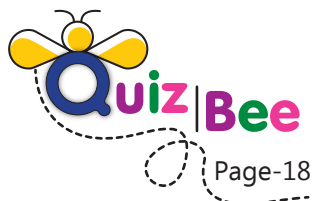


1. Networking Concepts



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 ground positioning of an object.
3. HTTPS stands for Hypertext Transfer Protocol Secure. It makes a secure connection by establishing an encrypting link between the browser and server, hence maintaining data integrity by encrypting the data.

ASSESS YOURSELF

1. a. (i) b. (iii) c. (iii) d. (iv) e. (ii)
2. a. Modem b. Bus topology c. Protocol d. network e. LAN
3. a. NIC b. Router c. WLAN d. GPS
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 to data to flow between two different networks which may use different protocols.
c. The components required to build a network are:
Sender: A sender is a computer that wants to send information to other computer connected to the network.
Receiver: A receiver is a computer which is expecting the data from other computer on the network.



Transmission Medium: The transmission medium, usually a wire or a cable, is what enables you to transfer data from one computer to another. Wireless communication between networked computers and peripherals is also possible.

Message: A message is the information or data which needs to be transferred from one computer to another.

Protocol: A protocol is a set of standard rules used for communication.

d. This connection between devices can be either wired or wireless. Network serves the following important purposes:

- 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.
- It allows sharing of application software over the network.
- It allows rapid communication such as e-mail, messaging, etc.
- It allows us to store information on one centralised location.
- It is a cost-effective method.

e. Topology or structure is the layout of the connection formed between computers. The efficiency and reliability of a network is determined by its structure. In other words, Topology refers to the geometric arrangement of computers or nodes in a network.

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





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

2. Introduction to GIMP

ASSESS YOURSELF

1. a. (iv) b. (ii) c. (ii) d. (iii)
2. a. (F) b. (T) c. (T) d. (F)
3. a. Workspace b. Text c. Sharpen d. Clone
4. a. Fuzzy Select tool is used to detect the edges of the image automatically on the basis of colour codes and do the selection quickly.
- b. Zoom tool is used to magnify a desired part of an image.
- c. Smudge tool is used to show the image as the wet paint on the image has been spread by a finger .
- d. Paintbrush tool is used to draw brush strokes to give an effect of painting. To use Opacity option in Paintbrush tool, follow the given option:
 - ① Choose a colour for your Paintbrush by adjusting the gradient sliders.
 - ② Choose the type of Brush from the Brushes tab.
 - ③ Click on the workspace and drag to draw the flow of brush.
- e. To use Clone Tool, follow the given steps:
 - ① Open the image and then click on **Clone Tool**.
 - ② Select the brush size and hardness from **Tool Options**.
 - ③ Press and hold the Ctrl key and click on the image to be cloned.
 - ④ Click and drag the mouse at the place where the clone is to be created.
- f. To use Blur/Sharpen tool, follow the given steps:
 - ① Open an image.
 - ② Click Blur/Sharpen Tool.
 - ③ Select the brush size and hardness.

- 4 Click and drag the mouse pointer over the area that you want to blur.
5. **Dodge Tool-** The Dodge feature is used to lighten the existing colours of the image.
Burn Tool- The Burn feature is used to darken the existing colours of the image.
6. a. She should use Fuzzy Select Tool.
 b. He should use Paintbrush Tool.
 c. She should use Healing Tool.
 d. He should use Clone Tool.
7. Paintbrush Tool, Text Tool and Fuzzy Select tool are used in this picture.



1. 20
2. (This question is printed incorrectly in the book, please correct it in your textbook.)
Question: We can multiply a number ending in 5 with its successor easily as given below.
 Example: $55 \times 56 = 55 \times (55+1) = 3025 + 55 = 3080$
 Now, perform the following calculations.

