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Section: S02   **Assignment 3: Problem solving using Alternate statements**


Aim: To learn python programming using alternate statements by forming expressions and statements involving reading and printing the data appropriately for the given specification.

Solve the following problems using Python (CO1, K3, 1.3.1, 1.4.1, 13.3.1)

Question 1: In a bus, a total of X passengers were travelling. Passengers can be children aged less than 12 years, senior citizens (above 65), or normal citizens. The ticket fare is categorised as follows:

    i.   For normal citizens, it is Rs. xyz.
    ii.   For children, it is 50% less than what normal citizens fare.

    iii.   For senior citizens, it is 30% less than what normal citizens fare.
Calculate the total bus fare for the passenger given the age of the passenger.
a. Identify the inputs required to solve the problem.

b. Devise a solution and represent the same using flowchart and pseudocode.
c. Develop a program to calculate the total bus fare for the passenger given the age of the passenger.

Flowchart:
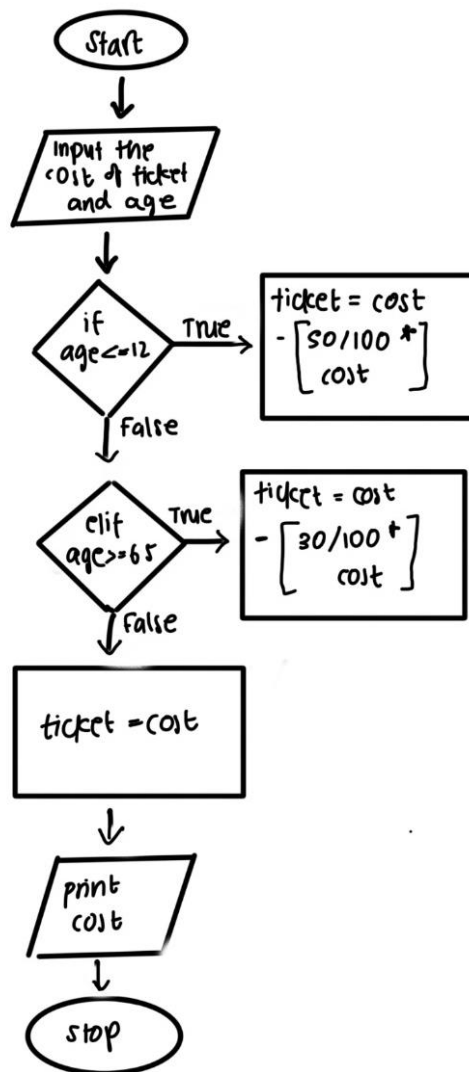
Code :

```
cost=float(input("Enter the cost of a regular passenger's ticket"))
age=int(input("Enter age"))
if(age<=12):
      ticket=cost-(50/100*cost)
elif(age>=65):
      ticket=cost-(30/100*cost)
else:
      ticket=cost
```

print("total bus fare : ",ticket)

Output:

= RESTART: Z:\ex3_1.py
Enter the cost of a regular passenger's ticket 20
Enter age 10
total bus fare :   10.0

============================= RESTART: Z:\ex3_1.py ==
Enter the cost of a regular passenger's ticket 20
Enter age 35
total bus fare :   20.0

============================= RESTART: Z:\ex3_1.py ==
Enter the cost of a regular passenger's ticket 20
Enter age 67
total bus fare :   14.0

Question 2: In the library system, the duration for returning books is ten days. If books are returned by the students within the given duration have no charges. The book returned after the duration will be fined Rs. Z per day. The book returned after the 20 days of the duration will be accounted for at Rs 3 times more than Z (3 x Z) per day. Accept the duration, the student having the book and calculate the total amount paid to the library by the student. Identify the inputs required to solve the problem.

 a. Devise a solution and represent the same using flowchart and pseudocode.

b. Develop a program to calculate the total amount paid to the library by the student.

c. Test the program for the following: A student borrowed three books from the library on February 23, 2023, and the due date is March 4, 2023. He has returned one book within the duration. The second book was returned five days after the duration period. The third returned after 30 days of the duration period.

