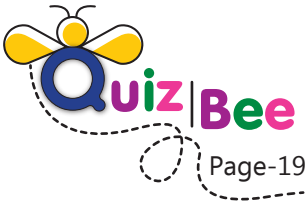
Class 8

Answer Key

Trackpad (V 2.1)

1. Networking Concepts



1. This type of network is useful when you want to connect two different departments in a building (e.g. an office, a building or a factory).
2. It is a satellite-based navigation system which is used to identify the geographical location of an object.
3. It is used to exchange data between a web browser and a website.

ASSESS YOURSELF

1.	a. (iv)	b. (iii)	c. (iii)	d. (iv)	e. (ii)
2.	a. Modem	b. Bus topology	c. Protocol	d. MAN	e. LAN
3.	a. NIC	b. Hub	c. Bluetooth	d. HTTPS	

4. a. A network is defined as a group of devices that are linked together to share information, data and resources.

   b. A gateway is a network device that allows the data to flow between two different networks which may use different protocols.

   c. The components required for communication system are:
   - Sender
   - Receiver
   - Transmission Medium
   - Message

- Protocol

d. We need a computer network for the following reasons:
   - It allows information or files to be shared with other computers in the network.
   - It allows computers in the network to share hardware like printer, scanner, fax machine, hard disks, etc.

e. Topology or structure is the layout of the connection formed between computers.

BUS TOPOLOGY

In this topology, all the nodes are connected to a single common path. It is simple and easy to maintain. Additional nodes can be connected at any point along its length. The major disadvantage of this topology is that fault detection in this topology is very difficult.

STAR TOPOLOGY

In this topology, central node acts as a hub to which all the other nodes are connected. As compared to the bus topology, star topology requires more devices and cables. The addition of a new node to a star topology is difficult as it involves a connection all the way to the central node.

f. Protocol is a set of rules that governs the communication between the computers on a network. Certain network protocols and standards are to be followed in order to ensure that your computer can communicate with another computer over a network.

FTP stands for File Transfer Protocol. It is a part of the TCP/IP protocol suite and enables files to be transferred between computers.

HTTPS stands for Hypertext Transfer Protocol Secure. It is an extension of Hypertext Transfer Protocol used for secure communication over a network. It makes a secure connection by establishing an encrypting link between the browser and server, hence maintaining data integrity by encrypting the data.

5. a.

SMTP	POP3
i. **SMTP** stands for Simple Mail Transfer Protocol.	i. **POP3** stands for Post Office Protocol 3.
ii. It is the most popular protocol for transferring electronic mail via the Internet.	ii. It is the recent version of Internet protocol for receiving e-mails. It allows you to download email messages on your local computer and read them even if you are offline.

b.

LAN	MAN
i. **LAN** stands for Local Area Network.	i. **MAN** stands for Metropolitan Area Network.
ii. It is a digital communication system that interconnects a larger number of computers and other peripheral devices within a radius of less than 1 km.	ii. It consists of two or more local area networks or campus area networks together that usually spans several buildings in the same city or town.

c.

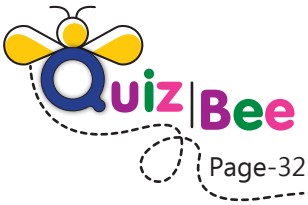
Client-Server Network	Peer-to-Peer Network
i. This is the most efficient network architecture that consisting of two parts: client system and server system.	i. An alternative to the client-server approach is the peer-to-peer approach. There are no dedicated servers.
ii. One or more computers on the One computer is designated as the server and all the other computers connected on the network are called the clients.	ii. All the computers are equal and can share their resources to be used by others and are therefore known as peers.

6. a. CAMPUS AREA NETWORK
   b. LOCAL AREA NETWORK
   c. WIDE AREA NETWORK
   d. METROPILTAN AREA NETWORK
7. a. Ring Topology
   b. Network Server

{CODING ZONE}

1. a. L Oryh frglqj
   b. Frpsxwhuv idvflqdwh ph
2. a. See you on monday
   b. Thank you
3. a. Acoettakrmhwstfte
   b. Bhnseoet

2. Animation in Krita



1. You can create digital art, illustrations, and even 2D animations with it. Krita has cool features like layers and filters to add special effects to your artwork.
2. Onion Skins Docker

ASSESS YOURSELF

1. a. (iii) b. (iii) c. (ii) d. (iv)
2. a. Layers b. Frame c. Keyframe d. Animation Timeline
3. a. Stage b. Animation c. Frame-by-frame raster animation
4. a. A frame is a single image in the sequence that makes up your animation.

   A keyframe is a special frame where a new symbol instance appears in the timeline. For example, change in size, shape, colour, position, etc.

   b. In Krita, the Animation feature allows users to create frame-by-frame animations using a timeline and onion skinning for smooth motion. It enables exporting animations in GIF, MP4, and image sequences while supporting multi-layer animation.

   c. (i) The Stage refers to the main drawing area where you create and view your artwork and animations.

   (ii) The Onion Skins Docker in Krita is a helpful tool for animators. It allows you to see multiple frames at once by showing transparent versions of the previous and next frames while you work on the current one.
5. a. Anita can adjust the animation speed by adjusting the Frame Rate in krita.

   b. Noor needs to add blank frames because they make the ball's movement look realistic. When a ball bounces, it compresses on the ground for a tiny moment before jumping back up. These blank frames help show that quick pause, making the animation smoother and more natural.

