PSWP Programs

Week-1: Introduction to Python Lab – Installation and Simple Output Display.

a) Write a python program to read a string "Python Programming" and display it on the screen.

```
string = input("Enter a string: ")
print("\'",string,"\'")
```

b) Write a python program to read integer, float & string values and display them on the screen.

```
i = int(input("Enter an integer: "))
f = float(input("Enter an floating point value: "))
s = input("Enter a string: ")
print("The entered integer is: \'",i,"\'")
print("The entered floating point is: \'",f,"\'")
print("The entered string is: \'",s,"\'")
```

Week-2: Programs using Input Output Statements, Variables and Expressions

a) Write a python program to read a float value and convert Fahrenheit to Centigrade.

```
f = float(input("Enter Temperature in Fahrenheit: "))
c = (f-32)*(5/9)
print("The value of",f,"Fahrenheit in Centigrade/Celsius is",c)
```

b) Write a python program to find the area of triangle.

```
a = int(input("Enter value for side a: "))
b = int(input("Enter value for side b: "))
area = (1/2)*a*b
print("The area of the triangle with sides as",a,",",b,"is",area)
```

c) Write a python program to read the Marks in 4 Subjects and Display the average.

```
m1=float(input("Enter marks in 1st Subject: "))
m2=float(input("Enter marks in 2nd Subject: "))
m3=float(input("Enter marks in 3rd Subject: "))
m4=float(input("Enter marks in 4th Subject: "))
s=m1+m2+m3+m4
avg=s/4
print("The Average of four numbers is:",avg)
```

d) Write a python program for demonstrating the usage of command line arguments.

Week-3: Programs using various operators in Python

a) Write a python program for demonstrating the usage of comparison operators.

```
a = float(input("Enter first number: "))
b = float(input("Enter second number: "))
print("== Operator:",a==b)
print("!= Operator:",a!=b)
print("> Operator:",a>b)
print(">= Operator:",a>=b)
print("< Operator:",a<b)
print("<= Operator:",a<=b)
```

b) Write a python program to swap / interchange two numbers.

```
a = 3
b = 7.98
print("Variables before swapping:","\na =",a,"\nb =",b)

# Swapping using temp variable:
temp = b
b=a
a=temp
print("Swapped variables after 1st swap:","\na =",a,"\nb =",b)

# Swapping without using variable:
a=a+b
b=a-b
a=a-b
print("Swapped variables after 2nd swap:","\na =",a,"\nb =",b)
```

c) Write a program that asks the user for a number of seconds and prints out how many minutes and seconds in it. For instance, 200 seconds is 3minutes and 20seconds.

```
a=int(input("Enter time in seconds: "))
minutes = a // 60
seconds = a % 60
print("The time entered is",minutes,"minutes and",seconds,"seconds")
```

d) Write a python program for demonstrating the usage of unary, shift, logical, membership and identity operators.

```
a = int(input("Enter an integer value for a: "))
b = int(input("Enter a value for b: "))
c = input("Enter a value for c: ")

print("Unary Operator for a:",-a)

print("Right Shift with 2 for a:",a>>2)
print("Left Shift with 2 for a:",a<<2)

print("Logical and for a,b:",a and b)
print("Logical or for a,b:",a or b)
print("Logical not for a:",not a)

print("Membership in for checking if 'a' is in c:",'a' in c)
print("Membership not in for checking if 'a' is not in c:",'a' not in c)

print("Identity is for checking if a is b:",a is b)
print("Identity is not for checking if a is not b:",a is not b)
```

Week-4: Programs using Conditional Statements

a) Write a python program to check a given number is Even or Odd.

```
a = int(input("Enter a number: "))

if a%2==0:
    print("The number %d is even" %(a))
elif a%2!=0:
    print("The number %d is odd" %(a))
```

b) Write a python program that asks the user to enter length in cm. If the user enters a negative length, the program should tell the user that the entry is invalid. Otherwise, the program should convert the length to inches and print out the result.

```
c=float(input("Enter length in Centimeters: "))

if c<0:
    print("The entered length is Invalid.")
else:
    i=c*(0.393701)
    print("The entered length converted to Inches is",i)
```

c) Write a python program to find the greatest of 3 integer numbers.

```
a = int(input("Enter a value for a: "))
b = int(input("Enter a value for b: "))
c = int(input("Enter a value for c: "))

if a>b and a>c:
    print("a is the greatest value")
elif b>a and b>c:
    print("b is the greatest value")
elif c>a and c>b:
    print("c is the greatest value")
```

d) Write a python program to demonstrate nested if statement.

```
a = int(input("Enter a value for a: "))
b = int(input("Enter a value for b: "))
c = int(input("Enter a value for c: "))


if a>b:
    if a>c:
        print("a is the greatest value")
    if c>a:
        print("c is the greatest value")
elif b>a:
    if b>c:
        print("b is the greatest value")
    if c>b:
        print("c is the greatest value")
```

