

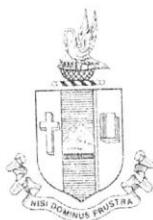
Problem Solving Using Python and R Lab

Lab Manual with Student Lab Record

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BONAFIDE CERTIFICATE

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Course Title PROBLEM SOLVING USING PYTHON AND R.

Certified that this is the bonafide record of work done by me during **Odd / Even**
Semester of **2020 - 2021** and submitted for the Practical Examination on

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Grade Sheet

Roll No	205229133		Name	VIVIYAN RICHARDS W
Year	2020		Semester	I
Instructor Name		Janani Selvaraj		

Lab	Date	Activity	Grade
1	09/12/2020	Python Basics and Conditions	
2	16/12/2020	Python Loops	
3	21/12/2020 23/12/2020	Python Functions and Modules	
4	23/12/2020 06/01/2021	Python String Processing	
5	06/01/2021 13/01/2021	List Processing in Python	
6	13/01/2021 18/01/2021 24/01/2021	Python File Processing	
7	24/01/2021	Dictionaries in Python	
8	26/01/2021	Python Regular Expressions	
9		Object Oriented Bank in Python	
10	04/02/2021	Implementation of Map, Filter and Reduce Functions	
11	06/02/2021	Retrieving Data from Web and Parsing	
12	09/02/2021	Database Programming Using Sqlite3	
13	10/02/2021	2D and 3D Data Visualization Using Seaborn	
14	10/02/2021	Animated Data Visualization Using R	
15	11/02/2021	Dashboard Visualization Using Tableau	
16		Concurrent Programming in Python	

Problem Solving Using Python and R Lab

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 your code with atleast 2 test cases

```
l = input("Length of the rectangle \n")
w = int(input("Width of the rectangle \n"))
area = l * w
perimeter = 2 * (l+w)
print("Area of Rectangle Rs", area)
print("Perimeter of Rectangle Rs", perimeter)
```

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 test cases to validate all conditions

```
ename = input("Enter the name of Employee \n")
salary = float(input("Enter the salary of Employee \n"))

if (salary < 150000):
    tax = 0
    print("Annual Income of " + ename + " Rs", salary)
    print("No taxable Amount")

elif (salary < 300000):
    tax = 0.2 * salary
    print("Annual Income of " + ename + " Rs", salary)
    print("The tax amount Rs", tax)

elif (salary > 300000):
    tax = 0.3 * salary
    print("Annual Income of " + ename + " Rs", salary)
    print("The tax amount is", tax)
```


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

Point ("Please (Pst")

name_item1 = str(input("Enter the item1: "))

quantity_1 = int(input("Enter the quantity1"))

rate_1 = int(input("Enter the rate1: "))

name_item2 = str(input("Enter the item2: "))

quantity_2 = int(input("Enter the quantity2: "))

rate_2 = int(input("Enter the rate2: "))

name_item3 = str(input("Enter the item3: "))

quantity_3 = int(input("Enter the quantity3: "))

rate_3 = int(input("Enter the quantity3: "))

amount = (quantity_1 * rate_1) + (quantity_2 * rate_2) + (quantity_3 * rate_3)

price = amount

discount = 0

if amount > 2000:
 discount = (amount * 20) / 100

 price = price - discount

else if amount > 1500:
 discount = (amount * 15) / 100

 price = price - discount

else:
 discount = (amount * 8) / 100

 price = price - discount

print("In total amount:", amount)

print("In total discount:", discount)

print("In final price:", price)

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

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

$$X1 = (11+31+23+8+7+5) / ((1-(1/2))-(1/20))$$

$$X2 = (((10*8)+8-((7/5)*(5**4)))\&3) | (2 \ll 1)$$

Point (X1)

Point (X2)

$$X1 = (11+31+23+8+7+5) / ((1-(1/2))-(1/20))$$

$$= 85 / (1-0.5-0.05)$$

$$= 85 / 0.45$$

$$= 188.888889.$$

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

```
name = str(input("Your Sweet Name:"))
mat = int(input("Enter your Maths Marks:"))
phy = int(input("Enter your Physics Marks:"))
che = int(input("Enter your Chemistry Marks:"))

tot = mat + phy + che
ave = tot / 3

if ave > 80:
    print("Congratulations", name, "you secured a total of", tot, "in your class is Class I and your average is", ave)
elif ave > 60:
    print("Congratulations", name, "you secured a total of", tot, "in your class is Class II and your average is", ave)
else:
    print("Congratulations", name, "you secured a total of", tot, "in your class is Class III and your average is", ave)
```

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

```
key = str(input("Enter the value from keyboard:"))

if ord(key) >= 48 and ord(key) <= 57:
    print("* It's a digit")
else:
    print("* It's not a digit")

if ord(key) % 2 == 0:
    print("* Given value is even")
else:
    print("* Given value is odd")

if ord(key) > -1:
    print("* Given number is positive")
elif ord(key) < -1:
    print("* Given number is negative")
else:
    print("* Given number is zero")

print("ASCII Value")
```

Problem Solving Using Python and R Lab

Lab2. Python Loops

Question1. Write a program that accepts numbers continuously as long as the number is positive and prints the sum of the numbers read (Use while loop). A sample user interaction will be:

Enter a number: 2
 Enter a number: 1
 Enter a number: 4
 Enter a number: 6
 Enter a number: -10
 Sum = 13

```
l=1
n=0
while l > -1:
    l = int(input("Enter the number:"))
    if l > -1:
        n = n+l
print(n)
```

Question 2. Write a program to take the values of two integers **m** and **n** from the user. Calculate the sum of even number between **m** and **n** (including both **m** and **n**).

Please note that value of **m** must be less than value of **n**. If **m > n**, then you must print a message "Value of **m** should be less than **n**" and ask for next input values.

Print the values of **m**, **n** and sum. (Use while loop).

The program should continue until user types 'q' to quit the program.

Sample user interaction:
 Enter m: 2
 Enter n: 10
 Sum of even numbers: 20
 Do you want to quit (Type q)? :
 Enter m: 2
 Enter n: 10
 Sum of even numbers: 20
 Do you want to quit (Type q)? :
 Enter m: 20
 Enter n: 10
 Value of m should be less than n
 Do you want to quit (Type q)? : q

```
while True:
    m = int(input("Enter the value for m="))
    n = int(input("Enter the values for n="))
    while m > n:
        print("Value of m should be less than n")
        n = int(input("Please Reenter Value for n="))
    sum = 0
    for i in range(m, n+1):
        if i%2 == 0:
            sum = sum+i
    print(sum)
    reply = str(input("Do you want to quit? (Type q)"))
    if reply == "q":
        break
```



Question3. Write a program to accept n and display its multiplication table. Value of n must be provided by the user. (Example: n * 1, n * 2,...,n*10) (Use for loop)

```
n = int(input("Enter the value:"))
for i in range(1,11):
    x = n*i
    print(n, "*", i, "=", x)
```

Question4. Write a program that receives an integer and prints the sum of its digits. For example, an input 125 will print output $1+2+5=8$.

- Try out with the following test cases
- 125
- 12
- 2
- -15

```
num = int(input("Enter a Integer:"))
total = 0
while num > 0:
    digit = num % 10
    total = total + digit
    num = num // 10
print("Sum of the Integer is:", total)
```

Question5 Develop an application in Python that repeatedly reads numbers until the user enters done. Once done is entered, print out the total, count, and average of the numbers. If the user enters anything other than a number, detect their mistake using try and except and print an error message and skip to the next number.

```
total = 0
Count = 0
while True:
    p = input("Enter a number or Done:")
    if (p == "Done"):
        break
    try:
        i = int(p)
        Count = Count + 1
        total = total + i
    except:
        print("Enter any numeric value")
        continue
    average = total / Count
    print("Total number of values entered is:", Count)
    print("Sum of the values entered is:", total)
    print("Average of the numbers entered is:", average)
```

Problem Solving Using Python and R Lab

Lab3. Python Functions and Modules

Question 1. Create a function `prime()` that receives an integer and returns whether n is prime or not. Print all prime numbers from 1 to 100 by calling `prime()` function. For example,

```

prime(1)
prime(2)
.....
prime(100)

def prime(num):
    for i in range(2,num):
        if num % i == 0:
            return 0
    else:
        return num

while True:
    n = int(input("Enter the number"))
    if n==0:
        print("n depends here....\n\n\n")
        break
    print("We are printing all prime numbers from 1 to 100 using prime function.\n\n")

```

Question 2. Develop a simple arithmetic calculator for 4 operations. The program should continue calculation until user types 'q' to quit. A sample user interaction can be:

- Enter operator (q to quit): +
- Enter value 1: 10
- Enter value 2: 20
- Result = 30

Create 4 functions `add()`, `subtract()`, `multiply()` and `divide()` that receives two values and returns the result of the operation.

Now, perform the following operations by calling the corresponding functions. Validate your outputs.

1. $10+20$
2. $20-5$
3. $8*5$
4. $50/3$

```

def .add(a,b):
    return a+b

def .sub(a,b):
    return a-b

def mul(a,b):
    return a*b

def .div(a,b):
    if b==0:
        else:
            return a/b

```

```

while True:
    print ("Enter the operator:")
    Operator = input()
    if(Operator == 'q'):
        break

    a = int(input("Enter the value of 1:"))
    b = int(input("Enter the value of 2:"))

    if (operator == '+'):
        r = add(a,b)
    elif (operator == '-'):
        r = sub(a,b)
    elif (operator == '*'):
        r = mul(a,b)
    elif (operator == '/'):
        r = div(a,b)
    print ("Result is:",r," \n")

```

Question3. Create a function **factorial()** that takes an integer and returns its factorial value.

- You can create as a non-recursive version of factorial.
- Also, check factorial of negative number does not exist.
- Factorial of 0 is 1.
- Save this Python file as **factorial_definition.py**.

Now, open another file and you can import **factorial_definition.py** as follows:

- **import factorial_definition**
- You can call factorial function as **factorial_definition.factorial()**.

Now, print the following factorial values.

1. **factorial_definition.factorial(3)**
2. **factorial_definition.factorial(5)**
3. **factorial_definition.factorial(10)**

def factorial(n):

If n<0:
Print ("factorial does not exist for negative numbers")

elif n=0 or n=1:

return 1

else:

fac = 1

while (n>1):

*fac = fac * n*

n = n-1

return fac

import factorial as definition



Problem Solving Using Python and R Lab

Lab4. Python String Processing

Question1. Develop a function `count_letter(string, search)` that returns the number of times search character appears in a string.

Test cases:

1. Str = "hello world". Search = 'o'. Calling `count_letter(str, search)` should return output 2
2. Str = "HeLlo wOrld". Search = 'o'. Then, calling `count_letter(str, search)` will return output 1

Modify `count_letter()` so that it ignores case sensitivity, so that o and O are same.

3. Str = "HeLlo wOrld" Search = 'o'. Calling `count_letter(str, search)` will return output 2

`def count_letter(str, search):`

```
    res = 0
    for i in str:
        if i == search:
            res += 1
```

`return res`

`def count_letter(str, search):`

```
    res = 0
    str = str.lower()
    for i in str:
        if i == search:
            res += 1
    return res
```



Question2. Write a program that counts the number of spaces, digits, vowels and consonants in a string that the user inputs. Print the string, no of spaces, no of digits, no of vowels and no of consonants.

Test case: Enter a string: **Bishop Heber College 17**. Then output should be:

Given string: Bishop Heber College 17
No. of spaces: 3
No. of digits: 2
No. of vowels: 7
No. of consonants: 12

```
st = input ("Enter a string:")
d = l = s = v = c = 0
for i in st:
    if i.isdigit():
        d = d + 1
    elif i.isalpha():
        l = l + 1
    elif i.isspace():
        s = s + 1
    else:
        v = v + 1
print ("Given String:", st)
print ("No. of spaces:", s)
print ("No. of digits:", d)
print ("No. of vowels:", v)
print ("No. of consonants:", l - v)
```

Question3. Develop a function **remove_punctuation(str)** that returns the string after removing the following punctuations.

Punctuation list - !"#\$%&'()*+,-./;:<=>?@[{}]\^~"

Test cases:

1. Str = "Bishop's College !.....". Calling **remove_punctuation(str)** should return output as "Bishops College"
2. Str = "#bhc trending @cs \$placements:::>." Calling **remove_punctuation(str)** should return output as "bhc trending cs placements"

```
def remove_punctuation(str):
    string = ''
    for i in str:
        if i.isalnum():
            string += i
    return string
```

Question4. Write a program that asks the user for a word. Translate their word into Pig Latin. Pig Latin game takes the first consonant (or set of first consonants) of an English word, moves it to the end of the word and suffixes an **ay**. If the first letter is a vowel, do not move that vowel, but instead add "way" at the end of the word.

Test Cases:

1. Enter a word: **pig**
Output: **ig-pay**
2. Enter a word: **banana**
Output: **anana-bay**
3. Enter a word: **trash**
Output: **ash-tray**
4. Enter a word: **apple**
Output: **apple-way**
5. Enter a word: **orange**
Output: **orange-way**

Modify your program so that it becomes a function **piglatin(word)** and returns translated word as output. Call this function 3 times with the same inputs and validate the outputs.

```
word = input("Enter a word to translate to pig latin:")
def piglatin(word):
    ay = 'ay'
    way = 'way'
    p = '-'
    consonant = ('B', 'C', 'D', 'F', 'G', 'H', 'J', 'K', 'L', 'M', 'N', 'P', 'Q', 'R', 'S', 'T', 'V', 'X')
    vowel = ('A', 'E', 'I', 'O', 'U', 'Y', 'Z')
    first_letter = word[0]
    first_letter = str(first_letter)
    first_letter = first_letter.upper()
    if first_letter in consonant:
        print(first_letter, 'is a consonant')
        length_of_word = len(word)
        remove_first_letter = word[1:length_of_word]
        pig_latin = remove_first_letter + p + first_letter + ay
        print('the word in pig latin is:', pig_latin)
    else:
        print(first_letter, 'is a vowel')
        pig_latin = word + pt + way.
```

Problem Solving Using Python and R Lab

Lab5. List Processing in Python

Question1. Write a function `find_average(student)` that takes student tuple as input and print student rollno, name, marks and average marks as output.

Test Cases:

- stud1 = (1, "rex", 60, 85, 70)
`find_average(stud1)`

Modify the above function `find_average(student)` so that it processes a tuple of tuples.

- stud2 = (2, "rex", (80, 75, 90))
`find_average(stud2)`

```
def find_average(student):
    roll_name, mark = student
    total = 0.
    for mark in marks:
        total += mark
    avg = total / len(marks)
    print("Roll No.", roll, "Name:", name, "Average:", avg)
```

stud1 = (1, "rex", (60, 85, 70))

`find_average(stud1)`

stud2 = (2, "Rex", (80, 75, 90))

`find_average(stud2)`

Question2. Write a weight management program that prompts the user to enter in 7 days of their body weight values as float numbers. Store them in list.
Then print first day weight, last day weight, 4th day weight, highest weight, lowest weight and average weight.
Finally, if average weight < lowest weight, then print "Your weight management is excellent". Otherwise print "Your weight management is not good. Please take care of your diet".

```
list = []
for i in range(7):
    c = float(input("Enter your weight:"))
    list.append(c)
print("In First day weight", list[0])
print("In last day weight", list[-1])
print("In Highest weight is", max(list))
print("In Lowest weight is", min(list))
print("In Average of weight is", round(sum(list)/len(list)))
firstday = list[0]
lastday = list[-1]
avg = round(sum(list)/len(list))

low_weight = min(list)
if avg < low_weight:
    print("Your weight management is excellent")
else:
    print("Your weight management is not good. Please take care of your diet")
```



Question3. Write a function `lastN(lst, n)` that takes a list of integers and n and returns n largest numbers.

How many numbers you want to enter?: 6

Enter a number: 12

Enter a number: 32

Enter a number: 10

Enter a number: 9

Enter a number: 52

Enter a number: 45

How many largest numbers you want to find?: 3

Largest numbers are: 52, 45, 32

```
b = int(input("How many numbers you want to enter?"))
lst = []
for i in range(b):
    c = int(input("Enter a number:"))
    lst.append(c)
n = int(input("How many largest numbers you want to find?"))
lastN(lst, n)
```

Question4. Given a list of strings, return a list with the strings in sorted order, except group all the strings that begin with 'x' first. Hint: this can be done by making 2 lists and sorting each of them before combining them.

Test Cases:

- Input: ['mix', 'xyz', 'apple', 'xanadu', 'aardvark']
Output: ['xanadu', 'xyz', 'aardvark', 'apple', 'mix']
- Input: ['ccc', 'bbb', 'aaa', 'xcc', 'xaa']
Output: ['xaa', 'xcc', 'aaa', 'bbb', 'ccc']
- Input: ['bbb', 'ccc', 'xx', 'xzz', 'xaa']
Output: ['xaa', 'xzz', 'xx', 'bbb', 'ccc']

```
def front_x(words):
```

```
xlist = []
aList = []
for word in words:
    if word.startswith("x"):
        xlist.append(word)
    else:
        aList.append(word)
return sorted(xlist) + sorted(aList)
```

words: ['min', 'xyz', 'apple', 'xanadu', 'aardvark']

front_x(words)

words: ['ccc', 'bbb', 'aaa', 'xcc', 'xaa']

front_x(words)

words: ['bbb', 'ccc', 'avx', 'xzz', 'xad']

front_x(words)

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Question5. Develop a function `sort_last()`. Given a list of non-empty tuples, return a list sorted in increasing order by the last element in each tuple. Hint: use a custom key= function to extract the last element from each tuple.

Test Cases:

1. Input: `[(1, 7), (1, 3), (3, 4, 5), (2, 2)]`
Output: `[(2, 2), (1, 3), (3, 4, 5), (1, 7)]`
2. Input: `[(1,3),(3,2),(2,1)]`
Output: `[(2,1),(3,2),(1,3)]`
3. Input: `[(2,3),(1,2),(3,1)]`
Output: `[(3,1),(1,2),(2,3)]`

```
def last(n): return n[-1]
```

```
def sort_list>Last(tuples):
    return sorted(tuples, key=last)
```

```
print("Test Case 1 \n\tInput: [(1,3),(3,2),(2,1)] \n\tOutput: ", sort_list>Last([(1,3),(3,2),(2,1)]))
```

Question6. Other String Functions

- a) Define a function `first()` that receives a tuple and returns its first element
- b) Define a function `sort_first()` that receives a list of tuples and returns the sorted
- c) Print lists in sorted order
- d) Define a function `middle()` that receives a tuple and returns its middle element
- e) Define a function `sort_middle()` that receives a list of tuples and returns it sorted using the key `middle`.
- f) Print the list `[(1,2,3), (2,1,4), (10,7,15), (20,4,50), (30, 6, 40)]` in sorted order. Output should be: `[(2, 1, 4), (1, 2, 3), (20, 4, 50), (30, 6, 40), (10, 7, 15)]`

```
def first(num):
```

```
    return num[0]
```

run: [(1,2,3), (2,1,4), (10,7,15), (20,4,50), (30, 6, 40)]

```
def sort_first(num):
```

```
    new = list(sorted(num))
```

first(num)

```
    return [first(item) for item in new]
```

sort-first(num)

```
    return new
```

middle(num)

```
def lists(num):
```

```
    return sorted(num, key=None, reverse=False)
```

sort-middle(num)

```
def middle(num):
```

```
    return num[int(len(num)/2)]
```

lists(num)

```
def sort_middle(num):
```

```
    return sorted(num, key=middle)
```

middle(num)



Question 7. Develop a function `remove_adjacent()`. Given a list of numbers, return a list where all adjacent same elements have been reduced to a single element. You may create a new list or modify the passed in list.

Test Cases:

1. Input: [1, 2, 2, 3] and output: [1, 2, 3]
2. Input: [2, 2, 3, 3, 3] and output: [2, 3]
3. Input: [], Output: []
4. Input: [2, 5, 5, 6, 6, 7]
Output: [2, 5, 6, 7]
5. Input: [6, 7, 7, 8, 9, 9]
Output: [6, 7, 8, 9]

```
def remove_adjacent(nums):
    result = []
    for num in nums:
        if len(result) == 0 or num != result[-1]:
            result.append(num)
    return result.

# nums = [1, 2, 2, 3]
remove_adjacent(nums)

nums = [2, 2, 3, 3]
remove_adjacent(nums)

nums = [2, 2, 3, 3]
remove_adjacent(nums)

nums = []
remove_adjacent(nums)

nums = [6, 7, 7, 8, 9, 9]
remove_adjacent(nums)
```



Question8. Write a function `verbing()`. Given a string, if its length is at least 3, add 'ing' to its end. Unless it already ends in 'ing', in which case add 'ly' instead. If the string length is less than 3, leave it unchanged. Return the resulting string. So 'hail' yields: 'hailing'; 'swimming' yields: 'swimmingly'; 'do' yields: 'do'.

Source code:

```
def verbing(s):
    length = len(s)
    if length >= 3:
        if s[-3:] == 'ing':
            s += 'ly'
        else:
            s += 'ing'
    return s
```

Question9. Develop a function `not_bad()`. Given a string, find the first appearance of the substring 'not' and 'bad'. If the 'bad' follows the 'not', replace the whole 'not'...'bad' substring with 'good'.