- a. 75×76
 b. 135×136
 c. 45×46

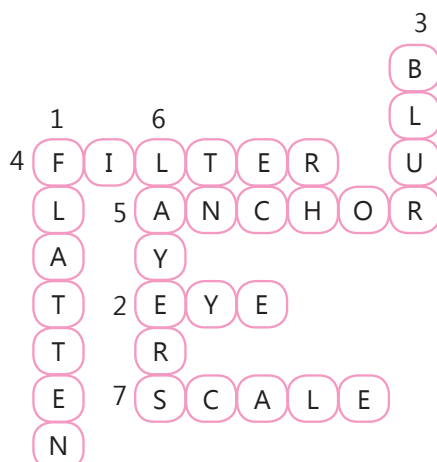
Ans: a. $75 \times 76 = 75 \times (75 + 1) = 75 \times 75 + 75 = 5625 + 75 = 5700$
 b. $135 \times 136 = 135 \times (135 + 1) = 135 \times 135 + 135 = 18225 + 135 = 18360$
 c. $45 \times 46 = 45 \times (45 + 1) = 2025 + 45 = 2070$

3. More on GIMP


ASSESS YOURSELF

1. a. (i) b. (iii)
 c. (This question is printed incorrectly in the book, please correct it in your textbook.)
Question: Hiding a layer means to make the layer temporarily
 (i) Visible (ii) Invisible (iii) Both (i) and (ii) (iv) None of these
Ans: (ii)
 d. (iii)
2. a. (F) b. (F) c. (F) d. (T)

3. a. Eye
b. (This option is printed incorrectly in the book, please change it in your textbook.)
Ans: Layer
c. copying, pasting
d. Filters
4. a. Layers are transparent sheets which are stacked on top of each other so that individual objects of an image can be edited without affecting other objects.
b. Filters are tools which are used to modify an image in a variety of ways.
c. Hiding a layer means to make the layer temporarily invisible.
d. Flattening layers means combining all the layers of an image to make one layer. To flatten layers, follow the given steps:
 - 1 Select a layer which you want to flatten.
 - 2 Right click on the Layers palette and select Flatten Image.
- e. To delete a layer, follow the given steps:
 - 1 Select a layer from the Layers palette.
 - 2 Click on the Delete layer button.
- f. To apply filter to an image, follow the given steps:
 - 1 Open an image in GIMP.
 - 2 Select the part of the image where you want to apply the filter.
 - 3 Click on the Filters menu from the menu bar.
 - 4 Choose Blur filter from this submenu.
 - 5 Click on Gaussian Blur option.
 - 6 Increase the value of the X and Y size to decrease or increase the effect of the filter.
 - 7 After you have applied the suitable value to the filter, click on OK button to apply the effect.
5. a. Layers
b. Merge two images
- 6.



