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**A Lab Report**

**On**

**Python programming**

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**LAB1.** **(*Area and perimeter of a rectangle*) Write a program that displays the area**

**and perimeter of a rectangle with the width of 4.5 and height of 7.9.**

length = float(input("Enter length of rectangle: "));

breadth = float(input("Enter breadth of rectangle: "));

perimeter = (2\*length) + (2\*breadth);

area = length\*breadth;

print("\nArea of Rectangle =", round(area,4));

print("\nPerimeter of Rectangle =", round(perimeter,4));

**Output**

**================= RESTART: C:\Users\Dell\Desktop\python\1.py =================**

**Enter length of rectangle: 4.5**

**Enter breadth of rectangle: 7.9**

**Area of Rectangle = 35.55**

**Perimeter of Rectangle = 24.8**

**Discussion**

Asks user with input length and breadth performs arithmetic operation as per the formulae and displays the area and perimeter.

**LAB2) (*Convert Celsius to Fahrenheit*) Write a program that reads a Celsius degree from**

**the console and converts it to Fahrenheit and displays the result. The formula for**

**the conversion is as follows:**

**fahrenheit = (9 / 5) \* celsius + 32**

Fahrenheit = int(input("Enter a temperature in Fahrenheit: "))

Celsius = (Fahrenheit - 32) \* 5.0/9.0

print ("Temperature:", Fahrenheit, "Fahrenheit = ", Celsius, " C")

**Output**

================= RESTART: C:\Users\Dell\Desktop\python\2.py =================

Enter a temperature in Fahrenheit: 212

Temperature: 212 Fahrenheit = 100.0 C

**Discussion**

Asks user for input and performs basic mathematics as per the formulae and displays the output.

**LAB3) (*Compute the volume of a cylinder*) Write a program that reads in the radius and**

**length of a cylinder and computes the area and volume using the following**

**formulas:**

**area = radius \* radius \* π volume = area \* length**

import math

height = float(input('Height of cylinder: '))

radius = float(input('Radius of cylinder: '))

area = radius \* radius \* math.pi

volume = area \* height

print("Area is: ", round(area,2))

print("Volume is: ", round(volume,2))

**Output**

================= RESTART: C:\Users\Dell\Desktop\python\3.py =================

Height of cylinder: 15

Radius of cylinder: 7

Area is: 153.94

Volume is: 2309.07

**Discussion**

User inputs the height and radius of cylinder. Calculation is performed as the formula given. Math library is used for value of "pi" as "math.pi".

**LAB4) (*Sum the digits in an integer*) Write a program that reads an integer between 0**

**and 1000 and adds all the digits in the integer. For example, if an integer is 932,**

**the sum of all its digits is 14.**

num = int(input("Enter a Number: "))

result = 0

while num > 0:

rem = num % 10

result = result + rem

num = int(num/10)

print("Sum of all digits is: ", result)

**Output**

================= RESTART: C:\Users\Dell\Desktop\python\4.py =================

Enter a Number: 1542

Sum of all digits is: 12

**Discussion**

User inputs any number between 0-1000. Each position number is obtained by modulo of the number by 10. This number is then divided by 10 to obtain rest other number. Those obtained numbers after modulo operation are added one by one in loop until 0 is obtained.

**LAB5) (*Health application: compute BMI*) Body mass index (BMI) is a measure of health**

**based on weight. It can be calculated by taking your weight in kilograms and**

**dividing it by the sLabuare of your height in meters. Write a program that prompts**

**the user to enter a weight in pounds and height in inches and displays the BMI.**

**Note that one pound is 0.45359237 Kilograms and one inch is 0.0254 meters.**

height = float(input("Input your height in inches: "))

weight = float(input("Input your weight in pounds: "))

kg = 0.45359237 \* weight

metre = 0.0254 \* height

bmi = kg/(metre \* metre)

print("Your body mass index is: ", round(bmi, 2))

**Output**

================= RESTART: C:\Users\Dell\Desktop\python\5.py =================

Input your height in inches: 65

Input your weight in pounds: 128

Your body mass index is: 21.3

**Discussion**

Input is entered by user in pound and inches. As indicated this is converted into Kg and meters respectively. BMI is then calculated using formulae. Round(X,Y) is function to round of the float values by Y precision.

