Explain programming and python in detail

* Defination and purpose of programming

programming is the proces of writing instructions (code) that tell a computer what to do to peyform a task or solve a problem.

* purpose of programming

The Main purpose of programming is to:

- Solve problems
- creat software and applications
- Automate tasks
- proces and Analyze data
- Make Computers work efficiently

* characteristic and Applications of python

- Easy to learn and use
- High-level language
- simple, readable syntax
- interpreted language
- platform independent
- Large library support

* Applications of python

- Data Analysis and statistics
- web development
- Machine learning and AI
- Automation and scripting
- Software development
- Scientific and numerical Computing

* Types of Comments in python with syntax

1) Single-line Comment

Syntax :- This is a single-line Comment

2) Multi-line Comment

Syntax :- used for Multiple lines (using triple quotes)

''' This is a Multi-line Comment '''

* Importance of python in modern software development

- Easy to learn and use, increase developer productivity
- Faster development with fewer lines of code
- widely used in web development, data science, AI and automation
- Large standard library and third-party frameworks
  platform independent and open source
  High demand in the software industry

2. Describe Data Types and operators in python with suitable examples.

* Built-in data Types in python

- Numeric Data Types :- used to store numbers

Type	Description	Example
int	whole numbers	a = 10
float	decimal numbers	b = 10.5
Complex	Real + imaginary	c = 2+3j

- Sequence data Types

used to store Multiple values in order

Type	description	Example
list	Mutable (changeable)	[1,2,3]
Tuple	immutable	(1,2,3)
str	characters	"python"

- Set data Types.

Stores unique elements (no duplicates)

Type	description	Example
set	Mutable	{1,2,3}
frozenset	immutable	frozenset({1,2})

- Mapping data Type :- stores key-value pairs

Type	Description	Example
dict	key: value	{"name": "Ali", "age": 20}

- Boolean Data Type : stores True or False.

* Type Identification using type()

used to find the data type of a variable.

code : x = 10

```
print(type(x))
name = "python"
print(type(name))
```

* python operators

- Arithmetic operators

used for Mathematical operations

operator	Meaning	Example
+	Addition	10 + 5
-	Subtraction	10 - 5
*	Multiplication	10 * 5
/	Division	10 / 5
%	Modulus	10 % 3
**	power	2 ** 3

- Assignment operators used to Assign values

operator	Example
=	x = 5
+=	x += 2
-=	x -= 2

- Comparison operators :- used to Compare values

operator	Meaning
==	Equal
!=	Not Equal
>	Greater
<	less
>=	greater or Equal
<=	less or Equal

- Logical operators :- used to Combine conditions

operator	Meaning
and	Both True
or	At least one True
not	Reverse result

- Membership operators

check presence in sequence

operator	Example
in	"a" in "apple"
not in	"x" not in "apple"

- Identity operators

check same object in memory

operator	Meaning
is	same object
is not	different object

* Real-world usage of operators

- Arithmetic operators are used in calculations like total bill, salary, marks etc
- Comparison operators are used for decision making such as age verification, pass/fail result check
- Logical operators are used to combine conditions in login systems, exams, job etc
- Assignment operator are used to update values like increasing salary stock count.
- Membership operators are used to check availability in a list, such as checking a name in a student list
- Identity operators are used to check whether two variables refer to the same object in memory, mainly in advanced programming.

3 Explain python input and output operations

* Input() function and dyault Data type

- Input() is used to take input from the user
- dyault data type of input() is string (Str)

Example: x = input("Enter a value: ")

print(type(x))

even if you enter 10, it is stored as "10" (String)

* Type conversion while Taking input

To use input as numbers, we convert it using Type casting

Example: a = iint(input("Enter an integer: "))

b = float(input("Enter a float: "))

print(a + 5)

print(b + 2.5)

* Taking Multiple Inputs

Multiple inputs can be Taken in a single line using split().

Example: x, y = input("Enter two numbers: ").split()

x = int(x)

y = int(y)

print(x+y)

* Formatted output using print()

- using sep

sep is used to separate values.

