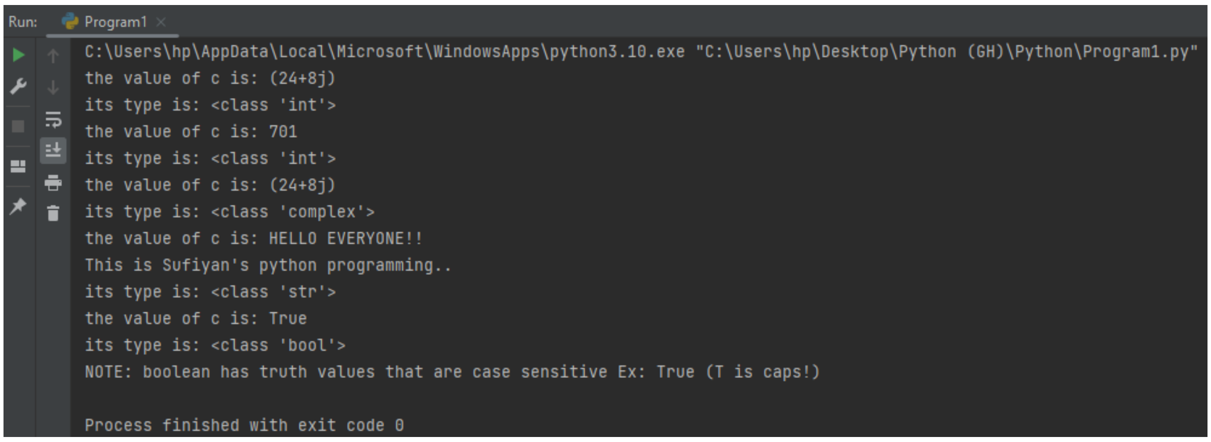
Code:

```
i = 7
c = 24+8j
f = 701
s = 'HELLO EVERYONE!!\nThis is Sufiyan\'s python programming..'
# NOTE: boolean has truth values that are case-sensitive Ex: True (T is caps!)
b = True
print("the value of c is:", c, '\nits type is:', type(i))
print("the value of c is:", f, '\nits type is:', type(f))
print("the value of c is:", c, '\nits type is:', type(c))
print("the value of c is:", s, '\nits type is:', type(s))
print("the value of c is:", b, '\nits type is:', type(b))
print('NOTE: boolean has truth values that are case sensitive Ex: True (T is caps!)')
```

Output:



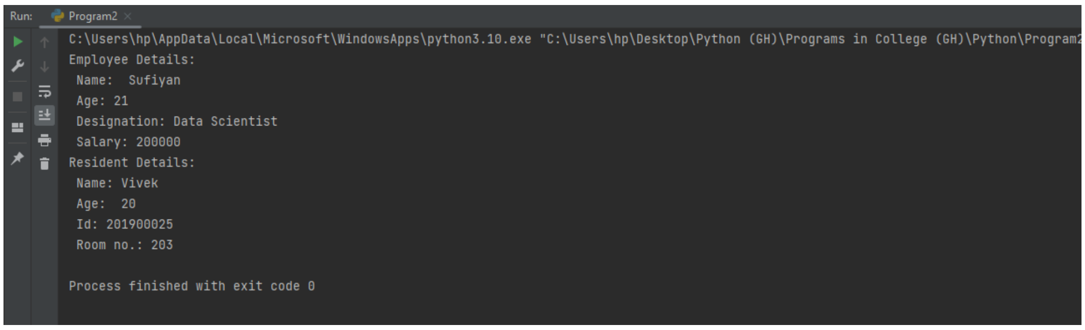
```
C:\Users\hp\AppData\Local\Microsoft\WindowsApps\python3.10.exe "C:\Users\hp\Desktop\Python (GH)\Python\Program1.py"
the value of c is: (24+8j)
its type is: <class 'int'>
the value of c is: 701
its type is: <class 'int'>
the value of c is: (24+8j)
its type is: <class 'complex'>
the value of c is: HELLO EVERYONE!!
This is Sufiyan's python programming..
its type is: <class 'str'>
the value of c is: True
its type is: <class 'bool'>
NOTE: boolean has truth values that are case sensitive Ex: True (T is caps!)

Process finished with exit code 0
```

Code:

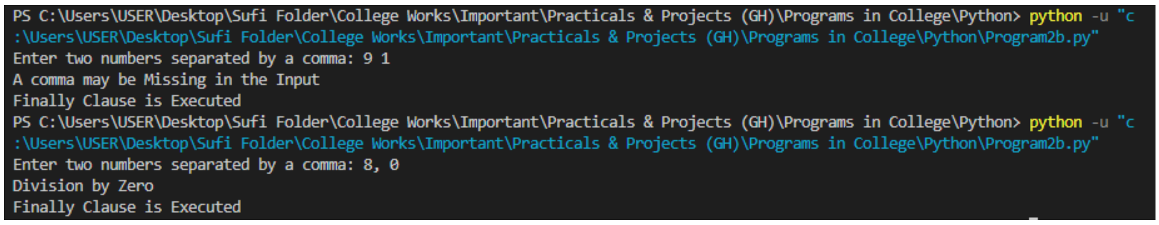
```
# Classes, Objects & Inheritance
# person is a base class

class Person:
   def __init__(self, n, a):
      self.name = n
      self.age = a


# employee is the class derived from person using single inheritance

class Employee(Person):

   def __init__(self, n, a, d, s):
      Person.__init__(self, n, a)
      self.designation = d
      self.salary = s

   def show(self):
      print("Employee Details: ")
      print(" Name: ", self.name, "\n Age:", self.age, "\n Designation:", self.designation, "\n
Salary:", self.salary)


class Student:
   def __init__(self, id_, rno):
      self.studentId = id_
      self.room_no = rno


# resident is a class derived from person and student using multiple inheritance

class Resident(Person, Student):

   def __init__(self, n, a, id_, rno):
      Person.__init__(self, n, a)
      Student.__init__(self, id_, rno)

   def show(self):
      print("Resident Details:")
      print(" Name:", self.name, "\n Age: ", self.age, "\n Id:", self.studentId, "\n Room no.:",
self.room_no)
```

```
# Creating objects of employee and resident classes

e1 = Employee("Sufiyan", 21, "Data Scientist", 200000)
r1 = Resident("Vivek", 20, 201900025, 203)
e1.show()
r1.show()

# Exception Handling
try:
   number1, number2 = eval(input("Enter two numbers separated by a comma:"))
   result = number1 / number2
   print("Result is",result)
except ZeroDivisionError:
       print("Division by Zero")
except SyntaxError:
        print("A comma may be Missing in the Input")
except RuntimeError:
       print("May be Meaningless ")
except:
       print("Something Wrong in the Input")
else:
       print("No Exceptions")
finally:
   print("Finally Clause is Executed ")
```

Outputs:



```
Run:  Program2
C:\Users\hp\AppData\Local\Microsoft\WindowsApps\python3.10.exe "C:\Users\hp\Desktop\Python (GH)\Programs in College (GH)\Python\Program2
Employee Details:
 Name:  Sufiyan
 Age: 21
 Designation: Data Scientist
 Salary: 200000
Resident Details:
 Name: Vivek
 Age:  20
 Id: 201900025
 Room no.: 203

Process finished with exit code 0
```



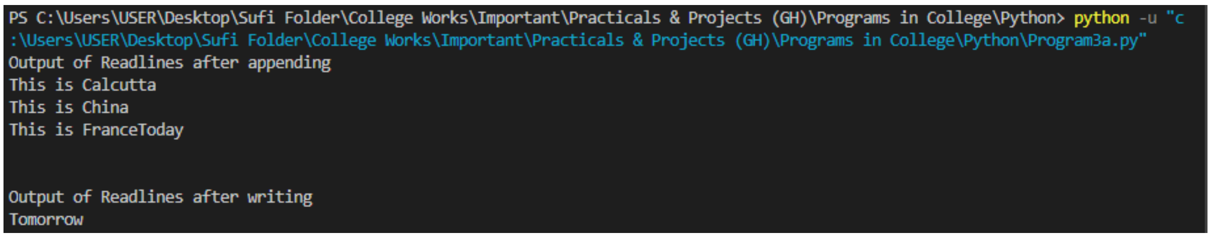
```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c
:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program2b.py"
Enter two numbers separated by a comma: 9 1
A comma may be Missing in the Input
Finally Clause is Executed
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c
:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program2b.py"
Enter two numbers separated by a comma: 8, 0
Division by Zero
Finally Clause is Executed
```

