INDEX

Sl. No.	Exercise title	Date of performance	Page number	Sign
1	Programs demonstrating use of Data types, Operators.	23/9/2021	5	
2	Programs demonstrating use of Control structures.	28/9/2021	55	
3	Programs demonstrating use of Lists and Tuples.	1/10/2021	71	
4	Programs demonstrating use of Sets and Dictionaries.	26/9/2021	1141	
5	Programs demonstrating implementation of Functions.	15/10/2021	55	
6	Programs demonstrating use of modules.	20/09/2021	163	
7	Programs demonstrating File Handling and I/O system.	16/10/2021	166	
8	Programs demonstrating use of Randomization in Python.	17/10/2021	175	
9	Programs demonstrating usage of regular expressions and biological problem solving.	17/10/20211	180	
10	Programs demonstrating Object Oriented Programming in Python.	17/10/2021	188	

Sl. No.	Exercise title	Date of performance	Page number	Sign
11	**Programs demonstrating usage of CGI Python.**	**17/10/2021**	**198**	
12	**Programs demonstrating usage of DBI Python.**	**17/10/2021**	**207**	
13	**Programs demonstrating usage of BIOPYTHON Modules.**	**12/10/2021**	**208**	

Python for Bioinformatics

Exercise 1

I-Title: Programs demonstrating use of Data types, Operators

1. W.a.p for demonstrating the usage of built-in number functions in Python

Answer: Some of the Built-in Number Functions in python are-

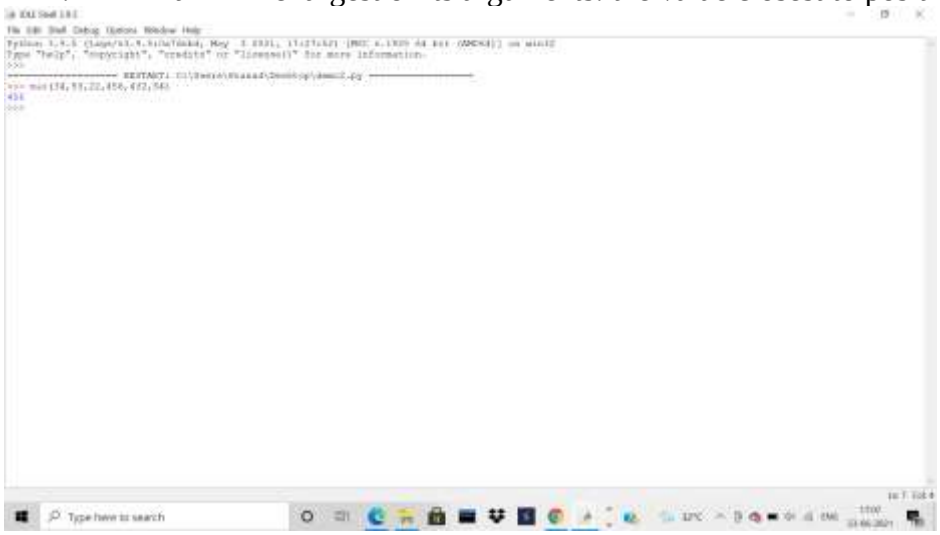
Algorithm:-

Step1→ start

Step2→ usage of built-in number functions in Python

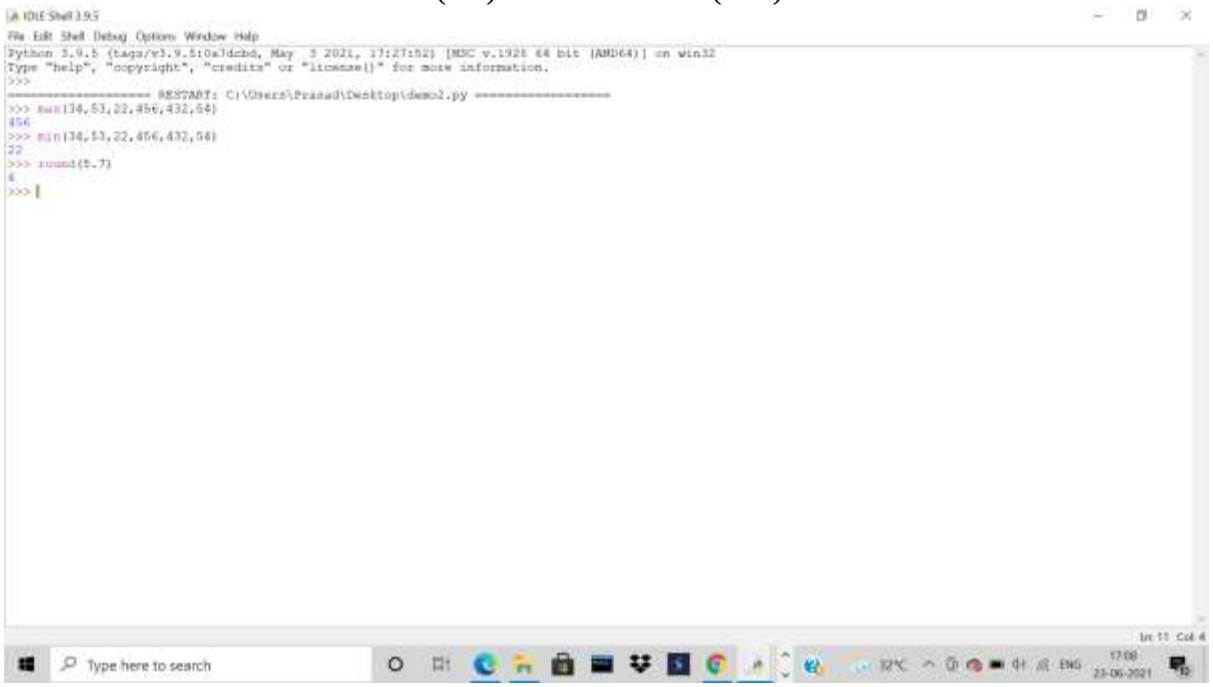
Step3→stop

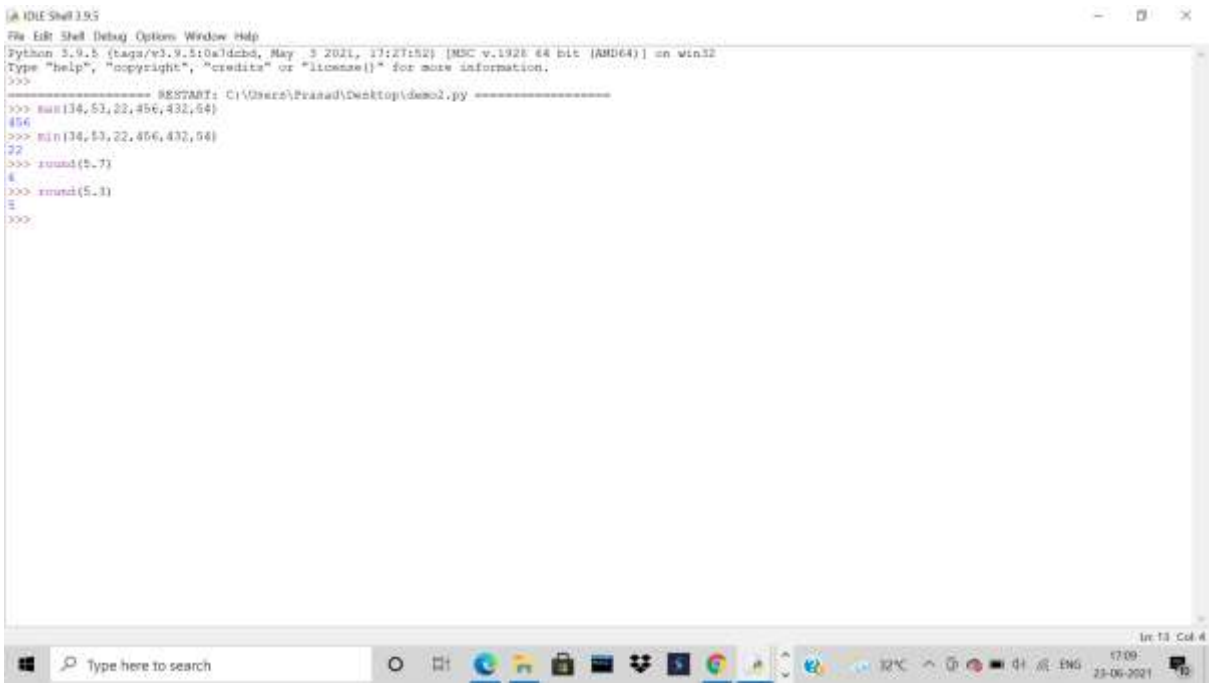
i. max = The largest of its arguments: the value closest to positive infinity



ii. min = The smallest of its arguments: the value closest to negative infinity

iii. round = x rounded to n digits from the decimal point. Python rounds away from zero as a tie-breaker: round(0.5) is 1.0 and round(-0.5) is -1.0.





2. W.a.p for demonstrating the usage of escape characters in strings.
Algorithm:-

Step1→ start
Step2→Using escape characters before special characters
Step3→stop

Answer: To insert characters that are illegal in a string, use an escape character. An escape character is a backslash \ followed by the character you want to insert. So basically, placing a '\' in front of one of these special or reserved characters will tell Python to just treat it as text, ensuring your code is valid and behaves as you'd expect.

Code	Result
\'	Single Quote
\\	Backslash
\n	New Line
\r	Carriage Return
\t	Tab
\b	Backspace
\f	Form Feed
\ooo	Octal value
\xhh	Hex value

i. Code = \n
Algorithm:-
Step1→ start
Step2→Using escape characters before special characters
Step3→stop
Output: \n is used to print word on next line.

ii. Code = \\

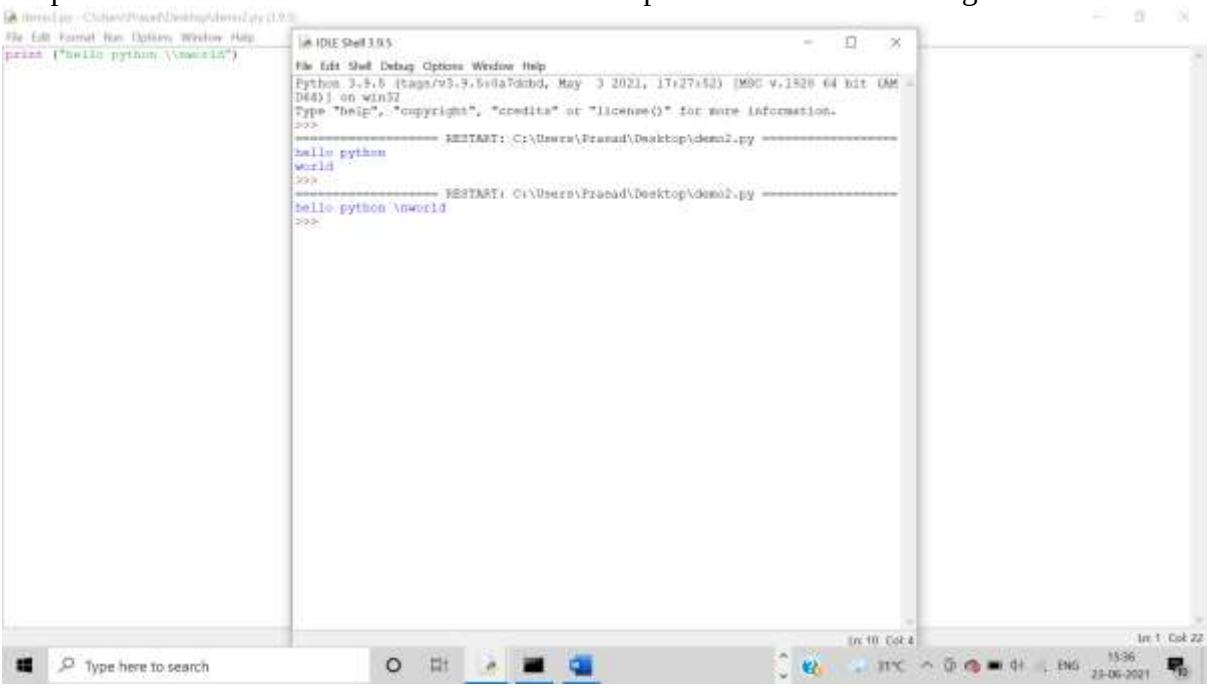
Algorithm:-

Step1→ start

Step2→Using escape characters before special characters

Step3→stop

Output: \\ is used to print a single backslash.



iii. Code = \

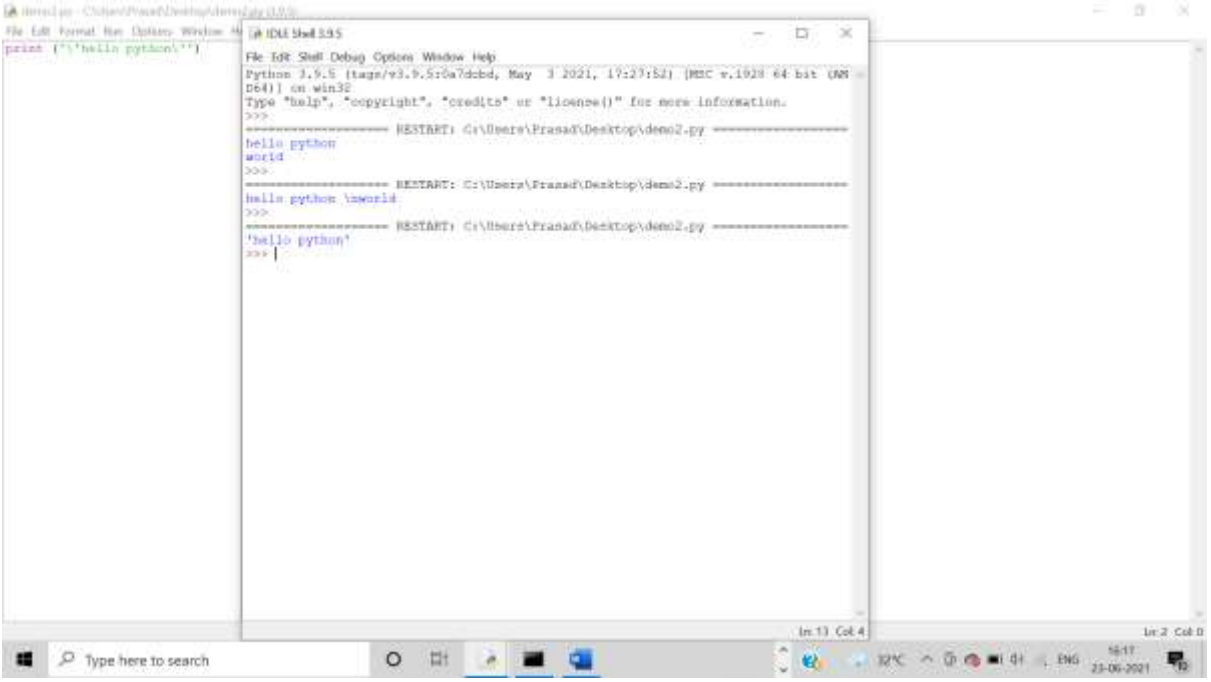
Algorithm:-

Step1→ start

Step2→Using escape characters before special characters

Step3→stop

Output:



iv. Code =\t

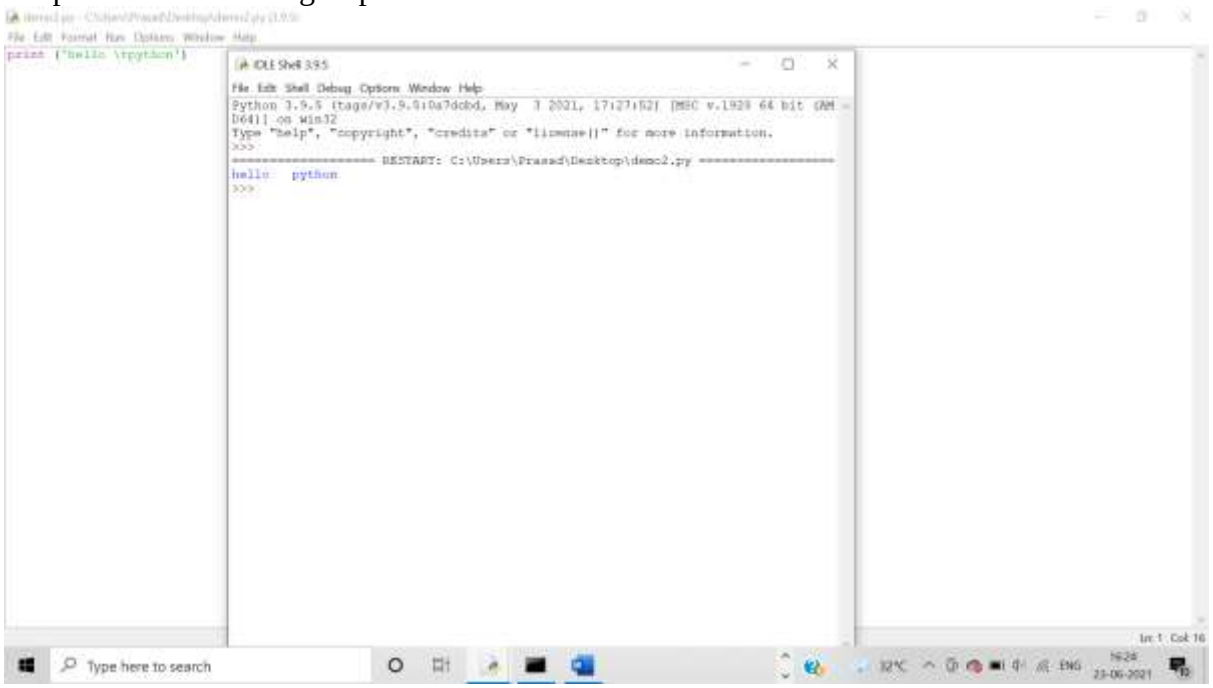
Algorithm:-

Step1→ start

Step2→Using escape characters before special characters

Step3→stop

Output: **"\t"** is used to get space between the words.



v. Code = \b

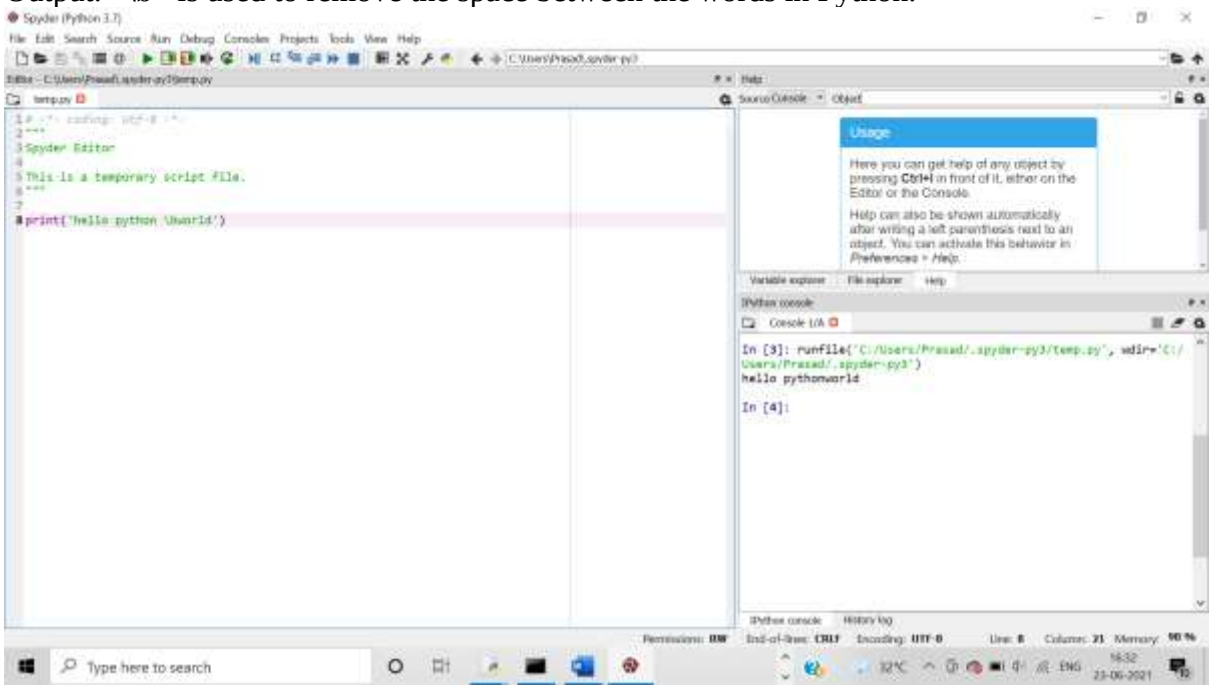
Algorithm:-

Step1→ start

Step2→Using escape characters before special characters

Step3→stop

Output: **"\b"** is used to remove the space between the words in Python.



vi. Code = \r Carriage return

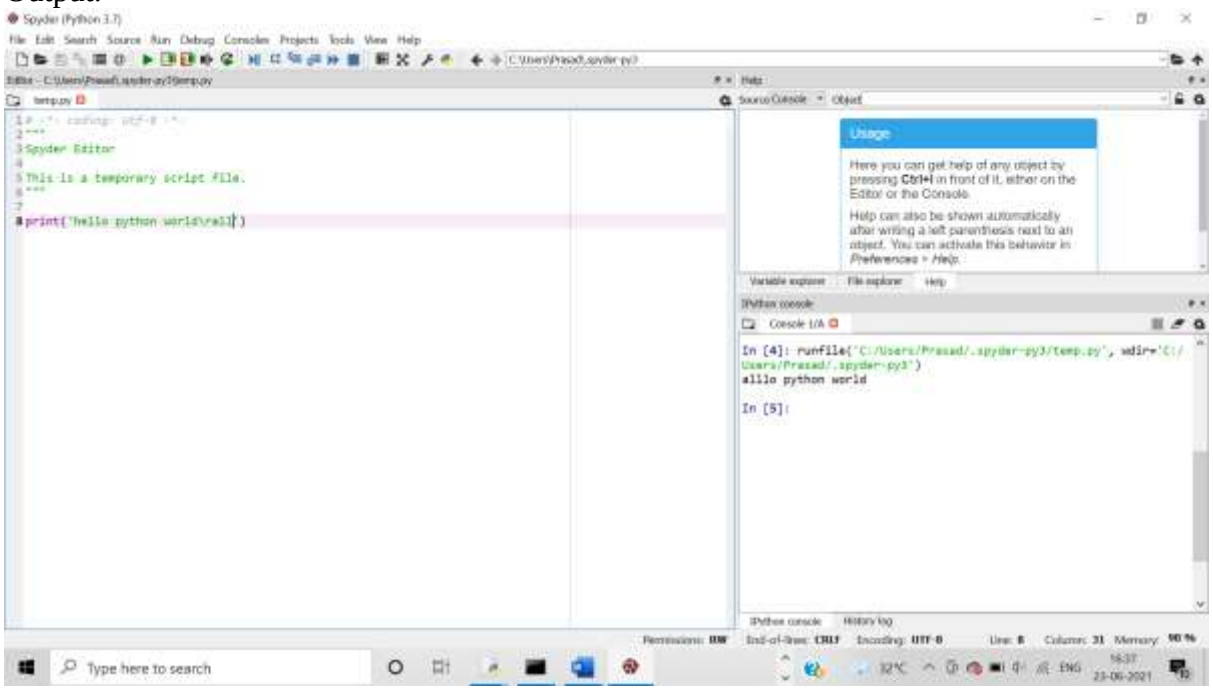
Algorithm:-

Step1→ start

Step2→Using escape characters before special characters

Step3→stop

Output:



vii. Code = \ooo Octal Values (\110\145\154\154\157)

