

ASSIGNMENT-1

1Q: Define Artificial Intelligence (AI) and provide examples of its applications.

Artificial Intelligence (AI) is the theory and development of computer systems capable of performing tasks that typically require human intelligence. These tasks include recognizing speech, making decisions, identifying patterns, and solving problems. AI encompasses a wide range of technologies, such as machine learning, deep learning, and natural language processing (NLP).

some examples of AI applications across various sectors:

1. **E-commerce:** AI helps in making personalized product recommendations based on user search history and preferences.
2. **Healthcare:** AI is used for medical diagnosis, predicting patient outcomes, and personalizing treatment plans.
3. **Automotive:** Self-driving cars and autonomous vehicle technology are prime examples of AI in action.
4. **Finance:** AI is utilized for automated trading, fraud detection, and financial planning.
5. **Social Media:** AI powers content personalization, targeted advertising, and chatbots for customer service.

2Q: Differentiate between supervised and unsupervised learning techniques in ML.

A: In supervised learning, the algorithm “learns” from the training dataset by iteratively making predictions on the data and adjusting for the correct answer. While supervised learning models tend to be more accurate than unsupervised learning models, they require upfront human intervention to label the data appropriately.

Unsupervised learning models, in contrast, work on their own to discover the inherent structure of unlabeled data. Note that they still require some human intervention for validating output variables. For example, an unsupervised learning model can identify that online shoppers often purchase groups of products at the same time.

3Q: What is Python? Discuss its main features and advantages.

A: **Python** is a dynamic, high-level, free open source, and interpreted programming language. It supports object-oriented programming as well as [procedural-oriented programming](#). In [Python](#), we don't need to declare the type of variable because it is a dynamically typed language

Features in Python

the features of Python programming language:

- Free and Open Source
- Easy to code
- Easy to Read
- Object-Oriented Language
- GUI Programming Support
- High-Level Language
- Large Community Support
- Easy to Debug
- Python is a Portable language
- Python is an Integrated language
- Interpreted Language:
- Large Standard Library
- Dynamically Typed Language
- Frontend and backend development
- Allocating Memory Dynamically

4Q: What are the advantages of using Python as a programming language for AI and ML?

A: • Python is a highly popular programming language for AI and ML (Artificial Intelligence and Machine Learning) due to its simplicity and the vast array of libraries available that make implementing complex algorithms easier. Here's a brief overview of how Python is used in AI/ML:

- **Ease of Learning and Use:** Python's syntax is clear and readable, making it an excellent choice for beginners in AI/ML.
- **Rich Library Ecosystem:** Python boasts a rich set of libraries specifically designed for AI and ML tasks. Some of the most popular libraries include.
- **NumPy:** [For numerical processing and working with arrays](#)
 - **SciPy:** [For advanced computing and scientific calculations.](#)
 - **Pandas:** For data manipulation and analysis.

5Q: Discuss the importance of indentation in Python code.

A: Indentation is a fundamental aspect of Python programming. It **enhances code readability and enforces a consistent structure**. By understanding and following the rules of indentation, you can write clean, error-free code that is easy to read and maintain.

6Q: Define a variable in Python. Provide examples of valid variable

A: A **variable** name must start with a letter or the underscore character. A variable name cannot start with a number. A variable name can only contain alpha-numeric characters and underscores (A-z, 0-9, and _) Variable names are case-sensitive (age, Age and AGE are three different variables). A variable name cannot be any of the Python keywords.

7Q: Explain the difference between a keyword and an identifier in Python.

A: In Python, **keywords** and **identifiers** serve distinct purposes:

1. **Keywords:**

- Keywords are **reserved words** that have predefined meanings within the Python language.
- They **cannot** be used as variable names, function names, or any other identifiers.
- Examples of Python keywords include `if`, `else`, `for`, `while`, `def`, `return`, `True`, and `False`.
- These words define the **syntax** and **structure** of Python code.
- All Python keywords are written in lowercase, except for `True` and `False`.

2. **Identifiers:**

- Identifiers are **user-defined names** used to identify various entities in Python code.
- Entities can include variables, functions, classes, modules, and other objects.
- Unlike keywords, identifiers are not reserved and can be freely chosen by the programmer.

3. **Good practices for identifiers:**

- Should start with a letter (a-z, A-Z) or an underscore (_).
- Can contain letters, digits, and underscores.
- Case-sensitive .

8Q: List the basic data types available in Python.

A: Python has the following data types built-in by default, in these categories: **Text Type: str** **Numeric Types: int, float, complex**
Sequence Types: list, tuple, range.

9Q: Describe the syntax for an if statement in Python.

A: An `if` statement can have an optional `else` clause. The `else` statement executes if the condition in the `if` statement evaluates to `False`.

Syntax:

If condition:

body of if statement

else:

body of else statement

Here, if the `condition` inside the `if` statement evaluates to

- **True** - the body of `if` executes, and the body of `else` is skipped.
- **False** - the body of `else` executes, and the body of `if` is skipped.

10Q: Explain the purpose of the elif statement in Python.

A: The 'elif' statement in Python is an essential part of the if-else structure, used for **handling multiple conditions**. It's a combination of 'else' and 'if', which can be read as 'else if'. It allows the program to check several conditions sequentially and execute a specific block of code as soon as a true condition is found.