

1. Computer Networking

Test Your Knowledge (Page 10)

1. Email
2. Telephone
3. Social Media
4. Face-to-Face



Topic Flashback (Page 13)

1. Client
2. Internet
3. Web portal



Art Integration Learning (Page 14)

Do it yourself



Topic Flashback (Page 17)

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



Experiential Learning (Page 19)

Do it yourself



Topic Flashback (Page 19)

1. Hyper Text Transfer Protocol Secure
2. Internet Message Access Protocol
3. File Transfer Protocol



QUICK QUIZ (Page 20)

1. b
2. a
3. a



Assess Yourself



Choose the correct option.

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



Tick (✓) the correct statements and cross (✗) the wrong ones.

1. ✓ 2. ✗ 3. ✗ 4. ✓ 5. ✗



Answer the following questions:

- Topology refers to the geometric arrangement of computers or nodes in a network.
Three different topologies are:
1. Bus Topology 2. Ring Topology 3. Star Topology
- Yes, it is possible. The printer can be shared over a network so that all 20 systems can send print commands. A print server allows multiple devices to access the printer.
- Smartphone, Laptop, Wireless headphones and Smartwatch are the examples of devices with Bluetooth feature.
- A Peer-to-Peer (P2P) network is a network of two or more computers that use the same type of program to share the data. Each computer is considered to have equal responsibilities and acts like a server to the other computers in the network. It works well in small environments. Whereas in a Client-Server network, one computer is designated as the server, and all the other computers connected to the network are called the clients. The clients can request the services from the server. The server processes the request and sends back the requested information.
- Sender, Receiver, Transmission Medium, Message and Protocol are the components of a network.



Scratch Your Brain.

1.

K	N	I	L	R	E	P	Y	H	D
T	J	I	V	Y	Q	V	F	E	M
X	R	N	N	S	G	W	K	V	T
N	Z	T	T	J	Q	D	K	B	O
F	H	R	P	G	O	Z	E	I	P
N	Y	A	W	E	T	A	G	R	O
E	S	N	U	M	E	D	O	M	L
W	I	E	P	Z	Z	O	V	N	O
J	Y	T	E	H	Z	T	U	M	G
R	E	T	U	O	R	N	X	Z	Y



2. Home Network is small, usually connecting a few devices like computers, smartphones, and smart TVs.

Whereas, a school network is larger, connecting multiple computers, printers, and servers with better security and management.

3. **Competency-based/Application-based questions:**

- a.
 - i. Campus Area Network (CAN)
 - ii. Cables, Wireless Access Points (WAPs), and communication devices
 - iii. Mesh Topology
 - iv. Client-Server Network
- b. Star Topology
- c. Personal Area Network (PAN)



Explore in the Lab

Do it yourself

2. Krita—Image Editing

Test Your Knowledge (Page 25)

Do it yourself



Experiential Learning

(Page 36)

Do it yourself



Topic Flashback

(Page 36)

1. Rectangular Selection Tool
2. Elliptical Selection Tool
3. Polygonal Selection Tool



QUICK QUIZ

(Page 37)

1. b
2. b
3. a



Assess Yourself



Choose the correct option.

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



Fill in the blanks with the correct words.

1. Crop
2. .kra
3. Smart Patch tool
4. Color Selector Docker
5. Cyan, Magenta, Yellow, Black



Answer the following questions:

1. Similarity: Both tools are used to select portions of an image.

Difference: The Freehand Selection Tool is used to select an object or section of an image by drawing a freehand border around it, while the Contiguous Selection Tool is used to detect the edges of the image automatically on the basis of the colour codes and do the selection quickly using the round brush tip.

2. Components of Krita are Menu Bar, Tool Options Docker, Toolbar, Toolbox, Workspace, Color Selector Docker, Layers Docker, Status Bar.


Workspace is used for creating and editing images.


3. To use Clone Tool, follow these steps:

Step 1: Open the image in which the object is to be cloned.

Step 2: Click on the Freehand Brush Tool.

Step 3: Click on the Clone Tool in the Brush Presets docker.

Step 4: Press the Ctrl key from the keyboard and place the  part of the mouse pointer on the object to be cloned.

