Course Title : Problem Solving Using Python and R Lab

Course Code : P21DS1P1

Lab1. Python Basics and Conditions

Question1. Write a program in Python to input length and breadth of a rectangle and print the area and perimeter of it.

 Test you code with atleast 2 test cases

```
1 l=int(input("enter the lenght of the rectangle: "))
2 b=int(input("enter the breath of the rectangle: "))
3 area=l*b
4 perimeter=2*(l+b)
5 print("area of the recangle is: ",area)
6 print("perimeter of the rectangle is: ",perimeter)
```

Shell

```
Python 3.7.9 (bundled)
>>> %Run l1.1.py

 enter the lenght of the rectangle: 2
 enter the breath of the rectangle: 3
 area of the recangle is:  6
 perimeter of the rectangle is:  10

>>> %Run l1.1.py

 enter the lenght of the rectangle: 7
 enter the breath of the rectangle: 2
 area of the recangle is:  14
 perimeter of the rectangle is:  18
```

Question2. Write a program, which accepts annual basic salary of an employee and calculates and displays the Income tax as per the following rules.

 If Basic is less than Rs. 1,50,000/-, then Tax = 0.

 If Basic is from Rs.1,50,000/- to Rs. 3,00,000/-, then tax is 20%.

 If Basic is greater than Rs.3,00,000/-, then tax is 30%.

 Print name, annual income and tax.

 Write 3 test cases to validate all conditions

```
bs=int(input("enter the basic salary: "))
ename=input("enter the employee name: ")
if(bs<150000):
    tax=0
    print('no need to pay tax')
elif(bs>150000 and bs<300000):
    tax=bs*0.20
    print("tax is 20%")
else:
    tax=bs*0.30
    print("tax is 30%")
print("name of the employee: ",ename)
print("annual income of the employee: ",bs)
print("tax to be paid: ",tax)
```

Shell

```
enter the basic salary: 160000
enter the employee name: jenifer
tax is 20%
name of the employee:  jenifer
annual income of the employee:  160000
tax to be paid:  32000.0
>>> %Run l1.2.py
enter the basic salary: 140000
enter the employee name: swetha
no need to pay tax
name of the employee:  swetha
annual income of the employee:  140000
tax to be paid:  0
>>> %Run l1.2.py
enter the basic salary: 400000
enter the employee name: swe
tax is 30%
name of the employee:  swe
annual income of the employee:  400000
tax to be paid:  120000.0
```

Question3. Write a program to accept quantity and rate for three (3) items. Compute the total

sales amount. Also compute and print the discount as follows:

 Amount > Rs. 2000/- : 20% discount

 Amount between Rs. 1500/- to Rs.1999/- :15% discount

 Amount between Rs. 1000/- to Rs.1499/- 8 % discount

 Compute final amount to be paid. Print name, rate and quantity of 3 items. Then print total sales amount, total discount and final amount to be paid to shop. Write 3 test cases to validate all conditions

```
cname=input("enter the customer name:")
n1=input("enter the name of the item:")
q1=int(input("enter the quantity of item1: "))
r1=int(input("enter the amount of item1: "))
n2=input("enter the name of the item2:")
q2=int(input("enter the quantity of item2: "))
r2=int(input("enter the amount of item2: "))
n3=input("enter the name of the item3:")
q3=int(input("enter the quantity of item3: "))
r3=int(input("enter the amount of item3: "))
amt=r1+r2+r3
if(amt>2000):
    dis=amt*0.20
    print("discount is 20%",dis)
elif(amt>1500 and amt<1999):
    dis=amt*0.15
    print("discount is 15%",dis)
elif(amt>1000 and amt<1499):
    dis=amt*0.08
    print("discount is 8%",dis)
final=amt-dis
print("name of the customer is: ",cname)
print("name,rate and quantity of item1 is {0},{1},{2}".format(n1,r1,q1))
print("name,rate and quantity of item2 is {0},{1},{2}".format(n2,r2,q2))
print("name,rate and quantity of item3 is {0},{1},{2}".format(n3,r3,q3))
print("total amount",amt)
print("total amount to be paid after discount:",final)
```

```
enter the customer name:jenifer
enter the name of the item:pen
enter the quantity of item1: 10
enter the amount of item1: 1000
enter the name of the item2:pencil
enter the quantity of item2: 10
enter the amount of item2: 50
enter the name of the item3:book
enter the quantity of item3: 5
enter the amount of item3: 1000
discount is 20% 410.0
name of the customer is:  jenifer
name,rate and quantity of item1 is pen,1000,10
name,rate and quantity of item2 is pencil,50,10
name,rate and quantity of item3 is book,1000,5
total amount 2050
total amount to be paid after discount: 1640.0
```

```
enter the customer name:swetha
enter the name of the item:note
enter the quantity of item1: 5
enter the amount of item1: 150
enter the name of the item2:book
enter the quantity of item2: 3
enter the amount of item2: 900
enter the name of the item3:paint
enter the quantity of item3: 1
enter the amount of item3: 500
discount is 15% 232.5
name of the customer is:  swetha
name,rate and quantity of item1 is note,150,5
name,rate and quantity of item2 is book,900,3
name,rate and quantity of item3 is paint,500,1
total amount 1550
total amount to be paid after discount: 1317.5
>>> %Run l1.3.py
enter the customer name:harini
enter the name of the item:bag
enter the quantity of item1: 1
enter the amount of item1: 800
enter the name of the item2:box
enter the quantity of item2: 2
enter the amount of item2: 200
enter the name of the item3:scale
enter the quantity of item3: 10
enter the amount of item3: 100
discount is 8% 88.0
name of the customer is:  harini
name,rate and quantity of item1 is bag,800,1
name,rate and quantity of item2 is box,200,2
name,rate and quantity of item3 is scale,100,10
total amount 1100
total amount to be paid after discount: 1012.0
```