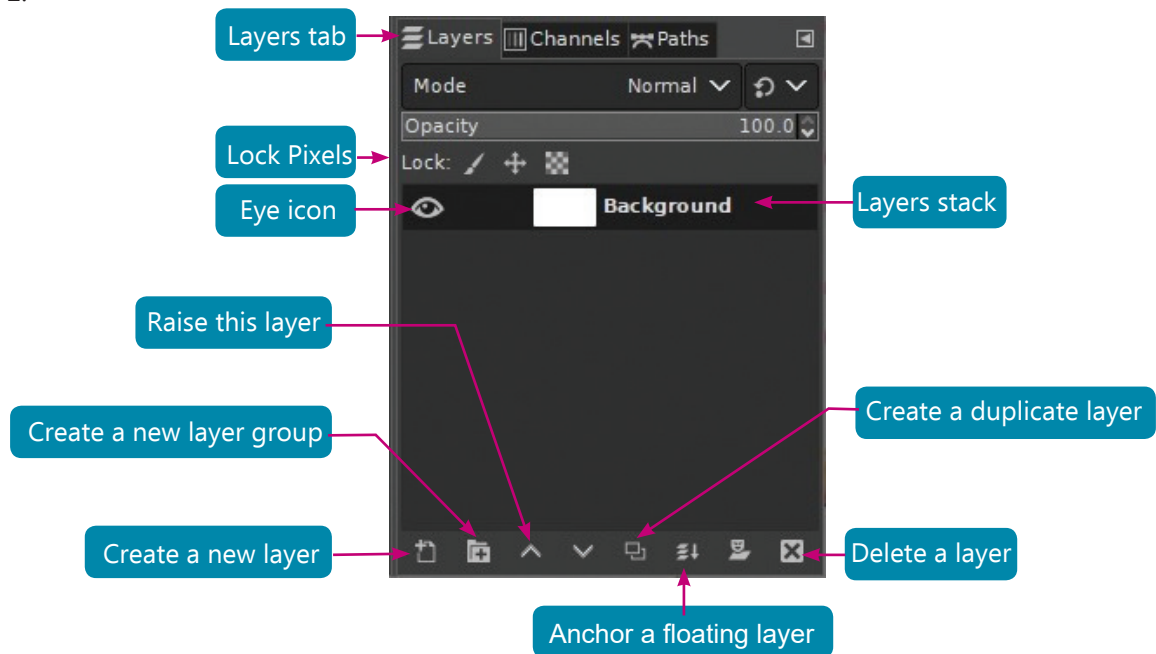


1. c. 300
2. a. 52
3. c. TVX
4. a. 6
5. 

Periodic Assessment-1

(Based on chapters 1 to 3)

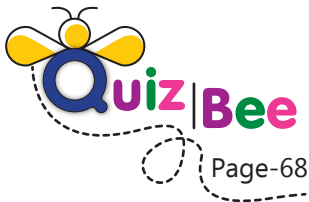
1. a. (v) b. (iv) c. (iii) d. (ii) e. (i)
- 2.



3. a. Ellipse Select Tool b. Paintbrush Tool
c. Clone Tool d. Smudge Tool
e. Blur/Sharpen tool



4. Dynamic Web Pages in HTML5



<SCRIPT> </SCRIPT>

ASSESS YOURSELF

1. a. (iii) b. (i) c. (iii) d. (ii)
2. a. Brendon Enrich b. interpreted c. loosely d. operator
e. expression
3. a. Interpreter 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. 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.
b. Commands and instructions given to the JavaScript interpreter to take some actions are called **statements** and a collection of statements is called a **script** or a **program**.
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. • 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.

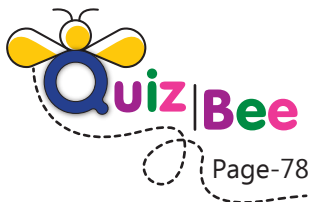
prompt() method	document write() method
i. JavaScript allows us to take input from the user with the help of prompt() method.	i. The document.write() method is used to display output on the web page.
ii. We can use the prompt() method in the following way: <pre>var age = prompt("Enter your age: ");</pre>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

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



1. d. 23
 2. a. Father

5. Latest IT Trends



Business-to-Consumer

ASSESS YOURSELF

1. a. (ii) b. (i) c. (iii) d. (i) e. (i)
 2. a. Blockchain b. Augmented Reality c. RPA d. Shakey
 e. Virtual f. RP



3. a. The act of selling and buying a commodity over the Internet is known as e-commerce. To facilitate this process, thousands of websites are available as platforms, for different types of people like consumers, producers, sellers, etc. These platforms help different people to connect and trade goods 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. So, AI is used to create intelligent machines that help us.
- c. **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. Each connected device has a unique identifier and can transfer data over the network without any human intervention. The connected devices gather and share data about their usage and their operative environment.
- d **Blockchain** refers to the system of recording information which makes it difficult or impossible to change, hack, or cheat the system. Every business runs on information and blockchain is a shared ledger on which we record the transactions and track assets (tangible or intangible) in a business network. Tangible assets include houses, cars, cash, lands, etc. and non-tangible assets include intellectual property, patents, copyrights, branding, etc.
- 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.