Return the resulting string. So 'This dinner is not that bad!' yields: This dinner is good!

```
def not_bad(s):
    snot = s.find('not')
    sbad = s.find('bad')
    if sbad > snot:
        s = s.replace(s[snot:(sbad+3)], 'good')
    return s
```



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Question8. Write a function `verbing()`. Given a string, if its length is at least 3, add 'ing' to its end. Unless it already ends in 'ing', in which case add 'ly' instead. If the string length is less than 3, leave it unchanged. Return the resulting string. So 'hail' yields: 'hailing'. 'swimming' yields: 'swimmingly', 'do' yields: 'do'.

Source code:

```
def verbing(s):
    length = len(s)
    if length >= 3:
        if s[-3:] == 'ing':
            s += 'ly'
        else:
            s += 'ing'
    return s
```

Question9. Develop a function `not_bad()`. Given a string, find the first appearance of the substring 'not' and 'bad'. If the 'bad' follows the 'not', replace the whole 'not'...'bad' substring with 'good'.

Return the resulting string. So 'This dinner is not that bad!' yields: This dinner is good!

```
def not_bad(s):
    snot = s.find('not')
    sbad = s.find('bad')
    if sbad > snot:
        s = s.replace(s[snot:(sbad+3)], 'good')
    return s
```



Problem Solving Using Python and R Lab

Lab6. Python File Processing

Question1. Write a program for *Password Management System*

- File creation: Ask user to enter N user names and their passwords. Store usernames and passwords into a file named "loginfile.txt". Store each user and password in one line.
- File Processing: Write a program that opens your "security.txt" file and reads usernames and passwords from it. Store user names in one list and passwords in another lists.
- Querying: ask user to enter user name and password for verification. If they match the values stored in the lists, print a message "Login Successful". Otherwise print a message "Login Failed, try again".

source code:

```

def reg():
    username = input("please input the first 2 letters of your first
                     name and your birth year")
    password = input("please input your desired password")
    file = open("loginfile.txt", "a")
    file.write(username)
    file.write("\n")
    file.write(password)
    file.write("\n")
    file.close()
    if login():
        print("you are logged in...")
    else:
        print("you aren't logged in!")

def login():
    Username = input("Please Enter your Name:")
    password = input("Please Enter your Password:")
    for line in open("loginfile.txt", "r").readlines():
        login_info = line.split()
        if Username == login_info[0] and password == login_info[1]:
            print("Correct Credentials!")
            return True
    print("Incorrect Credentials")
    return False

```



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Question2. Write a program for student Performance Analysis

- Create a text file, 'marks.txt', with N marks as floating point numbers. Open the file, read marks from it and compute and print the highest mark.
- If the user runs the program more than once you should not overwrite the previous text file – simply append the marks to the end of the file.
- Modify the above program so that it also prints Top-3 highest marks (Note: you may need to use list concept)
- Modify the above program so that it also prints the Lowest-3 marks.

Marks = [99.0, 100.0, 95.0, 96.0, 97.0]

With open('marks.txt', 'a') as file:

for mark in marks:

file.write("%f\n", mark)

number list = []

With open('marks1.txt', 'r') as fp:

number list.append(float(item)) for item in fp.readlines()

print(max(numberlist))

def Nmaxelements(list1, N):

final_list = []

for i in range(0, N):

max1 = 0

for j in range(len(list1)):

If list1[j] > max1:

max1 = list1[j]

list1[j].remove(max1);

final_list.append(max1)

print("Final List")

Nmaxelements(numberlist, 3)

def -Nminelements(list1, N):

final_list = [];

for i in range(0, N):

min1 = 99999999;

for j in range(len(list1)):

If list1[j] < min1:

list1[j].remove(min1);

final_list.append(min1)

print(final_list)

Nminelements(numberlist, 3)



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Question3. Write a program for Stock Price Analysis

- File Creation: Continually prompt a user for stock name, followed by price values for 5 days. Each row indicates stock name and daily prices of one stock. Store these values in a text file called "stock-prices.txt". Open the file in Append Mode. Prompt message "Do you want to continue?" and stop reading values accordingly. Then, you can close your file.
- File Processing: Now, open your file for processing. Print stock name, minimum price, maximum price and average price values.
- You can also print which day stock price was lowest in the week and which day stock price was highest. So, modify your print statement to print stock name, minimum price & day of minimum price, maximum price & day of maximum price and average price values. (Hint: Use enumerate to get index values)

```

while True:
    for st in open("stock-prices.txt", "r").readlines():
        p_min = []
        p_max = []
        p_avg = []
        p_min.append(int(st[0]))
        p_max.append(int(st[0]))
        p_avg.append(int(st[0]))
        for i in range(1, 6):
            p = input()
            p_min.append(int(p))
            p_max.append(int(p))
            p_avg.append(int(p))
        print("min price", min(p_min), "on day", p_min.index(min(p_min)))
        print("max price", max(p_max), "on day", p_max.index(max(p_max)))
        print("avg", sum(p_avg) / len(p_avg))

    con = st[0] if input("want to continue? ") == "y" else "n"
    if con == "n":
        break
file.close()

```

```

for st in open("stock-prices.txt", "r").readlines():
    p_min = []
    calc = st.split()
    p_min.append(int(calc[0]))
    for i in range(1, 6):
        p_min.append(int(calc[i]))
    print(min(p_min))
    print(max(p_min))
    avg = sum(p_min) / len(p_min)
    print(avg)
    print("\n")

```



Question4. Write a program for File Explorer

- Display the contents of file
- Count the number of lines in a text file. (Use splitlines())
- Count the number of unique words in a file.
- Find frequency of words in a given file. (Hint: Use Counter object)
- Show a random line in a file. (Use Random object)

```

Print("1. Display the contents of file:")
Print("Number of words: ", numWord)
Print("2. Count the number of lines in a text file: ")
Print("3. Count the number of unique words in a file: ")
Print("4. Find frequency of words in a given file: ")
Print("5. Show a random line in a file: ")

d = open("samplemr.txt", "r")
print("A. Read frequency of words in a given file: ")
display = d.read()
print(display)
d.close()
print("-----")

print("Enter the file name: ")
fname = input("-----")
print("-----")

try:
    fhand = open(fname)
except:
    print("File cannot be opened: ", fname)

counts = dict()

for line in fhand:
    words = line.split()
    for word in words:
        if word in counts:
            counts[word] += 1
        else:
            counts[word] = 1

print(counts)
fhand.close()

print("-----")
print("B. Show a random line in a file: ")
print("-----")

c = open("samplemr.txt", "r")
lines = open(fname).read().splitlines()
return random.choice(lines)

def random_line(fname):
    lines = open(fname).read().splitlines()
    return random.choice(lines)

print(random_line('samplemr.txt'))

```

Question5. [File Searcher]. Develop an application in Python to read through the email data ("mbox-short.txt") and when you find line that starts with "From", you will split the line into words using the split function. We are interested in who sent the message, which is the second word on the From line: From stephen.marquard@uct.ac.za Sat Jan 5 09:14:16 2008. You will parse the From line and print out the second word for each From line, then you will also count the number of From (not From:) lines and print out a count at the end

```

fhand = open('mbox-short.txt')
for line in fhand:
    line = line.rstrip()
    if line.startswith('From'):
        print(line)
fhand = open("mbox-short.txt")
count = 0
for line in fhand:
    line = line.rstrip()
    if line == " ":
        continue
    words = line.split()
    if words[0] != 'From':
        continue
    print(words[1])
    count = count + 1
print("There were", count, "lines in the file with from as the first word".)

```



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Question6. Write a program to read and write CSV files

- File Creation: Create M5 Excel file ("student_marks.csv") with 5 rows of student name, mark1, mark2, mark3, mark4, the comma to separate each value in a row (More information at: <https://docs.python.org/3/library/csv.html>)
- File Display: Now, open your CSV file and display the file contents row by row
- File Writing: Now, open ("student_marks.csv") for writing. Ask user to enter name followed by 4 marks for one new student and write them onto the file.

```

from csv import writer
def append_file(file_name, file_obj, data):
    file_obj = open(file_name, mode='a+', newline='')
    file_writer = writer(file_obj)
    file_writer.writerow(data)
    file_obj.close()

row1_content = ['Suresh', 88, 89, 90, 91]
row2_content = ['Ajay', 85, 86, 87, 88]
row3_content = ['Vimal', 82, 83, 84, 85]
row4_content = ['Rakesh', 80, 81, 82, 83]
row5_content = ['Kiran', 86, 87, 88, 89]

append_file('student_marks.csv', row1_content)
append_file('student_marks.csv', row2_content)
append_file('student_marks.csv', row3_content)
append_file('student_marks.csv', row4_content)
append_file('student_marks.csv', row5_content)

```

```

Request 01:
with open('student_marks.csv', mode='a+', newline='') as csvfile:
    file_writer = csv.writer(csvfile, delimiter=',', quotechar='\'')
    file_writer.writerow(['Name', 'Mark1', 'Mark2', 'Mark3', 'Mark4'])
    file_writer.writerow(['Suresh', 88, 89, 90, 91])

```



Problem Solving Using Python and R Lab

Lab7. Dictionaries in Python

Question1. Write a program for Fruit Inventory Management.

1. Create a dictionary **fruits** with fruit name as key and quantity available as values. There are 20 apples, 50 bananas, 100 oranges. Then, print outputs for the following queries.
2. Show the entire dictionary fruits (Print output as apples -> 20, bananas -> 50, etc)
3. How many bananas are there?
4. How many items in the dictionary?
5. Does graphs available in the dictionary?
6. Does pears exists in the dictionary? If so, return its quantity, otherwise, add 10 pears to dictionary.
7. Show all fruit names in ascending order (Iterate using for loop)
8. Show all fruits in descending order of quantities
9. Remove pears from the dictionary.
10. Develop a function **show()** that displays fruit name and quantity (Use **.format()** for pretty printing)
11. Develop a function **add_fruit(name, quantity)** that receives fruit name and quantity as input and increases the quantity of the fruit. Then, display the current inventory by calling **show()**.
12. Now, add 40 apples to inventory by calling **add_fruit(name, quantity)**
13. Now, add 100 bananas to inventory, by calling **add_fruit(name, quantity)**
14. Now, show the current inventory, by calling **show()**
15. Write the inventory fruits onto a file. (Use Pickle for file writing and reading)
16. Now, open Pickle file and display it.

```

1) fruits = {"apples": 20, "bananas": 50, "oranges": 100}.
    print(fruits)

2) print(fruits.get('bananas'))

3) len(fruits)

4) if "grapes" in fruits:
    print("yes")
else:
    print("No")

5) if "pears" in fruits:
    print(fruits.get("pears"))
else:
    fruits["pears"] = 10
    print(fruits)

6) for keys in fruits:
    print(sorted(fruits.keys()))

7) print(sorted(fruits.keys(), reverse=True))

8) del fruits["pears"]
print(fruits)

```

```

10) def show():
    print("{}\n".format(fruits))
    show()

11) def add_fruit(fruits, name, quantity):
    fruits[name] = fruits.get(name, 0) + quantity
    print(fruits)

12) fruits = {"apples": 20, "bananas": 50, "oranges": 100}
    add_fruit(fruits, "apples", 40)
    print(fruits)

13) fruits = {"apples": 20, "bananas": 50, "oranges": 100}
    add_fruit(fruits, "bananas", 100)
    print(fruits)

14) show()
import pickle
15) new_inventory = {"apple": 200,
                    "mango": 87, "banana": 50}
16) file = open("new_inv.inventory", "wb")
    pickle.dump(new_inventory, file)
    print(file)

```



Question2. Write a program for Telephone Directory Management

1. Create an empty dictionary called **customers**, where name is a key and contacts is a list of contacts such as phoneno and email ID for each customer.
2. Ask user to enter name and his contacts for N customers. Add them to dictionary **customers**. Stop reading when user types "done".
3. Show the contacts for customer "rex". If not exists, print message "Contacts not exists.."
4. Add a new customer with name "rex", phone number 9942002764 and email id rajkumar@bhc.edu
5. Show all customers both name and contacts. (Use items() method, unpack it and print inside for loop)
6. Show all customer contacts (Iterate using for loop)
7. Show all customer names in alphabetical order
8. How many customers are there in your dictionary?
9. Remove customer "rex" from dictionary customers

```

customers = {}
while(True):
    row = input("Enter the name and number: ")
    info = row.split()
    if info[0] == "done":
        break
    name = info[0]
    phone = info[1]
    email = info[2]
    contacts = [phone, email]
    customers[name] = contacts
print("After printing contacts:")
for name, contacts in customers.items():
    print(name, ":", contacts)
    if 'rex' in contacts:
        print("rex is present")
    else:
        print("There is no such contact")
# 1) customer["rex"] = [9942002764, "rajkumar@bhc.edu"]
# 2) for name, contacts in customers.items():
#     print(name, contacts)
# (1) do name for customers:
#     print(customers[name])
# (2) sorted(customers.keys())
# (3) len(customers.items())
# (4) del customer["rex"]

```



Problem Solving Using Python and R Lab

Lab8. Python Regular Expressions

Question1. Using Email Collections file, mbox short.txt, write a python program for the following queries.

1. Search for lines that contain 'From' and print them
2. Search for lines that start with 'From' and print them
3. Search for lines that start with 'F', followed by 2 characters, followed by 'm.'
4. Search for lines that start with From and have an at sign and print them
5. Search for lines that have an at sign between characters and print them (Use.findall())
6. Search for lines that have an at sign between characters. The characters must be a letter or number and print them
7. Search for lines that start with 'X' followed by any non white space characters and ':', followed by a space and any number. The number can include a decimal.
8. Search for lines that start with 'X' followed by any non whitespace characters and ':' followed by a space and any number. The number can include a decimal. Then print the number if it is greater than zero.
9. Search for lines that start with 'Details: rev=', followed by numbers and ':'. Then print the number if it is greater than zero
10. Search for lines that start with From and a character followed by a two digit number between 00 and 99 followed by ':'. Then print the number if it is greater than zero

```

① hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    if not line.startswith('From '):
        print(line)

② Insert 're'
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    if re.search('From ', line):
        print(line)

③ Import 're'
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    if re.search('At..: ', line):
        print(line)

```



4) Import re

```
hand = open('inbox-short.txt')
for line in hand:
    line = line.rstrip()
    if re.search('^From: .+@', line):
        print(line)
```

5) Import re

```
hand = open('inbox-short.txt')
for line in hand:
    line = line.rstrip()
    x = re.findall('.+\s+@\s+', line)
    if len(x) > 0:
        print(x)
```

6) Import re

```
hand = open('inbox-short.txt')
for line in hand:
    line = line.rstrip()
    x = re.findall('a-zA-Z0-9]+@[a-zA-Z-2]', line)
    if len(x) > 0:
        print(x)
```

7) Import re

```
hand = open('inbox-short.txt')
for line in hand:
    line = line.rstrip()
    if re.search('x.*:[0-9]+', line):
        print(line)
```

8) Import re

```
hand = open('inbox-short.txt')
for line in hand:
    line = line.rstrip()
    if len(x) > 0:
        x = re.findall('x.*:[0-9]+', line)
```

9) Import re

```
hand = open('inbox-short.txt')
for line in hand:
    line = line.rstrip()
    x = re.findall('details:[\n\t]*([0-9]+)', line)
    if len(x) > 0:
        print(x)
```

10) Import re

```
hand = open('inbox-short.txt')
for line in hand:
    line = line.rstrip()
    x = re.findall('x.*:[0-9]+', line)
    if len(x) > 0:
        print(x)
```



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Problem Solving Using Python and R Lab

Lab10. Implementation of Map, Filter and Reduce Functions

Reference: <https://ocw.mit.edu/ans7870/6/6.005/s16/classes/25-map-filter-reduce/>

Question1. Write a program to implement MAP function. Find the square root of a list of numbers [1, 2, 4, 6] using map and sqrt functions. Check the answer against your user defined function mymap().

```
from math import sqrt
lst = [1, 2, 4, 6]
map_object = map(sqrt, lst)
print(list(map_object))
```

```
def mymap(f, seq):
    result = []
    for elt in seq:
        result.append(f(elt))
    return result
mymap(sqrt, lst)
```

Question2. Write a program to implement FILTER function. Filter all upper case letters in a list ['x', 'Y', 'Z', '3', '2', 'b'] using filter function. Check the answer against your user define function myfilter().

```
filter_object = filter(str.isupper, ['x', 'Y', 'Z', '3', '2', 'b'])
print(list(filter_object))
def filter(f, seq):
    result = []
    for elt in seq:
        if f(elt):
            result.append(elt)
    return result
filter(str.isupper, ['x', 'Y', 'Z', '3', '2', 'b'])
```

Question3. Write a program to create a lambda function that takes two characters and concatenates them. Now, apply this function inside REDUCE function that will reduce the list of characters ['a', 'b', 'c', 'd'] ... to the intial value 'x'.

```
from functools import reduce
(lambda x,y:x+y)('a','b')
reduce(lambda x,y,x+y,['a','b','c','d'], 'x')
```



Question4. Imagine an accounting routine used in a book shop. It works on a list with sublists, which look like this:

Order No	Book Title and Author	Quantity	Price per Item
34587	Learning Python, Mark Lutz	4	40.95
98762	Programming Python, Mark Lutz	5	56.80
77226	Head First Python, Paul Barry	3	32.95
88112	Einführung in Python3, Bernd Klein	3	24.99

Write a Python program, which returns a list with 2-tuples. Each tuple consists of an order number and the product of the price per items and the quantity. The product should be decreased by RS 10 if the value of the order is smaller than RS 100.00. Write a Python program using **lambda** and **map** functions.

```
tab = [[34587, 'Learning Python, Mark Lutz', 4, 40.95],
       [98762, 'Programming Python, Mark Lutz', 5, 56.80],
       [77226, 'Head First Python, Paul Barry', 3, 32.95],
       [88112, 'Einführung in Python3, Bernd Klein', 3, 24.99]]
```

```
print(*tab; sep= '\n')
```

```
prog = []
prog1 = []
final = []
nprog = []
for i in range(4):
    j = tab[i][2] * tab[i][3]
    if j < 100:
        j = j - 10
    nprog.append(round(j, 2))
else:
    nprog.append(round(j, 2))
prog1.append(tab[i][0])
prog.append(nprog)
final.append(prog1)
print(final)
```

Problem Solving Using Python and R Lab

Lab11. Retrieving Data From Web and Parsing

Question1. Retrieve data from web page using **URLLIB** and print the frequency of words from that page.

```
import urllib.request
counts = dict()
fhand = urllib.request.urlopen('http://data.pr4e.org/romeo.txt')
for line in fhand:
    words = line.decode().split()
    for word in words:
        counts[word] = counts.get(word, 0) + 1
print(counts)
```



Question2. Retrieve and display all hyperlinks (ie., HREF attribute) from a webpage using BeautifulSoup.

```

Import urllib.request, urllib.parse, urllib.error
from bs4 import BeautifulSoup
Import ssl
ctx = ssl.create_default_context()
ctx.check_hostname = False
ctx.verify_mode = ssl.CERT_NONE
url = input('enter url')
html = urllib.request.urlopen(url, context=ctx).read()
soup = BeautifulSoup(html, 'html.parser')
tags = soup('a')
for tag in tags:
    print(tag.get('href', None))

```



Question3. Create a HTML file for the following Student Marks and print the number of students and their names and marks.

ID	name	mark1	mark2	mark3
DS01	rex	87	57	74
DS02	peter	68	98	55

from IPython.core.display import HTML

```
que3 = """
<table>
  <tr>
    <td> ID </td>
    <td> NAME </td>
    <td> MARK1 </td>
    <td> MARK2 </td>
    <td> MARK3 </td>
  </tr>
  <tr>
    <td> DS01 </td>
    <td> REX </td>
    <td> 87 </td>
    <td> 57 </td>
    <td> 74 </td>
  </tr>
  <tr>
    <td> DS02 </td>
    <td> PETER </td>
    <td> 68 </td>
    <td> 98 </td>
    <td> 55 </td>
  </tr>
</table>
"""

HTML(que3)
```

Question4. Create a JSON file for the following Students Marks and print the number of students and their names and marks.

```
ID: DS01: Name: rex
Semester1: 80, 55
Semester2: 50, 70, 82
ID: DS02: Name: peter
Semester1: 92, 75
```

```
import json
data = """
[{"id": "ds01",
 "name": "rex",
 "Semester1": "80, 55",
 "Semester2": "50, 70, 82"
},
 {"id": "ds02",
 "name": "peter",
 "Semester1": "92, 75",
 "Semester2": "68, 88, 97"}]
```

```
info = json.loads(data)
print('Users count:', len(info))
for item in info:
    print('Name', item['name'])
    print('Id', item['id'])
    print('Semester1', item['Semester1'])
    print('Semester2', item['Semester2'])
```



Question 5. Crawl Weather of a City and Display 7 Day Forecast

• Find weather data of Tiruchirappalli city from some website such as www.weather.com

• Exploring page structure with Chrome DevTools

• Extract information from web page and display the weather forecast for 10 days or 7 days

Reference: <https://www.dataquest.io/blog/web-scraping-tutorial-python/>

```

import requests
from bs4 import BeautifulSoup
page = requests.get("https://weather.com/en-IN/weather/tenday/1")
# Detailed forecast for Feb 26
page.content
bs4 = BeautifulSoup(page.content, 'html.parser')
bs4.findAll('p')
# Find all elements with class "DetailsSummary--DetailSummary-GPFD"
bs4.findAll('p')
# Find all elements with class "DetailsSummary--temperature-BTMQW"
# [temp].get_text() for temp
for p in page.findAll('p')[1:12]:
    # Find all elements with class "DetailsSummary--temperature-BTMQW"
    # [temp].get_text() for temp
    days = p.findAll('p')[1:12]
    temp_ps = p.findAll('p')[1:12]
    from IPython.display import display
    import pandas as pd
    # Creating a data frame to store the values
    b = {"Days": days, "Temperature": temp_ps}
    Weather = pd.DataFrame(b)
    Weather

```

Question 6. Real Time Stock Prices Crawling and Display of a specified Company

Crawl prices of a stock such as InfoSys (Stock Code INFY) for a period of month or year.