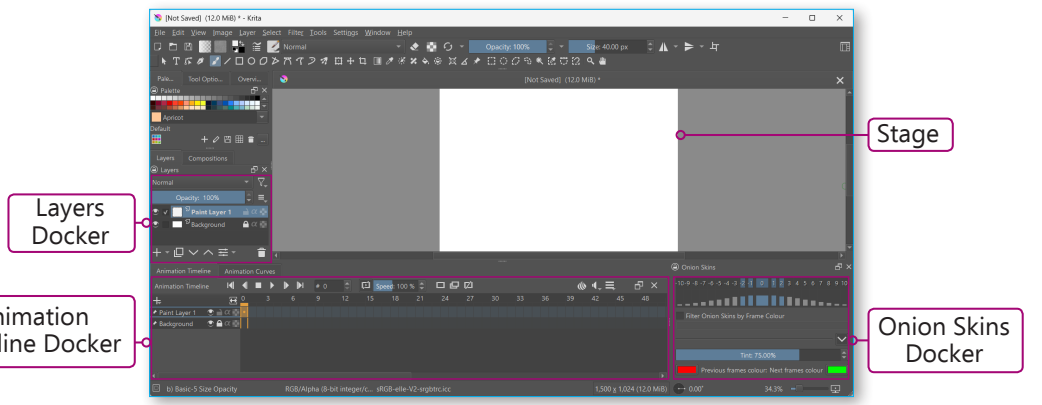
1. 95
2. 72
3. Circle
4. 2 hours

Periodic Assessment–1

(Based on chapters 1 & 2)

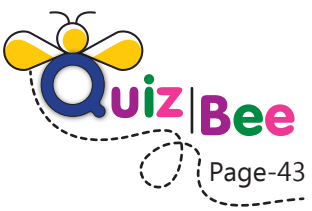
1. a. (v) b. (iv) c. (iii) d. (ii) e. (i)

2.



3. a. Canvas b. Animation
   c. Animation Curves Docker d. Custom Document Tab

3. Dynamic Web Pages in HTML5



The SRC attribute with the <SCRIPT> tag

ASSESS YOURSELF

1. a. (iii) b. (i) c. (iii) d. (ii)
2. a. Brendon Enrich b. case sensitive, interpreted c. loosely
   d. operator e. expression
3. a. Statements b. Mocha c. External d. Expressions
4. a. JavaScript, often abbreviated as JS, is a client-side scripting language used for enhancing users' interaction with the web page by making web pages dynamic.
   b. Commands and instructions given to the JavaScript interpreter to take some actions are called statements.
   c. The meaning of client-side scripting language is that the code written in JavaScript is interpreted by the web browser on which the web page is running.
   d. Some of the important features of JavaScript are as follows:
      - It is used with HTML code and run on web browsers.
      - It is a case sensitive and interpreted language.
   e. An operator is a symbol that is used to perform calculations on values or variables. The variables or values on which the operator performs calculation are called operands. Some of the examples of operators are + (Addition), - (Subtraction), * (Multiplication), / (Division), etc.
   f. The syntax to add external JavaScript is:

```
<HEAD>
<SCRIPT TYPE="text/javascript" SRC="D:\first.js">
</SCRIPT>
</HEAD>
```

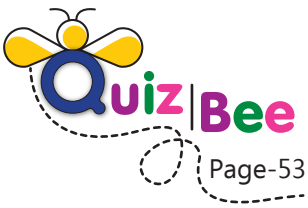
5.

prompt() method	document write() method
i. JavaScript allows us to take input from the user with the help of **prompt( )** method.	i. The document.write( ) method is used to display output on the web page.
ii. We can use the prompt( ) method in the following way: `var age = prompt("Enter your age: ");`	ii. For example: `document.write("Hello from JavaScript");`

6. a. He can use Javascript to add interactive elements.
   b. prompt( ) c. parseInt( )

1. x = 16
   y = "88"
   z = "Thanks8"
2. var a = 10;
   var b = 2;
   var c = 20;
   var d = a + 2 * (b + c) - c / 5;
   document.write(d);

4. Latest IT Trends



Business-to-Consumer

ASSESS YOURSELF

1. a. (ii) b. (i) c. (iii) d. (ii) e. (ii)
2. a. Blockchain b. Augmented Reality c. Shakey d. Virtual
   e. RP
3. a. E-commerce refers to the buying, selling and exchanging of goods, services, or information over the internet. It includes not just commodities but also digital products and services.
   b. AI is the branch of computer science that aims at creating expert and intelligent computer systems which simulate certain human qualities such as, learning, reasoning, communicating, seeing, hearing, and sensation.
   c. It is a system of connected computing devices, mechanical and digital machines for creating a virtual network where a monitoring centre ensures that everything is working smoothly.

d Blockchain refers to the system of recording information which makes it difficult or impossible to change, hack, or cheat the system. It is a shared ledger on which we record the transactions and track assets (tangible or intangible) in a business network.

e. (i) It can be defined as a communicating computer program that can solve problems which would otherwise require human assistance. These programs replicate the reasoning process of experts in certain areas. For example, **PROSPECTOR** was the first expert system that analysed geological data to identify and locate mineral deposits.

