Class 8

Answer Key

Computer Genius

1. Number System

LET'S RECAP (Page no. 7)

1. Facebook (United States)
2. WhatsApp (United States)
3. X (United States)
4. Instagram (United States)

QUEST (Page no. 12)

1. Gmail 2. Google Drive 3. Google Maps 4. Google Docs
5. Google Sheets 6. Google Slides

EXERCISE

A. 1. (iii) 2. (i) 3. (ii) 4. (ii) 5. (iii)

B. 1. Sundar Pichai 2. Google Sheets 3. Share 4. Map, Satellite, Terrain
5. Saved

C. 1. Google Drive is a cloud-based storage service. The synchronisation feature allows you to download and upload files into the remote server.

2. Google mail or Gmail is use to send and receive mails for free through a web browser.

3. Google Maps is a digital navigation program that provides detailed information about the geographical regions of any particular area. Google Map was launched on February 8, 2005. It became available in the Play Store from December 2012.

4. Perform the following steps to download a file from Google Docs:

   Step 1: Click on the File option.

   Step 2: Click on the Download option.

   Step 3: Select the desired format and click on save button.

IMPRINT 1

FUN ZONE

1. Google Slides
2. YouTube
3. Google Sheets
4. Broadcast Yourself
5. Google Docs
6. Google Drive
7. Gmail
8. Map view
9. Google

Competency-based/Application-based questions

1. She can use preview option to change the view of files.
2. Google Map

2. Trending Technologies

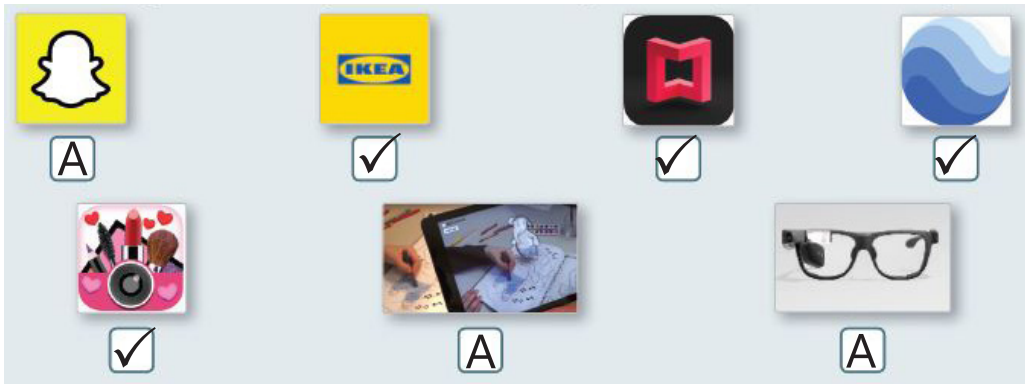
LET'S RECAP (Page no. 24)

Do it yourself.

QUEST (Page no. 27)

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

QUEST (Page no. 29)



EXERCISE

A. 1. (i) 2. (ii) 3. (ii) 4. (ii) 5. (i)

B. 1. T 2. F 3. F 4. T 5. T 6. T

C. 1. Robotics is a branch of engineering that uses technologies such as Artificial Intelligence and Machine Learning. It deals with the design, construction, operation, and application of robots. Robots are nowadays used to build cars, manufacture and pack items, perform surgeries.

IMPRINT 1

2. • Sophia is considered the most advanced humanoid robot. It is the world's first robot citizen.
   • Aibo is a robotic dog. It can develop emotional bonds with family members and provide love and affection.
   • Pepper is a friendly humanoid designed to be a companion in home and help customers at retail stores.
3. Augmented Reality is a technology that superimposes 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. For Example, Snapchat, Pokemon Go.

   Virtual Reality is a technology that creates a complete virtual world that users can interact with. In this world, you can experience places as if you were actually there. While using virtual reality, the user almost always wears VR devices such as HTC Vive or Google Cardboard.
4. 3D Printing or 3-Dimensional Printing is a process of making a physical object from a three dimensional physical model. The object can be made using a number of printing materials, including plastics, powders, filaments, paper or even human tissue. Tvasta is India's first 3d printed house which was created in 2020, in Chennai.

