Computer: A Wonder Machine
BOOK 8

Chapter 1
Computer Network

1. Answer the following questions:

(a) Computer Network is basically referred to as a group of computers and devices connected to each other with different communication channels. The purpose of computer network is to communicate among users and also allow them to share information, data and resources.

Computer Network has many advantages. It is widely used in today's world and provides multiple benefits to the people using it. Some of them are listed below:

(i) **Communication:** Using a network, we can communicate efficiently and easily through email, instant messaging, chat rooms, telephone, video telephone calls and video conferencing. We can exchange information and data quickly.

(ii) **Sharing Hardware Resources:** In a networked environment, the users are enabled to share various expensive devices. Each computer on a network may access and use hardware resources like printers and scanners attached to a network. This reduces the expenditure as many users can share these devices.

(iii) **Sharing Files, Data and Information:** In a networked environment, the users may access data and information stored on other computers on the network. This is only possible if the users have been authorised to access this data. For example, railway tickets are issued by railway employees all over the country by accessing the centralised railway database. This avoids duplication of data and also keeps the data secure. The capability of providing access to data and information on shared storage devices is an important feature of many networks.

(iv) **Sharing Software:** We can share software and can run programs on the network. We can also install software from other machines on the network.

(b) Every network includes:

(i) At least two computers, *i.e.*, Servers or Client workstations.

(ii) **Network Interface Card (NIC):** The NIC joins the computer to the network allowing it to communicate with other computers on the network.

(iii) A connection medium, usually a wire or cable, although wireless communication between networked computers and peripherals is also possible.

(iv) Network devices like Bridges, Routers, Hubs and Switches are also required for performing the function of joining smaller networks to create a larger network.

(v) Network Operating System software, such as Microsoft Windows 10 or NT or 2000, Novell NetWare, Unix and Linux.

(c) Computer networks are classified on the basis of the following different categories:

(i) Area covered by the network

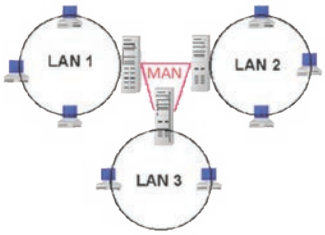
(ii) Network Architecture/Design

(iii) Network Layout/Topology

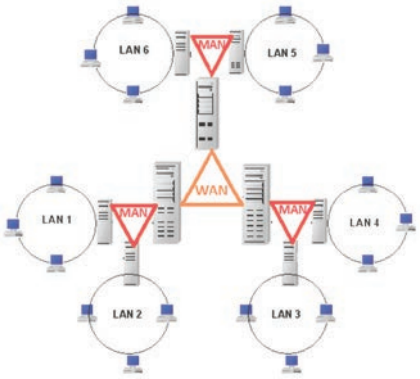
(iv) Medium used for networking

(d) (i) **Local Area Network (LAN):** As the name suggests, this type of network is usually confined to a geographical area, such as a single building or a school. LANs can be small, linking as few as three computers but often link hundreds of computers used by thousands of people. Your school lab is a perfect example of LAN.

(ii) **Metropolitan Area Network (MAN):** When two or more LANs are connected to each other, they form a network. This network is confined to a city or a metropolitan area. Delhi Metro network and ATM network of any area are examples of MAN.

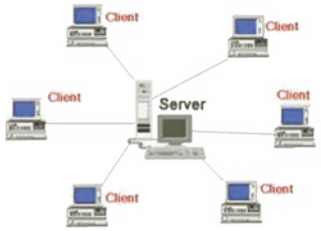


(iii) **Wide Area Network (WAN):** A WAN spans a large geographical area, such as a state, province or a country. WANs often connect multiple smaller networks, such as Local Area Networks (LANs) or Metropolitan Area Networks (MANs).

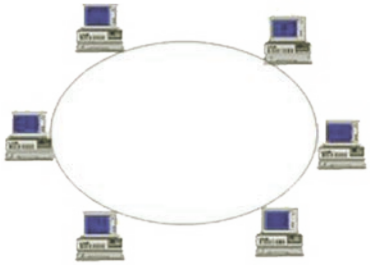


(iv) **Client/Server Networks:** Client/Server model is the most efficient network. It is also known as distributed application structure. In this network, there is a centralized powerful computer known as server and all other computers or nodes or workstations which are connected

to this server are known as client/ clients. A server machine is a host that is running one or more server programs which share their resources with clients. A client does not share any of its resources but requests a server's content.



(v) **Peer-to-Peer Networks:** In peer-to-peer networking, there are neither dedicated servers nor is there a hierarchy among the computers. All the computers are equal and are, therefore, known as peers. Normally, each computer serves as client/server and there is no one responsible for the entire network.



(vi) **Personal Area Network (PAN):** A Personal Area Network (PAN) refers to the interconnection of information technology devices or gadgets within the environment of an individual user. These interconnected devices might include laptops, PDAs, cellphones, printers, PCs or other wearable computer devices.

(e) Topology means the arrangement of computers in a network. Five basic topologies are used for arranging the computers in a network. These are:

(i) **Bus Topology:** In bus topology, a single cable, also known as backbone, carries all the data. All the computers and other peripherals are connected to this backbone cable. This kind of topology is used for small networks. The amount of cabling is also quite less. The entire network is dependent on the single backbone cable.

(ii) **Star Topology:** In star topology, all the computers are connected to one single central device known as a Hub. The hub could be a computer hub or sometimes just a switch. The hub controls the function of this network. Any information which has to be transferred from one computer to another has to pass through the central hub. This type of network is easy to set up, but if the central connection point fails, the entire network stops working. However, when there is a failure in cable, then only one computer gets affected and not the entire network.

(iii) **Ring Topology:** A ring topology is a network topology or an arrangement in which each network, device or a computer is attached along the same signal path to two other devices, forming a path in the shape of a ring.

Each device in the network handles every message that flows through the ring. Each device in the ring has a unique address. Since there is only one pathway in a ring topology, ring networks are generally disrupted by the failure of a single link.

(iv) **Tree Topology:** Among all the network topologies, the tree topology is said to be a combination of the bus and the star topologies. The tree-like structure allows us to have many servers on the network and we can branch out the network in many ways. A tree structure suits best when the network is widely spread and vastly divided into many branches. A tree network may not suit small networks as it may be a waste of cable.

(v) **Mesh Topology:** Mesh topology works on the concept of routes. In mesh topology, message sent to the destination can take any possible shortest, easiest route to reach its destination. Unlike topologies like star and bus, messages are usually broadcast to every computer. Similarly, in the ring topology, message can travel in only one direction. Internet uses the mesh topology and the message finds its route to its destination.

(f) Computer network find its application in various fields. Some of them are listed here:

(i) Emails are messages distributed by electronic means from one computer user to one or more recipients via a network.

(ii) Searchable Data (Websites) is a location connected to the internet that maintains one or more web pages. These can be accessed using a network.

(iii) File Sharing is the practice of making computer files available to other users of a network, for example, sharing of music and video through internet.

(iv) Printer Sharing is the process of allowing multiple computers and devices connected to the same network to access one or more printers.

(v) E-Commerce or Electronic Commerce, is the trading or facilitation of trading in products or services using computer networks, such as the internet or online social networks.

(vi) News Groups are internet-based discussion groups which discuss a particular topic.

(vii) Internet Telephony (VoIP or Voice over Internet Protocol) is a methodology and group of technologies for the delivery of voice communications and multimedia sessions over computer network such as the internet.

(viii) Videoconferencing means to conduct a conference between two or more participants at different sites by using computer networks to transmit audio and video data.

(ix) Chat Groups are groups of people who exchange messages online, especially people who share a common interest.

(g) **(i) Hub**

- A hub works in the physical layer.
- It is a non-intelligent device and has no decision-making capability.
- Hub takes the input data from one of the ports and broadcasts the information to all the other ports connected to the network.
- Only one transmission takes place on a network at a particular time.

