**USAGE OF CODES BASED ON GIVEN REQUIREMENTS :**

**1.TASK 1 Read all the files in the Python environment and append all the three versions for experiment data and blade geometry data. Now, you have two datasets that contain all the information**

CODE:

import csv

with open('experiment\_vol1.csv','r',newline='',encoding='utf-8') as f1, \

open('experiment\_vol2.csv','r',newline='',encoding='utf-8') as f2, \

open('experiment\_vol3.csv','r',newline='',encoding='utf-8') as f3, \

open('Combined\_experiment\_vol.csv','w',newline='',encoding='utf-8') as f4:

read1 = csv.reader(f1)

read2 = csv.reader(f2)

read3 = csv.reader(f3)

write = csv.writer(f4)

header = False

for row in read1:

if not header:

write.writerow(row)

header = True

else:

write.writerow(row)

for row in read2:

if read2.line\_num > 1:

write.writerow(row)

for row in read3:

if read3.line\_num > 1:

write.writerow(row)

with open('geom\_vol1.csv','r',newline='',encoding='utf-8') as f1, \

open('geom\_vol2.csv','r',newline='',encoding='utf-8') as f2, \

open('geom\_vol3.csv','r',newline='',encoding='utf-8') as f3, \

open('Combined\_geom\_vol.csv','w',newline='',encoding='utf-8') as f4:

read1 = csv.reader(f1)

read2 = csv.reader(f2)

read3 = csv.reader(f3)

write = csv.writer(f4)

header = False

for row in read1:

if not header:

write.writerow(row)

header = True

else:

write.writerow(row)

for row in read2:

if read2.line\_num > 1:

write.writerow(row)

for row in read3:

if read3.line\_num > 1:

write.writerow(row)

**2.Change the variable names in line with Python identifier naming convention.**

with open('Combined\_geom\_vol.csv','r',newline='',encoding='utf-8') as f1:

read = csv.reader(f1)

header = next(read)

new\_column\_names = ['Blades\_name','Propellers\_brand','Propellers\_diameter','Propellers\_pitch','Adimensional\_chord\_c/R','Adimensional\_radius\_r/R','Beta\_angle\_relative\_to\_motion']

if len(header) != len(new\_column\_names):

print('Error')

with open('Geom\_all\_vol\_crt\_names.csv','w',newline='',encoding='utf-8')as f2:

write=csv.writer(f2)

write.writerow(new\_column\_names)

for row in read:

write.writerow(row)

with open('Combined\_experiment\_vol.csv','r',newline='',encoding='utf-8') as f1:

read = csv.reader(f1)

header = next(read)

new\_column\_names = ['Propellers\_Name','Blades\_Name','Propellers\_Brand','No\_of\_Blades','Propellers\_Diameter','Propellers\_Pitch','Advanced\_Ratio\_Input','RPM\_Rotation\_Input','Thrust\_Coefficient\_Output','Power\_Coefficient\_Output','Efficiency\_Output']

if len(header) != len(new\_column\_names):

print('Error')

with open('Experiment\_all\_vol\_crt\_names.csv','w',newline='',encoding='utf-8')as f2:

write=csv.writer(f2)

write.writerow(new\_column\_names)

for row in read:

write.writerow(row)

**3. Adimensional Radius and Adimensional Chord values are provided. Multiplying these values with Radius(R) of the blade will give you radius and chord distributions. Find these distributions for all theblades of all the propellers. Picture provided below shows a propeller with three blades.**

import pandas as pd

df = pd.read\_csv('Geom\_all\_vol\_crt\_names.csv')

radius = df['Propellers\_diameter']/2

df ['Radius'] = radius \* df['Adimensional\_radius\_r/R']

df ['Chord'] = radius \* df ['Adimensional\_chord\_c/R']

df.to\_csv('Geom\_with\_chord\_radius\_value.csv',index = False)