FUN ZONE

A. Do it yourself.

B. 1. Ameca robot's movements are more lifelike than other robots. Companies creating AI or machine learning technology can use Ameca to test and present their technology in front of a live audience.
2. Sophia is considered the most advanced humanoid robot. It is the world's first robot citizen.
3. Aibo is a robotic dog. It can develop emotional bonds with family members and provide love and affection.
4. Nao is a small humanoid robot, packed with sensors. It can walk, dance, speak, and recognize faces and objects.

Competency-based/Application-based questions

1. Voice Recognition
2. 3D Printing

Periodic Assessment 1

(Based on chapters 1 to 2)

A. 1. Like button 2. Google sheet 3. Google Maps 4. Dislike button

IMPRINT 1

B. 1. Augmented Reality (AR) is a technology that superimposes 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.

2. Virtual Reality is a technology that creates a complete virtual world that users can interact with. In this world, you can experience places as if you were actually there. While using virtual reality, the user almost always wears VR devices such as HTC Vive or Google Cardboard.

3. Robotic Process Automation (RPA) is a software robot running on physical or virtual machine that mimics human actions. With RPA, software users create software robots that can learn, mimic, and then execute rule-based business processes.

4. Internet of Things (IoT) describes the network of physical devices that have unique identifiers (UIDs). This technology can transfer data over a network without any human intervention.

C.

3	Click on the Editor down-arrow.
6	Click on the Send button to share the file.
4	Click on the Editor option.
5	Type a message for the receiver in the Message box.
2	Enter the email address(es) of the people with whom you want to share the spreadsheet in the box.
1	Click on the Share button from the top-right corner of the spreadsheet.

3. AI In Real World

LET'S RECAP (Page no. 37)

1. Smiling 2. Not smiling 3. Smiling 4. Not smiling

QUEST Page no. 42)

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

EXERCISE

A. 1. (ii) 2. (iii)

B. 1. Deep learning and computer vision techniques

2. "Get smile count == 1" block means the person is smiling in the image.

FUN ZONE

To create Get smile count block, follow the given steps:

Step 1: Drag and drop Get face count block from Facial Features sub-category.

Step 2: Then, click on arrow of Get face count block.

Step 3: Select smile.

Get smile count block will be created.

Competency-based/Application-based questions

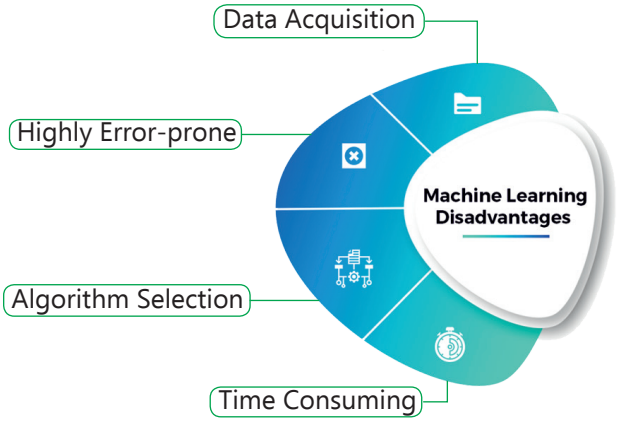
1. By clicking on the Get face count block arrow and then selecting smile.
2. Load Image block

4. Machine Learning

LET'S RECAP (Page no. 44)

(ii)

QUEST (Page no. 54)



EXERCISE

A. 1. (iii) 2. (iv)

B. 1. Machine learning is an application of Artificial Intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.

2. Following are the advantages of Machine Learning:
   - Continuous improvement
   - Trends and patterns identification
   - Wide range of applications

3. Follow the given steps to train a model in AI Connect:

Step 1: Create a new activity and select activity type AI Coding.

Step 2: To train your model, click on Train Model button and then select Teachable. Load Model window will appear, in it click on Image button and then click on Train button.

Step 3: After clicking on Train button, you will be directed to different web page.

Step 4: In this webpage, in class 1 click on upload and select the option choose image from your files or drag & drop here.

Step 5: Upload the image from the system in both the classes.

Class name can be edit, according to the requirement.

Step 6: Click on Train Model and wait. When the data is prepared the button will change to 'Model Trained'.