- Crawl prices of a stock such as InfoSys (Stock Code INFY) for a period of month or year.
- Plot a line graph of monthly or yearly price movements
- Crawl prices of one more stock such as CTS
- Update your line graph with the prices movements of two stocks

Reference:

<https://ntguardian.wordpress.com/2018/07/17/stock-data-analysis-python-v2/>

https://github.com/rajkumarbhc/data-science-utils/blob/master/data_science_utils/financial/Web%20Scraping%20and%20Financial%20Data%20Exploration%20in%20Python-Tutorial.ipynb

```
! pip install yfinance --upgrade --no-cache-dir
import yfinance as yf
yf.pdr_override()
df = pdr.get_data_yahoo("INFY", start="2018-01-01").reset_index()
info.to_csv('INFY.csv'; index=False)
info.head()

import matplotlib.pyplot as plt
%matplotlib inline
info["Adj. Close"].plot(grid=True)

import matplotlib.pyplot as plt
%matplotlib inline
cts("Adj. Close").plot(grid=True)

stocks.plot(grid=True)
```



Problem Solving Using Python and R Lab

Lab12. Database Programming using sqlite3

Question1. Perform CRUD operations on Student Table as outlined in the reference (<https://medium.com/analytics-vidhya/programming-with-databases-in-python-using-sqlite-4cecbef51ab9>).

Import sqlite3

```
conn = sqlite3.connect('My_database.sqlite')
cursor = conn.cursor()
print("Opened database successfully")
```

Creating a Table:

```
In [4]: cursor.execute("Create Table school")
```

```
(4): INT PRIMARY KEY NOT NULL,
NAME TEXT NOT NULL,
ADDRESS CHAR(50),
MARKS INT);'''
```

```
cursor.close()
```

```
import sqlite3
```

```
conn = sqlite3.connect('my_database.sqlite')
```

```
cursor = conn.cursor()
```

```
cursor.execute("insert into school (ID,NAME,AGE,ADDRESS,MARKS)\nVALUES(1,'Rohan',14,'Delhi',200);")
```

```
cursor.execute("INSERT INTO school (ID, NAME, AGE, ADDRESS, MARKS)\nVALUES(2,'Alpen',14,'Bangalore',150);")
```

```
cursor.execute("INSERT INTO school (ID, NAME, AGE, ADDRESS, MARKS)\nVALUES(3,'Martha',15,'Hyderabad',200);")
```

```
cursor.execute("INSERT INTO school (ID, NAME, AGE, ADDRESS, MARKS)\nVALUES(4,'Palak',15,'Kolkata',150);")
```

```
conn.commit()
```

```
conn.close()
```

```
import sqlite3
```

```
conn = sqlite3.connect('my_database.sqlite')
```

```
cursor = conn.cursor()
```



```

cursor.execute("INSERT INTO SCHOOL (ID, NAME, AGE, ADDRESS, MARKS) \n
VALUES(1, 'Rohan', 14, 'Delhi', 200); \n
cursor.execute("INSERT INTO SCHOOL (ID, NAME, AGE, ADDRESS, MARKS) \n
VALUES(2, 'Aryan', 14, 'Bangalore', 150); \n
cursor.execute("INSERT INTO SCHOOL (ID, NAME, AGE, ADDRESS, MARKS) \n
VALUES(3, 'Mandira', 15, 'Hyderabad', 200); \n
cursor.execute("INSERT INTO SCHOOL (ID, NAME, AGE, ADDRESS, MARKS) \n
VALUES(4, 'Palak', 15, 'Kolkata', 650); \n
conn.close(); conn.commit()

```

SELECTING records from the TABLE

```
import sqlite3
```

```
conn = sqlite3.connect('my_database.sqlite')\ncursor = conn.cursor()
```

```
for row in cursor.execute("SELECT id, name, marks from SCHOOL"):\n    print("ID = ", row[0])\n    print("NAME = ", row[1])\n    print("MARKS = ", row[2], "\n")\nconn.commit()\nconn.close()
```

UPDATE Records in the TABLE :

```
import sqlite3
```

```
conn = sqlite3.connect('my_database.sqlite')\ncursor = conn.cursor()
```

```
conn.execute("UPDATE SCHOOL SET MARKS=250 WHERE ID=3")\nconn.commit()
```

```
for row in cursor.execute("SELECT id, name, address, marks from SCHOOL"):\n    print("ID = ", row[0])\n    print("NAME = ", row[1])\n    print("MARKS = ", row[2], "\n")\nconn.commit()\nconn.close()
```



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CamScanner

Question2. Open the table MyRestaurants.db that you have created for NoSQL course

```
Import cx_Oracle
conn = cx_Oracle.connect("scott/scott")
sql = "Select * FROM MY_RES"
cursor = conn.cursor()
cursor.execute(sql)
for row in cursor.execute("SELECT * FROM MY_RES"):
    print("NAME =", row[0]) print("LASTVISIT", row[3]) conn.commit()
    print("FOODTYPE =", row[1]) print("ILIKE", row[2])
    print("DISTANCE =", row[2]) print("IN")
```

Question3. Write a SQL query that returns all restaurants in your table MyRestaurants.db.

```
Import cx_Oracle
conn = cx_Oracle.connect("scott/scott")
sql = "SELECT * FROM MY_RES"
cursor = conn.cursor()
cursor.execute(sql)
for row in cursor.execute("SELECT NAME FROM MY_RES"):
    print("NAME =", row[0])
    conn.commit()
    conn.close()
```

Question4. Write a SQL query that returns the names of restaurants in descending order that makes Chinese foods.

```
Import cx_Oracle
conn = cx_Oracle.connect("scott/scott")
sql = "SELECT * FROM MY_RES"
cursor = conn.cursor()
cursor.execute(sql)
for row in cursor.execute("SELECT NAME, FOODTYPE FROM MY_RES
                           WHERE FOODTYPE='Chinese'"):
    print("NAME =", row[0])
    print("FOODTYPE =", row[1])
    conn.commit()
    conn.close()
```



Question2. Open the table MyRestaurants.db that you have created for NoSQL course

```
Import cx_Oracle
conn = cx_Oracle.connect("scott/scott")
sql = "Select * FROM MY_RES"
cursor = conn.cursor()
cursor.execute(sql)
for row in cursor.execute("SELECT * FROM MY_RES"):
    print("NAME =", row[0]) print("LASTVISIT", row[3]) conn.commit()
    print("FOODTYPE =", row[1]) print("ILIKE", row[2])
    print("DISTANCE =", row[2]) print("IN")
```

Question3. Write a SQL query that returns all restaurants in your table MyRestaurants.db.

```
Import cx_Oracle
conn = cx_Oracle.connect("scott/scott")
sql = "SELECT * FROM MY_RES"
cursor = conn.cursor()
cursor.execute(sql)
for row in cursor.execute("SELECT NAME FROM MY_RES"):
    print("NAME =", row[0])
    conn.commit()
    conn.close()
```

Question4. Write a SQL query that returns the names of restaurants in descending order that makes Chinese foods.

```
Import cx_Oracle
conn = cx_Oracle.connect("scott/scott")
sql = "SELECT * FROM MY_RES"
cursor = conn.cursor()
cursor.execute(sql)
for row in cursor.execute("SELECT NAME, FOODTYPE FROM MY_RES
                           WHERE FOODTYPE='Chinese'"):
    print("NAME =", row[0])
    print("FOODTYPE =", row[1])
    conn.commit()
    conn.close()
```



LAB REPORT 1: Python Basics and Conditions

- In this lab we learn Python basics and conditions.
- Python is high level programming language.
- Its syntax easy to understand.
- Its object oriented programming language.
- Let see the python basics& conditions.
- In this exercise we use python conditions like a if and if else control statements
- And applying some mathematical methods
- That satisfy the given question
- And find the solution easily
- The result is given and get the output from jupyter notebook.

LAB REPORT 2.PYTHON LOOPS

- A loop statement allows us to execute a statement or group of statements multiple times.
- In this lab we learn for loops and while loops
- The while loop in Python is used to iterate over a block of code as long as the test expression (condition) is true. We generally use this loop when we don't know the number of times to iterate beforehand.
- We use a while loop in this lab
- And satisfy the question use of while loop and conditions
- No difficulty was faced in this lab
- And finally get the output from jupyter notebook.

LAB REPORT3 : Python functions and Modules

- In this lab create function and some logical and mathematical programs will do this lab.
- Grouping related code into a module makes the code easier to understand and use.
- A function is a block of code which only runs when it is called. You can pass data, known as parameters, into a function. A function can return data as a result.
- In this exercise using functions and modules
- And satisfy the question and give a solution
- We learn function and conditional statement in this lab ●
And finally get a output from jupyter notebook.

LAB REPORT 4. Python string processsing

- In this lab we use a function and character and user defined function and loops
- Using this concepts. Its help to satisfy the question and get the output from jupyter notebook
- In this exercise we apply a some logics like a digits,vowels,consonants and remove punctuation.
- In this lab .we can use the join() method to concatenate two strings.we will find all the methods that a string object can call.
- And finally get the output from jupyter noteook.

LAB REPORT 5. List processing in python

- In this lab already covered concepts and function. We will use . but in this exercise we will see the tuple,for loop and using invoke methods.
- Using other string functions like first(),sort_first(),middle().

- In this exercise we learn so much of functions and operations.
- Use of this method and function satisfy the questions ●
And write a program and apply a method and operations.
- Finally get the output from jupyter notebook.

LAB REPORT 6: Python File Processing

- In this lab we use file processing method and concept will cover.
- Creating a Text File. Before we can begin working in Python, we need to make sure we have a file to work.
- We learn file processing methods and open,read,close function can used.
- And apply needed methods and function.
- The file processing was learning in this exercise.
- Finally get a output from jupyter notebook.

LAB REPORT 7. Dictionaries in python

- In this lab we will see the dictionary concept
- Use of dictionary and satisfy the question and given conditions.
- Dictionaries are used to store data values in key:value pairs.
- Write a program for fruit inventory management and telephone directory management and write a character and word counter.
- Some logic are working and get a results.
- And get outputs from jupyter notebook.

LAB REPORT 8: Python regular expressions

- For this exercise we used regular expression and apply some logics
- "re" module provides regular expression support. The `re.search()` method takes a regular expression pattern and a string and searches for that pattern within the string.
- Using email collections file and program will satisfy the following queries and conditions.
- And open a mbox file and satisfy the conditions.
- Extract the file and get a solution
- And get a outputs. help of jupyter notebook.

LAB REPORT 10.Implementation of Map, filter and Reduce Functions.

- In this lab we will do some functions.
- And create a user defined functions and implementation of Map,filter and Reduce functions.

-

Apply a function and conditions are needed places ●

We learn some ideas from learned concepts.

- Get some reference from internet especially stack overflow
- Stack overflow is used for so many places in our python coding.
- And finally a get output from jupyter notebook.

LAB REPORT 11: Retrieving Data From Web and Parsing.

- In this lab some libraries are import help of anaconda prompt.
- In this exercise retrieve data from web page using URLLIB.
- And also import some libraries like Bs4 and beautifulsoup.
- Its may help supporting the packages and webpages.
- And additionally used html tags for web scraping
- Web scraping is the process of collecting and parsing raw data from the Web, and the Python community has come up with some pretty powerful web scraping tools.
- In some websites are there how to webscraping using python
- Also our lab manual given a some references and websites.
- We learn webscraping and usage of libraries
- And finally write the code and get a results and outputs from jupyter notebook.

LAB REPORT 12: Data base Programming using sqlite3

- In this exercise we will see important concept. Its very useful for web development.

-
- How to connect data base use of sqlite3 or mysql database
- And also learn CRUD operation like a create,read,update and delete.

Python is easy for webdevelopment and storing a data help of sqldatabase.
- Import some library like a sqlite3. its used to access to allow the connection. We learn data base access.
- And after create,insert,delete,update functions are used.
- In this lab was most usefull for python web development.
- And finally the database connected and stored the values in sqlite3

LAB REPORT 13. 2D and 3D Data visualization using Matplotlib And Seaborn

- For this lab we learn data visualization. And how to using Matplotlib and seaborn
- Seaborn is another of Python's data visualization library built on top of Matplotlib, which have a high-level interface with attractive designs.
- Plot library is used for creating interactive and multidimensional plots making the process of data analysis easier by providing a better visualization for the data.
- In this lab we will face some difficulties.
- But finally we can do and get results.

LAB REPORT 14 : Animated Data visualization using R

- For this lab we learn Animated Data visualization

-
- And use a R-language and ganimate package to plot various animated charts using sample datasets.
- We will see how to visualize animated bar chart, line chart and scatter plot using R and ganimate package.
- The packages that are required to build animated plots in R are: ggplot2.
For first it will be difficult but we learn the structure and usage.
- Finally Get a animated data visualization and get a barchart, line chart and scatter plot using R and ganimate package.

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 your code with atleast 2 test cases

In [5]:

```
l=int(input("Length : "))
b=int(input("Breadth : "))
area=l*b
perimeter=2*(l+b)
print("Area of Rectangle : ",area)
print("Perimeter of Rectangle : ",perimeter)
```

```
Length : 12
Breadth : 12
Area of Rectangle : 144
Perimeter of Rectangle : 48
```

Question2. Write a program which accepts annual basic salary of an employee and calculates and displays the Income tax according to 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 test cases to validate all conditions

In [8]:

```
e_name=input("Employee Name: ")
salary=float(input("Your Annual Basic Salary: "))
if(salary<150000):
    tax=0
    netsalary=salary-tax
    print("No taxable Amount")
    print("Your Annual Income: ",netsalary)
elif(salary<300000):
    tax=0.2*salary
    netsalary=salary-tax
    print("Your Tax Amount: ",tax)
    print("Your Annual Income: ", netsalary)
elif(salary>300000):
    tax=0.3*salary
    netsalary=salary-tax
    print("Your Tax Amount: ",tax)
    print("Your Annual Income: ", netsalary)
```

```
Employee Name: Deebug
Your Annual Basic Salary: 10000000
Your Tax Amount: 3000000.0
Your Annual Income: 7000000.0
```

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

In [6]:

```
print("PSPRDEPARTMENT STORE")
name_item1=str(input("enter the item1: "))
quantity_1=int(input("enter the quantity1: "))
rate_1=int(input("enter the rate1: "))

name_item2=str(input("enter the item2: "))
quantity_2=int(input("enter the quantity2: "))
rate_2=int(int(input("enter the rate2: ")))

name_item3=str(input("enter the item3: "))
quantity_3=int(input("enter the quantity3: "))
rate_3=int(input("enter the rate3: "))

amount=(quantity_1*rate_1)+(quantity_2*rate_2)+(quantity_3*rate_3)
price=amount

if amount > 2000:
    print("DISCOUNT 20%.....||\n")
    discount=(amount*20)/100
    price -= discount
elif amount > 1500 and amount < 1999:
    print("DISCOUNT 15%.....||\n")
    discount=(amount*15)/100
    price -= discount
elif amount > 1000 and amount < 1499:
    print("DISCOUNT 8%.....||\n")
    discount=(amount*8)/100
    price -= discount
print("\ntotal amount: ",amount)
print("\ntotal discount: ",discount)
print("\nfinal price to be paid by customer: ",price)
```

```
PSPRDEPARTMENT STORE
enter the item1: rice
enter the quantity1: 12
enter the rate1: 12
enter the item2: sugar
enter the quantity2: 12
enter the rate2: 139
enter the item3: munch
enter the quantity3: 3
enter the rate3: 123
DISCOUNT 20%.....||
```

```
total amount: 2181
total discount: 436.2
final price to be paid by customer: 1744.8
```

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

In [15]:

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

```
188.8888888888889
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>

In [19]:

```
name = str(input("Enter your name: "))
subject_1 = float(input("Please enter Subject 1 Mark: "))
subject_2 = float(input("Please enter Subject 2 Mark: "))
subject_3 = float(input("Please enter Subject 3 Mark: "))

total = int(subject_1+subject_2+subject_3)
average = total / 3
percentage = (total / 300) * 100

if(percentage>=80):
    print("\nCongratulation!", name, "you secured a total of", total, "and your class is : 1st Class")
elif(percentage>=60 and percentage<=80):
    print("\nCongratulation!", name, "you secured a total of", total, "and your class is : 2nd Class")
elif(percentage>=40 and percentage<=59):
    print("\nCongratulation!", name, "you secured a total of", total, "and your class is : Pass Class")
else:
    print("you are fail")
```

```
Enter your name: Deepak
Please enter Subject 1 Mark: 100
Please enter Subject 2 Mark: 89
Please enter Subject 3 Mark: 79
```

```
Congratulation! Deepak you secured a total of 268 and your class is: 1st Class
```

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

```

if n>0:
    print("number is POSITIVE \n")
    if n%2==0:
        print("number is even \n")
    else:
        print("number is odd \n")
elif n<0:
    print("number is NEGETIVE \n")
    if n%2==0:
        print("number is even \n")
    else:
        print("number is odd \n")
else:
    print("number is ZERO \n")

print("ASCII values \n")
if n>=65 and n<=91:
    print("represents UPPERCASE LETTER \n")
elif n>=97 and n<=122:
    print("represents LOWERCASE LETTER \n")
elif n>=48 and n<=57:
    print("represents DIGIT \n")

val=chr(n)
print("the value" ,val)
char=str(input("Enter ASCII values \n"))
print(ord(char))
n=100
chr(n)

char=str(input("Enter a single number or a letter \n"))
if(ord(char)>=65 and ord(char)<=90):
    print("IT IS AN UPPERCASE LETTERS")
elif(ord(char)>=97 and ord(char)<=122):
    print("IT IS AN LOWERCASE LETTERS")
else:
    (ord(char)>=48 and ord(char)<=57)
    print("IT IS A DIGIT")

```

Enter the number to check ODD or EVEN:

99

number is POSITIVE

number is odd

ASCII values

represents LOWERCASE LETTER

the value c

Enter ASCII values

k

107

Enter a single number or a letter

0

IT IS A DIGIT

In []:

I AR-2

Question1 Write a program that accepts numbers continuously as long as the number is positive and prints the sum of the numbers read (Use while loop) A sample user interaction will be:

```
Enter a number: 2
Enter a number: 1
Enter a number: 4
Enter a number: 6
Enter a number: -10
Sum = 13
```

In [2]:

```
total = 0
i = int(input("Enter any integer "))
while i > 0:
    total = total + i
    i = int(input("Enter next integer "))
print("\nThe sum of all numbers entered is", total)
```

```
Enter any integer 1
Enter next integer 2
Enter next integer 3
Enter next integer 4
Enter next integer 5
Enter next integer -2
```

```
The sum of all numbers entered is 15
```

Question 2 Write a program to take the values of two integers m and n from the user. Calculate the sum of even number between m and n (including both m and n). Please note that value of m must be less than value of n. If m > n then you must print a message "Value of m should be less than n" and ask for next input values. Print the values of m, n and sum (Use while loop). The program should continue until user types 'q' to quit the program.

Sample user interaction:

```
Enter m: 1
Enter n: 10
Sum of even numbers: 20
Do you want to quit (Type q)? :
Enter m: 2
Enter n: 10
Sum of even numbers: 20
Do you want to quit (Type q)? :
Enter m: 20
Enter n: 10
Value of m should be less than n
Do you want to quit (Type q)? : q
```

In [3]:

```
while True:
```

```
while True:
```

```

m = int(input("Enter any value for m= "))
n = int(input("Enter any value for n= "))

print("Value of m should be less than n")

sum = 0
for i in range (m,n+1):
    if i%2 ==0:
        sum = sum + i
print(sum)
reply=str(input("\n Do you want to quit? (type 'q'): "))
if reply =='q':
    break;

```

```

Enter any value for m= 1
Enter any value for n= 10
Value of m should be less than n
30

```

```

Do you want to quit? (type 'q'): y
Enter any value for m= 2
Enter any value for n= 10
Value of m should be less than n
30

```

```
Do you want to quit? (type 'q'): q
```

Question3. Write a program to accept n and display its multiplication table. Value of n must be provided by the user. (Example: n 1, n 2,...,n*10) (Use for loop)

In [14]:

```

num = int(input("Enter the number: "))
print("Multiplication Table of", num)
for i in range(1, 11):
    print(num, "X", i, "=", num * i)

```