(ii) It is the study of methods by which computers can recognize and understand spoken or written human language. Speech recognition software are an example of NLP where computers translate spoken speech into text.

(iii) **Augmented Reality** is the blending of Virtual Reality and real life. AR is using technology to superimpose information such as sounds, images and text on the real world that we can see. Images are created by developers within applications that blend in with content in the real world. AR users can interact with virtual content in the real world and can also distinguish between virtual and real content.

f. The major application of 3D Printing are:

(i) Education: It is widely used in the education sector.

(ii) Rapid Prototyping (RP) Method: It is used to create models to quickly test a new product before mass production.

(iii) Medicine: In the last several years, 3D Printing applications have increased manifold in the world of medicine.

(iv) Construction: It is widely used in the construction industry; model houses can be built in a day using 3D Printing.

(v) Art and Jewelry: The use of 3D Printing has led the jewelry makers to experiment with non-traditional designs which were not possible with the traditional methods of jewelry making.

4. a. Consumer-to-Consumer (C2C)

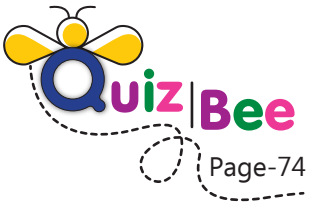
b. Natural Language Processing

{CODING ZONE}

1. 333D

2. 17

5. Cloud Computing



Cost Effective: One has to pay minimal to no subscription charges to avail the services. It saves us from buying expensive specialised hardware or software.

ASSESS YOURSELF

1. a. (ii) b. (iii) c. (i) d. (i) e. (ii)
2. a. (F) b. (F) c. (T) d. (F) e. (F)
3. a. Cloud computing is an Internet-based service that helps users to get shared resources, software, and information over a network on demand.

   b. The basic users of Dropbox are given 2 gigabytes of storage space. Whereas, if somebody has premium subscription then they are given 1 TB of storage space.

   c. Dropbox- 2 GB of free storage space is provided.

   ZipCloud- 1 GB of free storage space is provided.

   iCloud- 5 GB of free storage space is provided.

   d. To upload files on the OneDrive by following the given steps:

   1. Go to **Home** page of your **OneDrive** and click on the **Upload** button.
   2. Select the **Files** or **Folders** option.
   3. Select the file or folder which you want to upload. In this case, we have selected a Word document named **Cloud**.
   4. Click on the **Open** button.

      The process of uploading file will start at the top of the screen. Once the file is successfully uploaded, it will be displayed on the OneDrive.

   e. We need to follow the given steps to share a file or folder with other on OneDrive:

   1. Move the mouse pointer over the file or folder which you want to share with others. A small circle will appear at the top right corner of the thumbnail of the file.
   2. Click on the circle to select the file or folder. Some buttons will appear at the top of the screen.
   3. Click on the Share button. The Send Link pop-up box will appear.

4. Under the Enter name or e-mail address text box, enter the email address of the people with whom you want to share your file or folder.
5. Choose the level of access and click on the Send button.

4. a. Yes, It is possible to do so and he don't need to buy some specific hardware or software.

b. Eklavya won't find the OneDrive icon with his Yahoo account, because OneDrive is a Microsoft service, and it is available through a Microsoft account (like Outlook or Hotmail).

- To access OneDrive, he should go to www.onedrive.com
- Sign in using a Microsoft account (e.g., username@outlook.com).
- Once logged in, the OneDrive icon and interface will be accessible.

{CODING ZONE}

1. c 2. 13% 3. 4

Periodic Assessment–2

(Based on chapters 3 to 5)

1. a. B2B: If a company buys or sells products or services to other companies online through a sales portal, it is known as the business-to-business model of e-commerce.

b. EFT: Electronic Fund Transfer (EFT) is a technology that lets the online transfer of funds from the bank account of one organisation to another. This service is primarily used for e-banking.

c. IoT: Internet of Things (IoT) has become a buzzword nowadays throughout the world. It is a system of connected computing devices, mechanical and digital machines for creating a virtual network where a monitoring center ensures that everything is working smoothly

2. a. Public Cloud b. Private Cloud c. Community Cloud

3.
```
<HTML>
<HEAD>
<TITLE> My First JavaScript </TITLE>
<SCRIPT TYPE="text/javascript" SRC="external.js">
</SCRIPT>
</HEAD>
<BODY>
This message box is displayed using external JavaScript.
</BODY>
</HTML>
```

Test Sheet–1

(Based on chapters 1 to 5)

1. a. (i) b. (iii) c. (iv) d. (ii) e. (iii)
   f. (iv) g. (ii)
2. a. Transmission Medium b. Personal c. Keyframe
   d. Timeline Docker e. Augmented Reality f. LAN
3. a. (T) b. (F) c. (F) d. (F) e. (T)
   f. (F)
4. a. A network is defined as a group of devices that are linked together to share information, data and resources.
   b. For allowing information or files to be shared with other computers in the network.
   c. **Stage:** The Stage refers to the main drawing area where you create and view your artwork and animations. It's the canvas where you draw your individual frames, layers, and scenes.

