well. Ask students to open the same. Introduce students to the GUI of Microsoft Excel as explained in textbook on pg 25. Familiarize students with Font formatting pgs 25-29 and Alignment options pg 29. To demonstrate these concepts, use testScore sheet provided in the sample_sheet.xls workbook.

It is strongly recommended for teachers to practically demonstrate all these steps to students by working on the sample file provided and asking students to follow along. Since the chapter has a lot of topics to cover, it is recommended that teachers split it into two sessions.

Topics to be covered in first session

- Working with long text – pg 31 (Use testScore sheet provided in sample_sheet.xls)
- Number formatting – pg 32 (Use numberFormatting sheet provided in sample_sheet.xls)
- Applying cell styles – pg 34 (Use any of the sheets provided in sample_sheet.xls)
- Formulas in Excel – pg 34
- Cell range and references – pg 35 (Use any of the two sheets provided in sample_sheet.xls)
- Using Formulas – pg 35-48 (Use testScore sheet provided in sample.xls for demonstration)

Topics to be covered in second session:

- Creating charts – pg 49
- Components of a chart – pg 49-50 (Use either testScore sheet or populationData sheet provided in sample.xls)
- Types of Chart – pg 50-53 (Use either testScore, populationData or revExpense sheet provided in sample.xls)
- Creating charts – pg 54-55 (Use either testScore, populationData or revExpense sheet provided in sample.xls)
- Chart Elements – pg 56-59 (Use either testScore, populationData or revExpense sheet provided in sample.xls)
- Chart Layout and Chart Styles – pg 59 (Use either testScore, populationData or revExpense sheet provided in sample.xls)
- Change Chart type and Switch Rows and Columns – pg 60 (Use either testScore, populationData or revExpense sheet provided in sample.xls)
- Sparklines – pg 62-63

Digital content:

Assessments: There is a specialised assessment section of objective questions based on the entire chapter. It can be assigned to students in part after completing specific topics in class or as a whole at the end of the chapter. It can be used for reinforcement of concepts as home task or as marked assessment.

Classwork:

Objective type questions given on pg 65. KWL Chart, at the end of the session, ask students to fill “Learnt” column of provided.

Homework:

Descriptive type questions, application based questions, Group project

Conclusion:

Provide a brief recap of all the concepts explained in the class. Scaffold student learning by elaborating the concepts that students find challenging to grasp.

Assessment:

Discuss Objective Type Questions given on pg 65 verbally. At the end of the lesson, students will have achieved the following learning outcomes:

1. Familiarize with the purpose of Spreadsheet software particularly Excel
2. Understand various formatting options available in Excel
3. Apply text and Numeric formulas to manipulate data as per their needs
4. Understand different types of charts and their purpose
5. Use charts to visually represent data and make predictions



Answer to Exercise

Objective Type Questions

1. Choose the correct answer

a) b. wrap text	b) a. Number format b. font format	c) a. 54,612.00	d) b. pie chart	e) b. data label
f) d. both a and b	g) d. all of these	h) d. FIX	i) a. use SUM function	j) a. Go to the INSERT tab and click CHART



Descriptive Type Questions

- a. Steps to find out LCM are listed below:
 - a. Type three numbers in cells A1, A2, A3. Select the cell A4, where you would want the result to be displayed. Click Math and Trig option and select LCM from the drop-down menu.
 - b. In the function number arguments dialog box, input values for Number 1, Number 2 and Number 3. These will be the same as you entered in the cells A1, A2 and A3. You will notice result at the end of dialog box
 - c. Click OK to display output in the selected cell A4.
- b. Pointing is relatively an easier method of referencing a cell value. In the typing method, the value of the cell being referenced has to be typed in manually. Whereas, in case of pointing, the value of the cell can be referred to by simply clicking on the cell. This kind of referencing is useful when one has a lot of data to work with and its difficult to remember each cell value.
- c. There are two ways to view the formula:
 - a. Click on the cell, where the result is computed. The formula will reflect in the formula bar on the top.
 - b. Double click on the cell, to view the formula.
- d. The operators that can be used are: +, -, *, /, ^, >
- e. The spreadsheet can be created using either MS Excel or Google sheets. Google sheets would be a better choice as it allows to update the data collaboratively and lets everyone view the updates as and when made.

f. A possible solution for this is given below:

Monthly test	Math	Science	English	Computer	Total
Test 1	48	32	28	46	154
Test 2	40	30	30	48	148
Test 3	45	15	36	35	131
Test 4	45	28	30	42	145
Test 5	42	35	40	45	162
Average marks					148
Max Marks	48	35	40	48	162
Min Marks	40	15	28	35	131

g. Two ways to deal with long text in excel are:

- Wrap Text: if the text falls out of the cell boundary, the wrap text feature can be used to wrap the text around the cell. It displays the text on multiple lines in the same cell.
- Merge and Center: this feature joins or merges two or more cells to make one large, it prevents the long text from falling out of the cell boundary.

h. To add the rupee symbol:

- Type the value in the cell. Select the cell and in the Number section on Home tab
- Click on the drop-down menu and select Currency.
- If by default your currency is not set to Rupee, you can click on More Number Formats at the end of the drop-down menu.
- A Format Cell dialog box will appear.
- Select the required currency type from the Symbol drop-down menu and click OK. The cell will now reflect the desired currency type.

i. To apply background colour to the cell range A1:E5:

- Select the cell range.
- On Home tab, click the Fill colour in Font section.
- Choose the desired colour to apply.

j. The buttons present in the lower row are:

- Accounting
- Percentage
- Comma style
- Increase decimal
- Decrease decimal

k. To rotate the text to 25 degrees

- On the Home tab select Orientation button in Alignment section.
- Click on Format Cell Alignment. The Format Cell dialog box appears.
- In the Alignment tab, enter the desired rotation value in the Orientation panel given on right.
- Click okay to apply alignment.

l. We can format both text and numbers in Excel. The advantages of text formatting are:

- It allows to have a good visual representation of data.
- It's easier to understand the data if text is properly formatted.

- c. It can bring attention to important data in the excel sheet.

The advantages of Number formatting are as follows:

- a. It allows differentiating between different number types. For example, we can easily tell if a number represents a currency or is a general number.
 - b. If the numbers are large, the correct formatting style can help us read the value and interpret it.
 - c. It makes the organization of data easy for interpretation purposes.
- m.** Selecting the formatting method depends on the requirements of the data at hand. If for example, the data provided is the progress report of students in a term, it would be a good practice to use cell style in this case. It is because cell styles allow to represent data in an appropriate visual manner. One can apply headings using cell styles. Use different colours to represent data in the cell. Doing so will help the user bring their attention directly to the point of interest in the data.
- n** Teachers must encourage students to work on this question on their own. A sample response is given below:

	A	B	C	D	E
1	Name: Omer Ahsan	Age: 13			
	Class 8-B				
	School: Public School				
	Class teacher: Ms.Samiya Khan				
	Number of students: 20				
2					
3	My Subject Teachers	Subjects			
4	Ms. Shanza Khawer	Science			
5	Sir Shahwaiz Ahmed	Math			
6	Ms. Aliya Raza	Music			

- o.** The components of a chart are given below:
 - a. Data Table: refers to the data values from which the chart is derived.
 - b. X-axis: it is the horizontal axis of the chart. It is also known as category axis
 - c. Chart Title: it is placed at the top of the chart and tells what the chart is about.
 - d. Axis title: the title given to the axis
 - e. Chart Area: it is the area within which all the chart components are placed.
 - f. Plot area: it is bounded by the two axes. The x-axis and y-axis define the two sides of rectangular plot area.
 - g. Legend: it helps to identify the data series
 - h. Gridlines: lines that run across the plot area from each category on x-axis and from each value on y-axis.
 - i. Data label: it provides additional information about a data point in the chart.
- p.** Combination chart, as the name suggests, is a single chart that consist of a series that uses different chart types. To create a combination chart:
 - a. Select the desired data range.
 - b. Click INSERT>CHART>RECOMMENDED CHART. The insert chart dialog box appears.
 - c. Click the All Charts tab
 - d. In the list of chart types, click Combo

- e. For the different parameters in your data, select the desired chart type
 - f. Click OK to insert the chart.
- q.** Sparkline is a miniature chart, embedded in a single worksheet cell. Charts are different from Sparklines as they represent the overall data in the Excel sheet. Whereas sparklines only show the visual representation of data in a single cell/record.
- r.** The quick analysis tool takes a range of data and creates the desired chart with just a few commands. To create a bar chart using the quick analysis tool:
- a. Select the data range on the excel.
 - b. Click the quick analysis button at the bottom right of the selected data
 - c. Select the desired bar chart type. If it does not appear, click MORE and select the bar chart from the list that appears.
 - d. Click OK to apply the chart.



