PGP Data Science Engineering

Introduction to Programming – Mini Project:

Problem 1:

1. Write a program to calculate area of shapes. Your program should be capable of calculating the area of a square, rectangle, triangle and a circle. The user should be presented with options to select the shape. Based on which shape is chosed by the user, the program should ask for the appropriate input and print the resulting area on the screen.

When the program is run, the screen should display something like this:

Which shape would you like to calculate the area for? Please enter the option number-
1. Square
2. Rectangle
3. Triangle
4. Circle
Enter Option: _

Say the user enters the option 1.

Please enter the length of a side: _

If the user enters a value of 5. The output should be:

The area of the square is 25

This program should indicate that the input is invalid if the user enters a character instead of a number as input. For instance if the user enters a value of ‘a’ instead of 5 in the previous example the program should prompt:

Invalid input, please enter a number: _

In [ ]:
```
def main():
    choosen=0
    while choosen!=5:
        print('Which shape would you like to calculate the area for? Please en
ter the option number-\n1. Square\n2. Rectangle\n3. Triangle\n4. Circle\n5. Ex
it the program\nEnter Option: _')
        choosen=input()
        while choosen.isdigit()==False:
            print('Invalid input, please enter a number: _')
            choosen=input()
        choosen=int(choosen)
        if choosen==1:
            entry= input('Please enter the length of a side: ')
            while entry.isdigit()==False or int(entry)<0:
                print('Invalid input, please enter a number: _')
                entry=input()
            entry=int(entry)
            print('The area of the square is: ',entry*entry)
            upd()
        elif choosen==2:
            entry= input('Please enter the length of rectangle: ')
            while entry.isdigit()==False or int(entry)<0:
                print('Invalid input, please enter a number: _')
                entry=input()
            entry=int(entry)
            entry2= input('Please enter the breadth of rectangle: ')
            while entry2.isdigit()==False or int(entry2)<0:
                print('Invalid input, please enter a number: _')
                entry2=input()
            entry2=int(entry2)
            print('The area of the rectangle is: ',entry*entry2)
            upd()
        elif choosen==3:
            entry= input('Please enter the base of triangle: ')
            while entry.isdigit()==False or int(entry)<0:
                print('Invalid input, please enter a number: _')
                entry=input()
            entry=int(entry)
            entry2= input('Please enter the height of triangle: ')
            while entry2.isdigit()==False or int(entry2)<0:
                print('Invalid input, please enter a number: _')
                entry2=input()
            entry2=int(entry2)
            print('The area of the triangle is: ',0.5*entry*entry2)
            upd()
        elif choosen==4:
            entry= input('Please enter the radius of circle: ')
            while entry.isdigit()==False or int(entry)<0:
                print('Invalid input, please enter a number: _')
                entry=input()
            entry=int(entry)
            print('The area of the circle is: ',3.14159*entry*entry)
            upd()
        elif choosen==5:
            print('Exiting Program.. Bye!')
        else:
```

```
            print('Uh Oh! Wrong Input\nTry again..')
def upd():
    print('Thank you!')

main()
```

In [ ]:

```
### Problem 2:

Create and encrypter in python based on the ceaser cipher. It is a substitutio
n cipher where each character of the
original text is shifted a certain number characters in the alphabet. Write a
function that would require 2 arguments
– the input text to be encrypted and a key. For eg: Given the input text ‘hel
lo’ and the key 3, the resulting
    encryted text would be ‘khoor’. Here you can see that every character in
the string hello is shifted by 3 characters.
    ‘h’ has shifted to ‘k’, ‘e’ has shifted to ‘h’ and so on. If a key of 5
were used, the resulting string would be ‘mjqqt’.
    This function should be capable of ignoring any characters which are not a
lphabets. Th2 character ‘z’ entered b
y the user for a key of 3 would result in ‘c’.

Usage:<br>
**encrypt(‘hello world!’, 3)**<br>
**‘khoor zruog!’**

Similarly create decrypter which can decode the encryted text when provided th
e input text and key

Usage:<br>
**decrypt(‘khoor zruog!’, 3)**<br>
**‘hello world!’**

For the sake of simplicity you can assume that input solely consists of lowerc
ase alphabets, spaces and punctuation symbols.
Numbers in the input text would also be ignored similar to symbols.
```

In [13]:
```
def main():
    choosen=0
    while choosen!=3:
        print('Please enter the function you want to use: \n1. Encrypter\n2. D
ecryptor\n3. Exit program')
        choosen=input()
        while choosen.isdigit()==False:
            print('Invalid input, please enter a number: _')
            choosen=input()
        choosen=int(choosen)
        if choosen==1:
            crypter(1)
        elif choosen==2:
            crypter(2)
        elif choosen==3:
            print('Thankyou for using Arvind Software Solutions! Have a nice t
ime. Bye!')
        else:
            print('Uh Oh! Wrong Input\nTry again..')
def crypter(check):
            print((chr(random.randint(1,400))+" ")*30)
            c=''
            if check==1:
                c='Encrypter'
            elif check==2:
                c='Decrypter'
            else:
                c='Non-responsive'
            entry= input(c+' mode is ON. Enter text : ')
            key= input('Great, now enter the cipher key: ')
            while key.isdigit()==False:
                print('Invalid input, please enter a valid number: _')
                key=input()
            key=int(key)
            if check==2:
                key=-key
            if key>26 or key<(-26):
                key%=26
            key=int(key)
            list1= list(entry)
            a=0
            for var in list1:
                x=int(ord(var))
                if x>=65 and x<=90 :
                    x=x+key
                    if x > 90:
                        x=65+(x-90)-1
                    elif x <65:
                        x=90-(65-x)+1
                    list1[a]=chr(x)
                elif x>=97 and x<=122 :
                    x=x+key
                    if x > 122:
                        x=97+(x-122)-1
                    elif x <97:
                        x=122-(97-x)+1
```

```
                    list1[a]=chr(x)
                a+=1
            print("Generated output :\'","".join(list1),"\'")

import random
main()
```

```
Please enter the function you want to use:
1. Encrypter
2. Decryptor
3. Exit program
1
ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź ź
Encrypter mode is ON. Enter text : hello world
Great, now enter the cipher key: 3
Generated output :' khoor zruog '
Please enter the function you want to use:
1. Encrypter
2. Decryptor
3. Exit program
3
Thankyou for using Arvind Software Solutions! Have a nice time. Bye!
```