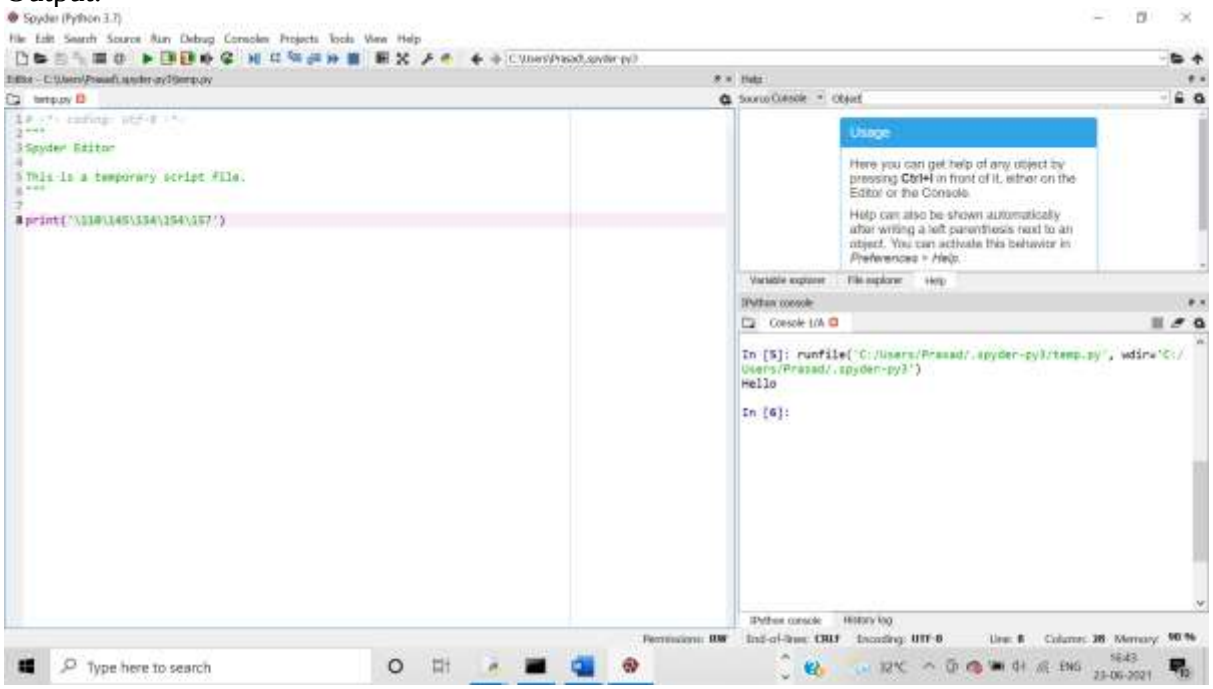
Algorithm:-

Step1→ start

Step2→Using escape characters before special characters

Step3→stop

Output:



viii. Code = \xhh Hex value (\x48\x65\x6c\x6c\x6f)

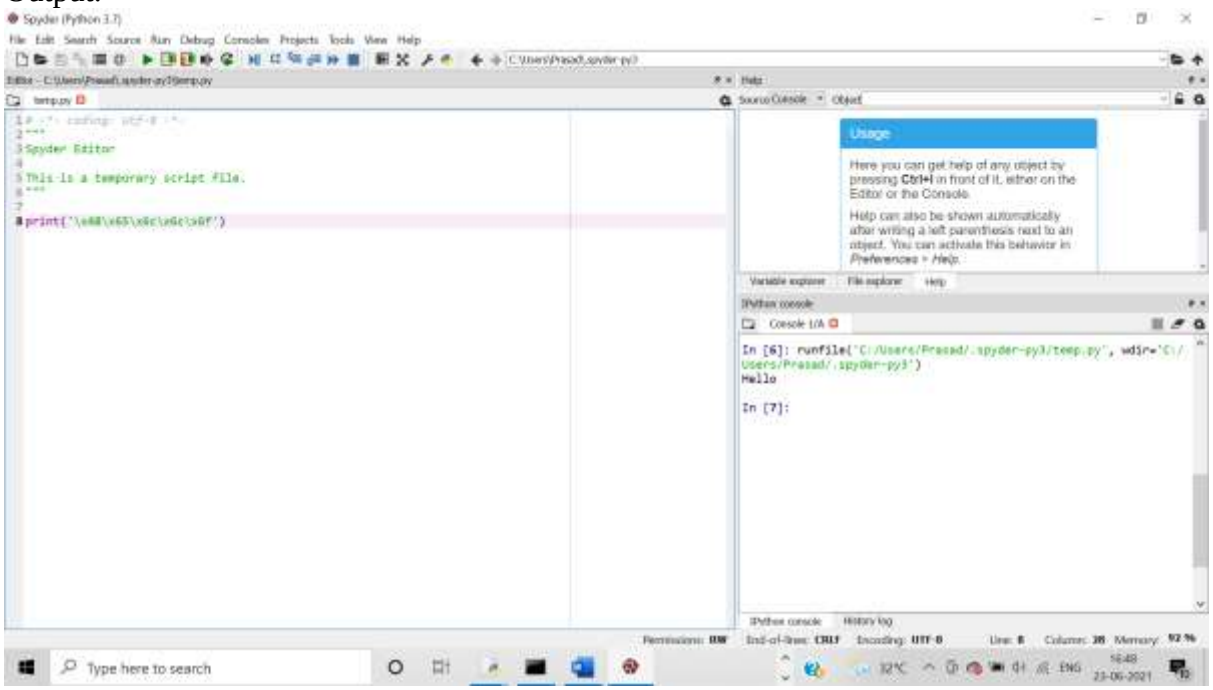
Algorithm:-

Step1→ start

Step2→Using escape characters before special characters

Step3→stop

Output:



3. W.a.p for demonstrating the usage of string function and string operators

Algorithm

Step1→ start

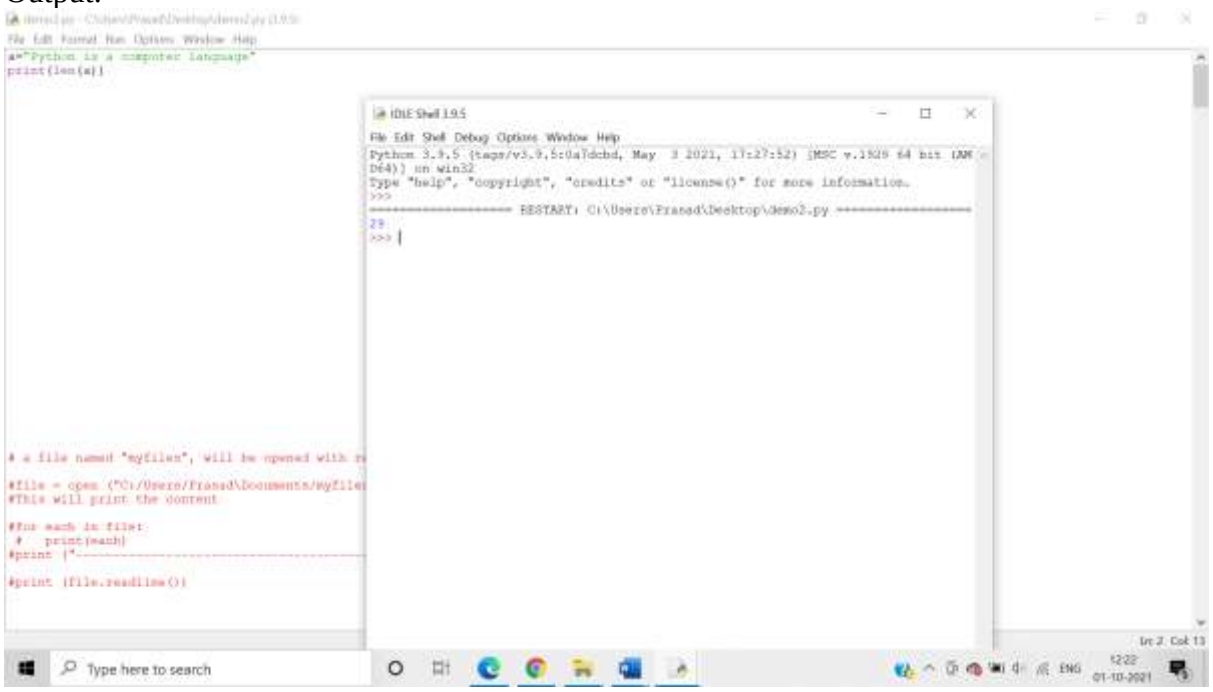
Step2→initialize a=string,b=string

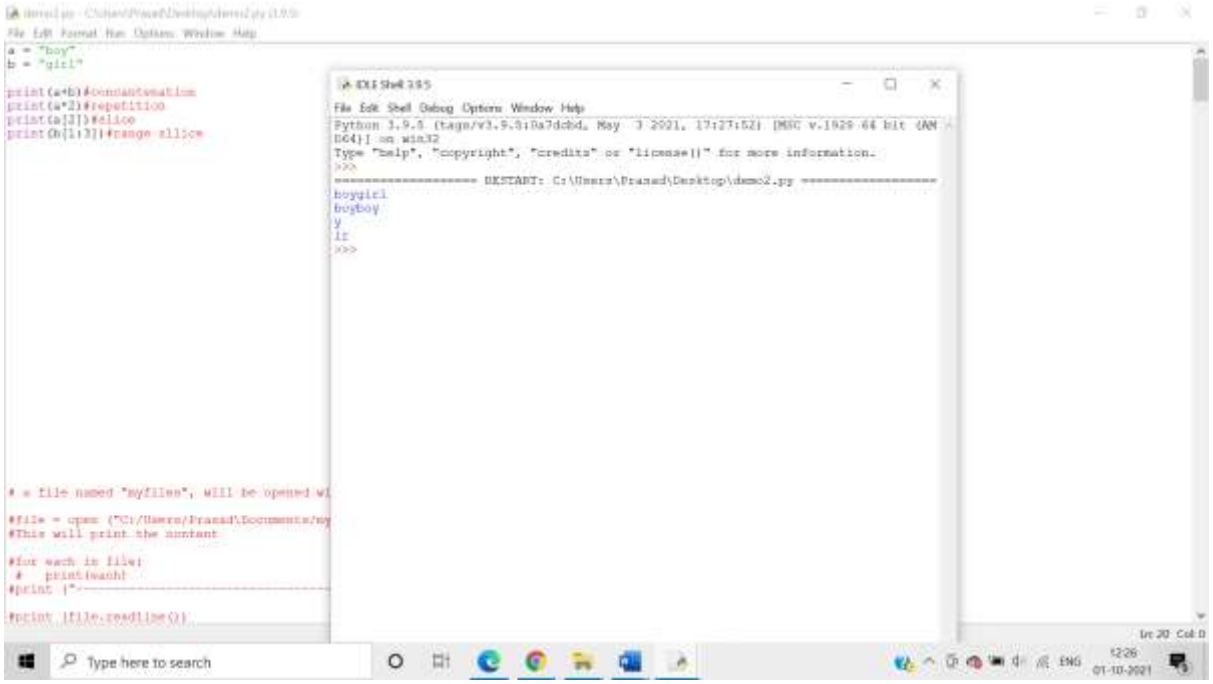
Step3→print(a+b),print(a*b),print(a[2]),print(b[1:3])

Step4→print i,j,a

Step5→stop

Output:-





4. W.a.p for demonstrating the usage of format method

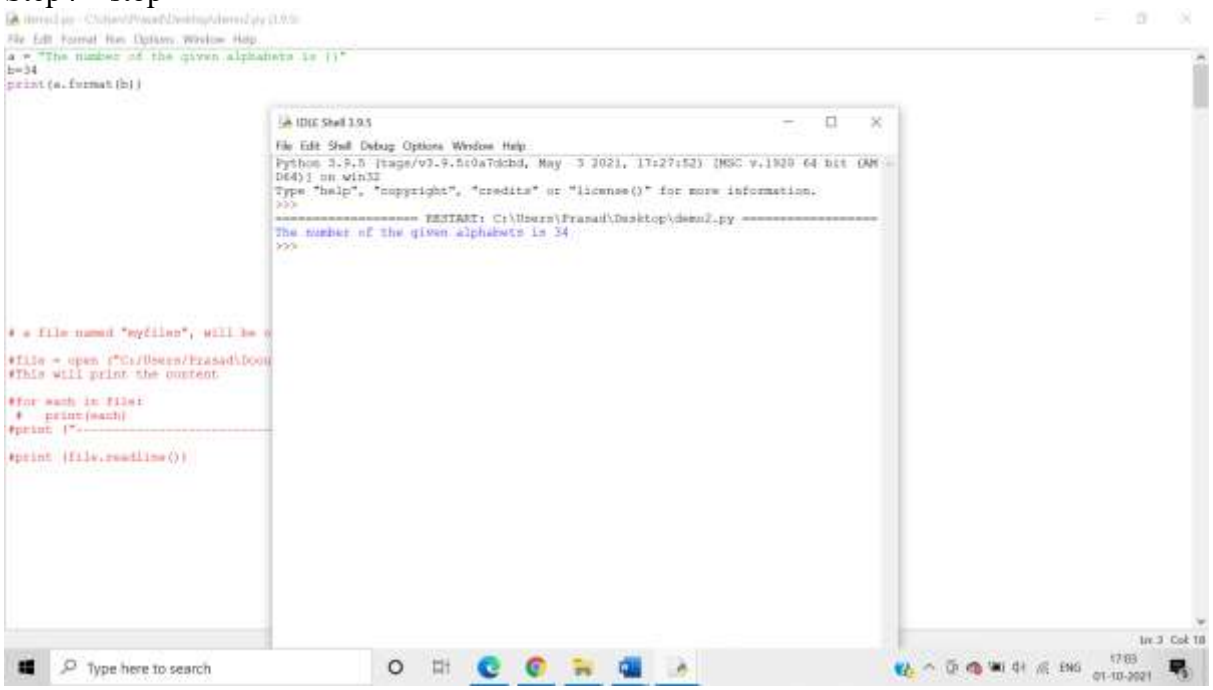
Algorithm

Step1→ start

Step2→initialize a =”string{}”,b=integer

Step3→print(a.format(b))

Step4→stop

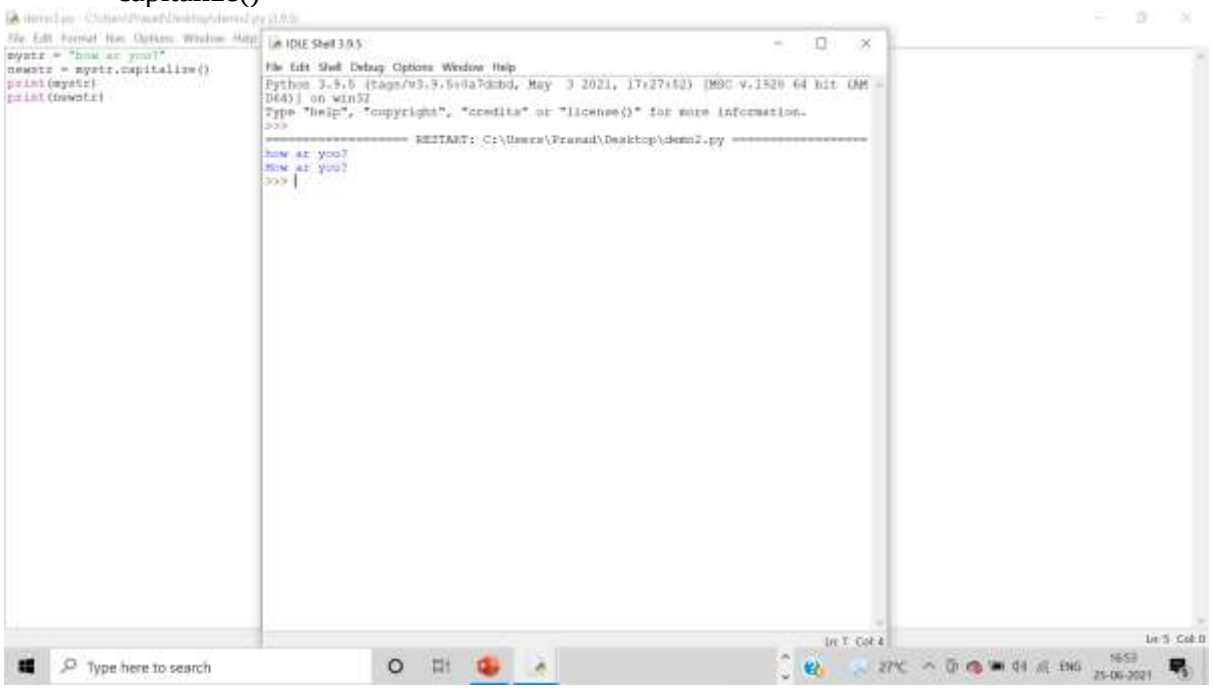


5. Write set of programs for demonstrating the usage of following String Methods along with its variants-

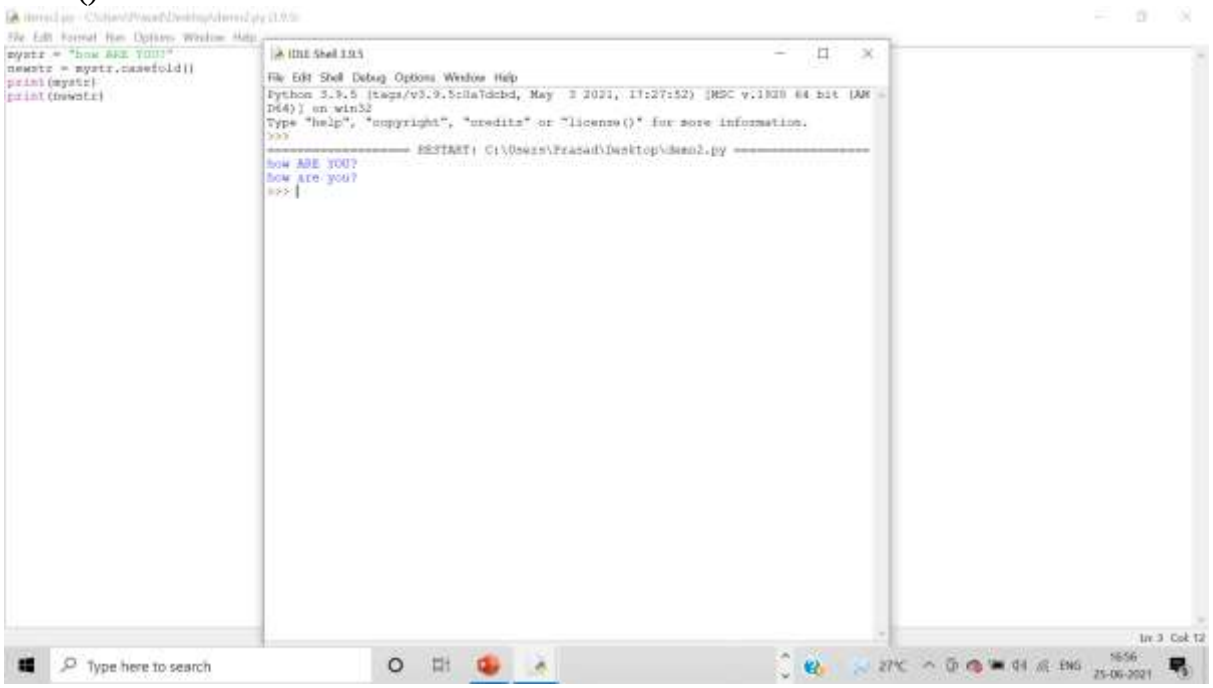
i. capitalize(), lower(), upper(), title(), casefold(), swapcase()

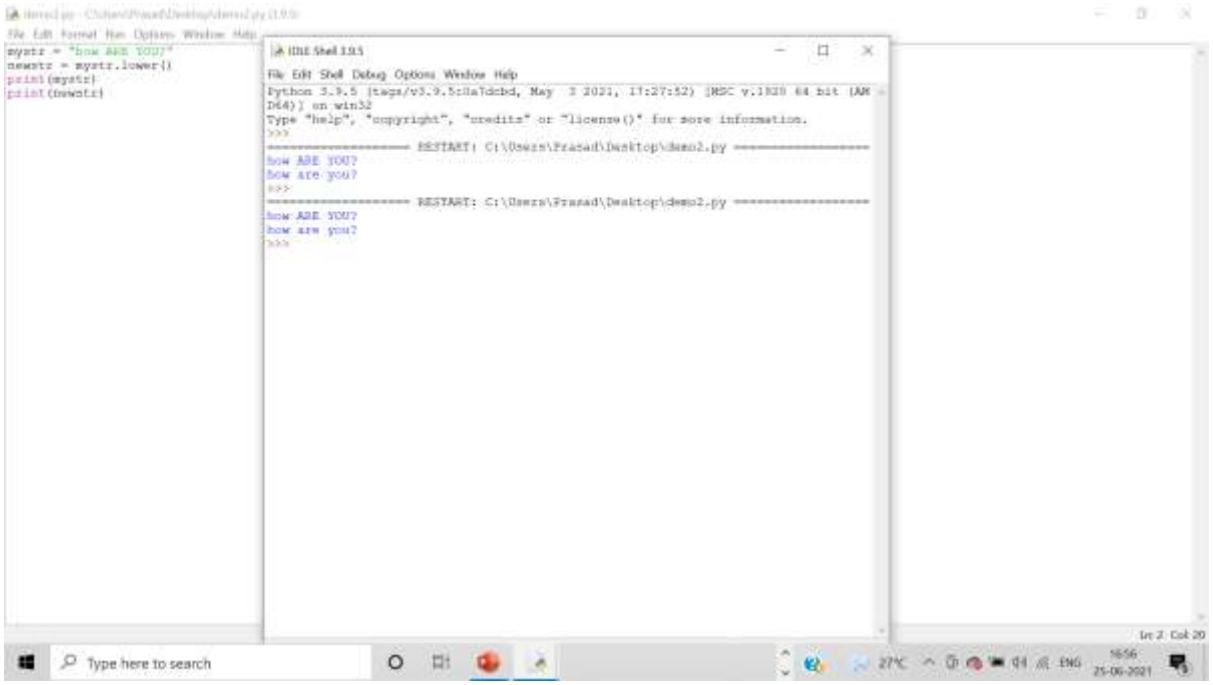
Algorthim:- Use the capitalize(), lower(), upper(), title(), casefold(), swapcase() string methods to alter and modify the given strings.