(ii) Switch

- A switch is an intelligent device that works in the data link layer.
- The term intelligent refers to the decision-making capacity of the switch.
- It has knowledge of the machine addresses of the ports in the network.
- It is a secure device because it sends information from sender machine to the receiver machine. It establishes a link between the sender and the receiver based on the machine addresses.

(iii) Repeaters

- A repeater works in the physical layer.
- It is used in places where amplification of input signal is necessary.
- It regenerates the input signal and amplifies only the desirable signal. Hence, the noise component of the signal is eliminated.
- It is necessary during the transmission of the signals over long distances, as the signal decreases and unnecessary noise disturbance is added, which leads in the loss of data. Hence, in order to prevent this, repeaters are used.

(iv) Bluetooth

- It is used to exchange data over a short distance from fixed or mobile devices.
- It helps in building Personal Area Network (PAN).
- It is useful when transferring information between two or more devices that are near each other in low-bandwidth situations.
- Bluetooth exists in many devices such as telephone, tablets, laptops, watches, etc.

(v) GPS

- The Global Positioning System (GPS) is a satellite-based navigation system.
- It is made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense.
- These satellites rotate around the earth. The orbits are arranged so that at any time, anywhere on Earth, there are at least four satellites "visible" in the sky. The GPS receiver locates these satellites and with some mathematical calculations the location is detected.
- GPS is used for tracking in mobiles, cars, etc.

2. Differentiate between:

(a) LAN and WAN

A LAN network is confined to a geographical area, such as a single building or a school.	A WAN spans a large geographical area, such as a state, province or a country.
LANs can be small, linking as few as three computers, but often link hundreds of computers used by thousands of people.	WANs often connect multiple smaller networks, such as Local Area Networks (LANs) or Metropolitan Area Networks (MANs).

(b) Client/Server network and Peer-to-Peer network

In Client/Server networking, there is a centralized powerful computer known as server and all other computers or nodes or workstations which are connected to this server are known as client/clients.	In peer-to-peer networking, there are neither dedicated servers nor is there a hierarchy among the computers.
A server machine is a host that is running one or more server programs which share their resources with clients.	All the computers are equal and are, therefore, known as peers.
A client does not share any of its resources but requests a server's content.	Normally, each computer serves as a client/server and there is no one responsible for the entire network.
Therefore, a server controls this type of network. This type of network is very expensive to set up.	This architecture is better for smaller networks and is inexpensive to set up and maintain.

(c) Star topology and Ring topology

In star topology, all the computers are connected to one single central device known as a Hub. The hub could be a computer hub or sometimes just a switch.	A ring topology is a network topology or an arrangement in which each network device or a computer is attached along the same signal path to two other devices, forming a path in the shape of a ring.
The hub controls the function of this network.	Each device in the network handles every message that flows through the ring.
Any information which has to be transferred from one computer to another has to pass through the central hub.	Each device in the ring has a unique address.

This type of network is easy to set up, but if the central connection point fails, the entire network stops working. But when there is a failure in cable, then only one computer might get affected and not the entire network.	Since there is only one pathway in a ring topology, ring networks are generally disrupted by the failure of a single link.

(d) Wi-Fi and Bluetooth

Wi-Fi means Wireless Fidelity. Wi-Fi can also be called as WLAN (Wireless Local Area Network).	Used to exchange data over a short distance from fixed or mobile devices.
Wi-Fi Network connects computers to each other, to the internet and to the wired network.	It helps in building Personal Area Network (PAN).
Devices which can use Wi-Fi technology include personal computers, video-game consoles, smartphones, digital cameras, tablets, digital audio players and modern printers.	It is useful when transferring information between two or more devices that are near each other in low-bandwidth situations.
Wi-Fi hotspot is created and then the Wi-Fi enabled devices can connect to the network wirelessly.	Bluetooth exists in many devices such as telephones, tablets, laptops, watches, etc.

(e) Switch and Repeater

A switch is an intelligent device that works in the data link layer.	A repeater works in the physical layer.
The term intelligent refers to the decision-making capacity of the switch.	It is used in places where amplification of input signal is necessary.
It has knowledge of the machine addresses of the ports in the network.	It regenerates the input signal and amplifies only the desirable signal. Hence, the noise component of the signal is eliminated.
It is a secure device because it sends information from sender machine to the receiver machine. It establishes a link between the sender and the receiver based on the machine addresses.	It is necessary during the transmission of the signals over long distances, as the signal decreases and unnecessary noise disturbance is added which leads in the loss of data. Hence, in order to prevent this, repeaters are used.

3. Fill in the blanks:

(a) Network Interface Card

(b) Bridges, Routers, Hubs, Switches

(c) Personal Area Network (PAN), Local Area Network (LAN), Metropolitan Area Network (MAN) and Wide Area Network (WAN)

(d) Internet

(e) MAN

(f) Hub

(g) Distributed application structure

(h) Server

(i) Tree

(j) Twisted pair cable, Coaxial cable and Fibre optic cable

4. Write T for true and F for false statements:

(a) F (b) T (c) F (d) T (e) F

(f) T (g) F (h) T (i) T (j) T

5. Match the following:

(a) (viii) Local Area Network

(b) (vii) Metropolitan Area Network

(c) (vi) Wide Area Network

(d) (iii) Networking Interface Card

(e) (ii) Hub

(f) (iv) Centralized powerful computer

(g) (ix) Single backbone cable

(h) (x) Combination of bus and star topologies

(i) (i) Message takes shortest route to reach destination

(j) (v) Transmit radio waves and microwaves

6. Tick (✓) the correct option:

(a) (ii) Bus topology

(b) (iii) Mesh topology

(c) (iv) Server

(d) (i) Hub/Switch

(e) (iv) Modem

(f) (iv) All of these including network devices

(g) (ii) Client/Server

(h) (ii) LAN

(i) (ii) shortest

(j) (iv) Bus and star topologies

7. Application-based Questions

(a) PAN (Personal Area Network)

(b) Router

(c) WAN (Wide Area Network)

(d) WAN (Wide Area Network)

(e) (i) Use strong passwords.

(ii) Enable firewall.

(iii) Install antivirus software.

(iv) Update software regularly.

Chapter 2
More on HTML

1. Answer the following questions:

(a) HTML programming follows a standard structure as given below:

```
<HTML>
        <HEAD>
            <TITLE>
            <!—Window title is written here-->
            </TITLE>
        </HEAD>
        <BODY>
        <!—Page content is written here-->
        </BODY>
</HTML>
```

Each HTML program should have the following tags:

- **<HTML> ... </HTML>:** <HTML> tag helps the browser to know that the HTML code starts from here and </HTML> tag tells the browser that the HTML code ends here in the program.
- **<HEAD> ... </HEAD>:** This indicates the first part in HTML code. It contains the title tag.
- **<TITLE> ... </TITLE>:** Title of the page is written here which gets displayed on the title bar of the window.
- **<BODY> ... </BODY>:** This is the main part of our HTML document. The contents of the page are written within this tag.

(b) HTML allows creation of hyperlinks in web pages. The tag that is used in linking is <A>, which stands for Anchor. Anchor tag has two attributes:

(i) Hyper Text Reference (Href) attribute

(ii) Name attribute.

The Image tag defines an image in an HTML page. The <img> tag requires two attributes:

(i) src (ii) alt

(c) (i) Creating a Horizontal Line: <HR> tag

(ii) Creating an Ordered List: <OL> tag

(iii) Creating a Bulleted List: <UL> tag

(iv) Creating Scrolling text: <MARQUEE> tag

(v) Displaying an image on the HTML page: <img> tag

(d) Uniform Resource Locator (URL) locates the linked document and then loads it in IE. URL can locate files on local machine or on any other machine on the internet. URL is the global address of documents and other resources (like images, executable files, etc.) on the World Wide Web. The first part of the address indicates what protocol to use, and the second part specifies the IP address or the domain name where the document or the resource is located.