      Onion Skins Docker: The Onion Skins Docker in Krita is a helpful tool for animators.
   d. This docker is used to set keyframes, play your animation to preview it, and manage multiple layers for different parts of your scene, like characters and backgrounds.
   e. • It is used in both client-side and server-side applications.
      • It is platform independent, hence, it runs on many operating systems.
   f. The act of selling and buying a commodity over the Internet is known as e-commerce.
   g. Cloud computing can be divided into two sections: the **front end** and the **back end**. Internet is the link that joins both these ends. The **front end** belongs to the users/clients from where they access the Internet for data, and the **back end** belongs the cloud computing provider.
5. a. In the world of computers, **data is the input, or what you tell the computer to do or save**. Information is the output, or how the computer interprets your data and shows you the requested action or directive.

      Multimedia is a form of communication that combines different content forms such as text, audio, images, animations, or video into a single interactive presentation, in contrast to traditional mass media which featured little to no interaction from users, such as printed material or audio recordings.
   b. • Frames are the individual images or slides in the timeline that make up an animation.
      • Keyframes are special frames where you define a significant change or a new drawing in your animation.
   c. The Animation feature in Krita allows users to:
      • Draw frame-by-frame animations.
      • Control timing using the timeline docker.

- Add keyframes, adjust playback, and preview animations.
- Export animations as GIFs, MP4s, or image sequences.

d. Following are steps to upload files or folders on OneDrive:

1. Click on the Add new button.
2. Select the Files upload option.
3. Navigate the location where the file is stored.
4. Select the file that you want to upload.
5. Click on the Open button.

e. The syntax to add external JavaScript is:

```
<HEAD>
<SCRIPT TYPE="text/javascript" SRC="D:\first.js">
</SCRIPT>
</HEAD>
```

Note that there are many other scripting languages, hence, it is recommended to use the **TYPE** attribute with the **<SCRIPT>** tag and set its value to **text/javascript** to specify that scripting language we are using.

f.

B2B Model	C2C Model
If a company buys or sells products or services to other companies online through a sales portal, it is known as the business-to-business model of e-commerce	There are various websites that allow buying and selling between the consumers. They offer online auctions where one can buy and sell products.

6. Algorithmic Intelligence

ASSESS YOURSELF

1. a. (ii) b. (iii) c. (iii) d. (i)
2. a. Condition b. If c. Else d. Conditional
3. a. Loops help by automating repetitive tasks, making the code more efficient by avoiding the need to write the same instructions multiple times.

b.
```
if today == "Sunday" and match == "yes":
    print("We have a match on Sunday")
else:
    print("No, match on Sunday")
```

c.
```
if today != "Saturday" and today != "Sunday":
    print("Exam today")
else:
    print("No exam on weekend")
```

4. 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

✗	✓				
	✗	✓			
		✗	✓		
			✗	✓	
				✗	✓

d.

	8	8	8	8	8

start

5. a. start

b. start

✗					
	✗				
		✗			
			✗		
				✗	
					✗

6. a. Lokesh can use a loop to reduce the lines of code in his program.

b.
```
if (year % 4 == 0 and year % 100 == 0):
    print("Yes")
else:
    print("No")
```

7. Control Structures in Python

ASSESS YOURSELF

1. a. (ii) b. (i) c. (iii) d. (i)
2. a. control statement b. sequential c. conditional d. continue
3. a. Statement b. FOR loop c. range( ) function d. iterative statements
4. a. A control structure is a programming language construct which affects the flow of the execution of a program.

   b. When we need to evaluate multiple statements to get a certain result. In such scenarios, we can use the if-elif-else statements to evaluate multiple scenarios. Syntax for the if-elif-else statement is:

```
if (conditional expression):
    statement(s)
elif (conditional expression):
    statement(s)
elif (conditional expression):
    statement(s)
else:
    statement(s)
```

   c. (i) The syntax of while loop is as follows:

```
while(loop - condition):
    statement(s)
```

   (ii) The syntax of the nested if statement is as follows:

```
if (conditional expression):
    statement(s)
    if (conditional expression2):
        statement(s)
    elif (conditional expression3):
        statement(s)
    else:
        statement(s)
else:
    statement(s)
```

d. These statements are used to jump out of the loop iterations even if the condition has not become false. They alter the flow of control unconditionally. The jump statements defined in Python are break and continue.

THE break STATEMENT

The break statement is used in the for and while loops to terminate the loop and completely transfer the control from the loop to the next statement after the body of the loop. It is mostly used when we need to exit from a loop at times.

THE continue STATEMENT

The continue statement causes the program to skip the rest of the statement of the current block and move to the next iteration of the loop. It immediately transfers control to the evaluation of the test expression of the loop for the next iteration of the loop.

5. a. Selection statements

   b. Iterative Statements

   Syntax: for <variable> in <sequence>:

   statement(s)

   c. Continue statement

6. a. l and m are equal

   b. Please enter number 5

   Sum is: 15

   c. Total digits are : 5

{CODING ZONE}

1.
```
l = 40
m = 100
if m > l :
    print ("m is greater than l")
```
Output: m is greater than l

2.
```
i = 10
while i >= 10:
    print (i)
i =+ 1
```
Output: Infinite loop

3.
```
for i in range (6):
    print (i)
```

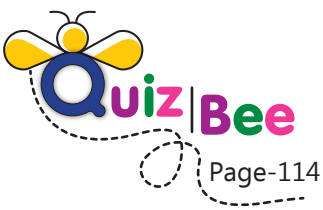
```
else:
    print ("Done")
```

Output:

```
0
1
2
3
4
5
```

Done

8. Functions, String and List in Python



1. A sequence of characters which is enclosed or surrounded by single (' ') or double (" ") 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 carriage returns and tab movements.