- capitalize()

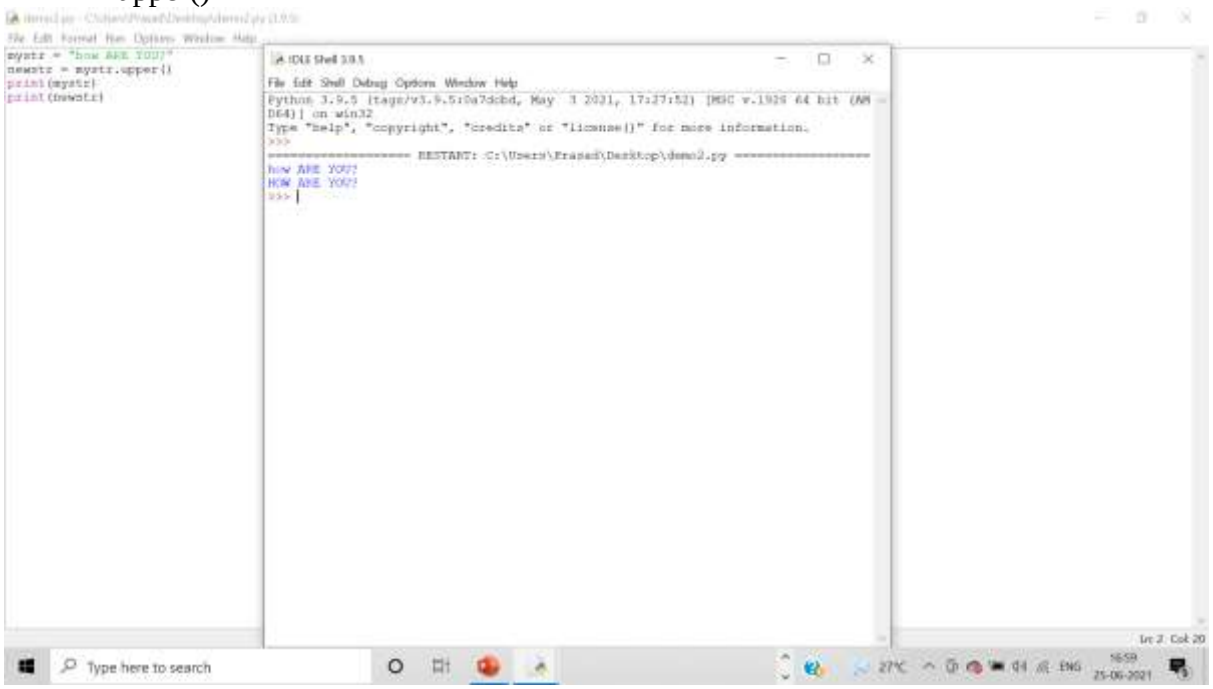


lower()

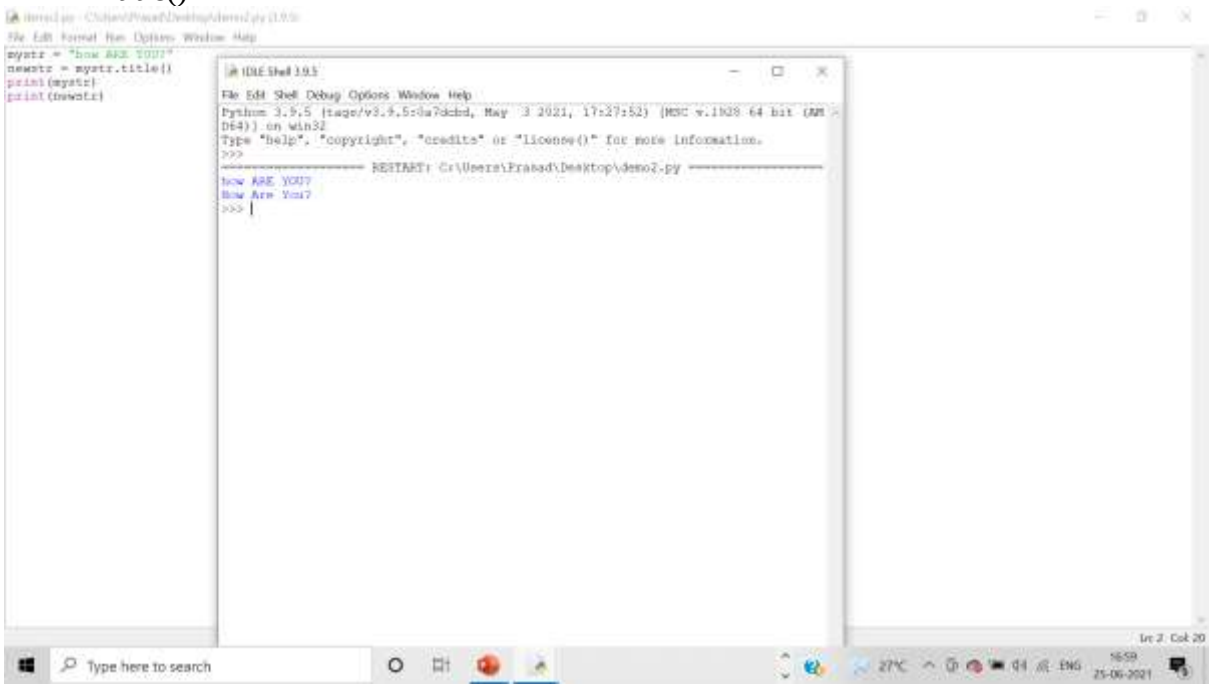



mystr = "how ARE YOU?"
newstr = mystr.lower()
print(mystr)
print(newstr)
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
how ARE YOU?
how are you?
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
how ARE YOU?
how are you?
>>>
Type here to search

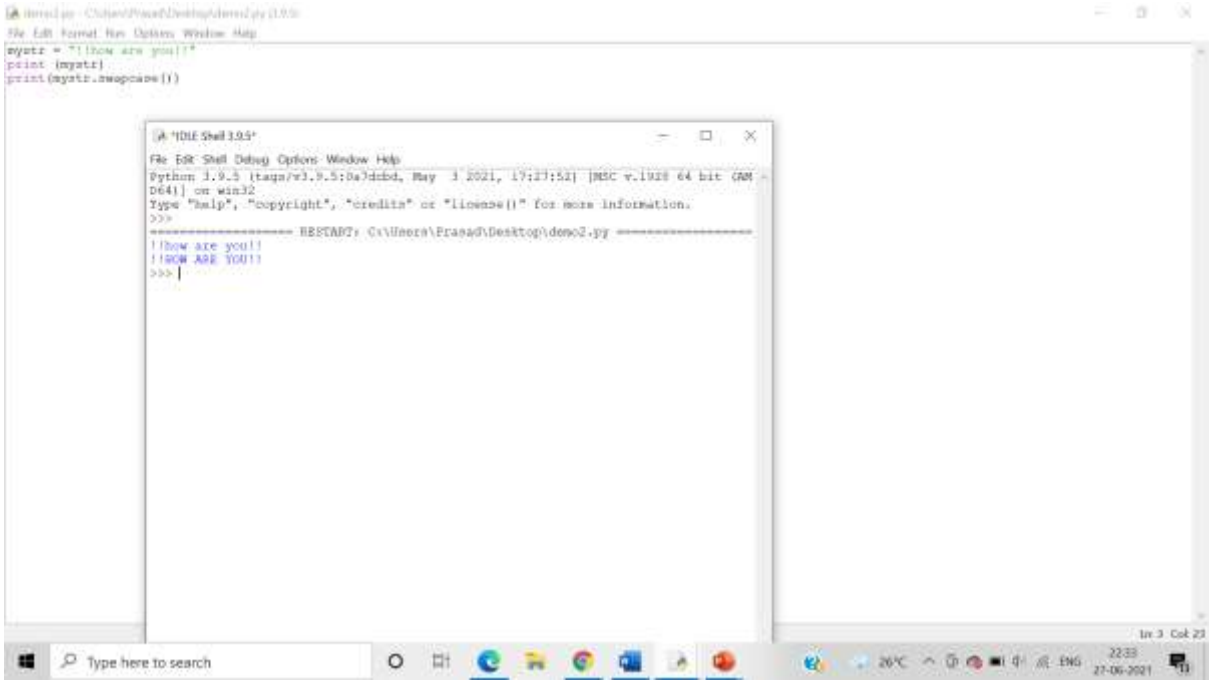
- upper()


mystr = "how ARE YOU?"
newstr = mystr.upper()
print(mystr)
print(newstr)
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
how ARE YOU?
HOW ARE YOU?
>>>
Type here to search

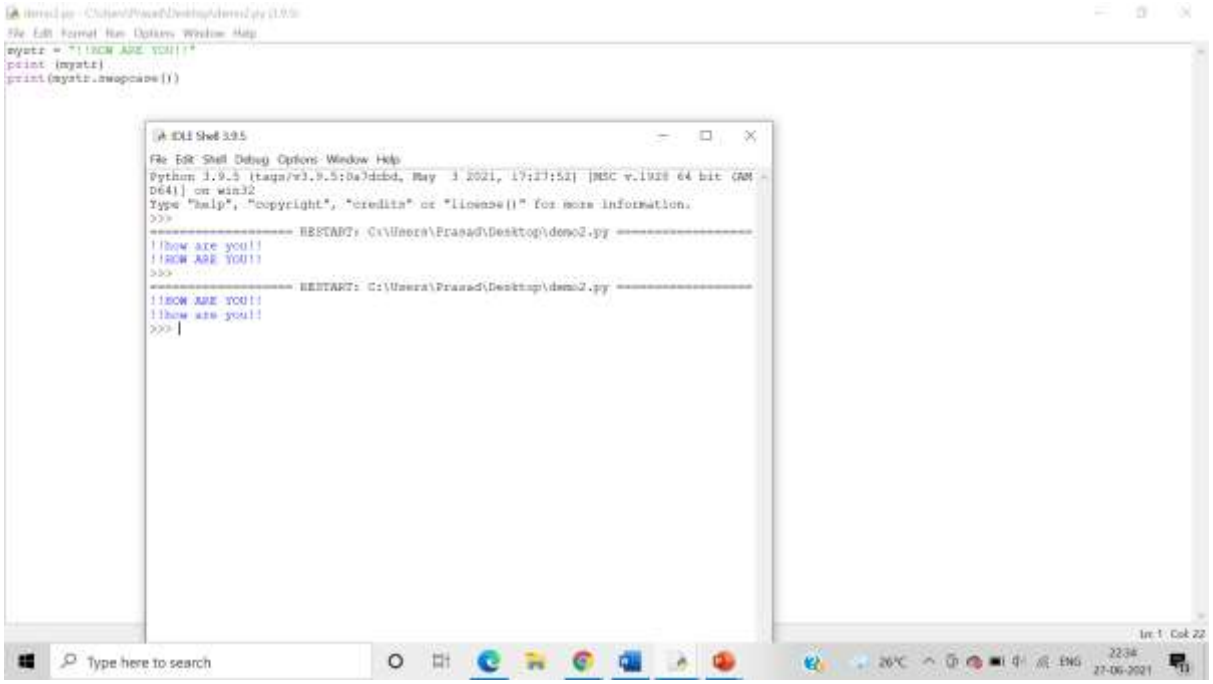
- title()



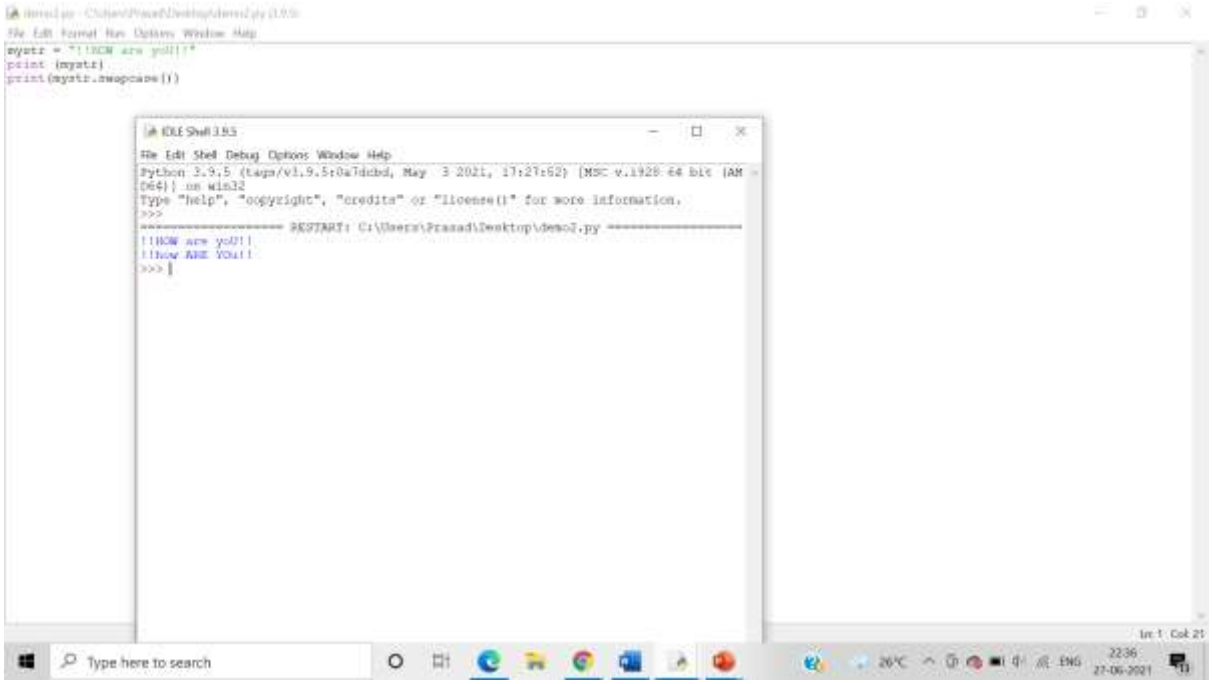
- swapcase()
  - uppercase



- lowercase



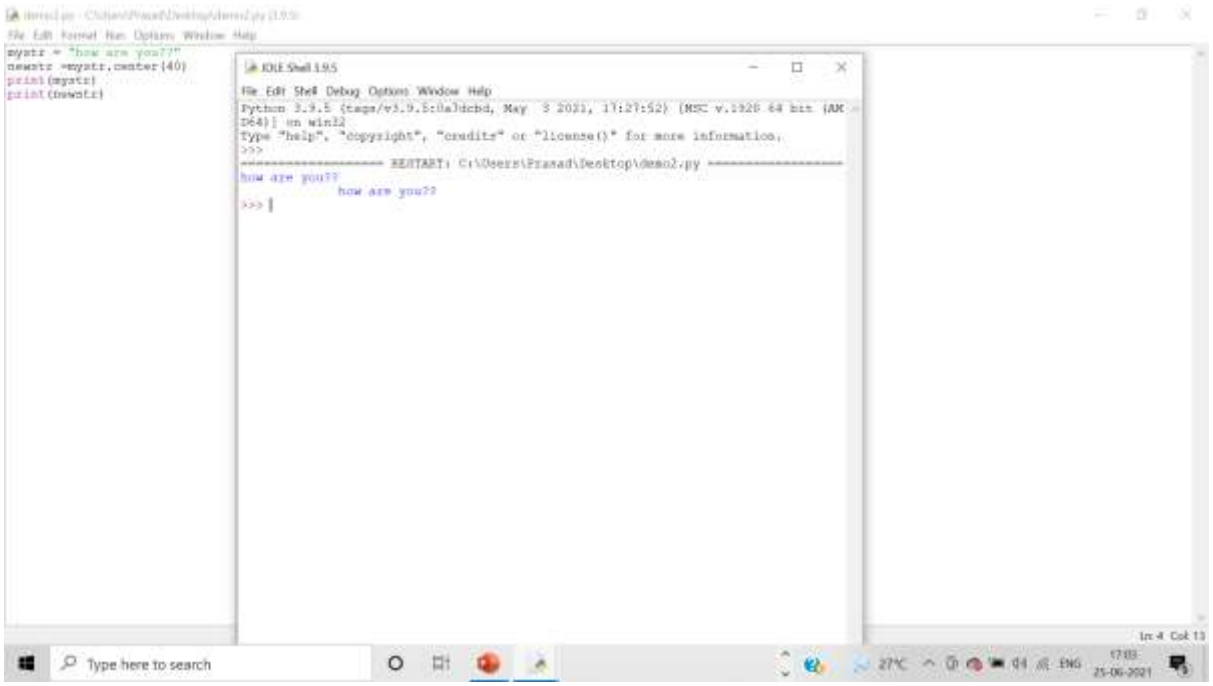
- mixed



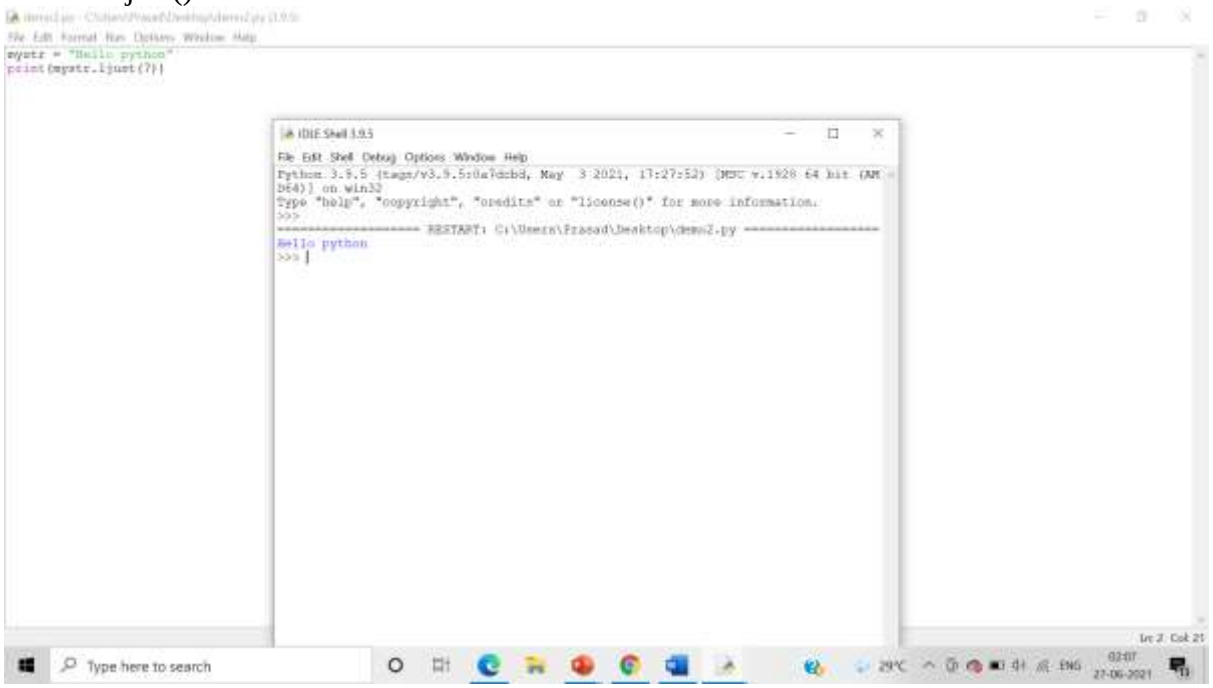
ii. center(),ljust(), rjust(), zfill()

Algorithm:- Use the center(),ljust(), rjust(), zfill() string methods to alter and modify the given string.

- center()

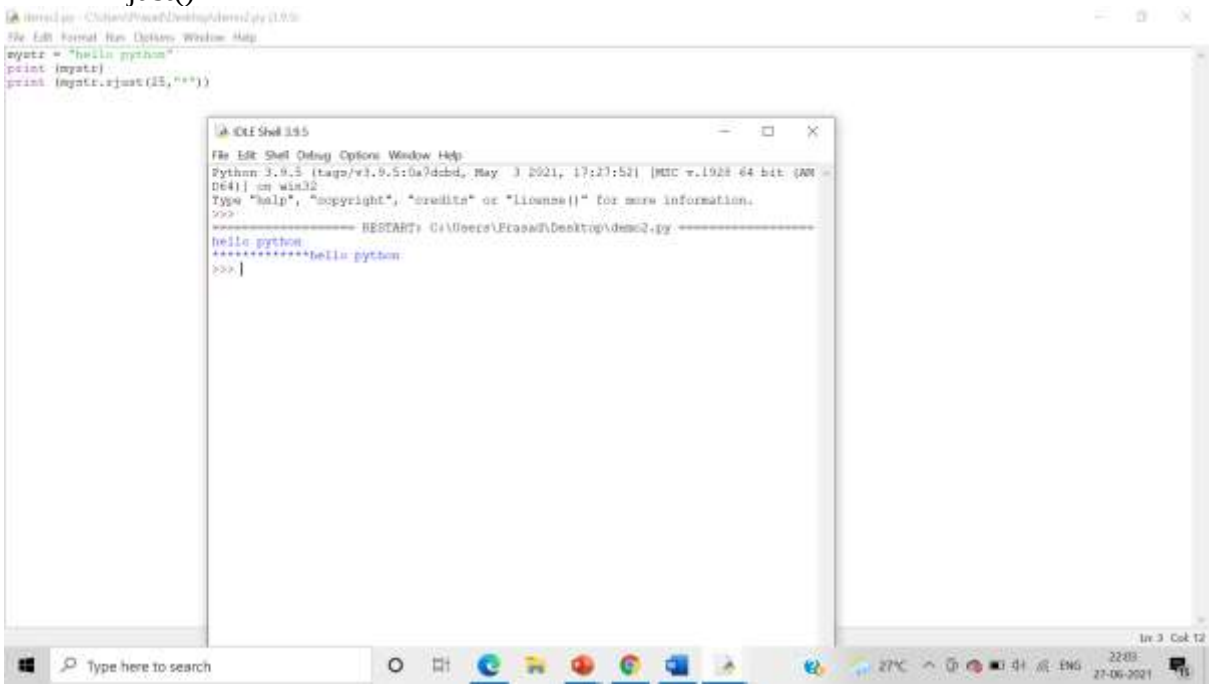


- ljust()

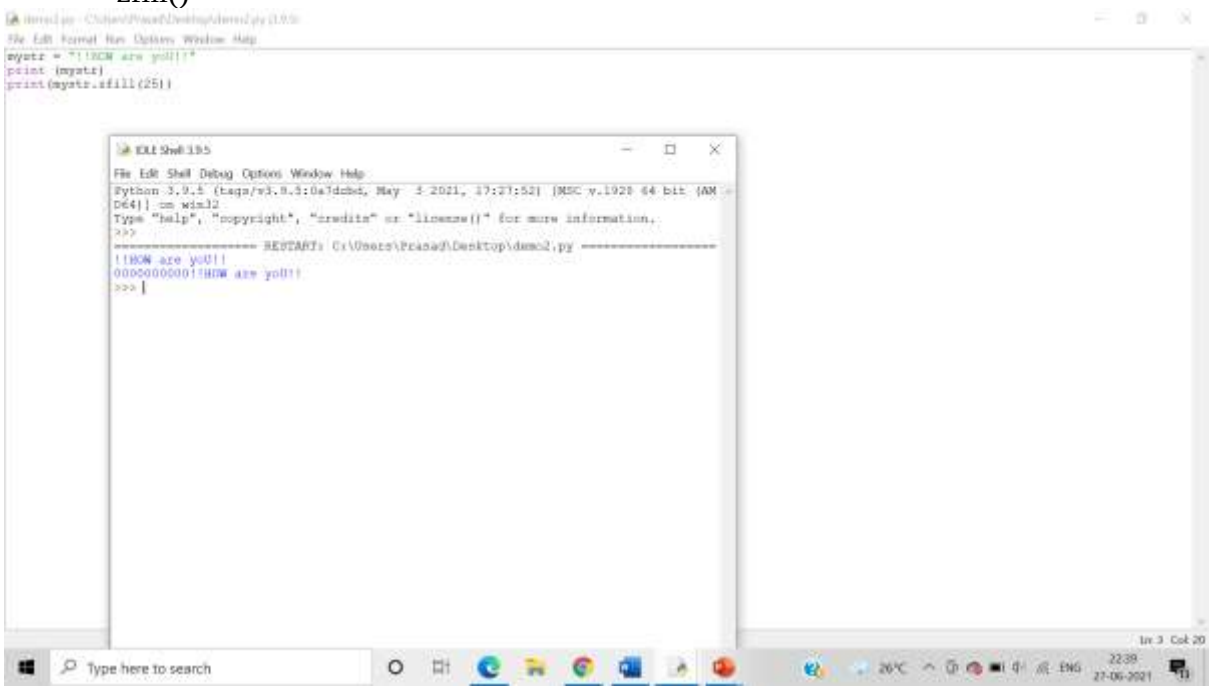


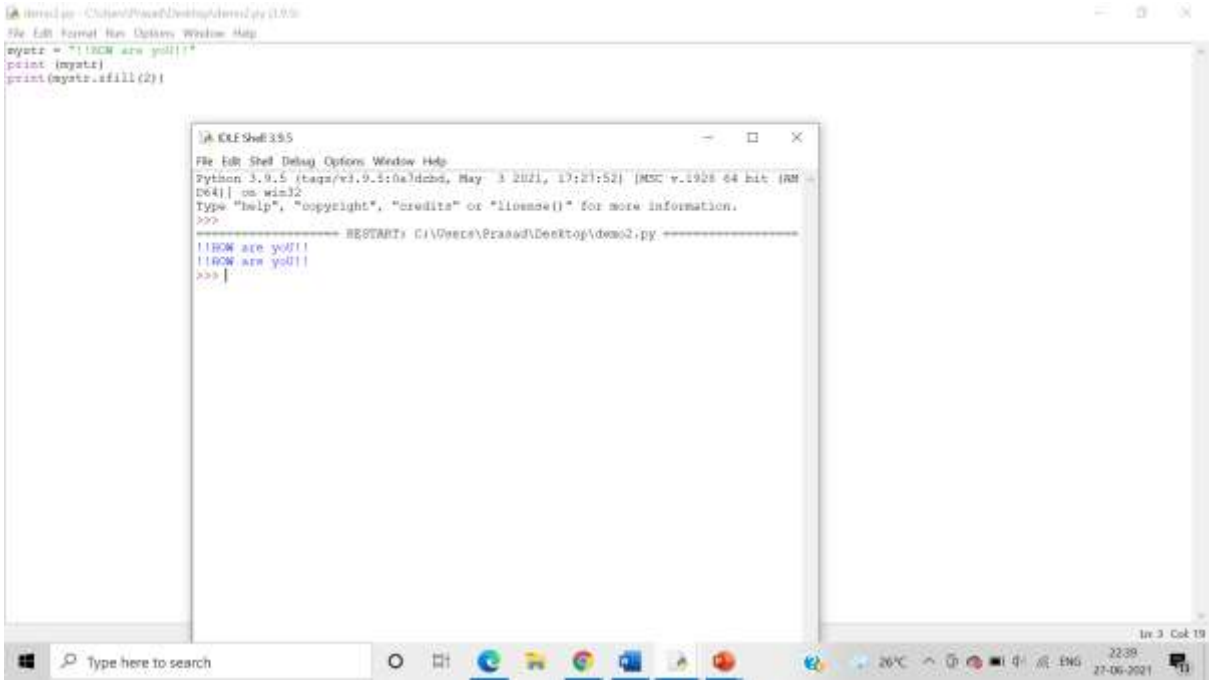

mystr = "Hello python"
print(mystr.ljust(34, "*"))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
Hello python**********
>>>
Type here to search