Code:

```
duration=int(input("Enter the duration of the book held"))
z=float(input("The extra charge"))
if(duration<=10):
        print("No charge")
elif(duration>10 and duration<=20):
```

charge=z*(duration-10)

print("Charge : ",charge)

else:

charge=20*z+(duration-30)*3*z

print("Charge : ",charge)

Output:

```
= RESTART: Z:\ex3_2.py
Enter the duration of the book being held 9
The extra charge 5
No charge
>
=========================== RESTART: Z:\ex3_2.py ========
Enter the duration of the book being held 15
The extra charge 5
Charge :  25.0
>
=========================== RESTART: Z:\ex3_2.py ========
Enter the duration of the book being held 40
The extra charge 5
Charge :  250.0
> |
```

Question 3: Extend the problem 2 of previous assignment (Assignment 1) as follows: Assume the population of a city consists of X persons of different age groups. X includes both males and females. The department can obtain peoples date of birth from the corporation from which the age can be calculated. (Note: Consider X to be less than or equal to 6)

Assume the election commission of India wants to count the eligible male and female voters separately for a constituency while preparing for the forthcoming election.

 Also, the public welfare department at the same time announces that the Aadhar card has to be renewed when the kid reaches the age 5 and the biometrics needs to be updated again when they attain the age of 15 years.

 a. Identify the inputs required to solve the problem.

 b. Devise a solution and represent the same using flowchart and pseudocode.

c. Develop a program to compute the age of every person. Apply the conditional construct to check whether the person is eligible to vote and also count the number of female and male voters and display the same.

d. Extend Qn.3.c to display whether the Aadhar card has to be renewed or not after computing the age. Also, count the number of persons need to renew the card.

Code:

```
X=int(input("Enter the number of people"))
if(X>6):
        print("INVALID INPUT!")
        exit()
age=range(X)
m=f=c=0
for i in age:
        DOB=int(input("Enter DOB in ddmmyyyy"))
        gender=int(input("Enter 1 of male and 2 for female"))
        age=2023-(DOB%10000)
        print("Age : ",age)
        if(age>=17 and gender ==1):
                m=m+1
        if(age>=17 and gender==2):
                f=f+1
        if(age==5):
                print("Aadhar card has to be renewed")
                c=c+1
        if(age==15):
                print("Aadhar card biometrics needs to be updated")
print("Number of male voters : ",m)
print("Number of female voters : ",f)
```

print("Number of people to renew aadhar card : ",c)

Output:

```
= RESTART: Z:\ex3_3.py
Enter the number of people 6
Enter DOB in ddmmyyyy 19071971
Enter 1 of male and 2 for female 1
Age :  52
Enter DOB in ddmmyyyy 11011978
Enter 1 of male and 2 for female 2
Age :  45
Enter DOB in ddmmyyyy 22072000
Enter 1 of male and 2 for female 2
Age :  23
Enter DOB in ddmmyyyy 11122018
Enter 1 of male and 2 for female 1
Age :  5
Aadhar card has to be renewed
Enter DOB in ddmmyyyy 13092008
Enter 1 of male and 2 for female 2
Age :  15
Aadhar card biometrics needs to be updated
Enter DOB in ddmmyyyy 30012018
Enter 1 of male and 2 for female 1
Age :  5
Aadhar card has to be renewed
Number of male voters :  1
Number of female voters :  2
Number of people to renew aadhar card :  2
```

Additional problems using alternative statements for practice:

Question 1: Find a number that is odd or even.

Algorithm: Step1: Start

Step 2: Input a number

Step 3: Check if the modulate of the number is equal to 0

Step 4: If it is then display that the number is even.

Step 5: Else display that the number is odd.

Step 6: Stop

Code:

n=int(input("Enter a number"))

```
if(n%2==0):
        print("The number is even")
else:
        print("The number is odd")
```

Output:

```
        Enter a number 34
        The number is even
>>

        ==============================
        Enter a number 67
        The number is odd
>>

        ==============================
        Enter a number 0
        The number is even
>>  |
```

Question 2: Obtain a input from the user and display the corresponding data types (primitive, compound data type).

Code:

```
s=(input("Enter the data type"))
a='integer'
b='float'
c='string'
d='boolean'
e='list'
f='tuple'
```

```
if(s==a or s==b or s==c or s==d):

        print("Primitive data type")

elif(s==e or s==f):

        print("Compund data type")

else:

        print("Data type not found")
```

Output:

```
= RESTART: Z:/ex3_a2.py
Enter the data typeboolean
Primitive data type
>

============================ RESTAI
Enter the data typetuple
Compound data type
>
```

Question 3: Find the largest among three given integers.