Code:

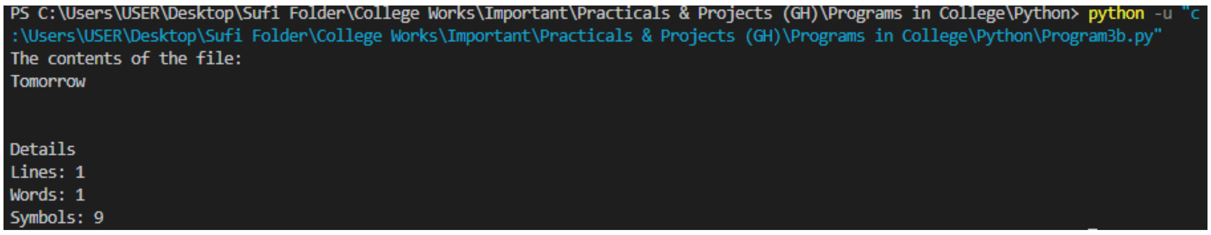
```
#Code1
file1 = open("myfile.txt", "w")
L = ["This is Calcutta \n", "This is China \n", "This is France"]
file1.writelines(L)
file1.close()
# Append-adds at last
file1 = open("myfile.txt", "a") # append mode
file1.write("Today \n")
file1.close()
file1 = open("myfile.txt", "r")
print("Output of Readlines after appending")
print(file1.read())
print()
file1.close()
# Write-Overwrites
file1 = open("myfile.txt", "w")
# write mode
file1.write("Tomorrow \n")
file1.close()
file1 = open("myfile.txt", "r")
print("Output of Readlines after writing")
print(file1.read())
print()
file1.close()

#Code2
file = open("myfile.txt","r")
print("The contents of the file: ")
print(file.read())
file.close()
file = open("myfile.txt","r")
lines = 0
words = 0
symbols = 0
for line in file:
   lines += 1
   words += len(line.split())
   symbols += len(line.strip('\n'))
print("\nDetails")
print("Lines:", lines)
print("Words:", words)
print("Symbols:", symbols)
```

```
file.close()

#Code3
# import OS module
import os
# Get the list of all files and directories
path = "C://Users//USER//Desktop//Sufi Folder"
dir_list = os.listdir(path)
print("Files and directories in '", path, "' :")
# prints all files
print(dir_list)
```

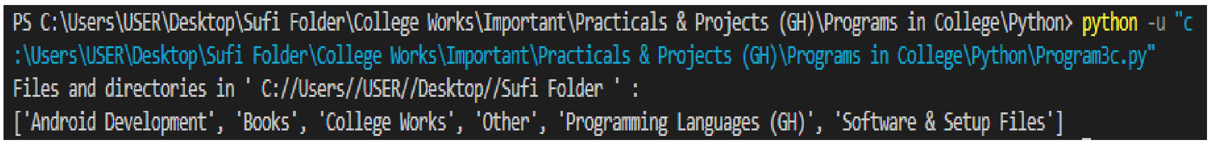
Outputs:



```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c
:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program3a.py"
Output of Readlines after appending
This is Calcutta
This is China
This is FranceToday


Output of Readlines after writing
Tomorrow
```



```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c
:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program3b.py"
The contents of the file:
Tomorrow


Details
Lines: 1
Words: 1
Symbols: 9
```

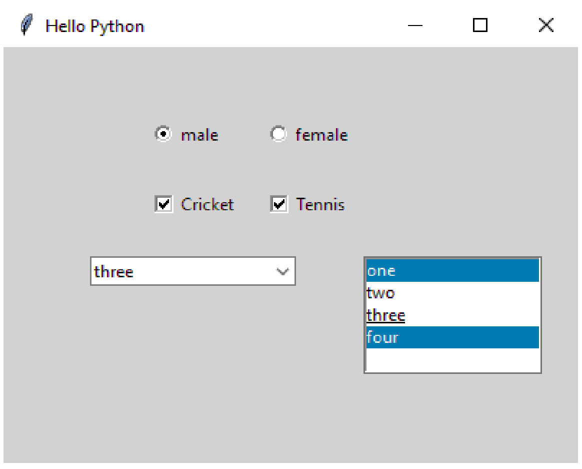


```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c
:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program3c.py"
Files and directories in ' C://Users//USER//Desktop//Sufi Folder ' :
['Android Development', 'Books', 'College Works', 'Other', 'Programming Languages (GH)', 'Software & Setup Files']
```

Code:

```
from tkinter import *
from tkinter.ttk import Combobox
window=Tk()
var = StringVar()
var.set("one")
data=("one", "two", "three", "four")
cb=Combobox(window, values=data)
cb.place(x=60, y=150)
lb=Listbox(window, height=5, selectmode='multiple')
for num in data: lb.insert(END,num)
lb.place(x=250, y=150)
v0=IntVar()
v0.set(1)
r1=Radiobutton(window, text="male", variable=v0,value=1)
r2=Radiobutton(window, text="female", variable=v0,value=2)
r1.place(x=100,y=50)
r2.place(x=180, y=50)
v1 = IntVar()
v2 = IntVar()
C1 = Checkbutton(window, text = "Cricket", variable = v1)
C2 = Checkbutton(window, text = "Tennis", variable = v2)
C1.place(x=100, y=100)
C2.place(x=180, y=100)
window.title('Hello Python')
window.geometry("400x300+10+10")
window.mainloop()
```

Output:


Hello Python

(●) male ( ) female

[✓] Cricket [✓] Tennis

three

one
two
three
four

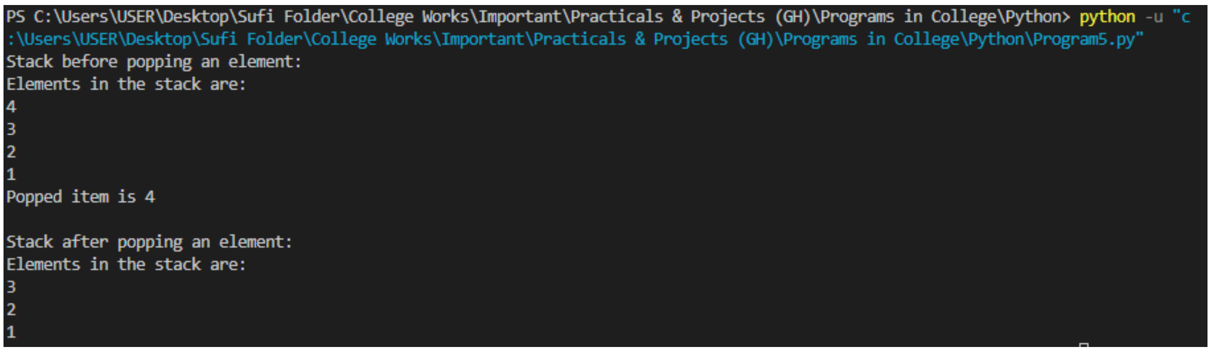
Code:

```
#Code1
def isEmpty(stk):
# checks whether the stack is empty or not
   if stk==[]:
      return True
   else:
      return False
def Push(stk,item): # Allow additions to the stack
      stk.append(item)
      top = len(stk)-1
def Pop(stk):
   if isEmpty(stk): # verifies whether the stack is empty or not
      print("Underflow")
   else:
 # Allow deletions from the stack
      item=stk.pop()
   if len(stk)==0:
      top = None
   else:
      top=len(stk)
   print("Popped item is "+str(item))
def Display(stk):
   if isEmpty(stk):
      print("Stack is empty")
   else:
      top=len(stk)-1
   print("Elements in the stack are: ")
   for i in range(top,-1,-1):
      print (str(stk[i]))
 # executable code
stk=[]
top=None
Push(stk,1)
Push(stk,2)
Push(stk,3)
Push(stk,4)
print("Stack before popping an element:")
Display(stk)
Pop(stk)
print("\nStack after popping an element:")
Display(stk)
```

