1. Program to calculate area of triangle, rectangle, circle

Problem solution,

1. while loop for continuetion of Program
2. Print Menu
3. if statement for Triangle
4. elif statement for Rectangle
5. elif statement for Circle
6. Take C value to continue or exit

```
c=1
while(c):
    print("Select to calculate area:")
    print("1.Triangle")
    print("2.Rectangle")
    print("3.Circle")
    n=int(input("Enter Your Choice:"))
    if(n==1):
        base = int(input("Enter Base of Triangle"))
        height = int(input("Enter Height of Triangle"))
        triarea = 0.5 * base * height
        print("Area of Triange is {0}".format(triarea))
    elif(n==2):
        length= int(input("Enter Length of Rectangel"))
        width=int(input("Enter Breadth of Rectangle"))
        rectarea= length * width
        print("Area of Rectangle is {0}".format(rectarea))
    elif(n==3):
        radius=int(input("Enter radius of Circle:"))
```

```
        circlearea=3.41 * radius *radius
        print("Area of Circle is {0}".format(circlearea))
    else:
        print("Wrong Choice")
    c=int(input("Enter 1 to Continue or 0 to Exit"))
```

Program Explanation:

1. Initialize c=1 to continue program using while loop
2. Print Menu 1. Triangle 2.Rectangle 3.Circle
3. Take choice as n from keyboard
4. if n == 1

a. Take base and height of triangle from keyboard

b. Calculate area of triangle with formula 0.5 * base * height

c. Print area of triangle.

5. elif n == 2

a. Take length and width of rectangle from keyboard

b. Calculate area of rectangle with formula length * width

c. Print area of rectangle

6. elif n == 3

a. Take radius of circle from keyboard

b. Calculate area of circle with formula pi value * radius * radius

c. Print area of circle

7. else print wrong choice

8 . Take c value from keyboard 1 to continue or 0 to exit

2. Program to Find the Union of two Lists

This is a Python Program to find the union of two lists.

Problem Description

The program takes two lists and finds the unions of the two lists.

Problem Solution

1. Define a function which accepts two lists and returns the union of them.
2. Declare two empty lists and initialise to an empty list.
3. Consider a for loop to accept values for two lists.
4. Take the number of elements in the list and store it in a variable.
5. Accept the values into the list using another for loop and insert into the list.
6. Repeat 4 and 5 for the second list also.
7. Find the union of the two lists.
8. Print the union.
9. Exit.

Program/Source Code

Here is source code of the Python Program to find the union of two lists. The program output is also shown below.

```
l1 = []
num1 = int(input('Enter size of list 1: '))
for n in range(num1):
    numbers1 = int(input('Enter any number:'))
    l1.append(numbers1)

l2 = []
num2 = int(input('Enter size of list 2:'))
for n in range(num2):
    numbers2 = int(input('Enter any number:'))
    l2.append(numbers2)

union = list(set().union(l1,l2))

print('The Union of two lists is:',union)
```

Program Explanation1. User must enter the number of elements in the list and store it in a variable.
2. User must enter the values to the same number of elements into the list.
3. The append function obtains each element from the user and adds the same to the end of the list as many times as the number of elements taken.
4. The same of 2 and 3 is done for the second list also.
5. The union function accepts two lists and returns the list which is the union of the two lists, i.e, all the values from list 1 and 2 without redundancy.
6. The set function in the union function accepts a list and returns the list after elimination of redundant values.
7. The lists are passed to the union function and the returned list is printed.

3. Program to find the intersection of two lists.

Python Program to Find the Intersection of Two Lists

This is a Python Program to find the intersection of two lists.

Problem Description

The program takes two lists and finds the intersection of the two lists.

Problem Solution

1. Define a function that accepts two lists and returns the intersection of them.
2. Declare two empty lists and initialize them to an empty list.
3. Consider a for loop to accept values for the two lists.
4. Take the number of elements in the list and store it in a variable.
5. Accept the values into the list using another for loop and insert into the list.
6. Repeat 4 and 5 for the second list also.
7. Find the intersection of the two lists.
8. Print the intersection.
9. Exit.