In preview, click on Webcam down arrow and select File. Select 'Choose images from your file or drag & drop here'. select the image from the system and check the output.

Step 7: Click on Export Model button, a pop up will appear on screen.

Click on 'upload my model' and wait.

From here you will receive a shareable link, copy it.

FUN ZONE

It specifies that an "Up" sign will be displayed when the confidence level is greater than 0.8.

Competency-based/Application-based questions

1. Train Model button
2. He can paste the link in the provided space of Load Model window.

5. AI Domains

LET'S RECAP (Page no. 56)

1. AI 2. AI 3. Not AI 4. AI 5. AI 6. AI

QUEST (Page no. 62)

1. Data and Natural Language Processing
2. iPhone's Siri and Amazon's Alexa chat-bots.

IMPRINT 1

EXERCISE

A. 1. (iii)

2. **(This question was printed incorrectly in the book. Please correct it in your textbook.)**

Question: Which of the following is the category of Artificial Intelligence?

(i) Strong Artificial Intelligence (ii) Bookish Artificial Intelligence

(iii) Taxonomy (iv) All of these

Ans. (i)

3. (iii) 4. (iv) 5. (iii) 6. (iv)

B. 1. statistics 2. John Searle 3. natural 4. Natural Language Processing 5. patterns

C. 1. T 2. F 3. F 4. F 5. T

D. 1. • Weak Artificial Intelligence: They scan or listen for things that are similar to what they know and respond to them accordingly. It is a human-like feature but still cannot take its own decisions.

• Strong Artificial Intelligence: Strong AI has been a crucial part of the AI Revolution. It functions very much like a human brain as it can learn and adapt to different situations.

2. In the game of 'Rock Paper Scissors', each player throws one of the three moves (usually by making the appropriate hand shape on the count of three), at the same time. If the move made by a player is not beaten by any other, that player wins.

3. Natural Language Processing (NLP) is a sub-field of Artificial Intelligence concerned with the interactions between computers and human (natural) languages.

In this, system learn to understand natural language by analysing a set of examples.

4. Computer Vision (CV) is a domain of AI that deals with how computers can be made to gain high-level understanding from digital images or videos.

It is used for replicating the complexity of the human vision system and enabling computers to identify and process objects in images and videos in the same way that humans do.

FUN ZONE

Do it yourself.

Competency-based/Application-based questions

1. Yes, it is true.

Emoji Scavenger Hunt uses Computer Vision to identify images taken from the camera.

2. (a) and (b)

IMPRINT 1

Periodic Assessment 2

(Based on chapters 3 to 5)

A.
```
import facialfeature
image = facialfeature.load("img.jpg")
if (facialfeature.smilecount(image)) == 1:
    print('Smiling')
else:
    print('Not Smiling')
facialfeature.show(image, False)
```

B. 1. Voice Recognition
2. Image Recognition
3. Banking Domain
4. Language Translation

C. 1. Data
2. Natural Language Processing
3. Computer Vision

Test Sheet 1

(Based on chapters 1 to 5)

A. 1. (iii) 2. (ii) 3. (ii) 4. (i) 5. (ii) 6. (iii) 7. (iii) 8. (iv) 9. (iv)

B. 1. Google Sheets 2. saved 3. Share 4. Sundar Pichai 5. John Searle 6. Natural Language Processing 7. statistics 8. patterns

C. 1. F 2. T 3. T 4. T 5. T 6. T 7. F 8. F

D. 1. Perform the following steps to download a file from Google Docs:
Step 1: Click on the File option.
Step 2: Click on the Download option.
Step 3: Select the desired format and click on save button.

2. Robotics is a branch of engineering that uses technologies such as Artificial Intelligence and Machine Learning. It deals with the design, construction, operation, and application of robots. Robots are nowadays used to build cars, manufacture and pack items, perform surgeries.