```

Enter the number: 123
Multiplication Table of 123
123 X 1 = 123
123 X 2 = 246
123 X 3 = 369
123 X 4 = 492
123 X 5 = 615
123 X 6 = 738
123 X 7 = 861
123 X 8 = 984
123 X 9 = 1107
123 X 10 = 1230

```

Question4. Write a program that receives an integer and prints the sum of its digits. For example, an input 125 will print output 1+2+5=8.

Try out with the following test cases

```

125
12
2
-15

```

In [16]:

```
digit = num % 10
total = total + digit
num = num // 10
print("Sum of the integer is:", total)
```

```
Enter a integer: 125
Sum of the integer is: 8
```

Question5 Develop an application in Python that repeatedly reads numbers until the user enters done. Once done is entered print out the total count and average of the numbers. If the user enters anything other than a number detect their mistake using try and except and print an error message and skip to the next number

In [18]:

```
num = 0
tot = 0
while True:
    number = input("Enter a number: ")
    if number == 'done':
        break
    try :
        num1 = int(number)
    except:
        print('Invailed Input')
        continue
    num = num+1
    tot = tot + num1
    avg = tot/num
print ('\ndone')
print ('\ntotal',tot)
print ('\nnum',num)
print ('\naverage',avg)
```

```
Enter a number: 1
Enter a number: 2
Enter a number: 3
Enter a number: 4
Enter a number: 3
Enter a number: 12
Enter a number: done
```

```
done
```

```
total 25
```

```
num 6
```

```
average 4.166666666666667
```

In []:

Lab3. Python Functions and Modules

Question 1: create a function prime() that receives an integer and returns whether n is prime or not. Print all prime numbers from 1 to 100 by calling prime() function.

In [34]:

```
def prime(num):
    for i in range(2,num):
        if num%i == 0:
            return 0
    else:
        return num

while True:
    n=int(input("Enter the number: "))
    if n==0:
        print("\nLoop ends here... \n\n\nHere we are printing all prime numbers from 1
to 100 using prime function: \n\n")
        break
    a=prime(n)
    if a!= 0:
        print(n,"is prime number\n")
    else:
        print(n,"is not prime number\n")

def prime(n):
    status = True
    if n < 2:
        status = False
    else:
        for i in range(2,n):
            if n % i == 0:
                status = False
    return status

for n in range(1,100):
    if prime(n):
        if n==100:
            print ('Prime',n)
        else:
            print ('Prime',n)
```

Enter the number: 1
1 is prime number

Enter the number: 2
2 is prime number

Enter the number: 3
3 is prime number

Enter the number: 4
4 is not prime number

Enter the number: 5
5 is prime number

Enter the number: 6
6 is not prime number

Enter the number: 0

Loop ends here...

Here we are printing all prime numbers from 1 to 100 using prime function:

```
Prime 2
Prime 3
Prime 5
Prime 7
Prime 11
Prime 13
Prime 17
Prime 19
Prime 23
Prime 29
Prime 31
Prime 37
Prime 41
Prime 43
Prime 47
Prime 53
Prime 59
Prime 61
Prime 67
Prime 71
Prime 73
Prime 79
Prime 83
Prime 89
Prime 97
```

Explanation 1 - Here we need to print the integer from the user wheather the entered number is prime number or not to do that we are creating a function using (def) and giving certain conditions in (while, if, else) which to validate specific condition in each block. Then we call prime function to print prime numbers from 1 to 100

Question 2: Develop a simple arithmetic calculator for 4 operations. The program should continue calculation until user types 'q' to quit. A sample user interaction can be:

```
Enter operator(q to quit): + Enter value 1: 10 Enter value 2: 20 Result = 30
```

Create 4 functions add(), subtract(), multiply(), and divide() that receives two values and returns the result of the operation. Now perform the following operations by calling the corresponding functions. Validate your outputs

1. 10+20
2. 20-5
3. 8*5
4. 50/3

In [35]:

```
def add(a,b):
    return a+b
def sub(a,b):
    return a-b
def mul(a,b):
    return a*b
def div(a,b):
    if b==0:
        print("division is not possible ")
    else:
        return a/b

while True:
    print("Enter the opertor: ")
    operator=input()
```

```

if (operator=='+'):
    r=add(a,b)
elif (operator=='-'):
    r=sub(a,b)
elif (operator =='*'):
    r=mul(a,b)
elif (operator=='/'):
    r=div(a,b)
print("Result is ",r,'\\n')
print("Quit")

```

Enter the opertor:

+

Enter the value of 1: 10
 Enter the value of 2: 20
 Result is 30

Enter the opertor:

-

Enter the value of 1: 20
 Enter the value of 2: 5
 Result is 15

Enter the opertor:

*

Enter the value of 1: 8
 Enter the value of 2: 5
 Result is 40

Enter the opertor:

/

Enter the value of 1: 50
 Enter the value of 2: 3
 Result is 16.66666666666668

Enter the opertor:

q

Quit

Explanation 2: Here we are creating 4 generate functions using 1 add 2 sub 3 mul 4 div I need to get input from the user to 'enter the operator' 'Enter the value 1' 'Enter the value 2' then using if and else operation it perform a validate add sub mul div while performing division if the innput is 0 then it print division is not possible else it perform next step. Then finally when the user enter q the program is to quite

Question3. Create a function factorial() that takes an integer and returns its factorial value.

- You can create as a non-recursive version of factorial
- Also, check factorial of negative number does not exist.
- Factorial of 0 is 1.
- Save this Python file as factorial_definition.py.

Now open another file and can import factorial_definition.py as follows:

- import factorial_definition
- You can call function function as factorial_definition.factorial().

Now print the following factorial values:

- 1. factorial_definition.factorial(3)
- 1. factorial_definition.factorial(5)
- 1. factorial_definition.factorial(10)

In [1]:

In [1]:

```
def factorial(n):
    result = 1;
    if(n < 0):
        print("The factorial does not exist for negative numbers")
    elif(n==0):
        print("The factorial of 0 is 1")
    elif(n==1):
        return 1
    else:
        for i in range(2, n + 1):
            result = result * i;
        return result;
```

Create a non recursive function factorial() that takes an integer and returns its factorial value. Save the python file as .py and import the module and use the functions.

In [2]:

```
import factorial_definition

factorial_definition.factorial(3)
```

Out[2]:

6

In [3]:

```
factorial_definition.factorial(5)
```

Out[3]:

120

In [4]:

```
factorial_definition.factorial(10)
```

Out[4]:

3628800

Lab4 Python String Processing

Question1: Develop a function count_letter(string, search) that returns the number of times search character appears in a string.

Test cases:

```
Str = "hello world".Search = 'o'. Calling count_letter(str, search) should return output 2  
Str = "HeLlo wOrld". Search = 'o'. Then, calling count_letter(str, search) will return output 1
```

Modify count_letter() so that it ignores case sensitivity, so that o and O are same.

```
Str = "HeLlo wOrld". Search='o'. Calling count_letter(str, search) will return output 2
```

In [2]:

```
def count_letter(word, search):  
    return count  
word = input("Enter the words to search: ").lower()  
search = input("Enter the character to search: ").lower()  
count = 0  
for char in word:  
    if char == search:  
        count += 1  
print(count_letter(word, search))
```

```
Enter the words to search: hello world  
Enter the character to search: o  
2
```

Question2: Write a program that counts the number of spaces, digits, vowels and consonants in a string that the user inputs. Print the string no of spaces, no of digits, no of vowels and no of consonants.

Test case: Enter a string: Bishop Heber College 17. Then output should be:

```
Given string: Bishop Heber College 17  
No. of spaces: 3  
No. of digits: 2  
No. of vowels: 7  
No. of consonants: 12
```

In [4]:

```
s =input("Enter the string: ")  
a = s.lower()  
vowels = "aeiou"  
consonants = "bcdfghjklmnpqrstvwxyz"  
digits = "1234567890"  
space = " "  
c = 0  
v = 0  
d = 0
```

```

for i in a:
    if i in vowels:
        v+=1
    elif i in consonants:
        c+=1
    elif i in digits:
        d+=1
    elif i in space:
        sp+=1

print("\nSpace: ",sp,"Digits: ",d,"Vowels: ",v,"Consonants: ",c)

```

Enter the string: bishop heber college 19

Space: 3
 Digits: 2
 Vowels: 7
 Consonants: 11

Question3. Develop a function remove_punctuation(str) that returns the string after removing the following punctuations

Punctuation List = "!"#\$%&'^*_-/:;<=>?@`{}"

Test case:

Str="Bishop's College !.....". Calling remove_punctuation(str) should return output as "Bishop College"
 Str="#bhc trending @cs \$placements:::>." Calling remove_punctuation(str) should return output as "bhc trending cs placements"

In [6]:

```

def remove_punctuation(string):
    punctuations = '!()-[]:,.<>>/?@#$%^&*`{}'
    for x in string.lower():
        if x in punctuations:
            string = string.replace(x, "")
    print(string)

```

In [7]:

```

string=(input("Enter the string with symbols: "))
remove_punctuation(string)

```

Enter the string with symbols: #bhc trending @cs \$placements:::>.
 bhc trending cs placements

Question4. Write a program that asks the user for a word. Translate their word into Pig Latin. Pig Latin name takes the first consonant (or set of first consonants) of an English word moves it to the end of the word and suffixes an ay. If the first letter is a vowel do not move that vowel but instead add "way" at the end of the word

Test Cases:

```

Enter a word: pig
    Output: ig-pay
Enter a word: banana
    Output: anana-bay
Enter a word: trash
    Output: ash-tray
Enter a word: apple
    Output: apple-way
Enter a word: orange
    Output: orange-way

```

```
Enter a word: orange
Output: orange-way
```

Modify your program so that it becomes a function piglatin(word) and returns translated word as output. Call this function 3 times with the same inputs and validate the outputs.

In [9]:

```
word = input("Enter a word to translate to pig latin:")
def piglatin(word):
    ay = 'ay'
    way = 'way'
    p = '-'
    consonant = ('B', 'C', 'D', 'F', 'G', 'H', 'J', 'K', 'L', 'M', 'N', 'P', 'Q', 'R', 'S', 'T', 'Y', 'V',
    'X', 'Z')
    vowel = ('A', 'E', 'I', 'O', 'U')
    first_letter = word[0]
    first_letter = str(first_letter)
    first_letter = first_letter.upper()
    if first_letter in consonant:
        print(first_letter, 'is a consonant')
        length_of_word = len(word)
        remove_first_letter = word[1:length_of_word]
        pig_latin = remove_first_letter+p+first_letter+ay
        print('The word in Pig Latin is:', pig_latin)
    elif first_letter in vowel:
        print(first_letter, "is a vowel")
        pig_latin = word+p+way
        print('The word in Pig Latin is:', pig_latin)
    else:
        print('I dont know what', first_letter, 'is')
```

```
Enter a word to translate to pig latin:pig
```

In [10]:

```
piglatin(word)
```

```
P is a consonant
The word in Pig Latin is: ig-Pay
```

In []:

Lab5. List Processing in Python

Question1: Write a function `find_average(student)` that takes student tuples as input and print student rollno, name, marks and average marks as output.

- Test Cases:

```
1. Stud1=(1,"rex",60,85,70)
   find_average(stud1)
```

Modify the above function `find_average(student)` so that it processes a tuple of tuples.

```
2. Stud2=(2,"rex", (80,75,90))
   find_average(stud2)
```

In [3]:

```
def find_average(student):
    roll, name, marks = student
    total = 0
    for mark in marks:
        total += mark
    avg = total / len(marks)
    print("Roll No:", roll, "Name:", name, "Average:", avg)
```

In [4]:

```
stud1 = (1, "rex", (60,85,70))
```

In [5]:

```
find_average(stud1)
```

Roll No: 1 Name: rex Average: 71.66666666666667

In [6]:

```
stud2 = (2, "Rex", (80,75,90))
```

In [7]:

```
find_average(stud2)
```

Roll No: 2 Name: Rex Average: 81.66666666666667

Question2: Write a weight management program that prompts that prompts the user to enter in 7 days of their body weight values as float numbers. Store them in list. Then print first day weight, last day weight, 4th day weight, highest weight, lowest weight and average weight.

Finally, print if average weight < lowest weight, then print "Your weight management is excellent". Otherwise print "Your weight management is not good. Please take care of your diet".

In [5]:

```
list=[]
for i in range(7):
    c=float(input("Enter your weight:"))
    list.append(c)
print("\n\nFirst day weight",list[0])
print("\nLast day weight",list[-1])
print("Highest weight is",max(list))
```

```

Firstday=list[0]
Lastday=list[-1]
avg=round(sum(list)/len(list))
low_weight=min(list)
if(avg<low_weight):
    print("\nYour weight management is excellent")
else:
    print("\nYour weight management is not good. Please take care of your diet")

```

Enter your weight:70
 Enter your weight:71
 Enter your weight:72
 Enter your weight:73
 Enter your weight:74
 Enter your weight:75
 Enter your weight:76

First day weight 70.0

Last day weight 76.0

Highest weight is 76.0

Lowest weight is 70.0

Average of weight is 73

Your weight management is not good. Please take care of your diet

QUESTION 3: Write a function lastN(lst,n) that takes a list of integers and n and returns n largest numbers.

How many numbers you want to enter?: 6 Enter a number: 12 Enter a number: 32 Enter a number: Enter a number: Enter a number: Enter a number:

How many largest numbers you want to find?: 3 Largest numbers are: 52, 45, 32

In [13]:

```

def lastN(lst, n):
    final_list = []

    for i in range(n):
        max1 = 0

        for j in lst:
            if j > max1:
                max1 = j;

        lst.remove(max1);
        final_list.append(max1)
    print("\nlargest numbers:",final_list)

b=int(input("How many number want to enter?: "))
lst=[]
for i in range(b):
    c=int(input("\nEnter a number: "))
    lst.append(c)

n=int(input("\nHow many largest numbers you want to find?: "))
lastN(lst,n)

```

How many number want to enter?: 6

Enter a number: 12

```
Enter a number: 24
Enter a number: 2
Enter a number: 29
How many largest numbers you want to find?: 3
largest numbers: [34, 29, 24]
```

QUESTION 4: Given a list of strings, return a list with the strings in sorted order, except group all the strings that begin with "X" first. Hint: this can be done by making 2 lists and sorting each of them before combining them.

Test Cases:

- 1. Input: ['min', 'xyz', 'apple', 'xanadu', 'aardvark'] Output: ['xanadu', 'xyz', 'aardvark', 'apple', 'mix']
- 2. Input: ['ccc', 'bbb', 'aaa', 'xcc', 'xaa'] Output: ['xaa', 'xcc', 'aaa', 'bbb', 'ccc']
- 3. Input: ['bbb', 'ccc', 'axx', 'xzz', 'xaa'] Output: ['xaa', 'xzz', 'axx', 'bbb', 'ccc']

In [14]:

```
def front_x(words):
    xlist = []
    alist = []

    for word in words:
        if word.startswith("x"):
            xlist.append(word)
        else:
            alist.append(word)
    return sorted(xlist) + sorted(alist)
```

In [15]:

```
words=['min', 'xyz', 'apple', 'xanadu', 'aardvark']
front_x(words)
```

Out[15]:

```
['xanadu', 'xyz', 'aardvark', 'apple', 'min']
```

In [16]:

```
words=['ccc', 'bbb', 'aaa', 'xcc', 'xaa']
front_x(words)
```

Out[16]:

```
['xaa', 'xcc', 'aaa', 'bbb', 'ccc']
```

In [17]:

```
words=['bbb', 'ccc', 'axx', 'xzz', 'xaa']
front_x(words)
```

Out[17]:

```
['xaa', 'xzz', 'axx', 'bbb', 'ccc']
```

QUESTION 5: Develop a function sort_last(). Given a list of non-empty tuples, return a list sorted in increasing order by the last element in each tuple. Hint: use a custom key= function to extract the last element from each tuple.

Test Cases:

In [18]:

```
def last(n): return n[-1]

def sort_list_last(tuples):
    return sorted(tuples, key=last)

print("Test Case:1 \n\tInput:[(1,7),(1,3),(3,4,5),(2,2)] \n\tOutput:",sort_list_last([(1,7),(1,3),(3,4,5),(2,2)]))

print("Test Case:2 \n\tInput:[(1,3),(3,2),(2,1)] \n\tOutput:",sort_list_last([(1,3),(3,2),(2,1)]))

print("Test Case:3 \n\tInput:[(2,3),(1,2),(3,1)] \n\tOutput:",sort_list_last([(2,3),(1,2),(3,1)]))
```

Test Case:1

Input: [(1,7),(1,3),(3,4,5),(2,2)]
Output: [(2, 2), (1, 3), (3, 4, 5), (1, 7)]

Test Case:2

Input: [(1,3),(3,2),(2,1)]
Output: [(2, 1), (3, 2), (1, 3)]

Test Case:3

Input: [(2,3),(1,2),(3,1)]
Output: [(3, 1), (1, 2), (2, 3)]

Question6. Other String Functions

- a) Define a function **first()** that receives a tuple and returns its first element
- b) Define a function **sort_first()** that receives a list of tuples and returns the sorted
- c) Print lists in sorted order
- d) Define a function **middle()** that receives a tuple and returns its middle element
- e) Define a function **sort_middle()** that receives a list of tuples and returns it sorted using the key middle
- f) Print the list **[(1,2,3), (2,1,4), (10,7,15), (20,4,50), (30, 6, 40)]** in sorted order. Output should be: **[(2, 1, 4), (1, 2, 3), (20, 4, 50), (30, 6, 40), (10, 7, 15)]**

In [22]:

```
def first(num):
    for j in num:
        a,b,c=j
        print(a)

def sort_first(num):
    new_list=sorted(num)
    return new_list

def lists(num):
    return sorted(num, key=None, reverse=0)

def middle(num):
    for j in num:
        a,b,c=j
        print(b)

def sort_middle(num):
    return sorted(num, key = lambda mid:mid[1])
num=[(1,2,3),(2,1,4),(10,7,15),(20,4,50),(30,6,40)]
```

In [23]:

```
first(num)
```

20
30

In [25]:

```
sort_first(num)
```

Out[25]:

```
[ (1, 2, 3), (2, 1, 4), (10, 7, 15), (20, 4, 50), (30, 6, 40) ]
```

In [21]:

```
sort_middle(num)
```

Out[21]:

```
[ (2, 1, 4), (1, 2, 3), (20, 4, 50), (30, 6, 40), (10, 7, 15) ]
```

In [24]:

```
middle(num)
```

```
2  
1  
7  
4  
6
```

QUESTION7: Develop a function `remove_adjacent()`. Given a list of numbers, return a list where all adjacent same elements have been reduced to a single element. You may create a new list or modify the passed in list.

Test Cases:

- 1. Input:[1, 2, 2, 3] and Output:[1, 2, 3]
- 2. Input:[2, 2, 3, 3, 3] and Output:[2, 3]
- 3. Input:[1] Output:[1]
- 4. Input:[2, 5, 5, 6, 6, 7] and Output:[2, 5, 6, 7]
- 5. Input:[6, 7, 7, 8, 9, 9] and Output:[6, 7, 8, 9]

In [1]:

```
def remove_adjacent(lst):  
    a = []  
    for item in lst:  
        if len(a):  
            if a[-1] != item:  
                a.append(item)  
        else:  
            a.append(item)  
    return a
```

In [2]:

```
remove_adjacent([1, 2, 2, 3])
```

Out[2]:

```
[1, 2, 3]
```

In [3]:

```
remove_adjacent([2, 2, 3, 3, 3])
```

Out[3]:

```
[2, 3]
```

In [4]:

```
remove_adjacent([2, 5, 5, 6, 6, 7])
```

```
Out[4]:
```

```
[2, 5, 6, 7]
```

```
In [5]:
```

```
remove_adjacent([6,7,7,8,9,9])
```

```
Out[5]:
```

```
[6, 7, 8, 9]
```

```
In [6]:
```

```
remove_adjacent([])
```

```
Out[6]:
```

```
[]
```

QUESTION8: Write a function `verbing()`. Given a string, if its length is at least 3, add 'ing' to its end. Unless it already ends in 'ing', in which case add 'ly' instead. If the string length is less than 3, leave it unchanged. Return the resulting string. So 'hail' yields: `hailing`. 'swimmmin' yields: `swimminaly`; 'do' yields: `do`.

```
In [7]:
```

```
def verbing(str):
    length = len(str)
    if length > 2:
        if str[-3:] == 'ing':
            str += 'ly'
        else:
            str += 'ing'
    return str
```

```
In [8]:
```

```
verbing("hail")
```

```
Out[8]:
```

```
'hailing'
```

```
In [9]:
```

```
verbing("swimming")
```

```
Out[9]:
```

```
'swimmingly'
```

```
In [10]:
```

```
verbing("do")
```

```
Out[10]:
```

```
'do'
```

QUESTION9: Develop a function `not_bad()`. Given a string, find the first appearance of the substring 'not' and 'bad'. If the 'bad' follows the 'not', replace the whole 'not'..'bad' substring with 'good'. Return the resulting string. So 'This dinner is not that bad!' Yields: 'This dinner is good!'