Step 5: Place the  part of the mouse pointer on the place where the object is to be copied.

Step 6: Click and drag slowly to draw the copied object.



Scratch Your Brain.

1. Do it yourself
2. Competency-based/Application-based questions:

a. Smart Patch Tool can be used to do so.

b. Jignesh can use the Crop Tool in Krita to remove the unwanted portion of the image.





Explore in the Lab

Do it yourself

3. Trending Technologies

Test Your Knowledge (Page 41)

Do it yourself



Topic Flashback (Page 44)

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



QUICK QUIZ (Page 48)

1. a.
2. a.
3. b.

Assess Yourself



Choose the correct option.

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



Tick (✓) the correct statements and cross (✗) the wrong ones.

1. ✓
2. ✓
3. ✗
4. ✗
5. ✗



Answer the following questions:

1. The Virtual World is a computer-generated environment where users can interact using VR headsets.

The Real World is the physical environment where humans naturally interact.

Example:

Virtual Reality Flight Simulators allow pilots to train in a simulated environment without flying a real aircraft.

2. Robotic Process Automation (RPA) is a software robot running on a physical or virtual machine that mimics human actions. With RPA, software users create software robots that can learn, mimic, and then execute rule-based business processes.
3. Edge computing is a complimentary approach to cloud computing. Edge computing keeps computer data close to the user.



Edge computing is used in technologies such as autonomous vehicles, video conferencing, and augmented reality. Edge computing, for example, reduces the delay of waiting for a server in the cloud to respond when an autonomous car makes a split-second choice to brake and avoid a collision.

4. Machine Learning is used in social media services, email spam and malware filtering, online customer support, search engine result refining, etc.



Scratch Your Brain.

1. Do it yourself.
2. Do it yourself.
3. **Competency-based/Application-based questions:**
 - a. Radika can use AI-powered robotic pets, such as Aibo (robotic dog), which can develop emotional bonds and provide companionship without triggering allergies.
 - b. The "View 3D Try-On" feature falls under Augmented Reality (AR).

Periodic Assessment-1

(Based on chapters 1 & 2)

- A.** 1. Router 2. Modem 3. Gateway 4. Google Earth VR
5. Matterport 6. Snapchat

B.

The screenshot shows the Krita software interface. The following components are labeled with dashed boxes and lines pointing to them:

- Menu bar:** Located at the top of the window, containing menus like File, Edit, View, Image, Layer, Select, Filter, Tools, Settings, Window, and Help.
- Toolbar:** Located on the left side of the window, containing various drawing tools like Eraser, Circle, Rectangle, etc.
- Toolbox:** Located on the left side of the window, containing various drawing tools like Eraser, Circle, Rectangle, etc.
- Status bar:** Located at the bottom of the window, displaying information like 'a) Eraser Circle', 'RGB/Alpha (8-bit L,ile-V2-argbtricc', '2,480 x 3,508 (33.5 MiB)', and '0.007'.
- Color Selector Docker:** Located on the right side of the window, containing a color wheel and a color bar.
- Tool Options Docker:** Located on the right side of the window, containing options for the selected tool, such as 'Brush Smoothing' and 'Basic'.
- Layers Docker:** Located on the right side of the window, containing a list of layers, including 'Paint Layer 1' and 'Background'.
- Workspace:** The central area of the window where the drawing is done.

- C.** 1. Sophia 2. Augmented Reality 3. Clone 4. Networking Cable .



4. Images, Links & Frames in HTML5

Test Your Knowledge (Page 53)

1.
 stands for "break".
2. <p> stands for "paragraph".
3. stands for "unordered list".
4. stands for "list item".
5. <tr> stands for "table row".
6. <td> stands for "table data".



Topic Flashback (Page 54)

Src, Width, Height



Art Integration Learning (Page 54)

Do it yourself



Topic Flashback (Page 63)

1. A website is a collection of web pages which are interlinked with each other and contains related information. These web pages are linked with the help of a feature of HTML called hyperlink.
2. Link Text
3. a:active and a:link



QUICK QUIZ (Page 66)

1. b.
2. b.
3. b.

Assess Yourself



Choose the correct option.

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



Tick (✓) the correct statements and cross (✗) the wrong ones.