Syntax of URL: protocol://domain-name/path/filename

Example: http://www.google.com

(e) (i) Nested list—Here is the code for nested list:

----------Code----------

```
<HTML>
    <HEAD>
    <TITLE>
    </TITLE>
    </HEAD>
<BODY>
    <UL>
            <LI> Outdoor Games:
    <UL>
            <LI> Football
            <LI> Cricket
    </UL>
            <LI>Indoor Games
    <UL>
            <LI> Chess
            <LI> Board and Table games
    </UL>
```

```
    </UL>
</BODY>
</HTML>
```

(ii) Definition list—Here is the code for definition list:

----------Code----------

```
<HTML>
<HEAD>
<TITLE>
</TITLE>
</HEAD>
<BODY>
<DL>
<B><DT>The Present Tense </B>
<DD>The verb that refers to the present time is said to be in the present tense.
<B><DT>The Past Tense</B>
<DD>The verb that refers to the past time is in the Past Tense.
<B><DT>The Future Tense</B>
<DD>The verb that refers to the future time is in the Future Tense.
</DL>
</BODY>
</HTML>
```

(iii) Table with three rows and two columns—Here is the code for a table:

----------Code----------

```
<HTML>
    <HEAD>
        <TITLE>
        Table
        </TITLE>
    </HEAD>
    <BODY>
    <!--Table STARTS HERE-->
    <TABLE BORDER = 4>
        <TR>
```

```
                    <TD> Cell1 </TD>
                    <TD> Cell2 </TD>
                </TR>
                <TR>
                    <TD> Cell3 </TD>
                    <TD> Cell4 </TD>
                </TR>
                <TR>
                    <TD> Cell5 </TD>
                    <TD> Cell6 </TD>
                </TR>
    </TABLE>
    </BODY>
</HTML>
```

---

2. Match the following:

(a) (iv) <Hy>...</Hy>
(b) (x) <HR >...</HR>
(c) (vi) Form data appended to URL
(d) (i) <MARQUEE>...</MARQUEE>
(e) (viii) <UL>...</UL>
(f) (v) <OL>...</OL>
(g) (ix) <DL>...</DL>
(h) (ii) <DT>...</DT>
(i) (vii) Uniform Resource Locator
(j) (iii) Hypertext link

3. Fill in the blanks:

(a) Hyper Text Markup Language
(b) Hyperlinks
(c) Anchor <A>
(d) <LI>, <DD> and <DT>
(e) Hyper Text Reference
(f) Bulleted list
(g) Hypertext links
(h) Controls
(i) Name
(j) Uniform Resource Locator

4. Write T for true and F for false statements:

(a) F (b) T (c) F (d) F (e) T

(f) F (g) T (h) F (i) T (j) T

5. Tick (✓) the correct option:

(a) (i) <BODY> tag

(b) (ii) FORM (name method action)... (form)

(c) (iv)

(d) (i) 6

(e) (ii) <TD>...</TD>

(f) (iv) <UL>

(g) (iii) <MARQUEE>

(h) (ii) Horizontal

(i) (iv) <LI>

(j) (iv) Submit

6. Application-based Questions

(a) <HR>

(b) <DL> <DD> <DT>

(c) <OL>

(d) <A>

(e) <FORM>

Chapter 3
App Development

1. Answer the following questions:

(a) Applications are the small software programs which run on our mobile phones, computers, tablets, etc. They are designed to perform specific tasks, functions or activities which are useful for us. Some of the commonly-used applications are word processor, spreadsheet, web browser, gaming console, etc. Some of the important features of an application software are:

(i) User-friendly

(ii) Easy to design

(iii) More interactive

(iv) Easy to understand

(b) Applications are used everywhere nowadays. Everyone is using applications in one form or another. These applications are installed on computers, mobiles, tablets, etc. Application software can be used:

(i) As a productivity tool

(ii) As a business tool

(iii) To assist graphic projects

(iv) To assist multimedia projects

(v) To provide support at home

(vi) To provide support in educational activities

(vii) To provide support in personal activities

(viii) To assist in communication

(c) There are three main types of applications:

(i) **Desktop:** The applications that run on standalone machines are termed as desktop applications. Therefore, we can define desktop applications as the applications that can be installed on a single computer and perform a specific task.

(ii) **Web-based:** Applications that run with the user's web browser are considered as web applications. With the introduction of internet and online commerce, web application development has gained importance. Online shopping cart on an e-commerce website is considered as an example of web application.

(iii) **Mobile:** A software application that runs on a smartphone, tablet or other portable device is called mobile application. Mobile applications help us by connecting to the internet services. The mobile application software helps us by making it easier to use the internet on our portable devices.

(d) Web/Mobile applications are better than desktop applications because of the following reasons:

(i) Applications need to be installed only once.

(ii) They can be accessed from any location through the internet.

(iii) Easy portability and better functions from usability point of view.

(e) Before developing an application, we should keep the following points in mind:

(i) **Uniqueness:** The idea should be unique. It should be one of its kind.

(ii) **User-friendly:** The application should be user-friendly and easy to use.

(iii) **Rich Features:** Features are very important part of an application. Our application should contain all the relevant features.

(iv) **Flawless Coding:** Application development is done in a particular programming language. Therefore, coding done should be flawless, well-commented and easy to maintain. The programs should be error-free, *i.e.*, application should be tested thoroughly before releasing to the user.

(v) **Powerful Marketing:** In today's world, advertising about our application is very important. If the users do not know about our application, they will not use it. Advertising can be done through various marketing channels like social media, email marketing, newspapers, newsletters, etc.

2. Fill in the blanks:

(a) Desktop application

(b) Mobile application

(c) Word processor or Media player

(d) Mobile application

(e) App

(f) Word processor

(g) Tabular

(h) Tables, Queries, Reports

(i) Internet

(j) App stores, Google Play Store

3. Place the apps under correct column:

Desktop apps	Web-based apps	Mobile apps
Word Excel Access	Web browser Gmail Naukri.com	Gmail for mobile WhatsApp Nova launcher Fifa 17 mobile Uber Amazon app

4. Write T for true and F for false statements:

(a) F (b) T (c) F (d) F (e) T

(f) F (g) F (h) T (i) T (j) F

5. Tick (✓) the correct option:

(a) (iii) Web browser (b) (ii) WhatsApp

(c) (ii) Videoconferencing (d) (iv) Laptop

(e) (ii) Standalone (f) (i) Portability

(g) (iii) Unique (h) (ii) Marketing

(i) (iv) All of these (j) (i) Word processor

6. Application-based Questions

(a) Mobile app

(b) Web-based app

(c) (i) Attractive GUI
(ii) Simple and easy to use
(iii) User-friendly
(iv) Quick performance
(v) Cross-platform compatibility

(d) (i) Notifications
(ii) Announcements and News Feed
(iii) Event Calendar
(iv) Homework and Assignments
(v) Attendance Tracking

(e) App Inventor

Chapter 4
Arrays in Programming

1. Answer the following questions:

(a) Array indexing gives each item a position number starting from 0.

Example:

fruits = ["apple", "banana", "orange"]

#Index: 0 1 2

- First item = Index 0
- Second item = Index 1
- Third item = Index 2

Why start from 0?

- It's how computers count memory positions
- 0 means "0 steps away from the start"
- Most programming languages use 0-based indexing

(b) Method 1: Using 'in' keyword

if "chocolate" in ice_cream_flavors:

print("We have chocolate!")

Use when: You just want to check if item exists (yes/no)

Method 2: Using .index() method

position = ice_cream_flavors.index("strawberry")

print("Found at position:", position)

Use when: You need to know the exact position

Method 3: Using .count() method

count = ice_cream_flavors.count("chocolate")

print("Found", count, "times")

Use when: You want to know how many times item appears

(c) Sorting means arranging items in order.