```
In [11]:
```

```
def not_bad(s):
    snot = s.find('not')
    shad = s.find('bad')
```

In [12]:

```
not_bad("This dinner is not really that bad!")
```

Out[12]:

```
'This dinner is good!'
```

Lab6. Python File Processing

Question1:Write a program for Password Management System

- **File creation:** Ask user to enter N user names and their passwords. Store usernames andpasswords into a file named “loginfile.txt”. Store each user and password in one line.
- **File Processing:** Write a program that opens your “loginfile.txt” file and reads usernames and passwords from it. Store user names in one list and passwords in another lists.
- **Querying:** ask user to enter user name and password for verification. If they match the values stored in the lists, print a message “Login Successful”. Otherwise print a message “Login Failed, try again”

In [4]:

```
def register():
    username = input("Please input the first 2 letters of your first name and your birth
year ")
    password = input("Please input your desired password ")
    file = open("loginfile.txt","a")
    file.write(username)
    file.write(" ")
    file.write(password)
    file.write("\n")
    file.close()
    if login():
        print("You are now logged in...")
    else:
        print("You aren't logged in!")

def login():
    username = input("Please enter your username: ")
    password = input("Please enter your password: ")
    for line in open("loginfile.txt","r").readlines(): # Read the lines
        login_info = line.split() # Split on the space, and store the results in a list
        of two strings
        if username == login_info[0] and password == login_info[1]:
            print("Correct credentials!")
            return True
    print("Incorrect credentials.")
    return False
```

In [5]:

```
register()
```

```
Please input the first 2 letters of your first name and your birth year deepak
Please input your desired password 987654321
Please enter your username: deepak
Please enter your password: 987654321
Correct credentials!
You are now logged in...
```

In [3]:

```
login()
```

```
Please enter your username: deepak
Please enter your password: 987654321
Correct credentials!
```

Out [3]:

```
True
```

- Create a text file, 'marks.txt', with N marks as floating point numbers. Open the file, read marks from it and compute and print the highest mark.
- If the user runs the program more than once you should not overwrite the previous text file – simply append the marks to the end of the file.
- Modify the above program so that it also prints Top-3 highest marks (Note: you may need to use list concept)
- Modify the above program so that it also prints the Lowest-3 marks.

In [4]:

```

marks= [99.0,100.0,95.0,96.0,97.0]
with open('marks1.txt', 'a') as file:
    for mark in marks:
        file.write("%.1f\n" % mark)
number_list=[]
with open('marks1.txt', 'r') as fp:
    number_list = [float(item) for item in fp.readlines()]
print(max(number_list))

def Nmaxelements(list1, N):
    final_list = []
    for i in range(0, N):
        max1 = 0
        for j in range(len(list1)):
            if list1[j] > max1:
                max1 = list1[j];
        list1.remove(max1);
        final_list.append(max1)
    print(final_list)
Nmaxelements(number_list,3)

def Nminelements(list1, N):
    final_list =[];
    for i in range(0, N):
        min1 = 9999999;
        for j in range(len(list1)):
            if list1[j]<min1:
                min1 = list1[j];
        list1.remove(min1);
        final_list.append(min1)
    print(final_list)
Nminelements(number_list,3)

```

```

100.0
[100.0, 100.0, 100.0]
[95.0, 95.0, 95.0]

```

Question:3 Write a program for Stock Price Analysis

- File Creation: Continually prompt a user for stock name, followed by price values for 5 days. Each row indicates stock name and daily prices of one stock. Store these values in a text file called "stock-prices.txt". Open the file in Append Mode. Prompt message "Do you want to continue? " and stop reading values accordingly. Then, you can close your file.
- File Processing: Now, open your file for processing. Print stock name, minimum price, maximum price and average price values.
- You can also print which day stock price was lowest in the week and which day stock price was highest. So, modify your print statement to print stock name, minimum price & day of minimum price, maximum price & day of maximum price and average price values. (Hint: Use enumerate to get index values)

In [11]:

```

while True:
    choice = input("Enter 1 to Continue or 0 to Exit")

```

```

for i in range(5):
    p=input()
    file.write(p)
    file.write("  ")
file.write("\n")
con = str(input("want to continue : "))
if con =='n':
    break
file.close()

```

Enter the name: HDFC

12
15
20
19
22

want to continue : Y

Enter the name: TESLA

99
100
121
132
143

want to continue : Y

Enter the name: GOOGLE

112
122
143
154
164

want to continue : N

Enter the name: WALMART

11
15
16
25
30

want to continue : n

In [13]:

```

for st in open("stock_prices.txt", "r").readlines():
    p_min=[]
    calc=st.split()
    print(calc[0])
    for i in range(1,4):
        p_min.append(int(calc[i]))
    print(min(p_min))
    print(max(p_min))
    av=sum(p_min)
    avg=av/5
    print(avg)
    print("\n")

```

dell
100
121
66.4

apple
132
137
80.6

lenovo
111
100

```
tcl  
89  
99  
55.6
```

```
HDFC  
12  
20  
9.4
```

```
TESLA  
99  
121  
64.0
```

```
GOOGLE  
112  
143  
75.4
```

```
WALMART  
11  
16  
8.4
```

In [15]:

```
for st in open("stock_prices.txt", "r").readlines():  
    p_min=[ ]  
    print("-----")  
    calc=st.split()  
    print(calc[0])  
    for i in range(1,4):  
        p_min.append(int(calc[i]))  
    mip=min(p_min)  
    mxp=max(p_min)  
    im=p_min.index(mip)  
    ix=p_min.index(mxp)  
    print("min price ",mip," on day ",im+1)  
    print("max price ",mxp," on day ",ix+1)
```

```
-----  
dell  
min price 100 on day 1  
max price 121 on day 2  
-----  
apple  
min price 132 on day 2  
max price 137 on day 3  
-----  
lenovo  
min price 111 on day 1  
max price 122 on day 3  
-----  
tcl  
min price 89 on day 1  
max price 99 on day 2  
-----  
HDFC  
min price 12 on day 1  
max price 20 on day 3  
-----
```

```
GOOGLE
min price 112 on day 1
max price 143 on day 3
-----
WALMART
min price 11 on day 1
max price 16 on day 3
```

Question:4 Write a program for File Explorer

Display the contents of file 1.Count the number of lines in a text file. (Use splitlines()) 2.Count the number of unique words in a file. 3.Find frequency of words in a given file. (Hint: Use Counter object) 4.Show a random line in a file. (Use Random object)

In [25]:

```
print("1.Display the contents of File:")
print("-----")
f = open("samplemv.txt", 'r')
display = f.read()
print(display)
f.close()
print("")

print("2.Count the number of lines in a text file:")
print("-----")
file = open("samplemv.txt", "r")
Counter = 0
Content = file.read()
CoList = Content.split("\n")

for i in CoList:
    if i:
        Counter += 1
print("Number of lines in the text file:", Counter)
print("\n")

print("3.Count the number of unique words in a file:")
print("-----")
num_words = 0
c = open("samplemv.txt", 'r')
for line in c:
    words = line.split()
    num_words += len(words)
print("Number of words:", num_words)
c.close()
print("\n")

print("4.Find Find frequency of words in a given file:")
print("-----")
fname = input('Enter the file name: ')
print("-----")
try:
    fhand = open(fname)
    counts = dict()
    for line in fhand:
        words = line.split()
        for word in words:
            if word in counts:
                counts[word] += 1
            else:
                counts[word] = 1
    print(counts)
except:
```

```

print("5.Show a random line in a file:") print("-----")
")
import random def
random_line(fname):
    lines = open(fname).read().splitlines()
return
random.choice(lines)
print(random_line("samplemv.txt"))

```

1.Display the contents of File:

Tesla, Inc. is an American electric vehicle and clean energy company based in Palo Alto, California. Tesla's current products include \ electric cars, battery energy storage from home to grid scale, solar panels and solar roof tiles, as well as other related products and services. Tesla ranked as the world's best-selling plug-in and battery electric passenger car manufacturer in 2019, with a market share of 17% of the plug-in segment and 23% of the battery electric segment. Through its subsidiary SolarCity, Tesla develops and is a major installer of solar photovoltaic systems in the United States. Tesla is also one of the largest global suppliers of battery energy storage systems, from home-scale to grid-scale. Tesla installed some of the largest battery storage plants in the world and supplied 1.65 GWh of battery storage in 2019. Founded in July 2003 as Tesla Motors, the company's name is a tribute to inventor and electrical engineer Nikola Tesla. Elon Musk, who contributed most of the funding in the early days, has served as CEO since 2008. According to Musk, the purpose of Tesla is to help expedite the move to sustainable transport and energy, obtained through electric vehicles and solar power. Tesla began production of their first car model, the Roadster, in 2009. The Roadster was a luxury sports car. This was followed by the Model S sedan in 2012, the Model X SUV in 2015, and the higher volume Model 3 sedan in 2017. Tesla global vehicle sales were 499,550 units in 2020, a 35.8% increase over the previous year. In 2020, the company surpassed the 1 million mark of electric cars produced. The Model 3 ranks as the world's all-time best-selling plug-in electric car, with more than 500,000 delivered. Tesla has been the subject of numerous lawsuits and controversies arising from statements and acts of CEO Elon Musk, allegations of whistleblower retaliation, alleged worker rights violations, and allegedly unresolved and dangerous technical problems with their products.

2.Count the number of lines in a text file:

Number of lines in the text file: 17

3.Count the number of unique words in a file:

Number of words: 325

4.Find Find frequency of words in a given file:

Enter the file name: samplemv.txt

```

{'Tesla': 1, 'Inc.': 1, 'is': 5, 'an': 1, 'American': 1, 'electric': 7, 'vehicle': 2, 'and': 15, 'clean': 1, 'energy': 3, 'company': 2, 'based': 1, 'in': 12, 'Palo': 1, 'Alto': 1, 'California': 1, "Tesla's": 1, 'current': 1, 'products': 2, 'include': 1, '\\': 1, 'cars': 1, 'battery': 6, 'storage': 4, 'from': 3, 'home': 1, 'to': 6, 'grid': 1, 'scale': 1, 'solar': 4, 'panels': 1, 'roof': 1, 'tiles': 1, 'as': 6, 'well': 1, 'other': 1, 'related': 1, 'services': 1, 'Tesla': 9, 'ranked': 1, 'the': 21, "world's": 2, 'best-selling': 2, 'plug-in': 3, 'passenger': 1, 'car': 2, 'manufacturer': 1, '2019': 1, 'with': 3, 'a': 5, 'market': 1, 'share': 1, 'of': 15, '17%': 1, 'segment': 1, '23%': 1, 'segment.': 1, 'Through': 1, 'its': 1, 'subsidiary': 1, 'SolarCity': 1, 'develops': 1, 'major': 1, 'installer': 1, 'photovoltaic': 1, 'systems': 1, 'United': 1, 'States': 1, 'also': 1, 'one': 1, 'largest': 2, 'global': 2, 'suppliers': 1, 'systems': 1, 'home-scale': 1, 'grid-scale'

```

```

.: 1, 'installed': 1, 'some': 1, 'plants': 1, 'world': 1, 'supplied': 1, '1.65': 1, 'GWh'
: 1, '2019.': 1, 'Founded': 1, 'July': 1, '2003': 1, 'Motors,' : 1, "company's": 1,
'name':
1, 'tribute': 1, 'inventor': 1, 'electrical': 1, 'engineer': 1, 'Nikola': 1, 'Tesla.': 1,
'Elon': 2, 'Musk,' : 3, 'who': 1, 'contributed': 1, 'most': 1, 'funding': 1, 'early': 1, 'days,' : 1, 'has': 2, 'served': 1, 'CEO': 2, 'since': 1, '2008.': 1, 'According': 1, 'purpose': 1, 'help': 1, 'expedite': 1, 'move': 1, 'sustainable': 1, 'transport': 1, 'energy,' : 1, 'obtained': 1, 'through': 1, 'vehicles': 1, 'power.': 1, 'began': 1, 'production': 1, 'their': 2, 'first': 1, 'model,' : 1, 'Roadster,' : 1, '2009.': 1, 'The': 2, 'Roadster': 1, 'was': 2, 'luxury': 1, 'sports': 1, 'car.': 1, 'This': 1, 'followed': 1, 'by': 1, 'Model': 4, 'S': 1, 'sedan': 2, '2012,' : 1, 'X': 1, 'SUV': 1, '2015,' : 1, 'higher': 1, 'volume ': 1, '3': 2, '2017.': 1, 'sales': 1, 'were': 1, '499,550': 1, 'units': 1, '2020,' : 2, '35
.8%': 1, 'increase': 1, 'over': 1, 'previous': 1, 'year.': 1, 'In': 1, 'surpassed': 1, '1
': 1, 'million': 1, 'mark': 1, 'cars': 1, 'produced.': 1, 'ranks': 1, 'all-time': 1, 'car
,': 1, 'more': 1, 'than': 1, '500,000': 1, 'delivered.': 1, 'been': 1, 'subject': 1, 'numerous': 1, 'lawsuits': 1, 'controversies': 1, 'arising': 1, 'statements': 1, 'acts': 1, 'allegations': 1, 'whistleblower': 1, 'retaliation,' : 1, 'alleged': 1, 'worker': 1, 'rights': 1, 'violations,' : 1, 'allegedly': 1, 'unresolved': 1, 'dangerous': 1, 'technical': 1, 'problems': 1, 'products.': 1}

```

5. Show a random line in a file: -----

-
electric cars, battery energy storage from home to grid scale, solar panels and solar roof tiles, as well as other related products and

Question5: Develop an application in Python to read through the email data (“mbox-short.txt”) and when you find line that starts with “From”, you will split the line into words using the split function. We are interested in who sent the message, which is the second word on the From line: From stephen.marquard@uct.ac.za Sat Jan 5 09:14:16 2008. You will parse the From line and print out the second word for each From line, then you will also count the number of From (not From:) lines and print out a count at the end.

In [118]:

```

fhand = open('mbox-short.txt')
for line in fhand:
    line = line.rstrip()      if
line.startswith('From')      :
print(line)

From stephen.marquard@uct.ac.za Sat Jan 5 09:14:16 2008
From louis@media.berkeley.edu Fri Jan 4 18:10:48 2008
From zqian@umich.edu Fri Jan 4 16:10:39 2008
From rjlowe@iupui.edu Fri Jan 4 15:46:24 2008
From zqian@umich.edu Fri Jan 4 15:03:18 2008
From rjlowe@iupui.edu Fri Jan 4 14:50:18 2008
From cwen@iupui.edu Fri Jan 4 11:37:30 2008
From cwen@iupui.edu Fri Jan 4 11:35:08 2008
From gsilver@umich.edu Fri Jan 4 11:12:37 2008
From gsilver@umich.edu Fri Jan 4 11:11:52 2008
From zqian@umich.edu Fri Jan 4 11:11:03 2008
From gsilver@umich.edu Fri Jan 4 11:10:22 2008
From wagnermr@iupui.edu Fri Jan 4 10:38:42 2008
From zqian@umich.edu Fri Jan 4 10:17:43 2008
From antranig@caret.cam.ac.uk Fri Jan 4 10:04:14 2008
From gopal.ramasammycook@gmail.com Fri Jan 4 09:05:31 2008
From david.horwitz@uct.ac.za Fri Jan 4 07:02:32 2008
From david.horwitz@uct.ac.za Fri Jan 4 06:08:27 2008
From david.horwitz@uct.ac.za Fri Jan 4 04:49:08 2008
From david.horwitz@uct.ac.za Fri Jan 4 04:33:44 2008
From stephen.marquard@uct.ac.za Fri Jan 4 04:07:34 2008
From louis@media.berkeley.edu Thu Jan 3 19:51:21 2008
From louis@media.berkeley.edu Thu Jan 3 17:18:23 2008
From ray@media.berkeley.edu Thu Jan 3 17:07:00 2008

```

```
From cwen@iupui.edu Thu Jan  3 16:34:40 2008
From cwen@iupui.edu Thu Jan  3 16:29:07 2008
From cwen@iupui.edu Thu Jan  3 16:23:48 2008
```

In [119]:

```
fhand = open("mbox-short.txt")
count = 0
for line in fhand:
    line = line.rstrip()
if line == "": continue
words = line.split()
```

```

if words[0] != "From": continue
print(words[1])
count = count+1
print ("There were", count, "lines in the file with From as the first word")

stephen.marquard@uct.ac.za
louis@media.berkeley.edu
zqian@umich.edu
rjlowe@iupui.edu
zqian@umich.edu
rjlowe@iupui.edu
cwen@iupui.edu
cwen@iupui.edu
gsilver@umich.edu
gsilver@umich.edu
zqian@umich.edu
gsilver@umich.edu
wagnermr@iupui.edu
zqian@umich.edu
antranig@caret.cam.ac.uk
gopal.ramasammycook@gmail.com
david.horwitz@uct.ac.za
david.horwitz@uct.ac.za
david.horwitz@uct.ac.za
david.horwitz@uct.ac.za
stephen.marquard@uct.ac.za
louis@media.berkeley.edu
louis@media.berkeley.edu
ray@media.berkeley.edu
cwen@iupui.edu
cwen@iupui.edu
cwen@iupui.edu
There were 27 lines in the file with From as the first word

```

Question6. Write a program to read and write CSV files

1).File Creation: Create MS Excel file (“student_marks.csv”) with 5 rows of student name, mark1, mark2, mark3, mark4. Use comma to separate each value in a row.

2).File Display: Now, open your CSV file and display the file contents row by row (More information at: <https://docs.python.org/3/library/csv.html>).

3).File Writing: Now, open (“student_marks.csv”) for writing. Ask user to enter name followed by 4 marks for one new student and write them onto the file.

In [15]:

```

from csv import writer
def append_list_as_row(file_name, list_of_elem):

    with open('student_marks.csv', 'a+', newline='') as write_obj:

        csv_writer = writer(write_obj)

        csv_writer.writerow(list_of_elem)

row_contents = ['Suresh', 68, 78, 89, 87, 90]
row_contents1 = ['ganesh', 68, 78, 89, 87, 90]
row_contents2 = ['Harish', 68, 78, 89, 87, 90]
row_contents3 = ['Rajesh', 68, 78, 89, 87, 90]
append_list_as_row('student_marks.csv', row_contents)
append_list_as_row('student_marks.csv', row_contents1)
append_list_as_row('student_marks.csv', row_contents2)
append_list_as_row('student_marks.csv', row_contents3)

```

```
reader = csv.reader(csvfile, delimiter = ' ', quotechar = '|')
for row in reader:
    print(' '.join(row))
```

student, name,mark1,mark2,mark3,mark4,mark5

Johnson,78,56,72,95,77

Tom,89,69,74,90,88

Josephine,90,89,93,78,70

Jerry,89,78,70,88,90

David,90,98,87,89,86

Sam,68,78,89,87,90

Ram,68,78,89,87,90

Ramkumar,68,78,89,87,90

Suresh,68,78,89,87,90

ganesh,68,78,89,87,90

Harish,68,78,89,87,90

Rajesh,68,78,89,87,90

Lab7 Dictionaries in Python

Question1. Write a program for Fruit Inventory Management.

1. Create a dictionary fruits with fruit name as key and quantity available as values. There are 20 apples, 50 bananas, 100 oranges. Then, print outputs for the following queries.
2. Show the entire dictionary fruits (Print output as apples -> 20, bananas -> 50, etc)
3. How many bananas are there?
4. How many items in the dictionary?
5. Does aranhs available in the dictionary?
6. Does nears exists in the dictionary?. If so, return its quantity, otherwise, add 10 pears to dictionary.
7. Show all fruit names in ascending order (Iterate using for loop)
8. Show all fruits in descending order of quantities
9. Remove nears from the dictionary
10. Develop a function show() that displays fruit name and quantity (Use format() for pretty printing)
11. Develop a function add_fruit(name, quantity) that receives fruit name and quantity as input and increases the quantity of the fruit. Then, display the current inventory by calling show()
12. Now, add 40 apples to inventory by calling add_fruit(name, quantity)
13. Now, add 100 bananas to inventory, by calling add_fruit(name, quantity)
14. Now, show the current inventory, by calling show()
15. Write the inventory fruits onto a file. (Use Pickle for file writing and reading)
16. Now, open Pickle file and display the inventory.

1. Create a dictionary fruits with fruit name as key and quantity available as values. There are 20 apples, 50 bananas, 100 oranges. Then, print outputs for the following queries

In [1]:

```
fruits={"apples":20,"bananas":50,"oranges":100}
```

2. Show the entire dictionary fruits

In [2]:

```
print(fruits)  
{'apples': 20, 'bananas': 50, 'oranges': 100}
```

3. How many bananas are there?

In [3]:

```
print(fruits.get('bananas'))
```

50

4. How many items in the dictionary?

In [4]:

```
len(fruits)
```

Out[4]:

3

In [5]:

```
if "grapes" in fruits:  
    print("yes")  
else:  
    print("No")
```

No

6 Does pears exists in the dictionary? If so return its quantity otherwise add 10 pears to dictionary

In [6]:

```
if "pears" in fruits.keys():  
    print(fruits.get('pears'))  
else:  
    fruits["pears"]=10  
print(fruits)
```

{'apples': 20, 'bananas': 50, 'oranges': 100, 'pears': 10}

7 Show all fruit names in ascending order (Iterate using for loop)

In [7]:

```
for keys in fruits:  
    print(sorted(fruits.keys()))
```

['apples', 'bananas', 'oranges', 'pears']
['apples', 'bananas', 'oranges', 'pears']
['apples', 'bananas', 'oranges', 'pears']
['apples', 'bananas', 'oranges', 'pears']

8 Show all fruits in descending order of quantities

In [8]:

```
print(sorted(fruits.keys(),reverse=True))
```

['pears', 'oranges', 'bananas', 'apples']

9 Remove pears from the dictionary

In [9]:

```
del fruits['pears']  
print(fruits)
```

{'apples': 20, 'bananas': 50, 'oranges': 100}

10. Develop a function show() that displays fruit name and quantity (Use .format() for pretty printing)

In [10]:

```
def show():  
    print("{} {} {}".format(*fruits.items()))  
show()
```

('apples', 20) ('bananas', 50) ('oranges', 100)

```
def add_fruit(fruits, name, quantity):
    fruits[name]=fruits.get(name, 0)+quantity
```

12. Now, add 40 apples to inventory by calling add_fruit(name, quantity)

In [12]:

```
fruits={"apples":20, "bananas":50, "oranges":100}
add_fruit(fruits, 'apples', 40)
print(fruits)

{'apples': 60, 'bananas': 50, 'oranges': 100}
```

13. Now, add 100 bananas to inventory, by calling add_fruit(name, quantity)

In [13]:

```
fruits={"apples":20, "bananas":50, "oranges":100}
add_fruit(fruits, "bananas",100)
print(fruits)

{'apples': 20, 'bananas': 150, 'oranges': 100}
```

14. Now, show the current inventory, by calling show()

In [14]:

```
show()

('apples', 20) ('bananas', 150) ('oranges', 100)
```

15. Write the inventory fruits onto a file. (Use Pickle for file writing and reading)

In [15]:

```
import pickle
new_inventory={"apple":300, "mango":87, "banana":320}
# Write the dictionary to the pickle file
file = open("fruits_inventory.p", "wb")
pickle.dump(new_inventory, file)
print(new_inventory)

{'apple': 300, 'mango': 87, 'banana': 320}
```

16. Now, open Pickle file and display the inventory.

In [16]:

```
file = open("fruits_inventory.p", "rb")
dict2 = pickle.load(file)
file.close()
print(new_inventory)

{'apple': 300, 'mango': 87, 'banana': 320}
```

Question 2. Write a program for Telephone Directory Management

1. Create an empty dictionary called customers, where name is a key and contacts is a list of contacts such as phoneno and email ID for each customer.