**LAB6) (*Physics: acceleration*) Average acceleration is defined as the change of velocity**

**divided by the time taken to make the change, as shown in the following formula:**

**(a = v1-v0)/t.**

**Write a program that prompts the user to enter the starting velocity *v*0 in**

**Meters/second, the ending velocity *v*1 in meters/second, and the time span *t* in**

**seconds, and displays the average acceleration.**

v0 = float(input("Enter starting velocity in meter per sec: "))

v1 = float(input("Enter ending velocity in meter per sec: "))

t = float(input("Enter the span time in sec : "))

avg\_acce = (v1-v0)/t

print("the average acceleration is",round(avg\_acce,3))

**Output**

================= RESTART: C:\Users\Dell\Desktop\python\6.py =================

Enter starting velocity in meter per sec: 0

Enter ending velocity in meter per sec: 26

Enter the span time in sec : 10

the average acceleration is 2.6

**Discussion**

User inputs V0 and V1 and time taken. Formula used to calculate the acceleration. Round(X,Y) is used for output

**LAB7) (*Geometry: area of a pentagon*) Write a program that prompts the user to enter**

**the length from the center of a pentagon to a vertex and computes the area of the**

**pentagon. The formula for computing the area of a pentagon is A = ((3√3)/2)\*s2**

**where s is the length of a side. The side can be computed using the formula s = 2\*r**

**sin(π/5) where r is the length of the center of a pentagon to a vertex.**

import math

r = float(input("Enter the length from the centre of the pentagon to its vertex: "));

s = 2\*r\* math.sin(math.pi/5)

area = ((3\* math.sLabrt(3) )/2)\* s \*s

print("the area of the pentagon is ", round(area,2))

**Output**

================= RESTART: C:\Users\Dell\Desktop\python\7.py =================

Enter the length from the centre of the pentagon to its vertex: 15

the area of the pentagon is 807.85

**Discussion**

User inputs the "r" value . "math" library is used for sLabrt(sLabuare root) sin(trigonometric)

and "pi" value. Output is round off by 2 precision and printed.

**LAB 8) (*Game: learn addition*) Write a program that generates two integers under 100 and prompts the user to enter the sum of these two integers. The program then reports true if the answer is correct, false otherwise.**

import random

a = random.randint(1,101)

b = random.randint(1,101)

print(a," ",b)

x = int(input("Enter the sum of the numbers above :"))

if x == (a+b):

print("True")

else:

print("False")

**Output**

================= RESTART: C:\Users\Dell\Desktop\python\8.py =================

87 54

Enter the sum of the numbers above : 200

False

**Discussion**

Random library is use to generate the random value using 'random.randint(X,Y)' where X-Y is the range .They are output to screen for user to add them up. If the sum is not eLabual to the exact sum, 'false ' is printed otherwise 'true.'

**LAB 9) (*Find the number of days in a month*) Write a program that prompts the user to enter the month and year and displays the number of days in the month. For example, if the user entered month 2 and year 2000, the program should display that February 2000 has 29 days. If the user entered month 3 and year 2005, the program should display that March2005 has 31 days.**

dict = {1: "January has 31 ", 2: "February has 28",

3:"March has 31",4: "April has 30",

5: "May has 31", 6:"June has 30",

7: "July has 31", 8:"August has 31",

9:"September has 30", 10:"October has 31",

11:"November has 30", 12:"December has 31",13:"February has 29"}

def is\_leap\_year(year):

return (year % 4 == 0) and (year % 100 != 0) or (year % 400 == 0)

month = int(input("input month in number :"))

year = int(input("input year :"))

if(month != 2):

print(dict[month],"days in ",year)

elif(month == 2):

if(is\_leap\_year(year)== True):

print(dict[13],"days in ",year)

else:

print(dict[month],"days in ",year)

**Output**

================= RESTART: C:\Users\Dell\Desktop\python\9.py =================

input month in number :2

input year :2004

February has 29 days in 2004

**Discussion**

Dictionary is used to define the cases for the days in the months. As per the user input, respective index value is printed. But in case of February, it has two cases of 28 and 29 days(for leap year). Leap year is checked for the year being divisible by 4 & 400 but not 100.

**LAB10) (*Game: scissor, rock, paper*) Write a program that plays the popular scissor-rock- paper game. (A scissor can cut a paper, a rock can knock a scissor, and a paper can wrap a rock.) The program randomly generates a number 0, 1, or 2 representing scissor, rock, and paper. The program prompts the user to enter a number 0, 1, or 2 and displays a message indicating whether the user or the computer wins, loses, or draws.**

import random

dic={0:"Scissor",1:"Paper",2:"Rock"}

a = random.randint(0,3)

b = int(input("Enter any number\n0 for scissor\n1 for paper\n2 for rock\n"))

print("you chose ",dic[b])

print("Computer chose ",dic[a])

if(a==b):

print("Draw")

elif(a==0):

if(b==1):

print("you lose")

if(b==2):

print("you win")

elif(a==1):

if(b==2):

print("you lose")

if(b==0):

print("you win")

elif(a==2):

if(b==1):

print("you lose")

if(b==0):

print("you win")

**Output**

Enter any number

0 for scissor

1 for paper

2 for rock

2

you chose Rock

Computer chose Rock

Draw

**Discussion**

Computer asks for input any no between 0,1,2 for scissor, paper and rock respectively. Computer generates random number between same range for same denomination using 'random' library. For the game rule, series of if statements are used for every possible combinations. Result is displayed as the conditions as win, lose or draw.