1. ✗
2. ✓
3. ✗
4. ✗
5. ✗





Answer the following questions:

1. It specifies the alternate text to be displayed in the web browser, if the provided image is not found.
2. `<AUDIO SRC="TalkNext.mp3" CONTROLS AUTOPLAY></AUDIO>`
3. The "control" attribute allows users to gain control over how the video is played.
4. Use the `target="_blank"` attribute inside the `<a>` tag.
5. HTML provides a feature to display more than one web page on a single screen of the web browser. These web pages are actually displayed using frames. Frames are the different sections or parts of a web page.



Scratch Your Brain.

1. Do it yourself.
2. The code will execute without errors, but the image will not be displayed. Instead, the alternative text (alt) "Description of the image" will be shown in the browser.
3. **Competency-based/Application-based questions:**
 - a. Neha can use the following HTML tags to insert audio and video files:
For Audio:
`<AUDIO SRC="Music.mp3" CONTROLS AUTOPLAY></AUDIO>`
For Video:
`<VIDEO SRC="Dance.mp4" WIDTH="300" HEIGHT="300" CONTROLS AUTOPLAY></VIDEO>`
 - b. Meera should use the `` tag to insert images into the web page
 - c. Do it yourself.

5. Forms in HTML5

Test Your Knowledge (Page 71)

1. HREF
TARGET
2. SRC
ALT



Topic Flashback (Page 72)

1. `<Form> ... Form element.. </Form>`
2. Action and Method





Do it yourself



1. a. 2. b. 3. b.

Assess Yourself



Choose the correct option.

1. b. 2. a. 3. d. 4. b. 5. a. 6. b.



Fill in the blanks with the correct words.

1. Password 2. Method 3. Type 4. Reset 5. Select and Option



Answer the following questions:

- Similarity:
Both allow users to select options in a form.
Difference:
Radio Button allows selecting only one option from a group.
Check Box allows selecting multiple options.
- Text – Creates a text box.
 - Password – Creates a password field.
 - Radio – Creates a radio button.
 - Checkbox – Creates a checkbox.
 - Submit – Creates a submit button.
- Use the <INPUT> tag with TYPE="CHECKBOX".
 - Assign a NAME attribute to group the checkboxes.
 - Use different VALUE attributes for different options.

Example:

```
<input type="checkbox" name="hobby" value="Reading"> Reading
<input type="checkbox" name="hobby" value="Travelling"> Travelling
<input type="checkbox" name="hobby" value="Music"> Music
```
- ACTION:** This attribute specifies the action that will take place when the form is submitted.
 - METHOD:** This attribute specifies the type of method the form will use to submit the entered values.



- c. **ENCTYPE:** This attribute specifies the data encoding method a web browser uses before sending it to the server.
5. The <SELECT> tag is used to add a drop-down list in the HTML form. This tag produces a list of options for the user with the help of <OPTION> tag. We can create a combo box using <SELECT> and <OPTION> tags.



Scratch Your Brain.

1. • Replaced type="radio" with type="checkbox" so that multiple options can be selected.
• Kept the name="effect" the same for each checkbox, as it is not required to be unique for each checkbox when using them.

Now, users can select multiple harmful effects at once.

```
<!DOCTYPE html>
<html>
<head>
<title>Harmful Effects of Plastics</title>
</head>
<body>
<h2>Select Harmful Effects of Plastics:</h2>
<form>
  <input type="checkbox" name="effect" value="Pollution">Pollution<br>
  <input type="checkbox" name="effect" value="Pleasant
  Weather">Pleasant Weather<br>
  <input type="checkbox" name="effect" value="Endangering
  Wildlife">Endangering Wildlife<br>
  <input type="checkbox" name="effect" value="Toxicity">Toxicity<br>
  <input type="checkbox" name="effect" value="Greenery">Greenery<br>
</form>
</body>
</html>
```

2. **Competency-based/Application-based questions:**
- Do it yourself.
 - Do it yourself.

Periodic Assessment-2

(Based on chapters 4 & 5)

- A. 1. It specifies the source location or URL of the image to be inserted in the web page.
2. It specifies the width of the image on the web page.



