1.Define artificial intelligence (AI) and provide examples of its applications

ANS: **Artificial Intelligence (AI) refers to the simulation of human intelligence in machines**. Some examples of AI applications include:

1. **Healthcare**: AI is used for medical diagnosis, drug discovery, and predictive analysis of diseases.
2. **Finance**: AI helps in credit scoring, fraud detection, and financial forecasting.
3. **Retail**: AI is used for product recommendations, price optimization, and supply chain management.

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

## ANS: supervised learning:

1. supervised learning algorithms are trained using labelled data.
2. Supervised learning model predicts the output.
3. Supervised learning needs supervision to train the model.
4. Supervised learning is classified into two categories of algorithms:

Regression: A regression problem is when the output variable is a real value, such as “dollars” or “weight”.

Classification: A classification problem is when the output variable is a category, such as “Red” or “blue” ,“disease” or “no disease”.

Unsupervised learning:

1.unsupervised learning algorithms are trained using unlabelled data.

2.unsupervised learning model finds the hidden patterns from data.

3.unsupervised learning does not need any supervision.

Unsupervised learning is classified into two categories of algorithms:

**Clustering**:

A clustering problem is where you want to discover the inherent groupings in the data, such as grouping customers by purchasing behaviour.

**Association**:

An association rule learning problem is where you want to discover rules that describe large portions of your data, such as people that buy X also tend to buy Y.

3.What is python and discuss its main features and advantages.

ANS: **Python** is a dynamic, high-level, free open-source, and interpreted programming language. Here are some of its key features and advantages:

**1.Free and Open Source**: Python is freely available on the official website, and you can download it without any cost. Being open-source, its source code is accessible to the public, allowing you to use, modify, and share it.

2.**Easy to Code**: Python’s syntax is straightforward, making it easy to learn and write code. Compared to languages like C, C#, Java, or JavaScript, Python is developer-friendly and can be picked up in just a few hours or days.

3.**Easy to Read**: Python’s readability is a standout feature. Instead of using semicolons or brackets, code blocks are defined by indentation. This simplicity makes Python code more intuitive and less error-prone.

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

ANS: Python is the major code language for AI and ML. it surpasses java in popularity and has many advantages, such as a great library ecosystem, good visualization options, a low entry barrier , community support, flexibility, readability, and platform independence.

Advantages of using python for AI and ML

1. **Less code Access to great libraries and frameworks for AI and machine learning (ML)**
2. **Simplicity and consistency**
3. **Platform independence**
4. **Flexibility**

5.Discuss the importance of indentation in python code.

ANS: Indentation is a very important concept of Python because without properly indenting the Python code, you will end up seeing Indentation Error and the code will not get compiled.

The primary purpose of indentation in python is to define the scope of statements, such as those within loops, conditionals, functions, and classes. Consistent and proper indentation in crucial for the interpreter to understand the logical structure of the code.

6.Define a variable in python. Provide examples of valid variable names.

ANS: In Python, a **variable** is a name given to a memory location where we can store values. Unlike some other programming languages, Python is not “statically typed,” which means we don’t need to declare variables explicitly or specify their types. Instead, a variable is created the moment we assign a value to it.

 examples of valid variable names:

* My-var
* count\_1
* \_total\_amount
* My Var
* MYVAR
* myvar2

7. Explain the difference between a keyword and a identifier in python.

ANS: **Keywords**:

Keywords are predefined reserved words in Python that have specific meanings and are part of the language syntax.

1.They **cannot** be used as identifiers (such as variable names, function names, or class names).

2.Python keywords are case-sensitive, except for True and False.

**Identifiers**:

Identifiers are user-defined names used to identify various programming entities within Python code.

1.These entities can include variables, functions, classes, modules, and other objects.

2.Unlike keywords, identifiers are not predefined; you create them based on your needs.

8.List the basic data types available in python.

ANS: In Python, there are several built-in data types that you can use. Let’s explore them:

1. **Text Type (String)**: Represented by the str class, strings are used to store textual data. For example:

**Python**

x = "Hello, World!"