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3. 3D Printing or 3-Dimensional Printing is a process of making a physical object from a three dimensional physical model. The object can be made using a number of printing materials, including plastics, powders, filaments, paper or even human tissue. Tvasta is India's first 3d printed house which was created in 2020, in Chennai.
4. Deep learning and computer vision techniques.
5. Machine learning is an application of Artificial Intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.
6. Following are the advantages of Machine Learning:
   - Continuous improvement
   - Trends and patterns identification
   - Wide range of applications
7. - Weak Artificial Intelligence: They scan or listen for things that are similar to what they know and respond to them accordingly. It is a human-like feature but still cannot take its own decisions.
   - Strong Artificial Intelligence: Strong AI has been a crucial part of the AI Revolution. It functions very much like a human brain as it can learn and adapt to different situations.
8. Natural Language Processing (NLP) is a sub-field of Artificial Intelligence concerned with the interactions between computers and human (natural) languages.

   In this, system learn to understand natural language by analysing a set of examples.

6. Future of Artificial Intelligence

LET'S RECAP (Page no. 69)

Do it yourself.

QUEST (Page no. 75)

1. Smart Traffic Management and Smart Parking.
2. Smart Content and Intelligent Tutoring Systems.

EXERCISE

A. 1. (iv) 2. (iv) 3. (ii)

B. 1. Smart parking 2. Smart recycling 3. smart lighting

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

D. 1. AI is used in the following ways in Smart School:
   - Recorded lectures for the students

IMPRINT 1

- Providing notes on a digital medium
- Easy access to information
- Paper is replaced by digital documents
- Easy to maintain students data and lectures

2. Personalised electronic tutoring is customised to the learning styles and preferences of the students. It uses cognitive science and AI technology to provide personalised/group tutoring and real time feedback for students.
3. Smart home technology, also referred as home automation or 'Domotics', is a domain of programming and artificial intelligence technologies. It provides owners with security, comfort, convenience and energy efficiency by allowing them to control smart devices often by a smart home app on their smart phone or other network device.
4. A home equipped with lights, AC's and other electronic appliances can be controlled remotely by a smartphone or a computer.

   A Smart Home would combine a number of sensory interfaces such as facial or voice recognition, context-based suggestions and responsive notifications via artificial intelligence to reduce the amount of input required on the part of the owner.

   This would all come together to create a control system that simplifies user's decision-making process in a rapidly changing environment.

FUN ZONE

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

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Competency-based/Application-based questions

1. Yes
2. Do it yourself.

7. Sustainable Development Goals

LET'S RECAP (Page no. 79)

Do it yourself.

QUEST (Page no. 83)

1. Affordable and Clean Energy
2. Gender Equality
3. No Poverty
4. Life Below Water
5. Responsible Consumption and Production
6. Zero Hunger
7. Quality Education
8. Reduced Inequalities

EXERCISE

A. 1. (ii) 2. (i) 3. (iii) 4. (iv) 5. (i)

B. 1. 17 2. 16 3. economic 4. violence 5. water

C. 1. T 2. F 3. T 4. F 5. T

D. 1. Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

2. Today, 750 million adults can't read and write. The fourth sustainable development goal is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

3. Role of AI in sustainable development:

   - Computer vision based on satellite, drone or even phone images can help farmers protect their crops and increase their yields by detecting plant damage early, and getting recommendations on fertilising, watering and harvesting.
   - IoT networks of small microphones combined with speech processing can detect chainsaw sounds in forests to detect and locate illegal activities.

FUN ZONE

Do it yourself.

IMPRINT 1

Competency-based/Application-based questions

1. I am not agree with Mohan because SDG "Zero Hunger" is about providing enough food to others and not to eat less.
2. Yes, I agree with her. Natural Language Processing (a domain of AI) can help increase the quality and inclusiveness of education, by giving students automated feedback on exercises and adapting their level of difficulty.

8. Careers in AI

LET'S RECAP (Page no. 87)

Do it yourself.

QUEST (Page no. 117)

1. **(This question was printed incorrectly in the book. Please correct it in your textbook.)**

   Question: GPS

   Ans. General Problem Solving
2. Fifth Generation Computer Systems
3. Intelligent Knowledge-Based Systems

EXERCISE

A. 1. (ii) 2. (iv) 3. (i) 4. (ii)

B. 1. Cycorp Inc 2. 1982 3. expert systems 4. common sense
5. AI research scientist

C. 1. The Dartmouth Conference marked the start of the first phase of AI research, which utilised methods for General Problem Solving (GPS). At that time, scholars generally believed that by utilising computer code and mathematical models, any issue could be resolved. They used computer data that was thoroughly searched until a solution was found to solve difficulties.