Ascending Order (smallest to largest):

numbers = [5, 2, 8, 1]

numbers.sort()

print(numbers) # [1, 2, 5, 8]

Descending Order (largest to smallest):

numbers = [5, 2, 8, 1]

numbers.sort(reverse=True)

print(numbers) # [8, 5, 2, 1]

Real-life examples:

- Height line: shortest to tallest
- Names: A to Z
- Scores: highest to lowest

(d) 1. .pop() - Removes last element

python

fruits.pop()

2. .remove() - Removes specific element

   python

   fruits.remove("banana")

3. del - Removes element at position

   python

   del fruits[1]

4. .clear() - Removes all elements

   python

   fruits.clear()

(e) append()

insert()

Adds to the end

Adds at specific position

Takes 1 parameter

Takes 2 parameters

list.append("item")

list.insert(1, "item")

Examples:

append():

python

colors = ["red", "blue"]

colors.append("green")

Result: ["red", "blue", "green"]

Use when: Adding to the end

insert():

python

colors = ["red", "blue"]

colors.insert(1, "yellow")

Result: ["red", "yellow", "blue"]

Use when: Adding at specific position

2. Fill in the Blanks:

(a) append()
(b) 0
(c) sort()
(d) pop()
(e) len()
(f) insert()
(g) remove()
(h) in
(i) count()

3. Multiple Choice Questions:

(a) (iii) index()
(b) (ii) fruits.append("orange")
(c) (ii) 1
(d) (ii) [1, 2, 5, 8]
(e) (ii) remove()
(f) (ii) 5
(g) (ii) insert()
(h) (ii) 2
(i) (ii) in
(j) (iii) Last element

4. State T for true and F for false:

(a) T
(b) T
(c) F
(d) F
(e) F
(f) T
(g) T
(h) T
(i) F
(j) F

5. Match the following:

(a) (iii) Adds element to end of array
(b) (v) Arranges elements in order
(c) (iv) Finds position of element
(d) (i) Removes last element
(e) (ii) Generates sequence of numbers
(f) (vii) Adds element at specific position
(g) (vi) Removes specific element
(h) (ix) Returns number of elements
(i) (viii) Counts occurrences of element
(j) (x) Reverses order of elements

6. Application-based Questions

(a) School Management System

```
python
# Student names and grades
students = ["Alice", "Bob", "Charlie", "Diana"]
grades = [85, 72, 95, 88]
# Calculate average
total = 0
for grade in grades:
total = total + grade
average = total / len(grades)
print("Class Average:", average)
# Find highest and lowest
highest = max(grades)
lowest = min(grades)
print("Highest Score:", highest)
print("Lowest Score:", lowest)
# Display sorted (highest to lowest)
grades.sort(reverse=True)
print("Sorted Grades:", grades)
```

(b) E-commerce Shopping Cart

```
python
# Shopping cart
cart_items = []
cart_prices = []
```

```
# Add items
cart_items.append("Laptop")
cart_prices.append(45000)
cart_items.append("Mouse")
cart_prices.append(500)
# Remove item
cart_items.remove("Mouse")
cart_prices.pop(1)
# Calculate total
total = 0
for price in cart_prices:
total = total + price
# Apply discount
if total > 1000:
discount = total * 0.10
total = total - discount
print("Discount applied!")
print("Total:", total)
```

(c) Library Book Tracking

```
python
# All books and borrowed books
all_books = ["Harry Potter", "Wonder", "Matilda"]
borrowed_books = []
# Borrow a book
book = "Wonder"
if book in all_books and book not in borrowed_books:
borrowed_books.append(book)
print("Book borrowed!")
# Check availability
if book in borrowed_books:
print("Book is borrowed")
else:
print("Book is available")
# Calculate fine (5 per day)
days_late = 5
if days_late > 0:
fine = days_late * 5
print("Fine:", fine)
```

Chapter 5
Decision-Making and Loops in Python

1. Answer the following questions:

(a) Whenever we build an application in any programming language, there is a need for including decision control statements in code. We can include various conditions in our program using these statements. We can perform different tasks based on the conditions. This helps us to solve the problem. Thus, decision-making involves choosing between possible solutions to a problem.

(b) Syntax for the following statements:

(i) if

```
Syntax: if expression:
            statements
```

(ii) if...else

```
Syntax: if expression:
            Statements
        else
            Statements
```

(iii) elif

```
Syntax: if expression 1:
            Statements
        elif expression 2:
            Statements
        elif expression 3:
            Statements
        else:
            Statements
```

(iv) shorthand if

```
Syntax:
        if expression: Statements
```

(v) shorthand if...else

```
Syntax:
        Statements if expression else Statements
```

(vi) nested if

```
Syntax:
        if expression 1:
```

```
Statements
if expression 2:
        Statements
elif expression 3:
        Statements
else:
        Statements
else:
        Statements
```

(c) The following loops are explained as:

(i) **For Loop:** In Python, *for* loop is used to iterate over the sequence of items. All the items in a sequence are assigned to the iterating variable and the code within the *for* loop is executed. Once all the items of the sequence are assigned, the control moves to the next line of code.

For example:

```
# y is an iterating variable
games = ["Football", "Cricket", "Table tennis", "Lawn tennis", "Badminton"]
for y in games:
        print y
```

(ii) **While Loop:** The statements within the loop get executed repeatedly till the condition is true.

When the condition becomes false, the control moves to the next line. In *while* loop, we require a variable which is also known as indexing variable. We should keep on incrementing as the control executes the code within the block. Before starting the loop, we should set the value of the indexing variable to 1.

For example:

```
count = 5
while count > 0:
        print ("Welcome")
        count – = 1
else:
        print ("Exiting the while loop")
```

(d) If you forget the increment statement, you create an infinite loop - the loop never stops!

Wrong Code (Infinite Loop):

python

```
count = 1
while count <= 10:
  print(count)
  # Forgot: count = count + 1
```

What happens:

- Keeps printing 1 forever
- Never stops
- Computer hangs
- count never changes, so condition stays True

Correct Code:

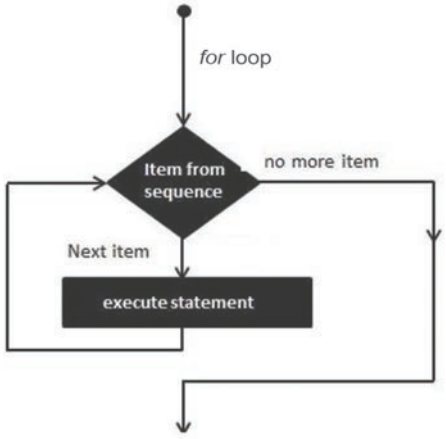
python

```
count = 1
while count <= 10:
print(count)
count = count + 1 # MUST HAVE THIS!
```

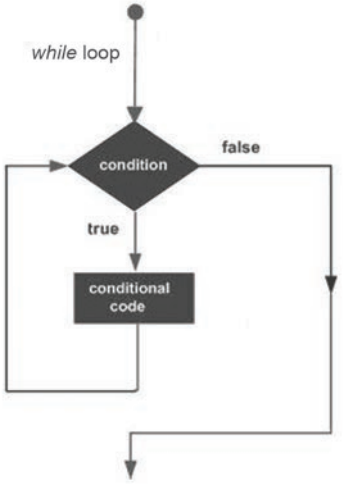
Remember: Always update the variable in a while loop!