Week-5: Programs using Iterative Statements

a) Write a Python program to reverse the digits of a given number.

```
n=int(input("Enter a number: "))
r=0
while n>0:
    a=n % 10
    r=r*10+a
    n=n//10

print("The reverse of the given number is %d." %(r))
```

b) Write a Python program to find the factorial of a given number.

```
x=int(input("Enter a number: "))
p=1
for i in range(1,x+1):
    p*=i
print("The factorial of %d is %d." %(x,p))
```

c) Write a python program to find the GCD of given two numbers.

```
x=int(input("Enter a number x: "))
y=int(input("Enter a number y: "))
gcd=1
for i in range(1,x+1):
    if x%i==0 and y%i==0 and gcd<i:
        gcd=i
print("The GCD of %d and %d is %d." %(x,y,gcd))
```

d) Write a python program to display factors of a given integer number.

```
x=int(input("Enter a number x: "))

for i in range(1,x+1):
    if x%i==0:
        print(i,end=",")
print("\b are the factors of %d." %(x))
```

Week-6: Programs using Iterative Statements

a) Write a python program to display all prime numbers between 0 to n.

```
n=int(input("Enter a number: "))

for i in range(n):
    count=0
    if i>1:
        for k in range(2,i):
            if i%k==0:
                count+=1
        if count==0:
            print(i,end=",")
print("\b are the prime numbers between 0 and %d." %(n))
```

b) Write a program to print all Armstrong numbers between given range using for loop.

```
n=int(input("Enter a number: "))

for i in range(1,n+1):
    istr=str(i)
    l=len(istr)
    s=0
    for k in istr:
        s+=(int(k)**l)
    if s==i:
        print(i,end=",")
print("\b are the Armstrong numbers between 1 and %d." %(n))
```

c) Write a Python program to display a simple pyramid pattern for demonstrating nested loop.

```
n=int(input("Enter a number: "))
'''
l=2*n-1
for i in range(n):
    s="*"+" *"*(i)
    print((s).center(l))
'''
for i in range(n):
    for j in range(n-1-i):
        print(" ",end="")
    print("*"+" *"*i)
```

Week-7: Programs using Strings and Its Operations

a) Write a program that asks the user to enter a string and perform the following:
(i) The total number of characters in the string.
(ii) Repeat the string 10 times.
(iii) The first character of the string.
(iv) The first three characters of the string.
(v) The last three characters of the string.
(vi) The string in backwards.
(vii) The seventh character of the string if exist otherwise display a message "Not exist".
(viii) The string with its first and last characters removed.
(ix) The string into capital case.
(x) The string with every a replaced with an e.
(xi) The string with every letter replaced by a space.

```
s=input("Enter a string: ")

print("The number of characters in the string \"%s\" are %d." %(s,len(s)))

print("The string repeated 10 times:\n%s" %(s*10))

print("The first character of the entered string \"%s\" is \"%s\"." %(s,s[0]))

print("The first three characters of the entered string \"%s\" is \"%s\"." %(s,s[0:3]))

print("The last three characters of the entered string \"%s\" is \"%s\"." %(s,s[-3:]))

print("The reverse of the entered string \"%s\" is \"%s\"." %(s,s[::-1]))


if len(s)>=7:
    print("The seventh character of the entered string \"%s\" is \"%s\"." %(s,s[6]))
else:
    print("The seventh character of the entered string DOES NOT EXIST.")

print("The string \"%s\" with its first & last elements removed is \"%s\"." %(s, s[1:len(s)-1]))

print("The entered string \"%s\" converted into capital case is \"%s\"." %(s,s.upper()))

print("The string \"%s\" after \'a\' replaced with \'e\' is \"%s\"." %(s,s.replace("a","e")))

z=s
for i in range(len(s)):
    if ord('a')<=ord(s[i])<=ord('z') or ord('A')<=ord(s[i])<=ord('Z'):
        z=z.replace(s[i]," ")
print("The entered string \"%s\" after replacing every letter with a space is \"%s\"." %(s,z))
```

Week-8: Programs using Strings.

