

AI Programming

[Day-3]

Understand the uses of conditional statement like if, if-else, if-elif-else etc.

Program 1: Positive or Negative

Take an integer as input from the user and determine whether the given number is positive or negative,

Test Case 1

Input: 4

Output: positive

Test Case 2

Input: -23

Output: Negative

Solution:

```
num = int(input("Enter any number"))
if(num>0):
    print("positive")
elif(num<0):
    print("negative")
else:
    print("0")
```

Output:

Enter any number-23

Negative

Program 2: Triangle check

Given 3 sides, check whether these 3 sides form a triangle. (sum of 2 sides greater than the remaining sides). Also for a triangle confirmation found, check if the triangle is isosceles.

Solution:

```
a=int(input("Enter side 1 : "))
b=int(input("Enter side 2 : "))
c=int(input("Enter side 3 : "))
if ((a+b)>c and (a+c)>b and (b+c)>a):
    print("This is a triangle ")
    if ((a==b) and (b!=c)) or ((a==c) and (b!=c)) or ((c==b) and (a!=c)):
        print("And it's Isosceles")
    else:
        print("Not Isosceles")
else:
    print("This is not a triangle ")
```

Output:

Enter side 1 : 1

Enter side 2 : 2

Enter side 3 : 3

This is not a triangle

Program 3: Retirement Bonus

A company is giving a retirement bonus of their retirement amount to all their employees retiring this year. The retirement is based on the following table

Service < 5 years, bonus = 0

Service >= 5 years, bonus = 5%

Service >= 10 years, bonus = 10%

Service >= 20 years, bonus = 20%

Write a program to take retirement amount and year of service as input and return the final amount (retirement amount + bonus) as output.

Solution:

```
amount = int(input("enter retirement amount "))
year = int(input("enter year of service "))
if(year>=20):
    bonus = 0.2*amount
elif(year>=10):
    bonus = 0.1*amount
elif(year>=5):
    bonus = 0.05*amount
else:
    bonus = 0
finalamount=amount+bonus
print("Total retirement bonus : ",finalamount)
```

Output:

enter retirement amount 30000

enter year of service 7

Total retirement bonus : 31500.0

Program 4: Write a python program to take the marks of the user as input and determine the grade based on the table.

Marks	Grade
-------	-------

85-100	A
--------	---

60-84	B
-------	---

40-59	C
-------	---

30-39	D
-------	---

>30	F
-----	---

Solution:

```
# Sample input
attendance_marks = float(input("cam="))
midterm_marks = float(input("mte="))
assignment_marks = float(input("cam1="))
instructor_marks = float(input("iam="))
end_term_marks = float(input("ete="))

# Calculate the cumulative marks out of 100
total_marks = (
    attendance_marks + midterm_marks +
    assignment_marks + instructor_marks +
    end_term_marks
)

# Determine the grade based on the rules
if total_marks >= 85:
    grade = 'A'
elif total_marks >= 80:
    grade = 'A-'
elif total_marks >= 70:
    grade = 'B'
elif total_marks >= 65:
    grade = 'B-'
elif total_marks >= 55:
    grade = 'C'
elif total_marks >= 33:
    grade = 'D'
else:
    grade = 'F'

# Print the grade
print("Grade is :", grade)
```

Output:

```
cam=8
mte=16
cam1=5
iam=9
ete=41
Grade is : B
```

Program 5: Simple or Compound

Dia has borrowed Rs P from Ryan for T years and promised Ryan to pay the amount with the interest. She must pay R% per year.

Now she wants to calculate the total interest after five years. Write a python code to calculate the total amount Dia must pay to Ryan depending upon whether she must pay "simple" or "compound" interest, absence of these cases must produce "Invalid choice".

Note: For Compound interest the interest is applied half yearly

Solution:

```
from ast import Pow
P=int(input("Enter principle amount : "))
T=int(input("Enter number of year : "))
R=int(input("Enter rate of interest : "))
type = input("Enter type of interest : ")
```

```
SI = P*(1+(R*T/100))
CI = P*(pow((1+(R/200)),2*T))
if (type=='compound'):
    print(CI)
if (type=='simple'):
    print(SI)
```

Output:

```
Enter principle amount : 10000
Enter number of year : 4
Enter rate of interest : 5
Enter type of interest : compound
12184.028975099172
```

Program 6: UpperCase or LowerCase

Take a character as input from the user and determine whether the input character is in Uppercase, Lowercase, special character or a digit. (hint: ord())

Solution:

```
char = ord(input("enter a single char "))
if char<=127 and char>=0:
    if char>=65 and char<=90:
        print("uppercase letter")
    elif char>=97 and char<=122:
        print("lowercase letter")
    elif char>=48 and char<=57:
        print(" Digits")
    else :
        print(" special symbols")
else:
    print("invalid input")
```

Output:

```
enter a single char @
special symbols
```

Program 7: Function solve.