Application Based Questions

1. The following font formatting have been used:
 - a. Underline text b. Center alignment c. Bold d. Font style e. Cell background colour
2. A) bold, font style and orientation
B) Center alignment, wrap text, font style.
3. A) In cell B3:E3 center alignment and bold. In cell A4:A6 left alignment and bold
B) Currency number format is used
4. A) Select the desired cell range. On the home page, in the Font section, click Fill Colour and choose Pink. To apply border colour, click on Border and select More Borders. Select the colour from the colour panel on the right. Apply border to both inside and outside. Click OK to reflect the changes.
B) To make a subscript, on Home tab, click on Font Settings. In the dialog box that opens, select Subscript from the Effect panel. Click OK to reflect the changes.
5. A) In order to see the result, Mehak needs to use either the =SUM function or needs to add = sign before A1+A2+A3 and click enter.
B) Yes, changing value in any of the cell, will reflect the change in the total sum result.
6. A) The result will be 3.
B) Since the formula is copied exactly, the result will still be the same because cells being referred to in the formula have not changed.
C) Absolute reference.
7. A) The resultant value will be 36
B) The value in C2: 54, C3: 27, C4:72

- C) Absolute reference.
8. A) Formula in cell C2: $=B2*0.08$ or $B2*8\%$, Formula in cell D2: $= B2-C2$
B) To calculate the discounted price and net amount for the remaining items, use autofill feature of excel. Hold the selection and drag it to cell C5. Repeat the same for D2.
9. A) To visualize his data, Murtaza can either generate a Pie Chart or a Column chart. Both of them will be easier to visualize and interpret.
B) Select the data range A1:B4, On INSERT tab, in the CHART section, select the desired chart. You can also use RECOMMENDED CHART option to generate the suitable chart.
- 10.A) 13 years
B) 8 yrs, 9 yrs, 10yrs, 17-22 yrs
- 11.A) To change the chart type, he can click double-click on the existing chart, this will open the Chart Design Menu. Select the Change Chart Type button in the Type section. He can then select the desired chart type.
B) Right click on the chart, in the menu that opens, click on Move Chart. The move chart dialog box opens, select the destination sheet. Click OK to apply the operation.
- 12.A) Rehan can use the quick analysis method. To do so, he only has to select data and click on quick analysis button that appears in the bottom right corner of the selection.
B) Once the quick selection menu is open, he can then select Pie Chart from the list and generate the chart.



In the Lab

- An outline of the features used is:
 - Merge Cell
 - Heading (Cell Styles)
 - Font Style
 - Background colours
 - Text alignment (Left for the gas names, center for the symbol and right for the percentage)
 - Subscript
 - Bold
- The formatting features used are:
 - Font style
 - Alignment (Left and Center)

- c. Bold
 - d. Table Borders
 - e. Merge cell
3. The formatting features used are:
- a. Font Style Verdana and Size 12
 - b. Bold
 - c. Merge cell
 - d. Alignment (Center and Left)
 - e. Wrap text
 - f. Table border
4. The formatting features used is:
- a. Merge cell
 - b. Bold
 - c. Font Style
 - d. Cell background colour
 - e. Alignment (Center, Right and Left)
 - f. Number Formatting – Currency and Decimal
 - g. Sum formula to calculate sum.
5. To find the Area, he can use the formula: $3.14 \times (\text{Cell reference})^2$. Then he can use the autofill feature to find the area for the remaining cells. To find the circumference, he can use the formula $=2 \times 3.14 \times (\text{Cell reference})$
6. To find the multiples of the given series, she will need to use the * or to multiply or use the PRODUCT formula.
7. To calculate the commission, use formula [cell reference*10% or cell reference * 0.1). To find total, use the SUM function, to find average, use the AVERAGE function, and for maximum and minimum, use Max and Min respectively.
8. For this, first find the total by entering the formula $=C2 \times D2$. Use the autofill to find the total for rest of the data. Once the total is calculated, use SUM function $E13 = \text{SUM}(E2:E11)$
9. Fatima should enter all the data in the Excel sheet and properly format it. After that she will have to select the data range and click on quick analysis button and select the desired chart type, in this case pie chart. She should use formatting options, to make the chart more readable and clear.
10. To change the chart type, simply select the chart which is already created and double click. Chart Design tab will appear, in the Type section, Click on Change chart Type and select the desired chart.
11. Refer to the combination chart section in the textbook to perform this.
12. Refer to sparklines topic in the textbook to perform this.



Group Project

1. Encourage students to work on this in groups or pairs. A brief outline of steps is given below:
 - a. Let students gather final/midterms marks.
 - b. Assign data collection of each subject to each group member.
 - c. Students can collect this data on a paper
 - d. Ask students to make an Excel sheet with Student Names, Roll Numbers, Subject (Math. English Science).
 - e. Make sure that Excel sheet is properly formatted with Text formatting options
 - f. Use appropriate formulas to find the total, average, etc.
 - g. Use appropriate charts to visualize the data
2. Encourage students to carry out this research using the Internet and prepare the data sheet.
3. Encourage students to research on the given chart types and prepare a presentation on it.

4

Algorithmic Thinking

Lesson plan

Recommended number of periods is two. The teachers are advised to break down the lesson plan as per the class needs and availability of the resources.

Resources: Textbook, teaching guide, projector, KWL chart.

Pre-requisite: Familiarity with algorithms, computational thinking, process of CT such as decomposition, abstraction, pattern recognition and algorithm, writing algorithms

Introduction:

Students have covered basic concepts of algorithms and computational thinking in Keyboard 6 and 7 chapter 4 and 5 respectively. This chapter builds on those concepts and extends them further.

Begin the lesson by using recall strategy. For this, distribute the KWL chart given in the resource folder. Give 5 minutes to students to fill Know and Wonder section of the KWL chart. Ask them to leave Learnt section for now as it will be filled at the end of the lesson.

After 5 minutes, ask students to share their knowledge about algorithms. For example you can ask questions such as: “What do you remember about algorithms?” “Why do you think they are used?” “Can you give any daily life example?” Encourage students to share their learning expectations by asking what anticipate learning in this chapter. Expected responses can be: “more examples of algorithms” “how to write computer programs using algorithms”.

Explanation:

Ask students to read the text given on pg 67 and 77 silently. After they have read, you can ask them to share their understanding. Next, elaborate the different problem solving strategies given on pg 77. Teachers must emphasize the fact that there is no right or wrong way to solve a problem. A problem can be solved in many different ways, however, one must always try to select the solution that is effective.

Elaborate the concept of Flowcharts in detail given on pg 78. As a quick exercise, ask students to draw flow chart of making a tea. Instruct them to first deconstruct the problem by identifying and listing down the steps involved in making tea. Next, identify the patterns in the process. After these steps, ask them to write the algorithm and draw a flowchart. Once they are done, ask students to exchange their flowcharts with their peers and observe what they have done differently. This exercise will help students apply the problem solving skills.

In the second session, explain the concepts of conditional statements to students along with the examples given in the textbook on pg 80. Elaborate the basics of writing pseudocode on pg 81. Ask students to convert the flowchart that they made in previous class into pseudocodes. Encourage students to work collaboratively with their peers.

Digital content:

Assessments:

There is a specialised assessment section of objective questions based on the entire chapter. It can be assigned to students in part after completing specific topics in class or as a whole at the end of the chapter. It can be used for reinforcement of concepts as home task or as marked assessment.

Classwork:

Objective type questions given on pg 83. KWL Chart, at the end of the session, ask students to fill “Learnt” column of provided.

Homework:

Descriptive type questions, application based questions, Group project

Conclusion:

Provide a brief recap of all the concepts explained in the class. Scaffold student learning by elaborating the concepts that students find challenging to grasp.

Assessment:

Let students fill the Learnt section of the KWL chart. Encourage them to share their knowledge of the concepts learnt.



Answer to Exercise



Objective Type Questions

1. Choose the correct answer

a) all of these	b) creating an online shop	c) correct	d) a and b	e) undecidable problems
-----------------	----------------------------	------------	------------	-------------------------



Descriptive Type Questions

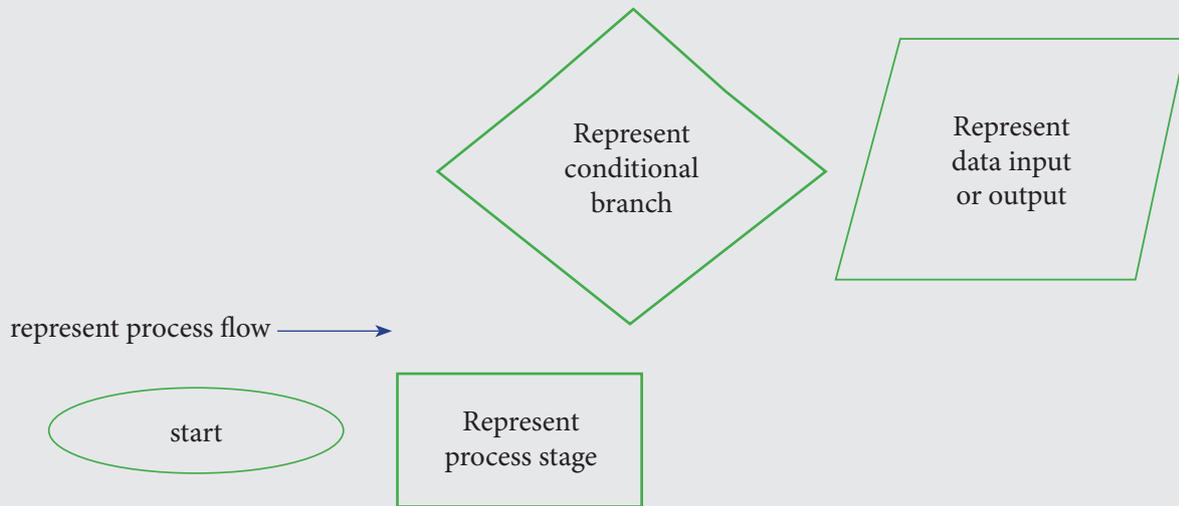
- a. Conditional statements provide a way for decision making in programs. They tell the program to follow a set of instructions if some conditions are met. The conditional statements are of two types:
 - a. If statement: it checks whether the condition is TRUE or FALSE. IF keyword is used to write these statements. They have the syntax:

```
if (condition):  
do this  
END if
```
 - b. If-else statements: It checks the condition, if the condition is met, the line of code that follows the IF block is executed, else the line of code after the ELSE keyword is executed. It follows the syntax:

```
IF (condition):
```

do this
ELSE:
Do this
END

- c. Algorithms are the sequence of instructions. They are used to solve the problem by defining a clear set of steps. They are important because they allow to conceptualize solutions in discrete steps. They help to develop reasoning abilities too.
- d. Flowcharts are the pictorial representation of an algorithm. They show step by step ways of solving a problem. It allows one to express ideas about solving a problem pictorially. The flowcharts use various shapes to indicate the various steps and conditions:



- e. The nesting refers to a concept in programming, which means placing one programming construct inside the other. It is a way to structure and organize code. An example code is given below:

```
//take input from the user
scanf("%d %d %d", &a, &b, &c);

//if else condition to check whether first two numbers are equal
if (a == b) {

    //nested if else condition to check if c is equal to a and b
    if (a == c) {
        //all are equal
        printf("Yes");
    } else {
        //all are not equal
        printf("No");
    }
} else {
    //the first two numbers are not equal, so they are not equal
    printf("No");
}
```



Application Based Questions

1. Algorithm for fixing tv.
STEP 01: TV wont turn on
STEP 02: Check if TV is plugged in
STEP 03: if its plugged in, check the batteries in remote
Step 04: if its not plugged in, plug the tv
Step 05: go to step 03 again. If batteries are in the remote then
Step 06: take the TV for repair
STEP 07: if not the put in batteries
2. A simple problem can be making a tea, Whereas complex problem can be creating an online map. In both cases, it is important to solve problems using algorithmic thinking and applying the process of computational thinking such as pattern recognition, abstraction, decomposition, etc. Solving a simple problem will require fewer resources and less data. And for complex problems, its important to brainstorm ideas and follow problem solving strategies to reach a solution.
3. The pseudocode is given below:
BEGIN
NUMBER len, area
INPUT len
area = len*len
OUTPUT area
END
4. A variable is used to hold values or data whose value can be changed at any stage during a program. On the other hand consonant is used to hold values that do not change during the program execution.



In the Lab

1. The algorithm is as follows:
DECLARE X AS INTEGER
DECLARE MIN AS INTEGER
DECLARE NUM AS INTEGER
MIN=100
FOR X=1 TO 7
INPUT NUM
IF NUM<MIN THEN
MIN=NUM
NEXT
PRINT MIN



Group Project

1. a) If I catch the 9.00 ferry then I will not be late.
b) If I don't wash this dress then I won't have anything to wear tonight.
2. a) If he finishes the major project then he will graduate.
b) If she finishes the homework, then she will go shopping with her friends.

Lesson plan

Recommended number of periods is two. The teachers are advised to break down the lesson plan as per the class needs and availability of the resources.

Resources: Textbook, teaching guide, projector, laptop

Pre-requisite: Familiarity with algorithms, computational thinking, C programming, Scratch programming, programming constructs such as loops, conditional statements and sequences

Introduction:

Begin the lesson by asking students about their understanding of algorithms. Students, by now must have a clear understanding of it. Next, ask them about programming languages. Help them recall the concepts they learnt in C programming and Scratch.

Explanation:

The chapter covers both the textual programming language as well as visual programming. Teachers are advised to reserve two sessions for this chapter. In the first session, they must demonstrate Python language and should provide sufficient time to students for practice.

In the second session, ask students to work independently and work on the minigame: The Wizard Battle given in the textbook on pgs 96-109.

Explain to students the difference between visual programming and textual programming. Help students recall that the scratch programming interface is an example of visual programming, whereas C language is an example of textual programming language.

Ask students to read the text given on pg 86 and 87. Use inquiry to gauge students' understanding. Ask questions such as: "What is a computer program?" "How is program different from an algorithm?" "which programming languages are mentioned in the book?" "Are you aware of any other languages?"

Next, ask students to download the PyCharm software from the internet. Encourage students to search, download and install the tool independently. Ask them to follow the steps illustrated on pg 80-91 to install the tool.

After they have downloaded the tool, demonstrate the working of the codes given on pgs 92-94. It is recommended that teachers must make deliberate errors in the code while demonstrating and ask students to identify the mistakes in the code and debug it. Teachers must also encourage students to try different input parameters to see how the output changes. Students must be encouraged to practice and write code independently.

Digital content:

Assessments: There is a specialised assessment section of objective questions based on the entire chapter. It can be assigned to students in part after completing specific topics in class or as a whole at the end of the chapter. It can be used for reinforcement of concepts as home task or as marked assessment.

Classwork:

Minigame: The Wizard Battle.

Homework:

Objective type questions, Descriptive type questions, Application based questions, Group project

Conclusion:

Provide a brief recap of all the concepts explained in the class. Scaffold student learning by elaborating the concepts that students find challenging to grasp.

Assessment:

At the end of the lesson, students will have achieved the following learning outcomes:

1. Use both simple and complex loops
2. Discuss the concept of constants and variables a computer program
3. Create a game using in visual programming language tool

 **Answer to Exercise**

 **Objective Type Questions**

1. Choose the correct answer

a) a programmer	b) B++	c) python3
d) =	e) all of the above	

 **Descriptive Type Questions**

a. A programming language is the computer language used by programmers and developers to write and develop different programs and software. The most commonly used programming languages are:

- C++
- JavaScript
- Python
- Java
- C

b. The table below shows the difference between the different types of languages:

Languages	Features	Applications
Assembly language	It is a low-level programming language It allows complex jobs to run in a simple way It is based on computer architecture, hence provides help in contacting the hardware	Used for: Coding device drivers Low level embedded systems Reverse engineering
C++	Mid-level programming language Has lots of built-in functions It helps to structure and break the problem in different parts	Used in: Programming OS Games Banking applications
Java	Capable of handling runtime errors Has strong memory management system More secure than other languages	Used in: GUI Web based gaming Cloud based application

c. To install python:

1. Search for PyCharm download
2. Choose platform and click download
3. Choose where to download file and wait for it to download
4. On the installation window click NEXT
5. Select the installation folder and click NEXT
6. Select all options and click NEXT
7. Let the installation finish
8. Reboot the computer after saving your work and launch the software after the computer reboots
9. Accepts terms and conditions after the launch

d. Following are the steps to create and run the program in SCRATCH

1. Create a new project
2. Rename the project
3. Click create
4. Erase everything in main.py and start coding
5. To run the code, right click and select Run main or press ctrl+shift+F10

e. The blocks in scratch can be dragged from the block palette and dropped into the script area. The blocks can cascade with each other to form a script and run the code.

f. The description of different blocks present in SCRATCH are given below:

1. **Motion blocks:** they help the sprite to move in different directions.
2. **Looks block:** allows to change the color, size and costume of the sprite.
3. **Sound block:** allows to add sounds to your program. You can add sound from the default sound library or upload from your computer.
4. **Events:** tell scratch when to start the program by specifying a triggering movement such as clicking the green flag.
5. **Control block:** provides options such as wait, use loops or conditional statements.
6. **Sensing:** they are used to detect things such as position of mouse pointer on the screen.
7. **Operators:** allows to perform calculations on both numbers and text also known as strings.
8. **Variables:** allow to save the variables that are used in the program.
9. **My blocks:** allow to create your own blocks for a sprite. You can name this block and define what the new block does using other scratch blocks.



Application Based Questions

1. The code is given below:

```
print("Enter Marks Obtained in 3 Subjects: ")
mOne = int(input())
mTwo = int(input())
mThree = int(input())
sum = mOne+mTwo+mThree
perc = (sum/300)*100
print (end=" Sum")
print (sum)
print(end="Percentage Mark = ")
print(perc)
```

2. The following techniques can be used to implement game mechanics in SCRATCH
 - a. Choose a game idea and plan the objectives of the game
 - b. Identify the sprites and the backgrounds you will need. Also identify if the sprites are available in the library or you will need to paint a new one
 - c. Identify the number of levels you want in the game
 - d. Decide the winning and losing strategy
 - e. Write the scripts to control the game behaviour
 - f. Test the game and look for bugs. Correct the bugs and make adjustments accordingly.
3. For more complex games, nested loops and conditional statements are used.



In the Lab

1. `num = 500`
`num = num+500`
`print (num)`
2. the code to write table of 2 is given below
`num = 2`
`counter = 1`
`while counter < 11:`
`answer=num*counter`
`print (answer)`
`counter=counter+1`
3. the code to compare the marks of 3 students is given below:

```
number1 = int(input('Enter marks of First student : '))
number2 = int(input('Enter marks of second student : '))
number3 = int(input('Enter marks of thirs student : '))
if (number1 > number2) and (number1 > number3):
    largest_num = number1
elif (number2 > number1) and (number2 > number3):
    largest_num = number2
else:
    largest_num = number3
print("the highest marks are : ", largest_num)
```



Group Project

```
number1 = int(input('enter the first number : '))
number2 = int(input('enter the second number : '))
selection = int(input('enter the selection 1 for addition and 2 for
subtraction'))
if selection == 1:
    result=number1+number2
    print(result)
elif selection == 2:
    result=number1-number2
    print(result)
else:
    print('not a valid selection. Try again')
```

6

Advance C Language

Lesson plan

Recommended number of periods is two. The teachers are advised to break down the lesson plan as per the class needs and availability of the resources.