- rjust()


mystr = "hello python"
print (mystr)
print (mystr.rjust(25,"*"))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
hello python
**********hello python
>>>
Type here to search

- zfill()

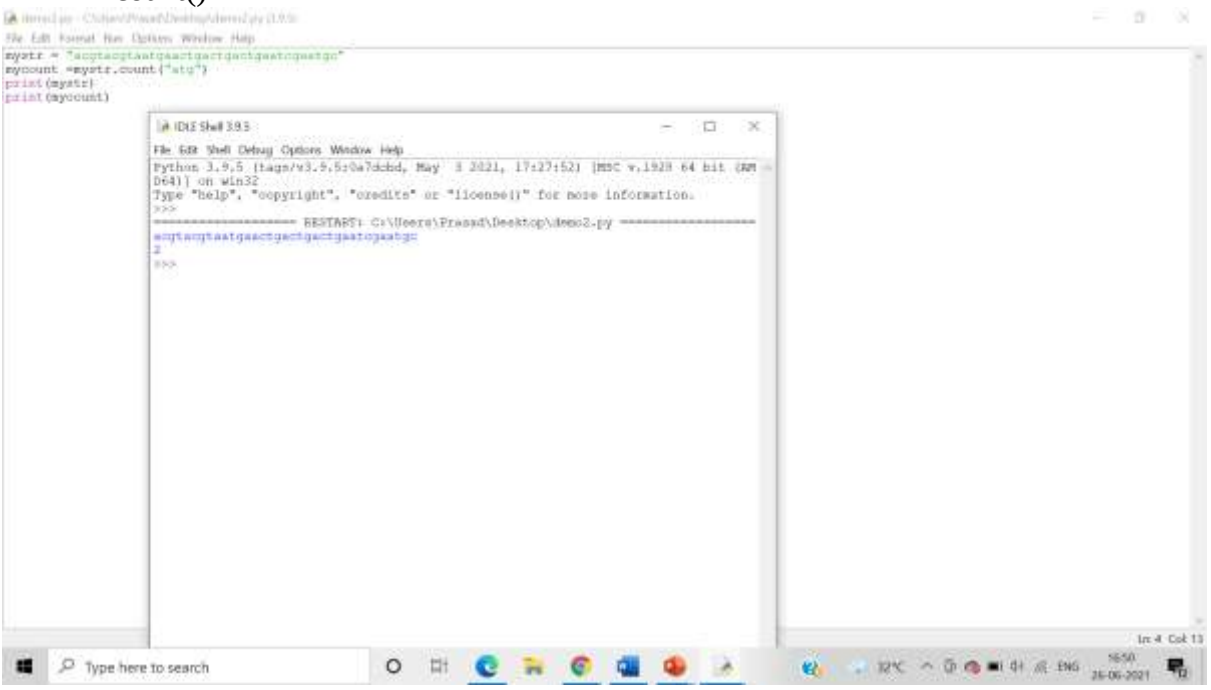

mystr = "!!HOW are you!!"
print (mystr)
print(mystr.zfill(25))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
!!HOW are you!!
0000000000!!HOW are you!!
>>>
Type here to search


mystr = "!!HOW are you!!"
print (mystr)
print(mystr.zfill(2))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
!!HOW are you!!
!!HOW are you!!
>>>
Type here to search

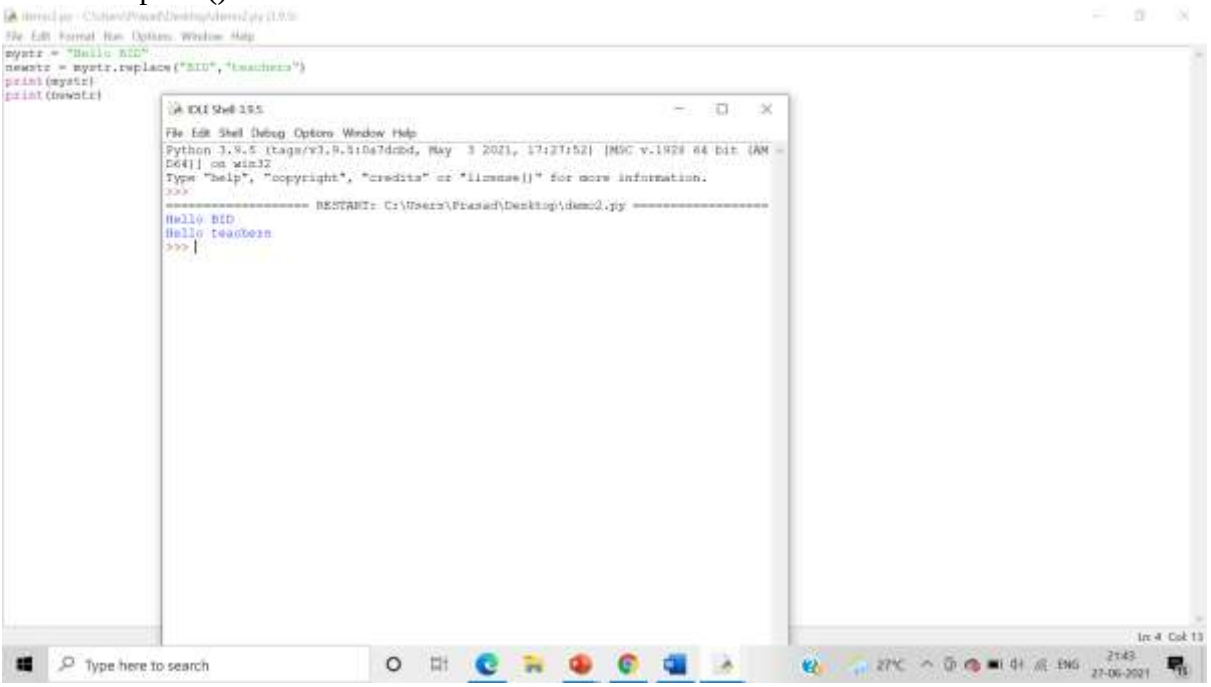
iii. count(), replace()

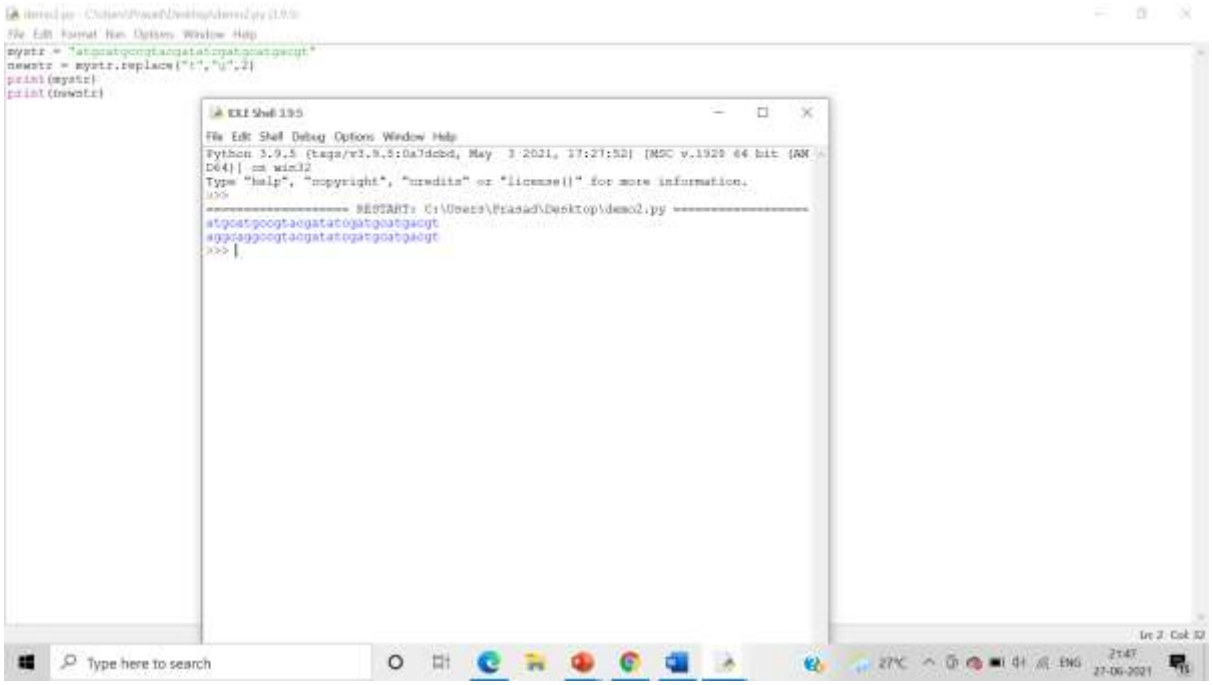
Algorithm:- Use the count() and replace() method to alter and modify the given string.

- count()



- replace()

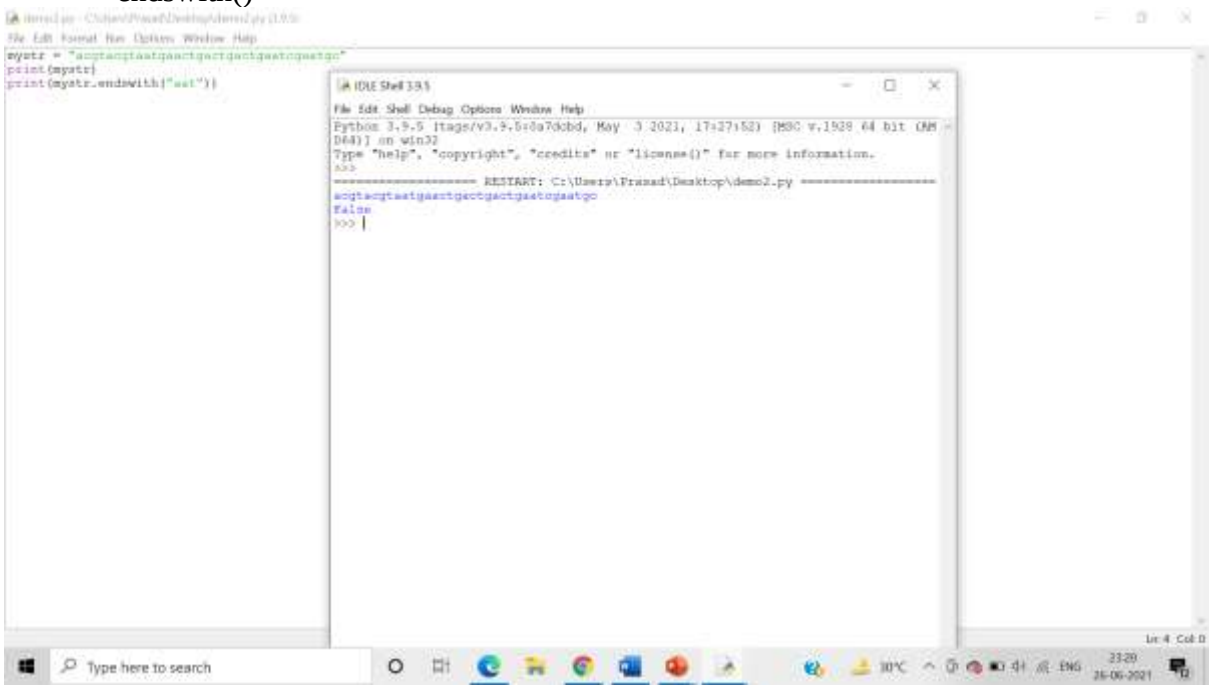


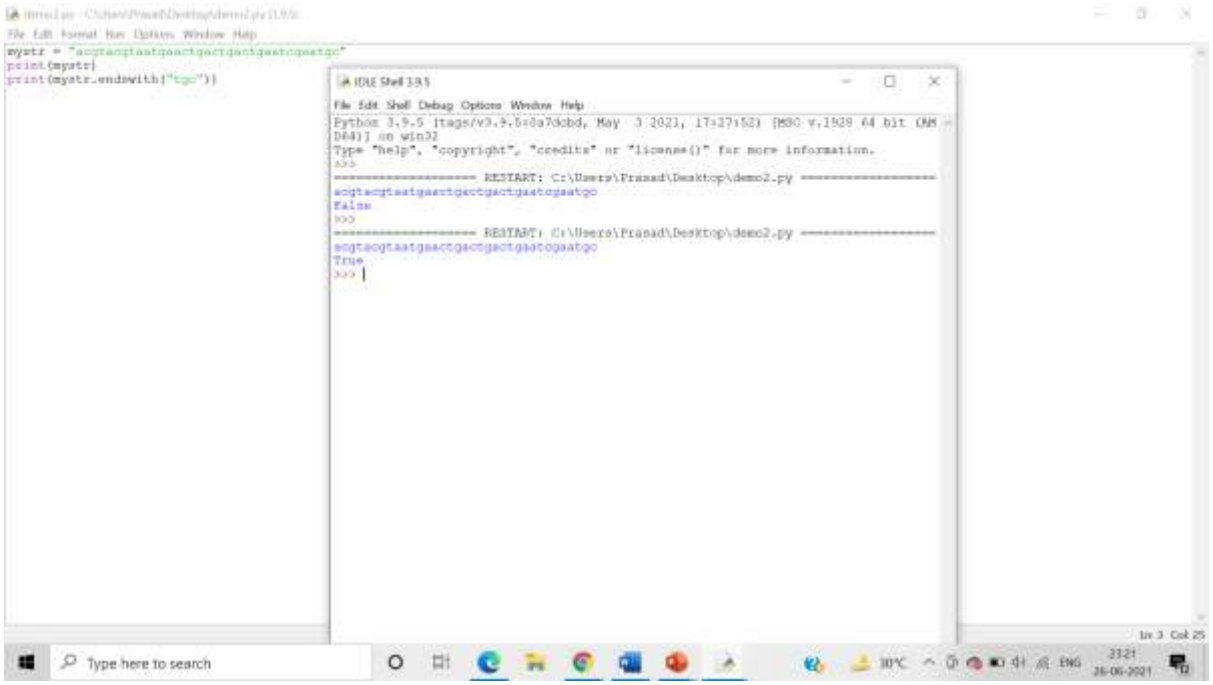


iv. endswith(), startswith()

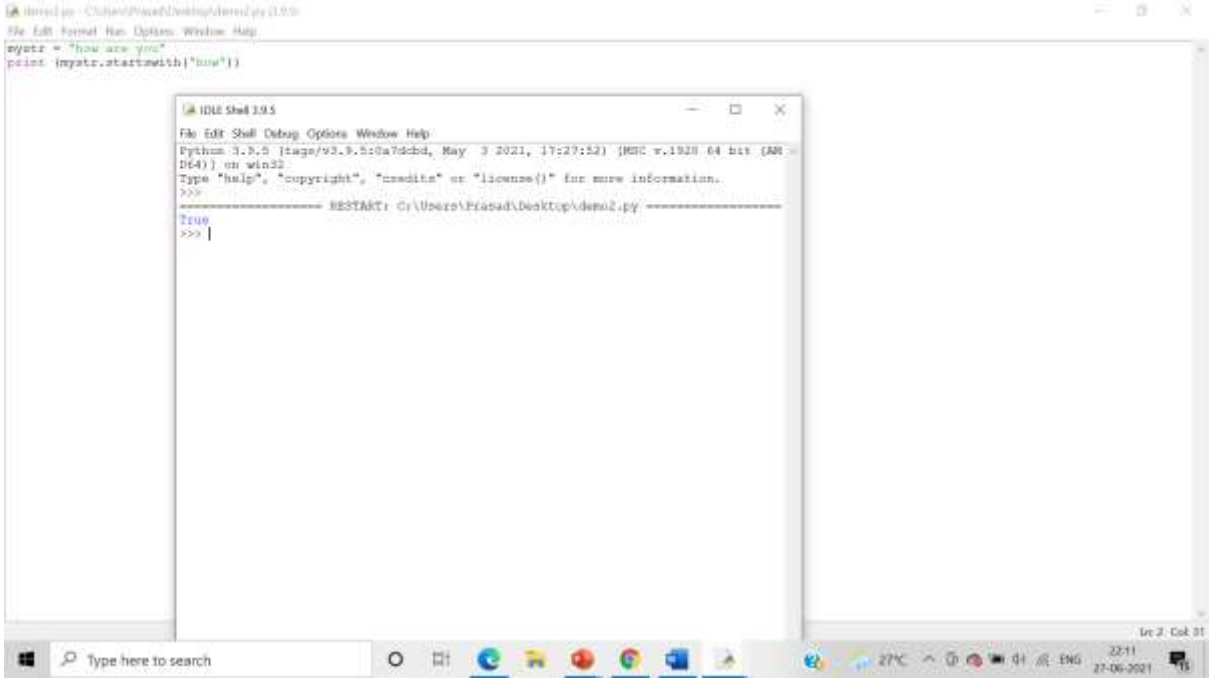
Algorithm:- Use the endswith(), startswith() methods to alter and modify the given strings.

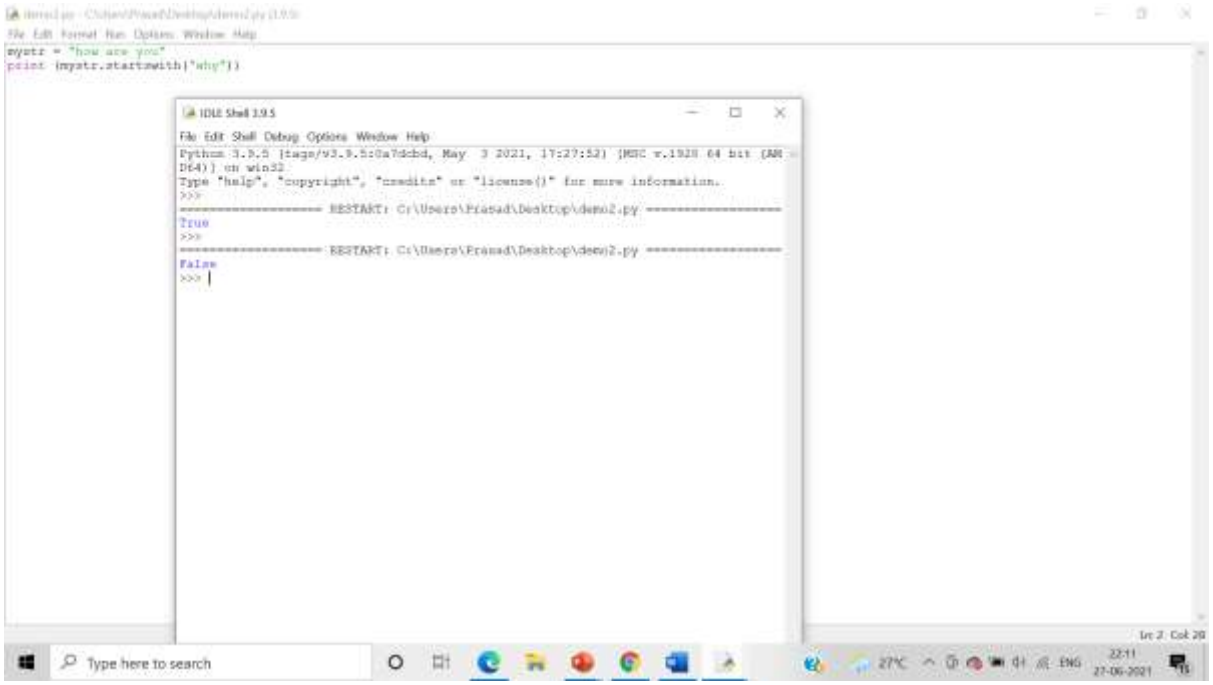
- endswith()




demo2.py - C:\Users\Prasad\Desktop\demo2.py (3.9.5)
File Edit Format Run Options Window Help
mystr = "acgtacgtaatgaactgactgactgaatcgaatgc"
print(mystr)
print(mystr.endswith("tgc"))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
acgtacgtaatgaactgactgactgaatcgaatgc
False
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
acgtacgtaatgaactgactgactgaatcgaatgc
True
>>>
Ln: 3 Col: 25
Type here to search
30°C
ENG
23:21
26-06-2021

startswith()

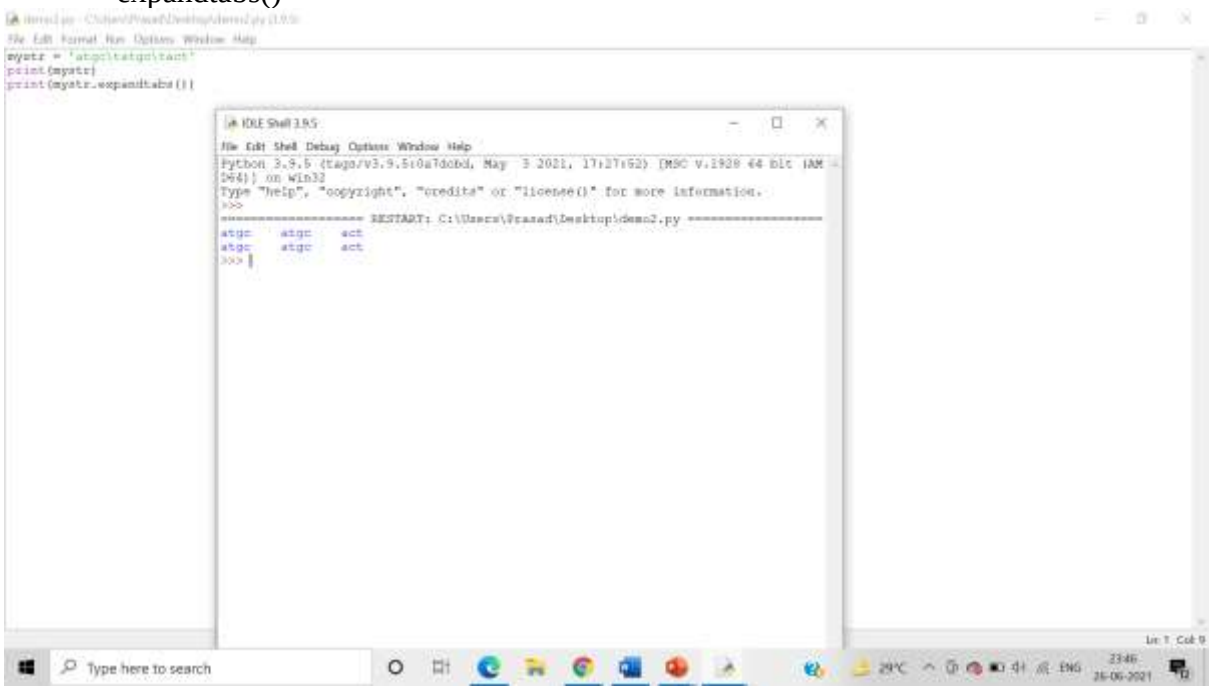

demo2.py - C:\Users\Prasad\Desktop\demo2.py (3.9.5)
File Edit Format Run Options Window Help
mystr = "how are you"
print (mystr.startswith('how'))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
True
>>>
Ln: 2 Col: 31
Type here to search
27°C
ENG
22:11
27-06-2021



v. expandtabs(), format()

Algorithm:- Use the expandtabs(), format() to alter and modify the given string.