Program/Source Code

Here is source code of the Python Program to find the intersection of two lists. The program output is also shown below.

```
def intersection(a, b):
    return list(set(a) & set(b))

def main():
    alist=[]
    blist=[]
    n1=int(input("Enter number of elements for list1:"))
    n2=int(input("Enter number of elements for list2:"))
    print("For list1:")
    for x in range(0,n1):
        element=int(input("Enter element" + str(x+1) + ":"))
        alist.append(element)
    print("For list2:")
    for x in range(0,n2):
        element=int(input("Enter element" + str(x+1) + ":"))
        blist.append(element)
    print("The intersection is :")
    print(intersection(alist, blist))
main()
```

Program Explanation

1. User must enter the number of elements in the list and store it in a variable.
2. User must enter the values to the same number of elements into the list.

3. The append function obtains each element from the user and adds the same to the end of the list as many times as the number of elements taken.
4. The same of 2 and 3 is done for the second list also.
5. The intersection function accepts two lists and returns the list which is the intersection of the two lists, i.e, all the common values from list 1 and 2.
6. The set function in the intersection function accepts a list and returns the list which contains the common elements in both the lists.
7. The lists are passed to the intersection function and the returned list is printed.

4 Program to Remove the ith Occurrence of the Given Word in a List where Words can Repeat

This is a Python Program to remove the ith occurrence of the given word in list where words can repeat.

Problem Description

The program takes a list and removes the ith occurrence of the given word in the list where words can repeat.

Problem Solution

1. Take the number of elements in the list and store it in a variable.
2. Accept the values into the list using a for loop and insert them into the list.
3. Use a for loop to traverse through the elements in the list.
4. Then use an if statement to check if the word to be removed matches the element and the occurrence number and otherwise it appends the element to another list.
5. The number of repetitions along with the updated list and distinct elements is printed.
6. Exit.

Program/Source Code

Here is source code of the Python Program to remove the ith occurrence of the given word in list where words can repeat. The program output is also shown below.

```
a=[]
n= int(input("Enter the number of elements in list:"))
for x in range(0,n):
    element=input("Enter element" + str(x+1) + ":")
    a.append(element)
print(a)
c=[]
count=0
b=input("Enter word to remove: ")
n=int(input("Enter the occurrence to remove: "))
for i in a:
    if(i==b):
        count=count+1
        if(count!=n):
            c.append(i)
    else:
        c.append(i)
if(count==0):
    print("Item not found ")
else:
    print("The number of repetitions is: ",count)
    print("Updated list is: ",c)
    print("The distinct elements are: ",set(a))
```

Program Explanation

1. User must enter the number of elements in the list and store it in a variable.
2. User must enter the values of elements into the list.

3. The append function obtains each element from the user and adds the same to the end of the list as many times as the number of elements taken.
4. User must enter the word and the occurrence of the word to remove.
5. A for loop is used to traverse across the elements in the list.
6. An if statement then checks whether the element matches equal to the word that must be removed and whether the occurrence of the element matches the occurrence to be removed.
7. If both aren’t true, the element is appended to another list.
8. If only the word matches, the count value is incremented.
9. Finally the number of repetitions along with the updated list and the distinct elements is printed.

5. Program to Count the Occurrences of Each Word in a Given String Sentence

This is a Python Program to count the occurrences of each word in a given string sentence.

Problem Description

The program takes a string and counts the occurrence of each word in the given sentence.

Problem Solution

1. Take a string and a word from the user and store it in separate variables.
2. Initialize a count variable to 0.
3. Split the string using space as the reference and store the words in a list.
4. Use a for loop to traverse through the words in the list and use an if statement to check if the word in the list matches the word given by the user and increment the count.
5. Print the total count of the variable.
6. Exit.

Program/Source Code

Here is source code of the Python Program to calculate the length of a string without using library functions. The program output is also shown below.

```
string=raw_input("Enter string:")
word=raw_input("Enter word:")
a=[]
count=0
a=string.split(" ")
for i in range(0,len(a)):
      if(word==a[i]):
            count=count+1
print("Count of the word is:")
print(count)
```

Program Explanation

1. User must enter a string and a word and store it in separate variables.
2. The count variable is initialized to zero.
3. The string is split into words using space as the reference and stored in a list.
4. The for loop is used to traverse through the words in the list.
5. The count is incremented each time the word in the list is equal to the word given by the user.
6. The total count of the word is printed.