2. Core Research Development and Deployment: These jobs requiring advanced training and education. These jobs usually related to research, development, and deployment of AI systems.

   Field and Area Specialists: Jobs where entry requirements are comparatively low. These jobs are typically related to operations of the AI systems.

3. A machine learning engineer works in the areas of image and speech recognition, fraud prevention, customer insights, and risk management whereas Business Intelligence Developer's role and responsibility includes analysing data to identify business and market trends.

4. They are responsible for collecting, analysing, and drawing interpretation from huge data sets whereas AI Research Scientists conduct research in the field of Artificial Intelligence and they add to the knowledge of AI.

FUN ZONE

1. Core Research Development and Deployment
2. Field and Area Specialists

Competency-based/Application-based questions

1. AI Research Scientist
2. Machine Learning Engineer

Periodic Assessment 3

(Based on chapters 6 to 8)

A. Some of the applications of AI in smart cities are:

- Smart Traffic Management
- Smart Parking
- Smart Waste Management
- Smart Lighting
- Smart Government

B. 1. Good Health and Well-Being
2. Clean Water and Sanitation
3. Decent Work and Economic Growth
4. Industry, Innovation and Infrastructure
5. Sustainable Cities and Communities
6. Partnerships for the goals

C. 1. Some of the skills required for a machine learning engineer are:

- One must have a sound command of applying predictive models to magnificent data.
- Knowledge of programming, computing, and mathematics is essential to becoming a successful machine learning engineer.
- Responsible for developing and managing machine learning projects.

2. Some of the skills required for this AI Research Scientists are:

- Master or Doctorate degree in computer science or related field.
- Strong background in applied mathematics.

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9. Access to AI and Ethical Issues

LET'S RECAP (Page no. 96)

Do it yourself

QUEST (Page no. 103)

1. The AI system used by Amazon service for recruitment got affected by gender-bias in its data. This created a situation in which many eligible females were left out of consideration.
2. Tay learned from hundreds of tweets and formed a racist personality in less than 24 hours after its introduction.

EXERCISE

A. 1. (i)

2. **(This question was printed incorrectly in the book. Please correct it in your textbook.)**

   Question: According to _____ , by the year 2022, AI would lead to job loss of 75 million people.

   (i) World Economic Forum (ii) McKinsey Global Institute

   (iii) Oxford Economics (iv) Google

   Ans. (i)

3. (ii)
4. (iv)

B. 1. Philosophy 2. bias 3. gender

4. **(This question was printed incorrectly in the book. Please correct it in your textbook.)**

   Question: Every technological advancement can be used for mankind's development or its _____ .

   Ans. destruction

5. terrorists

C. 1. T 2. F 3. F 4. F 5. T

D. 1. Following are the types of data that a smart-phone can collect:

- Contact Lists: Call logs or contact lists available in the smart phone contains the name and phone number of all the friends, relatives, business partners, colleagues, etc. Google can easily access these close information of yours at any time.

- Location: The location of your house, all your friends' and relative's house, your school, places where you hang out most of the time etc. are all recorded by your smart-phone.
- Chats: Google knows every message or secret that you ever shared or received on your device. It also knows all your friends, their habits, personal life etc.

2. On average smart phone has an Android Operating System running, which is owned by Google. The Operating System comes with a number of pre-installed Google apps that require specific data from the user to run. So, if a user gives permission for some of these apps, then Google gets access to the following information: A Google apps, can record your contact list, location, chats, Email, photos, etc.
3. Bias from everyday life can significantly affect Artificial Intelligence (AI) systems, primarily when they are trained on biased data or interact with biased human input. Consider an AI system designed to assist with job candidate screening for a company. If the AI system is trained on historical hiring data, which might reflect biases in the hiring decisions made by humans in the past, it could perpetuate those biases in its recommendations.
4. Following are the components of good AI system:
   - Learning
   - Reasoning
   - Problem Solving
   - Perception
   - Language understanding
5. AI systems, especially the ones based on neural networks, cannot explain the reasoning which they used for arriving at a peculiar decision or solution. Most of the time, even their creators cannot explain the process of the decision-making. This is known as the Black Box problem. What happens inside the Black Box remains in the Black Box forever.