Question4. Evaluate the expressions using Pen and Paper first and then print the value.

- X1=(11+31+23+8+7+5)/((1-(1/2)-(1/20)))
- X2=(((10*8)+8-((7//5)%(5**4)))&3)|(2<<1)

```
1  x1=(11+31+23+8+7+5)/((1-(1/2)-(1/20)))
2  x2=(((10*8)+8-((7//5)%(5**4)))&3)|(2<<1)
3  print(x1)
4  print(x2)
```

Shell

```
>>> %Run l1.4.py
188.88888888888889
7
```

Question5. Write a program to accept name, marks for three subjects and find the total marks secured, average and also display the class obtained.

 Class I – above 80%

 Class II – 60% to 80%

 Pass class – 40% to 59% and

 Fail otherwise

Print a message as “Congratulations << your name>>, you secured a total of <<total marks>>, and Your class is <<class>>”Test you code with atleast 2 test cases

```
sname=input("enter the student name:")
m1=int(input("etner the mark1:"))
m2=int(input("enter the mark2:"))
m3=int(input("enter the mark3:"))
total=m1+m2+m3
avg=total/3
if(avg>80):
    c="class I"
elif(avg>60 and avg<80):
    c="class II"
elif(avg>40 and avg<59):
     c="class III"
else:
     c="fail"
print("congratulations",sname,"you secured a total of",total,"and your class is",c)

```

Shell

```
enter the student name:jenifer
etner the mark1:70
enter the mark2:60
enter the mark3:70
congratulations jenifer you secured a total of 200 and your class is class II
>>> %Run l1.5.py
enter the student name:yoga
etner the mark1:50
enter the mark2:50
enter the mark3:60
congratulations yoga you secured a total of 160 and your class is class III
>>> %Run l1.5.py
enter the student name:swe
etner the mark1:36
enter the mark2:25
enter the mark3:32
congratulations swe you secured a total of 93 and your class is fail
```

```
enter the student name:swetha
etner the mark1:90
enter the mark2:80
enter the mark3:90
congratulations swetha  you secured a total of 260 and your class is class I
```

Question6. Read a number from keyboard. Print whether it is odd number, even number,

positive number, negative number or zero. Also, print if its ASCII value represents a lower

case or upper case letter or digit. Write 8 test cases to validate odd, even, positive, negative, zero, lower case, upper case and digit input types

```
n=int(input("enter number: "))
if(n%2==0):
    print("it is a even number")
else:
    print("it is a odd number")
if(n>0):
    print("it is positive number")
elif(n<0):
    print("it is negative number")
else:
    print("number is zero")
if(n>65 and n<90):
    print("number's ASCII value represents a upper case")
elif(n>97 and n<122):
    print("number's ASCII value represents a lower case")
else:
    print("it's a digit")
```

Shell

```
>>> %Run l1.6.py
  enter number: 4
  it is a even number
  it is positive number
  it's a digit
>>> %Run l1.6.py
  enter number: 5
  it is a odd number
  it is positive number
  it's a digit
>>> %Run l1.6.py
  enter number: 87
  it is a odd number
  it is positive number
  number's ASCII value represents a upper case
>>> %Run l1.6.py
  enter number: 102
  it is a even number
  it is positive number
  number's ASCII value represents a lower case
>>> %Run l1.6.py
  enter number: 0
  it is a even number
  number is zero
  it's a digit
>>> %Run l1.6.py
  enter number: -7
  it is a odd number
  it is negative number
  it's a digit
```