Assignment

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

Answer: Artificial Intelligence (AI) is a branch of computer science that aims to create systems capable of performing tasks that would normally require human intelligence. These tasks include learning, reasoning, problem-solving, perception, and language understanding. Examples of AI applications include voice assistants like Siri and Alexa, recommendation systems like those used by Netflix and Amazon, and autonomous vehicles.

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

Answer: In Machine Learning (ML), supervised learning is a method where the model is trained using labeled data, i.e., the input data comes with corresponding output labels. On the other hand, unsupervised learning is a method where the model is trained using unlabeled data. The model tries to find patterns and relationships in the input data without any guidance.

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

Answer: Python is a high-level, interpreted programming language. It is known for its simplicity and readability, which makes it a great language for beginners. Python supports multiple programming paradigms, including procedural, object-oriented, and functional programming. It has a large standard library and a vibrant community that contributes to a vast selection of third-party packages.

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

Answer: Python is widely used in AI and ML due to its simplicity and consistency, which makes the development and testing process faster. It has numerous libraries and frameworks like TensorFlow, PyTorch, and Scikit-learn that are specifically designed for AI and ML. Python's syntax and readability make it easier to implement complex algorithms.

5: Discuss the importance of indentation in Python code.

Answer: In Python, indentation is used to define a block of code. Unlike other programming languages that use braces `{}` to define a block of code, Python uses indentation. This makes the code more readable and clean.

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

Answer: In Python, a variable is a named location used to store data in memory. A variable name can contain letters (a-z, A-Z), digits (0-9), or the underscore character (_). However, a variable name cannot start with a digit. Examples of valid variable names are `myVariable`, `var123`, and `_temp`.

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

Answer: In Python, a keyword is a reserved word that has a predefined meaning in the language. Keywords cannot be used as identifiers. An identifier is a name used to identify a variable, function, class, module, or other objects. An identifier can be a short name (like `x` and `y`) or a more descriptive name (like `age`, `sum`, `total_volume`).

8: List the basic data types available in Python.

Answer: Python has several basic data types available, including:

Numeric Types: `int`, `float`, `complex`

Sequence Types: `str`, `list`, `tuple`

Mapping Type: `dict`

Set Types: `set`, `frozenset`

Boolean Type: `bool`

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

Answer: The syntax for an `if` statement in Python is

```
if condition:
    # code to execute if condition is True
```

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

Answer: The `elif` statement in Python is short for “else if”. It allows us to check for multiple expressions. If the condition for `if` is `False`, it checks the condition of the next `elif` block and so on. If all the conditions are `False`, the body of `else` is executed. Only one block among the several `if`…`elif`…`else` blocks is executed according to the condition.