3. It specifies the alternate text to be displayed in the web browser, if the provided image is not found.

Test Sheet-1

(Based on chapters 1 to 5)

- A.** 1. b. 2. d. 3. d. 4. a. 5. c. 6. a. 7. c. 8. b. 9. a. 10. d.
- B.** 1. Crop Tool 2. .kra 3. <input> 4. type
5. <SELECT> and <OPTION>
- C.** 1. ✓ 2. ✗ 3. ✗ 4. ✓ 5. ✓
- D.** 1. Yes, it is possible. The printer can be shared over a network so that all 20 systems can send print commands. A print server allows multiple devices to access the printer.
2. a. Smartphone b. Laptop c. Wireless headphones d. Smartwatch
3. Components of Krita are Menu Bar, Tool Options Docker, Toolbar, Toolbox, Workspace, Color Selector Docker, Layers Docker, Status Bar.
Workspace is used for creating and editing images.
4. Similarity: Both tools are used to select specific parts of an image in Krita.
Difference: Freehand Selection Tool is used to select an object or section of an image by drawing a freehand border around it.
While the Contiguous Selection Tool is used to detect the edges of the image automatically on the basis of the colour codes and do the selection quickly using the round brush tip.
5. Robotic Process Automation (RPA) is a software robot running on a physical or virtual machine that mimics human actions. With RPA, software users create software robots that can learn, mimic, and then execute rule-based business processes.
6. Extended Reality (XR) is an umbrella term that covers all of the various technologies, which includes Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR) technologies. It involves the use of computer-generated environments or overlays that merge the physical and digital worlds to create immersive experiences.
7. <AUDIO SRC="TalkNext.mp3" CONTROLS AUTOPLAY></AUDIO>
8. Use the target="_blank" attribute inside the <a> tag.
9. a. Text – Creates a text box.
b. Password – Creates a password field.
c. Radio – Creates a radio button.
d. Checkbox – Creates a checkbox.
e. Submit – Creates a submit button.



- 10.a. Use the <INPUT> tag with TYPE="CHECKBOX".
- b. Assign a NAME attribute to group the checkboxes.
- c. Use different VALUE attributes for different options.

Example:

```
<input type="checkbox" name="hobby" value="Reading"> Reading
```

```
<input type="checkbox" name="hobby" value="Travelling"> Travelling
```

```
<input type="checkbox" name="hobby" value="Music"> Music
```

6. Algorithmic Intelligence

Test Your Knowledge (Page 89)

1. You cannot vote
2. First Division



Topic Flashback (Page 91)

It's a holiday Entry not allowed

2. Action and Method



Interdisciplinary Learning (Page 91)

Do it yourself



QUICK QUIZ (Page 93)

1. b.
2. a.
3. b.
4. b.

Assess Yourself



Choose the correct option.

1. b.
2. c.
3. c.
4. a.



Fill in the blanks with the correct words.

1. condition
2. if
3. else
4. conditional



Answer the following questions:

1. A loop allows a set of instructions or a block of code to be executed repeatedly. It helps in automating repetitive tasks and makes the code more efficient by avoiding the need to write the same instructions multiple times.



```

2. day = "Sunday"
   match = True
   if day == "Sunday" and match:
       print("We have a match on Sunday")
   else:
       print("No, match on Sunday")

3. weekday = True
   exam = True
   if weekday or exam:
       print("Exam today")
   else:
       print("No exam on weekend")

```



Scratch Your Brain.

1. a.

Num1	4	7	87	45	22
Num2	7	5	34	32	90
Print	Num2 is greater	Num1 is greater	Num1 is greater	Num1 is greater	Num2 is greater

b.

Marks	45	40	55	49	85
Result	Fail	Fail	Pass	Fail	Pass

c. Start

x	✓				
	x	✓			
		x	✓		
			x	✓	
				x	✓

d.