Resources: Textbook, teaching guide, projector, laptop

Pre-requisite: Familiarity with algorithms, computational thinking, C programming, programming constructs such as loops, conditional statements and sequences

Introduction:

Begin the lesson by asking students about their understanding of algorithms. Students, by now must have a clear understanding of it. Next, ask them about the C programming language. For instance, you may use inquiry based learning to support recall: “What is the difference between low-level programming language and high-level programming language?” “How would you categorize C programming language?” “Share your understanding of keywords?” “Provide examples of keywords used in C programming language?” Write a sample code on the C online editor, and make some deliberate mistakes in it. For example, do not put semicolon at the end of the statement. Ask students to debug the code. As a quick revision, ask them to write a simple Program in C that displays their name, class and topic name.

Explanation:

The chapter covers advanced features of the C language. Before you start these, students must be familiar with the basics of C language. If students find it challenging, it is advised to give them a quick recap of the basic concepts.

Elaborate the Arithmetic, relational and logical operators given on pgs 112-113. Demonstrate the code illustrated in figure 6.1 on pg 114 of the textbook. Ask students to use the same logic and write a program that finds the perimeter of the rectangle.

Next, demonstrate how to use built-in functions in C, showcasing the examples illustrated in figure 6.4 on pg 115. For the first session, spare 10-15 minutes of class time at the end of the class and ask students to practice the codes. Encourage them to write their own codes making use of the concepts they have studied. Also, ask them to attempt In The Lab exercise given on pg 124.

In the second session, explain the concept of Functions in C programming. Help students understand the difference between built-in functions and user defined functions. Demonstrate the working of the program illustrated in figure 6.7 on pgs 116 and 117.

Elaborate the concept of conditional statements (if and if-else) and loops (for, while and do-while loop) given on pgs 117-122. Encourage students to practice all the sample codes provided in the examples in the textbook.

Digital content:

Assessments: There is a specialised assessment section of objective questions based on the entire chapter. It can be assigned to students in part after completing specific topics in class or as a whole at the end of the chapter. It can be used for reinforcement of concepts as home task or as marked assessment.

Classwork:

In the lab, descriptive questions, objective type questions.

Conclusion:

Provide a brief recap of all the concepts explained in the class. Scaffold student learning by elaborating the concepts that students find challenging to grasp.

Assessment:

Discuss objective type questions and descriptive questions verbally in class as formative assessment to gauge students' understanding of the concepts.

At the end of the lesson, students will have achieved the following learning outcomes:

1. Differentiate between arithmetic, relational and logical operators.
2. Identify and apply built-in functions and user-defined functions.
3. Differentiate between printf and scanf commands and use them appropriately.
4. Design complex programs using various programming constructs such as nested loops, for loop, while loop, do-while loop.
5. Apply conditional statements when writing programs.

Answer to Exercise

Objective Type Questions

1. Choose the correct answer

a) all of them	b) using the if keyword	c) using the printf functions
d) always executes the code block at least once	e) union operators	

Descriptive Type Questions

- a. 12
- b. 24
- c. 24

d. The following are the types of operators in C language:

i. Arithmetic operators: these operators help to perform arithmetic operations. The various arithmetic operators are given below:

Operator	Description
+	Adds two operands
-	Subtracts two operands
*	Multiplies two operands
/	Divides numerator by denominator
%	Finds remainder after division
++`	Increases the value by 1
--	Decrement operator decreases the value by 1

ii. Relational operator: these test the relationship between two entities. They are given below:

Operator	Description
==	Checks if the value of both entities is same or not. Returns true if it is
!=	Not equal to checks if both entities are same or not. If the values are not equal it returns true
>	Checks if the value of left operand is greater than the right operand
<	Checks if the value of left operand is lesser than the right operand
>=	Checks if the value of left operand is greater than or equal to the value of right operand
<=	Checks if the value of left operand is lesser than or equal to the value of

iii. Logical operators: these are used to check the conditions. They are described below

Operator	Description
&&	AND operator, returns true if both the operands are non-zero
	OR operator, returns false, if any of the two operands are non-zero
!	NOT operator. Used to reverse the logical state of an operand.

e. The functions in programming provide a way of writing a piece of code once and reusing it again and again by simply calling it wherever needed in the program, without having the need to rewrite the code again. Using functions make programs robust and efficient.

f. Control statements: these statements help to control or define the flow of the program. With sequential statements, the programs run in the order it is written, whereas, control statements test some conditions and then decide the flow of the program. The control statements are:

i. Looping statements: they allow a block of code to be executed multiple times based on some conditions. For loop, do-while loop, while loop and nested loop are examples of looping statements.

ii. Conditional statements: they test a certain condition and direct the flow of program on basis of

that. These include IF and IF-ELSE statements.

- g. The files are needed because:
- i. When the program is terminated, all the data is lost. The files help preserve the data even when the program is terminated.
 - ii. If all the data is in the file, it can easily be accessed only by writing a few commands in C.
 - iii. Helps to move the data from one PC to another.



In the Lab

```
int main() {
    int p, q;
    int sum, sub, mul, mod;
    float div;
    // It will take two integer numbers
    printf("Enter any two positive integer numbers:\n");
    scanf("%d%d", &p, &q);
    // It will perform all arithmetic operations
    sum = p + q;
    sub = p - q;
    mul = p * q;
    div = (float)p / q;
    mod = p % q;
    // It will print the final output of the program
    printf("\n");
    printf("Addition of    %d + %d = %d\n", p, q, sum);
    printf("Subtraction of  %d - %d = %d\n", p, q, sub);
    printf("Multiplication of %d * %d = %d\n", p, q, mul);
    printf("Division of    %d / %d = %f\n", p, q, div);
    printf("Modulus of    %d %% %d = %d\n", p, q, mod);
    return 0;
}
```

Lesson plan

Recommended number of periods is two. The teachers are advised to break down the lesson plan as per the class needs and availability of the resources.

Resources: Textbook, teaching guide, projector, laptop

Pre-requisite: Familiarity with algorithms, computational thinking, C programming, basics of visual basic, programming constructs such as loops, conditional statements and sequences

Introduction:

Begin the lesson by asking students to recall the concepts they learnt in chapter 7. Use inquiry to support recall, asking questions such as: “What do you remember about operators in C language?”, “What do you remember about functions? Why are they used?” Next, inquire about what students remember about Visual Basic language. Ensure that Visual Studio 3 is downloaded and installed on all the computers. If not, ask students to download and install it.

Explanation:

Explain to students that the logic and the concepts, such as data types and variables remain same for all the languages. Computer languages differ only in their structure or syntax. Elaborate the concept of GUI and IDE. Ask students to read the topic Introduction to Visual Basic given on pg 125. Provide a brief explanation of the operators given on pg 126. Relate this topic with their understanding of operators in the C language. Ask students to analyze any difference between the two.

Students by this point are already familiar with the programming constructs. Teachers must encourage students to take ownership of their learning. Ask students to read through the text given on 127-131. Also, instruct students to practice all the sample programs as well. While students are doing so, teachers are advised to monitor student activity closely. Observe keenly what students find easy and what they find challenging. Provide support to students where required. If the entire class is struggling with any concept or program, make a note of that and explain it collaboratively to the entire class.

Ask students to attempt In the Lab exercise 1 in class.

In the second session, explain and demonstrate in detail the concept of arrays and multidimensional arrays, 132-133. Demonstrate the program illustrated in figure 7.14 on pg 133.

Digital content:

Assessments:

There is a specialised assessment section of objective questions based on the entire chapter. It can be assigned to students in part after completing specific topics in class or as a whole at the end of the chapter. It can be

used for reinforcement of concepts as home task or as marked assessment.

Homework:

Objective type questions, Descriptive type questions and In the Lab.

Conclusion:

Provide a brief recap of all the concepts explained in the class. Scaffold student learning by elaborating the concepts that students find challenging to grasp.

Assessment:

At the end of the lesson, students will have achieved the following learning outcomes:

1. Identify and use different types of operators in Visual basic.
2. Use different programming constructs when writing programs.
3. Define and use arrays to handle data in programming.



Answer to Exercise



Objective Type Questions

1. Choose the correct answer

a) for loop

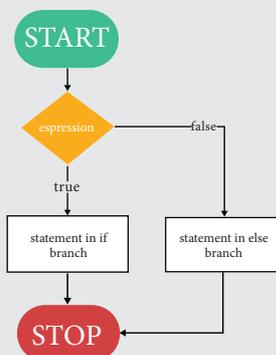
b) sub

c) integrated development environment



Descriptive Type Questions

a.



- b. The while loop first checks the defined or tested condition. If the condition is met then the statements in the while block are executed. However, in the do-while loop, the statements in the DO block are executed and then the condition is checked. The loop runs the program at least once before checking the condition.



In the Lab

1. Encourage students to use programming constructs to make a quiz.
2. Hint: Use for loop and decrement operator

```
Dim Games(5) As String

Games(0) = "GTA4"
Games(1) = "Battlefield 3"
Games(2) = "SWAT 4"
Games(3) = "Arma 2"
Games(4) = "RollerCoaster Tycoon 3"
Games(5) = "GRID"

Dim x As Integer

x = 0
Console.WriteLine("Pick a Number between 0 and 5")
x = Console.ReadLine()
Console.WriteLine(Games(x))
Console.ReadLine()
```

Lesson plan

Recommended number of lessons for this chapter is two. The teachers are advised to break down the lesson plan as per the class needs and availability of the resources.

Resources: Textbook, teaching guide, projector, laptop

Pre-requisite: Internet search techniques, the basic concept of digital citizenship, and online safety

Introduction:

Begin the lesson by playing the Reality River game collaboratively with the class. Encourage students to respond to the different questions in the game. To make the activity more engaging, you can divide your class into teams, preferably 3-4 members in one team. The team that raises a hand first will get the chance to answer first. Also, encourage students to share their reasoning about why they think a particular response is right. Teachers can decide the incentive for the winning team.