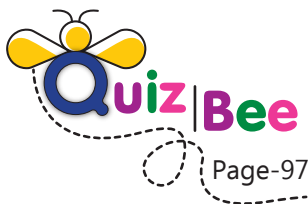
(v) Art and Jewelry: The use of 3D Printing has led the jewelry makers to experiment with non-traditional designs which were not possible with the traditional methods of jewelry making.

4. a. Consumer-to-Consumer (C2C)
- b. Natural Language Processing



1. 333D
2. 17

6. 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. (iv)
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. A **hybrid cloud** includes both public and private clouds. This consists of services that are owned by a private company but also provides its services to the general public.
- 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. He can find the One Drive icon appears on the Home screen.



1. c 2. 13% 3. 4

Periodic Assessment–2

(Based on chapters 4 to 6)

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>
<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 6)

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

f. (This question is printed incorrectly in the book, please correct it in your textbook.)

Question: Hiding a layer means to make the layer temporarily

- (i) Visible (ii) Invisible (iii) Both (i) and (ii) (iv) None of these

Ans: (ii)

g. (ii)

2. a. Transmission Pathway b. Personal c. Layer d. Text

3. a. (T) b. (F) c. (F) d. (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. Any two features of GIMP are:

(i) User friendly interface.

(ii) Image manipulation can be done quickly.

d. The Fuzzy Select tool is used to detect the edges of the image automatically on the basis of colour codes and do the selection quickly.

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. You can combine all the layers of an image to make one layer by flattening layers. To flatten layers, follow the given steps:

❶ Select the layers that you want to combine into one.

❷ Right click and select the Flatten Image option from the context menu.

c. To save a file, follow the given steps:

- 1 Click on the **File** menu.
- 2 Click on **Save** option.
- 3 Navigate the folder to save the file.
- 4 Give the name of the file in the Name: box.
- 5 Click on **Save** button.

d. A layer can be defined as one transparent sheet on top of another. Each of these layers contain a part of the image, which are then combined to form the complete image. When you open a file in Photoshop, the first layer by default is the **Background** layer with white color.

To create a new layer, follow the given steps:

- 1 Click on Layer menu from the Menu bar.
- 2 Choose New Layer option. Or Click on the Create a new layer button at the bottom of the Layers palette.
- 3 Fill the values such as name of the layer, its dimensions, etc.
- 4 Click on **OK** 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	B2C 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	When a website is established by a company to sell its products and services to consumers, it is known as the business-to-consumer model of e-commerce.

