Week2 Set7

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Q1

Data protection has become one of the most crucial task in the internet. An application uses Caesar cipher for this purpose, which works as following:

The encryption can be represented using modular arithmetic by first transforming the letters into numbers, according to the scheme, A → 0, B → 1, ..., Z → 25. Encryption of a letter x by a shift n can be described mathematically as,

En(x) = (x+n) mod 26

Write a subroutine “encrypt(msg, n)” that takes ‘msg’ and ‘n’ as parameters and returns encrypted text using Caesar cipher.

EXAMPLE:
Text: ATTACKATONCE
Shift: 4
Cipher: EXXEGOEXSRGI

In [25]:
```
shift = lambda a,n : (a+n)%26

text = input('Enter the text to be encripted: ')
n = int(input('Enter the number by which the letters should shift: '))

newString = ''
for ch in text:
    newString += chr(((ord(ch)-65+n)%26)+65)

print(newString)
```

```
Enter the text to be encripted: ATTACKATONCE
Enter the number by which the letters should shift: 4
EXXEGOEXSRGI
```

Q2

Develop an application called “Feedback analyzer”. The application has sets of words for the feedback –‘Positive’, ‘Negative’.

Positive – (good, excellent, super, great, fantastic)
Negative – (bad, worse, worst, pathetic, poor)

Your task is to store the bag of words in a tuple. Given a feedback sentence, find out if it is a positive or negative feedback.

EXAMPLE:

Input: The watch is good
Output: Positive

Input: The watch is pathetic
Output: Negative

In [28]:
```
positive = ('good', 'excellent', 'super', 'great', 'fantastic')
negative = ('bad', 'worse', 'worst', 'pathetic', 'poor')

feedback = input('Enter the feedback sentence: ')
feedbackList = feedback.split(' ')

for word in feedbackList:
    if word in positive:
        print('Positive')
        break
    elif word in negative:
        print('Negative')
        break
```

```
Enter the feedback sentence: This was a very good service.
Positive
```

Q3

Image encryption plays a major role in the transmission of multimedia data. The greyscale value of a pixel is in the ranges of [0,255]. The following method is used for encrypting a pixel value for a given key, which is in the range [0,255] too.

temp_pixel = pixel (xor) ((key+5)%256)

Write a lambda function in python to perform the above task. For increasing the strength of the cipher the encryption must be repeated 5 times

In [6]:
```
cipher = lambda pixel,key : pixel ^ ((key+5)%256)

pixelVal = int(input('Enter the value of pixel i.e. should range between
 0 to 255: '))
keyVal = int(input('Enter key value that also ranges between 0 to 255'))

for i in range(5):
    pixelVal = cipher(pixelVal, keyVal)

print('The final encripted value of the pixel is: ' + str(pixelVal))
```

```
Enter the value of pixel i.e. should range between 0 to 255: 155
Enter key value that also ranges between 0 to 25580
The final encripted value of the pixel is: 206
```

Q4

Write 2 lambda functions in python to calculate the volume and area of a sphere using the formulas.

$V = 4\pi r^3/3$
$A = 4\pi r^2$

In [2]:
```
volume = lambda r : (4*3.14*(r**3))/3
area = lambda r : 4*3.14*(r**2)

print("Volume of a sphere with radius 10 is: ", volume(10))
print("Surface area of a sphere with radius 10 is: ", area(10))
```

```
Volume of a sphere with radius 10 is:  4186.666666666667
Surface area of a sphere with radius 10 is:  1256.0
```

Q5

An application has to be created for storing the register number and Xth board exam marks of the students. Your task is to create a dictionary in python to store the pair {register_no: marks} for 5 students. For a given, register number, display the corresponding marks.

In [4]:
```
studentsMarks = {}

for i in range(5):
    regNo = int(input('Registration number is: '))
    marks = float(input('Marks scored is: '))
    studentsMarks[regNo] = marks

givenRegNo = int(input('Regestration number whose marks we need to displa
y is: '))

if givenRegNo in studentsMarks:
    print('The marks of registration number ' + str(givenRegNo) + ' is '
+ str(studentsMarks[givenRegNo]))
else:
    print('The registration number present does not exist')
```

```
Registration number is: 258
Marks scored is: 87
Registration number is: 259
Marks scored is: 98
Registration number is: 266
Marks scored is: 90
Registration number is: 256
Marks scored is: 86
Registration number is: 232
Marks scored is: 100
Regestration number whose marks we need to display is: 259
The marks of registration number 259 is 98.0
```