Explanation:

Since students are expected to have a fundamental understanding of digital citizenship and online safety, encourage them to share their understanding of the terms privacy, cyberbullying, and misinformation, given on pg 136. At this point, use inquiry to gauge the understanding of students. For instance, you may ask them: “What should you do if someone threatens you on the internet?” The expected response can be: “Report to a teacher or trusted adult.” Or “How can you check for misinformation?” The expected response can be: “Cross-check the information from authentic sources”.

Next, ask students to read through Adopting Safe Practices Online and the Importance of Being Safe, Responsible, and Respectful on pg 137.

Elaborate the concept of copyright, piracy, and plagiarism. Elaborate on the topic of Threats of the Internet on pg 140 and Cybercrime and its types are given on pgs 141-142. Assign the following topics to students for class presentation:

1. Improper use of computer resources – pg 138
2. Secure information – pg 138
3. Uses of the Internet in business, social networking, entertainment, information/news – pg 139
4. Appropriate and inappropriate behaviour while navigating the internet – pg 139
5. Positive and negative impact of social media – pg 140

It is recommended that the teachers should encourage students to use internet search techniques and read more on these topics and prepare a PowerPoint presentation. Teachers can reserve the second session for student presentations.

Digital content:

Assessments: There is a specialised assessment section of objective questions based on the entire chapter. It can be assigned to students in part after completing specific topics in class or as a whole at the end of the chapter. It can be used for reinforcement of concepts as home task or as marked assessment.

Homework:

Objective type questions, Descriptive type questions, and In the Lab.

Conclusion:

Provide a brief recap of all the concepts explained in the class. Scaffold student learning by elaborating the concepts that students find challenging to grasp.

Assessment:

At the end of the lesson, students will have achieved the following learning outcomes:

1. Understand different ethical issues related to the use of the internet such as cyberbullying, misinformation, and privacy.
2. Identify and practice safe practices online
3. Understand the concepts of copyright, plagiarism, and piracy
4. Practice securing information when using the internet and social media.
5. Identify various applications of the Internet in business, education, and the entertainment industry.
6. Identify various internet threats such as malware, phishing attacks, cyberbullying, and identity theft.
7. Understand the positive and negative impact of social media.



Answer to Exercise



Objective Type Questions

1. Choose the correct answer

a) all of these

b) all of these



Descriptive Type Questions

Provide this question as a home activity. The responses to this will vary from student to student depending on the discussion they have with their parents at home.



In the Lab

Encourage students to use Internet search techniques and find the required information.



Group Project

Students should be encouraged to use the internet to research this and come up with answers.

9

Entrepreneurship in Digital Age

Lesson plan

Recommended number of lessons for this chapter is two. The teachers are advised to break down the lesson plan as per the class needs and availability of the resources.

Resources: Textbook, teaching guide, projector, laptop

Pre-requisite: Design thinking process, entrepreneurship process, familiarity with innovation.

Introduction:

Begin the lesson by asking students to recall the concept of design thinking and entrepreneurship. Ask them to share examples of some entrepreneurs and the businesses they do.

Next, ask students what they understand by digital entrepreneurship and why they think it's important. Expected responses could include that digital entrepreneurship involves conducting business through the internet. The Internet makes it easy to manage the business and provides more reach (pg 144).

Explanation:

Elaborate the term Digital Entrepreneurship. Help them differentiate digital entrepreneurship from traditional entrepreneurship, by explaining that doing business through digital means is convenient in the sense that it does not require a large amount of investment.

Explain to students the different components of a business plan in detail given on pg 145. Demonstrate the process of setting up a Facebook ad campaign as elaborated on pgs 147-154.

In the next session, elaborate on the Steps to create the business plan, and a SWOT analysis as given on pg 155. Demonstrate the different features of MS Publisher and work with it. It is recommended that teachers encourage students to read through the text and explore the software on their own (pgs 164-172).

Digital content:

Videos may be assigned before studying the relevant topic or after the topic is complete as a reinforcement.

List of videos:

1. Marketing Business Plan

Assessments: There is a specialised assessment section of objective questions based on the entire chapter. It can be assigned to students in part after completing specific topics in class or as a whole at the end of the chapter. It can be used for reinforcement of concepts as home task or as marked assessment.

Classwork:

Objective type questions

Homework:

Descriptive type questions, In the Lab, Group Project

Conclusion:

Provide a brief recap of all the concepts explained in the class. Scaffold student learning by elaborating the

concepts that students find challenging to grasp.

Assessment:

At the end of the lesson, students will have achieved the following learning outcomes:

1. Develop an understanding of digital marketing
2. Familiarize yourself with the concept of digital entrepreneurship
3. Use social media to market business
4. Create a business plan by highlighting different components of the business, including market need, product design, costing, operations, and marketing.
5. Use Microsoft Publisher 365 to create digital content for marketing purposes.

Answer to Exercise

Objective Type Questions

1. Choose the correct answer

a) digital entrepreneurship	b) 5	c) SWOT	d) Promote	e) both a and b
f) both a and b	g) objects			

Descriptive Type Questions

- a. Digital entrepreneurship refers to the process of creating a business on the Internet and selling products online. With digital entrepreneurship, the need of operating the business through physical needs is eliminated. Some examples of digital businesses are online courses, e-commerce, blogs, YouTube, etc.
- b. SEO stands for Search Engine Optimization. It is the process by which the visibility of the site can be increased on the internet when people search for products or services related to the business on Google or other search engines.
- c. Business plan is a document that describes the business and the company's objectives, operations, marketing objectives, and financial projections. It has the following parts:
 - a. Executive Summary: it explains the business idea briefly.
 - b. Business description and structure: describes in detail the purpose of the business and the products or services one is offering. It is important to highlight the value proposition of the products or services being offered.
 - c. Market research and promotional strategies: it describes sales forecast, promotions, public relations, and how the business stands in relation to its competitors.

- d. Financial Documents: it describes profit and loss statements, balance sheets, etc.
- d. The steps to create a Facebook ad are listed below:
 - a. Select the campaign objective: this should align with your advertising goals. It is important to choose the right objective for your advertising. The various options available are brand awareness, reach, traffic, app installations, messages, lead generation, etc.
 - b. Select a name that best represents your ad campaign. This makes it easier to scale up and organize campaigns.
 - c. The next step is to see if the ad falls under a special category. Once that is done, conduct an A/B test. This will let you run experiments and collect data. The budget optimization options help you to determine how to allocate your campaign budget among your many ad sets in the most effective way possible.
 - d. Set the ad budget in the Budget and Schedule section.
 - e. Next, set up your target audience. This allows you to target likes or interests on Facebook as well as behaviours, allowing you to make your campaign reach the right audience.
 - f. Select where on Facebook's vast network you want your ad to appear.
 - g. The last step is selecting the preferred Facebook ad type and inserting your ad images and copy.
- e. Some of the traditional ways of marketing are:
 - a. Newspaper ads
 - b. Billboards
 - c. Mail advertisements
 - d. TV and radio advertisements.
- f. The page navigation pane allows you to view and work with all the pages in your publication. It shows page thumbnails and allows you to add, delete, rearrange, and duplicate pages in the pane.
- g. The two additional tabs that appear on the ribbon are:
 - a. Drawing tools
 - b. Textbox tools
- h. The difference between MS Word and Publisher are given below:

MS Word	MS Publisher
Word processor software	Desktop publication software
Used to create CVs or reports or other general documentation	Used to create documents that are more graphical such as brochures, flyers, posters, etc

The similarities between MS Publisher and MS Word are:

1. The interface is pretty much the same.
 2. Both allow typing of text and import images.
 3. Both allow to store documents directly on the cloud.
- i. Ask students to search for various inspirations on the internet and work on them.



Application Based Questions

1. Students can refer to and look for various business plans on the internet and can make a business plan accordingly. They must include all the business plan components covered in the chapter.
2. a) Salar has used a typography feature
b) To apply the text, follow the steps below:
 - i. Select the text
 - ii. In the TYPOGRAPHY group, in the FORMAT tab, click Drop Cap
 - iii. Select the drop cap style from the gallery
3. a) The linking feature can be used to connect the text boxes.
b) The steps to link the textbox are given below:
 - i. Select the left textbox
 - ii. Click the FORMAT tab, under the textbox tools, and in the LINKING group, click CREATE LINK.
 - iii. The cursor changes to the link icon. Click on the textbox that you want to link to.
 - iv. The textboxes are now linked. Resize the textbox as you wish.



In the Lab

Students are expected to work on these tasks. The teachers may ask students to use the internet to look for design inspiration if needed.



Group Project

Students should be encouraged to use the internet to research this and come up with answers.

Emerging Technologies



Worksheet 1

Choose the correct answer:

- Emerging technology refers to:
 - New technologies
 - Technologies that change the way we work
 - new technologies
 - all of them
- _____ is a photographic technique in which 3D objects are recorded using a laser and then restored as precisely as possible to match the original object.
 - 3D imaging
 - 3D modeling
 - 3D printing
 - None of them
- Google Chrome web browser is an example of the following emerging technology:
 - 3D modeling
 - Augmented reality
 - Virtual reality
 - Distributed computing
- The term artificial intelligence was first introduced by:
 - Charles Babbage
 - John McCarthy
 - Issac Newton
 - None of them

5. Which of the following best describes the 5G technology?
- Mobile video consumption
 - SMS
 - IoT
 - All of them
6. _____ is an engineering field that deals with the conception, design, and construction of intelligent devices that allow automation.
- Robotics
 - Artificial intelligence
 - Virtual reality
 - All of them
7. _____ is an example of digital currency.
- Bitcoin
 - Blockchain
 - Both a and b
 - None of them

Fill in the blanks:

- Agents that help classify emails as spam are called _____.
- _____ and _____ are AI-based applications and are used widely for entertainment purposes.
- _____ overlays digital images on top of the real world.
- Creating prototypes and finished products such as household items can be achieved through _____.
- Hologram technology is also known as _____.
- CAT stands for _____.