	8	8	8	8	8

Start



start

b. Start

x						
	x					
		x				
			x			
				x		
					x	

3. Competency-based/Application-based questions:

a. He can use Loop to use the code.

b. `if year % 400 == 0:`

`print("Yes")`

`else:`

`print("No")`

7. Loops in Python

Test Your Knowledge (Page 99)

1. False

2. True

3. True



Topic Flashback (Page 103)

1. The syntax of the for statement is given below:
`for <counter variable> in range(start, stop, step_size):`

Statements

2. The syntax of while statement is given below:

`while (test expression):`

Statements

increment/decrement expression

3. a. -10

-9

-8

-7



14



-6
-5
-4
-3
-2
-1

- b. Orange Education
Orange Education
Orange Education
Orange Education
Orange Education



Interdisciplinary Learning (Page 104)

Do it yourself



Topic Flashback (Page 105)

1. Hello Computer Science
An infinite loop is created with the above message.
2. $i = 1$
 $i = 2$
 $i = 3$
 $i = 4$
 $i = 5$
Done



QUICK QUIZ (Page 107)

1. b. 2. b. 3. b. 4. b.

Assess Yourself



Choose the correct option.

1. c. 2. a. 3. a. 4. c.



Tick (✓) the correct statements and cross (✗) the wrong ones.

1. ✓ 2. ✗ 3. ✓ 4. ✓ 5. ✓





Fill in the blanks with the correct words.

1. Iterative
2. Two
3. Infinite
4. Break, Continue



Answer the following questions:

1. Looping is the process of executing a block of code multiple times until a specified condition is met.
2. Generated values: 10, 12, 14, 16, 18
3. Jump statements control the flow of execution within loops.
Python provides two jump statements:
break – Exits the loop immediately.
continue – Skips the current iteration and moves to the next one.
4. The while loop is used to execute a block of code as long as a condition remains true.

Example:

```
i = 1
while i <= 5:
    print(i)
    i += 1
```

Output:

```
1
2
3
4
5
```

5. The **break** statement stops the execution of the loop and program flow continues to the statement after the loop.
The **continue** statement is used inside loops. When a **continue** statement is encountered inside a loop, control of the program jumps to the beginning of the loop for the next iteration, skipping the execution of the rest of the statements inside the loop for the current iteration.



Scratch Your Brain.

1.
 - a. 55
 - b. 2
 - c. The sum of numbers from 1 to 5 is: 15
 - d. The factorial of 5 is: 120
 - e. Guess the number(between 1 and 10): 6
Wrong guess. Try again!



Guess the number(between 1 and 10): 7
Congratulations! You guessed the correct number.
Game over.

2. **Competency-based/Application-based questions:**

She can use The While Statement.

Syntax:

while (test expression):

Statements

increment/decrement expression

8. Functions and String in Python

Test Your Knowledge (Page 113)

```
sum = 0
for number in range(1, 6):
    sum += number
print("Sum of the first five natural numbers:", sum)
```



Topic Flashback (Page 115)

1. Parameters, Statements
2. The main difference between these two categories is that built-in functions do not require to be written by us, whereas a user-defined function has to be developed by the user at the time of writing a program.



Interdisciplinary Learning (Page 117)

#Function to find the HCF of two numbers

```
def find_hcf(x, y):
    # Find the smaller number
    if x > y:
        smaller = y
    else:
        smaller = x
    #Check for common factors starting from the smaller number
    for i in range(1, smaller + 1):
        if (x % i == 0) and (y % i == 0):
            hcf = i # HCF is the last common factor
```



```

    return hcf
#Function to find the LCM of two numbers
def find_lcm(x, y):
#Calculate LCM using the formula: LCM = (x * y) // HCF
    lcm = (x * y) // find_hcf(x, y)
    return lcm
# Input from the user
num1 = int(input("Enter the first number: "))
num2 = int(input("Enter the second number: "))
# Find HCF and LCM
hcf = find_hcf(num1, num2)
lcm = find_lcm(num1, num2)
# Display the results
print(f"The HCF of {num1} and {num2} is: {hcf}")
print(f"The LCM of {num1} and {num2} is: {lcm}")

```



Topic Flashback (Page 120)

1. A sequence of characters which is enclosed or surrounded by single (' '), double (" "), or triple ("' ") quotes is known as a string.
2. An escape sequence is a sequence of characters that does not represent itself when used inside a character or string. It is typically used to specify actions such as special characters and formatting actions.



Interdisciplinary Learning (Page 121)

Do it yourself.



QUICK QUIZ (Page 124)

1. b.
2. b.
3. b.