Given y as a function of x where,

$$y = ax^2 - bx + c \quad (x > k),$$

$$y = 0 \quad (x = k),$$

$$y = ax^2 + bx + c \quad (x < k)$$

Write a program to read all the values and return the final answer of y. Order of inputs (a,b,c,x,k)

Test Case 1

Input:

```
2
3
4
1
5
```

Output: 39

Test Case 2

Input:

```
1
1
```

1
1
1

Output: 0

Solution:

```
a=int(input("ENTER a :"))
b=int(input("ENTER b :"))
c=int(input("ENTER c :"))
x=int(input("ENTER x :"))
k=int(input("ENTER k :"))
if(x>k):
    y=a*pow(x,2) - b*x + c
if(x==k):
    y=0
if(x<k):
    y=a*pow(x,2) + b*x + c

print(y)
```

Output:

ENTER a :1
ENTER b :1
ENTER c :1
ENTER x :1
ENTER k :1
0

Program 8: Cab Charges

Distance Charges

1-50 7 Rs./Km

51-100 10 Rs./Km

> 100 15 Rs./Km

Write a program to take distance as input and calculate charges.

Solution:

```
dist=int(input("Enter the distance : "))
if(dist<=50 and dist>=1):
    charge=7
if(dist<=100 and dist>50):
    charge=10
if(dist>100):
    charge=15

totalfare = charge*dist
print(totalfare)
```

Output:

Enter the distance : 25
175

Program 9: Excess In-Flight Baggage

A commercial airline charges their customers for their excess baggage by its weight, type of payment, and by type of flight. Check the following tables for domestic and international flights respectively.

Baggage (Domestic)	3 kg Prepaid	5 kg Prepaid	10 Kg Prepaid	15 Kg Prepaid	20 Kg Prepaid	30Kg Prepaid	At Airport Per Kg
INR	1350	2250	4500	6750	9000	13500	550

Currency	5kg Pre-paid	10kg Pre-paid	15kg Pre-paid	20kg Pre-paid	30kg Pre-paid	At Airport Per Kg
INR	2760	5520	8280	11040	16560	600

Write a python program to take the type of flight, type of payment and the weight of the baggage as input and calculate the final amount to be paid by the user for their baggage.

Solution:

```
weight=int(input("enter the choice \n 1) DOMESTIC \n 2) INTERNATIONAL"))
choice=int(input("enter the choice \n 1) PREPAID \n 2) AT AIRPORT"))
w=int(input("enter the excess wieght:"))
if weight==1:
    if choice==1:
        if w <= 3:
            fare=1350
        elif w >3 and w <=5:
            fare=2250
        elif w >5 and w <=10:
            fare=4500
        elif w >10 and w <=15:
            fare=6750
        elif w >15 and w <=20:
            fare=9000
        else:
            fare=13500
    elif choice==2:
        fare=w*550
    else:
        print("enter the right choice:")
elif weight==2:
    if choice==1:
        if w < 5 :
            fare=2760
        elif w >5 and w <=10:
            fare=5520
        elif w >10 and w <=15:
            fare=8280
        elif w >15 and w <=20:
            fare=11040
        else:
            fare=16560
    elif choice==2:
        fare=w*600
    else:
        print("enter the right choice:")
else:
    print("enter the right choice:")
print("total fare=", fare)
```

Output:

```
enter the choice
1) DOMESTIC
2) INTERNATIONAL2
enter the choice
1) PREPAID
2) AT AIRPORT2
enter the excess wieght:5
total fare= 3000
```

Program 10: Discount Calculation

An car dealership has the following rates for different types of Car brands:

- a. Toyota – 25000
- b. Honda – 35000
- c. Hyundai – 45000
- d. Suzuki – 60000
- e. Tata – 80000

They are giving a 10% discount for online booking and an 8% discount for advance booking and no discount is given for spot/window booking.

- a. Ask the user to enter the booking type like online, advance, or window booking.
- b. Ask the user to select the Brand.
- c. Compute the amount.

Solution:

```
a=int(input("Enter your booking type \n
1)ONLINE\n 2)ADVANCED BOOKING\n 3)WINDOW
SHOPPING\n"))
b=int(input("ENTER HTE CAR BRAND\n
1)Toyota - 25000\n 2)Honda - 35000\n
3)Hyundai - 45000\n 4)Suzuki - 60000\n
5)Tata - 80000\n"))
if a ==1:
    if b==1:
        total_amount=25000-10/100 *25000
    elif b==2:
        total_amount=35000-10/100 *35000
    elif b==3:
        total_amount=45000-10/100 *45000
    elif b==4:
        total_amount=60000-10/100 *60000
    elif b==5:
        total_amount=80000-10/100 *80000
    else:
        print("NO such brand")
elif a==2:
    if b==1:
        total_amount=25000-8/100 *25000
    elif b==2:
        total_amount=35000-8/100 *35000
    elif b==3:
        total_amount=45000-8/100 *45000
    elif b==4:
        total_amount=60000-8/100 *60000
    elif b==5:
        total_amount=80000-8/100 *80000
```

```
else:
    print("NO such brand")
elif a==3:
    if b==1:
        total_amount=25000-0/100 *25000
    elif b==2:
        total_amount=35000-0/100 *35000
    elif b==3:
        total_amount=45000-0/100 *45000
    elif b==4:
        total_amount=60000-0/100 *60000
    elif b==5:
        total_amount=80000-0/100 *80000
    else:
        print("NO such brand")
else:
    print("wrong option")
print("TOTAL AMOUNT:",total_amount)
```

Output:

```
Enter your booking type
1)ONLINE
2)ADVANCED BOOKING
3)WINDOW SHOPPING
2
ENTER HTE CAR BRAND
1)Toyota - 25000
2)Honda - 35000
3)Hyundai - 45000
4)Suzuki - 60000
5)Tata - 80000
2
TOTAL AMOUNT: 32200.0
```