1. **Numeric Types**:
   * **Integer (**int**)**: Used for whole numbers.
   * **Float (**float**)**: Used for decimal numbers.
   * **Complex (**complex**)**: Used for complex numbers.
2. **Sequence Types**:
   * **List (**list**)**: Ordered collection of items.
   * **Tuple (**tuple**)**: Similar to lists but immutable (cannot be modified).
   * **Range (**range**)**: Represents a sequence of numbers.
3. **Mapping Type**:
   * **Dictionary (**dict**)**: Key-value pairs.
4. **Set Types**:
   * **Set (**set**)**: Unordered collection of unique elements.
5. **Boolean Type**:
   * **Boolean (**bool**)**: Represents True or False.
6. **Binary Types**:
   * **Bytes (**bytes**)**: Represents a sequence of bytes.

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

ANS: In Python, the if statement is used for conditional execution. It allows you to execute a block of code only when a specific condition is met. Here’s the basic syntax for an if statement in python

Syntax: if condition:

# code block to execute if the condition is true

Statement 1

Statement 2

…….

10.Explain the purpose of the Elif statement in python.

ANS: [The Elif statement in Python is used to **check multiple conditions in sequence and execute different code blocks depending on which condition is true**](https://www.bing.com/ck/a?!&&p=d4385981ff7d6432JmltdHM9MTcxNTI5OTIwMCZpZ3VpZD0wMzQ2OGRiZS02MjYwLTZjMjgtMGIzNy05ZTc2NjM1ZjZkNTcmaW5zaWQ9NTgzMw&ptn=3&ver=2&hsh=3&fclid=03468dbe-6260-6c28-0b37-9e76635f6d57&psq=Explain+the+purpose+of+the+Elif+statement+in+python&u=a1aHR0cHM6Ly93d3cuZnJlZWNvZGVjYW1wLm9yZy9uZXdzL2hvdy10by11c2UtY29uZGl0aW9uYWwtc3RhdGVtZW50cy1pZi1lbHNlLWVsaWYtaW4tcHl0aG9uLw&ntb=1). [It acts as a continuation of the if statement and allows developers to evaluate additional conditions if the if condition is not met](https://www.bing.com/ck/a?!&&p=ccd8d1ac61ff45afJmltdHM9MTcxNTI5OTIwMCZpZ3VpZD0wMzQ2OGRiZS02MjYwLTZjMjgtMGIzNy05ZTc2NjM1ZjZkNTcmaW5zaWQ9NTgzNw&ptn=3&ver=2&hsh=3&fclid=03468dbe-6260-6c28-0b37-9e76635f6d57&psq=Explain+the+purpose+of+the+Elif+statement+in+python&u=a1aHR0cHM6Ly9za2lsbGFwcC5jby9ibG9nL3VuZGVyc3RhbmRpbmctcHl0aG9ucy1lbGlmLXN0YXRlbWVudC1hLWNvbXByZWhlbnNpdmUtZ3VpZGUv&ntb=1). [The Elif statement makes code easier to write and can be used instead of keeping track of if..else statements as programs get more complex and grow in size](https://www.bing.com/ck/a?!&&p=3767462e465bf8deJmltdHM9MTcxNTI5OTIwMCZpZ3VpZD0wMzQ2OGRiZS02MjYwLTZjMjgtMGIzNy05ZTc2NjM1ZjZkNTcmaW5zaWQ9NTgzOQ&ptn=3&ver=2&hsh=3&fclid=03468dbe-6260-6c28-0b37-9e76635f6d57&psq=Explain+the+purpose+of+the+Elif+statement+in+python&u=a1aHR0cHM6Ly93d3cuZnJlZWNvZGVjYW1wLm9yZy9uZXdzL3B5dGhvbi1pZi1lbHNlLXN0YXRlbWVudC1jb25kaXRpb25hbC1zdGF0ZW1lbnRzLWV4cGxhaW5lZC8&ntb=1)