Ex: print(10, 20, 30, sep=",")

O/P: 10, 20, 30

- using end :- end controls what is printed at the end

Ex: print("Hello", end=" ")
print("world")

O/P :- Hello world

- format specifiers (format() / f-strings)

→ using format()

name = "shaziya"
age = 20
print("Name: {}, Age: {}".format(name, age))

using f-string (Recommended)

Marks = 85.5678
print(f"Marks : {Marks:.2f}")

O/P :-
Marks : 85.57

4. Discuss control statements and Decision-Making statements in python

* Meaning of control statements

Control statements control the flow of execution of a program. They decide which statement runs, when it runs, and how many times it runs

* Importance of control statement
  Help in decision making
  Allow logical condetions
  Reduce repeated code
  Make programs dynamic and efficient
  Essential for real-world programs (marks, login, AI
* Types of control statements
  * Decision-making statements
    → if
    → if-else
    → if-elif-else
  • Looping statements
    → for
    → while
  • Jump statements
    → Break
    → continue
    → pass
* Decision-Making Statements
  1) If statement :: execute a block only if condition is True
  Syntax: if condition :
            statement
  2) if-else statement : Execute one Block if condition is True, otherwise execute else block.
  syntax : if condition:
            statement 1
          else
            statement 2

eg: age = 16

```
if age >= 18:
    print ("Eligible to vote")
else:
    print ("Not Eligible to vote")
```

3) If-elif-else statement

checks Multiple conditions in sequence

syntax: if condition1:
        statement1:
    elif condition2:
        statement2
    else:
        statement3

ex:

```
Marks = 75
if Marks >= 90:
    print ("Grade A")
elif marks >= 60:
    print ("Grade B")
else:
    print ("Grade C")
```

5 Write an esay on python programming fundamentals

* Role of programming in problem solving

programming helps to analyze problems. Break them into smaller steps, and create logical solutions. it converts real-world problems into step by-step instructions that a computer can execute efficiently.

* python syntax simplicity and Readability
python has simple and clear syntax similar to English
- No complex symbols
- uses indentation instead of braces
- Easy to learn and understand this makes python beg
new-friendly and reduces errors.

* use of comments for code documentation
Comments are used to explain code and improve readab
ility. They help programmers understand the logic and ma
-tain code easily.
Types of comments:
""" "Multi-line comment" """

* Data Types, operators, and Input/output operations
- Data Types
  - int - whole numbers
  - float - decimal numbers
  - str - text
  - bool - True/False
- operators
  - Arithmetic: + - * / %
  - Comparision: == != ><
  - Logical: and or not
- Input/output

```
x = input("enter value:")
print(x)
```

Control flow using Decision-Making statements

Decision-Making statements control program execution based on conditions.

Ex:- age = 20

```
if age >= 18:
    print("Eligible to vote")
else
    print("Not eligible")
```

Solve Below Real-world problems using Python programming

1 Movie Ticket pricing

```
age = int(input("Enter age: "))
is3D = int(input("Is it a 3D movie? (1=yes, 0=No): "))
if age < 13:
    price = 150
elif age <= 59:
    price = 250
else:
    price = 200
if is3D == 1:
    price += 50
print("Final Ticket price: ₹",
```

2. College Attendance Rule

```
attendance = float(input("Enter attendance percentage
Medical = int(input("Medical certification ? (1= ye
                                    0 = NO) : "))

if attendance >= 75 or (attendance >= 60 and Medi
    print("Allowed")
else :
    print("Not Allowed")
```

3 E-Commerce Discount

```
bill = float(input("Enter bill amount : "))
isprime = int(input("prime member ? (1 = yes , 0 = NO) :
if bill >= 5000 :
    discount = 20
elif bill >= 2000 :
    discount = 10
else :
    discount = 0
if isprime == 1 :
    discount += 5
final_amount = bill - (bill * discount/100)
print("final amount to be paid : ₹", final_amount)
```