2. Fill in the blanks:

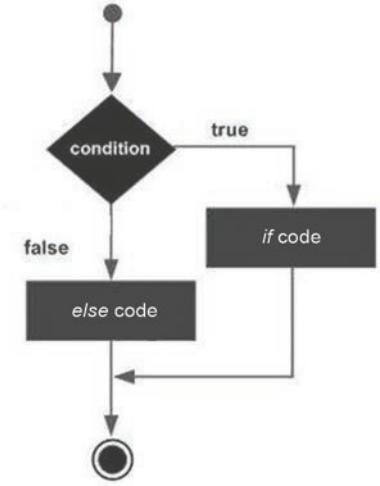
(a) *for* loop



(b) *while* loop



(c) *if…else*



(d) while loop

(e) exit

(f) for

(g) nested loop

3. Tick (✓) the correct option:

(a) (iv) All of these
(b) (ii) True
(c) (iv) Message displaying "Invalid syntax"
(d) (ii) Expected an indented block
(e) (ii) a and b are equal
(f) (iii) shorthand if…else statement
(g) (ii) nested
(h) (iii) elif
(i) (ii) single
(j) (iii) incremental
(k) (ii) 3 2 1
(l) (ii) 4 times
(m) (ii) for loop

4. Write T for true and F for false statements:

(a) T (b) T (c) T (d) F (e) T

5. Application-based Questions

(a) Decision-making/conditional statement: *if, elif* and *else*

(b) Looping statement: *for* loop

(c) Looping statement

(d) Decision-making/conditional statement

(e) Decision-making/conditional statement

6. Machine Room Exercise:

Number1 = 20, Number2 = 40, i = 1,
games = ("football", "cricket", "badminton", "squash")

(i)
```
count = 10
while count > 0 :
        print ("Bob")
        count – = 1
```

(ii)
```
# y is an iterating variable
games = ["football", "cricket", "tennis", "squash", "badminton"]
for y in games:
print y
```

(iii)
```
number = 5
sum = 0
i = 1
while (i<=number):
   sum = sum + i
   i = i + 1
print (sum)
```

(iv)
```
Number1 = 20
Number2 = 40
if (Number1 == Number2):
  print("Number1 is equal to Number2")
elif (Number1 > Number2):
  print("Number1 is greater than Number2")
elif (Number1 < Number2):
  print("Number1 is smaller than Number2")
```

(v)
```
for x in "badminton":
  print(x)
```

(vi)
```
Number1 = 20
Number2 = 40
```

```
if (Number2 > Number1 and Number2 > 15 and Number2 > 10):
  print("Number2 is greater than Number1")
else:
  print ("Number2 is smaller than Number1")
```

Chapter 6
Python Functions

1. Answer the following questions:

(a) Python allows us to use functions in our programming. Functions help us to break our program into smaller pieces or modules. As our program grows larger and larger, functions make it more organized and manageable. This is the reason Python is also known as modular programming language.

(b) Python function consists of the following components:

(i) **def** is the keyword used to mark the start of function header.

(ii) A function name should be unique and easy to correlate with the task it will perform.

(iii) Parameters (arguments) through which we pass values to a function.

(iv) A colon (:) is used to mark the end of function header.

(v) In the function body we write the Python statements.

(c) Creating a function involves two steps:

(i) **Defining a function:** Let us take an example where we greet a person.

```
def greet(name):
      print("Hello," + name + "Good morning!")
```

Here,

def is the keyword,

greet is the name of the function,

name is the parameter which we will pass to the greet function at the time of calling it.

(ii) **Calling a function:** After defining a function, we can call it from another function, from another program, or from the command prompt. For calling a function, we type the function name and pass the parameters. In the above example for calling a greet function we simply type:

```
greet ('Bob')
```

Bob is the name parameter which we are passing to the function greet.

(d) We enjoy programming when a user can provide the input to the program. This makes our program interactive. In Python, we can use an in-built function named Input to get the user input.

(e) There are two types of functions in Python:

(i) **Built-in Functions:** Functions that already exist in Python. print() function is the most important built-in function of Python.

(ii) **User-defined Functions:** Functions defined by the users at the time of programming.

(f) Parameters are variables that receive values when we call a function. They help us pass information to functions.

Why useful:

- Make functions flexible
- Can work with different values
- Don't need to write same code again

Example - Calculate Total Cost:

```
def calculate_total(price, tax_percent):
tax = price * tax_percent / 100
total = price + tax
return total
# Calling function
result = calculate_total(1000, 10)
```

2. Fill in the blanks:

(a) User-defined

(b) Built-in

(c) Input()

(d) Parameters

(e) Creating a function involves two steps:

(i) Defining a function

(ii) Calling a function by passing the parameters

(f) User-defined functions

(g) def

(h) Unique and easy to correlate.

(i) Modules

3. Tick (✓) the correct option:

(a) (i) modules
(b) (iii) def
(c) (i) :
(d) (i) arguments
(e) (iii) Defining
(f) (iv) All of these
(g) (iii) both print() and input()
(h) (i) input()
(i) (iv) User-defined
(j) (iv) All of these
(k) (ii) 25 (5 × 3 = 15, then 15 + 10 = 25)
(l) (iii) 3 (length, width, height = 3 parameters)

4. Write T for true and F for false statements:

(a) F
(b) F
(c) T
(d) F
(e) T

5. Application-based Questions

(a) Inputs: length (l) and breadth (b)
Output: area (a = l * b)
(b) Input: marks of students (to check passing criteria)
Output: passed or not
(c) Input: Price of items purchased
Output: total cost (adding up prices of all items)
(d) Input: Book number or Book Title (to search)
Output: Available or not (by applying condition)
(e) Input: Game Points (win)
Output: Total score (adding up all the points)

6. Activity

(a) (ii) Python is awesome.
(b) (ii) Hello Frodo
(c) (i) b is greater than a
(d) (ii) B

7. Machine Room Exercise

(a)
```
name = input("Enter your name")
print ('Hello,',name,'welcome to class VIII.')
```

(b)
```
def add(x, y):
    return x + y
num1 = int(input('Enter first number:'))
num2 = int(input("Enter second number:"))
print(num1, "+", num2,"=", add(num1,num2))
```

(c)
```
number = 5
sum = 0
i = 1
while (i<=number):
  sum = sum +i
  i = i + 1
print (sum)
```

(d)
```
----------Code----------
# Python program to find the largest number among the three input numbers
# take three numbers from user
num1 = int(input("Enter first number: "))
num2 = int(input("Enter second number: "))
num3 = int(input("Enter third number: "))


if (num1 > num2) and (num1 > num3):
      largest = num1
elif (num2 > num1) and (num2 > num3):
      largest = num2
else:
      largest = num3

print("The largest number is",largest)
------------------------------------------------------------
```

(e)
```
def multiply(x,y):
    return x*y
num1 = int(input("Enter first number:"))
num2 = int(input("Enter second number:"))
print(num1, "*", num2,"=", multiply(num1, num2))
```

Chapter 7
E-Commerce

1. Answer the following:

(a) In the context of e-commerce, 'shopping' involves the experience of browsing, selecting, buying items online and avoiding going from shop to shop spending hours, sometimes without geting anything of your choice. The best part of online shopping is that if you are not satisfied with your purchase for some reason, the item can always be returned within a fixed time period.

(b) E-commerce is divided into three categories:

(i) **Business to Business (B2B):** Where buying and selling is within the business groups. For example, Investopedia.com.

(ii) **Business to Consumer (B2C):** Where buying and selling is between the consumer and the business. For example, Amazon.com, Flipkart.com, etc.

(iii) **Consumer to Consumer (C2C):** Where buying and selling is between the consumers. For example, Quikr.com.

(c) E-Commerce provides the following features:

(i) **Marketing to Target Segments:** Extensive marketing campaigns are run to attract customers to buy products online.

(ii) Allowing consumers to make comparisons and selection.

(iii) Buy online by paying online or on delivery.

(iv) Payment online can be done using credit cards and debit cards.

(v) Payment on delivery can also be done using cash, if the seller permits.

(vi) **24 × 7 Availability:** Online shopping sites are available 24 × 7.

(vii) **Increased Sales:** Online sites are available 24 × 7, allowing people to buy products anytime, anywhere, thus leading to increased sales.

(viii) **Support:** E-Commerce provides various ways to provide pre-sales and post-sales assistance to offer better services to customers.

(ix) **Efficient Inventory Management:** In E-Commerce, inventory management of products is automated and is efficient and easy to maintain.

