

1. Explain programming and python in detail

Definition and purpose of programming

Programming is the process of designing, writing, testing and maintaining instructions that a computer follows to perform specific tasks.

Purpose of the programming

- \* solve real-world problems logically
- \* Automate repetitive tasks
- \* Develop software, websites, apps and systems
- \* process and analyze data efficiently.

What is python?

Python is a high-level, interpreted, general purpose programming language created by Guido van Rossum.

Characteristics of python

- \* Easy to learn and use
- \* Interpreted language
- \* object oriented and functional
- \* platform independent
- \* large standard library

Applications of python

- \* web development
- \* data science and AI
- \* Automation and scripting

- \* Cyber security tools
- \* Game development

## Types of comments in python

### 1. Single-line comment

Ex - # This is a single line comment  
print("Hello")

### 2. Multi-line comment

''' This is a multi-line comment  
used for document  
'''

## Importance of python in modern software development

- \* Faster development due to simple syntax
- \* widely used in AI, ML and Data science
- \* strong community support
- \* used by ~~most~~ many companies like Google, Netflix.

## 2. Describe data types and operators in python

### Built-in data types in python

#### 1. Numeric

- \* Int
- \* Float

#### 2. Sequence

- \* List
- \* Tuple
- \* String

### 3. set

Ex:- colors = {"red", "Green", "Yellow"}

### 4. Mapping

\* Dictionary -> key : value pair

Ex:- student = {"name": "python", "age": 9}

### 5. Boolean

True or False

Ex:- is\_pass = True

### Python operators

#### 1. Arithmetic operator

+ Addition

- subtraction

\* multiplication

/ division

% modulo

#### 2. Assignment operator

= Assign

+= Add & Assign

-= Subtract & Assign

\*= multiply & Assign

/= Divide & Assign

#### 3. Comparison operator

== if equal to

!= not equal to

> Greater than

$>=$  Greater than equal to

$<$  less than

$\leq$  less than equal to

#### 4. Logical operator

and

or

not

#### 5. Membership operator

in

not in

#### 6. Identity operator

is

is not

### Real-world usage of operators

\* Arithmetic -> calculating salary, marks

\* comparison -> checking eligibility

\* logical -> login validation

\* membership -> searching items in list

### 3. Python Input and output operations

#### Input() function

name = input("Enter name")

→ Default data type of input is string

## Type conversion

Ex:- age = int(input("Enter age"))

## Taking multiple inputs

a,b = input(input("Enter two numbers"), split())

## Formatted output

### using print

Ex:- print("Hello", name)

### using separator

Ex:- print(1,2,3, sep = ", ")

### using format()

print("Age is: {}", format(age))

## 4. Control statements and decision making statements

Control statements decide which part of the program runs and how many times it runs

### Types of control statements

- \* Decision making

- \* Looping

- \* Jumping

### Decision making

#### i. if statement

```
age = 18
```

```
if age >= 18:
```

```
    print("Eligible to vote")
```

## 2. if - else statement

age = 18

```
if age >= 18:  
    print("Eligible")
```

else:

```
    print("Not eligible")
```

## 3. if - elif - else statement

marks = 85

```
if marks >= 85:  
    print("Grade A")
```

```
elif marks >= 75:  
    print("Grade B")
```

else:

```
    print("Fail")
```

## 5. write an essay on python programming Fundamentals

Programming plays an important role in problem solving. It helps us break a big problem into small steps and solve it logically using a computer. By writing programs, tasks such as calculations, data processing and automation can be done easily and accurately.

Comments are used in python to explain the code. They help programmers understand what the code does and make programs easier to read.

Comments are very useful for documentation and for working in a team.

Python provides different data types such as numbers, string, list, tuples, sets, dictionaries etc. Operators are used to perform calculations, comparisons and logical operations. Input and output operations allows interactions between the user and the program.

Control flow in python is managed using decision making statements like if, if-else, if-elif-else. This statement helps the program make decisions based on conditions and executes the required block of code.