**LAB11) Write a program that read a text file and split the sentences, words and counts their respective number of occurrence.**

file=open(r"C:\Users\Dell\Desktop\python\file.txt","r+")

wordcount={}

for word in file.read().split():

if word not in wordcount:

wordcount[word] = 1

else:

wordcount[word] += 1

for k,v in wordcount.items():

print (k,v)

file.close()

**Output**

================ RESTART: C:\Users\Dell\Desktop\python\13.py ================

the 2

Labuick 1

brown 1

fox 2

jumps 1

over 1

lazy 1

dog 2

. 2

got 1

killed 1

by 1

**Discussion**

file.read().split(): is used to split into words and add to the dictionary. If any othe new word is found, is added to the dictionary else if it is already in the dictionary the count is incremented by 1. After all word are accessed the dictionary is printed which has the word and the count.

**LAB12) write a script that inputs a line of plain text and a distance value and outputs an encrypted text using Caesar chipper. The script should work for any printable characters.**

plainText = input("text to encrypt : ")

distance = int(input("distance: "))

code = ""

for ch in plainText:

ordValue = ord(ch)

cipherValue = ordValue + distance

if cipherValue > ord('z'):

cipherValue = ord('a') + distance - (ord('z') - ordValue + 1)

code = code + chr(cipherValue)

print(code)

**Output**

================ RESTART: C:/Users/Dell/Desktop/python/15.py ================

text to encrypt : the Labuick brown fox jumps over the lazy dog.

distance: 3

wkh#txlfn#eurzLab#ira#mxpsv#ryhu#wkh#odcb#grj1

**Discussion**

User inputs the text and the distance value as input. Distance value is added to the ASCII or order value for value less than 'z'. Otherwise " cipherValue = ord('a') + distance - (ord('z') - ordValue + 1)" is use for other than alphabets. The result is then printed to screen.

**LAB13) Write a program that reads a text file, convert the uppercase character**

**into lowercase and removes the occurrence of numbers from the file.**

import re

import fileinput

print("Initially in the file :\n")

f1 = open(r'C:\Users\Dell\Desktop\python\file1.txt', 'r')

filecontents = f1.read()

print (filecontents)

f1.close()

for line in fileinput.input(r"C:\Users\Dell\Desktop\python\file1.txt", inplace=True):

print (re.sub("\d+", "", line)),

fo = open(r'C:\Users\Dell\Desktop\python\file1.txt', 'r')

for x in fo.read():

y = x.lower()

fo1 = open(r'C:\Users\Dell\Desktop\python\file2.txt', 'a')

fo1.write(y)

print("After lowercasing and removal of numbers:\n")

f = open(r'C:\Users\Dell\Desktop\python\file2.txt', 'r')

file\_contents = f.read()

print (file\_contents)

**Output**

================ RESTART: C:\Users\Dell\Desktop\python\16.py ================

Initially in the file :

1234567890 ABCDEFGHIJKLMNOPLABRSTUVWXYZ

After lowercasing and removal of numbers:

abcdefghijklmnopLabrstuvwxyz

**Discussion**

The initial and final contents are printed so as to notify the changes to user. Lower() function changes the all uppercase to lowercase letter by letter each in a loop.

For removal of digits(numbers) we use 're' library and its function in a loop as

: print (re.sub("\d+", "", line)),

Here d+ means one or more digits is replaced by ""(empty space)

**LAB14) Write a program that reads a text file and remove the occurrence of**

**stop words from the file. Stop words are the words that occurs**

**repeatedly in the file and does not play an important role in text**

**processing, e.g. a, an, the, what, when, etc.**

stoplist = []

file1 = open(r'C:\Users\Dell\Desktop\python\file.txt','r')

file2 = open(r'C:\Users\Dell\Desktop\python\stop.txt','r')

file3 = open(r'C:\Users\Dell\Desktop\python\file1.txt','a')

for line in file2:

w = line.split()

for word in w:

stoplist.append(word)

for line in file1:

w = line.split()

for word in w:

if word in stoplist: continue

else:

file3.write(word)

file3.write(" ")

file1.close()

file2.close()

file3.close()

**Output**

Contents of stop.txt

A, an, the, what, when ……….

Contents of file.txt

what is something that goes up when it rains : Umbrella

Contents in file1.txt after removal of stop words

something goes rains : Umbrella

**Discussion**

stop.txt : contain list of stopwords

file.text : contain normal text as seen in output

file1.txt : contain the text after removal of stop words

stoplist is generated to store stop word from stop.txt. If the words from file.txt matches with stop words then no action. If not matched then it is written to the file1.txt.