(x) **Extensive Communication:** In E-commerce, extensive, fast, efficient and reliable communication is done with customers (buyers) and partners (sellers).

(d) (i) **E-commerce:** When we buy from online shopping sites, it is like a simple business transaction, where we become the buyer and the online shopping site becomes the seller. In this case, we are using electronic medium to do business transaction, so it is called electronic commerce or e-commerce.

(ii) **E-shopping:** Shopping virtually on the internet using web browser is known as Electronic Shopping or E-Shopping. A consumer visits various shopping websites in search of the product of interest. Once the product is selected, the consumer orders this product. The ordered product is delivered at the doorstep, thus saving precious time and energy of the buyer.

(iii) **E-ticketing:** E-Ticket or Electronic Ticket is also known as Digital Ticket. It is an effective method of generating tickets. Nowadays airlines, trains, movie halls and some major event organizers offer e-tickets. Like we do online shopping, in the same way we buy online tickets. Without physically visiting the ticket counter, we can book our tickets.

(iv) **E-banking:** E-Banking is also known as electronic banking, online banking or internet banking. It is an electronic banking system which helps bank customers to do financial transactions through the bank websites.

(e) With the growth of internet banking, a lot of security threats like hacking, viruses, grooming, phishing, spam, etc., have come up. For preventing such threats, we need to tackle them by making improvements in the security measures.

Here are some important tips to use internet banking safely:

(i) We should always use genuine antivirus software.

(ii) Avoid using public Wi-Fi.

(iii) Check for latest updates of your Smartphone's operating system.

(iv) Change your password regularly and ensure it's a strong one.

(v) Avoid signing in to your netbanking account via mailers.

(vi) Do not use public computers to log in to netbanking.

(vii) Check your account regularly.

2. Match the following:

(a) (iv) Online, real time

(b) (v) One-Time Password

(c) (vi) Digital Ticket

(d) (vii) Done by Credit Card

(e) (viii) Done by Cash

(f) (ix) C2C

(g) (x) B2B

(h) (i) B2C

(i) (iii) Computer, Network and Servers

(j) (ii) Electronic information transfer system

3. Fill in the blanks:

(a) electronic medium

(b) Business to Business

(c) websites

(d) picture, description

(e) criminals

(f) Digital ticket

(g) Email, SMS alerts

4. Write T for true and F for false statements:

(a) T (b) T (c) T (d) F (e) F

5. Tick (✓) the correct option:

(a) (iv) Credit Card

(b) (ii) B2C

(c) (ii) 24×7

(d) (iv) All of these

(e) (i) Virtual shopping

(f) (iii) Pre-sales and post-sales assistance

(g) (iv) All of these

(h) (iv) Investment

(i) (ii) Financial transactions

6. Application-based Questions

(a) Comparison and selection

(b) Business to Business (B2B)

(c) E-ticket or digital ticket

(d) E-banking/Netbanking

(e) Post-sales assistance

Chapter 8
Safe Computing: Preventing Viruses and Cyber Threats

1. Answer the following questions:

(a) Ways to Prevent Viruses:

1. Install antivirus–Buy and install good antivirus software
2. Update regularly–Keep antivirus updated
3. Don't open unknown emails–Don't open suspicious email attachments
4. Scan devices–Scan CDs and pen drives before use
5. Avoid unnecessary sites–Don't register on unknown websites
6. Use safe OS–Use UNIX or similar secure operating systems
7. Be careful with macros–Don't run macros unless sure

Remember: Prevention is better than cure!

(b) Antivirus Definition: Antivirus is a special program that keeps computers safe from harmful software like viruses, worms and spyware.

Functions of Antivirus:

1. Prevents viruses–Stops viruses from entering the computer
2. Scans files–Checks all files and folders for threats
3. Detects threats–Finds harmful programs
4. Removes malware–Deletes or fixes viruses
5. Shows status–Tells if computer is safe or not

Examples: Norton, Kaspersky, McAfee, AVG

(c) (i) Phishing

Phishing is an attempt to get sensitive information (like passwords, credit card details) through fake emails that look like they're from trustworthy sources.

Example: Getting an email that looks like it's from your bank asking for password.

(ii) Spamming

Spamming means receiving unwanted emails, usually for advertisements. These are also called "junk mails" that waste time and choke the internet.

(iii) Cyberbullying

Cyberbullying (or cyber harassment) is when someone is bullied, harassed or humiliated through the internet, digital technology or mobile phone.

(iv) Plagiarism

Plagiarism means stealing someone else's work (ideas, words, creations) and presenting it as your own without giving credit to the original creator.

(d) Digital Footprint is the trail or record we leave behind after surfing the internet. It's also called cyber shadow.

What it includes:

- Social media activities (Facebook, Instagram posts)
- Photos and videos we upload
- Browsing history
- Online games we play
- Comments we make
- Personal information shared

Important points:

- Digital footprints are permanent
- Even the owner cannot control them once made
- Used by interviewers and law agencies
- Think before you post!

(e) Ethical Uses of Computers:

1. Don't harm others–Don't use computers to hurt people
2. Respect privacy–Don't sneak into others' files
3. Don't interfere–Don't disturb others' computer work
4. Use licensed software–Don't use pirated software
5. Get permission–Don't use others' resources without asking
6. Think of society–Consider consequences before making software
7. Show respect–Use computers with respect for others
8. Give credit–Don't copy others' work without acknowledgment

2. Fill in the blanks:

(a) Spamming/spam.
(b) Cyberbullying.
(c) Password/PIN/OTP
(d) Boot sector viruses
(e) Infection
(f) Viruses and worms/malware
(g) Hacker.
(h) e-commerce/online shopping.
(i) Patent
(j) Internet

3. Write T for true and F for false statements:

(a) F
(b) F
(c) F
(d) F
(e) T
(f) T
(g) F
(h) T
(i) T
(j) T

4. Match the following:

(a) (ii) Example of worm
(b) (iv) Moral principles
(c) (i) Virus prevention software
(d) (vii) Example of email virus
(e) (vi) Cyber harassment
(f) (viii) Unauthorized copying
(g) (iii) Attacks at the time when computer boots
(h) (ix) Infects computers
(i) (x) Unwanted mails
(j) (v) Infects people

5. Tick (✓) the correct option:

(a) (ii) Intellectual property rights

(b) (ii) Hacker

(c) (ii) Phishing

(d) (iv) Melissa

(e) (ii) Abnormally

(f) (iii) Needing a medium like air, water, physical contact to get transmitted

(g) (iv) Virus software

(h) (iii) Trojan horse

(i) (iv) Damage cables

6. Application-based Questions

(a) Nehal should install Antivirus software.

Examples:

- Norton
- Kaspersky
- McAfee
- AVG
- Total AV

Important: She should also update it regularly to fight new viruses.

(b) It could contain:

- Email virus - Spreads through email attachments
- Trojan horse - Looks harmless but damages computer
- Spyware - Steals personal information

What Lokesh should do:

- Don't open the attachment
- Delete the email
- Don't reply to it
- Verify with sender first, if needed

(c) This is called Plagiarism.

What it means:

- Stealing someone else's work
- Presenting it as your own
- Not giving credit to original creator

What Prisha should do:

- Give credit to the original author
- Mention the source
- Write in her own words
- Be honest

(d) This is Phishing.

What it is:

- Fake email pretending to be from bank
- Trying to steal personal information
- Used for malicious purposes

What Rishabh should do:

- Don't reply
- Don't share bank details
- Delete the email
- Never click links in such emails
- Banks never ask for details via email

Chapter 9
Increasing Productivity Using Artificial Intelligence

1. Answer the following questions:

(a) AI-powered chatbots are like smart robots that can chat with us. They are created using artificial intelligence. This means they can learn and get better over time, just like how we learn new things in school. Some available chatbots are Chatfuel, Dialogflow, ChatGPT, etc.