## Real-world problems using python programming

### 1. Movie Ticket pricing

A movie theatre charges:

₹ 150 for children (age < 13)

₹ 250 for adults (age 13-59)

₹ 200 for seniors (age  $\geq 60$ )

If the person is watching 3D movie add ₹50 extra

Write a program that takes age and is3D (1 or 0) print the final ticket price

```
age = int(input("Enter age"))
```

```
is3D = int(input("Enter 1 if you are watching 3D movie else 0:"))
```

```
if age <= 13:
```

```
# age <= 13
```

```
# if is3D == 1/1
```

```
price = 150
```



if age < 60 :

    price = 250

else:

    price = 200

if is3D == 1:

    price = 50

    print("Final ticket price : ", price)

## 2. College Attendance Rule

A student is allowed to write the exam if:  
attendance  $\geq 75$  or attendance  $\geq 60$  AND medical certificate  
(1 = Yes, 0 = No)

Take attendance percentage and medical certificates as input  
and print "Allowed" OR "Not Allowed"

att = int(input("Enter Attendance percentage"))

med = int(input("Enter 1 if medical certificate exist else 0"))

if att  $\geq 75$  OR (att  $\geq 60$  and med == 1):

    print("Allowed")

else:

    print("Not Allowed")

## 3. E-commerce Discount

A shopping site gives:

20% discount if bill  $\geq 5000$

10% discount if bill is between 2000 and 4999

No discount if bill  $< 2000$

But if the customer is prime number then get extra 5%.

discount

Input: bill amount, if prime(1 or 0)

Print final amount to be paid

bill = int(input("Enter the total bill amount"))

prime = int(input("Enter 1 if you are prime member else 0 :"))

if bill >= 5000:

    if prime == 1:

        price = bill - (25/100) \* bill

        print(price)

    else:

        price = bill - (20/100) \* bill

        print(price)

elif bill > 2000 and bill <= 4999:

    if prime == 1:

        price = bill - (15/100) \* bill

        print(price)

    else:

        price = bill - (10/100) \* bill

        print(price)

else:

    print(bill)

u. Smart phone Battery warning

battery = int(input("Enter the battery of mobile :"))

is\_charging = int(input("Enter 1 if mobile is charging  
else 0 :"))

```
if battery < 0 or battery > 100:  
    print("Invalid")  
elif ischarging == 1:  
    print("charging")  
elif battery <= 20:  
    print("Low Battery")  
elif battery >= 91 OR battery < 80:  
    print("Normal")  
else:  
    print("Full")
```

## 5. Driving license check

A person can get a driving license if

age  $\geq 18$ :

AND passed driving test (l = yes)

But if age  $\geq 60$ , driving test is not needed

Input: age, testpassed

print("eligible" or "not eligible")

age = int(input("Enter age"))

test = int(input("Enter test result -1 for passed else 0:"))

if age  $\geq 18$  and test == 1 and age < 60 OR (age  $\geq 60$ ):

print("eligible")

else:

print("not eligible")

```
Print("Final bill amount: ")
```

### 9. Student Scholarship

```
Marks = int(input("Enter marks "))
```

```
fincome = int(input("Enter family income "))
```

```
Sigparent = int(input("Enter 1 if you have single parent else 0: "))
```

```
if sigparent == 1 and Marks >= 85 or Marks >= 85 and
```

```
fincome < 500000:
```

```
Print("Eligible")
```

```
else:
```

```
Print("Not Eligible")
```

### 10. Online Exam Result

```
Theory = int(input("Enter your marks "))
```

```
Practical = int(input("Enter your practical marks "))
```

```
if total >= 100 or (theory >= 40 and practical >= 40):
```

```
Print("Pass")
```

```
else:
```

```
Print("Fail")
```