Code:

```
a=int(input("Enter first number"))

b=int(input("Enter second number"))

c=int(input("Enter third number"))

if(a>b and a>c):

   print("The first number is greatest")

elif(a>b and a<c):

   print("The third number is greatest")

else:
```

print("The second number is greatest")

Output:

```
Enter first number 5
5
Enter second number 7
7
Enter third number 2
2
The second number is greatest
>
```

Question 4: To check if a given year is a leap year or not. Leap year = A leap year is divisible by 4 but not by 100 or divisible by 400

Code:

```
year=int(input("Enter the year"))
if(year%400==0 or (year%4==0 and year%100!=0)):
        print("It is a leap year")
else:
        print("It is not a leap year")
```

Output:

```
= RESTART: Z:\ex3_a4.py
Enter the year 2013
It is not a leap year
>>

============================
Enter the year 2020
It is a leap year
>>

============================
Enter the year 1700
It is not a leap year
>>
```

Question 5: Test whether a given number is divisible by 5 and 7 OR by 5 only OR 7 only OR neither by 5 nor by 7. Assume only positive integers > zero.

Code:

num=int(input("Enter the number"))

if(num%5==0 and num%7==0):

     print("The number is divisible by both 5 and 7")

elif(num%5==0 and num%7!=0):

     print("The number is divisible by only 5 and not 7")

elif(num%5!=0 and num%7==0):

     print("The number is divisible by 7 and not 5")

else:

     print("The number is neither divisible by 5 not 7")

Output:

```
>
 = RESTART: Z:\ex3_a5.py
 Enter the number 35
 The number is divisible by both 5 and 7
>
 ============================= RESTART: Z:\ex3_a5
 Enter the number 45
 The number is divisible by only 5 and not 7
>
 ============================= RESTART: Z:\ex3_a5
 Enter the number 49
 The number is divisible by 7 and not 5
>
 ============================= RESTART: Z:\ex3_a5
 Enter the number 411
 The number is neither divisible by 5 nor 7
>|
```

Question 7: Classify the students' grade based on the percentage. Prompt a user to read the marks of five different subjects. Calculate the total marks and percentage of the marks and display the message according to the range of percentage given below.

PERCENTAGE	MESSAGE
Per<60	Fail
per >= 60 && per < 70	Pass

<div align="center">

per > = 70 && per < 80   Second Class

per > = 80 && per < 90   First Class

per > = 90   Distinction

</div>

Code:

```
Sub1=int(input("Enter marks in subject 1"))
Sub2=int(input("Enter marks in subject 2"))
Sub3=int(input("Enter marks in subject 3"))
Sub4=int(input("Enter marks in subject 4"))
Sub5=int(input("Enter marks in subject 5"))
per=(sub1+sub2+sub3+sub4+sub5)/5
if(per>=90):
        print("Distinction")
elif(per>=80 and per<90):
        print("First Class")
elif(per>=70 and per<80):
        print("Second Class")
elif(per>=60 and per<70):
        print("Pass")
else:
        print("Fail")
```

Output:

```
>>
   = RESTART: Z:\ex3_a6.py
   Enter marks in subject 1 100
   Enter marks in subject 2 99
   Enter marks in subject 3 98
   Enter marks in subject 4 97
   Enter marks in subject 5 96
   Distinction
>>
   =========================== RESTA
   Enter marks in subject 1 88
   Enter marks in subject 2 87
   Enter marks in subject 3 86
   Enter marks in subject 4 85
   Enter marks in subject 5 84
   First Class
>>
   =========================== RESTA
   Enter marks in subject 1 78
   Enter marks in subject 2 77
   Enter marks in subject 3 76
   Enter marks in subject 4 75
   Enter marks in subject 5 73
   Second Class
>>
   =========================== RESTA
   Enter marks in subject 1 64
   Enter marks in subject 2 65
   Enter marks in subject 3 67
   Enter marks in subject 4 66
   Enter marks in subject 5 61
   Pass
>>
   =========================== RESTA
   Enter marks in subject 1 43
   Enter marks in subject 2 42
   Enter marks in subject 3 39
   Enter marks in subject 4 41
   Enter marks in subject 5 37
   Fail
>> |
```

Learning outcome:

1. Reading inputs / Printing the result
2. Using appropriate datatypes for the given input
3. Variable assignment
4. Converting the formula into python expressions

Result: Thus I learnt to implement simples problems in Python and solve the same using alternate statements.