FUN ZONE

Do it yourself.

Competency-based/Application-based questions

1 When, he give permission for Google's GPS, then Google gets access to his location history, that stored by Google in its data for future use.

2. (b)

3. Mona

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10. Basics of Python

LET'S RECAP (Page no. 108)

1. 8 2 20 2. output: 30 3. output: 84

QUEST (Page no. 121)

1. 20 3.0 21

2. StemRobo

3. 12.2
   30.8
   4.8125

4. False
   True
   False

5. False
   True
   False

6. False
   True
   False

EXERCISE

A. 1. (iii) 2. (i) 3. (ii) 4. (iv) 5. (iv)

B. 1. variable 2. output 3. hash symbol 4. Keywords 5. Equal

C. 1. Following are the application of the Python:

- Python can be used to create web applications.
- Python can be used for AI development.
- Python can be used to handle complex mathematics.

2. Error is a term used to describe any issue that arises unexpectedly in a computer ,as a result the computer could not function properly. Computers can encounter two types of errors:

- Hardware Error: A hardware error is a malfunction of a hardware component such as CPU, RAM etc., in a computer system.

IMPRINT 1

- Software Error: Software errors result due to some fault in a computer program.

3. Data types are the classification or categorisation of data items. It represents the kind of value that tells what operations can be performed on a particular data.

   Some of the data types are Numeric, Boolean, Set, etc.

4. There are various types of Operators used in Python, some of them are:

   - Arithmetic Operators: Arithmetic operators are used to perform mathematical operations like addition, subtraction, multiplication etc.
   - Assignment Operators: Assignment operators (=), are used to assign values to variables. It assigns values from the right-side operands to the left-side operands.
   - Comparison Operators: Comparison operators are the operators that compare the values on either side of the symbol. Depending on their operation, these checks if the two operands satisfy the given condition. Then return either "True" or "False" based on the result.

FUN ZONE

Expression	Operator	Meaning
3x+1	Addition	Add two operands together
2x//5y	Floor Division	Division that results into the whole-number adjusted to the left in the number line
4p+3q	Addition	Add two operands or unary plus
ab/32c	Division	Divide left operand by the right one
3.2x**5h	Exponentiation/ Power Operator	A type of Multiplication where a value is multiplied with itself for a certain number of times
3t *48y	Multiplication	Multiply two operands

Competency-based/Application-based questions

1. It'll display error.

2. In the first line of the code, she did not close the double quotation marks(").

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11. Control Flow Statements

LET'S RECAP (Page no. 125)

Do it yourself.

QUEST (Page no. 131)

if (Test Expression):

Indented statement block

EXERCISE

A. 1. (i) 2. (ii) 3. (iv) 4. (iii)

B. 1. Looping 2. one 3. true 4. Elif

C. 1. Some types of the conditional statements are:

- if Statement
- if-else Statement
- if-elif-else Statement

2. Iterative statements allow us to execute a set of code repeatedly as long as a specified condition is true. These are mainly used when we need to run the same code again and again.

3. In if statement, the program evaluates the test expression and will execute statement(s) only if the test expression is True; if the test expression is False, the statement(s) is not executed. Whereas in if-else statement, 'if' statement evaluates the test expression and will execute the body only if the test condition is True; if the condition is False, the body of 'else' is executed.

FUN ZONE

1. if (Condition1):

   Statement1

   Statement2

   . . . . . .

   elif(Condition2):

   Statement3

   Statement4

   . . . . . .

   elif(Condition3):

Statement5

Statement6

. . . . . .

else :

Statement7

Statement8

. . . . . .

2. for x in range(n):

    Statement 1

    Statement 2

    .....