```
In [17]:
```

```
customer = {}
while(True):
    row = input("Enter the name and number: ")
    info = row.split()
    if(info[0] == "done"):
        break
    name = info[0]
    phone = info[1]
    email = info[2]
    contacts=[phone,email]
    customer[name] = contacts
print("\nPrinting Contacts:")
for name, phone in customer.items():
    print(name, ":", phone)
```

Enter the name and number: abc 7867906567 abc@gmail.com
 Enter the name and number: def 9887765904 def@gmail.com
 Enter the name and number: ghi 9090907889 ghi@gmail.com
 Enter the name and number: done

Printing Contacts:
 abc : ['7867906567', 'abc@gmail.com']
 def : ['9887765904', 'def@gmail.com']
 ghi : ['9090907889', 'ghi@gmail.com']

3. Show the contacts for customer “rex”. If not exists, print message “Contacts not exists..”

```
In [18]:
```

```
if 'rex' in customer:
    print("rex in present")
else:
    print("There is no such contact")
```

There is no such contact

4. Add a new customer with name “rex”, phone number 9942002764 and email id yourname@bhc.edu

```
In [19]:
```

```
customer['rex']= ['9942002764', 'jonny@bhc.edu']
```

5. Show all customers both name and contacts. (Use items() method, unpack it and print inside for loop)

```
In [20]:
```

```
for name, contacts in customer.items():
    print(name, contacts)
```

abc ['7867906567', 'abc@gmail.com']
 def ['9887765904', 'def@gmail.com']
 ghi ['9090907889', 'ghi@gmail.com']
 rex ['9942002764', 'jonny@bhc.edu']

6. Show all customer contacts (Iterate using for loop)

```
In [21]:
```

```
for name in customer:
    print(customer[name])
```

['7867906567', 'abc@gmail.com']
 ['9887765904', 'def@gmail.com']
 ['9090907889', 'ghi@gmail.com']
 ['9942002764', 'jonny@bhc.edu']

7. Show all customer names in alphabetical order

In [22]:

```
sorted(customer.keys())
```

Out[22]:

```
['abc', 'def', 'ghi', 'rex']
```

8. How many customers are there in your dictionary?

In [23]:

```
len(customer.items())
```

Out[23]:

```
4
```

9 Remove customer "rex" from dictionary customers

In [24]:

```
del customer['rex']
```

In [25]:

```
customer
```

Out[25]:

```
{'abc': ['7867906567', 'abc@gmail.com'],
 'def': ['9887765904', 'def@gmail.com'],
 'ghi': ['9090907889', 'ghi@gmail.com']}
```

Lab8. Python Regular Expressions

Question1: Using Email Collections file: mbox-short.txt, write a python program for the following queries

1 Search for lines that contain 'From' and print them

In [16]:

```
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    if re.search('From:', line):
        print(line)
```

```
From: stephen.marquard@uct.ac.za
From: louis@media.berkeley.edu
From: zqian@umich.edu
From: rjlowe@iupui.edu
From: zqian@umich.edu
From: rjlowe@iupui.edu
From: cwen@iupui.edu
From: cwen@iupui.edu
From: gsilver@umich.edu
From: gsilver@umich.edu
From: zqian@umich.edu
From: gsilver@umich.edu
From: wagnermr@iupui.edu
From: zqian@umich.edu
From: antranig@caret.cam.ac.uk
From: gopal.ramasammycook@gmail.com
From: david.horwitz@uct.ac.za
From: david.horwitz@uct.ac.za
From: david.horwitz@uct.ac.za
From: david.horwitz@uct.ac.za
From: stephen.marquard@uct.ac.za
From: louis@media.berkeley.edu
From: louis@media.berkeley.edu
From: ray@media.berkeley.edu
From: cwen@iupui.edu
From: cwen@iupui.edu
From: cwen@iupui.edu
```

2 Search for lines that start with 'From' and print them

In [15]:

```
import re
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    if re.search('^From:', line):
        print(line)
```

```
From: stephen.marquard@uct.ac.za
From: louis@media.berkeley.edu
From: zqian@umich.edu
From: rjlowe@iupui.edu
From: zqian@umich.edu
From: rjlowe@iupui.edu
From: cwen@iupui.edu
From: cwen@iupui.edu
From: gsilver@umich.edu
From: gsilver@umich.edu
From: zqian@umich.edu
```

```
From: zqian@umich.edu
From: gsilver@umich.edu
From: wagnermr@iupui.edu
From: zqian@umich.edu
From: antranig@caret.cam.ac.uk
From: gopal.ramasammycook@gmail.com
From: david.horwitz@uct.ac.za
From: david.horwitz@uct.ac.za
From: david.horwitz@uct.ac.za
From: david.horwitz@uct.ac.za
From: stephen.marquard@uct.ac.za
From: louis@media.berkeley.edu
From: louis@media.berkeley.edu
From: ray@media.berkeley.edu
From: cwen@iupui.edu
From: cwen@iupui.edu
From: cwen@iupui.edu
```

3 Search for lines that start with 'F' followed by 2 characters followed by 'm:'

In [17]:

```
import re
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    if re.search('^F..m:', line):
        print(line)
```

```
From: stephen.marquard@uct.ac.za
From: louis@media.berkeley.edu
From: zqian@umich.edu
From: rjlowe@iupui.edu
From: zqian@umich.edu
From: rjlowe@iupui.edu
From: cwen@iupui.edu
From: cwen@iupui.edu
From: gsilver@umich.edu
From: gsilver@umich.edu
From: zqian@umich.edu
From: gsilver@umich.edu
From: wagnermr@iupui.edu
From: zqian@umich.edu
From: antranig@caret.cam.ac.uk
From: gopal.ramasammycook@gmail.com
From: david.horwitz@uct.ac.za
From: david.horwitz@uct.ac.za
From: david.horwitz@uct.ac.za
From: david.horwitz@uct.ac.za
From: stephen.marquard@uct.ac.za
From: louis@media.berkeley.edu
From: louis@media.berkeley.edu
From: ray@media.berkeley.edu
From: cwen@iupui.edu
From: cwen@iupui.edu
From: cwen@iupui.edu
```

4 Search for lines that start with From and have an at sign and print them

In [18]:

```
import re
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    if re.search('^From:.+@', line):
```

```
print(line)
```

```
From: stephen.marquard@uct.ac.za
From: louis@media.berkeley.edu
From: zqian@umich.edu
From: rjlowe@iupui.edu
From: zqian@umich.edu
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From: louis@media.berkeley.edu
From: ray@media.berkeley.edu
From: cwen@iupui.edu
From: cwen@iupui.edu
From: cwen@iupui.edu
```

5 Search for lines that have an at sign between characters and print them (Use.findall())

In [19]:

```
import re
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    x = re.findall('\S+@\S+', line)
    if len(x) > 0:
        print(x)
```

```
['stephen.marquard@uct.ac.za']
['<postmaster@collab.sakaiproject.org>']
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```

6. Search for lines that have an at sign between characters. The characters must be a letter or number and print them

In [20]:

```
import re
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    x = re.findall('[a-zA-Z0-9]\S+@\S+[a-zA-Z]', line)
    if len(x) > 0:
        print(x)
```

```
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['gsilver@umich.edu']
['postmaster@collab.sakaiproject.org']
['200801041608.m04G8d7w007184@nakamura.uits.iupui.edu']
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['source@collab.sakaiproject.org']
['gsilver@umich.edu']
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['postmaster@collab.sakaiproject.org']
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['antranig@caret.cam.ac.uk']
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['gopal.ramasammycook@gmail.com']
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['gopal.ramasammycook@gmail.com']
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['dhorwitz@david-horwitz-6:~/branchManagemnt/sakai_2-5-x']
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['source@collab.sakaiproject.org']
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['david.horwitz@uct.ac.za']

['postmaster@collab.sakaiproject.org']

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['louis@media.berkeley.edu']
['postmaster@collab.sakaiproject.org']
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['ray@media.berkeley.edu']
['cwen@iupui.edu']
['postmaster@collab.sakaiproject.org']
['200801032133.m03LX3gG005191@nakamura.uits.iupui.edu']
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['postmaster@collab.sakaiproject.org']
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['apache@localhost']
['source@collab.sakaiproject.org']
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['cwen@iupui.edu']

```
['cwen@iupui.edu']
['postmaster@collab.sakaiproject.org']
['200801032122.m03LMFo4005148@nakamura.uits.iupui.edu']
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['cwen@iupui.edu']
['source@collab.sakaiproject.org']
['cwen@iupui.edu']
['cwen@iupui.edu']
['wagnermr@iupui.edu']
```

7. Search for lines that start with 'X' followed by any non white space characters and ':' followed by a space and any number. The number can include a decimal

In [21]:

```
import re
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    if re.search('^X\S*: [0-9.]+', line):
        print(line)
```

```
X-DSPAM-Confidence: 0.8475
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.6178
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.6961
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7565
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7626
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7556
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7002
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7615
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7601
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7605
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.6959
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7606
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7559
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7605
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.6932
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7558
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.6526
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.6948
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.6528
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7002
```

```
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.6959
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.7556
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.9846
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.8509
X-DSPAM-Probability: 0.0000
X-DSPAM-Confidence: 0.9907
X-DSPAM-Probability: 0.0000
```

8.Search for lines that start with 'X' followed by any non whitespace characters and ':' followed by a space and any number. The number can include a decimal. Then print the number if it is greater than zero.

In [22]:

```
import re
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    x = re.findall('^X\S*: ([0-9.]+)', line)
    if len(x) > 0:
        print(x)
```

```
['0.8475']
['0.0000']
['0.6178']
['0.0000']
['0.6961']
['0.0000']
['0.7565']
['0.0000']
['0.7626']
['0.0000']
['0.7556']
['0.0000']
['0.7002']
['0.0000']
['0.7615']
['0.0000']
['0.7601']
['0.0000']
['0.7605']
['0.0000']
['0.6959']
['0.0000']
['0.7606']
['0.0000']
['0.7559']
['0.0000']
['0.7605']
['0.0000']
['0.6932']
['0.0000']
['0.7558']
['0.0000']
['0.6526']
['0.0000']
['0.6948']
['0.0000']
['0.6528']
['0.0000']
['0.7002']
['0.0000']
```

```
['0.6959']
['0.0000']
['0.7556']
['0.0000']
['0.9846']
['0.0000']
['0.8509']
['0.0000']
['0.9907']
['0.0000']
```

9. Search for lines that start with 'Details: rev=', followed by numbers and '.'. Then print the number if it is greater than zero

In [23]:

```
import re
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    x = re.findall('^Details:.*rev=([0-9.]+)', line)
    if len(x) > 0:
        print(x)
```

```
['39772']
['39771']
['39770']
['39769']
['39766']
['39765']
['39764']
['39763']
['39762']
['39761']
['39760']
['39759']
['39758']
['39757']
['39756']
['39755']
['39754']
['39753']
['39752']
['39751']
['39750']
['39749']
['39746']
['39745']
['39744']
['39743']
['39742']
```

10. Search for lines that start with From and a character followed by a two digit number between 00 and 99 followed by ':'. Then print the number if it is greater than zero

In [25]:

```
import re
hand = open('mbox-short.txt')
for line in hand:
    line = line.rstrip()
    x = re.findall('^From .* ([0-9][0-9]):', line)
    if len(x) > 0: print(x)
```

```
['16']
['15']
['15']
['14']
['11']
['11']
['11']
['11']
['11']
['11']
['11']
['11']
['10']
['10']
['10']
['09']
['07']
['06']
['04']
['04']
['04']
['04']
['19']
['17']
['17']
['16']
['16']
['16']
```

Question2 Baby Names Popularity Analysis

Reference: <https://developers.google.com/edu/python/exercises/baby-name> **S** The Social Security administration has this neat data by year of what names are most popular for babies born that year in the USA. The files baby1990.html baby1992.html ... contain raw html pages. Take a look at the html and think about how you might scrape the data out of it. In the babynames.py file, implement the extract_names(filename) function which takes the filename of a baby1990.html file and returns the data from the file as a single list -- the year string at the start of the list followed by the name-rank strings in alphabetical order. ['2006', 'Aalivah 91', 'Abigail 895', 'Aaron 57'] Modify main() so it calls your extract_names() function and prints what it returns (main already has the code for the command line argument parsing). If you get stuck working out the regular expressions for the year and each name, solution regular expression patterns are shown at the end of this document. Note that for parsing webpages in general, regular expressions don't do a good job, but these webpages have a simple and consistent format. Rather than treat the boy and girl names separately, we'll just lump them all together. In some years, a name appears more than once in the html, but we'll just use one number per name. Optional: make the algorithm smart about this case and choose whichever number is smaller. Build the program as a series of small milestones, getting each step to run/print something before trying the next step. This is the pattern used by experienced programmers -- build a series of incremental milestones, each with some output to check rather than building the whole program in one huge step. Printing the data you have at the end of one milestone helps you think about how to re-structure that data for the next milestone. Python is well suited to this style of incremental development. For example, first get it to the point where it extracts and prints the year and calls sys.exit(0). Here are some suggested milestones:

- Extract all the text from the file and print it
- Find and extract the year and print it
- Extract the names and rank numbers and print them
- Get the names data into a dict and print it
- Build the [year, 'name rank', ...] list and print it
- Fix main() to use the ExtractNames list

Earlier we have had functions just print to standard out. It's more re-usable to have the function return the extracted data, so then the caller has the choice to print it or do something else with it. (You can still print directly from inside your functions for your little experiments during development.) Have main() call extract_names() for each command line arg and print a text summary. To make the list into a reasonable looking summary text, here's a clever use of join: text = '\n'.join(mylist) + '\n' The summary text should look like this for each file: 2006 Aalivah 91 Aaron 57 Abigail 895 Abbev 695 Abbie 650

```

import re
import sys

def extract_names(filename):
    """
    Given a file name for baby.html, returns a list starting with the year string
    followed by the name-rank strings in alphabetical order.
    ['2006', 'Aaliyah 91', Aaron 57', 'Abagail 895', ' ...]
    """
    names = []
    f = open(filename, 'r')
    text = f.read()
    year_match = re.search(r'Popularity\s+in\s+(\d\d\d\d)', text)
    if not year_match:
        sys.stderr.write('Couldn\'t find the year!\n')
        sys.exit(1)
    year = year_match.group(1)
    names.append(year)

    tuples = re.findall(r'<td>(\d+)</td><td>(\w+)</td><td>(\w+)</td>', text)

    names_to_rank = {}
    for rank_tuple in tuples:
        (rank, boyname, girlname) = rank_tuple
        if boyname not in names_to_rank:
            names_to_rank[boyname] = rank
        if girlname not in names_to_rank:
            names_to_rank[girlname] = rank

    sorted_names = sorted(names_to_rank.keys())

    for name in sorted_names:
        names.append(name + " " + names_to_rank[name])

    return names

```

In [28]:

```
extract_names('baby2006.html')
```

Out[28]:

```

['2006',
 'Aaliyah 91',
 'Aaron 57',
 'Abagail 895',
 'Abbey 695',
 'Abbie 650',
 'Abbigail 490',
 'Abby 205',
 'Abdullah 888',
 'Abel 338',
 'Abigail 6',
 'Abigale 889',
 'Abigayle 777',
 'Abraham 183',
 'Abram 586',
 'Abril 845',
 'Ace 838',
 'Ada 715',
 'Adam 64',
 'Adamaris 920',
 'Adan 302',
 'Addison 27',
 'Addisyn 612',
 'Addyson 370',
 'Adelaide 921',
 'Adeline 467']

```

'Adolfo 581',
'Adonis 822',
'Adrian 63',
'Adriana 106',
'Adrianna 179',
'Adriel 707',
'Adrien 754',
'Adrienne 736',
'Adyson 877',
'Aedan 760',
'Agustin 657',
'Ahmad 524',
'Ahmed 559',
'Aidan 44',
'Aiden 30',
'Aidyn 910',
'Aileen 537',
'Aimee 763',
'Ainsley 456',
'Aisha 683',
'Aiyana 739',
'Akeelah 711',
'Akira 965',
'Alaina 248',
'Alan 122',
'Alana 166',
'Alani 933',
'Alanna 473',
'Alayna 268',
'Albert 354',
'Alberto 315',
'Alden 811',
'Aldo 587',
'Aleah 667',
'Alec 328',
'Aleena 830',
'Alejandra 232',
'Alejandro 96',
'Alena 665',
'Alessandra 361',
'Alessandro 608',
'Alex 67',
'Alexa 39',
'Alexander 12',
'Alexandra 40',
'Alexandria 147',
'Alexandro 861',
'Alexia 164',
'Alexis 14',
'Alexus 545',
'Alexzander 615',
'Alfonso 552',
'Alfred 755',
'Alfredo 334',
'Ali 360',
'Alia 928',
'Alice 383',
'Alicia 167',
'Alijah 584',
'Alina 355',
'Alisa 890',
'Alisha 584',
'Alison 271',
'Alissa 377',
'Alivia 254',
'Aliya 699',
'Aliyah 236',
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'Alize 959',
'Allan 507',
'Allen 283',
'Allie 229',
'Allison 46'

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'Alondra 170',
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'Alonzo 558',
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'Alvin 513',
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'Amanda 102',
'Amani 687',
'Amara 573',
'Amare 778',
'Amari 421',
'Amaris 909',
'Amaya 215',
'Amber 136',
'Amelia 82',
'Amelie 784',
'America 458',
'Amina 978',
'Amir 324',
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'Amirah 971',
'Amiya 742',
'Amiyah 635',
'Amy 128',
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'Ana 143',
'Anabelle 757',
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'Anastasia 288',
'Anaya 486',
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'Andre 207',
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'Andreas 880',
'Andres 161',
'Andrew 8',
'Andy 204',
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'Angelica 208',
'Angelina 48',
'Angeline 863',
'Angeline 693',
'Angelo 262',
'Angie 389',
'Anika 485',
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'Aniyah 220',
'Ann 731',
'Anna 23',
'Annabel 848',
'Annabella 556',
'Annabelle 206',
'Annalise 589',
'Anne 460',
'Annette 881',
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'Annika 335',
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'Antoine 631',
'Anton 725',
'Antonio 93',
'Antony 815',
'Antwan 828',
'Anya 405'.

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'Arnav 932',
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'Ashlyn 140',
'Ashlynn 293',
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'Athena 504',
'Atticus 767',
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'Aubrie 604',
'Audrey 68',
'August 618',
'Augustus 831',
'Aurora 312',
'Austen 924',
'Austin 41',
'Austyn 974',
'Autumn 95',
'Ava 5',
'Averie 899',
'Avery 52',
'Axel 295',
'Ayana 700',
'Ayanna 527',
'Aydan 576',
'Ayden 119',
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'Ayla 264',
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'Bailey 112',
'Barbara 561',
'Barrett 762',
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'Ben 555',
'Benjamin 24',
'Bennett 369',

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'Betsy 743',
'Bianca 182',
'Billy 473',
'Blaine 572',
'Blaise 985',
'Blake 97',
'Blanca 800',
'Blaze 868',
'Bo 771',
'Bobby 480',
'Bode 848',
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'Brad 897',
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'Bradyn 675',
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'Joseph 11',
'Josephine 221',
'Josh 714',
...]
```

In []:

Lab10. Implementation of Map, Filter and Reduce Function

Question1. Write a program to implement MAP function. Find the square root of a list of numbers [1, 2, 4, 6] using map and sqrt functions. Check the answer against your user defined function mymap().