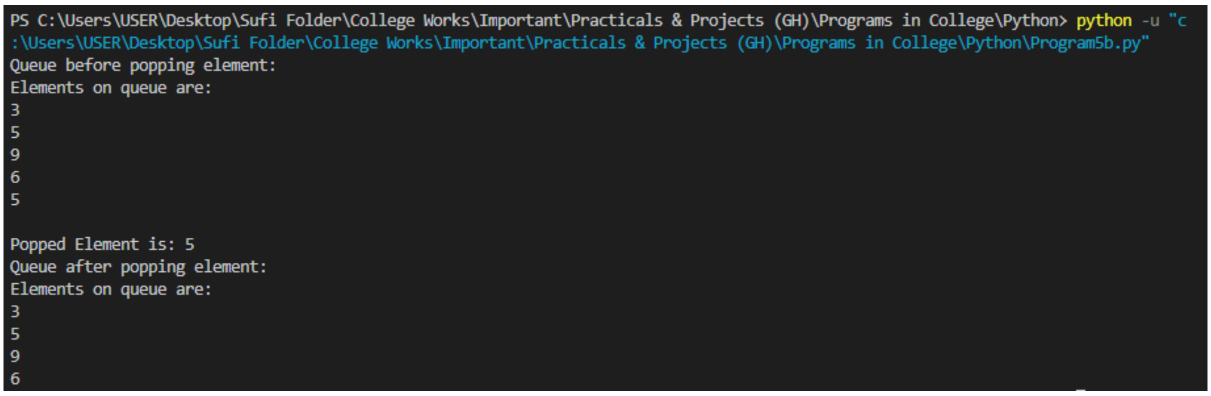
```
#Code2
#Adding elements to queue at the rear end
def enqueue(data):
      queue.insert(0,data)
 #Removing the front element from the queue
def dequeue():
   if len(queue)>0:
      return queue.pop()
   return ("Queue Empty!")
#To display the elements of the queue
def display():
   print("Elements on queue are:");
   for i in range(len(queue)):
      print(queue[i])
 # executable code
queue=[]
enqueue(5)
enqueue(6)
enqueue(9)
enqueue(5)
enqueue(3)
print("Queue before popping element: ")
display()
print("\nPopped Element is: "+str(dequeue()))
print("Queue after popping element: ")
display()

#Code3
# importing module
import collections

# initialising a deque() of arbitrary length
linked_lst = collections.deque()

# filling deque() with elements
linked_lst.append('first')
linked_lst.append('second')
linked_lst.append('third')

print("Elements in the linked_list:")
print(linked_lst)

# adding element at an arbitrary position
linked_lst.insert(1, 'fourth')
```

```
print("\nElements in the linked_list:")
print(linked_lst)

# deleting the last element
linked_lst.pop()

print("\nElements in the linked_list:")
print(linked_lst)

# removing a specific element
linked_lst.remove('fourth')

print("\nElements in the linked_list:")
print(linked_lst)
```

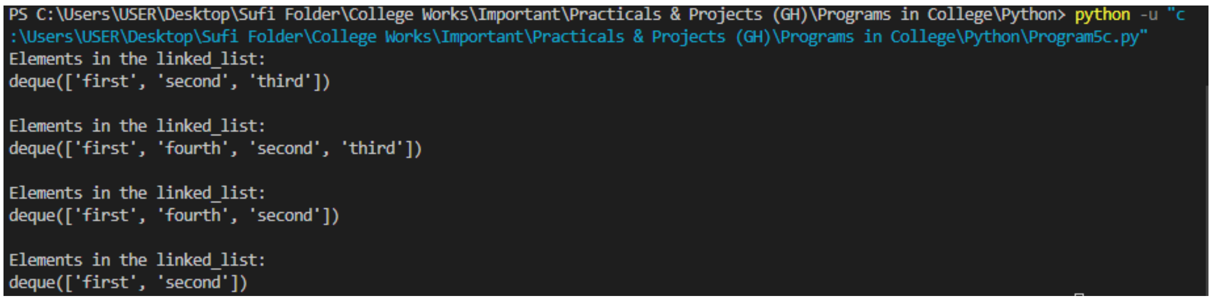
Outputs:



```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c
:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program5.py"
Stack before popping an element:
Elements in the stack are:
4
3
2
1
Popped item is 4

Stack after popping an element:
Elements in the stack are:
3
2
1
```



```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c
:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program5b.py"
Queue before popping element:
Elements on queue are:
3
5
9
6
5

Popped Element is: 5
Queue after popping element:
Elements on queue are:
3
5
9
6
```



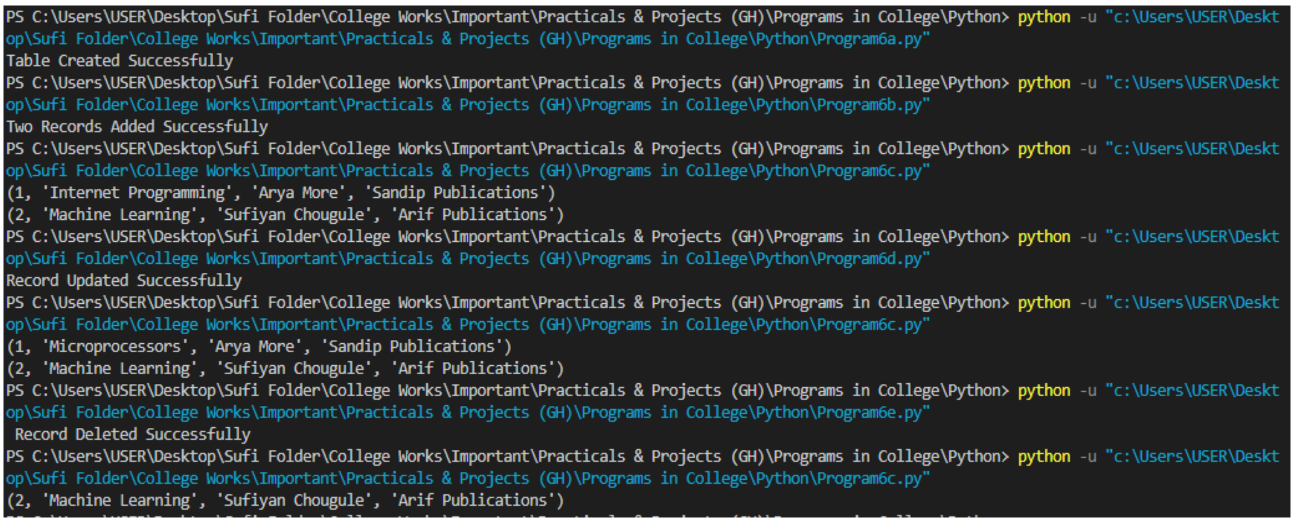
```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c
:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program5c.py"
Elements in the linked_list:
deque(['first', 'second', 'third'])

Elements in the linked_list:
deque(['first', 'fourth', 'second', 'third'])

Elements in the linked_list:
deque(['first', 'fourth', 'second'])

Elements in the linked_list:
deque(['first', 'second'])
```

Code:

```
#Code1
import sqlite3
db=sqlite3.connect('database.db')
try:
 cur =db.cursor()
 cur.execute('''CREATE TABLE book (
 BookID INTEGER PRIMARY KEY AUTOINCREMENT,
 title TEXT (20) NOT NULL,
 author TEXT (30),
 publisher TEXT (20));''')
 print ('Table Created Successfully')
except:
 print ('Error in Operation')
db.rollback()
db.close()

#Code2
import sqlite3
db=sqlite3.connect('database.db')
qry="insert into book (title, author, publisher) values('Internet Programming', 'Arya More', 'Sandip Publications'),('Machine Learning', 'Sufiyan Chougule', 'Arif Publications');"
try:
   cur=db.cursor()
   cur.execute(qry)
   db.commit()
   print ("Two Records Added Successfully")
except:
   print ("Error in operation")
   db.rollback()
   db.close()

#Code3
import sqlite3
db=sqlite3.connect('database.db')
sql="SELECT * from book;"
cur=db.cursor()
cur.execute(sql)
while True:
   record=cur.fetchone()
   if record==None:
    break
   print (record)
```

```
db.close()

#Code4
import sqlite3
db=sqlite3.connect('database.db')
qry="update book set title = 'Microprocessors' where author = 'Arya More'"
try:
   cur=db.cursor()
   cur.execute(qry)
   db.commit()
   print("Record Updated Successfully")
except:
   print("Error in Operation")
   db.rollback()
   db.close()

#Code5
import sqlite3
db = sqlite3.connect( 'database.db')
qry= " DELETE from book where publisher='Sandip Publications'"
try:
   cur=db.cursor()
   cur.execute(qry)
   db.commit()
   print(" Record Deleted Successfully")
except:
   print(" Error in Operation")
   db.rollback()
   db.close()
```