ASSESS YOURSELF

1.	a. (i)	b. (ii)	c. (ii)	d. (iv)	e. (ii)
2.	a. append	b. function	c. lower	d. string	
3.	a. capitalize()	b. Mixed data type	c. del	d. def	e. Type2

4. a. Use the index operator [ ] to access the elements of a list.

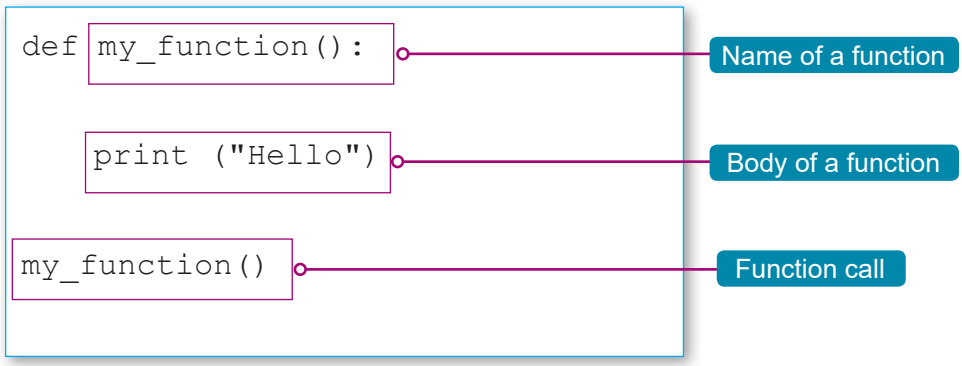
   b. A sequence of characters which is enclosed or surrounded by single (' ') or double (" ") quotes is known as a string. The sequence may include a letter, number, special characters or a backslash. Python treats single quotes as double quotes.

   c. In Python, a list is a type of container that is used to store a list of values of any type.

   The append() Function - It inserts the object passed to it at the end of the list.

   The extend( ) Function - For adding more than one element, we use the extend( ) function.

d. A function can be called anytime from other functions or from the command prompt after the definition. For calling a function, we type the function and pass the parameters. For example:



e. **Built-In Functions**

The print() and input() belong to the category of built-in functions. We also have other built-in functions like range(), type(), etc. 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.

User-Defined Functions

User-defined functions are created by the user according to the need of the program. Once the user defines a function, the user can call it in the same way as the built-in functions. User-defined functions are divided into various categories based on the parameters and return type.

f.
```
L = [3, 5, 7, 9, 12, 15]
even_positions = []
for i in range(len(L)):
    if L[i] % 2 == 0:
        even_positions.append(i)
print(even_positions)
```

5. a. Yes, it is possible. He can do this by using String Concatenation Operator.

   b. He can use extend() function.

6. a. The original string is: Good Morning

   The resultant string: GOOD MORNING

   b. 5 has occurred 2 times

   c. [24,45,9,32,12]

   d. ['O', 'r', 'a', 'n', 'g', 'e', 'E', 'd', 'u', 'c', 'a', 't', 'i', 'o', 'n']

   i

1. **Corrected code:**

```
str = "Orange Education"
count = 0
for i in str:
    if( i=='A' or i=='a' or i=='E' or i=='e' or i=='I' or i=='i' or
    i=='O' or i=='o' or i=='U' or i=='u'):
        count += 1;
print("Total vowels are: ", count)
```

Output: Total vowels are: 8

2. **Corrected code:**

```
total= 0
list1 = [25, 15, 10, 5]
for ele in range(0, len(list1)):
    total = total + list1[ele]
print("Sum of all elements in given list: ", total)
```

Output: Sum of all elements in given list: 55

Periodic Assessment–3

(Based on chapters 7 & 8)

1. a. Hello Trackpad
   Hello Trackpad
   Hello Trackpad
   Hello Trackpad
   Hello Trackpad
   Hello Trackpad

   b. 0
   0
   1
   0
   2

2.
```
for a in range (2, 26):
    if (a%2 == 0):
        print (a)
    else:
        continue
```

3. a. len()

   The len() function calculates and returns the length of a string supplied as an argument.

   b. append()

   The append() function inserts the object passed to it at the end of the list. Syntax of using append()

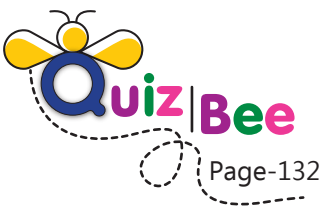
   c. capitalize()

   The capitalize() function returns a string with the first character in capital.

   d. del( )

   We use the del( ) function to remove a sublist (start : stop : step) or a whole list of elements.