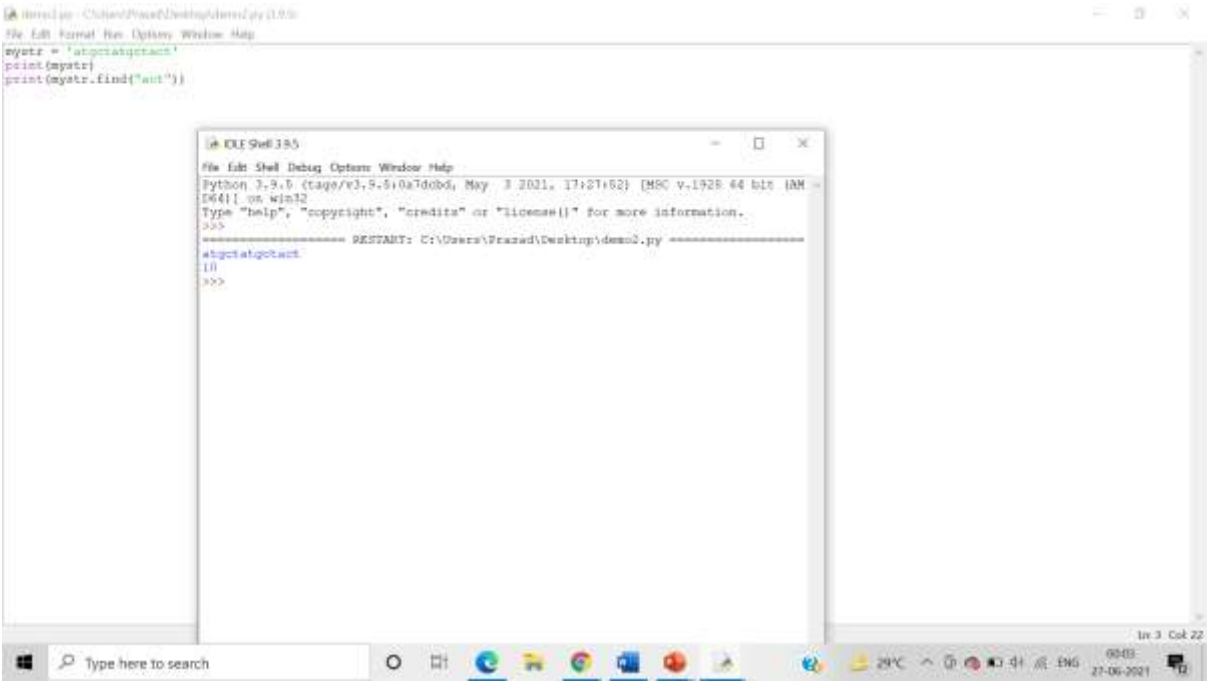
- expandtabs()

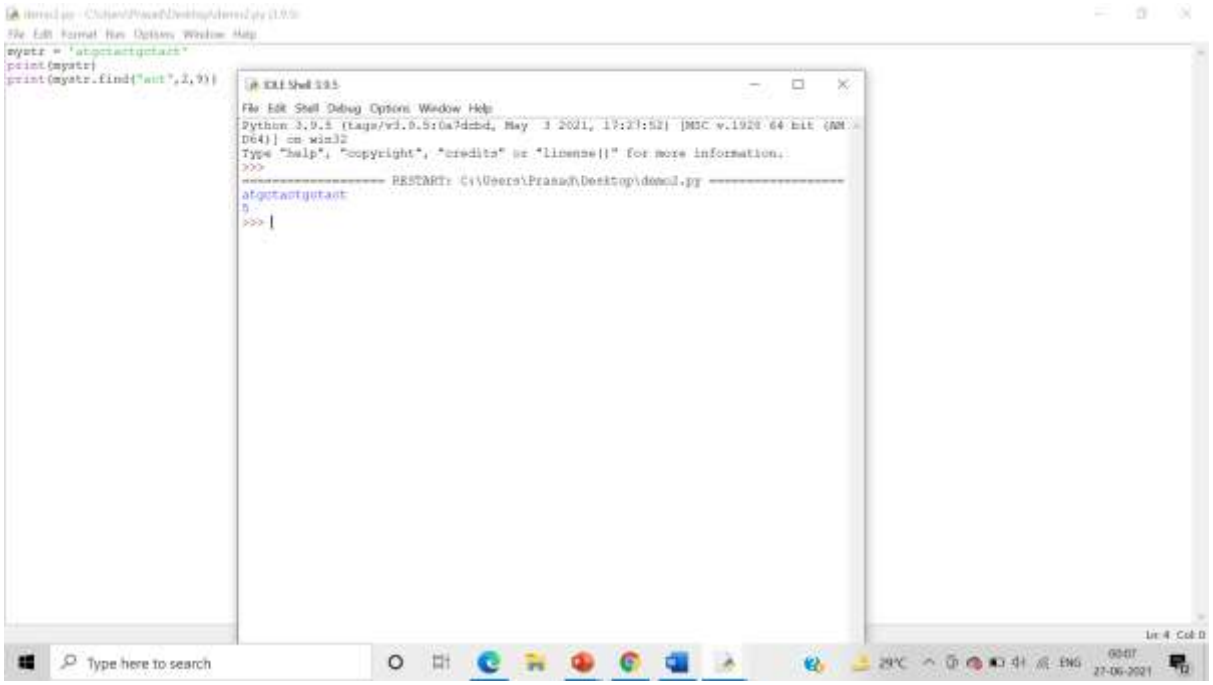


vi. find(), rfind(), index(), rindex()

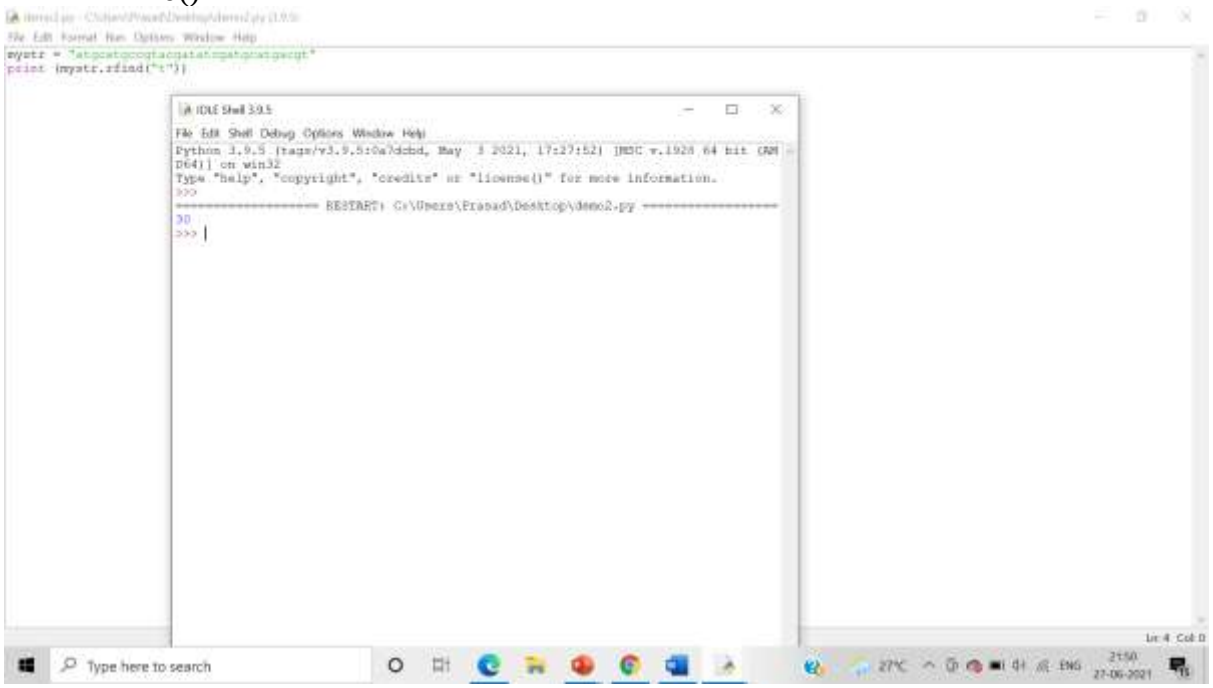
Algorithm:- Use the find(), rfind(), index(), rindex() methods to modify or alter the given string.

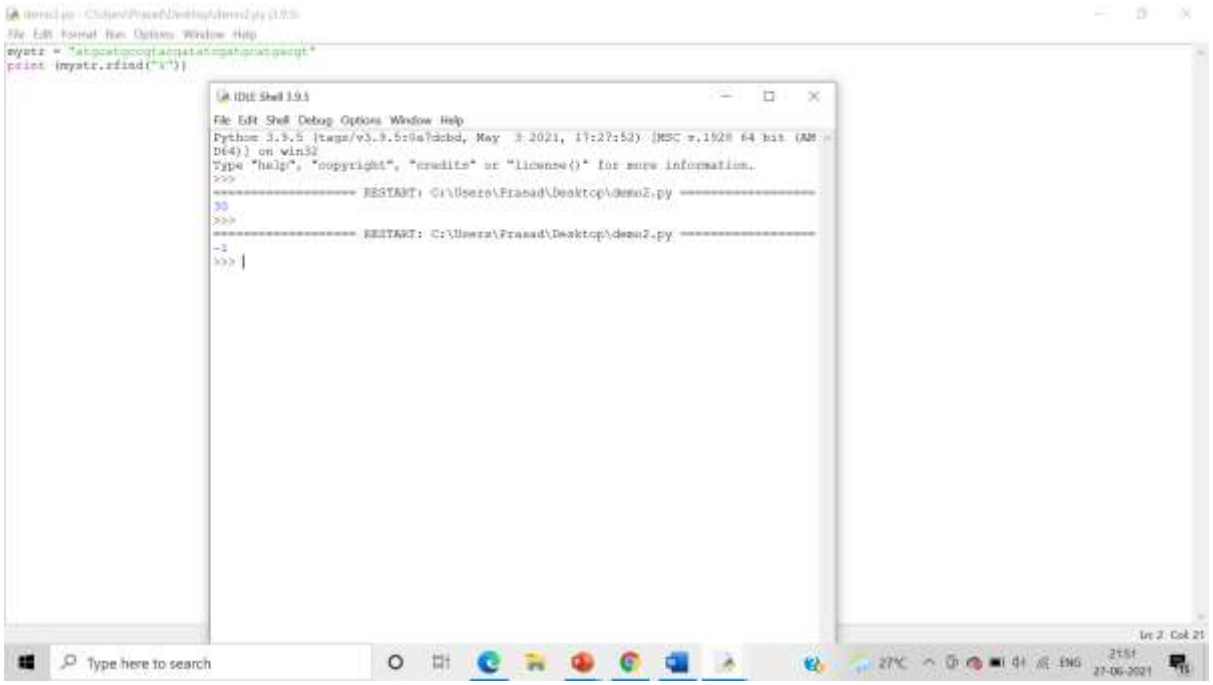
- find()



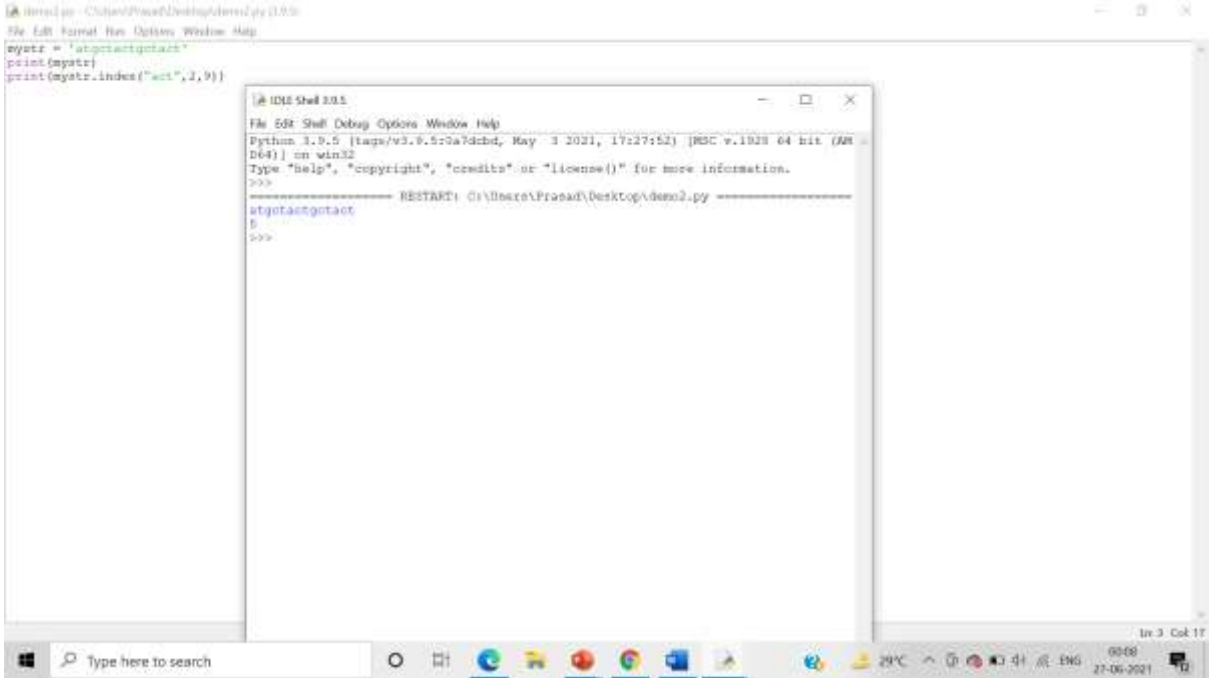

mystr = 'atgctactgctact'
print(mystr)
print(mystr.find('act',2,9))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo1.py ==========
atgctactgctact
5
>>>
Type here to search

- rfind()

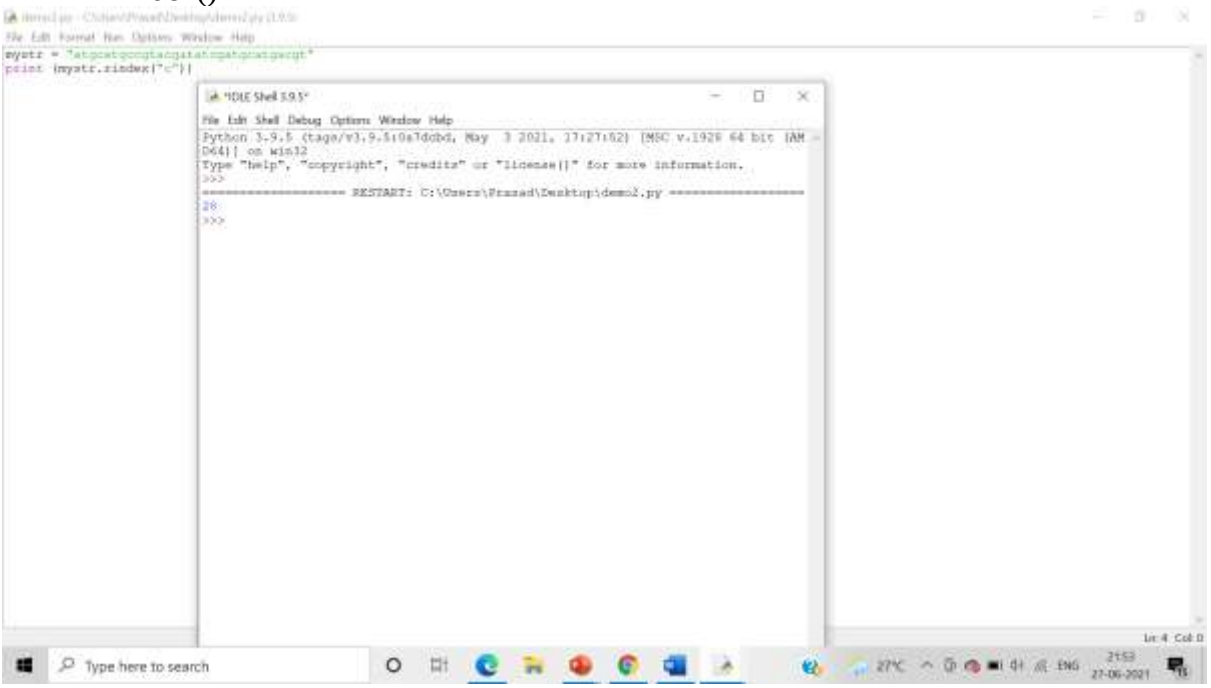

mystr = "atgcatgccgtacgatatcgatgcatgacgt"
print (mystr.rfind("t"))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
30
>>>
Type here to search

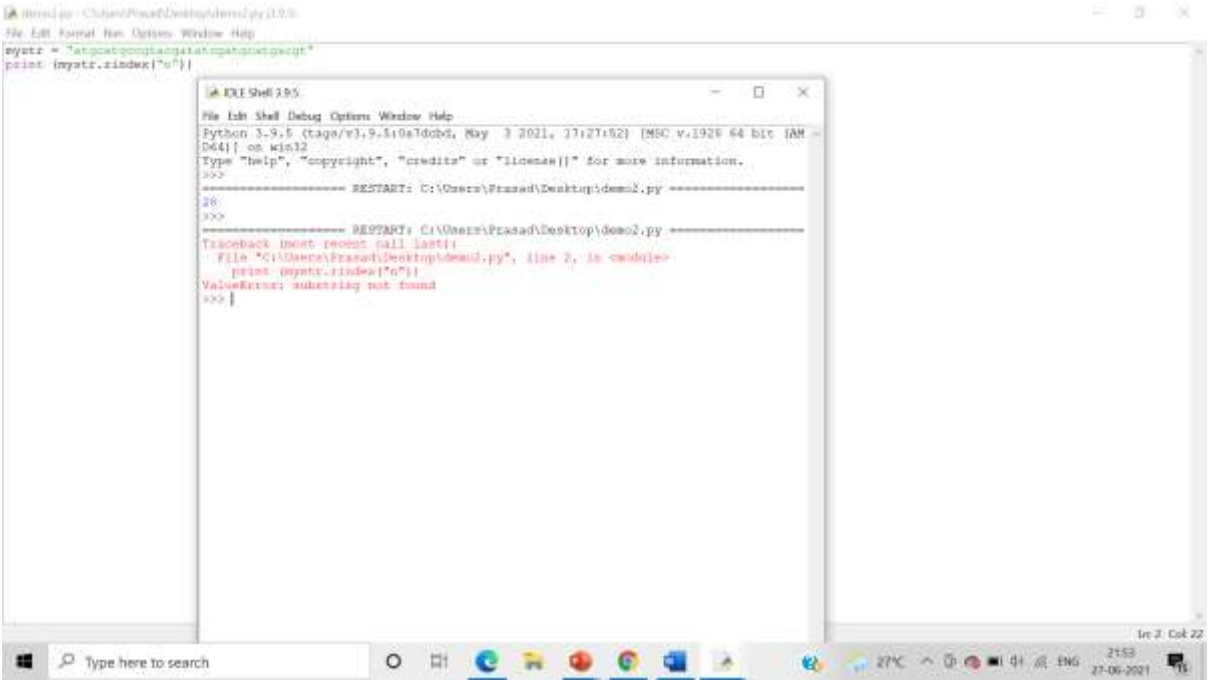

mystr = "atgcatgccgtacgatatcgatgcgatgacgt"
print (mystr.rfind("a"))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
30
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
-1
>>>
Type here to search

- index()


mystr = 'atgctactgctact'
print(mystr)
print(mystr.index("act",2,9))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
atgctactgctact
5
>>>
Type here to search

- rindex()

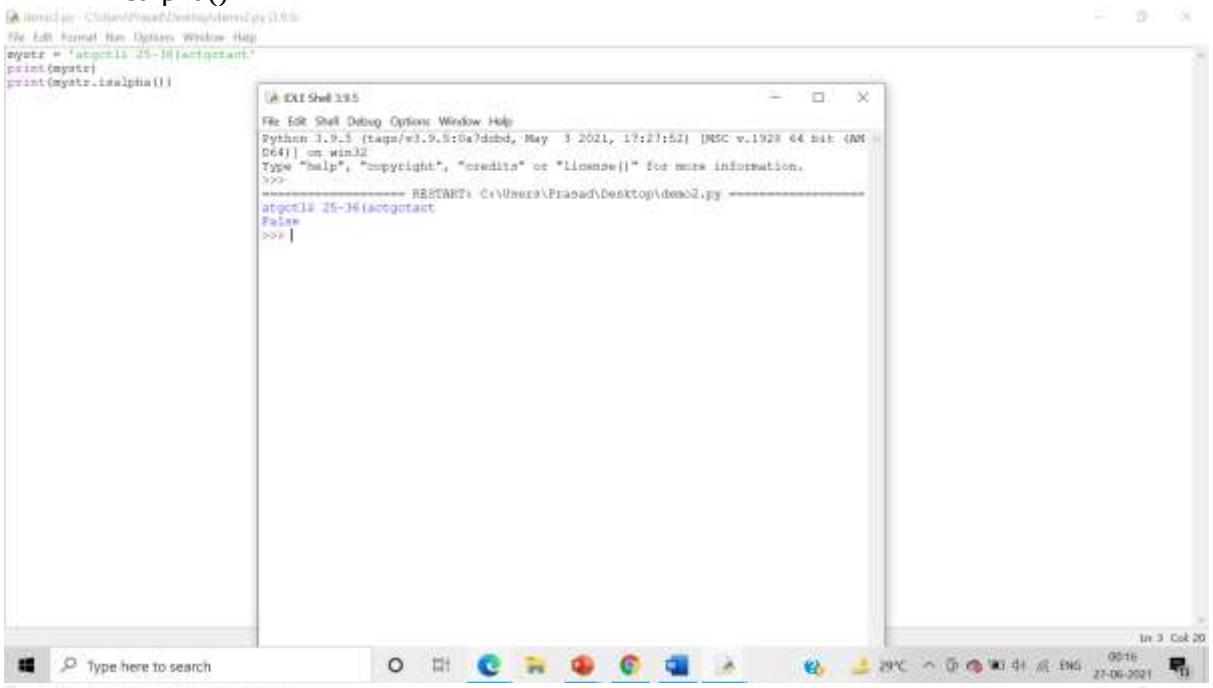

mystr = "atpcatgccgtacgatatcgatgcatgacgt"
print (mystr.rindex("c"))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
28
>>>
Ln: 4 Col: 0
Type here to search
27°C
ENG
21:53
27-06-2021

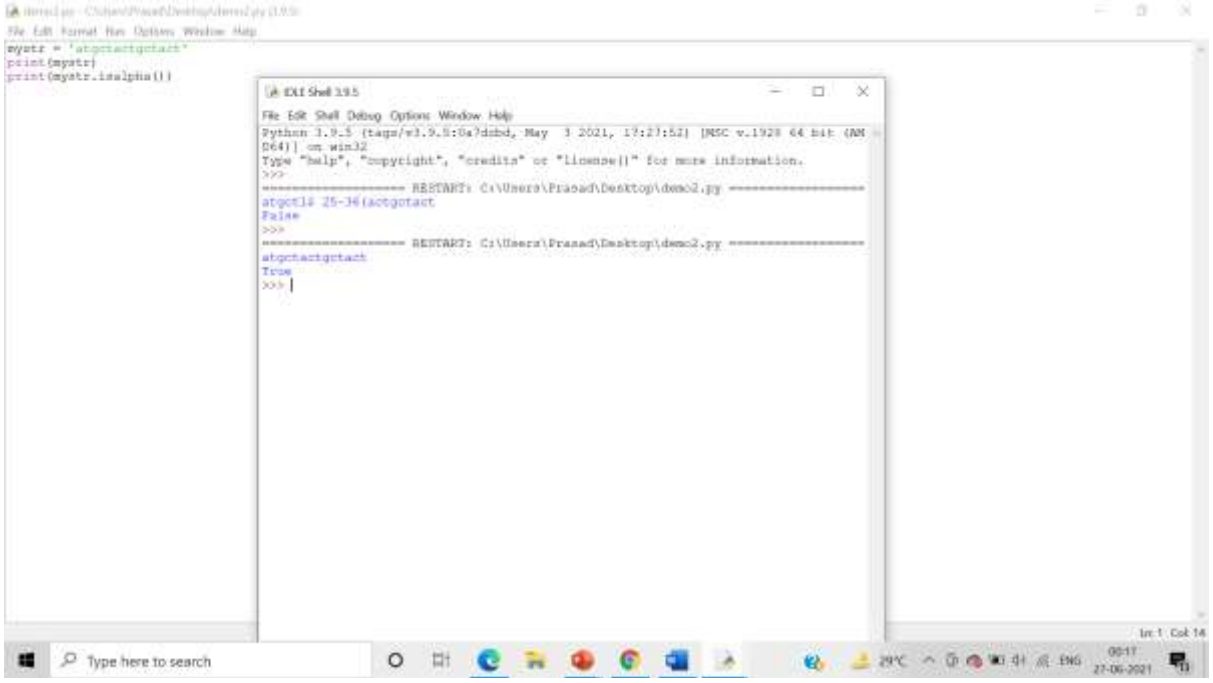

mystr = "atpcatgccgtacgatatcgatgcatgacgt"
print (mystr.rindex("n"))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
28
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
Traceback (most recent call last):
File "C:\Users\Prasad\Desktop\demo2.py", line 2, in <module>
print (mystr.rindex("n"))
ValueError: substring not found
>>>
Ln: 2 Col: 22
Type here to search
27°C
ENG
21:53
27-06-2021

vii. isalnum(), isalpha(), isdigit(), isidentifier(), islower(), isnumeric(), isspace, isupper(), istitle()