Output:

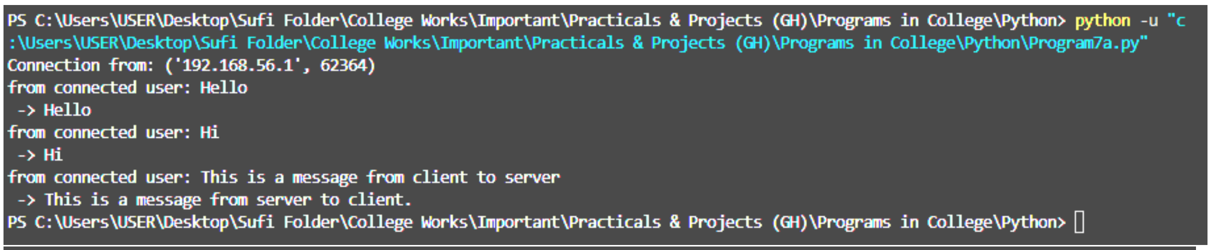


```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program6a.py"
Table Created Successfully
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program6b.py"
Two Records Added Successfully
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program6c.py"
(1, 'Internet Programming', 'Arya More', 'Sandip Publications')
(2, 'Machine Learning', 'Sufiyan Chougule', 'Arif Publications')
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program6d.py"
Record Updated Successfully
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program6c.py"
(1, 'Microprocessors', 'Arya More', 'Sandip Publications')
(2, 'Machine Learning', 'Sufiyan Chougule', 'Arif Publications')
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program6e.py"
 Record Deleted Successfully
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program6c.py"
(2, 'Machine Learning', 'Sufiyan Chougule', 'Arif Publications')
```

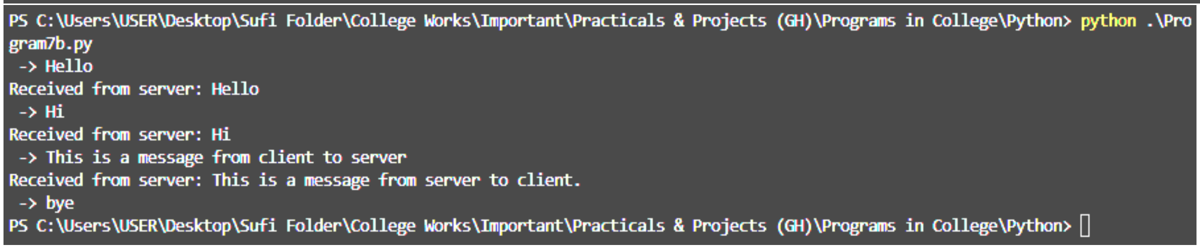
Code:

```
#Code1
import socket


def server_program():
    # get the hostname
    host = socket.gethostname()
    port = 5000  # initiate port no above 1024

    server_socket = socket.socket()  # get instance
    # look closely. The bind() function takes tuple as argument
    server_socket.bind((host, port))  # bind host address and port together

    # configure how many client the server can listen simultaneously
    server_socket.listen(2)
    conn, address = server_socket.accept()  # accept new connection
    print("Connection from: " + str(address))
    while True:
        # receive data stream. it won't accept data packet greater than 1024 bytes
        data = conn.recv(1024).decode()
        if not data:
            # if data is not received break
            break
        print("from connected user: " + str(data))
        data = input(' -> ')
        conn.send(data.encode())  # send data to the client

    conn.close()  # close the connection


if __name__ == '__main__':
    server_program()


#Code2
import socket


def client_program():
    host = socket.gethostname()  # as both code is running on same pc
    port = 5000  # socket server port number
    client_socket = socket.socket()  # instantiate
    client_socket.connect((host, port))  # connect to the server

    message = input(" -> ")  # take input

    while message.lower().strip() != 'bye':
        client_socket.send(message.encode())  # send message
        data = client_socket.recv(1024).decode()  # receive response

        print('Received from server: ' + data)  # show in terminal

        message = input(" -> ")  # again take input

    client_socket.close()  # close the connection


if __name__ == '__main__':
    client_program()
```

Outputs:



```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c
:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program7a.py"
Connection from: ('192.168.56.1', 62364)
from connected user: Hello
 -> Hello
from connected user: Hi
 -> Hi
from connected user: This is a message from client to server
 -> This is a message from server to client.
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> 
```



```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python .\Pro
gram7b.py
 -> Hello
Received from server: Hello
 -> Hi
Received from server: Hi
 -> This is a message from client to server
Received from server: This is a message from server to client.
 -> bye
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> 
```

Code:

```
#Code1
from django import forms
from django.contrib.auth.forms import UserCreationForm
from django.contrib.auth.models import User


# Create your forms here.

class NewUserForm(UserCreationForm):
	email = forms.EmailField(required=True)

	class Meta:
		model = User
		fields = ("username", "email", "password1", "password2")

	def save(self, commit=True):
		user = super(NewUserForm, self).save(commit=False)
		user.email = self.cleaned_data['email']
		if commit:
			user.save()
		return user

#Code2
from django.urls import path
from . import views

app_name = "main"


urlpatterns = [
   path("", views.homepage, name="homepage"),
   path("register", views.register_request, name="register")
]

#Code3
from django.shortcuts import  render, redirect
from .forms import NewUserForm
from django.contrib.auth import login
from django.contrib import messages

def register_request(request):
	if request.method == "POST":
		form = NewUserForm(request.POST)
		if form.is_valid():
			user = form.save()
			login(request, user)
			messages.success(request, "Registration successful." )
			return redirect("main:homepage")
		messages.error(request, "Unsuccessful registration. Invalid information.")
	form = NewUserForm()
	return render (request=request, template_name="main/register.html",
context={"register_form":form})

#Code4
from django.urls import path
from . import views

app_name = "main"


urlpatterns = [
  path("", views.homepage, name="homepage"),
  path("register", views.register_request, name="register"),
  path("login", views.login_request, name="login")
]

#Code5
from django.shortcuts import  render, redirect
from .forms import NewUserForm
from django.contrib.auth import login, authenticate #add this
from django.contrib import messages
from django.contrib.auth.forms import AuthenticationForm #add this

def register_request(request):
	...

def login_request(request):
	if request.method == "POST":
		form = AuthenticationForm(request, data=request.POST)
		if form.is_valid():
			username = form.cleaned_data.get('username')
			password = form.cleaned_data.get('password')
			user = authenticate(username=username, password=password)
			if user is not None:
				login(request, user)
				messages.info(request, f"You are now logged in as {username}.")
				return redirect("main:homepage")
```

```
                    else:
                              messages.error(request,"Invalid username or password.")
          else:
                    messages.error(request,"Invalid username or password.")
     form = AuthenticationForm()
     return render(request=request, template_name="main/login.html",
context={"login_form":form})
```

HTML Files:

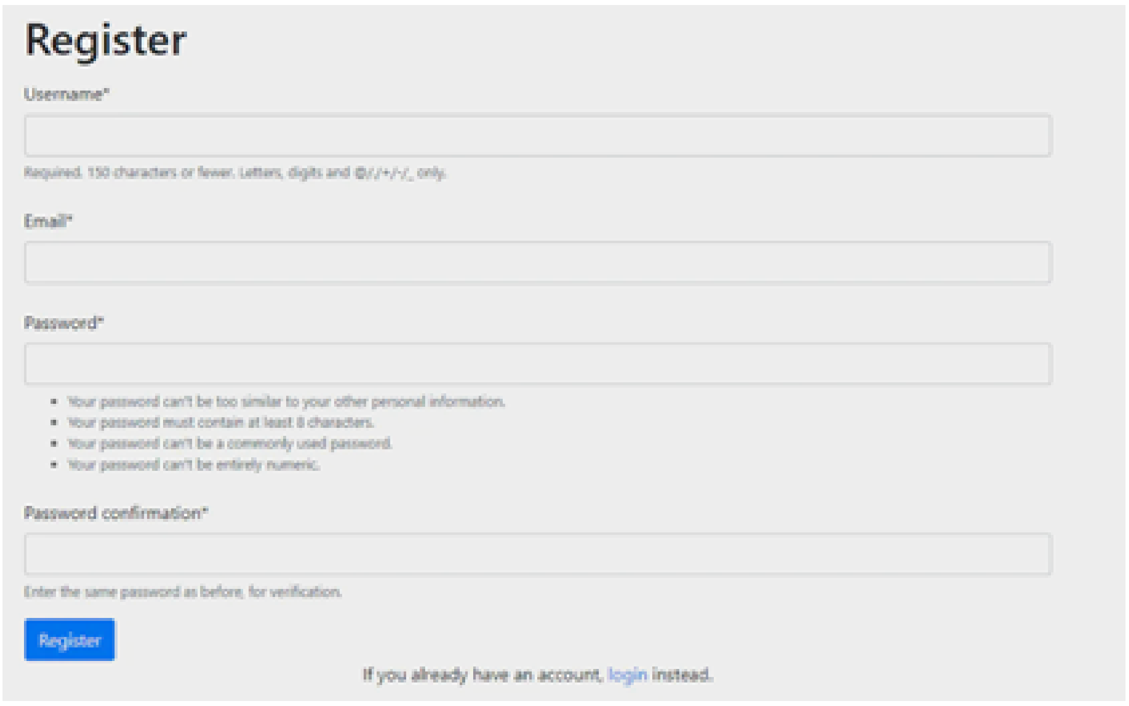
#File1: register.html

```
{% extends "main/header.html" %}

{% block content %}

{% load crispy_forms_tags %}

<!--Register-->
<div class="container py-5">
     <h1>Register</h1>
     <form method="POST">
          {% csrf_token %}
          {{ register_form|crispy }}
          <button class="btn btn-primary" type="submit">Register</button>
     </form>
     <p class="text-center">If you already have an account, <a href="/login">login</a>
instead.</p>
</div>

{% endblock %}
```

#File2: login.html

```
{% extends "main/header.html" %}

{% block content %}

{% load crispy_forms_tags %}

<!--Login-->
<div class="container py-5">
  <h1>Login</h1>
  <form method="POST">
    {% csrf_token %}
    {{ login_form|crispy }}
    <button class="btn btn-primary" type="submit">Login</button>
  </form>
  <p class="text-center">Don't have an account? <a href="/register">Create an account</a>.</p>
</div>

{% endblock %}
```

Outputs:



Register

Username*

Required. 150 characters or fewer. Letters, digits and @/./+/-/_ only.

Email*

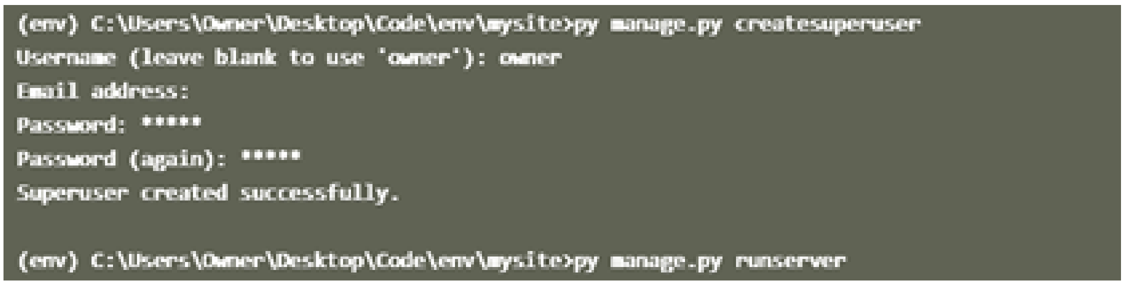
Password*

- Your password can't be too similar to your other personal information.
- Your password must contain at least 8 characters.
- Your password can't be a commonly used password.
- Your password can't be entirely numeric.

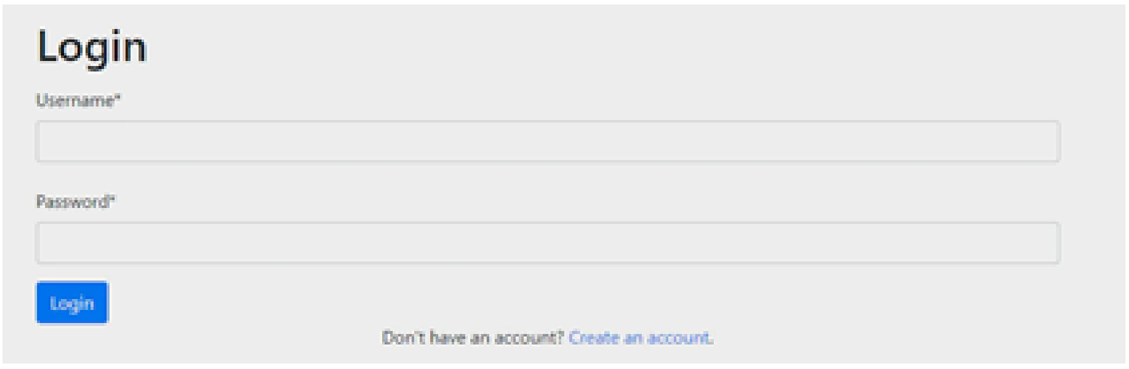
Password confirmation*

Enter the same password as before, for verification.

If you already have an account, login instead.



```
(env) C:\Users\Owner\Desktop\Code\env\mysite>py manage.py createsuperuser
Username (leave blank to use 'owner'): owner
Email address:
Password: *****
Password (again): *****
Superuser created successfully.

(env) C:\Users\Owner\Desktop\Code\env\mysite>py manage.py runserver
```



Login

Username*

Password*

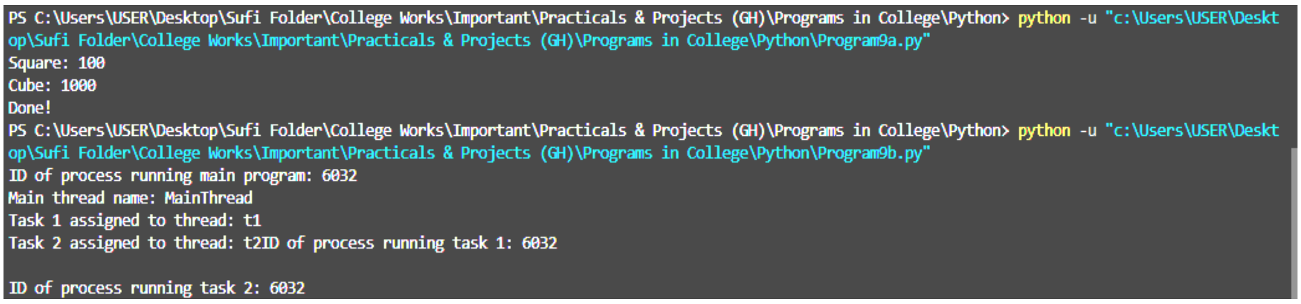
Don't have an account? Create an account.