9. Artificial Intelligence and its Domain



Data, Computer Vision and Natural Language Processing

ASSESS YOURSELF

1. a. (iii) b. (iii) c. (i) d. (ii)
2. a. Narrow AI b. Machine Learning c. Computer vision d. NLP
3. a. Dedicated for one task b. General AI c. High cost of creation
   d. Computer Vision
4. a. The starting point of every application is data and it is the foundation of artificial intelligence. Data is all around us, be it a google search, a passport scan or an online shopping history, all of this contains data that is collected, analysed, and monetised. Data is not just collected but also properly formatted and aligned with the project requirements.

b. Convolutional Neural Network (CNN) helps a machine learning model to process the image by breaking it down into pixels. It then transforms it into digital data by applying algorithms before comparing the captured images with those stored in the database. These systems are used to identify an individual based on their facial features like spacing of eyes, ears, chin, etc.

c. Natural Language Processing (NLP) is the ability of an AI system to understand human language as it is spoken. Computer cannot understand the language we speak. Hence, we need software and programming languages to communicate with the computer.

Examples of AI applications based on Natural Language Processing:

- Chatbot applications that interact with humans on a regular basis are available all the time which helps the customers to resolve their queries, thus improving the customer's experience.
- Translation tools such as Google Translate; Microsoft Translate are a big help as they can translate the local language to a tourist.
- Personal assistant applications such as Google Assistant, Siri, and Alexa.

d. Weather prediction models using AI need data such as temperature, humidity and all underlying patterns that impact weather.

AI is used in the prediction of upcoming customer orders for the next season. This enables retailers to plan the inventory and purchases that helps them to predict and control the cost.

The software that controls vehicles works with the control radar system, lane control feature, accident avoidance features, cameras, GPS, etc. All these technologies are AI based and rely on data to function.

Companies like Google, Facebook and Amazon are ruling the world because they were the first to build data sets. Amazon already knows what the customers are going to buy and all of this has been possible because of predictive analytics and tons of customers' data.

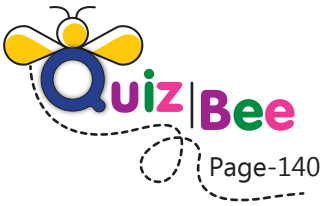
5.

Narrow AI	General AI
Narrow AI systems are intelligent systems that are programmed to perform specific tasks. In other words, this technology is designed to work on narrowly defined tasks intelligently. Examples of Narrow AI around us include Alexa, Google Assistant, Siri, Cortana, audio-visual feed, self-driven cars, facial recognition tools, customer service bots that redirect inquiries on webpages, spam filters that keep our inbox clean, etc.	**Artificial General Intelligence or Strong AI** has the capability of understanding a vast scope of activities that allows machine to apply knowledge and skills in a different context. This is considered an intelligence that closely mirrors human intelligence as shown through movie characters like **R2-D2** in **Star Wars**, **Jarvis** in **Iron Man**, and **The Terminator**

6. a. General AI
b. Narrow AI
c. Chatbot
d. Computer Vision

1. Do it yourself.
2. 354

10. Fields of Artificial Intelligence



AI helps the banks and financial sectors in various ways. AI predicts future scenarios by analysing past user experiences.

ASSESS YOURSELF

1. a. (ii) b. (i) c. (iii) d. (iv) e. (i)
2. a. (T) b. (T) c. (F) d. (F)
3. a. Facebook b. Smart Doorbell c. Google Maps
4. a. Alexa, Socratic and Fyle

   b. For Security and Surveillance, AI program functions by using Computer Vision. The video surveillance cameras have AI programs that analyse images and audio in order to recognize humans, various objects, vehicles and actions. The Artificial Intelligence program sends an alert if it detects some unusual activities breaking the set rules.

   c. Information and Communication Technology (ICT) is used to improve the operations efficiently, share the data with the residents easily, provide quality government services and citizen's well-being effectively.

   d. The concept of smart living is based on making life easier for the people using various electronic appliances. These appliances are capable of understanding the user's behaviour patterns and work accordingly.

   So, a Smart Home can be perceived as a home that can provide maximum comfort for its users by minimizing their efforts. For example, if a resident is watching TV and he wants to lower the temperature of his home and switch on the lights at the same time, Smart Home gadgets are equipped with technology that allows the resident to do such tasks using a remote device, voice or a gesture.

   e. Benefits of Smart Cities:

(i) They have data-driven and more effective decision making standards.

(ii) Smart Cities have smart street lights. The lighting can be customised as per the activities on the street.

(iii) Parking sensors provide real time information about the free parking spaces to make it hassle-free.

(iv) Garbage sensors equipped trucks are used for automatic waste collections.

(v) They have adequate water supply.

(vi) They have better transportation facilities.

(vii) It improves economic growth opportunities.

(viii) The public utilities are very efficient.

(ix) They have smart and more efficient energy grids.

(x) They have a centralised camera surveillance system which monitors the whole city.

f. Financial challenges due to lack of proper funds.

Growing population.

Digital security issues.

Lack of high speed Internet facility and connectivity issues.