6. Program to Check if a Substring is Present in a Given String

This is a Python Program to check if a substring is present in a given string.

Problem Description

The program takes a string and checks if a substring is present in the given string.

Problem Solution

1. Take a string and a substring from the user and store it in separate variables.
2. Check if the substring is present in the string using find() in-built function.
3. Print the final result.
4. Exit.

Program/Source Code

Here is source code of the Python Program to calculate the length of a string without using library functions. The program output is also shown below.

```
string=raw_input("Enter string:")
sub_str=raw_input("Enter word:")
if(string.find(sub_str)==-1):
      print("Substring not found in string!")
else:
      print("Substring in string!")
```

Program Explanation

1. User must enter a string and a substring from the user and store it in separate variables.
2. It is then checked if the substring is present in the string using find() in-built function.
3. An if statement is used to make the decision and the final result is printed.

7. Program to Map Two Lists into a Dictionary

This is a Python Program to map two lists into a dictionary.

Problem Description

The program takes two lists and maps two lists into a dictionary.

Problem Solution

1. Declare two empty lists and initialize them to an empty list.
3. Consider a for loop to accept values for the two lists.
4. Take the number of elements in the list and store it in a variable.
5. Accept the values into the list using another for loop and insert into the list.
6. Repeat 4 and 5 for the values list also.
7. Zip the two lists and use dict() to convert it into a dictionary.
8. Print the dictionary.
9. Exit.

Program/Source Code

Here is source code of the Python Program to map two lists into a dictionary. The program output is also shown below.

```
keys=[]
values=[]
n=int(input("Enter number of elements for dictionary:"))
print("For keys:")
for x in range(0,n):
    element=int(input("Enter element" + str(x+1) + ":"))
    keys.append(element)
print("For values:")
for x in range(0,n):
    element=int(input("Enter element" + str(x+1) + ":"))
    values.append(element)
d=dict(zip(keys,values))
print("The dictionary is:")
print(d)
```

Program Explanation

1. User must enter the number of elements in the list and store it in a variable.
2. User must enter the values to the same number of elements into the list.
3. The append function obtains each element from the user and adds the same to the end of the list as many times as the number of elements taken.
4. The same of 2 and 3 is done for the second values list also.
5. The two lists are merged together using the zip() function.
6. The zipped lists are then merged to form a dictionary using dict().
7. The dictionary formed from the two lists is then printed.

8. Program to Count the Frequency of Words Appearing in a String Using a Dictionary

This is a Python Program to count the frequency of words appearing in a string using a dictionary.

Problem Description

The program takes a string and counts the frequency of words appearing in that string using a dictionary.

Problem Solution

1. Enter a string and store it in a variable.
2. Declare a list variable and initialize it to an empty list.
3. Split the string into words and store it in the list.
4. Count the frequency of each word and store it in another list.
5. Using the zip() function, merge the lists containing the words and the word counts into a dictionary.
3. Print the final dictionary.
4. Exit.

Program/Source Code

Here is source code of the Python Program to count the frequency of words appearing in a string using a dictionary. The program output is also shown below.

```
test_string=raw_input("Enter string:")
l=[]
l=test_string.split()
wordfreq=[l.count(p) for p in l]
print(dict(zip(l,wordfreq)))
```

Program Explanation

1. User must enter a string and store it in a variable.
2. A list variable is declared and initialized to an empty list.
3. The string is split into words using a space as the reference and stored in the list.
4. The frequency of each word in the list is counted using list comprehension and the count() function.
5. The final dictionary is created using the zip() function and is printed.

9.Program to Create a Dictionary with Key as First Character and Value as Words Starting with that Character

This is a Python Program to create a dictionary with key as first character and value as words starting with that character.

Problem Description:The program takes a string and creates a dictionary with key as first character and value as words starting with that character.

Problem Solution

1. Enter a string and store it in a variable.
2. Declare an empty dictionary.
3. Split the string into words and store it in a list.
4. Using a for loop and if statement check if the word already present as a key in the dictionary.
5. If it is not present, initialize the letter of the word as the key and the word as the value and append it to a sublist created in the list.
6. If it is present, add the word as the value to the corresponding sublist.
7. Print the final dictionary.
8. Exit.