Short questions and answers:

- Enlist 5 areas where robotics is used.
- The table below shows examples of different emerging technology applications. Classify these applications

by identifying the correct ET type:

Example	Emerging Technology Type
Snapchat filters	
Netflix	
Google Cardboard	
Google Translator	

3. What do you understand by the term Machine Learning?
4. Give two reasons for how you think AI can be useful in education.

Higher-order questions:

1. One of the applications of AI that you have read in the chapter is its vast use in the e-commerce industry. The use of AI in e-commerce has made our shopping experience enthralling. When purchasing, we only get recommendations of the products or services that are of interest to us and hence it saves us a lot of time. But if we pause and think for a moment, have you ever wondered if there could be any potential drawbacks to using AI in e-commerce? Some factors are listed below, brainstorm and write what you think can be disadvantages of using AI in e-commerce.
 - a. Cost
 - b. Customer bias
 - c. Privacy concerns
 - d. Lack of human interaction
 - e. Security risks
2. Imagine you went on a vacation with your friends and uploaded lots of pictures on social media and tagged your friends. The social media service was able to identify all your friends in the pictures. How do you think this happened? Do you think it is always safe to upload pictures on social media? If not, why? What are the security and privacy measures that one should seek?
3. Throughout the chapter you have read and understood in detail various emerging technologies. Which technology fascinates you the most? Why? Also, reflect on how you think our world would look in the future. You can either pen down or illustrate your responses.

Computer Network



Worksheet 2

Choose the correct answer:

1. People are interconnected around the globe through:
 - a. Internet
 - b. Computer network
 - c. Satellite
 - d. All of them
2. _____ connect devices such as hubs, switches, and routers:
 - a. Network interface card
 - b. Host
 - c. Nodes
 - d. All of them
3. The structure that determines how computers are arranged and connected is known as:
 - a. Network architecture
 - b. Client-server architecture
 - c. Both a and b
 - d. None of them
4. Which of the following defines STAR topology
 - a. Every node is connected to many other nodes
 - b. Central node is linked to multiple client networks
 - c. Each node is linked to two other nodes
 - d. Both b and c
5. _____ is used in armed forces for communication
 - a. WLAN
 - b. LAN

- c. PAN
 - d. None of them
6. Radio waves is an example of:
- a. Guided media
 - b. Transmission media
 - c. Unguided media
 - d. Both b and c
7. _____ is a transmission media that allows one to share information between fixed and mobile devices over short distances.
- a. Bluetooth
 - b. GPS
 - c. Wifi embedded system
 - d. All of them

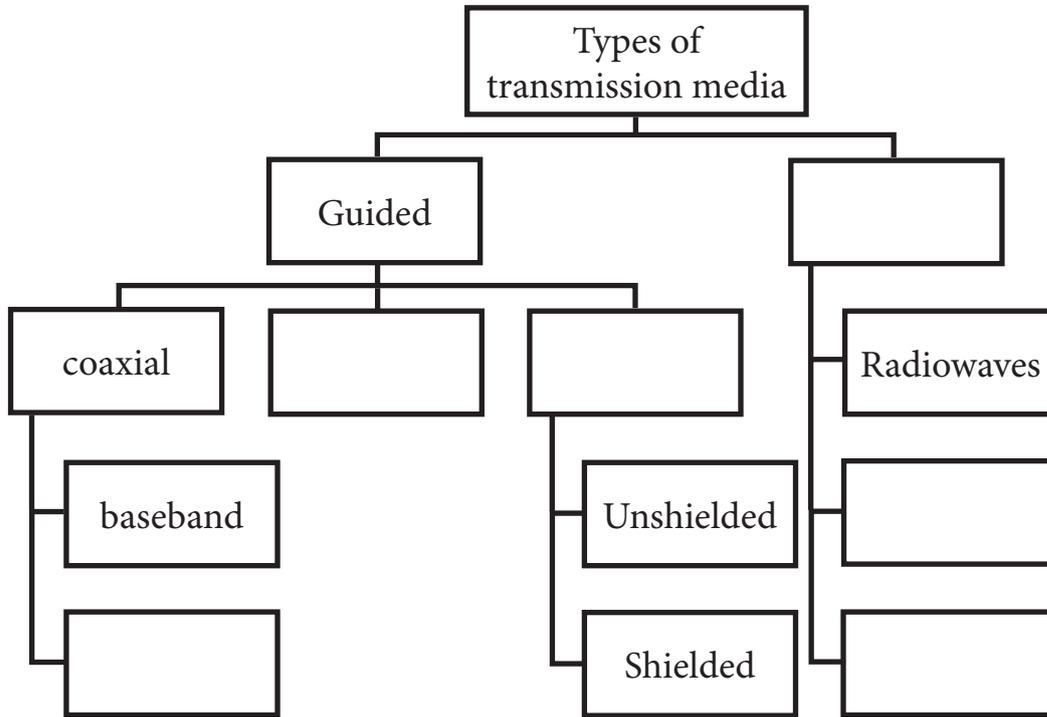
Fill in the blanks:

1. IoT stands for _____.
2. _____ is characterized by dozens or hundreds of thin strands of glass or plastic that carry data pulses of light.
3. _____ bypasses geographical restrictions.
4. The network that can be utilized to connect devices throughout one building or more depending on the proximity of the building is called _____.
5. An example of PAN technology is _____.
6. Network topology is characterized by the arrangement of _____ and _____.
7. The network where resources are shared between connected devices and there are no dedicated client or server computers is called _____.

Short question and answer:

1. Draw the following arrangements:
 - a. Star
 - b. Ring
 - c. Bus
 - d. Mesh

- Name the key factors to consider when designing a network topology
- Complete the chart below:



- Mention one advantage and one disadvantage of fiber optic cable.
- Why is network security important? How can you ensure it?
- Complete the table below:

Name	Description	Characteristic
LAN		Advantage: Offers the center to share a single internet connection among all LAN users Disadvantage: Data is at risk of being used by unauthorized users
	Used for one individual and can connect only a handful of devices such as computers, smartphones, or printer	Advantage: Relatively secure and safe _____ Disadvantage: _____

		<p>Advantages: Requires less wiring Lesser in cost</p> <p>Disadvantages: If the number of devices is increased, the connectivity decreases External factors may affect the communication</p>
MAN	Connects multiple LANs and spans across an entire geographical area	<p>Advantage: _____</p> <p>_____</p> <p>Disadvantage:</p>
	Acts as a middleman between you and the network by encrypting your data	<p>Advantage:</p> <p>Disadvantage: Free from online censorship The providers monitor all activity</p>

7. Define:

- a. Edge computing
- b. Lifi
- c. Data analysis

Higher-order questions:

1. The Internet Usage and Monitoring checklist is given below. Study the parameters of this checklist carefully and evaluate your internet usage. Tick Yes for the areas that you fulfill and NO for the areas that you do not. Once you are done, reflect on your analysis.

Parameters	Yes	No
I am aware of the dangers and risks of the internet		
I am well aware of the fact that my identity is important		
I stay aware of strangers on the internet		
If I want to arrange a meeting with someone I met online, I tell my parents first and make sure one of them comes with me.		
If an online message makes me feel uncomfortable or frightened, I do not respond to it. Instead, I tell a trusted adult right away		
I keep my social media accounts secure and use strong passwords		
I do online shopping from secure sites		
I understand the website's privacy policy		
Backup important data regularly		
Keep privacy settings on when using social media		

Spreadsheet software



Worksheet 3

Choose the correct answer:

- Which of the following tool helps to analyze and interpret data:
 - Google Sheets
 - Apache open office
 - MS Excel
 - All of them
- _____ is a set of letters, and numbers written in a particular style
 - Font formatting
 - Font alignment
 - Font
 - All of them
- The default number alignment in MS Excel is:
 - Bottom-right
 - Bottom left
 - Center
 - All of them
- When the row and column references do not change when copying a formula, this is called:
 - Absolute referencing
 - Relative referencing
 - Mixed referencing
 - Both a and c
- #VALUE! Excel indicates that:
 - The formula refers to a cell that does not exist
 - The column is not wide enough to display the value
 - The formula contains invalid operation
 - The formula has an invalid argument

6. Which of the following is not an AutoSum function:
- SUM
 - AVERAGE
 - MIN
 - TOTAL
7. The COUNT function is characterized by:
- Counts the number of numeric values in a cell range
 - Counts the maximum value in a cell range
 - Totals all the values in a cell range
 - All of them
8. _____ are predefined and perform calculations.
- Functions
 - Formulas
 - Parameters
 - None of them
9. A column chart is best described as:
- Comparing trends in data at equal intervals
 - Illustrates comparison among individual items
 - Illustrate changes in data over a period of time
 - Show changes in the data values at regular time intervals
10. Chart elements include:
- Label
 - Chart title
 - Legend
 - All of them

Fill in the blanks:

- A _____ shows the relationship of parts to a whole.
- X-axis is also known as _____ and y-axis is known as _____.
- ^ represents _____ in Excel.
- Using the order of evaluation, the result of $8*3+5$ will be _____.
- The error message indicated by Excel when an attempt is made to divide a number by zero is represented by _____.
- The sequence of characters is called _____.

7. ="Hello"&" "&"World" will yield the output _____.