5. a. Amazon Alexa b. Smart Thermostat

{CODING ZONE}

1. 48 2. b. 630

11. Introduction to SDGs and Data Science

Quiz Bee

Page-157

Unstructured

ASSESS YOURSELF

1. a. (ii) b. (i) c. (ii) d. (i) e. (ii)
   f. (iii)
2. a. (F) b. (T) c. (T) d. (T) e. (T)

3. a. Eradicating extreme poverty and reducing poverty by at least by 50% is the target to achieve. Worldwide, approximately 17.2 percent people are struggling to fulfill the most basic needs like health, education and access to clean water and sanitation. AI can help in improving the farming land, agriculture, quality of products, etc. AI can also help with aid distribution in poor and war-torn areas, or where natural disasters have caused heavy destruction. AI can help in reaching out the goal by tracking food wastage, finding ways to grow yields, identifying diseases and pest outbreaks, analysing means to reduce population, etc.

b. Education is one of the most basic public services. It enables people to develop all of their attributes and skills to achieve their potential as human beings and members of the society. Quality Education provides the foundation for equity in society and helps to reach gender equality. AI in education can be used to achieve Quality Education goals by developing smart content, providing personalized guidance, round the clock assistance, virtual learning environment and creating more secured online exams.

c.

Structured Data	Unstructured Data
Such type of data is stored in the database or within tables of Excel files, and is typically found in data models.	Such type of data is not easy to fit into any data models such as Word files, or emails.

d. **R SCRIPTING LANGUAGE**

R is a scripting language that is used for statistical computing and is widely incorporated in data analysis modelling. It is an interpreter-based language and possesses the features of an object-oriented programming language.

STRUCTURED QUERY LANGUAGE (SQL)

SQL is used for managing and querying data stored in databases. Extracting information from the database is the first step towards data analysis. It is a flexible and dynamic language and is used in extracting, managing and manipulating data.

e. Data science is a field that studies data and the ways it can be transformed into valuable input and resources to create business and IT strategies. This is a science that combines domain expertise, programming skills and knowledge of mathematics to extract insights from the large and ever-increasing volumes of data collected by organisations.

4. a. He can relate it to SDG 15, i.e, Life on Land.

b. Tableau

{CODING ZONE}

1. Either 2 or 3
2. 

Periodic Assessment–4

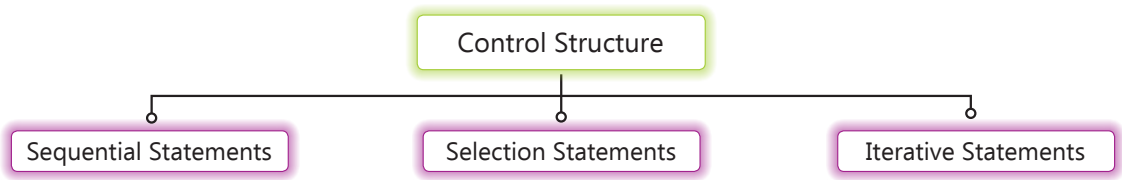
(Based on chapters 9 to 11)

1. a. ROBOTICS
   b. ARTIFICIAL INTELLIGENCE
   c. MACHINE VISION
   d. LOGISTICS PLANNING
   e. ALAN TURING
2. a. Gender Equality
   b. Zero Hunger
   c. Life on Land
   d. Peace Justice and Strong Institutions
3. a. Narrow AI systems are non-intelligent systems that are programmed to perform specific tasks.
   b. Google Maps uses Machine Learning domain of AI to generate predictions of traffic patterns and live conditions based on the sets of data.

Test Sheet–2

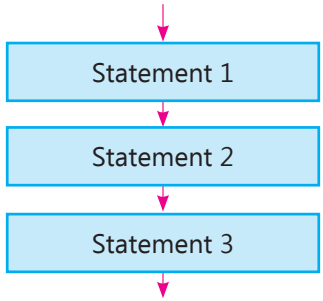
(Based on chapters 7 to 11)

1. a. (iii) b. (i) c. (iii) d. (iii) e. (i)
   f. (ii) g. (i)
2. a. Control Statements b. sequential c. Function d. lower
   e. Computer Vision f. NLP g. Smart Assistant
3. a. (F) b. (T) c. (T) d. (F)
   e. (T) f. (T)
4. a. We can use the if-elif-else statements to evaluate multiple scenarios. First, it checks and evaluates the first condition. If it is true, it will execute the respective statement(s), but if the condition is false, it goes to the elif statement and evaluated that conditions. Finally, if none of the conditions evaluates to true it executes the else block.
   b. A **control structure** is a programming construct which affects the flow of the execution of a program. Various types of control structures provided by Python are shown below:



SEQUENTIAL STATEMENTS

The statements that are executed in a sequential order, i.e., one after the other without any jumps, are called sequential statements. A sequential structure is also known as a straight line path.



SELECTION STATEMENTS

Some problems cannot be solved by performing a set of ordered steps as seen in a sequential execution. When programmers are required to execute a particular set of statements depending upon a particular test condition, a selection or decision making statement is required. Python provides the following selection statements:

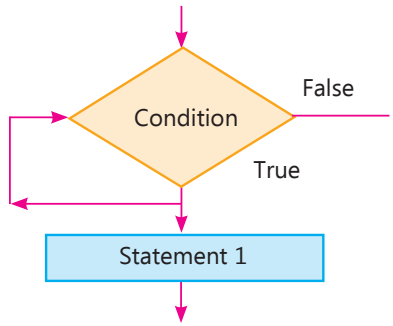
(i) if statement

(ii) if-else

(iii) if-elif-else statement

ITERATIVE STATEMENTS

Iterative statements refer to the statements that are used to repeat a task based on a given condition. These statements are also known as looping statements. An iteration means one pass of a loop.