a) Write a python program to read a string and find the number of characters in it (Without using Built in Functions).

```
s=input("Enter a string: ")
count=0
for i in s:
    count+=1
print("The number of characters in the string \"%s\" are %d." %(s,count))
```

b) Write a Python program to read a String and check whether it is palindrome or not (Without using Built in Functions).

```
s=input("Enter a string: ")
'''
rs=s[::-1]
'''
rs=""
for i in range(len(s)):
    rs+=s[len(s)-i-1]
print(rs)
if s==rs:
    print("The entered string \"%s\" is a palindrome." %(s))
else:
    print("The entered string \"%s\" is not a palindrome." %(s))
```

Week-9: Programs using Python Data Structures (Lists).

a) Write a python program to perform following operations on a list of integers.

(i) Print the total number of items in the list.

(ii) Print the last item in the list.

(iii) Print the list in reverse order.

(iv) Print Yes if the list contains a 5 and No otherwise.

(v) Print the number of occurrences of an element in the list.

(vi) Remove the first and last items from the list and sort the remaining items.

(vii) Print how many integers in the list is less than a given value?

(viii) Print the average of the elements in the list.

(ix) Print the largest and smallest value in the list.

(x) Print the second largest and second smallest entries in the list.

(xi)Print number of even numbers in the list.

```
l=[2,34,237,2,3,5,2,9,7]
                                                                    #1
print("The number of elements in the list \"",l,"\" is",len(l))
                                                                    #2
print("The last element in the list in \"",l,"\" is",l[len(l)-1])
                                                                    #3
print("The list l=",l)
rl=l[::-1]
print("The reverse list of l=",rl)
                                                                    #4
print("The list l=",l)
count=0
for i in range(len(l)):
    if l[i]==5:
        count+=1
if count>0:
    print("Yes")
else:
    print("No")
```

```
                                                                                #5
print("The list l=",l)
count=0
for i in l:
    print("No.of Occurences of",i,"in list l is",l.count(i))
                                                                                #6
print("The list l=",l)
del l[len(l)-1]
del l[0]
sl=sorted(l)
print("The list l after removing first and last elements and sorting is",sl)
                                                                                #7
m=int(input("Enter an integer: "))
l=[2,34,237,3,5,9,7]
print("The list l=",l)
for i in l:
    if i<m:
        print(i,end=",")
print("are the elements in l less than the given value %d." %(m))
                                                                                #8
s=0
l=[2,34,237,3,5,9,7]
print("The list l=",l)
for i in l:
    s+=i
avg=s/len(l)
print("The average of elements of l is %d." %(avg))
                                                                                #9
l=[2,34,237,3,5,9,7]
print("The list l=",l)
sl=sorted(l)
print("The largest value in the list is",sl[len(sl)-1])
print("The smallest value in the list is",sl[0])
                                                                                #10
l=[2,34,237,3,5,9,7]
print("The list l=",l)
sl=sorted(l)
print("The second largest value in the list is",sl[len(sl)-2])
print("The second smallest value in the list is",sl[1])
                                                                                #11
e=0
l=[2,34,237,3,5,9,7]
print("The list l=",l)
for i in l:
    if i%2==0:
        e+=1
print("The no.of even numbers in l is %d." %(e))
```

Week-10: Programs using Python Data Structures (Dictionary).

a) Write a python program for demonstrating the creation of dictionary, accessing dictionary elements, modifying dictionary elements, finding length and possible operations.

```
print("#Creating Dictionary:")
d={61:"Rahul",62:"Faisal"}
print(d)
print("#Accessing Element in dictionary:")
print(d.get(61))
print(d[62])
print("#Adding Element to dictionary:")
d[63]="-"
print(d)
print("#Modifying Element in dictionary:")
d[63]="Abhishek"
print(d)
print("#Finding length of dictionary:")
print(len(d))
print("#Deleting Element in dictionary:")
del d[63]
print(d)
```

b) Write a python program to create a dictionary of students with keys as roll numbers and values as names. Perform operations like insert, update, and modify student data.

```
d1={61:"Rahul",62:"Faisal"}
print(d1)
print("#Inserting:")
d1[63]="Gopi"
print(d1)
print("#Updating:")
d2={64:"Abhiram"}
d1.update(d2)
print(d1)
print("#Modifying:")
d1[64]="Abhishek"
print(d1)
```

c) Write a program that uses a dictionary that contains ten usernames and passwords. The program should ask the user to enter username and password. If the username is not in the dictionary, the program should indicate that the person is "not a valid user" of the system. If the username is in the dictionary, but the user does not enter the right password, the program should say that "the password is invalid". If the password is correct, then the program should display "Welcome".

```
d={"Rahul":"61","Faisal":"62","Abishek":"63","Gopi":"64","Asrith":"65","Karthin":"66","Rohith":"69",
"Chaitanya":"70","Ganesh":"72","Dheeraj":"77"}
u=input("Enter username: ")
if u not in d:
    print("Invalid Username!")
else:
    p=input("Enter password: ")
    if d[u]==p:
        print("Welcome!")
    else:
        print("Invalid Passsword!")
```