Program/Source Code

Here is source code of the Python Program to create a dictionary with key as first character and value as words starting with that character. The program output is also shown below.

```
test_string=raw_input("Enter string:")
l=test_string.split()
d={}
for word in l:
    if(word[0] not in d.keys()):
        d[word[0]]=[]
        d[word[0]].append(word)
    else:
        if(word not in d[word[0]]):
          d[word[0]].append(word)
for k,v in d.items():
        print(k,":",v)
```

Program Explanation

1. User must enter a string and store it in a variable.
2. An empty dictionary is declared.
3. The string is split into words and is stored in a list.
4. A for loop is used to traverse through the words in the list.
5. An if statement is used to check if the word already present as a key in the dictionary.
6. If it is not present, the letter of the word is initialized as the key and the word as the value and they are append to a sublist created in the list.
7. If it is present, the word is added as the value to the corresponding sublist.
8. The final dictionary is printed.

10. Program to Find the Length of a List Using Recursion

This is a Python Program to find the length of a list recursively.

Problem Description

The program takes a list and finds the length of the list recursively.

Problem Solution

1. Define a recursive function which takes a list as the argument.
2. Initialize a variable to a list.
3. In the function, put the condition that if it is not the original list, return 0.
4. Otherwise, recursively call the function to find the length of the list.
5. Print the final result of the string.
6. Exit.

Program/Source Code

Here is source code of the Python Program to find the length of a list recursively. The program output is also shown below.

```
def length(lst):
    if not lst:
        return 0
    return 1 + length(lst[1::2]) + length(lst[2::2])
a=[1,2,3]
print("Length of the string is: ")
print(a)
```

Program Explanation

1. Define a recursive function which takes a list as the argument.
2. Initialize a variable to a list.
3. In the function, put the condition that if it is not the original list, return 0.
4. Otherwise, recursively call the function to find the length of the list.
5. Print the final result of the string.

11 #program for Compute the diameter, circumference, and volume of a sphere using class

1. Define and declare class name
2. Define member function
3. Create object and initialize
4. Print diamete of sphere
5. Print Circumference of sphere
6. Print Volume of sphere

```
class sphere:
    def __init__(self,r):
        self.radius = r
    def diameter(self):
        return 2 * self.radius
    def circumference(self):
        return 2 * 3.14 * self.radius
    def volume(self):
        return 4/3 * 3.14 * self.radius ** 3

radius=float(input("Enter radius of sphere:"))
a=sphere(radius)
print("The diameter of sphere is:",a.diameter())
print("The Circumference of sphere is: ", a.circumference())
print("The Volume of sphere is: ",a.volume())
```

Program Explaintion:

1. Define Class with name sphere
2. Define __init__ function to initialize class
3. Define diameter function to calculate diameter (2 * radius) of sphere
4. Define circumference function to calculate circumference (2 * pi value * radius) of sphere
5. Define volume function to calculate volume (4/3 * pi value * radius **3)
6. Take input from keyboard and save as radius
7. Create object a of class sphere with parameter radius
8. Print and call a.diameter() function
9. Print and call a.circumference() function
10. Print and call a.volume() function

12. Python Program to Read a File and Capitalize the First Letter of Every Word in the File

This is a Python Program to read a file and capitalize the first letter of every word in the file.

Problem Description

The program reads a file and capitalizes the first letter of every word in the file.

Problem Solution

1. Take the file name from the user.
2. Read each line from the file and use the title() function to capitalize each word in the line.
3. Print the altered lines of the file.
5. Exit.

Program/Source Code

Here is source code of the Python Program that reads a file and capitalizes the first letter of every word in the file. The program output is also shown below.

```
fname = input("Enter file name: ")

with open(fname, 'r') as f:
    for line in f:
        l=line.title()
        print(l)
```

Program Explanation

1. User must enter a file name.
2. The file is opened using the open() function in the read mode.
3. A for loop is used to read through each line in the file.
4. Each word in the line is capitalized using the title() function.
5. The altered lines are printed.