Python provides the following iterative statements:

(i) For loop (ii) While loop

c. A function can be defined as a block of a reusable code that performs a specific task. This concept is the central aspect on which the concept of procedural programming works.

d. In Python, a list is a type of container that is used to store a list of values of any type. One can store an integer, string as well as objects in a single list. Each element in a list is assigned an index number. The first index is 0, the second index is 1, the third is 2, and so on.

e. Convolutional Neural Network (CNN) helps a machine learning model to process the image by breaking it down into pixels. It then transforms it into digital data by applying algorithms before comparing the captured images with those stored in the database. These systems are used to identify an individual based on their facial features like spacing of eyes, ears, chin, etc.

f. AI is extensively used in social media platforms to serve personalized content. These sites monitor the way you use the features that they provide and record the way you use it. This data is used to create ads that are customised according to your preferences.

For example, social networking site Facebook uses AI to detect content having graphic violence, etc. It also helps to understand the psychology of a person.

g. Eradicating extreme poverty and reducing poverty by at least by 50% is the target to achieve. Worldwide, approximately 17.2 percent people are struggling to fulfill the most basic needs like health, education and access to clean water and sanitation. AI can help in improving the farming land, agriculture, quality of products, etc. AI can also help with aid distribution in poor and war-torn areas, or where natural disasters have caused heavy destruction.

5. a. These statements are used to jump out of the loop iterations even if the condition has not become false. They alter the flow of control unconditionally. The jump statements defined in Python are break and continue.

THE break STATEMENT

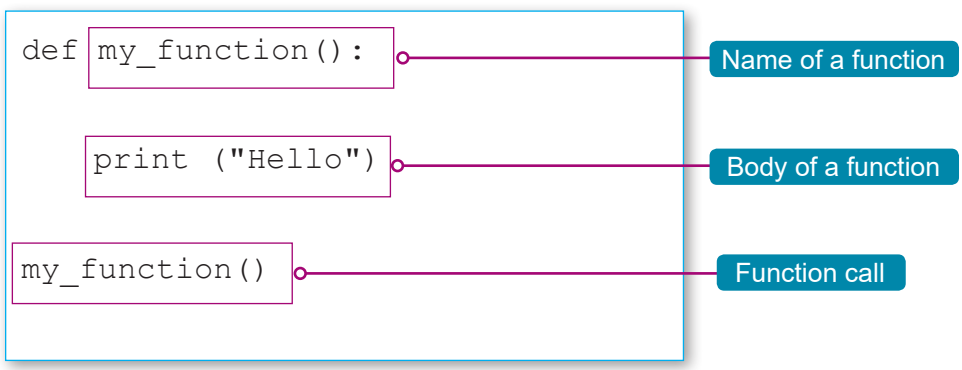
The break statement is used in the for and while loops to terminate the loop and completely transfer the control from the loop to the next statement after the body of the loop. It is mostly used when we need to exit from a loop at times.

THE continue STATEMENT

The continue statement causes the program to skip the rest of the statement of the current block and move to the next iteration of the loop. It immediately transfers control to the evaluation of the test expression of the loop for the next iteration of the loop.

b. A function can be called anytime from other functions or from the command prompt after the definition. For calling a function, we type the function and pass the parameters.

For example:



Built-In Functions

The print() and input() belong to the category of built-in functions. We also have other built-in functions like range(), type(), etc. 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.

User-Defined Functions

User-defined functions are created by the user according to the need of the program. Once the user defines a function, the user can call it in the same way as the built-in functions. User-defined functions are divided into various categories based on the parameters and return type.

c. Data science is a field that studies data and the ways it can be transformed into valuable input and resources to create business and IT strategies. This is a science that combines domain expertise, programming skills and knowledge of mathematics to extract insights from the large and ever-increasing volumes of data collected by organisations.

d. AI has lots of benefits but it is not void of mistakes or errors. Let us understand the risks and limitations of this technology as well.

HIGH COST OF CREATION

AI is an emerging field and a new technology. Hence, it is difficult to find people who can work on this technology. This unavailability makes it difficult to maintain and work with. Moreover, with change in requirements and growing demands, the hardware and software need to get updated simultaneously, which may require huge costs as they are very complex machines. If robotics need to be repaired, humans have to step in to fix it and this costs more resources and money.

MAKING HUMANS LAZY

The automated applications provided for majority of work are making humans lazy. This might lead to an addiction to convenience in future generations.

UNEMPLOYMENT

Majority of repetitive tasks are being replaced by work robots, which is causing organisations to replace less qualified employees with AI robots to do similar tasks.

NO EMOTIONS

Decisions made by humans are heavily dependent on emotions. AI on the other hand, does not have any emotions yet, so they are more efficient.

NO OUT-OF-THE-BOX THINKING

Machines may have the ability to learn and get better than humans with tasks if coded and designed to do so, but when encountered with new situations which they are not programmed for, they tend to crash or give unusual outputs.

e. Sustainable cities and communities aims to provide safe and affordable housing facilities to all. It also advocates green and culturally inspiring conditions for all. Technologies like AI in smart cities help the cities to utilise current assets more effectively, allot resources more efficiently and understand how data can be shared and managed across the whole system.