Code:

```
#Code1
# Python program to illustrate the concept
# of threading
# importing the threading module
import threading

def print_cube(num):
   # function to print cube of given num
   print("Cube: {}" .format(num * num * num))

def print_square(num):
   # function to print square of given num
   print("Square: {}" .format(num * num))

if __name__ =="__main__":
   # creating thread
   t1 = threading.Thread(target=print_square, args=(10,))
   t2 = threading.Thread(target=print_cube, args=(10,))
   # starting thread 1
   t1.start()
   # starting thread 2
   t2.start()
   # wait until thread 1 is completely executed
   t1.join()
   # wait until thread 2 is completely executed
   t2.join()
   # both threads completely executed
   print("Done!")


#Code2
# Python program to illustrate the concept
# of threading
import threading
import os
def task1():
   print("Task 1 assigned to thread: {}".format(threading.current_thread().name))
   print("ID of process running task 1: {}".format(os.getpid()))
def task2():
   print("Task 2 assigned to thread: {}".format(threading.current_thread().name))
   print("ID of process running task 2: {}".format(os.getpid()))
if __name__ == "__main__":
```

```
# print ID of current process
print("ID of process running main program: {}".format(os.getpid()))
# print name of main thread
print("Main thread name: {}".format(threading.current_thread().name))
# creating threads
t1 = threading.Thread(target=task1, name='t1')
t2 = threading.Thread(target=task2, name='t2')
# starting threads
t1.start()
t2.start()
# wait until all threads finish
t1.join()
t2.join()
```

Output:

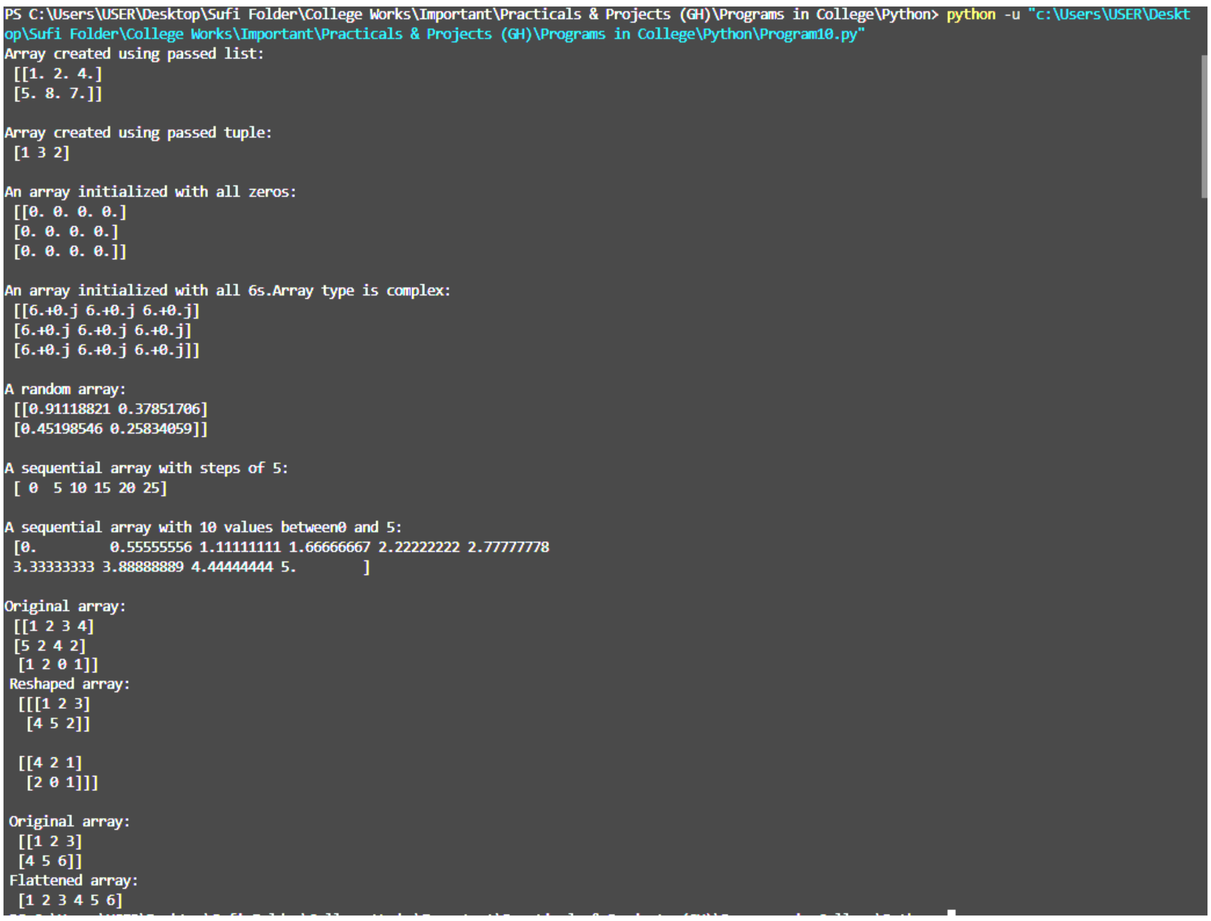


```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Deskt
op\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program9a.py"
Square: 100
Cube: 1000
Done!
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Deskt
op\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program9b.py"
ID of process running main program: 6032
Main thread name: MainThread
Task 1 assigned to thread: t1
Task 2 assigned to thread: t2ID of process running task 1: 6032

ID of process running task 2: 6032
```

Code:

```
# Python program to demonstrate
# array creation techniques
import numpy as np
# Creating array from list with type float
a = np.array([[1, 2, 4], [5, 8, 7]], dtype = 'float')
print ("Array created using passed list:\n", a)
# Creating array from tuple
b = np.array((1 , 3, 2))
print ("\nArray created using passed tuple:\n", b)
# Creating a 3X4 array with all zeros
c = np.zeros((3, 4))
print ("\nAn array initialized with all zeros:\n", c)
# Create a constant value array of complex type
d = np.full((3, 3), 6, dtype = 'complex')
print ("\nAn array initialized with all 6s."
"Array type is complex:\n", d)
# Create an array with random values
e = np.random.random((2, 2))
print("\nA random array:\n", e)
# Create a sequence of integers
# from 0 to 30 with steps of 5
f = np.arange(0, 30, 5)
print("\nA sequential array with steps of 5:\n", f)
# Create a sequence of 10 values in range 0 to 5
g = np.linspace(0, 5, 10)
print ("\nA sequential array with 10 values between"
"0 and 5:\n", g)
# Reshaping 3X4 array to 2X2X3 array
arr = np.array([[1, 2, 3, 4],
[5, 2, 4, 2],
[1, 2, 0, 1]])
newarr = arr.reshape(2, 2, 3)
print ("\nOriginal array:\n", arr)
print ("Reshaped array:\n", newarr)
# Flatten array
arr = np.array([[1, 2, 3], [4, 5, 6]])
flarr = arr.flatten()
print("\nOriginal array:\n", arr)
print("Flattened array:\n", flarr)
```

Output:

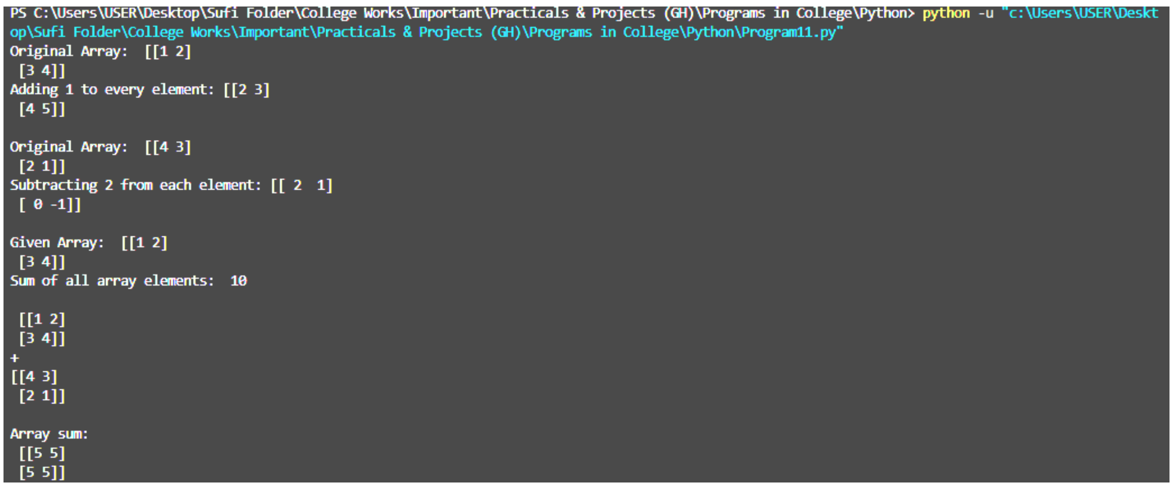


```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Deskt
op\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program10.py"
Array created using passed list:
 [[1. 2. 4.]
 [5. 8. 7.]]

Array created using passed tuple:
 [1 3 2]

An array initialized with all zeros:
 [[0. 0. 0. 0.]
 [0. 0. 0. 0.]
 [0. 0. 0. 0.]]

An array initialized with all 6s.Array type is complex:
 [[6.+0.j 6.+0.j 6.+0.j]
 [6.+0.j 6.+0.j 6.+0.j]
 [6.+0.j 6.+0.j 6.+0.j]]

A random array:
 [[0.91118821 0.37851706]
 [0.45198546 0.25834059]]

A sequential array with steps of 5:
 [ 0  5 10 15 20 25]

A sequential array with 10 values between0 and 5:
 [0.         0.55555556 1.11111111 1.66666667 2.22222222 2.77777778
 3.33333333 3.88888889 4.44444444 5.        ]

Original array:
 [[1 2 3 4]
 [5 2 4 2]
  [1 2 0 1]]
 Reshaped array:
  [[[1 2 3]
   [4 5 2]]

  [[4 2 1]
   [2 0 1]]]

 Original array:
  [[1 2 3]
  [4 5 6]]
 Flattened array:
  [1 2 3 4 5 6]
```