Week-11: Programs using Python Data Structures (Tuples and Set) .

a) Write a python program to demonstrate various operations on tuples.

```
t1=(1,4,6,0,34,9)
t2=(54,-5,7)
print("# Accessing Elements:")
print(t1[2])
print("# Slicing:")
print(t1[2:5])
print("# Length:")
print(len(t1))
print("# Concatenation:")
print(t1+t2)
print("# Repetition:")
print(t2*3)
print("# Membership:")
print(5 in t1)
print("# Comparision:")
print(t1==t2)
print("# Maximum and Minimum:")
print(max(t1))
print(min(t1))
```

b) Write a python program to demonstrate various operations onsets.

```
s=set([1,4,3,6,2,5])
print("Set s=",s)
print("# Update:")
s1=set([4,8,7])
s.update(s1)
print(s)
print("# Add:")
s.add(9)
print(s)
print("# Remove:")
s.remove(8)
print(s)
print("# Discard:")
s.discard(4)
print(s)
print("# Pop:")
s.pop()
print(s)
print("# IsSubset:")
print(s1<=s)
print("# IsSuperset:")
print(s>=s1)
print("# Union:")
print(s|s1)
print("# Intersection:")
print(s&s1)
print("# Difference:")
print(s-s1)
print("# Symmetric Difference:")
print(s^s1)
print("# Clear:")
s.clear()
print(s)
```

Week-12: Programs using User Defined Functions.

a) Write a Python program to calculate simple interest using function.

```
def si(p,t,r):
    i=p*t*r/100
    return i
p=float(input("Enter Principle amount:"))
t=float(input("Enter Time:"))
r=float(input("Enter Rate of interest:"))
print("The simple interest is :",si(p,t,r))
```

b) Write a Python program to find the nth term of a Fibonacci number using function.

```
def fs(n):
    a=0
    b=1
    if n==1:
        return 1
    elif n>1:
        for i in range(n-1):
            c=a+b
            a=b
            b=c
        return b

n=int(input("Enter a number:"))
print(n,"term in fibonacci series is",fs(n))
```

c) Write a Python program to find the number of elements in a list using function.

```
def n(l):
    c=0
    for i in l:
        c+=1
    return c

l=[1,2,3,7,4,8,2]
print("l =",l)
print("The length of the list is",n(l))
```

d) Write a python program to find factorial of a given number using recursion.

```
def fac(n):
    if n==0:
        return 1
    else:
        return n*fac(n-1)

n=int(input("Enter a number:"))
print("The factorial of %d is %d." %(n,fac(n)))
```

e) Write a python program to find sum of individual digits of a given number using recursion.

```
def p(n):
    if n==0:
        return 0
    else:
        return n%10+p(n//10)

n=int(input("Enter a number:"))
print(p(n))
```

Week-13: Programs using File Handling in Python.

a) Write a Python program to read data from a source file and copy its content in to a destination file.

```
with open("F:\source.txt","r") as s:
    with open("F:\destination.txt","w") as d:
        for line in s:
            d.write(line)
```

b) Write a python program to display the number of characters, digits and special characters present in the given file content.

```
with open ("F:\source.txt","r") as s:
    ac=0
    dc=0
    sc=0
    for line in s:
        words=line.split()
        for ch in words:
            for c in ch:
                if c.isalpha():
                    ac=ac+1
#                    print("\n Alphabet:",c)
                elif c.isdigit():
                    dc=dc+1
#                    print("\n Digit:",c)
                else:
                    sc=sc+1
#                    print("\n Special Character:",c)
    print("Alph count:",ac,"\nDigit count:",dc,"\nSpecial Char count:",sc)
```

c) You are given a file calledgrades.txt, where each line of the file contains a one-word student username and three test scores separated by spaces, like below:

- **Rathan 83 77 54**
- **Adams 86 69 90**

Write code that scans through the file and determines how many students passed all three tests.

```
sf=open("F:\class_grades.txt","r")
c,s=0,0
for line in sf:
    l=line.split()
    s+=1
    if int(l[1])>35 and int(l[2])>35 and int(l[3])>35:
        c+=1
#        print(l[0],"has Passed.")
print(c,"Students are passed out of",s)
```

```
# Data in class_grades.txt
Rathan 83 77 54
Adams 86 69 90
Samuel 99 20 100
Ron 30 76 90
Harry 90 87 76

# Data in source.txt
Laboratory Equipment/Software/Tools Required:
1. A computer System with Windows / Ubuntu Operating System.
2. Python 3.x (Any Latest Version)
3. A text editor Notepad++ (Windows) / Gedit (Ubuntu) / IDE
```

File Handling

```
# Opening
f1=open("E:\sample.txt","r") # read mode
# file object will be associated with name, mode and encoding value
print("file object is: ",f1)
# each file object is associated with three attributes
print("name of the file is :",f1.name)
print("Mode of the file is :",f1.mode)
print("Closing status of file is :",f1.closed)
# Closing
f1.close()
print("Closing status of file is :",f1.closed)

# Reading
# read()-to read entire file,
# realine()-returns one line,
# readlines()-returns contents in line format as string
f1=open("E:\sample.txt","r")
print("\n** .read method **\n",f1.read())
f1.close()
f1=open("E:\sample.txt","r")
print("\n** .readline method **\n",f1.readline())
print("** .readlines method ** after first line\n",f1.readlines())

#tell()-tell the position of the file object
print("\nlocation of file object is :",f1.tell())
#seek()- move file pointer to the desired position. first argument is offset
f1.seek(3,0)
print("location of file object is :",f1.tell())
f1.close()

# Reading without using read(), readlines()
f1=open("E:\sample.txt","r")
print("\n** Reading using for loop **\n")
i=1
for line in f1:
    print("line ",i," : ",line)
    i=i+1
f1.close()

# Writing
# write() to write one string, writelines()-write multiple strings
f1=open("E:\sample.txt","w") # write mode
f1.write("Written using .write in write mode")
f1.close()

f1=open("E:\sample.txt","a") # append mode
f1.write("\nWritten using .write in append mode")
f1.writelines(["\nWritten"," using .writelines"," in append mode"])
f1.close()
```

```
# Opening using with keyword
print("\n** Opening using with and Reading using for loop **\n")
with open("E:\sample.txt", "r") as file:
    i=1
    for line in file:
        print("line ",i, " : ",line)
        i=i+1

print("\nFile closed status :",file.closed)

# Program to find no.of words
print("\n** Program to find no.of words **\n")
with open("E:\sample.txt", "r") as file:
    wc=0
    for line in file:
        words=line.split() # default is space
        wc=wc+len(words)
        print(words)
    print("total no.of words are: ",wc)

# Program to count occurence of each word in a file
with open("f1.txt","r") as f1:
    data=f1.read()
    words=data.split()
    print(words)
    for i in words:
        print("%s Occurs %d times in the file" %(i,words.count(i)))

# Program to copy data from a source to a destination file
print("\n** Program to copy data from a source to a destination file **\n")
with open ("E:\sample.txt","r")as fr:
    with open ("E:\copy_destnation.txt","w")as fw:
        for line in fr:
            print(line)
            fw.write(line)
    print("Source file content is written into the destination file")

# Program to display no.of characters, digits, special characters
print("\n** Program to display no.of characters, digits, special characters **\n")
with open ("E:\sample.txt","r")as fr:
    ac=0
    dc=0
    sc=0
    for line in fr:
        print(line)
        for ch in line:
            if ch.isalpha():
                ac=ac+1
            elif ch.isdigit():
                dc=dc+1
            else:
                sc=sc+1
    print("\nTotal no.of characters :",ac, "\nDigits :",dc,"\nSpecial characters :",sc)
```

```
# Program to read marks of students from a file and display no.of students passed

print("\n** Program to read marks of students from a file and display no.of students passed **\n")
with open ("E:\marks.txt","r")as fr:
    tp=0   #counter for total no.of students who passed in all the subjects
    for line in fr:
        words=line.split()  # split line into words
        print(words)        # to print words it is optional
        for w in range(1, len(words)):
            count=1 # to say pass
            #print(w, "type",type(words[w]), int(words[w]),"type :",type(int(words[w])))
            if (int(words[w]) <40):
                count=0  # to set as fail
                break
        if count==1:
            tp=tp+1
    print("total number of students passed is:",tp)
```