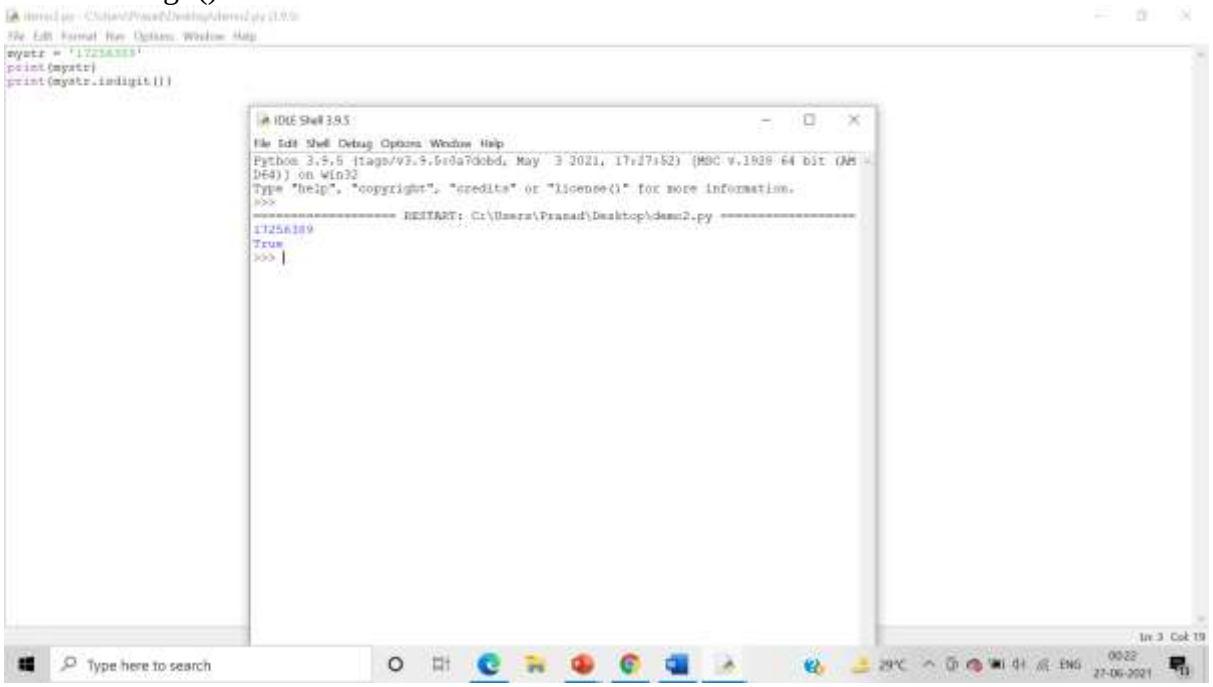
Algorithm:_ Use the . isalnum(), isalpha(), isdigit(), isidentifier(), islower(), isnumeric(), isspace, isupper(), istitle() string methods to check the class of the given string.

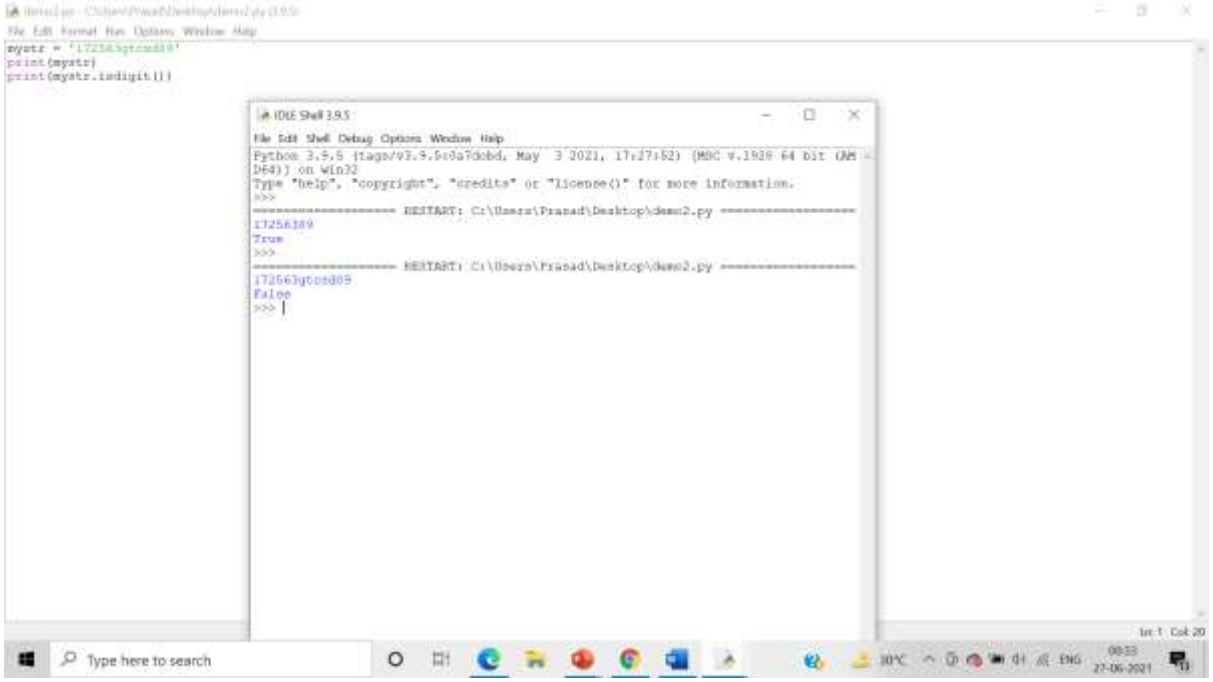
- isalpha()





- isdigit()


mystr = '17256389'
print(mystr)
print(mystr.isdigit())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
17256389
True
>>>
Type here to search


mystr = '17256389'
print(mystr)
print(mystr.isdigit())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
17256389
True
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
17256bytosd09
False
>>>
Type here to search

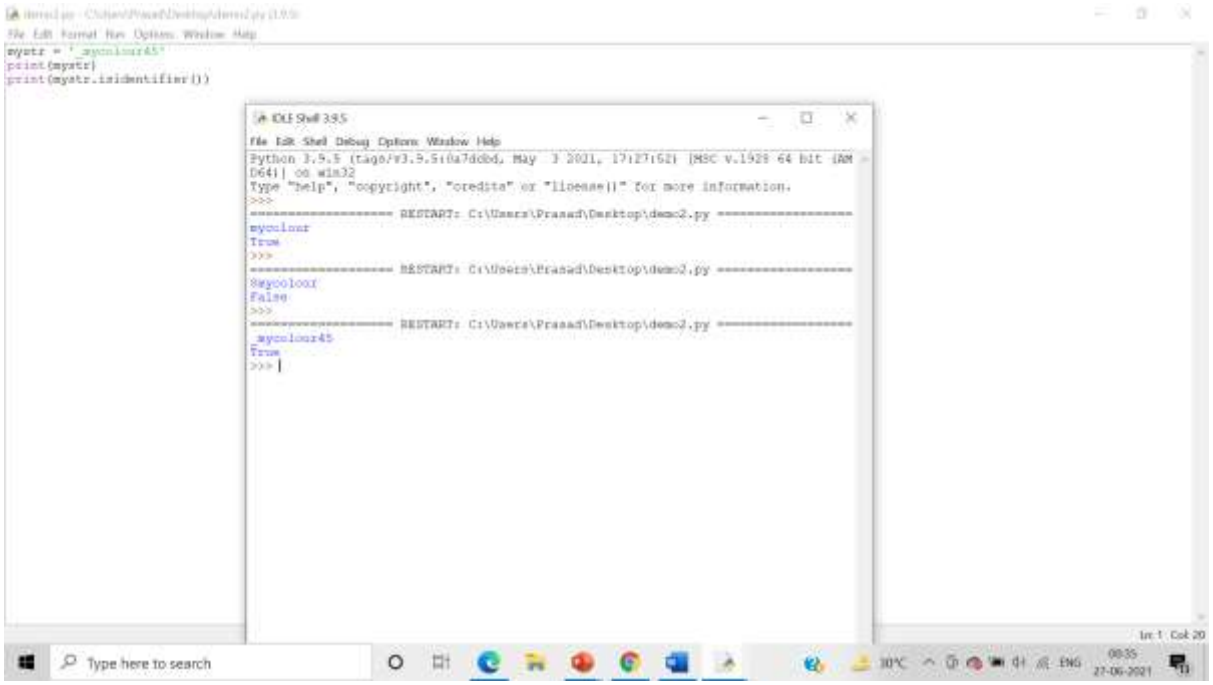
- isidentifier()

```
mystr = 'myccolour'
print(mystr)
print(mystr.isidentifier())
```

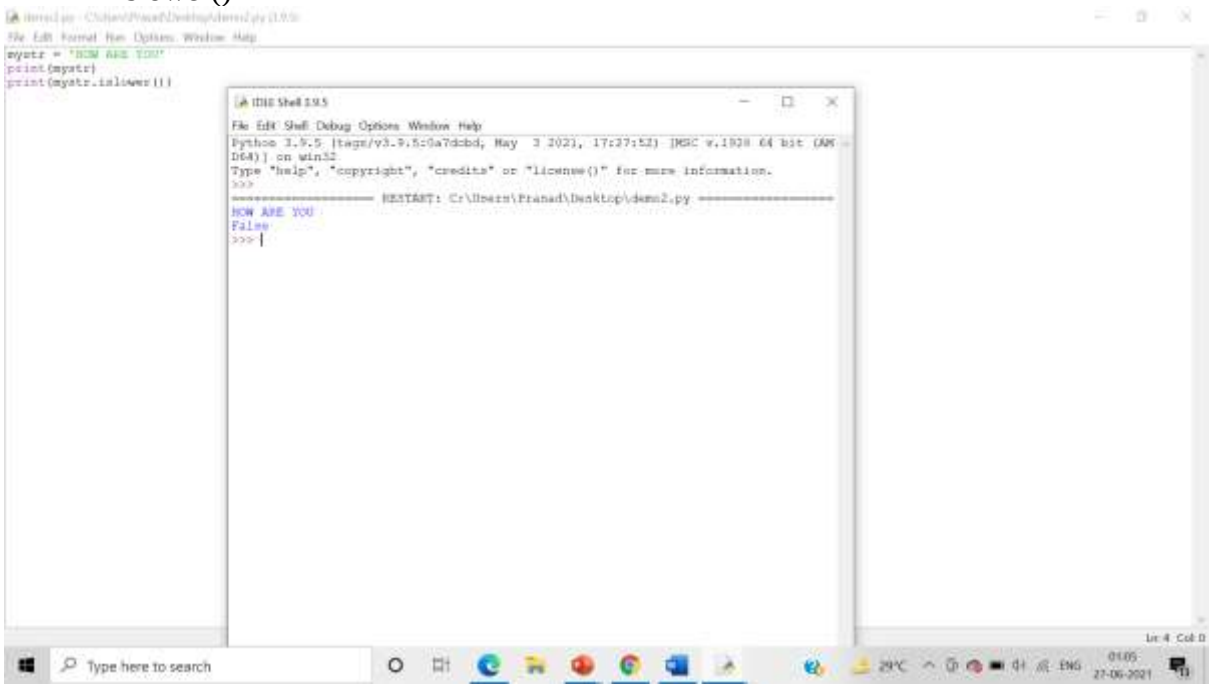
```
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May  3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
myccolour
True
>>>
```

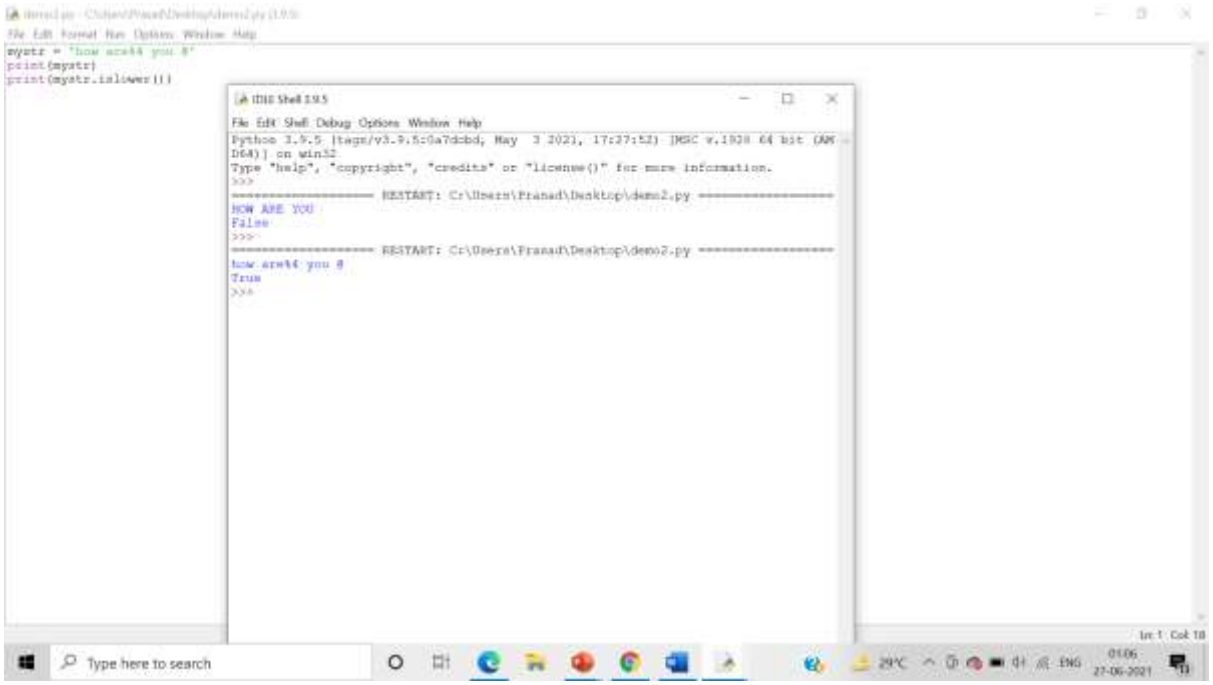
```
mystr = '3myccolour'
print(mystr)
print(mystr.isidentifier())
```

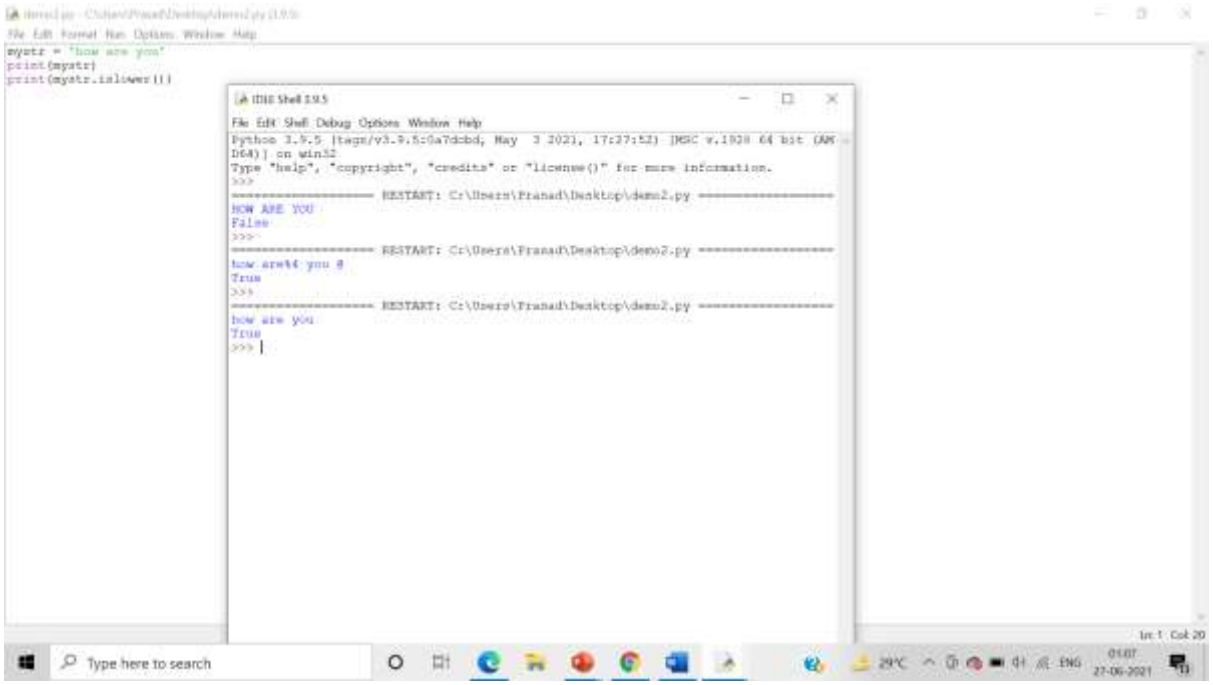
```
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May  3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
myccolour
True
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
3myccolour
False
>>>
```


mystr = '_mycolour45'
print(mystr)
print(mystr.isidentifier())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
mycolour
True
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
8mycolour
False
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
_mycolour45
True
>>>
Type here to search

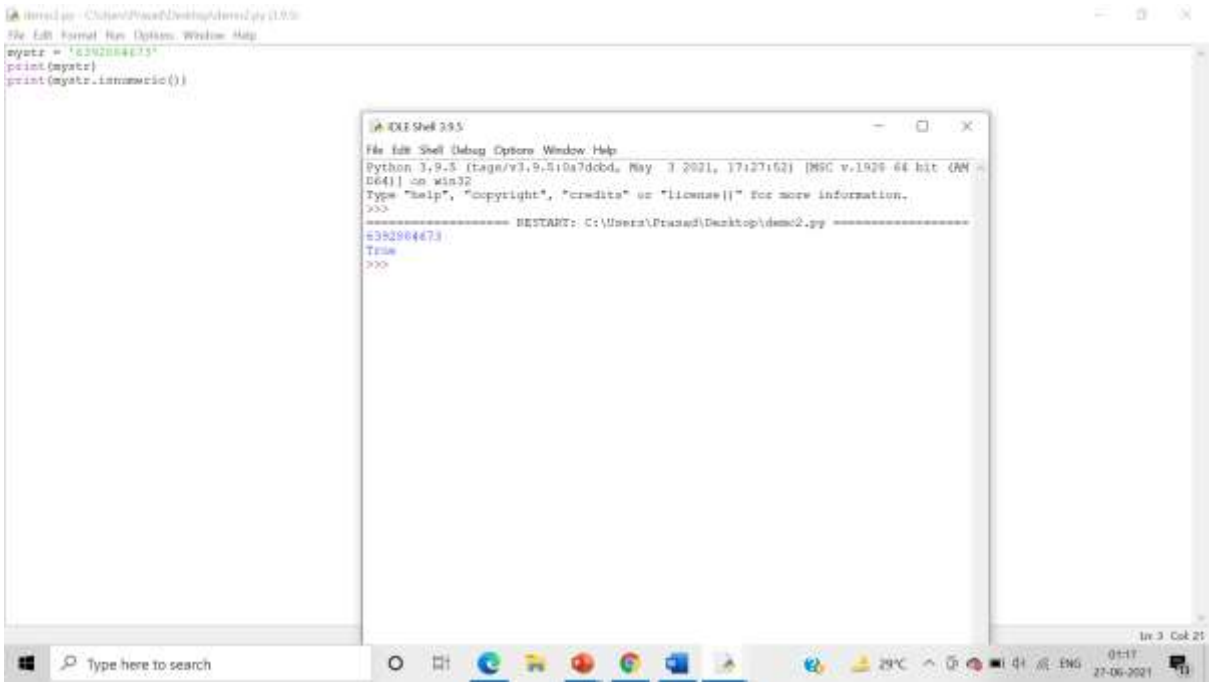
- islower()

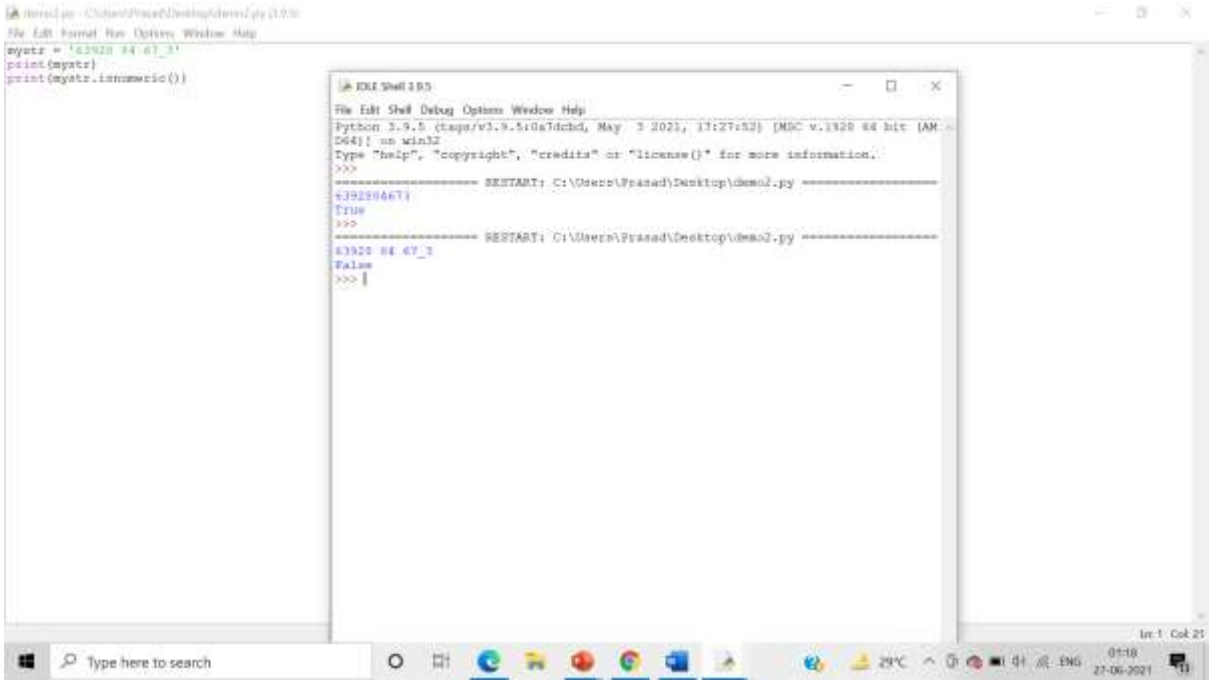

mystr = 'HOW ARE YOU'
print(mystr)
print(mystr.islower())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
HOW ARE YOU
False
>>>
Type here to search


