# ASSIGNMENT-1

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

A. **Artificial Intelligence (AI)** is the theory and development of computer systems capable of performing tasks that historically required human intelligence, such as recognizing speech, making decisions, and identifying patterns.

**Applications:**

- **GPS and Navigation**
  Examples: Voice assistance, Traffic Prediction, etc.
- **Robotics**
  Examples: Object recognition and Manipulation, Human Robotic Interaction, etc.
- **Education Purpose**
  Examples: Voice assistant, smart content, Transcription of faculty lectures.
- **Healthcare**
  Examples: Patient monitoring, surgical assistance, X-rays, MRIs, CT scans.
- **Agriculture**
  Examples: Insect and plant disease detection, Agricultural robotics, Determine soil and crop health, etc.

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

A.

| Supervised Learning | Unsupervised Learning |
|---|---|
| Supervised learning algorithms are trained using labeled data. | Unsupervised learning algorithms are trained using unlabeled data. |

| | |
|---|---|
| Supervised learning can be categorized in **Classification** and **Regression** problems. | Unsupervised Learning can be classified in **Clustering** and **Associations** problems. |
| Supervised learning is not close to true Artificial Intelligence as in this, we first train the model for each data, and then only it can predict the correct output. | Unsupervised Learning is more close to the true Artificial Intelligence as it learns similarly as a child learns daily routine things by his experiences. |
| The goal of supervised learning is to train the model so that it can predict the output when it is given new data. | The goal of unsupervised learning is to find the hidden patterns and useful insights from the unknown dataset. |

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

A. **Python:** Python is a computer programming language often used to build websites and software, automate tasks, and analyze data. Python is a general-purpose language, not specialized for any specific problems, and used to create various programs.

**Features of Python:**

- **Free and open source:**
  Python is freely available for everyone. Anyone can contribute to the Python community. The open-source means, "Anyone can download its source code without paying any penny."
- **Object-Oriented Language:**
  Python supports object-oriented language and concepts of classes and objects come into existence. It supports inheritance, polymorphism, and encapsulation, etc.
- **Interpreted Language:**
  Python is an interpreted language; it means the Python program is executed one line at a time. The advantage of being interpreted language, it makes debugging easy and portable.

- **Cross Platform Language:**

  Python can run equally on different platforms such as Windows, Linux, UNIX, and Macintosh, etc. So, we can say that Python is a portable language.

**Advantages Of Python:**

- Rapid Development.
- Wide Range of Libraries and Frameworks.
- Easy to learn and use.

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

A. Advantages of using Python as a programming language for AI and ML are as following:

- **A great library ecosystem:**

  A great choice of libraries is one of the main reasons Python is the most popular programming language used for AI. ML requires continuous data processing, and Python's libraries let you access, handle and transform data.
- **Flexibility:**

  Python for machine learning is a great choice, as this language is very flexible. It offers an option to choose either to use OOPs or scripting.

- **Platform Independence:**

  The next advantage of python for AI and ML development is platform independence. Python is not only comfortable to use and easy to learn but also very versatile. This saves time and money for tests on various platforms and makes the overall process more simple and convenient.
- **A low entry barrier:**

  Working in the ML and AI industry means dealing with a bunch of data that you need to process in the most convenient and effective way. The low entry barrier allows more data scientists to quickly pick up Python

and start using Python for AI development without wasting too much effort on learning the language.

**5.Discuss the importance of indentation in Python code.**

A. **Python Indentation:**

Indentation refers to the spaces at the beginning of a code line. Where in other programming languages the indentation in code is for readability only, the indentation in Python is very important. Python uses indentation to indicate a block of code.

The identification of a block of code in Python is done using Indentation. In many different programming languages like C, C++, Java, etc. use flower brackets or braces {} to define or to identify a block of code in the program, whereas in Python, it is done using the spaces or tabs, which is known as indentation and also it is generally known as 4 space rule.

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

A. **Variables:** Variables are containers for storing data values. Python has no command for declaring a variable. A variable is created the moment you first assign a value to it. Variables do not need to be declared with any particular *type*, and can even change type after they have been set.

A variable can have a short name (like x and y) or a more descriptive name (age, name). Rules for Python variables:

- 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 Keyword.

**Examples:**

name = “Rani”

_name = “Rani”

NAME = “Rani”

name1 = “Rani”

**7. Explain difference between a keyword and an identifier in python.**

A.

| Keyword | Identifier |
|---|---|
| Keywords are predefined word that gets reserved for working program that have special meaning and cannot get used anywhere else. | Identifiers are the values used to define different programming items such as variables, integers, structures, unions and others and mostly have an alphabetic character. |
| Specify the type/kind of entity. | Identify the name of a particular entity. |
| It always starts with a lowercase letter. | First character can be a uppercase, lowercase letter or underscore. |
| A keyword contains only alphabetical characters. | An identifier can consist of alphabetical characters, digits and underscores. |
| Examples of keywords are: int, char, if, while, do, class etc. | Examples of identifiers are: Test, count1, highspeed, etc. |

**8.List the basic data types available in Python.**

A. In programming, data type is an important concept. Variables can store data of different types, and different types can do different things.

Python has the following data types built-in by default, in these categories:

- Numeric Types
    - Int
    - Float
    - Complex
- String
    - Str
- Boolean
    - Bool
- Collection types
    - List
    - Tuple
    - Set
    - dict

**9.Describe the syntax for an if statement in python.**

A. An if statement is written by using if keyword.

**Syntax:**

If(condition):

    <statement1>

    <statement2>

<new statement>

**Example:**

n=10

if(n=10):

    print(“welcome”)

print(“bye”)

**10. Explain the purpose of the elif statement in python.**

A. The elif keyword is python way of saying "if the previous conditions were not true, then try this condition".

elif used test multiple conditions.

**Syntax:**

```
If(condition):
    <statement>
elif(condition):
    <statement>
else:
    <statement>
```