Smartphone Battery Warning

```
Battery = int(input("Enter battery percentage: "))
isCharging = int(input("Is the phone charging? (1: yes, 0 = NO): "))

if isCharging == 1:
    print("charging")
else:
    if Battery <= 20:
        print("Low Battery")
    elif battery <= 80:
        print("Normal")
    else:
        print("Full")
```

5. Driving License check

```
age = int(input("Enter age: "))
testpassed = int(input("passed driving test ? (1= yes, 0=NO): "))

if age >= 60:
    print("Eligible")
elif age >= 18 and testpassed == 1:
    print("Eligible")
else:
    print("Not Eligible")
```

6. online food delivery

```
amount = float(input("Enter order amount : "))
is_Gold = int(input("Gold member ? "))
distance = float(input("Enter distance (km) : "))
if distance > 10:
print("Delivery Charged")
elif amount >=500 or is_Gold == 1:
 print("free delivery")
else:
    print("Delivery charged")
```

7. Bank Loan Approval

```
salary = int(input("Enter salary : "))
creditscore = int(input("Enter credit score : "))
if salary >= 50000 or (salary >= 30000 and creditscore
                                    >= 700):
 print("Loan Approved")
else:
    print("Loan Rejected.")
```

8 Electricity Bill

```
units = int(input("Enter units consumed : "))
if units <= 100:
    bill = units * 2
elif units <= 200:
    bill = (100 * 2) + (units - 100) * 3
else:
```

```
bill = (100 * 2) + (100 * 3) + (units - 200) * 5
print ("Final Electricity Bill Amount : ₹ ", bill)
```

Student scholarship

```
Marks = int(input("Enter marks : "))
income = int(input("Enter family income : "))
singleparent = int(input("singleparent (1= Yes, 0=No) : "))
if Marks >= 85 and (income < 500000 or singleparent == 1):
    print("student is eligible for scholarship")
else:
    print("student is not eligible for scholarship")
```

Online Exam Result

```
Theory = int(input("Enter theory marks : "))
practical = int(input("Enter practical marks : "))
Total = theory + practical
if (theory >= 40 and practical >= 40) or Total >= 100:
    print("student passed")
else:
    print("student failed")
```

11 Hotel Room pricing

```
isWeekend = int(input("Is it weekend? (1=yes, 0=No):"))
daysStayed = int(input("Enter number of days stayed."))
if isWeekend == 1:
    rate = 4000
else :
    rate = 3000
bill = rate * daysstayed
if daysstayed > 3 :
    bill = bill * 0.85
print("Final Hotel Bill Amount: ₹", bill)
```

12. Gaming Level unlock

```
score = int(input("Enter score : "))
ispremium = bool(input("Is premium pass ? (T/F) : "))
usedcheat = bool(input("usedcheat ? (T/F): "))
if not usedcheat and (score >= 100 or ispremium):
    print("Next Level unlocked")
else :
    print ("Access denied X")
```

"))

)

Mobile Data usage

```
dataUsed = float(input("Enter data used today (GB): "))
hasUnlimitedplan = bool(input("Has unlimited plan?
                        (True/False): "))
isRoaming = bool(input("Is roaming ON? (T/F): "))
if dataUsed <= 2 or
(hasUnlimitedplan and not isRoaming):
    print("unlimited data Available ")
else:
    print("Data Limit Applied ")
```

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Office Entry system

```
idValid = bool(input("Is ID Card Valid: (T/F): "))
fingerprint = bool(input("Fingerprint Matched ? (T/F): "))
facescan = bool(input("Face scan Matched ? (True/False): "))
isHoliday = bool(input("Is today a holiday? (True/False): "))
if not isHoliday and idValid and (fingerprint or facescan):
    print("Entry allowed ✓")
else:
    print("Entry denied X")
```

15 Movie Rating Display

```
averageRating = float(input("Enter average rating :"))
isEditorChoice = int(input("Is editor's choice ? (1/0):"))
if isEditorsChoice == 1:
    print("Recommended")
elif averageRating >= 8.5:
    print("Excellent")
elif 6.0 <= averageRating <= 8.4:
    print("Good")
else
    print("Average")
```