In [9]:

```
from math import sqrt
lst=[1,2,4,6]
map_object=map(sqrt,lst)
print(list(map_object))

def mymap(f, seq):
    result = []
    for elt in seq:
        result.append(f(elt))
    return result
mymap(sqrt,lst)
```

[1.0, 1.4142135623730951, 2.0, 2.449489742783178]

Out[9]:

[1.0, 1.4142135623730951, 2.0, 2.449489742783178]

Question2. Write a program to implement FILTER function. Filter all upper case letters in a list ['x', 'Y', '2', '3', 'Z', 'b'] using filter function. Check the answer against your user define function myfilter().

In [16]:

```
filter_object=filter(str.isupper,['x', 'Y', '2', '3', 'Z', 'b'])
print(list(filter_object))

def filter(f, seq):
    result = []
    for elt in seq:
        if f(elt):
            result.append(elt)
    return result
filter(str.isupper,['x', 'Y', '2', '3', 'Z', 'b'])
```

['Y', 'Z']

Out[16]:

['Y', 'Z']

Question3. Write a program to create a lambda function that takes two characters and concatenates them. Now, apply this function inside REDUCE function that will reduce the list of characters ['a', 'b', 'c', 'd'] with the intial value 'x'.

In [26]:

```
from functools import reduce
(lambda x,y:x+y)('a','b')
reduce (lambda x,y:x+y,['a','b','c','d'],'x')
```

Out[26]:

'abcd'

Question4. Imagine an accounting routine used in a book shop. It works on a list with sublists, which look like:

Write a Python program, which returns a list with 2-tuples. Each tuple consists of an order number and the product of the price per items and the quantity. The product should be decreased by RS 10 if the value of the order is smaller than RS 100.00. Write a Python program using lambda and map functions.

In [1]:

```
tab = [[34587, 'Learning Python , Mark Lutz', 4, 40.95],  
       [98762, 'Programming Python , Mark Lutz', 5, 56.80],  
       [77226, 'Head first Python , Paul Barry', 3, 32.95],  
       [88112, 'Einfuhrung in Python , Bernd Klein', 3, 24.99]]  
print(*tab, sep='\n')
```

```
[34587, 'Learning Python , Mark Lutz', 4, 40.95]  
[98762, 'Programming Python , Mark Lutz', 5, 56.8]  
[77226, 'Head first Python , Paul Barry', 3, 32.95]  
[88112, 'Einfuhrung in Python , Bernd Klein', 3, 24.99]
```

In [2]:

```
prg = []  
prg1 = []  
final = []  
nprg = []  
for i in range(4):  
    j=tab[i][2]*tab[i][3]  
    if j < 100:  
        j = j - 10  
        nprg.append(round(j,2))  
    else:  
        nprg.append(round(j,2))  
    prg1.append(tab[i][0])  
t1=tuple(prg1)  
t2=tuple(nprg)  
final.append(t1)  
final.append(t2)  
print(final)
```

```
[(34587, 98762, 77226, 88112), (163.8, 284.0, 88.85, 64.97)]
```

In []:

Lab11. Retrieving Data From Web and Parsing

1.Retrieve data from web page using URLLIB and print the frequency of words from that page.

In [8]:

```
import urllib.request
counts = dict()
fhand = urllib.request.urlopen('http://data.pr4e.org/romeo.txt')
for line in fhand:
    words = line.decode().split()
    for word in words:
        counts[word] = counts.get(word, 0) + 1
print(counts)

{'But': 1, 'soft': 1, 'what': 1, 'light': 1, 'through': 1, 'yonder': 1, 'window': 1, 'bre
aks': 1, 'It': 1, 'is': 3, 'the': 3, 'east': 1, 'and': 3, 'Juliet': 1, 'sun': 2, 'Arise':
1, 'fair': 1, 'kill': 1, 'envious': 1, 'moon': 1, 'Who': 1, 'already': 1, 'sick': 1, 'pal
e': 1, 'with': 1, 'grief': 1}
```

2.Retrieve and display all hyperlinks (ie., HREF attribute) from a webpage using BeautifulSoup

In [15]:

```
import urllib.request,urllib.parse,urllib.error
from bs4 import BeautifulSoup
import ssl
ctx=ssl.create_default_context()
ctx.check_hostname=False
ctx.verify_mode = ssl.CERT_NONE
url=input('enter url')
html=urllib.request.urlopen(url,context=ctx).read()
soup=BeautifulSoup(html,'html.parser')
tags=soup('a')
for tag in tags:
    print(tag.get('href',None))

enter urlhttps://www.crummy.com/software/BeautifulSoup/bs4/doc/
genindex.html
#
#beautiful-soup-documentation
http://www.crummy.com/software/BeautifulSoup/
http://www.crummy.com/software/BeautifulSoup/bs3/documentation.html
#porting-code-to-bs4
https://www.crummy.com/software/BeautifulSoup/bs4/doc.zh/
http://kondou.com/BS4/
https://www.crummy.com/software/BeautifulSoup/bs4/doc.ko/
https://www.crummy.com/software/BeautifulSoup/bs4/doc.ptbr
https://www.crummy.com/software/BeautifulSoup/bs4/doc.ru/
#getting-help
https://groups.google.com/forum/?fromgroups#!forum/beautifulsoup
#diagnose
#quick-start
#installing-beautiful-soup
http://www.crummy.com/software/BeautifulSoup/bs3/documentation.html
http://www.crummy.com/software/BeautifulSoup/download/4.x/
#problems-after-installation
#installing-a-parser
http://lxml.de/
http://code.google.com/p/html5lib/
#differences-between-parsers
#making-the-soup
#id17
```

#navigating-the-tree

```
#navigating-the-tree
#searching-the-tree
#name
#attributes
#multi-valued-attributes
#navigablestring
#navigating-the-tree
#searching-the-tree
#replace-with
#navigating-the-tree
#searching-the-tree
#beautifulsoup
#tag
#navigating-the-tree
#searching-the-tree
#modifying-the-tree
#tag
#comments-and-other-special-strings
#navigating-the-tree
#going-down
#navigating-using-tag-names
#searching-the-tree
#contents-and-children
#descendants
#string
#strings-and-stripped-strings
#going-up
#parent
#parents
#going-sideways
#next-sibling-and-previous-sibling
#next-siblings-and-previous-siblings
#going-back-and-forth
#next-element-and-previous-element
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#the-recursive-argument
```

```
#the-recursive-argument
#calling-a-tag-is-like-calling-find-all
#find
#id12
#attrs
#recursive
#id13
#kwargs
#navigating-using-tag-names
#find-parents-and-find-parent
#id12
#attrs
#id13
#limit
#kwargs
#id12
#attrs
#id13
#kwargs
#parent
#parents
#find-next-siblings-and-find-next-sibling
#id12
#attrs
#id13
#limit
#kwargs
#id12
#attrs
#id13
#kwargs
#sibling-generators
#find-previous-siblings-and-find-previous-sibling
#id12
#attrs
#id13
#limit
#kwargs
#id12
#attrs
#id13
#kwargs
#sibling-generators
#find-all-next-and-find-next
#id12
#attrs
#id13
#limit
#kwargs
#id12
#attrs
#id13
#kwargs
#element-generators
#find-all-previous-and-find-previous
#id12
#attrs
#id13
#limit
#kwargs
#id12
#attrs
#id13
#kwargs
#element-generators
#css-selectors
https://facelessuser.github.io/soupsieve/
https://facelessuser.github.io/soupsieve/
```

#append

```
#append
#extend
#navigablestring-and-new-tag
#insert
#insert-before-and-insert-after
#clear
#extract
#decompose
#replace-with
#wrap
#unwrap
#smooth
#output
#pretty-printing
#non-pretty-printing
#encodings
#output-formatters
#get-text
#string-generators
#specifying-the-parser-to-use
#installing-a-parser
#differences-between-parsers
#encodings
#unicode-dammit
#output-encoding
#unicode-dammit
#smart-quotes
#inconsistent-encodings
#line-numbers
#comparing-objects-for-equality
#copying-beautiful-soup-objects
#advanced-parser-customization
#parsing-only-part-of-a-document
#soupstrainer
#searching-the-tree
#id12
#attrs
#id13
#kwargs
#searching-the-tree
#customizing-multi-valued-attributes
#handling-duplicate-attributes
#instantiating-custom-subclasses
#troubleshooting
#diagnose
#errors-when-parsing-a-document
#installing-a-parser
#parser-installation
#parser-installation
#version-mismatch-problems
#parsing-xml
#parser-installation
#other-parser-problems
#differences-between-parsers
http://www.w3.org/TR/html5/syntax.html#syntax
#parsing-xml
#miscellaneous
http://wiki.python.org/moin/PrintFails
#improving-performance
http://lxml.de/
#parser-installation
http://pypi.python.org/pypi/cchardet/
#parsing-only-part-of-a-document
#translating-this-documentation
#id18
http://www.crummy.com/software/BeautifulSoup/bs3/download/3.x/BeautifulSoup-3.2.0.tar.gz
http://www.crummy.com/software/BeautifulSoup/bs3/documentation.html
#porting-code-to-bs4
http://www.python.org/dev/peps/pep-0008/
#you-need-a-parser
#installing-a-parser
#method-names
#generators
```

```
#generators
#string-generators
+xml
#entities
#unicode-dammit
#output-formatters
#id19
#string
#multi-valued-attributes
#id13
#id12
#string
#id13
#
#
#getting-help
#quick-start
#installing-beautiful-soup
#problems-after-installation
#installing-a-parser
#making-the-soup
#kinds-of-objects
#tag
#name
#attributes
#multi-valued-attributes
#navigablestring
#beautifulsoup
#comments-and-other-special-strings
#navigating-the-tree
#going-down
#navigating-using-tag-names
#contents-and-children
#descendants
#string
#strings-and-stripped-strings
#going-up
#parent
#parents
#going-sideways
#next-sibling-and-previous-sibling
#next-siblings-and-previous-siblings
#going-back-and-forth
#next-element-and-previous-element
#next-elements-and-previous-elements
#searching-the-tree
#kinds-of-filters
#a-string
#a-regular-expression
#a-list
#true
#a-function
#find-all
#the-name-argument
#the-keyword-arguments
#searching-by-css-class
#the-string-argument
#the-limit-argument
#the-recursive-argument
#calling-a-tag-is-like-calling-find-all
#find
#find-parents-and-find-parent
#find-next-siblings-and-find-next-sibling
#find-previous-siblings-and-find-previous-sibling
#find-all-next-and-find-next
#find-all-previous-and-find-previous
#css-selectors
#modifying-the-tree
```

#navigablestring-and-new-tag

```
#navigablestring-and-new-tag
#insert
#insert-before-and-insert-after
#clear
#extract
#decompose
#replace-with
#wrap
#unwrap
#smooth
#output
#pretty-printing
#non-pretty-printing
#output-formatters
#get-text
#specifying-the-parser-to-use
#differences-between-parsers
#encodings
#output-encoding
#unicode-dammit
#smart-quotes
#inconsistent-encodings
#line-numbers
#comparing-objects-for-equality
#copying-beautiful-soup-objects
#advanced-parser-customization
#parsing-only-part-of-a-document
#soupstrainer
#customizing-multi-valued-attributes
#handling-duplicate-attributes
#instantiating-custom-subclasses
#troubleshooting
#diagnose
#errors-when-parsing-a-document
#version-mismatch-problems
#parsing-xml
#other-parser-problems
#miscellaneous
#improving-performance
#translating-this-documentation
#id18
#porting-code-to-bs4
#you-need-a-parser
#method-names
#generators
#xml
#entities
#id19
_sources/index.rst.txt
genindex.html
#
```

<https://www.sphinx-doc.org/>

3 Create a HTML file for the following Student Marks and print the number of students and their names and marks.

In [2]:

```
from IPython.core.display import HTML

que3 = '''
<table>
<tr>
    <td>ID</td>
    <td>NAME</td>
    <td>MARK1</td>
```

```

<td>DS01</td>
<td>REX</td>
<td>87</td>
<td>57</td>
<td>74</td>
</tr>
<tr>
    <td>DS02</td>
    <td>PETER</td>
    <td>68</td>
    <td>98</td>
    <td>55</td>
</tr>
</table>
...

```

HTML (que3)

Out [2] :

ID	NAMF	MARK1	MARK2	MARK3
DS01	REX	87	57	74
DS02	PETER	68	98	55

4 Create a JSON file for the following Students Marks and print the number of students and their names and marks. ID- DS01- Name- rex Semester1- 80 55 Semester2- 50 70 82 ID- DS02- Name- peter Semester1- 92 75

In [23] :

```

import json
data = '''
[
{"id" : "ds01",
"name" : "rex",
"semester1":"80,55",
"semester2":"78,98"
},
 {"id" : "ds02",
"name" :"Brent",
"semester1":"35,67",
"semester2":"65,87"
}
]'''
info = json.loads(data)
print('User count:', len(info))
for item in info:
    print('Name', item['name'])
    print('Id',item['id'])
    print('semester1', item['semester1'])
    print('semester2',item['semester2'])

```

```

User count: 2
Name rex
Id ds01
semester1 80,55
semester2 78,98
Name Brent
Id ds02
semester1 35,67
semester2 65,87

```

5.Crawl Weather of a City and Display 7 Day Forecast. Find weather data of Tiruchirappalli city from some website such as www.weather.com Exploring page structure with Chrome DevTools Extract information from web page and display the weather forecast for 10 days or 7 days Reference:

```

import requests
from bs4 import BeautifulSoup

page=requests.get("https://weather.com/en-IN/weather/tenday/1/d251a574fa1fa7a38aef6a630cb7e91a5c92cc2165acc34a8ba2f7e589c0f61e")
page.content

bs4=BeautifulSoup(page.content,'html.parser')
bs4.find_all('p')
(bs4.find_all(class_="DetailsSummary--DetailsSummary--QpFD-"))
days=[bs4.find_all('h2')[day].get_text() for day in range(len(bs4.find_all('h2')))]
tempr=[bs4.find_all(class_="DetailsSummary--temperature--3FMIw")[temp].get_text() for temp in range(len(bs4.find_all(class_="DetailsSummary--temperature--3FMIw")))]

days=days[1:12]
tempr=tempr[1:12]

from IPython.display import display
import pandas as pd
#creating a data frame to store the values
b={"Days": days,
   "Temperature": tempr}
weather = pd.DataFrame(b)

weather

```

Out [1]:

	Days	Temperature
0	Tonight	34°/22°
1	Sun 14	35°/22°
2	Mon 15	35°/21°
3	Tue 16	35°/22°
4	Wed 17	34°/22°
5	Thu 18	33°/22°
6	Fri 19	33°/22°
7	Sat 20	32°/22°
8	Sun 21	34°/21°
9	Mon 22	35°/21°
10	Tue 23	36°/21°

6. Real Time Stock Prices Crawling and Display of a specified Company Crawl prices of a stock such as InfoSys (Stock Code INFY) for a period of month or year. Plot a line graph of monthly or yearly price movements Crawl prices of one more stock such as CTS Update your line graph with the prices movements of two stocks

Reference: <https://ntguardian.wordpress.com/2018/07/17/stock-data-analysis-python-v2/>

https://github.com/rajkumarbhc/datascienceutils/blob/master/data_science_utils/financial/Web%20Scraping%20Tutorial.ipynb

In [8]:

```

!pip install yfinance --upgrade --no-cache-dir
import yfinance as yf
yf.pdr_override()
df_info = pdr.get_data_yahoo("INFY", start="2018-01-01").reset_index()
df_info.to_csv('INFY.csv', index=False)
df_info.head()

```

```
Requirement already satisfied: numpy>=1.15 in c:\users\mahesh\anaconda3\lib\site-packages
Requirement already satisfied: numpy>=1.15 in c:\users\mahesh\anaconda3\lib\site-packages
(from yfinance) (1.19.2)
Requirement already satisfied: requests>=2.20 in c:\users\mahesh\anaconda3\lib\site-packages
(from yfinance) (2.25.1)
Requirement already satisfied: multitasking>=0.0.7 in
c:\users\mahesh\anaconda3\lib\sitepackages (from yfinance) (0.0.9)
Requirement already satisfied: lxml>=4.5.1 in c:\users\mahesh\anaconda3\lib\site-packages
(from yfinance) (4.6.2)
Requirement already satisfied: python-dateutil>=2.7.3 in c:\users\mahesh\anaconda3\lib\site-packages
(from pandas>=0.24->yfinance) (2.8.1)
Requirement already satisfied: pytz>=2017.3 in c:\users\mahesh\anaconda3\lib\site-packages
(from pandas>=0.24->yfinance) (2021.1)
Requirement already satisfied: six>=1.5 in c:\users\mahesh\anaconda3\lib\site-packages
(from python-dateutil>=2.7.3->pandas>=0.24->yfinance) (1.15.0)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\mahesh\anaconda3\lib\site-packages
(from requests>=2.20->yfinance) (1.26.3)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\mahesh\anaconda3\lib\site-packages
(from requests>=2.20->yfinance) (2020.12.5)
Requirement already satisfied: idna<3,>=2.5 in c:\users\mahesh\anaconda3\lib\site-packages
(from requests>=2.20->yfinance) (2.10)
Requirement already satisfied: chardet<5,>=3.0.2 in c:\users\mahesh\anaconda3\lib\site-packages
(from requests>=2.20->yfinance) (4.0.0)
[*****100%*****] 1 of 1 completed
```

Out [8]:

	Date	Open	High	Low	Close	Adj Close	Volume	Volume	e
00	2018-01-02	8.135	8.195	8.115	8.145	7.429263	12298200		
11	2018-01-03	8.120	8.135	8.050	8.075	7.365414	10250800		
22	2018-01-04	8.100	8.100	8.010	8.025	7.319807	16272000		
33	2018-01-05	8.085	8.190	8.075	8.175	7.456626	9813600		
44	2018-01-08	8.190	8.260	8.170	8.240	7.515914	11198200		

In [7]:

```
!pip install yfinance --upgrade --no-cache-dir
import yfinance as yf
yf.pdr_override() df_cts = pdr.get_data_yahoo("CTS", start="2018-01-01").reset_index() df_cts.to_csv('CTS.csv', index=False)
df_cts.head()

Requirement already satisfied: yfinance in c:\windows\system32\src\yfinance (0.1.55)
Requirement already satisfied: pandas>=0.24 in c:\users\mahesh\anaconda3\lib\site-packages
(from yfinance) (1.2.1)
Requirement already satisfied: numpy>=1.15 in c:\users\mahesh\anaconda3\lib\site-packages
(from yfinance) (1.19.2)
Requirement already satisfied: requests>=2.20 in c:\users\mahesh\anaconda3\lib\site-packages
(from yfinance) (2.25.1)
Requirement already satisfied: multitasking>=0.0.7 in
c:\users\mahesh\anaconda3\lib\sitepackages (from yfinance) (0.0.9)
Requirement already satisfied: lxml>=4.5.1 in c:\users\mahesh\anaconda3\lib\site-packages
(from yfinance) (4.6.2)
Requirement already satisfied: pytz>=2017.3 in c:\users\mahesh\anaconda3\lib\site-packages
(from pandas>=0.24->yfinance) (2021.1)
Requirement already satisfied: python-dateutil>=2.7.3 in c:\users\mahesh\anaconda3\lib\site-packages
(from pandas>=0.24->yfinance) (2.8.1)
Requirement already satisfied: six>=1.5 in c:\users\mahesh\anaconda3\lib\site-packages
(from python-dateutil>=2.7.3->pandas>=0.24->yfinance) (1.15.0)
```

```
Requirement already satisfied: chardet<5,>=3.0.2 in c:\users\mahesh\anaconda3\lib\site-packages (from requests>=2.20->yfinance) (4.0.0)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\mahesh\anaconda3\lib\site-packages (from requests>=2.20->yfinance) (2020.12.5)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\mahesh\anaconda3\lib\site-packages (from requests>=2.20->yfinance) (1.26.3)
Requirement already satisfied: idna<3,>=2.5 in c:\users\mahesh\anaconda3\lib\site-packages (from requests>=2.20->yfinance) (2.10)
[*****100%*****] 1 of 1 completed
```

Out [7] :

	Date	Open	High	Low	Close	Adj Close	Volume
0	2018-01-02	25.900000	26.950001	25.850000	26.500000	26.042004	117900
1	2018-01-03	26.549999	26.700001	26.200001	26.250000	25.796324	62600
2	2018-01-04	26.500000	27.150000	26.450001	26.750000	26.287683	55800
3	2018-01-05	26.750000	27.049999	26.600000	26.850000	26.385950	39700
4	2018-01-08	26.750000	26.900000	26.549999	26.700001	26.238546	40100

In [9] :

```
import matplotlib.pyplot as plt
%matplotlib inline

df_info["Adj Close"].plot(grid = True)
```