Assess Yourself



Choose the correct option.

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



Fill in the blanks with the correct words.

1. Arguments
2. Single, Double
3. Three
4. \n, \t
5. Positive
6. upper()





Answer the following questions:

1. A function in Python is defined using the `def` keyword followed by the function name and parentheses.
2. Built-in functions are predefined in Python, such as `print()`, `len()`, and `max()`.
User-defined functions are created by the programmer to perform specific tasks.

For example:

Built-in function

```
print(len("Hello")) # Output: 5
```

User-defined function

```
def square(num):
    return num * num

print(square(4)) # Output: 16
```

3. `name = "RAKESH Mishra"`

```
print(len(name)) # Output: 13
print(name.lower()) # Output: rakesh mishra
print(name.upper()) # Output: RAKESH MISHRA
print(name.capitalize()) # Output: Rakesh mishra
```
4. Arguments are passed inside the parentheses when calling a function.

Example:

```
def add(a, b):
    return a + b

print(add(5, 3)) # Output: 8
```

Here, 5 and 3 are passed as arguments to the `add()` function.

5. String Concatenation Operator (+): String concatenation operator joins two or more strings into one string.
String Replication Operator (*): The replication operator is used to repeat the string for a given number of times.

Example:

Concatenation

```
s1 = "Hello" + " World"
print(s1) # Output: Hello World
```

Replication

```
s2 = "Hi" * 3
print(s2) # Output: HiHiHi
```



Scratch Your Brain.

Do it yourself.



3. Competency-based/Application-based questions:

```
a. def check_voting_eligibility(age):  
    if age >= 18:  
        print("You are eligible to vote.")  
    else:  
        print("You are not eligible to vote.")
```

#Testing the function

check_voting_eligibility(17) # Output: You are not eligible to vote.

check_voting_eligibility(23) # Output: You are eligible to vote.

```
b. def Avg(english, maths, science, social_science):  
    total = english + maths + science + social_science  
    average = total / 4  
    return average
```

#Testing the function

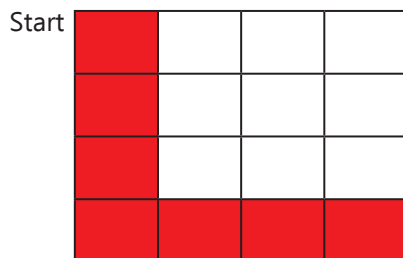
student_avg = Avg(85, 90, 78, 88) # Example marks

print("The average marks are:", student_avg)

Periodic Assessment–3

(Based on chapters 6 to 8)

A.



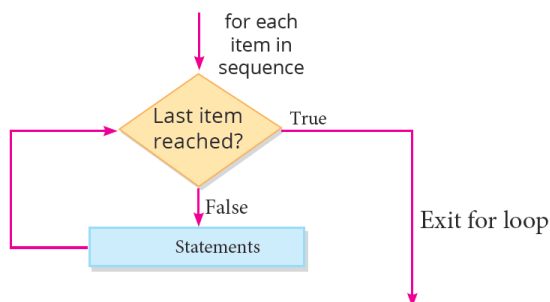
Repeat 4 times

(Move 1 down and Fill Colour)

Repeat 3 times

(Move 1 right and Fill Colour)

- B.
1. Missing Execution of Loop Body on the False Path.
 2. Incorrect Placement of Exit Loop Condition.



- C. 1. The len() function calculates and returns the length of a string supplied as an argument.
2. The lower() function converts all uppercase letters to lowercase.
3. The capitalize() function returns a string with the first character in capital and the rest in lowercase.
4. Arguments are the values passed to a function when calling it.
5. A return value is the output that a function gives back after execution.

9. List in Python

Test Your Knowledge (Page 130)

1. "Name"
2. "Delhi"
3. 123
4. 23234.54
5. "22323.11"
6. "&%\$#"



Topic Flashback (Page 132)

1. Syntax to Create a List:

```
<list_name> = [value1, value 2, value 3, ...]
```
2. L1 = ['Orange', 2.0, 5, [10,20]]



Topic Flashback (Page 136)

1. f.
2. c.
3. a.
4. e.
5. b.
6. d.