### 11. Hostel Room Pricing

A hostel charges

₹ 3000 per day for normal days

₹ 4000 per day on weekend

If customer stays more than 3 days gives 15% discount

6. Online Food Delivery

```
amount = int(input("Enter bill amount: "))
is_gold = int(input("Enter 1 if you are gold member else 0: "))
if discount <= 10 and amount >= 500 OR is_gold == 1 and
discount <= 10;
    print("Free delivery")
else:
    print("Delivery charges are applicable")
```

### 7. Bank Loan Approval

```
sal = int(input("Enter salary: "))
c_score = int(input("Enter credit score: "))
if sal >= 30000 AND c_score >= 700 OR sal >= 50000:
    print("Loan Approved")
else:
    print("Loan Rejected")
```

### 8. Electricity Bill

```
units = int(input("Enter number of units consumed: "))
if units <= 100:
    bill = units * 2.00
elif units <= 200:
    bill = 100 * 2 + (units - 100) * 3
else:
    bill = 100 * 2 + 100 * 3 + (units - 200) * 5
```

```

Input : isweekend (1 or 0) days stayed
Print final bill
Stay = int(input("Enter no. of stay:"))
isweekend = int(int(input("Enter the 1 if stay is weekend"))
if stay >= 3:
    if isweekend == 1:
        bill = 4000 * stay
        price = bill - (15/100) * bill
        print("Final bill amount is : ", price)
    else:
        bill = 5000 * stay
        price = bill - (15/100) * bill
        print("Final bill amount is : ", price)
else:
    if isweekend == 1:
        bill = 4000 * stay
        print("Final bill amount is : ", bill)
    else:
        bill = 3000 * stay
        print("Final bill amount: ", bill)

```

## 12 Gaming level unlock

A game unlocks next level if

Score  $\geq 100$  OR player has a premium pass

But if player used cheating, access is denied

```

input = score, is premium, used cheat
score = int(input("Enter the score"))
ispremium = int(input("Enter 1 if you're premium number"))
cheat = int(input("Did any cheating? Enter 1 else 0"))
if score >= 100 and cheat == 1 or ispremium == 1 and
cheat != 1:
    print("Access denied")
else:
    print("Access granted")

```

### 13) Mobile data usage

A network gives unlimited data if  
 daily usage  $\leq 2\text{GB}$  or user has unlimited plan  
 But if roaming is on, unlimited plan does not work  
 Input: Data user has unlimited plan, is Roaming

```

usage = float(input("Enter the daily usage of data in GB"))
unlimited_p = int(input("Has unlimited plan? Enter 1 else 0"))
isroaming = int(input("Is roaming is on? Enter 1 else 0"))
if usage <= 2 and unlimited_p == 1 and isroaming != 1:
    print("Unlimited data available")
else:
    print("Unlimited data unavailable")

```

### 14) Office entry system

An employee can enter the office if  
 ID card is valid AND fingerprint matches OR face scan

match)

But if it is a holiday entry is denied for everyone

Input: Idvalid, fingerprint, facescan, isholiday

Id = int(input("Enter 1 if Id is valid else 0:"))

fd = int(input("Enter 1 if fingerprint matches else 0:"))

face = int(input("Enter 1 if facescan matches else 0:"))

if id == 1 AND fd == 1 AND face == 1 AND isholiday == 0:

print("Entry is confirmed")

else :

print("Entry is denied")

#### 14) Movie Rating Display

A movie app shows rating based average on score

Average  $\geq 8.5 \rightarrow$  Excellent

Average between 6.0 and 8.4  $\rightarrow$  Good

Average  $< 6.0 \rightarrow$  Average

But if the movie is marked as editor's choice , always  
show Recommended

Input: message rating is editorchoice(1 or 0)

Print the message

avgrating = float(input("Enter the average rating of movie"))

editor = int(input("Enter editor choice (if yes enter 1 else 0:"))

```
if avgRating < 0 and avgRating > 10:  
    print("Invalid Rating")  
elif editor == 1:  
    print("Recommended")  
elif avgRating >= 8.5:  
    print("Excellent")  
elif avgRating < 0 and avgRating < 8.4:  
    print("Good")  
else:  
    print("Average")
```