Out [9] :

<AxesSubplot:>



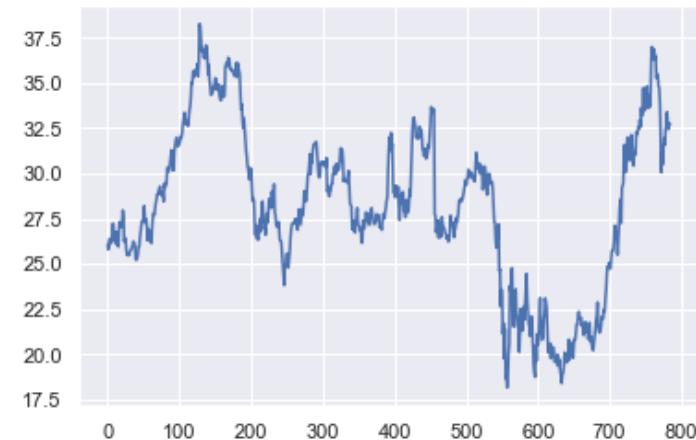
In [10] :

```
import matplotlib.pyplot as plt
%matplotlib inline

df_cts["Adj Close"].plot(grid = True)
```

Out [10] :

<AxesSubplot:>



In [11] :

"To Be Continued"

```
stocks = pd.DataFrame({"INFY": df_info["Adj Close"],  
                      "CTS": df_cts["Adj Close"]})
```

```
stocks.head()
```

```
[*****100%*****] 1 of 1 completed  
[*****100%*****] 1 of 1 completed
```

Out[11]:

	INFY	CTS
0	7.429263	26.042004
1	7.365414	25.796324
2	7.319807	26.287683
3	7.456626	26.385950
4	7.515914	26.238546

In [12]:

```
stocks.plot(grid = True)
```

Out[12]:

<AxesSubplot:>



LAB -12

Question1. Perform CRUD operations on Student Table as outlined in the reference

<https://medium.com/analytics-vidhya/programming-with-databases-in-python-using-sqlite-4cecbef51ab9>

In [2]:

```
import sqlite3
conn = sqlite3.connect('my_database.sqlite')
cursor = conn.cursor()
print("Opened database successfully")
```

Opened database successfully

Creating a Table

In [4]:

```
cursor.execute('''CREATE TABLE SCHOOL
                (ID INT PRIMARY KEY      NOT NULL,
                 NAME           TEXT      NOT NULL,
                 AGE            INT       NOT NULL,
                 ADDRESS        CHAR(50),
                 MARKS          INT);'''')
cursor.close()
```

In [7]:

```
import sqlite3
conn = sqlite3.connect('my_database.sqlite')
cursor = conn.cursor()

cursor.execute("INSERT INTO SCHOOL (ID,NAME,AGE,ADDRESS,MARKS) \
    VALUES (1, 'Rohan', 14, 'Delhi', 200)");
cursor.execute("INSERT INTO SCHOOL (ID,NAME,AGE,ADDRESS,MARKS) \
    VALUES (2, 'Allen', 14, 'Bangalore', 150 )");
cursor.execute("INSERT INTO SCHOOL (ID,NAME,AGE,ADDRESS,MARKS) \
    VALUES (3, 'Martha', 15, 'Hyderabad', 200 )");
cursor.execute("INSERT INTO SCHOOL (ID,NAME,AGE,ADDRESS,MARKS) \
    VALUES (4, 'Palak', 15, 'Kolkata', 650)");conn.commit()
conn.close()
```

SELECTING records from the TABLE

In [9]:

```
import sqlite3
conn = sqlite3.connect('my_database.sqlite')
cursor = conn.cursor()
for row in cursor.execute("SELECT id, name, marks from SCHOOL"):
    print("ID = ", row[0])
    print("NAME = ", row[1])
    print("MARKS = ", row[2], "\n")

conn.commit()
conn.close()
```

```
MARKS = 200

ID = 2
NAME = Allen
MARKS = 150

ID = 3
NAME = Martha
MARKS = 200

ID = 4
NAME = Palak
MARKS = 650
```

UPDATING Records in the TABLE

In [10]:

```
import sqlite3
conn = sqlite3.connect('my_database.sqlite')
cursor = conn.cursor()
conn.execute("UPDATE SCHOOL set MARKS = 250 where ID = 3")
conn.commit()

for row in cursor.execute("SELECT id, name, address, marks from SCHOOL"):
    print("ID = ", row[0])
    print("NAME = ", row[1])
    print("MARKS = ", row[2], "\n")

conn.commit()
conn.close()
```

```
ID = 1
NAME = Rohan
MARKS = Delhi

ID = 2
NAME = Allen
MARKS = Bangalore

ID = 3
NAME = Martha
MARKS = Hyderabad

ID = 4
NAME = Palak
MARKS = Kolkata
```

DELETE Operation

In [14]:

```
import sqlite3
conn = sqlite3.connect('my_database.sqlite')
cursor = conn.cursor()
conn.execute("DELETE from SCHOOL where ID = 2")
conn.commit()

for row in cursor.execute("SELECT id, name, address, marks from SCHOOL"):
    print("ID = ", row[0])
    print("NAME = ", row[1])
    print("ADDRESS = ", row[2])
    print("MARKS = ", row[3], "\n")
```

```

ID = 1
NAME = Rohan
ADDRESS = Delhi
MARKS = 200

ID = 3
NAME = Martha
ADDRESS = Hyderabad
MARKS = 250

ID = 4
NAME = Palak
ADDRESS = Kolkata
MARKS = 650

```

Question2. Open the table MyRestaurants.db that you have created for NoSQL course

In [52]:

```

import cx_Oracle
conn = cx_Oracle.connect( "scott/scott")
sql = "SELECT * FROM MY_RES "
cursor = conn.cursor()
cursor.execute(sql)
for row in cursor.execute("SELECT * from MY_RES"):
    print("NAME = ", row[0])
    print("FOODTYPE=",row[1])
    print("DISTANCE=",row[2])
    print("LASTVISIT=",row[3])
    print("ILIKE=",row[4])
    print("\n")

conn.commit()
conn.close()

```

```

NAME = dosacorner
FOODTYPE= nonveg
DISTANCE= 10
LASTVISIT= 05-feb-2020
ILIKE= 1

```

```

NAME = apple_leaf
FOODTYPE= nonveg
DISTANCE= 15
LASTVISIT= 01-jan-2020
ILIKE= 1

```

```

NAME = sowmyas
FOODTYPE= veg
DISTANCE= 18
LASTVISIT= 20-mar-2020
ILIKE= 1

```

```

NAME = thinnappa
FOODTYPE= nonveg
DISTANCE= 25
LASTVISIT= 20-nov-2019
ILIKE= 0

```

```

NAME = sribhavan

```

```
NAME = chinaworld
FOODTYPE= chinese
DISTANCE= 14
LASTVISIT= 05-mar-2020
ILIKE= 1
```

```
NAME = littlechina
FOODTYPE= chinese
DISTANCE= 30
LASTVISIT= 10-mar-2020
ILIKE= 0
```

```
NAME = munivilas
FOODTYPE= nonveg
DISTANCE= 20
LASTVISIT= 05-dec-2019
ILIKE= None
```

Question3 Write a SQL query that returns all restaurants in your table MyRestaurants.db.

In [53]:

```
import cx_Oracle
conn = cx_Oracle.connect( "scott/scott")
sql = "SELECT * FROM MY_RES "
cursor = conn.cursor()
cursor.execute(sql)
for row in cursor.execute("SELECT NAME from MY_RES"):
    print("NAME = ", row[0])
conn.commit()
conn.close()
```

```
NAME = dosacorner
NAME = apple_leaf
NAME = sowmyas
NAME = thinnappa
NAME = sribhavan
NAME = chinaworld
NAME = littlechina
NAME = munivilas
```

Question4 Write a SQL query that returns the names of restaurants in descending order that makes Chinese foods

In [54]:

```
import cx_Oracle
conn = cx_Oracle.connect( "scott/scott")
sql = "SELECT * FROM MY_RES "
cursor = conn.cursor()
cursor.execute(sql)
for row in cursor.execute("SELECT NAME, FOODTYPE from MY_RES WHERE FOODTYPE = 'chinese' GROUP BY NAME, FOODTYPE ORDER BY NAME, FOODTYPE DESC"):
    print("NAME = ", row[0])
    print("FOODTYPE= ", row[1])
    print("\n")
conn.commit()
```

```
NAME = littlechina
FOODTYPE= chinese
```

In []:

LAB - 13

2D and 3D Data Visualization using Matplotlib and Seaborn

In this lab, you will draw simple 2-dimensional and 3-dimensional charts from matplotlib and seaborn packages.

Question1. Plot all 2D and 3D Plots using Matplotlib and Seaborn.

* Plot 2D line, bar, histogram and box plot using Matplotlib

* Histogram and box plot using Seaborn

Reference1: <https://acadgild.com/blog/data-visualization-using-matplotlib-and-seaborn>

Reference2: <https://www.kaggle.com/janani90/data-viz-exercise-matplotlib-and-seaborn>

In [7]:

```
import seaborn as sns #dataviz modules
import pandas as pd #data_processing modules
import matplotlib.pyplot as plt #data_viz
%matplotlib inline
```

In [10]:

```
data_heart = pd.read_csv('heart.csv')
data_heart.head()
```

Out[10]:

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
0	63	1	3	145	233	1	0	150	0	2.3	0	0	1	1
1	37	1	2	130	250	0	1	187	0	3.5	0	0	2	1
2	41	0	1	130	204	0	0	172	0	1.4	2	0	2	1
3	56	1	1	120	236	0	1	178	0	0.8	2	0	2	1
4	57	0	0	120	354	0	1	163	1	0.6	2	0	2	1

In [11]:

```
data_heart.dtypes
```

Out[11]:

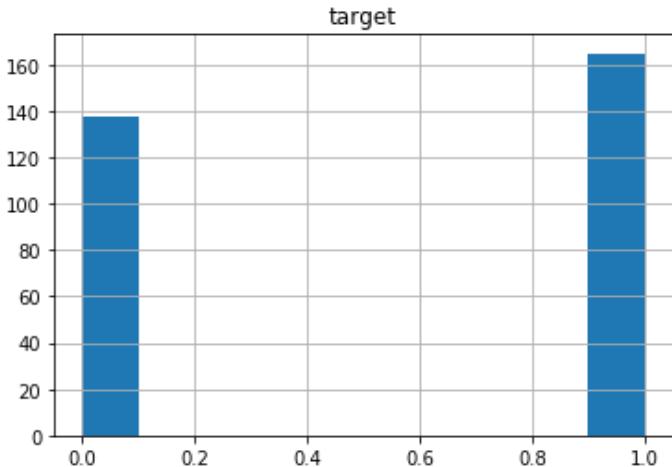
```
age          int64
sex          int64
cp           int64
trestbps    int64
chol         int64
fbs          int64
restecg     int64
thalach     int64
exang        int64
oldpeak      float64
slope        int64
ca           int64
thal         int64
```

In [3]:

```
data_heart.hist('target')
```

Out[3]:

```
array([<matplotlib.axes._subplots.AxesSubplot object at 0x7f013e7cb048>],  
      dtype=object)
```

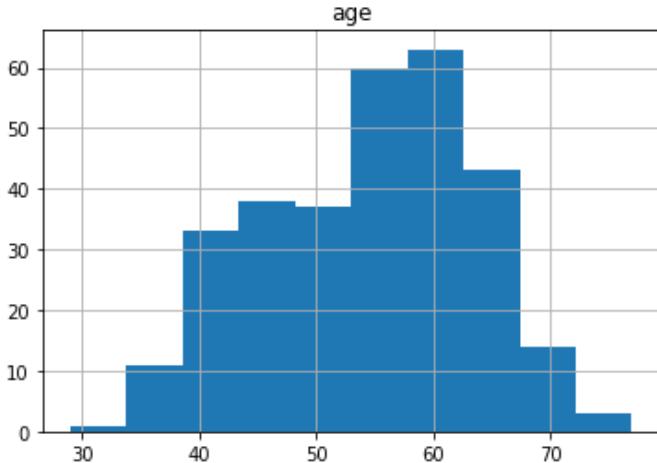


In [4]:

```
data_heart.hist('age') # histogram for one quantitative variable
```

Out[4]:

```
array([<matplotlib.axes._subplots.AxesSubplot object at 0x7f013e77eeb8>],  
      dtype=object)
```



In [5]:

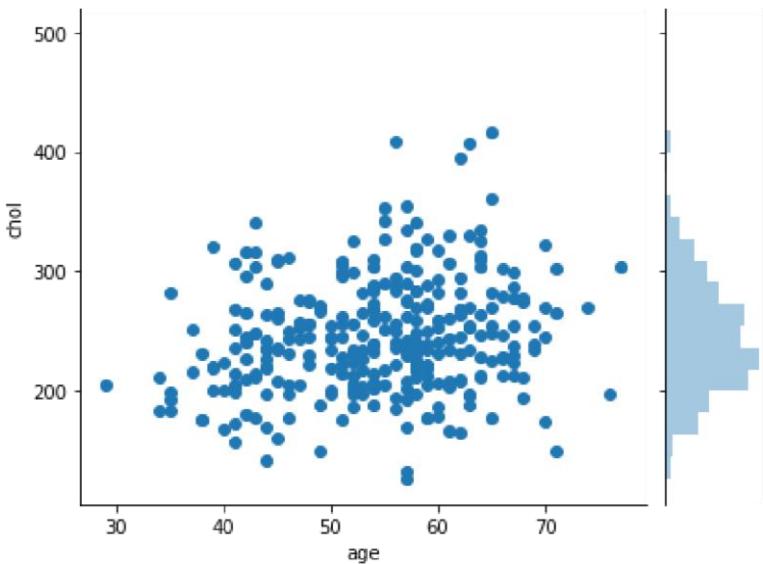
```
sns.jointplot(x='age', y='chol', data=data_heart) # scatter plot for 2 quantitative variables
```

```
/opt/conda/lib/python3.6/site-packages/scipy/stats/stats.py:1713: FutureWarning: Using a  
non-tuple sequence for multidimensional indexing is deprecated; use `arr[tuple(seq)]` instead of `arr[seq]`. In the future this will be interpreted as an array index, `arr[np.array(seq)]`, which will result either in an error or a different result.  
    return np.add.reduce(sorted[indexer] * weights, axis=axis) / sumval
```

Out[5]:

```
<seaborn.axisgrid.JointGrid at 0x7f013e775e80>
```



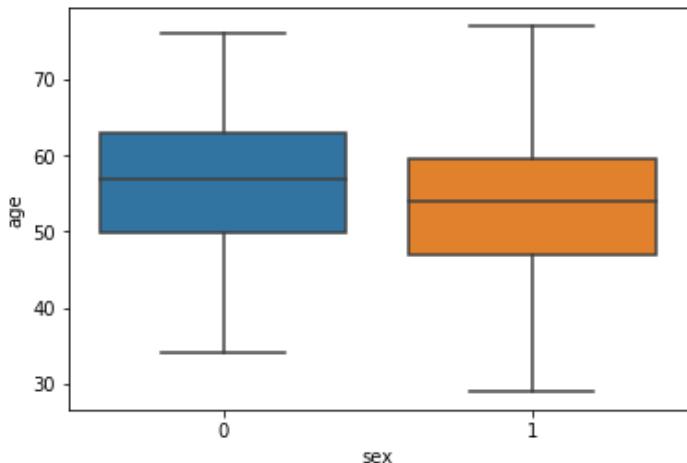


In [6]:

```
sns.boxplot(x='sex', y='age', data=data_heart)
```

Out[6]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f013ad27eb8>
```



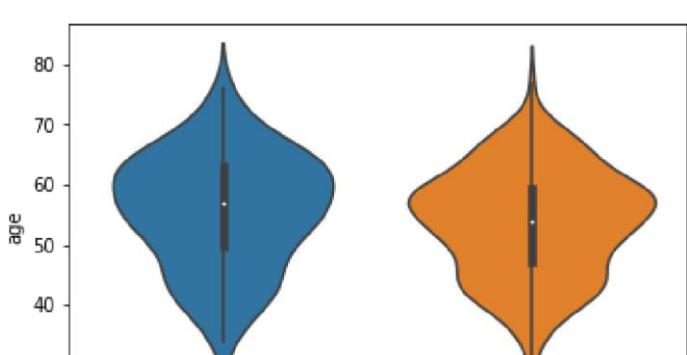
In [7]:

```
sns.violinplot(x='sex', y='age', data=data_heart)
```

```
/opt/conda/lib/python3.6/site-packages/scipy/stats/stats.py:1713: FutureWarning: Using a non-tuple sequence for multidimensional indexing is deprecated; use `arr[tuple(seq)]` instead of `arr[seq]`. In the future this will be interpreted as an array index, `arr[np.array(seq)]`, which will result either in an error or a different result.  
    return np.add.reduce(sorted[indexer] * weights, axis=axis) / sumval
```

Out[7]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f013acb0208>
```



In [8]:

```
data_heart.corr()
```

Out[8]:

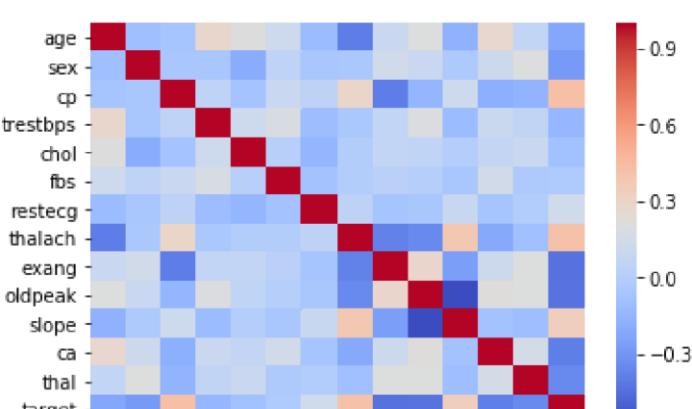
	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	
age	1.000000	0.098447	0.068653	0.279351	0.213678	0.121308	0.116211	0.398522	0.096801	0.210013	0.168814	0.276
sex	0.098447	1.000000	0.049353	0.056769	0.197912	0.045032	0.058196	0.044020	0.141664	0.096093	0.030711	0.118
cp	0.068653	0.049353	1.000000	0.047608	0.076904	0.094444	0.044421	0.295762	0.394280	0.149230	0.119717	0.181
trestbps	0.279351	0.056769	0.047608	1.000000	0.123174	0.177531	0.114103	0.046698	0.067616	0.193216	0.121475	0.101
chol	0.213678	0.197912	0.076904	0.123174	1.000000	0.013294	0.151040	0.009940	0.067023	0.053952	0.004038	0.070
fbs	0.121308	0.045032	0.094444	0.177531	0.013294	1.000000	0.084189	0.008567	0.025665	0.005747	0.059894	0.137
restecg	0.116211	0.058196	0.044421	0.114103	0.151040	0.084189	1.000000	0.044123	0.070733	0.058770	0.093045	0.072
thalach	0.398522	0.044020	0.295762	0.046698	0.009940	0.008567	0.044123	1.000000	0.378812	0.344187	0.386784	0.213
exang	0.096801	0.141664	0.394280	0.067616	0.067023	0.025665	0.070733	0.378812	1.000000	0.288223	0.257748	0.115
oldpeak	0.210013	0.096093	0.149230	0.193216	0.053952	0.005747	0.058770	0.344187	0.288223	1.000000	0.577537	0.222
slope	0.168814	0.030711	0.119717	0.121475	0.004038	0.059894	0.093045	0.386784	0.257748	0.577537	1.000000	0.080
ca	0.276326	0.118261	0.181053	0.101389	0.070511	0.137979	0.072042	0.213177	0.115739	0.222682	0.080155	1.000
thal	0.068001	0.210041	0.161736	0.062210	0.098803	0.032019	0.011981	0.096439	0.206754	0.210244	0.104764	0.151
target	0.225439	0.280937	0.433798	0.144931	0.085239	0.028046	0.137230	0.421741	0.436757	0.430696	0.345877	0.391

In [9]:

```
sns.heatmap(data_heart.corr(), cmap='coolwarm')
```

Out[9]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f013845ee48>
```




```
1 install.packages("gapminder")
2 install.packages("ggplot2")
3 install.packages("ggridge")
4 library(gapminder)
5 library(ggplot2)# data visualisation
6 library(ggridge)# animation
7 gapminder
8 dim(gapminder)# dimensions
9 str(gapminder)
10 #histogram/density plot
11 ggplot(gapminder,aes(gdpPercap))+geom_histogram()
12 #dataset
13 #aesthetic-aes()
14 #geometry-geom()
15 #facet-subplots
16
17 #scatterplot
18 ggplot(gapminder,aes(gdpPercap,lifeExp,size=pop))+
19   geom_point(aes(color=continent),show.legend = FALSE)+  

20   scale_size(range = c(2,12))+  

21   scale_x_log10() +
22   facet_wrap(continent~.)+
23   labs(title = 'Year: {frame_time}', x = 'GDP per capita', y = 'life expectancy') +
24   transition_time(year) +
25   ease_aes('linear')
26 #anim <- animate(p)
27 #magick::image_write(anim, path="myanimation.gif")
28
29
30
```