8. The chart embedded within a cell is called _____.

Short questions and answers:

1. Look at the data table below and identify the number formatting type against each value:

C	
Data	
	1765
	1234.00
	Rs501,234.00
Rs	672,859.00
	14/08/2023
	Wednesday, 6 September 2023
	8:30:00 AM
	67%
	5/6
	3.00E+08

2. Define circular reference.

3. Consider the datasheet below, and calculate the total expenses in the month of May. Which formula would you use to do so? Determine the expense type in the month of Feb that was the minimum. Mention the formula that you would use to calculate this.

	A	B	C	D	E	F	G
1	Income	Jan	Feb	Mar	April	May	June
2	Salary	\$1,800.00	\$1,800.00	\$1,800.00	\$1,800.00	\$1,800.00	\$1,800.00
3							
4	Expenses						
5	Rent	\$350	\$350	\$350	\$350	\$350	\$350
6	Phone bill	\$25	\$30	\$29	\$15	\$35	\$25
7	Car Fuel	\$90	\$85	\$70	\$65	\$30	\$91
8	Gas Bill	\$50	\$50	\$45	\$50	\$47	\$50
9	Electricity	\$70	\$65	\$75	\$73	\$60	\$80
10	Food	\$200	\$350	\$500	\$250	\$700	\$340

4. Define pie charts and 3D surface charts.

5. Which feature of MS Excel would you use if you are not sure about the type of chart you want to use to visualize your data?

6. You have read about various chart components such as:

- Data table
- X-axis
- Y-axis
- Chart title
- Axis title
- Chart area
- Plot area

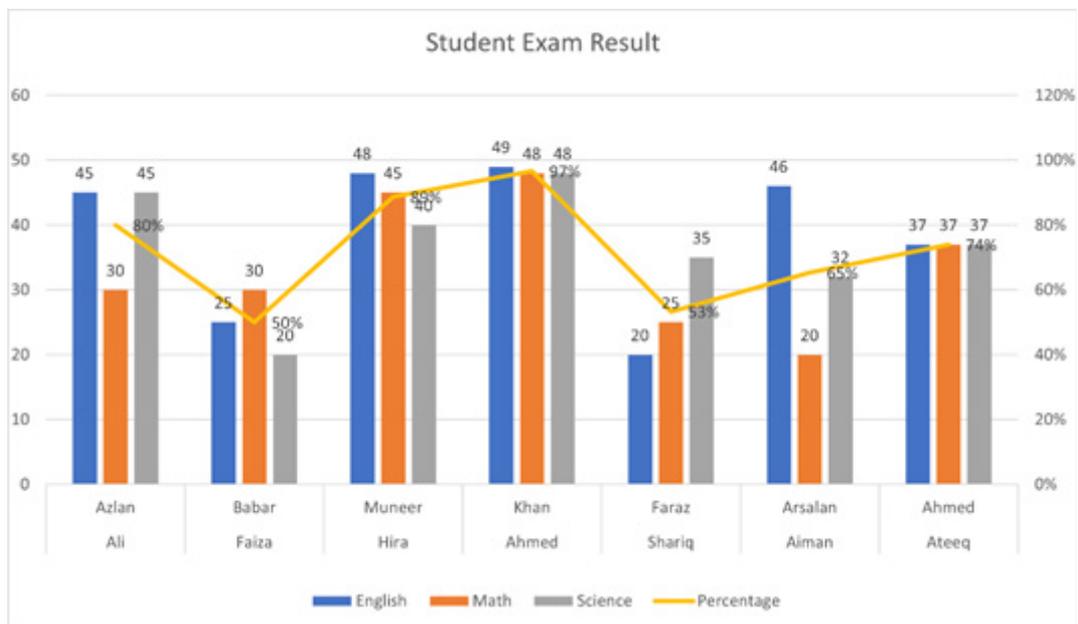
- h. Legend
- i. Gridlines
- j. Data label

If you were to create a chart using only four of these components, which one would you consider? Justify your response with valid reasons.

Higher-order questions:

1. Study the results of examinations, presented in the form of a chart below. Carefully observe these results and write your analysis.

	A	B	C	D	E	F	G	H	I
1	First Name	Last Name	Full Name	Age	English	Math	Science	Total	Percentage
2	Ali	Azlan		13	45	30	45	120	80%
3	Faiza	Babar		13	25	30	20	75	50%
4	Hira	Muneer		13	48	45	40	133	89%
5	Ahmed	Khan		14	49	48	48	145	97%
6	Shariq	Faraz		13	20	25	35	80	53%
7	Aiman	Arsalan		13	46	20	32	98	65%
8	Ateeq	Ahmed		12	37	37	37	111	74%



2. You are now familiar with word processing software, presentation software, and spreadsheets. Using your knowledge and working experience with all three tools, perform an analysis of each. Your analysis should include the following parameters:
 - a. Purpose
 - b. Provider
 - c. Unique characteristics
 - d. Advantages
 - e. Limitations
 - f. Feedback/recommendation for improvement

Algorithmic Thinking



Worksheet 4

Choose the correct answer:

- Sequence of instructions is called:
 - Algorithms
 - Simple problem
 - Both a and c
 - None of them
- Which of the following is not a problem-solving strategy?
 - Act it out
 - Ask for help
 - Draw a diagram
 - Leaving it unsolved
- Sequence of an algorithm is best depicted by which of the following?
 - Flow diagram
 - Flowcharts
 - Circuit diagram
 - Both a and b
- _____ instruct the computer to carry out actions based on certain conditions:
 - Syntax
 - If-Else
 - IF
 - Both b and c
- _____ is used to describe distinct steps in algorithms which is easier to understand.
 - Pseudocode
 - Instruction
 - Block of code

d. Flowchart

Fill in the blanks:

1. _____ represents the decision box in a flowchart.
2. Problems solved through simple series of steps are called _____.
3. Complex problems can be best solved by _____.
4. Problem-solving strategy in which one looks for the patterns involved is called _____.
5. The word algorithm comes from _____.

Short questions and answers:

1. What do you understand by the word efficient algorithm?
2. Draw the following elements of a flowchart:
 - a. Starting or ending stage
 - b. Representation of data input or output
 - c. Representation of process flow
 - d. Representation of process stage

3. Draw the flowchart for the following code:

x=30

z=25

if z<x:

print("z is less than x")

else

print("z is greater than b")

end if

4. Write the syntax for the if statement and if-else statement.
5. How would you differentiate between if statement and if-else? Which one in your opinion is more beneficial? Give at least one reason.
6. What are some limitations of algorithms?
7. What do you understand by nesting in algorithmic thinking?

Higher-order questions:

1. What are some benefits of representing the algorithms graphically?
2. You have studied nesting in algorithmic thinking. Why do you think it's useful? Can we nest conditional statements? If yes, how? Give an example.

Advance programming



Worksheet 5

Choose the correct answer:

1. Which language is best suited to code low-level embedded systems?
 - a. Assembly language
 - b. C++
 - c. HTML
 - d. Java
2. Drag and drop block is an example of:
 - a. Assembly language
 - b. Visual programming language
 - c. C language
 - d. None of them
3. Which of the following was the first computer language?
 - a. C
 - b. Java
 - c. Visual basic
 - d. None of them
4. The language best suited for GUIs and web-based gaming is?
 - a. Java
 - b. C
 - c. Assembly languages
 - d. None of them

5. Which symbol is used to join a string and a number?
- a. +
 - b. -
 - c. *
 - d. All of them
6. Which of the following is a command in Python to declare a variable?
- a. DECLARE
 - b. ASSIGN
 - c. STORE
 - d. None of them
7. Which data type in Python will hold a collection of characters or letters?
- a. Int
 - b. Float
 - c. String
 - d. char
8. %= is an example of:
- a. Comparison operator
 - b. Assignment operator
 - c. Arithmetic operator
 - d. None of them

Fill in the blanks:

1. _____ helps in contacting the hardware directly as it is based on computer architecture.
2. Block-based programming is an example of _____.
3. Every programming language has _____, _____ and _____.
4. The code of Python is executed line by line, hence it is called _____.
5. The command used to display output in C++ is called _____.

Short questions and answers:

1. Complete the table below:

Languages	Features	Applications
	Low-level programming language _____ _____	Boot codes Reverse engineering _____
	Capable of handling runtime errors Strong memory management	
		Used in banking applications Data structures Software engineering Web browser games

2. What do you understand by cross-platform language? Justify your response with an example.
3. Why is python preferred over other languages? Highlight its features.
4. How would you differentiate between programming language and computer program?
5. Write a code for a calculator in Python. It will take numbers as user input.

Higher-order questions:

1. Write a code in Python for password confirmation and Forget Password.

Advance C language



Worksheet 6

Choose the correct answer:

- Blocks of code that perform specific tasks are called:
 - Algorithms
 - Flowchart
 - Conditional block of code
 - Functions
- || represents
 - Addition operator
 - AND operator
 - OR operator
 - NOT operator
- .bin is an extension for which of the following file type?
 - Binary files
 - Text files
 - Document files
 - All of them
- Which keyword is used to take user data as input in C?
 - Printf
 - Printin
 - Scanf
 - Both b and c

5. `\n` is a command in C language which is used for
 - a. New line
 - b. Display the letter 'n'
 - c. Divide something by n
 - d. None of them
6. It is possible to have more than one function in C language
 - a. True
 - b. False
7. Which programming construct is best used to repeat a block of code
 - a. For loop
 - b. If statement
 - c. Sequential statement
 - d. Both a and b

Fill in the blanks:

1. C language is widely used in applications such as _____ and _____.
2. _____ in C language serves as a starting point of the program and calls all other functions.
3. The output of the logical operator can be either _____ or _____.
4. Consider $X=3$ and $Y=2$, the operator $<=$ for the expression $x<=y$ will yield the result _____.
5. _____ are passed to the functions when it is called in the program.
6. Consider $\text{int } x=32$ and $\text{int } y=14$ the statement $\text{if}(x>y)$ will yield the result _____.