QUICK QUIZ (Page 138)

1. b.
2. b.
3. b.

Assess Yourself



Choose the correct option.

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



Tick (✓) the correct statements and cross (✗) the wrong ones.

1. ✓
2. ✗
3. ✗
4. ✓
5. ✗



Fill in the blanks with the correct words.

1. different types
2. count()
3. reverse()
4. +, *
5. []





Answer the following questions:

1. A list is a sequence of multiple values in a specific order. In a list, each element or value is called an item. A list is mutable, which means the items in a list can be modified by assigning new values.
2. An empty list can be created using square brackets [].
To create empty list:
`List1 = []`
3. Yes, a list in Python can store elements of different data types.
4. You can use the `len()` function to find the number of elements in a list.
5. There are different ways to remove elements from a list:
Using `remove()` → Removes the first occurrence of an element.
Using `pop()` → Removes an element at a specified index.
6. List slicing refers to a part of a list. In Python, list slicing is done by using the Slicing operator (:).
The syntax of slicing the list is as follows:
`name of the list[start : stop : step]`
Example:
`numbers = [10, 20, 30, 40, 50]`
`print(numbers[1:4])` # Output: [20, 30, 40]

Function	Description	Example
<code>len()</code>	Returns the number of elements in a list	<code>len([1, 2, 3]) → 3</code>
<code>max()</code>	Returns the largest element in the list	<code>max([10, 20, 30]) → 30</code>
<code>min()</code>	Returns the smallest element in the list	<code>min([10, 20, 30]) → 10</code>
<code>append()</code>	Adds an element at the end of the list	<code>list.append(50)</code>
<code>sort()</code>	Sorts the list in ascending order	<code>list.sort()</code>



Scratch Your Brain.

1. a. [1, 2, 3, 4]
b. [20, 30, 40]
c. [1, 2, 5, 7, 8]
d. 1
e. 5
f. ['apple', 'banana', 'date', 'cherry']
2. a. `append()` only takes one argument, but (1, 2) contains two values, which causes an error.
Corrected Code:
`my_list = [1, 2, 3]`



```
my_list.append(1) # Append only one element
print(my_list) # Output: [1, 2, 3, 1]
```

- b. You cannot add a list (list1) and an integer (7).

Lists can only be concatenated with other lists.

Corrected Code:

```
result = list1 + [7] # Convert integer to a list before concatenation
print(result) # Output: [1, 2, 3, 7]
```

- c. Incorrect slice range ([2:1]): The start index (2) is greater than stop index (1), resulting in an empty list.

Corrected Code:

```
sliced_list = my_list[1:3] # Corrected slicing (start=1, stop=3)
print(sliced_list) # Output: [20, 30]
```

- d. extend() requires an iterable (like a list, tuple, or string), but 4 is an integer, which is not iterable.

Corrected Code:

```
my_list.append(4) # Append a single integer
print(my_list) # Output: [1, 2, 3, 4]
```

3. **Competency-based/Application-based questions:**

- a. Yes, it is possible to create a list inside another list.

This type of list is called a Nested List in Python.

- b. Pratha can remove 'Yashik' and add 'Mridul' to the Party list using Python list methods.

Removing 'Yashik' using remove() method:

```
Party.remove('Yashik')
```

Adding 'Mridul' using append() method:

```
Party.append('Mridul')
```

Final Corrected List:

```
print(Party) # Output: ['Vinay', 'Ranu', 'Krish', 'Mridul']
```

10. AI Domains

Test Your Knowledge (Page 149)

Do it yourself.



Topic Flashback (Page 152)

1. Natural Language Processing (NLP)
2. Computer Vision (CV)



1. a. 2. a. 3. a. 4. b.

Assess Yourself



Choose the correct option.

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



Tick (✓) the correct statements and cross (✗) the wrong ones.

1. ✗ 2. ✓ 3. ✓ 4. ✓ 5. ✓



Fill in the blanks with the correct words.