(b) The AI tools available in Microsoft Word are:

1. Editor
2. Researcher
3. Ideas
4. Translator
5. Dictation
6. Accessibility Checker
7. Smart Lookup

(c) In Microsoft Word, the Translator tool helps in translating words, phrases or the whole document into another language.

To use Translator, perform the following steps:

(i) Open the Word document we want to translate.

(ii) Click the Review tab on the ribbon.

(iii) Click on the Translate down arrow in the language group

For translating the selection with Microsoft translator, we click on Translate Selection option or choose Translate Document for creating a translated copy of our document with Microsoft Translator.

Translator pane appears on the right side of the document. Here, we can select the required language from the drop-down list. Then, clicking on Translate button translates the document into the selected language.

(d) The Dynamic Arrays feature allows us to write formulas. Press the Enter key to view the displayed array of values is on the sheet. Functions in Excel that use Dynamic Array are:

(a) =UNIQUE

(b) =FILTER

(c) =RANDARRAY

(d) =SEQUENCE

(e) =SORT

(f) =SORTBY

(g) =XLOOKUP

(h) =XMATCH.

(e) With Rehearse with Coach, we can easily rehearse our presentation and get intelligent tips to improve our presentation skills. Here is how you can use it:

(i) Open presentation in PowerPoint.

(ii) Go to the Slide Show tab.

(iii) Click on Rehearse with Coach in the Rehearse section of the ribbon.

(iv) Click on Start Rehearsing in the small dialog box that appears.

(v) For feedback, check the box for Show real-time feedback.

(vi) When we present our presentation, the AI coach listens to our presentation and provides online feedback.

2. Match the following:

(a) (x) Spelling and grammar checker

(b) (iv) Collect the content from the web

(c) (v) Microphone gets activated

(d) (ix) Suggestions to make document accessible

(e) (viii) Write a formula

(f) (iii) Data range gets updated automatically

(g) (vii) Text into formulas

(h) (vi) Rehearse our presentation

(i) (i) Chat Generative Pre-Trained Transformer

(j) (ii) Microsoft Edge

3. Fill in the blanks:

(a) PowerPoint Designer theme ideas

(b) dynamic arrays

(c) Editor

(d) Accessibility Checker

(e) Generative Pre-Trained Transformer

4. Tick (✓) the correct option:

(a) (i) To check grammar and style using AI

(b) (iii) It provides definitions, synonyms and translations of words.

(c) (ii) To generate insights from data

(d) (iii) It automatically fills in values.

(e) (iv) Chat Generative Pre-Trained Transformer

(f) (iii) It provides real-time feedback on presentation skills.

(g) (ii) To provide design suggestions for slides

(h) (iii) Open AI

(i) (ii) It can perform web searches.

(j) (ii) Microsoft

5. Application-based Questions

(a) Researcher

(b) PowerPoint Designer theme ideas

(c) Analyze Data

(d) Chatfuel

(e) Presenter Coach

Chapter 10
Artificial Intelligence – Project Life Cycle

1. Answer the following questions:

(a) The most basic and important difference between AI project life cycle and traditional IT project life cycle is that in the case of Artificial Intelligence project life cycle, we provide the result as input and train the AI application accordingly. Data plays an important role in the development of AI applications whereas in traditional IT project life cycle, we identify the need and objective of our project and after that we build an application to obtain the result.

(b) Different phases of traditional IT project life cycle are:

(i) **Initiating**—This is the first phase of a project life cycle. In this phase, we identify the need and objective of our project. Here, in our example, Berry's objective was to bake a cake for her friend.

(ii) **Planning**—The next phase is planning where the project solution is developed in detail. The necessary steps and strategies are planned in order to complete the project. Here, in our example, Berry found the recipe and ingredients required for baking a cake.

(iii) **Executing**—This is also known as the implementation phase. During this phase, the task is performed as per the plan. Program is written for achieving our objective. In our example, the process is followed according to the recipe for baking the cake.

(iv) **Monitoring and Controlling**—Regular monitoring and controlling is required during the execution phase. During the project activities, we can take corrective action if required. In our example, Berry monitored the temperature of the oven and the cake baking process.

(v) **Closing**—It is the last phase, also known as the closure phase. The project has reached its completion and is ready for delivery. In our example, Berry has finished baking the cake and is ready to surprise her friend.

(c) **Problem Scoping**—Scope refers to the combined objectives and requirements needed to complete a project. This stage begins after identifying the problem where we need to understand various factors that affect the problem and set

goals that are to be achieved by the project. For scoping the problem in a better and more efficient way, we use the 4W's Canvas. 4W's Canvas is a tool used in defining the scope of the problem in a more structured way.

The 4W's are:

(i) **Who?:** Who refers to the person or group of persons facing the problem that are affected by the problem.

(ii) **What?:** What refers to the exact nature of a problem.

(iii) **Where?:** Where is related to the location or context or situation of a problem.

(iv) **Why?:** Why refers to the reason for solving the problem and the benefits obtained by solving this problem.

(d) (i) **Artificial Intelligence:** Artificial Intelligence is a field that enables computers to perform tasks that require human intelligence. It allows the machines to recognize objects or understand voice commands through voice assistants.

(ii) **Machine Learning:** Machine Learning is a subset of Artificial Intelligence that gives machines the capability to learn from data, identify patterns and make decisions without human involvement.

(iii) **Deep Learning:** Deep Learning is the most advanced field of Artificial Intelligence that mimics the working of the human brain in processing data and creating patterns for decision-making. Deep Learning is a subset of Machine Learning that deals with algorithms inspired by the function of the brain called Artificial Neural Networks.

(e) After analyzing and visualizing the patterns of data in the exploration stage, we create algorithms based on that data, which are also known as models. The process of creating models based on the analyzed data is known as modelling. We can use pre-built models or algorithms available in different platforms or we can write our own programs. The advantages and disadvantages of the model can also be checked during the process of modelling.

Artificial intelligence has two types of models:

- **Rule-based Models:** In rule-based models, the machine follows the patterns and instructions defined by the developer and performs its task accordingly. Rule-based model works on the concept of a decision tree.
- **Learning-based Models:** In learning-based models, the patterns are not defined by the developers; rather, a huge amount of unlabelled data is fed into the machines. The machine analyzes the data and generates patterns from it. During data analysis, it extracts similar data and tries to learn on its own. Learning-based models are of two types:
  - ♦ Machine Learning
  - ♦ Deep Learning

2. Fill in the blanks:

(a) Rule-based

(b) Decision tree

(c) Learning-based

(d) Machine learning, Deep learning

(e) Evaluation

(f) Deep Learning

(g) Artificial Intelligence

(h) data visualization

(i) Binary

3. Tick the correct option:

(a) (iii) When

(b) (i) Input

(c) (iv) Problem Identification

(d) (ii) Data acquisition

(e) (iii) Artificial Intelligence

(f) (ii) Unlabelled

(g) (i) Evaluation

(h) (iv) Newspaper

(i) (ii) Secondary

(j) (ii) Scope

4. Write T for true and F for false statements:

(a) T	(b) F	(c) T	(d) T	(e) F
(f) F	(g) T	(h) T	(i) F	(j) T

5. Application-based Questions

(a) Problem Identification

(b) User data and movie data

(c) Complexity, Data available, Accuracy

(d) Planning

(e) Evaluation

Chapter 11
AI Ethics

1. Answer the following questions:

(a) AI Ethics is a system of moral principles intended to guide the responsible development and use of AI. They are important because:

- AI technologies can create risks, inequalities and divides in society.
- We need policies and frameworks to ensure AI benefits all of humanity.
- They help prevent harmful consequences of AI misuse.
- They ensure AI is used in a fair and responsible way to help all.

(b) AI Bias means when an AI model gives unfair or biased results. This happens when AI learns from biased data.