Competency-based/Application-based questions

1. (ii) 2. (i)

Periodic Assessment 4

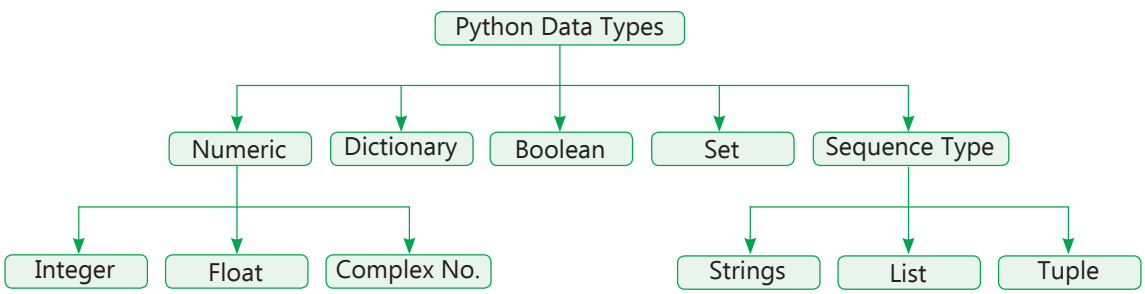
(Based on chapters 9 to 11)

A. 1. Google can easily access these close information of yours at any time. It can also identify the names of people that you really like to talk to and with whom you do not like to talk, as well as the best and worst time to call you.

2. The location of your house, all your friends' and relative's house, your school, places where you hang out most of the time etc. are all recorded by your smart-phone. It also knows how much time you spend at these places, the routes you take to reach them. With a little effort, it can even predict if you're gonna take a cab to get somewhere, drive yourself, or ask your parents to drop you.

3. Data from every single email you've ever sent and received is available to Google. Further, it can access emails that you may have written but never sent, as well as emails that you never read. For instance, Google is aware of every job offer you've ever received.

B.



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C. if (Condition 1):
    Statement 1
    Statement 2
elif (Condition 2):
    Statement 3
    Statement 4
elif (Condition 3):
    Statement 5
    Statement 6
else:
    Statement 7
    Statement 8

Test Sheet 2

(Based on chapters 6 to 11)

Section A

A. 1. (iv) 2. (i) 3. (i) 4. (ii) 5. (i)

6. **(This question was printed incorrectly in the book. Please correct it in your textbook.)**

Question: According to _____ , by the year 2022, AI would lead to job loss of 75 million people.

(i) World Economic Forum (ii) McKinsey Global Institute

(iii) Oxford Economics (iv) Google

Ans. (i)

7. (ii) 8. (ii) 9. (iii)

B. 1. smart lighting 2. 16 3. water 4. 1982

5. common sense 6. Philosophy 7. development 8. hash symbol 9. true

C. 1. T 2. T 3. F 4. T 5. F

D. 1. Smart home technology, also referred as home automation or 'Domotics', is a domain of programming and artificial intelligence technologies. It provides owners with security, comfort, convenience and energy efficiency by allowing them to control smart devices often by a smart home app on their smart phone or other network device.

2. Today, 750 million adults can't read and write. The fourth sustainable development goal is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

3. Role of AI in sustainable development:

    • Computer vision based on satellite, drone or even phone images can help farmers

IMPRINT 1

protect their crops and increase their yields by detecting plant damage early, and getting recommendations on fertilising, watering and harvesting.

- IoT networks of small microphones combined with speech processing can detect chainsaw sounds in forests to detect and locate illegal activities.

4. Two types of AI careers are:
   - Core Research Development and Deployment: These jobs requiring advanced training and education. These jobs usually related to research, development, and deployment of AI systems.
   - Field and Area Specialists: Jobs where entry requirements are comparatively low. These jobs are typically related to operations of the AI systems.
5. The Dartmouth Conference marked the start of the first phase of AI research, which utilised methods for General Problem Solving (GPS). At that time, scholars generally believed that by utilising computer code and mathematical models, any issue could be resolved. They used computer data that was thoroughly searched until a solution was found to solve difficulties.
6. AI systems, especially the ones based on neural networks, cannot explain the reasoning which they used for arriving at a peculiar decision or solution. Most of the time, even their creators cannot explain the process of the decision-making. This is known as the Black Box problem. What happens inside the Black Box remains in the Black Box forever.
7. Following are the application of the Python:
   - Python can be used to create web applications.
   - Python can be used for AI development.
   - Python can be used to handle complex mathematics.
8. In if statement, the program evaluates the test expression and will execute statement(s) only if the test expression is True; if the test expression is False, the statement(s) is not executed. Whereas in if-else statement, 'if' statement evaluates the test expression and will execute the body only if the test condition is True; if the condition is False, the body of 'else' is executed.