- | | |
|--------------------------------------|---------------------------------|
| 1. Natural Language Processing (NLP) | 2. Voice assistants |
| 3. Computer vision | 4. Artificial Intelligence (AI) |



Answer the following questions:

- Spam email filtering (Categorizing emails into spam/junk).
Voice Assistants (Alexa, Siri, Google Assistant).
- Computer Vision: Face recognition, self-driving cars.
NLP: Chatbots, virtual assistants.
Data Science: Personalized recommendations on Netflix and Amazon.
- Computer Vision is a very popular field of AI that trains a computer to understand and interpret the visual world.
- Natural Language Processing (NLP)
Computer Vision (CV)
Data Science



Scratch Your Brain.

- Do it yourself.
- Competency-based/Application-based questions:**
Computer Vision (CV)

11. Developments Using AI

Test Your Knowledge (Page 157)

1. Natural Language Processing (NLP)
2. Computer Vision (CV)
3. Big Data



Topic Flashback (Page 158)

CCTV based monitoring using AI can help in building surveillance systems to keep a check on potential criminal incidents and security of the residents.

Test Your Knowledge (Page 160)

1. F
2. F
3. F
4. T



QUICK QUIZ (Page 162)

1. b.
2. b.
3. b.

Assess Yourself



Choose the correct option.

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



Fill in the blanks with the correct words.

1. Smart highway
2. AI-enabled homes
3. military technology
4. Automated transportation
5. controlled, managed



Answer the following questions:

1. AI helps in early disease detection, robotic surgeries, medical research, and drug discovery.
Example: Google's DeepMind outperformed doctors in detecting breast cancer at an early stage.
2. AI transforms the classical way of education to a digital approach by offering interactive lessons, games, and quizzes that make learning fun and engaging.
3. CCTV-based monitoring using AI can help build surveillance systems to keep a check on potential criminal incidents and ensure the security of the residents.
4. Any country's growth depends on its economic and financial condition. AI has great potential to boost an individual's economic health. Nowadays, AI algorithms are being used to manage equity funds.



5. Automated transportation ensures that there are fewer accidents. Google began testing a self-driving car in 2012. Many other automobile manufacturers, like General Motors, Ford, Mercedes, BMW, and others, are in the process of developing driverless car systems.



Scratch Your Brain.

1. Do it yourself.
2. **Competency-based/Application-based questions:**
 - a. CCTV based monitoring
 - b. Biometric Authentication

Periodic Assessment–4

(Based on chapters 9 to 11)

- A. 11
23
25
- B. 1. Alexa
2. Drones
- C. 1. AI-enabled CCTV surveillance
2. AI-powered smart homes
3. AI-powered Smart Classroom

Test Sheet–2

(Based on chapters 6 to 11)

- A. 1. a. 2. c. 3. b. 4. c. 5. b. 6. c.
7. d. 8. c.
- B. 1. military technology 2. while
3. Arguments 4. Single, Double
5. different types 6. 1981
- C. 1. × 2. ✓ 3. ✓ 4. × 5. ✓ 6. ×
- D. 1.

```
num = int(input("Enter a number: "))  
if num % 2 == 0:  
    print("Even number")  
else:  
    print("Odd number")
```



2. If only one condition needs to be true irrespective of the other, the OR (or) operator is used.

Example:

```
age = int(input("Enter your age: "))
if age < 18 or age > 60:
    print("You are not eligible for a driving license.")
else:
    print("You are eligible for a driving license.")
```

3. A for loop is used when the number of iterations is known and iterates over sequences like lists, ranges, or strings, whereas a while loop runs until a specified condition becomes False, making it useful when the number of iterations is unknown.
4. You can exit a loop before the condition becomes False in Python using the break statement.
5. In Python, arguments are passed to a function inside the parentheses when calling it.

Example:

```
def greet(name):
    print("Hello, ", name)
# Calling the function with an argument
greet("Alice")
```

6. String Concatenation Operator (+): String concatenation operator joins two or more strings into one string.

String Replication Operator (*): The replication operator is used to repeat the string for a given number of times.

Example:

Concatenation

```
s1 = "Hello" + " World"
print(s1) # Output: Hello World
```

Replication

```
s2 = "Hi" * 3
print(s2) # Output: HiHiHi
```

7. An empty list can be created using square brackets [].
8. A list is a sequence of multiple values in a specific order. In a list, each element or value is called an item. A list is mutable, which means the items in a list can be modified by assigning new values.