Short questions and answers:

1. Spot the errors in the following codes:
 - a. Code 1


```
int main ( )
int number;
for (number = 0 ; Number < 5; number++)
```

```
printf("welcome to C");  
}  
return 0;  
}
```

b. Code 2:

```
int main (  
{  
int x=20  
int y=22  
if(x<z):  
{  
printf("variable x is less than z")  
}  
return 0;  
}
```

2. Write the syntax for:

- a. Function
- b. Printf
- c. Scanf

3. Draw the flowchart to illustrate conditional and Loop statements.

4. Define the Escape sequence.

5. Mention 3 advantages of using built-in functions.

6. Enlist the type of operators in C.

Advance Visual Basic



Worksheet 7

Choose the correct answer:

1. An element in visual basic that tells the compiler to perform mathematical or logical manipulation is called an:
 - a. Operator
 - b. Block of code
 - c. Function
 - d. Both a and b
2. The AND operator in visual basic is represented as:
 - a. ||
 - b. Keyword AND
 - c. &&
 - d. Both b and c
3. The XOR operator in VB is represented as:
 - a. XoR
 - b. X||
 - c. Both b and c
 - d. None of them
4. Which of the following negates the statement?
 - a. -
 - b. +
 - c. False
 - d. NOT
5. <> represents _____ in VB?
 - a. OR
 - b. Less than or equal to

- c. Not equal to
 - d. Equal to
6. Which keyword is used in VB to write for loop?
- a. FOR
 - b. REPEAR
 - c. FOR-NEXT
 - d. All of them
7. _____ -- checks the condition after the execution of all statements in the body of the loop
- a. While loop
 - b. For loop
 - c. Do-while loop
 - d. All of them

Fill in the blanks:

1. The if condition in visual basic is represented as: _____.
2. Visual basic uses the system called _____.
3. The operator to concatenate two expressions in VB is represented by _____.
4. A variable with a single name that stores elements of the same data type is called _____.

Short questions and answers:

1. How is a Label different from Textbox in Visual Basic?
2. What do you understand by concatenation operator? Mention with examples the concatenation operators supported by VB.
3. Differentiate between For, while, and Do-while loops
4. Define multi-dimensional arrays. Give any two examples where these can be useful.

Higher-order questions:

You have studied various programming languages such as VB, C, Python, and Scratch. Keeping your knowledge of all these languages in view, perform an analysis along with the following parameters:

1. Features of each
2. Applications
3. Limitations
4. Pros and Cons

Cyber Security



Worksheet 8

Choose the correct answer:

- Principles that guide us in how to conduct and behave are called:
 - Ethics
 - Digital etiquette
 - Behaviour
 - All of them
- The spread of false or misleading information is called:
 - Phishing
 - Piracy
 - Misinformation
 - Both b and c
- The practice of using the creative work of someone and passing it on as one's work is called:
 - Copyright
 - Phishing
 - Plagiarism
 - Piracy
- The software designed to disrupt the computer system or digital device is called:
 - Malware
 - Identity theft
 - Cyberbullying
 - Both a and c
- Which of the following is NOT inappropriate behaviour while navigating the internet?
 - Sharing pirated material
 - Gaining unauthorized access to computer systems
 - Reporting cyberbullying or harassment of any kind to an adult
 - Engaging in illegal activities
- The act in which the perpetrator makes machine or network resource unavailable for intended users either

temporarily or indefinitely by disrupting the services of the host to a connected network is called:

- a. Hacking
- b. Phishing
- c. Spoofing
- d. None of them

Fill in the blanks:

1. Giving creators the control of how their creative works can be used is called _____.
2. Unauthorized distribution of copyrighted material is called _____.
3. Using a computer or internet to bully or harass someone is called _____.
4. Act of getting one computer or network to pretend to have the identity of another computer is called _____.

Short questions and answers:

1. Define the following terms:
 - a. Privacy
 - b. Phishing
 - c. Identity theft
2. How does two-factor authentication work?
3. Mention any 3 examples of cybercrime.
4. Provide examples of how Internet is useful in businesses and social networking.
5. What do you understand by behaving inappropriately on the internet? Explain your answer with an example.
6. Given any two examples of improper use of computer resources.

Higher-order questions:

Study the scenarios below and respond accordingly

1. Two different offices on campus are working to fix an error in an employee's bank account resulting from a direct deposit mistake. Office #1 emails the correct account and deposit information to office #2, which promptly fixes the problem. The employee confirms with the bank that everything has, indeed, been straightened out.

Question: What's wrong here?

2. A staff member in I.T.S. subscribes to several free I.T. magazines. When activating her subscriptions, one magazine asked for her month of birth, a second asked for her year of birth, and a third asked for her mother's maiden name.

Question: What do you think might be going on here?

3. You are receiving an electronic Hallmark greeting card (e-card) in your email. You need to click on the attachment to see the card.

Question: What should you do?

Entrepreneurship in Digital Age



Worksheet 9

Choose the correct answer:

- Which of the following does not align with the concept of digital entrepreneurship?
 - Creating business on the internet
 - Investing in physical spaces to run the business
 - Selling products online
 - Both b and c
- The document that describes the company objectives, operations, marketing strategies, and financial projections is called:
 - Executive plan
 - Marketing plan
 - Financial Summary
 - Business plan
- Brand awareness of the product or service is called:
 - Promotion
 - Marketing
 - Value proposition
 - Both a and b
- SEO stands for
 - Search Engine Optimization
 - Search Efficient option
 - Source Enterprise Optimization
 - None of them
- Facebook Ad Manager works both for Instagram and Facebook
 - True
 - False

6. Which option in Facebook Ad Manager lets you view all the campaigns?
 - a. Ads View
 - b. Campaign breakdown
 - c. Columns
 - d. Campaign view
7. Which marketing objective below best defines maximizing the exposure of your ad and generating buzz?
 - a. Video views
 - b. Conversions
 - c. Reach
 - d. Store traffic
8. Segments with specific characteristics and needs within a broader market of operation are called:
 - a. Niche
 - b. Value proposition
 - c. Hub
 - d. Both a and b
9. SEO that focuses on links directed to the website from somewhere else on the internet is called:
 - a. Content distribution
 - b. On-page SEO
 - c. Technical SEO
 - d. Off-page SEO

Fill in the blanks:

1. _____ is a tool supported by Microsoft which allows you to create documents such as brochures, labels, etc
2. Market needs can be best identified through _____.
3. Blue lines that mark the edges of the printable area are called _____ in Publisher 365.
4. Text, WordArt, graphics, and pictures in Publisher 365 are called _____.
5. The style and appearance of the character in a piece of text is called _____.

Short questions and answers:

1. Define:
 - a. Swash

- b. Ligatures
 - c. Drop cap
2. Why do you think it is important to present content in visual form when marketing?
 3. What do you understand by the term value proposition? In your opinion, what will be the value proposition of a ride-hailing service over a regular taxi?
 4. What is SWOT analysis? What could be some benefits of it?
 5. Suggest domain names that will closely represent the following business:
 - a. A bakery that specializes in making cakes of all sorts and other bakery items
 - b. A bookstore that sells all kinds of books related to tech
 - c. A service that counsels and helps students decide on a career path

Higher-order questions:

Study the scenario of the following business and prepare SWOT Analysis for each:

Case 1:

Founded in 1965, Subway is a Connecticut-based fast food restaurant franchise known for its submarine sandwiches (subs), salads, and beverages. The food giant became popular in 2002 and now has outlets in 100+ countries. Subway has the highest number of outlets compared to its competitors. It currently has over 37,000+ outlets worldwide (down from 42,000+ outlets in 2020). It is also the third in terms of brand loyalty and is considered to be healthier than McDonald's and KFC. Even though Subway has the highest number of outlets, it's not the most preferred restaurant. It stands in second place while McDonald's is first. As it follows a franchise model, the service is highly variable, and therefore customer satisfaction fluctuates. Subway restaurant themes are old and out of fashion and need to be updated. As now more people are looking for healthier options, Subway can leverage this and offer healthier food. It can also add more variety of food instead of sticking to its iconic subs. Subway needs to improve its home delivery and drive-through services. Along with its major competitors, Subway also faces competition from new restaurants with Subway-like business models. There have been several lawsuits against it for serving stale and unhealthy food; this can tremendously affect the brand image.

Case 2:

Founded in 1908 by William C. Durant, General Motors is an American Detroit-based automobile company. It is one of the world's largest car manufacturing companies and ranks first in the US. It also provides financing services through its General Motor Financial company. General Motors has a strong brand reputation in its industry. The automobile giant has one of the most loyal customer bases. It has been enrolled in the US Environmental Protection Agency since 2010. The company has also consistently received the annual 'Energy Star' certification given its high operational efficiency. Despite its occupancy in the global market, General Motors has a limited presence in some developing countries. Adding to that, the company is overly dependent on the US market. Over 60% of the company's annual revenue comes from the US market. The Covid-19 pandemic led to a global recession, and General Motors had seen a 43.3% drop in sales in China. The company also has several issues with labor. In 2018, 34 plant operations were halted due to labor strikes. There is an increasing demand for electric and automated vehicles. Due to technological advancements and environmental implications, this is an inevitable next step for the company. Cruise, a subsidiary of General Motors, is testing GM's line of self-driving cars.