File Edit Format Run Options Window Help
mystr = 'how are44 you 8'
print(mystr)
print(mystr.isisawer())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "licensee()" for more information.
>>>
========== RESTART: C:\Users\Pranad\Desktop\demo2.py ==========
HOW ARE YOU
False
>>>
========== RESTART: C:\Users\Pranad\Desktop\demo2.py ==========
how are44 you 8
True
>>>
Ln: 1 Col: 18
Type here to search
29°C
ENG
01:06
27-06-2021

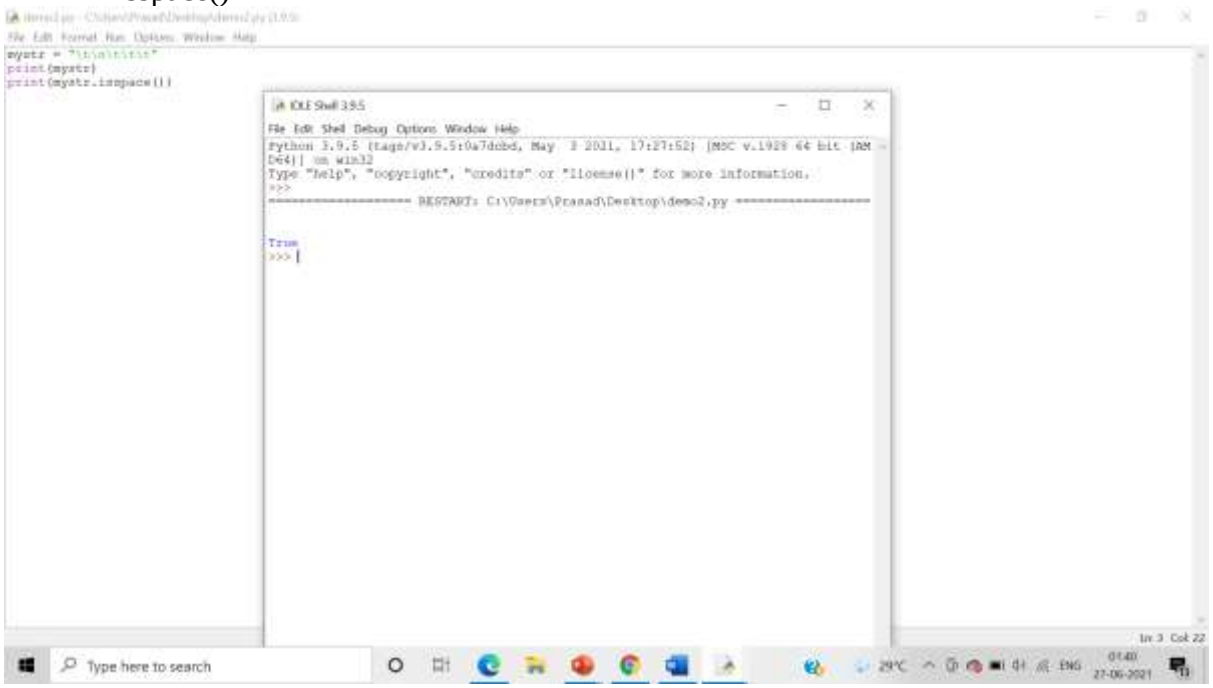

File Edit Format Run Options Window Help
mystr = 'how are you'
print(mystr)
print(mystr.isisawer())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "licensee()" for more information.
>>>
========== RESTART: C:\Users\Pranad\Desktop\demo2.py ==========
HOW ARE YOU
False
>>>
========== RESTART: C:\Users\Pranad\Desktop\demo2.py ==========
how are44 you 8
True
>>>
========== RESTART: C:\Users\Pranad\Desktop\demo2.py ==========
how are you
True
>>>
Ln: 1 Col: 20
Type here to search
29°C
ENG
01:07
27-06-2021

- isnumeric()


mystr = '6392984673'
print(mystr)
print(mystr.isnumeric())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
6392984673
True
>>>
Type here to search


mystr = '63920 84 67_3'
print(mystr)
print(mystr.isnumeric())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
6392984673
True
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
63920 84 67_3
False
>>>
Type here to search

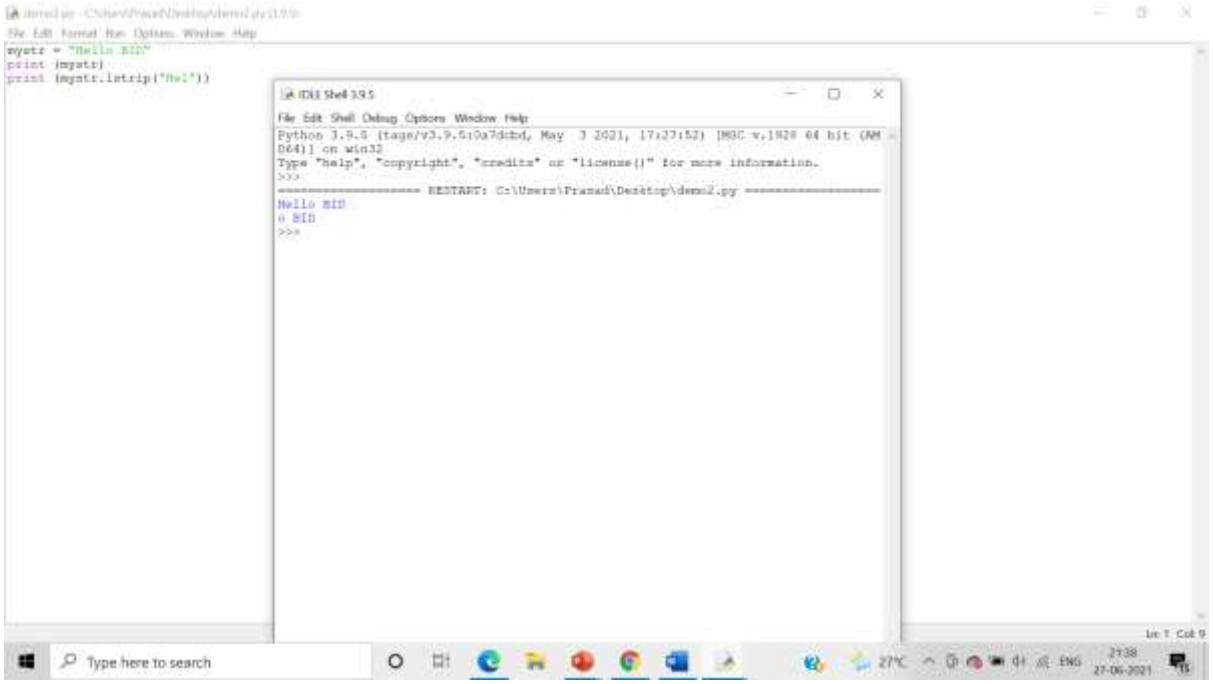
- isspace()

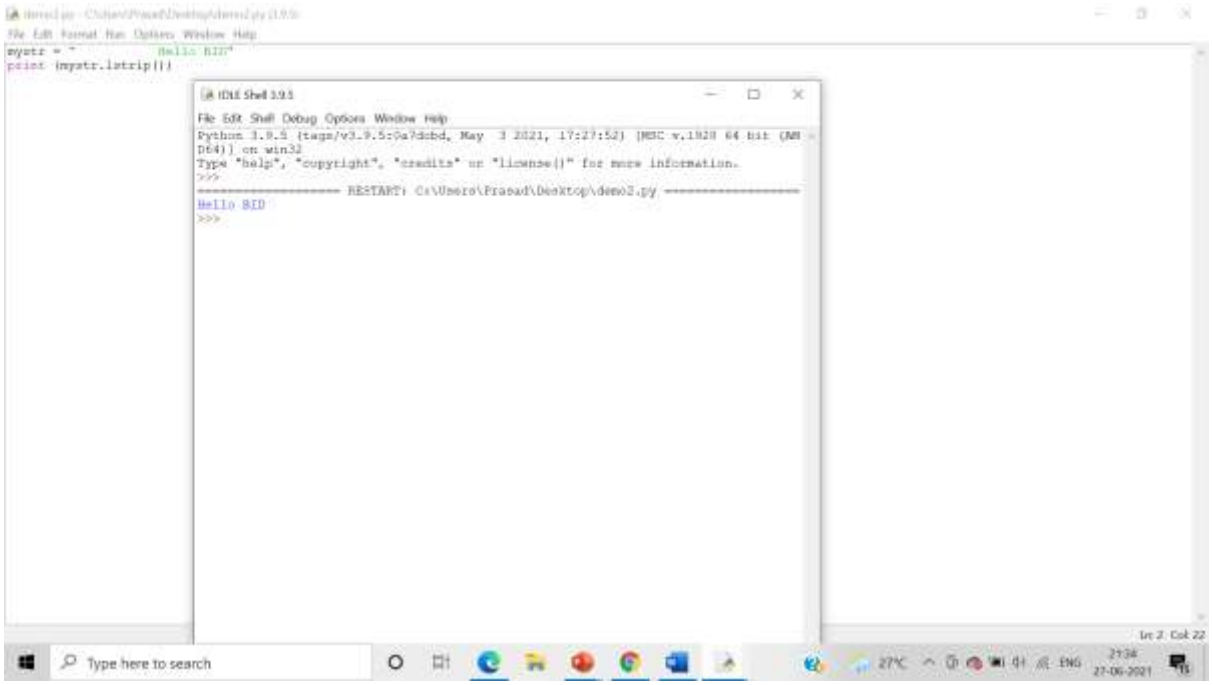


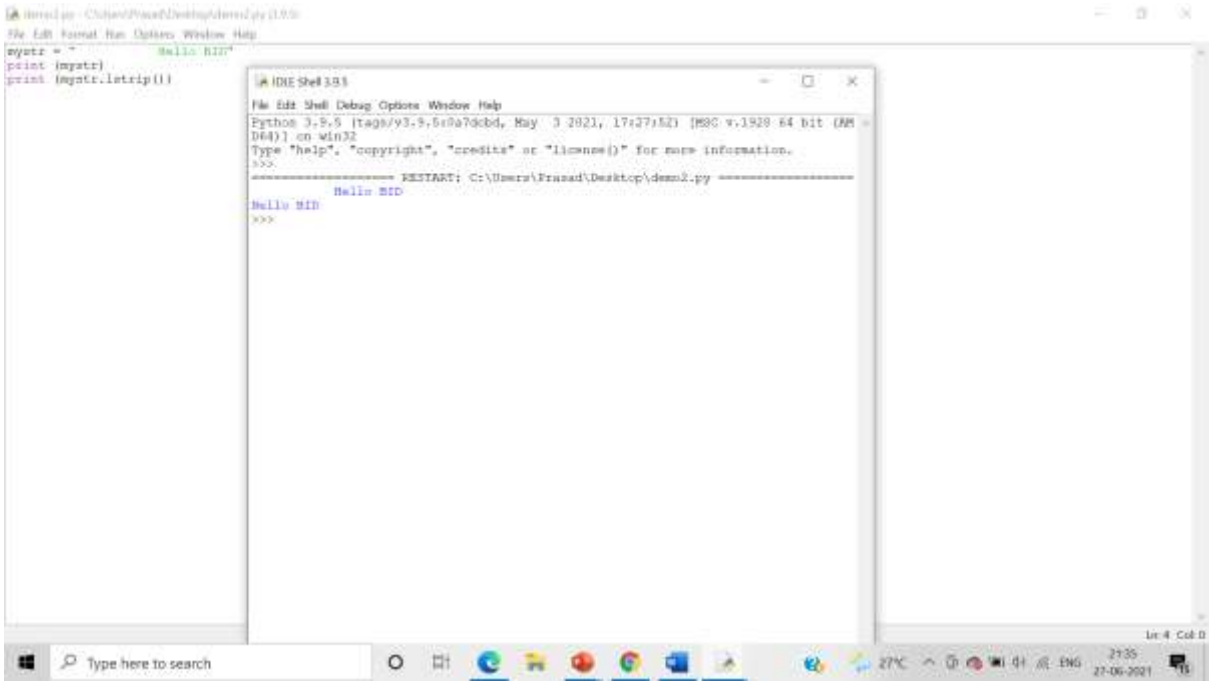
viii. lstrip, rstrip, strip

Algorithm:- Use the lstrip, rstrip, strip to alter or modify the given string.

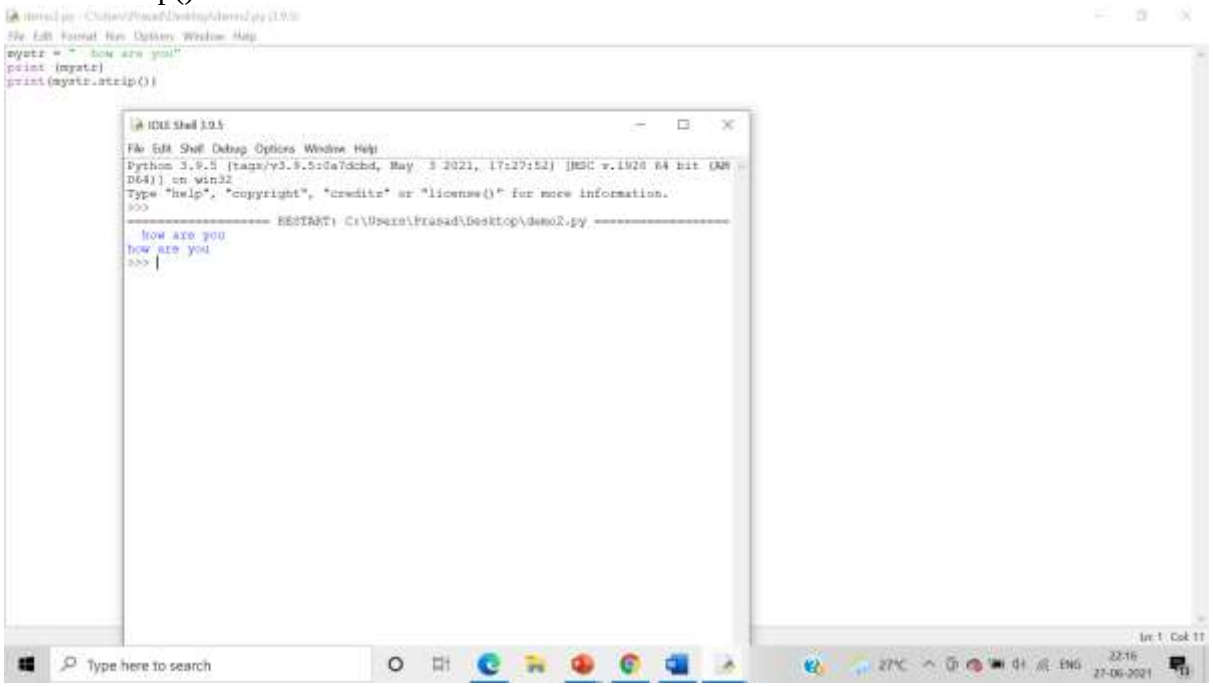
- lstrip




mystr = " Hello BID"
print (mystr.lstrip())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
Hello BID
>>>
Type here to search


mystr = " Hello BID"
print (mystr)
print (mystr.lstrip())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
  Hello BID
Hello BID
>>>
Type here to search

- strip()


mystr = " how are you"
print (mystr)
print(mystr.strip())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
  how are you
how are you
>>>
Type here to search

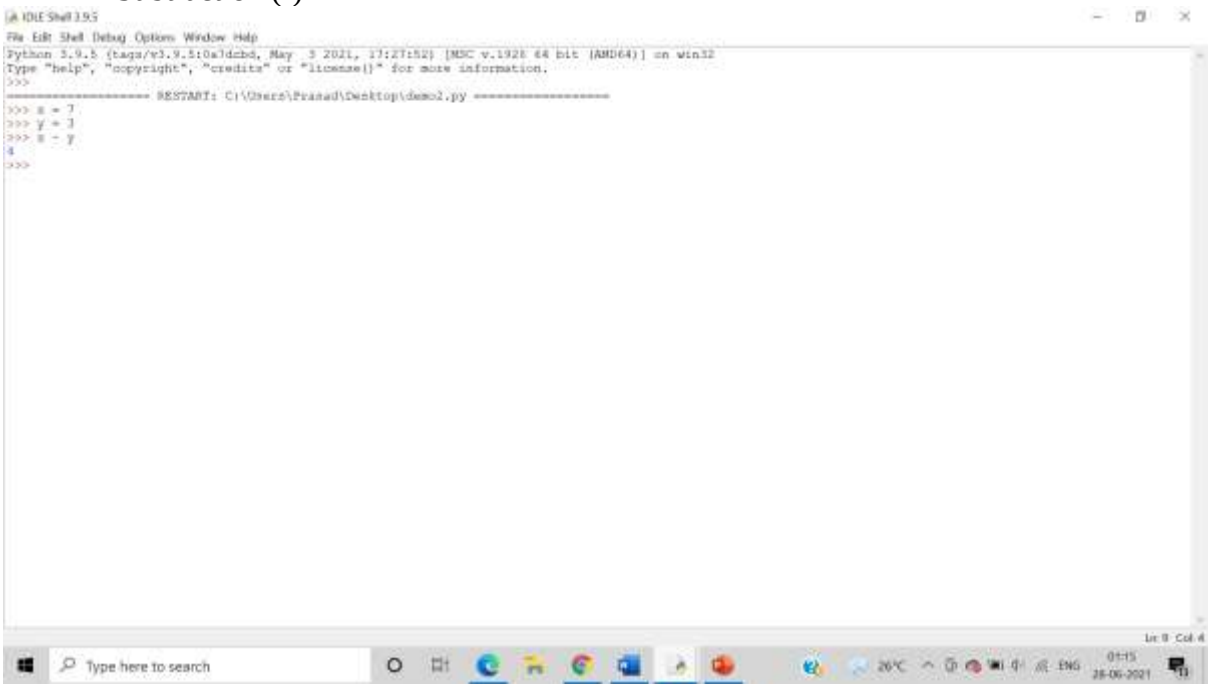

mystr = "!!how are you!!"
print (mystr)
print(mystr.strip("!!"))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
!!how are you!!
how are you
>>>
Type here to search

6. Write set of programs for demonstrating the usage of following Operators
Algorithm: - We use the arithmetic operators (+,-,*,/,**,//) to perform the operations of addition, subtraction, multiplication, division, floor division as well as to find the exponent between 2 variables ‘a’ and ‘b’

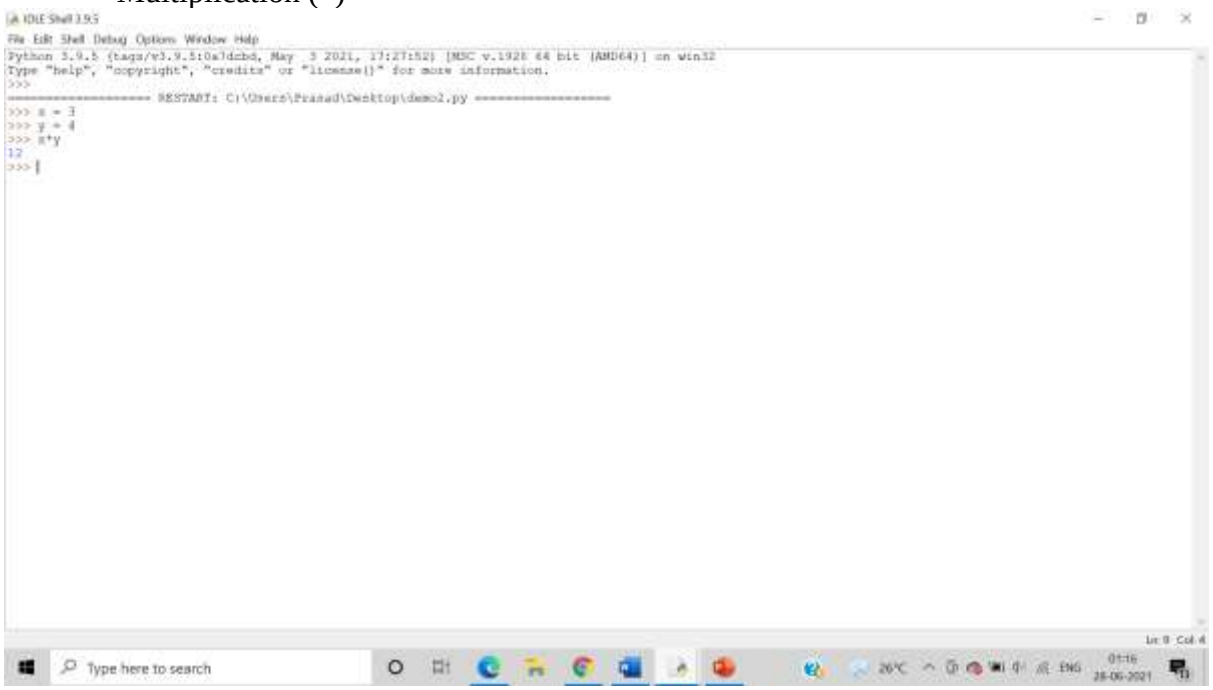
i. Arithmetic operators

- Addition (+)

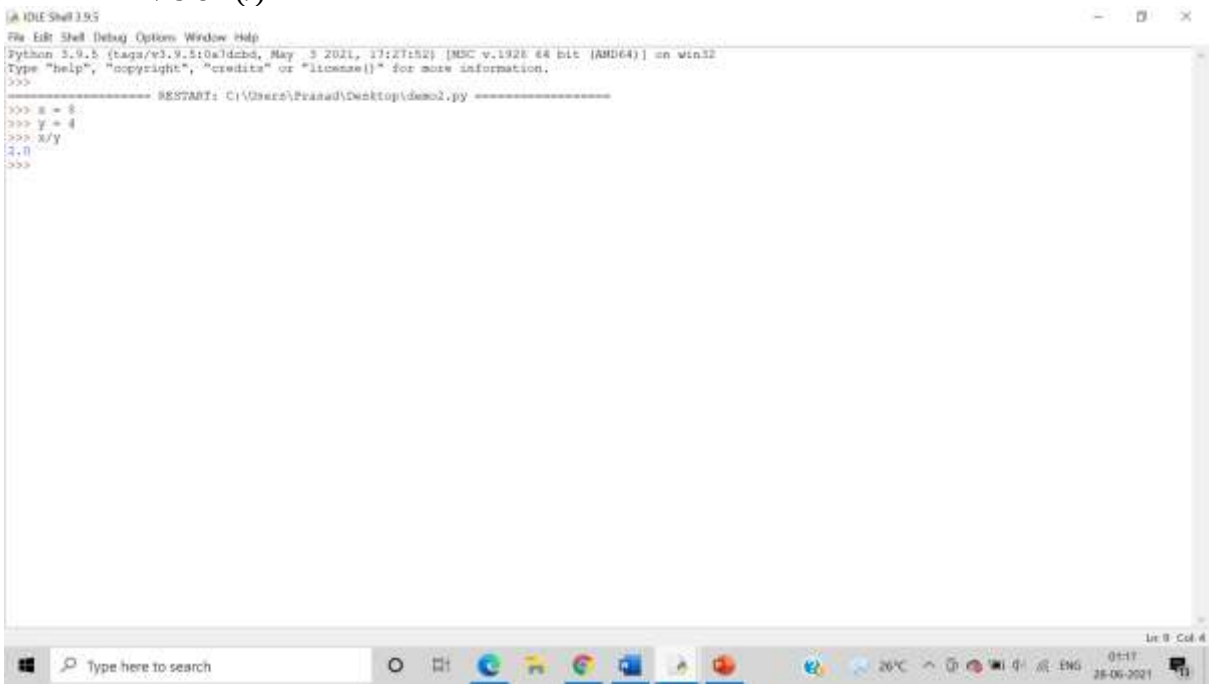
- Subtraction (-)