Examples:

1. Virtual Assistants–Most virtual assistants have female voices, showing gender bias in assuming female voices are preferred.
2. Search Results–When searching for "salons" on Google, mostly female salons appear first, assuming the searcher is female.
3. Job Selection–If AI learns from data showing one gender getting better jobs, it might continue favoring only that group unfairly.

(c)
1. Human-centric AI Solutions – Technology designed to help people in a fair and positive way, respecting human values like honesty, safety, fairness and responsibility
2. Unbiased AI Solutions – Making sure computers make fair decisions and treat everyone equally without favoring one group over another
3. Data Protective AI Solutions – Keeping people's private information safe by collecting data carefully, storing it safely, and using it responsibly
4. Sustainable AI Solutions – Building technology that is good for both people and the planet by saving energy, using fewer resources, and thinking about society

(d)
1. AI Bias–AI systems can treat people unfairly if trained on biased data, preferring one group over another
2. Privacy Issues–AI might collect and use personal data without proper permission, invading someone's privacy

3. Job Replacement–AI can do jobs faster than humans, leading to fewer job opportunities for people
4. Misinformation–AI can create fake news or images that look real, making it hard to know what is true or false

(e) Ethics are guiding principles that help us decide:

- What is good or bad
- What is fair or unfair
- What is right or wrong
- How to make decisions that might impact others
- How to be responsible for our actions

Ethics guide us in choosing values for our life and making the right choices in different situations.

2. Fill in the blanks:

(a) Ethics
(b) Moral principles
(c) AI Bias
(d) Privacy issues
(e) Human-centric
(f) Unbiased
(g) Data protective
(h) Sustainable
(i) Misinformation
(j) Job replacement

3. State T for true and F for false statements:

(a) F
(b) T
(c) F
(d) T
(e) F
(f) T
(g) F
(h) F
(i) T
(j) F

4. Tick (✓) the correct option:

(a) (ii) External rules of conduct

(b) (ii) Moral compass

(c) (ii) What is right or wrong

(d) (iii) How decisions impact others

(e) (ii) To guide responsible development and use of AI

(f) (iii) To guide responsible development and use of AI

(g) (iv) Ensuring human-centric AI solutions

(h) (iii) To ensure sustainable AI solutions

(i) (ii) Biased training data

(j) (iii) Increased processing speed

5. Application-based Questions:

(a) This shows AI bias because the app is not showing diverse music from different cultures. To fix this:

- Request music from different countries and cultures
- Provide feedback to the app about wanting diverse suggestions
- Manually explore music from other cultures to train the AI better
- Report the bias to the app developers

(b) Problems this could cause:

- Privacy invasion - constant monitoring of students
- Students may feel uncomfortable and not behave naturally
- Misuse of recorded data

Solutions:

- Get permission from students and parents
- Use cameras only when necessary
- Keep data secure and delete it after use
- Be transparent about what is being monitored and why

(c) The school should be careful about:

- Not grouping students only by marks (bias against low scorers)
- Considering different learning styles and needs
- Not labelling or discriminating against any student

To ensure fairness:

- Include diverse criteria (interests, skills, learning preferences)
- Allow students to choose their groups too
- Regularly check if grouping is helping all students
- Mix students of different abilities together

(d) Teachers and developers should keep in mind:

- Fair grading criteria for all types of writing styles
- Not missing creative or unique ideas
- Understanding context and meaning, not just grammar
- Different cultural perspectives in writing
- Providing constructive feedback, not just scores
- Checking for bias in grading patterns

(e) This is unfair gender bias because the AI assumes:

- Boys only like science fiction and adventure
- Girls only like health and laughter stories

Solutions:

- Suggest books based on individual interests, not gender
- Show diverse book options to everyone
- Allow users to set their own preferences
- Train AI with unbiased data that doesn't assume gender preferences

Chapter 12
Applications of Artificial Intelligence

1. Answer the following questions:

(a) Artificial Intelligence is a branch of Computer Science that enables a computer system or any machine to perform various tasks with human-like intelligence.

(b) The three main domains of Artificial Intelligence are:

(i) **Data Science/Big Data:** This domain focuses on analyzing large volumes of data to uncover patterns, make predictions and informed decisions.

(ii) **Computer Vision:** This area enables machines to interpret and understand visual information from the world, such as images and videos.

(iii) **Natural Language Processing (NLP):** NLP allows computers to understand, interpret and generate human language, making it possible for machines to communicate with us in our own languages.

(c) Advantages of Artificial Intelligence are:

(i) Reduces human errors

(ii) Can continue working without getting exhausted or bored

(iii) Can perform the same task again and again

(iv) Faster decision-making

(v) Early detection of a problem based on symptoms

Disadvantages of Artificial Intelligence are:

(i) Increases production cost

(ii) Increased use of AI can lead to unemployment

(iii) Humans have become completely dependent on machines

(iv) Machines do not have emotions

(v) Machines do not have ethics or morality

(d) The three rules that we would set before playing any games are as follows:

(i) Read and understand the game by reading all the instructions carefully.

(ii) Be respectful while playing, whether with the computer or others.

(iii) Enjoy the experience and have fun.

(e) The role of AI in the healthcare sector:

(i) Diagnosis of a problem

(ii) Treatment protocol development

(iii) Drug development

(iv) Patient monitoring

(v) Robotic surgery

(vi) Updating patient records

(vii) Billing

(viii) Personalized medicine

(f) (i) **Intelligent Tutor System:** Intelligent Tutor System (ITS) is a computer system that interacts and provides feedback to students without any human intervention. ITS replicates the role of a teacher.

(ii) **Smart Classroom Technology:** A smart classroom is a digitally equipped classroom that offers a wide variety of teaching and learning methods. It uses AI technology to conduct a class. It includes audio and visual components to explain the subject.

(iii) **Adaptive Learning:** It is also known as adaptive teaching. It is a method in which computer algorithms and artificial intelligence are used to teach and interact with the learner. Teaching is customized according to the specific needs of the learner.

(iv) **Pedagogical Agents:** Pedagogical agents are virtual human-like characters used in online learning environments. They integrate artificial intelligence and assist us in our learning processes. These agents act as instructors and motivators. They interact with learners and provide support. Interacting with on-screen agent and learning helps in improving performance.

(g) We can monitor the health of crops with the help of AI-enabled application called Plantix. It identifies deficiencies in the soil, including plant pests and diseases, allowing farmers to use better quality fertilizers and improve crop yield.

(h) With the help of AI, computers can make decisions based on data within fractions of a second. This technology is widely applied across various fields. For example, self-driving cars use autopilot mode to navigate independently and react to obstacles. If a person steps in front of the car, it automatically comes to a halt.

(i) In mining, AI is used for excavation, mapping, surveying, drilling, explosive handling and locating valuable minerals. Robots equipped with AI can also detect harmful gases or water, ensuring worker safety.

2. Fill in the blanks

(a) Plantix

(b) Pedagogical Agents

(c) Adaptive

(d) Smart Classroom

(e) Intelligent Tutor System

(f) Brain-Computer

(g) Precision Farming

(h) Decision-making

(i) Human errors

(j) Production cost and unemployment

3. Tick (✓) the correct option:

(a) (iv) All of these

(b) (i) Provides combat support

(c) (iv) Robot

(d) (iii) Adaptive learning

(e) (ii) Digitally

(f) (iv) All of these

(g) (i) Surgeries

(h) (iv) All of these

(i) (iv) Sensors

(j) (i) Data available

4. Write T for true and F for false statements:

(a) T (b) F (c) F (d) T (e) T

(f) F (g) T (h) F (i) T (j) T

5. Application-based Questions

(a) AI in healthcare

(b) AI in video games

(c) AI in agriculture

(d) Rise in unemployment

(e) AI and Robotics

Chapter 13
Skill Sets Required for Future

1. Application-based Questions

(a) Education: Language learning tools

(b) Environment and Sustainability: Climate Change Prediction

(c) Disaster Relief and Crisis Management: Predicting Natural Disasters

(d) Robotics and Automation

(e) Technical and Non-technical Skills