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. software b. FOR c. Range d. TRUE
4. a. A control structure is a programming language construct which affects the flow of the execution of a program.
b. 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. The syntax of if-elif-else statement is as follows:

```
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}

=

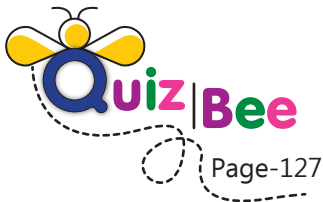
Coding Zone

[]

Coding Zone

1. No output
2. Infinite loop
3. Syntax error

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. (iii) c. (iii) d. (i) e. (ii)
2. a. append b. function c. lower d. string
3. a. Capitalize() b. Mixed data type c. Del d. Def e. Type1
4. a. A function can be defined as a block of a reusable code that performs a specific task. Functions help us to break our program into smaller pieces or modules.
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. 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.

Empty List

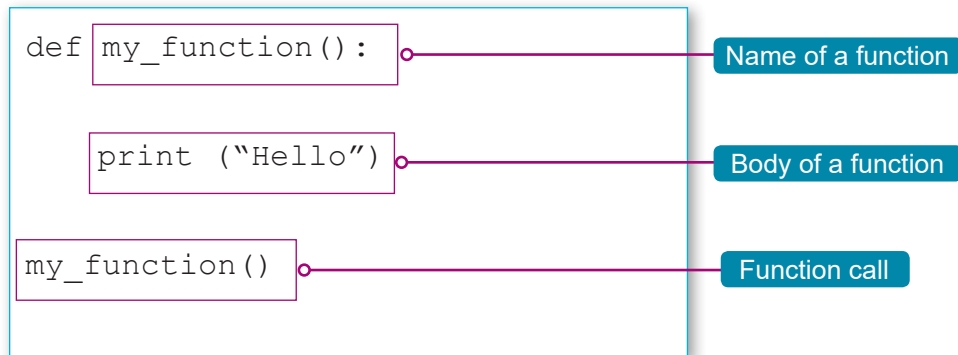
An empty list in Python is created using []. There are the two ways to create an empty list.

Mixed Data Type List

Mixed data type list can be created to place different data types such as integers, strings, double, etc.

- 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. Lists can be created by inserting the elements in square brackets []. The elements in the list are separated by a comma.

A screenshot of a Python IDE window titled "ilypython.py - C:/Users/Orange/Desktop/ilypython.py (3.9.7)". The code editor contains the following lines: `a = [10, 20, 30, 40, 50]` and `print(a[2])`.

You will get the following output:

A screenshot of the IDLE Shell window titled "IDLE Shell 3.9.7". The shell shows the following output: `>>>` followed by a restart message, then `30` is printed, and finally `>>>` is shown on the next line. The status bar at the bottom indicates "Ln: 6 Col: 4".

5. a. Yes, it is possible. He can do this by using String Concatenation Operator.
b. By using upper() function.
c. 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', 'd', 'u', 'c', 'a', 't', 'i', 'o', 'n']



{CODING ZONE}

=

Coding Zone

[]

Coding Zone

1. **Corrected code:**

```
def rev_sentence(sentence):
    words = sentence.split(' ')
    reverse_sentence = ' '.join(reversed(words))
    return reverse_sentence