Code:

```
# Python program to demonstrate
# basic operations on single array
import numpy as np

# Defining Array 1
a = np.array([[1, 2],[3, 4]])

# Defining Array 2cls

b = np.array([[4, 3],[2, 1]])

# Adding 1 to every element
print("Original Array: ",a)
print ("Adding 1 to every element:", a + 1)

# Subtracting 2 from each element
print("\nOriginal Array: ",b)
print ("Subtracting 2 from each element:", b - 2)

# sum of array elements
# Performing Unary operations
print("\nGiven Array: ",a)
print ("Sum of all array elements: ", a.sum())

# Adding two arrays
# Performing Binary operations
print("\n",a)
print("+")
print(b)
print ("\nArray sum:\n", a + b)
```

Output:

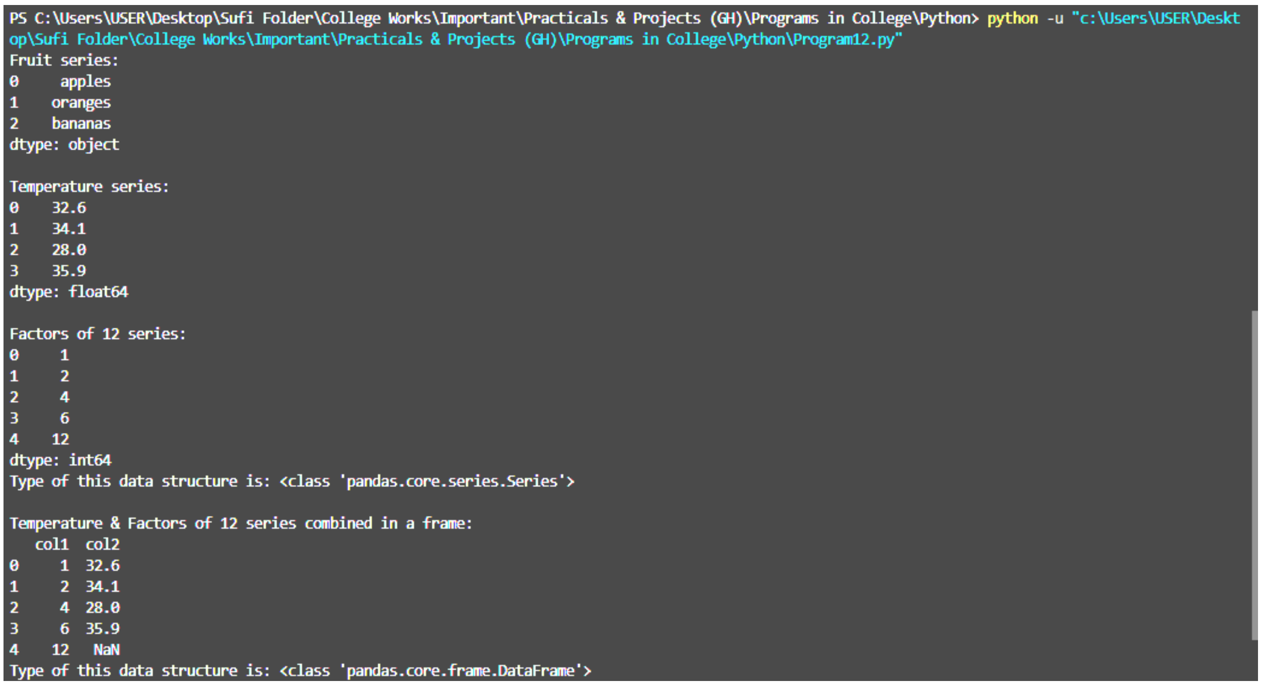


```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program11.py"
Original Array:  [[1 2]
 [3 4]]
Adding 1 to every element: [[2 3]
 [4 5]]

Original Array:  [[4 3]
 [2 1]]
Subtracting 2 from each element: [[ 2  1]
 [ 0 -1]]

Given Array:  [[1 2]
 [3 4]]
Sum of all array elements:  10

 [[1 2]
 [3 4]]
+
[[4 3]
 [2 1]]

Array sum:
 [[5 5]
 [5 5]]
```

Code:

```
import pandas
##### INTIALIZATION #####
#STRING SERIES
fruits = pandas.Series(["apples", "oranges", "bananas"])
print("Fruit series:")
print(fruits)
#FLOAT SERIES
temperature = pandas.Series([32.6, 34.1, 28.0, 35.9])
print("\nTemperature series:")
print(temperature)
#INTEGER SERIES
factors_of_12 = pandas.Series([1,2,4,6,12])
print("\nFactors of 12 series:")
print(factors_of_12)
print("Type of this data structure is:", type(factors_of_12))

#FLOAT & INTEGER FRAME
temp_fact = {'col1':factors_of_12, 'col2':temperature}
result = pandas.DataFrame(data = temp_fact)
print("\nTemperature & Factors of 12 series combined in a frame: ")
print(result)
print("Type of this data structure is:", type(result))
```

Output:



```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program12.py"
Fruit series:
0     apples
1    oranges
2    bananas
dtype: object

Temperature series:
0    32.6
1    34.1
2    28.0
3    35.9
dtype: float64

Factors of 12 series:
0     1
1     2
2     4
3     6
4    12
dtype: int64
Type of this data structure is: <class 'pandas.core.series.Series'>

Temperature & Factors of 12 series combined in a frame:
   col1  col2
0     1  32.6
1     2  34.1
2     4  28.0
3     6  35.9
4    12   NaN
Type of this data structure is: <class 'pandas.core.frame.DataFrame'>
```

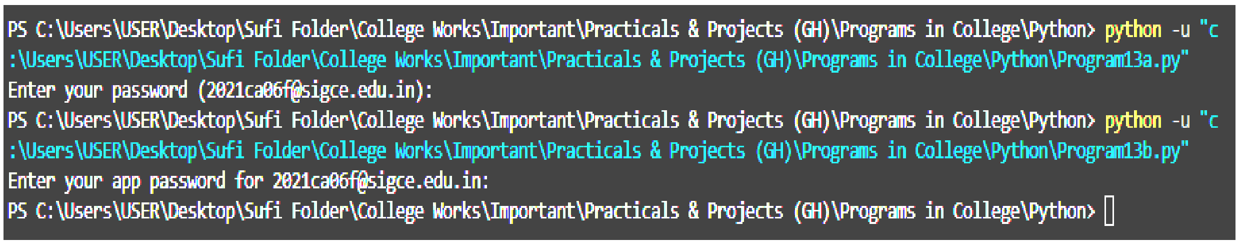
Code:

```
#Code 1
import smtplib, ssl
import getpass as gp
from email.mime.multipart import MIMEMultipart
from email.mime.text import MIMEText

# Defining HTML Doc:
html = """
This is an e-mail message to be sent in HTML format
<html>
<body>
   <b>This is an HTML message.</b>
   <h1>This is a heading.</h1>
</body>
</html>
"""

# Defining Required Details
smtp_server = "smtp.gmail.com"
port = 465

sender = "2021ca06f@sigce.edu.in"
receiver = "2021ca21f@sigce.edu.in"
password = gp.getpass("Enter your password (2021ca06f@sigce.edu.in): ")

# Create a MIMEMultipart class, and set up the From, To, Subject fields
email_message = MIMEMultipart()
email_message['From'] = sender
email_message['To'] = receiver
email_message['Subject'] = "SMTP HTML e-mail test"

# Attach the html doc defined earlier, as a MIMEText html content type to the MIME message
email_message.attach(MIMEText(html, "html"))
# Convert it as a string
email_string = email_message.as_string()

context = ssl.create_default_context()

with smtplib.SMTP_SSL(smtp_server, port, context = context) as server:
   server.login(sender, password)

   #sending the email:
```

