1.What is oops ?

Object-Oriented Programming (OOP) is a programming paradigm that uses the concept of "objects" to design and develop software. In OOP, objects are instances of classes, which serve as blueprints or templates for creating objects. This paradigm is centered around four key principles: Encapsulation, Inheritance, Polymorphism, and Abstraction. OOP is widely used in many programming languages, including Python, Java, C++, and others.

2.What is python ?

Python is an interpreted, object-oriented high level programming language with dynamic semantics.

3.What are the fields in which python is used ?

1.Web Development

2.data science & Analytics

3.AI & Machine learning

4.Automation & scripting

5.Game development

6.Internet of things

7.Desktop application development

8.Cloud computing

4. What is the history of python ?

It was developed by Guido van Rossum in 1991.It was initially called ABC, Guido van Rossum started working on ABC in the 1980s.

5.What are variables & Identifiers ?

A variable in Python is a reserved storage location that holds a value. Variables allow you to store data that can be used and manipulated throughout your program.

An identifier is a name used to identify a variable, function, class, module, or other objects in Python. It is essentially the name you give to these entities.

# 6.What is an identifier ?

Identifier is a name which used to identify an object.

Identifier can be a name of variables, name of a function, name of an array, name of classes etc.

6. what is a data type and what are the various data types present in python ?

A data type represents the type of data i.e. assigned to a variable.

# Types

| **Category** | **Data Type** | **Description** | **Example** |
| --- | --- | --- | --- |
| **Numeric** | int | Integer values | x = 10 |
|  | float | Floating-point numbers | y = 3.14 |
|  | complex | Complex numbers | z = 2 + 3j |
| **Sequence** | str | String of characters | name = "Alice" |
|  | list | Ordered, mutable collection | fruits = ["apple", "banana"] |
|  | tuple | Ordered, immutable collection | coordinates = (10, 20) |
|  | range | Immutable sequence of numbers | range(1, 10) |
| **Mapping** | dict | Key-value pairs | student = {"name": "Alice"} |
| **Set** | set | Unordered collection of unique items | colors = {"red", "blue"} |
|  | frozenset | Immutable set | frozen\_colors = frozenset(["red"]) |
| **Boolean** | bool | Boolean values (True or False) | is\_valid = True |
| **Binary** | bytes | Immutable sequence of bytes | data = b"hello" |
|  | bytearray | Mutable sequence of bytes | mutable\_data = bytearray(b"hello") |
|  | memoryview | Memory-efficient view of bytes | view = memoryview(b"hello") |

# 7.What is an operator ? what are its types ?

An **operator** is a symbol that performs an operation on one or more operands. Operands are the values or variables on which the operator acts. Operators are used to perform various operations such as arithmetic, comparison, logical, and bitwise operations, among others.

# Types

1. Arithmatic operator(+,-)

2. Assignment op(=,+=)

3. comparison op(==,!=)

4. Logical op(AND,OR,NOT)

5. Membership op(in, not in)

6. Identity op (is, is not)

7. Bitwise op(Bitwise or,and,xor,leftshift,rightshift)

# 8.what is data structure in python ?

Data structure is like a container which is used to store the data and the same data can be used later to perform operations.

A data structure in Python is a way of organizing and storing data in a format that allows efficient access and modification, using built-in types like lists, tuples, dictionaries, and sets, or more complex structures like queues, stacks, and trees.

Ex-string, list, tuple, set, dict data structure, queues (FIFO) & stacks(LIFO)

# String

* String is a collection of characters enclosed by quotes.
* It is immutable in nature. (Not Changeable)
* It supports both forward indexing (0)& backward indexing(-1)
* Ex-“himanshu sekhar sahoo”

# List

* It is a collection of elements enclosed by square brackets.(elements can be a int,float,str)
* It is mutable in nature
* It supports both forward indexing (0)& backward indexing(-1)
* Ex-[2,4,6,”chintu”]

# Tuple

* It is a collection of elements enclosed by parenthesis
* It is immutable in nature.
* It supports both forward and backward indexing
* Ex-(“himanshu”,12,5.3)

# Set

* It is a collection of unique and unordered elements enclosed by curly braces
* It doesn’t support duplicate values
* Set itself is mutable but its elements are immutable
* It doesn’t support indexing.
* Ex-{1,2,3,”Ram”}

# Dictionary

* It is a collection of key-value pairs enclosed by curly braces.
* It doesn’t allow duplicate keys but allows duplicate values
* It is mutable in nature
* Ex-{“name”:”himanshu”,”Address”:”Bdk”}

# 9. Control statements

Control statements in Python are used to control the flow of execution within a program.

1.Conditional statement

* If statement
* If-else statement
* Elif statement
* Nested if statement

2. Iteration statement

* For loop & While loop

3.Jumping statements

* Break , Continue , pass

# 10.Comprehension

Comprehensions in Python provide a concise way to create lists, dictionaries, sets, or generators. They offer a more readable and often more efficient approach compared to traditional loops and conditionals.

### Types of Comprehensions

* **List Comprehension**
* **Dictionary Comprehension**
* **Set Comprehension**
* **Generator Expression**

**Syntax**

**<Exp> <for loop> <if condition>**

# Filter()

Purpose: To apply a function that returns True or False to each item in an iterable and return an iterator containing only the items for which the function returned True.

Use case: When you need to select or filter out elements from an iterable based on a condition.

# Map()

Purpose: To apply a function to each item in an iterable and return an iterator of the results.

Use case: When you need to transform or modify each element of an iterable based on some function.

# Reduce()

The reduce() function in Python is used to apply a function cumulatively to the items of an iterable, reducing the iterable to a single value. It is part of the functools module, so you need to import it before using it.