if __name__ == "__main__":
    input = "Today is Sunday"
    print (rev_sentence(input))
```

Output: Sunday is Today

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: 55

Periodic Assessment–3

(Based on chapters 7 & 8)

1. a. Infinite loop b. Infinite loop
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()

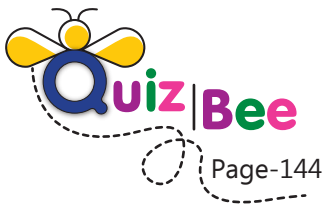
c. capitalize()

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 Domains



Data, Computer Vision and Natural Language Processing

ASSESS YOURSELF

1. a. (iii) b. (iii) c. (i) d. (iv)
2. a. Narrow AI b. Machine Learning c. Computer vision d. NLP
3. a. Understanding Human Language 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.

- 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.

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

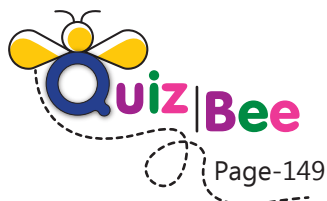
6.
 - a. General AI
 - b. Narrow AI
 - c. Chatbot
 - d. Computer Vision



1. Do it yourself

2. 354

10. Fields of Artificial Intelligence



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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. Twitter 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. Self-help customer service

b. Amazon Alexa

c. Smart Thermostat



{CODING ZONE} {}

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Coding Zone

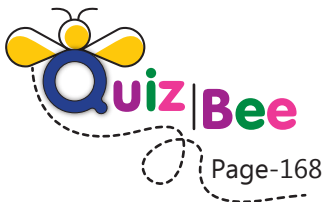
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Coding Zone

1. Do It yourself

2. c. 1260

11. Introduction to SDGs and Data Science



Unstructured

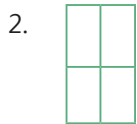
ASSESS YOURSELF

1. a. (ii) b. (i) c. (ii) d. (iii) e. (i)
f. (i) g. (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. End hunger issues by 2030 and ensure access to nutritious food for all children. 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. 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.
- 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. Descriptive Analytics



1. Either 2 or 3



Periodic Assessment–4

(Based on chapters 9 to 11)

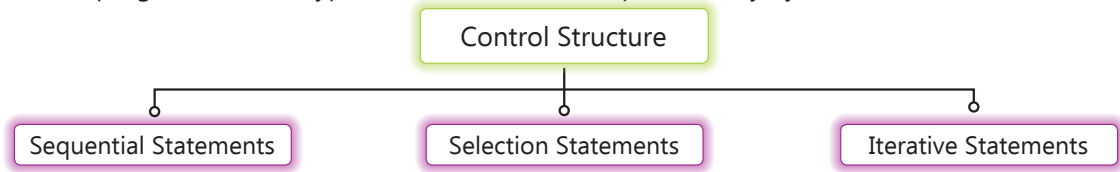
1. a. ROBOTICS
c. MACHINE VISION
e. ALAN TURING
- b. ARTIFICIAL INTELLIGENCE
d. LOGISTICS PLANNING
2. a. Gender Equality
c. Life on Land
- b. Zero Hunger
d. Peace Justice and Strong Institutions
3. a. Narrow AI systems are non-intelligent systems that are programmed to perform specific tasks.
b. Google 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)

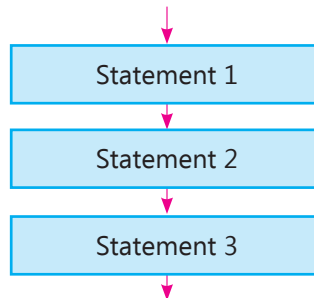
1. a. (iii)
f. (iii)
- b. (i)
g. (ii)
- c. (i)
- d. (iii)
- e. (i)
2. a. Control Statements
e. Machine Learning
- b. sequential
f. NLP
- c. Function
g. Smart Assistant
- d. lower
3. a. (F)
e. (T)
- b. (T)
f. (T)
- c. (T)
- d. (F)
4. a. We can use the if-elif-else statements to evaluate multiple scenarios. 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

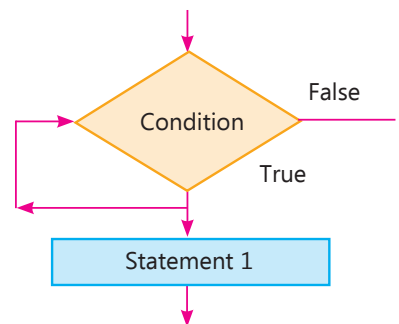
Iterative statements refer to the statements that are used to repeat a task based on a given condition. These statements are also known as looping statements. An iteration means one pass of a loop.

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.

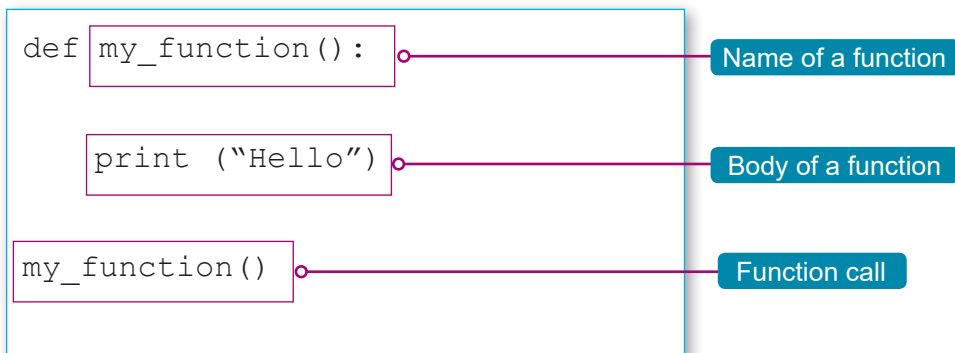
THE break STATEMENT

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.