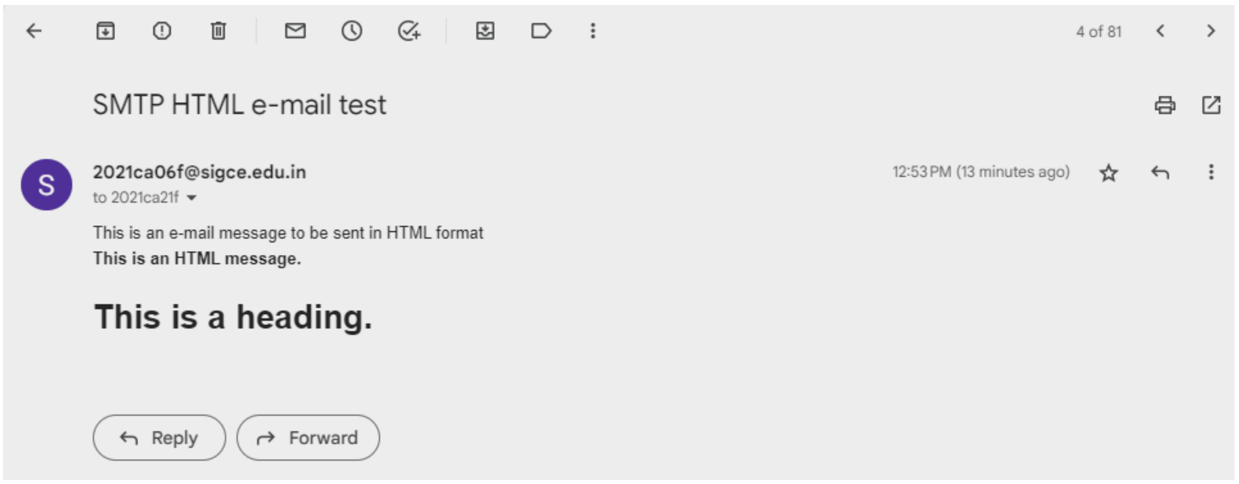
```
   server.sendmail(sender, receiver, email_string)


#Code 2
import smtplib, ssl
import getpass as gp
from email.mime.text import MIMEText
from email.mime.multipart import MIMEMultipart
from email.mime.application import MIMEApplication

# Open the attachment file for reading in binary mode (using 'rb'), and make it a MIMEApplication
class
def file_attacher(email_message, file_name):
   with open(file_name, 'rb') as f:
      file_attachment = MIMEApplication(f.read())
      # Add header/name to the attachments
      file_attachment.add_header("Content-Disposition",f"attachment; filename = {file_name}")
      # Attach the file to the message
      email_message.attach(file_attachment)

# Defining required details
smtp_server = "smtp.gmail.com"
port = "465"
html = """
This message contains an attachment, html enclosed text and simple text(this sentence).
<h1 style = "color:#045803;">Hello Prathamesh!</h1><br>
<p> This is the second Program file for <b>Python Experiment 13<b>. </p>
<p> The Python program used to send this email itself is the second program file. Do<b>reply if
you want the second program file.</b></p>
"""
sender = "2021ca06f@sigce.edu.in"
receiver = "2021ca69f@sigce.edu.in"
password = gp.getpass(f"Enter your app password for {sender}: ")

# Create a MIMEMultipart class, and set up the From, To, Subject fields
email_message = MIMEMultipart()
email_message['From'] = sender
email_message['To'] = receiver
email_message['Subject'] = "SMTP e-mail test (HTML, File Attachments)"

# Attach the html doc defined earlier, as a MIMEText html content type to the MIME message
email_message.attach(MIMEText(html, "html"))

# Attaching a file to the email message using function
file_attacher(email_message, "Program13a.py")
```

```
# Convert it as a string
email_string = email_message.as_string()

context = ssl.create_default_context()

with smtplib.SMTP_SSL(smtp_server, port, context = context) as server:
   server.login(sender, password)

   #sending the email:
   server.sendmail(sender, receiver, email_string)
```

Outputs:



```
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c
:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program13a.py"
Enter your password (2021ca06f@sigce.edu.in):
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python> python -u "c
:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python\Program13b.py"
Enter your app password for 2021ca06f@sigce.edu.in:
PS C:\Users\USER\Desktop\Sufi Folder\College Works\Important\Practicals & Projects (GH)\Programs in College\Python>
```



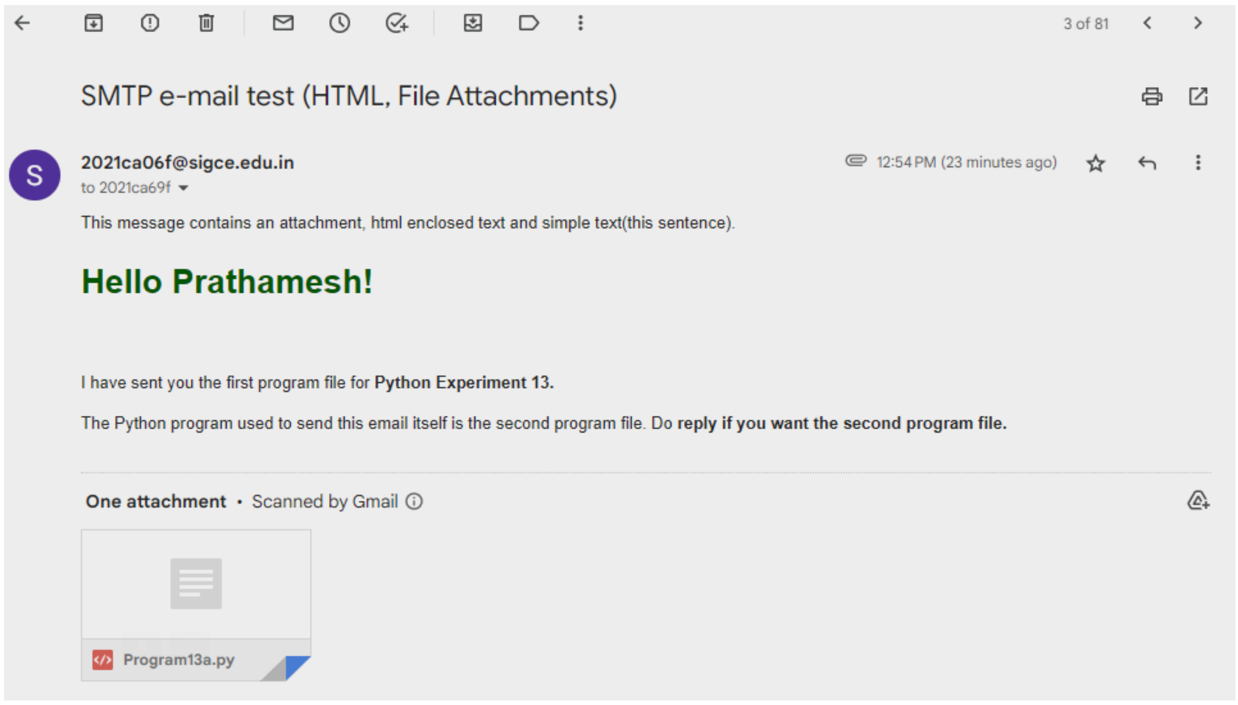
SMTP HTML e-mail test

2021ca06f@sigce.edu.in
to 2021ca21f

12:53 PM (13 minutes ago)

This is an e-mail message to be sent in HTML format
This is an HTML message.

This is a heading.



SMTP e-mail test (HTML, File Attachments)

2021ca06f@sigce.edu.in
to 2021ca69f

12:54 PM (23 minutes ago)

This message contains an attachment, html enclosed text and simple text(this sentence).

Hello Prathamesh!

I have sent you the first program file for **Python Experiment 13.**

The Python program used to send this email itself is the second program file. Do **reply if you want the second program file.**

One attachment • Scanned by Gmail

Program13a.py