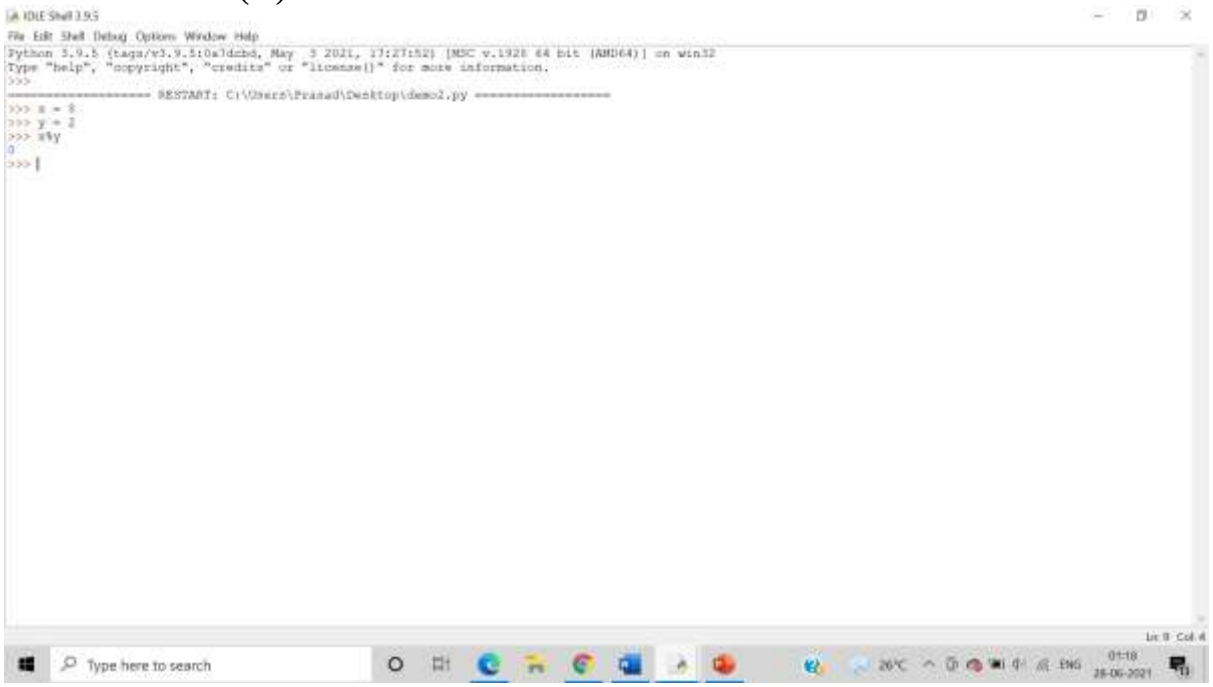
- Multiplication (*)



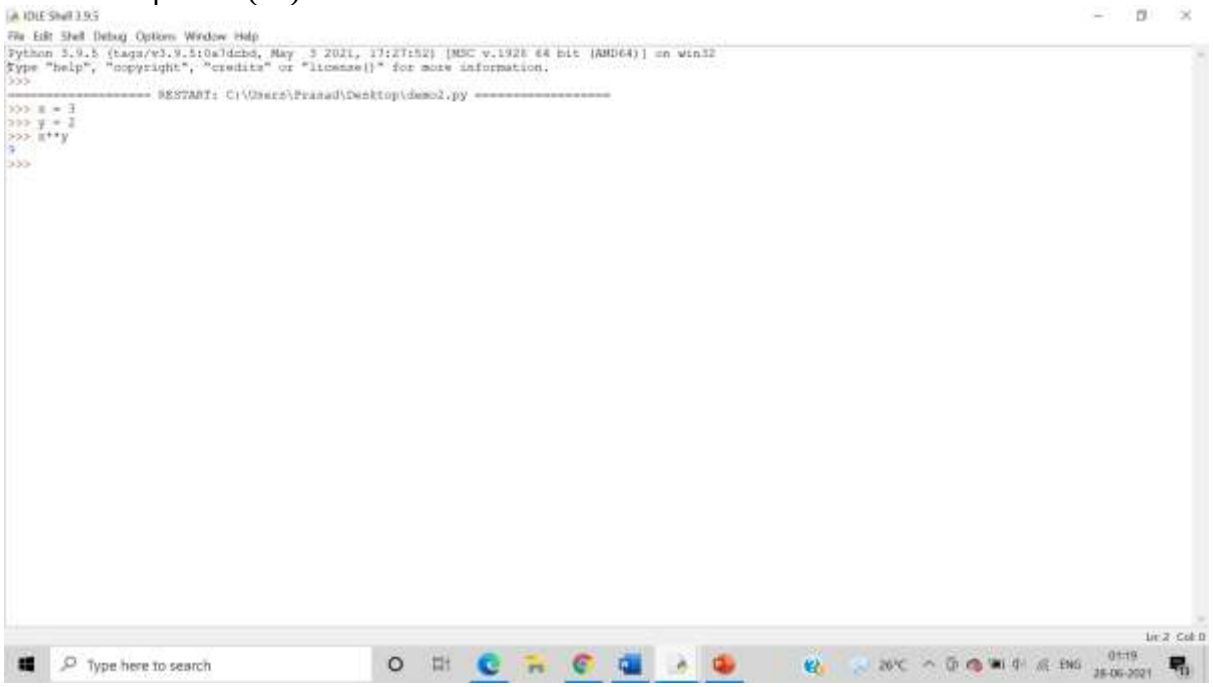
- Division (/)



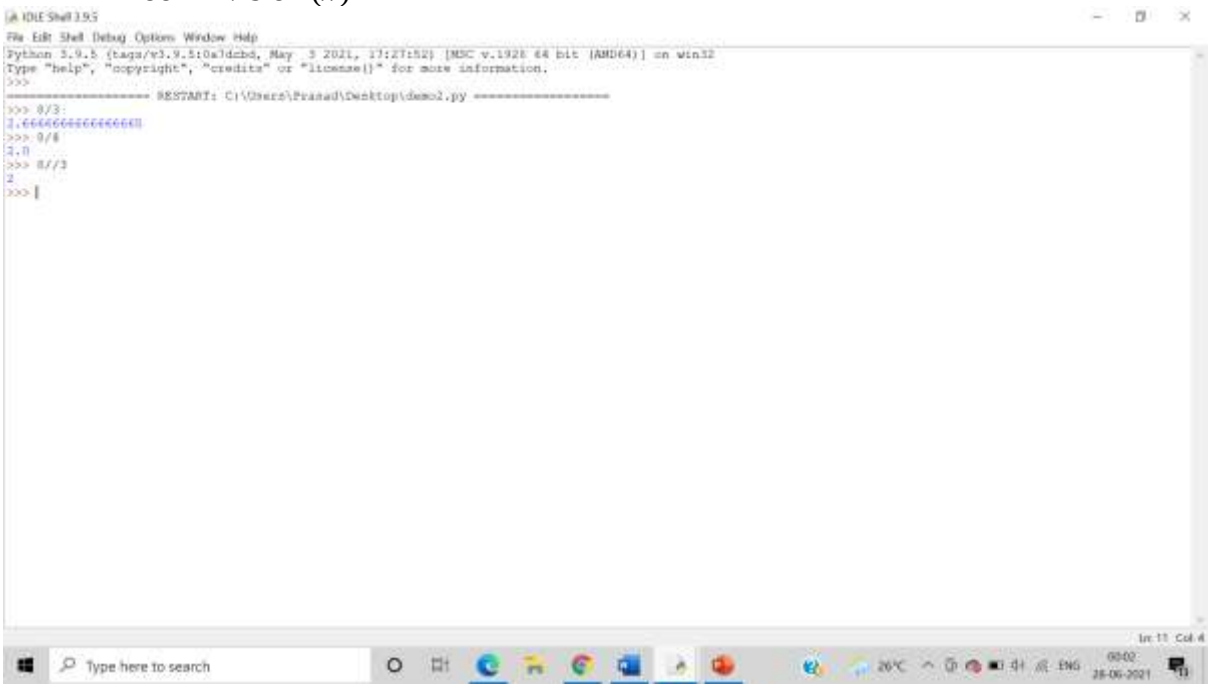
- Modulus (%)

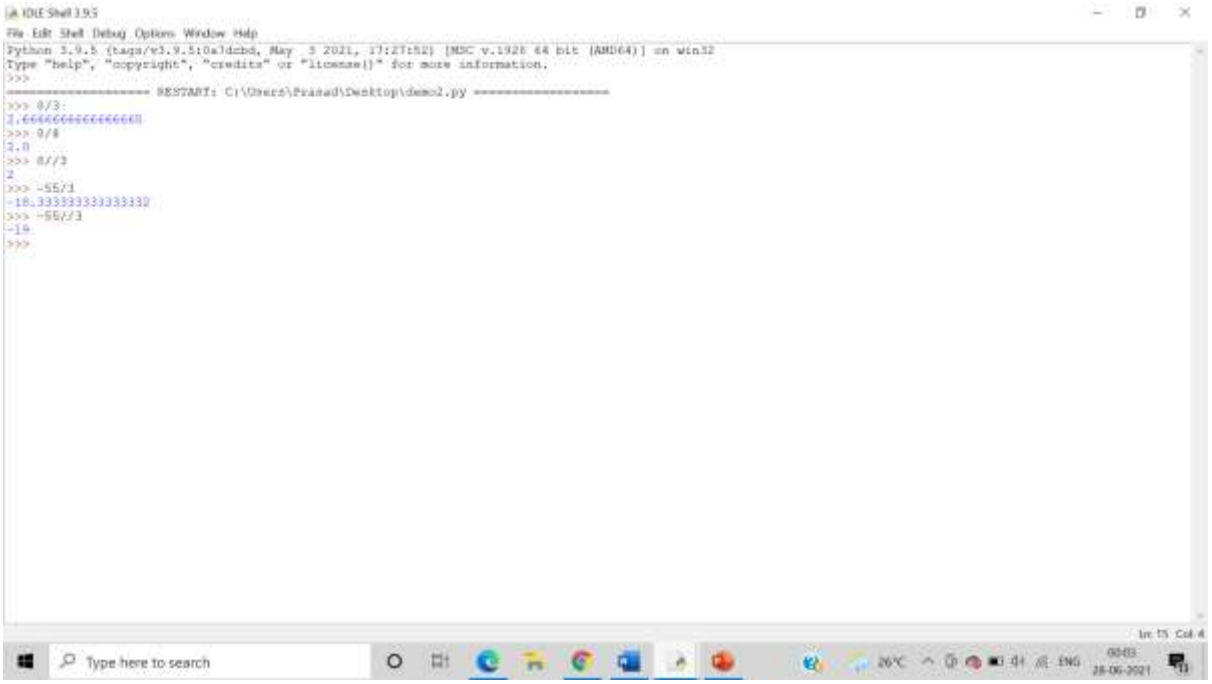


- Exponent (**)



- Floor Division (//)



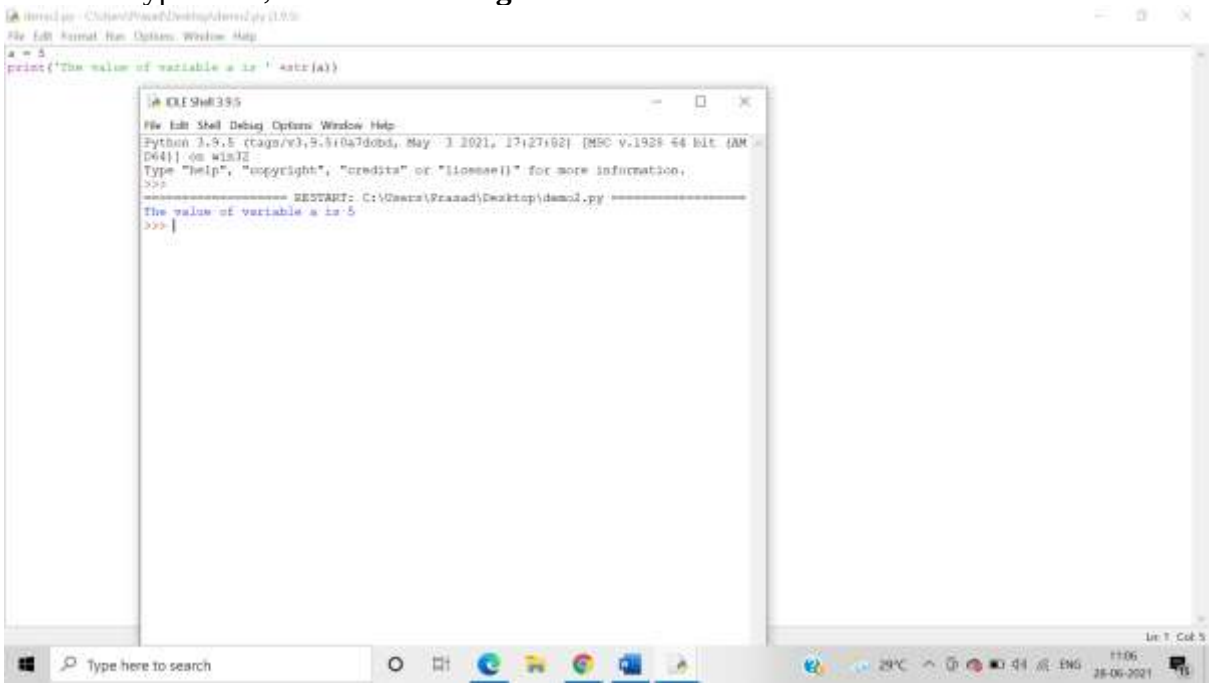


ii. Assignment operators

Algorithm: - We use the assignment operators (=, +=, -=,*=, /=, **=, //=) to perform the operations of addition, subtraction, multiplication, division, floor division as well as to find the exponent of the variable a with a integer.

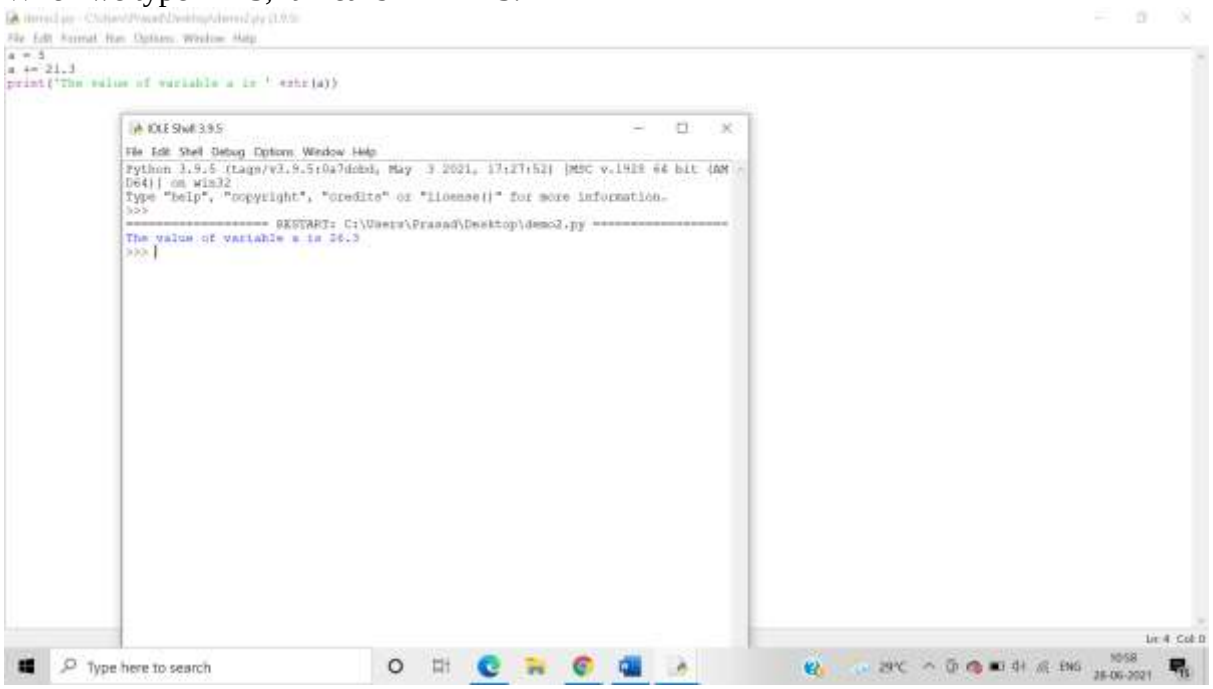
- =

When we type x = 5, that time we **assign** value of x as 5.



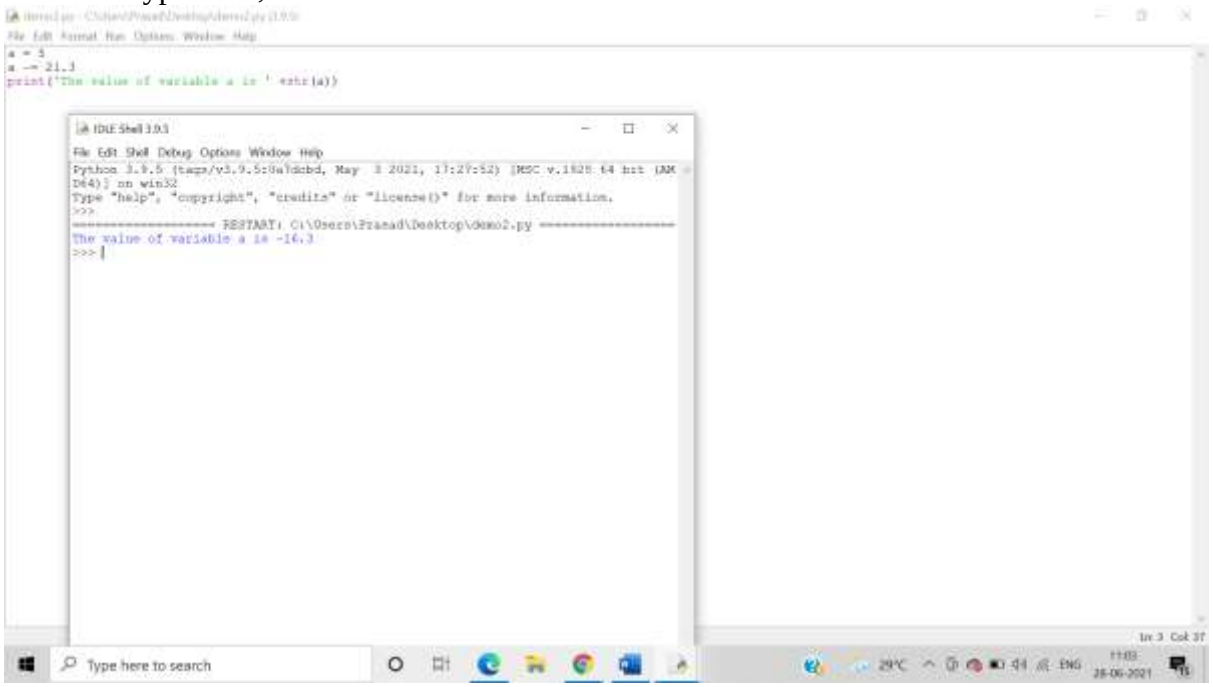
- +=

When we type x+=5, it means x = x + 5.



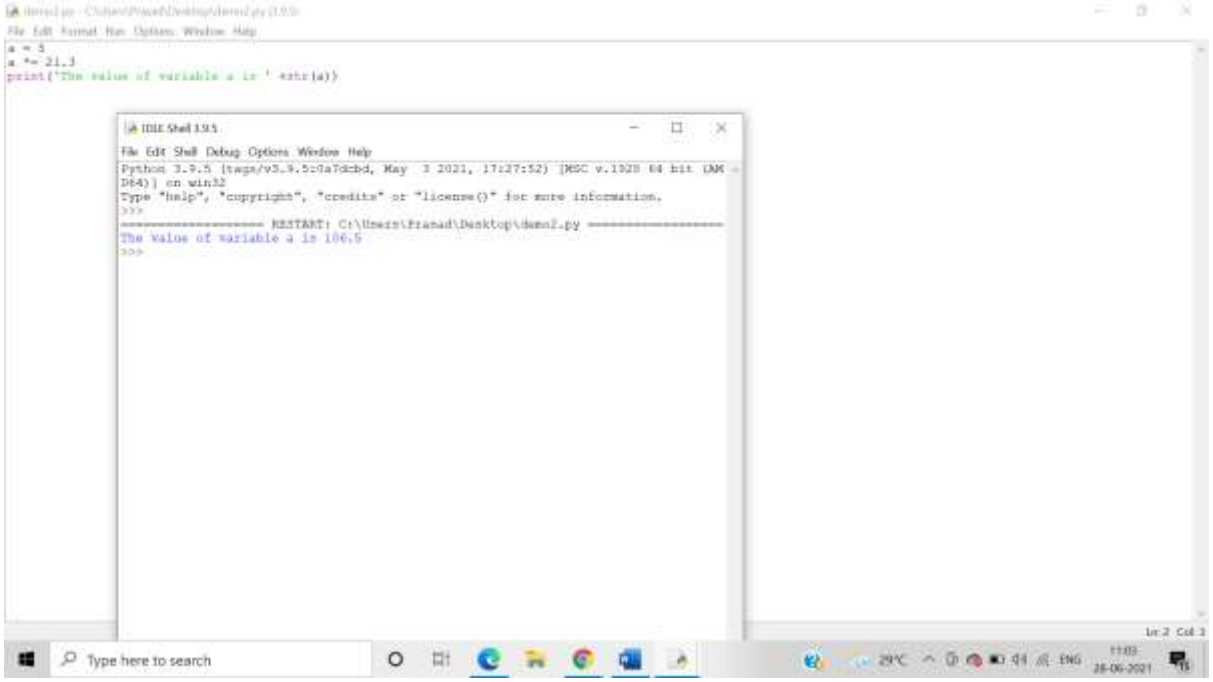
- -=

When we type x-=5, it means x = x - 5.



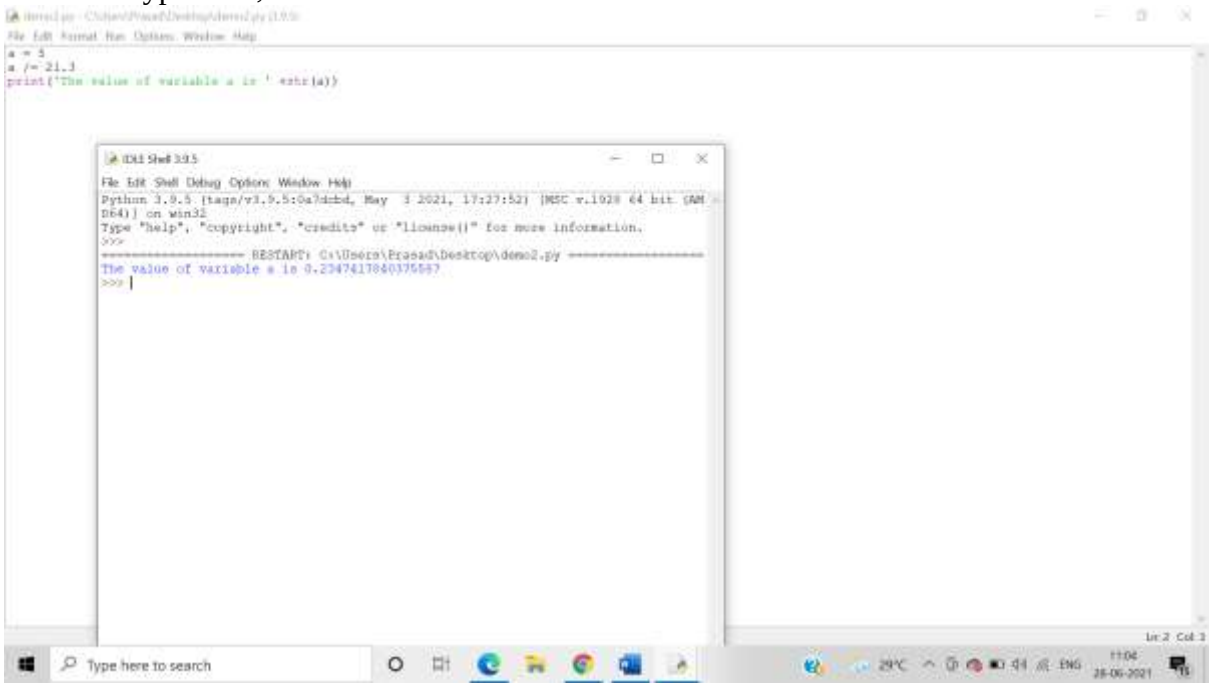
- *=

When we type x*=5, it means x = x * 5 .



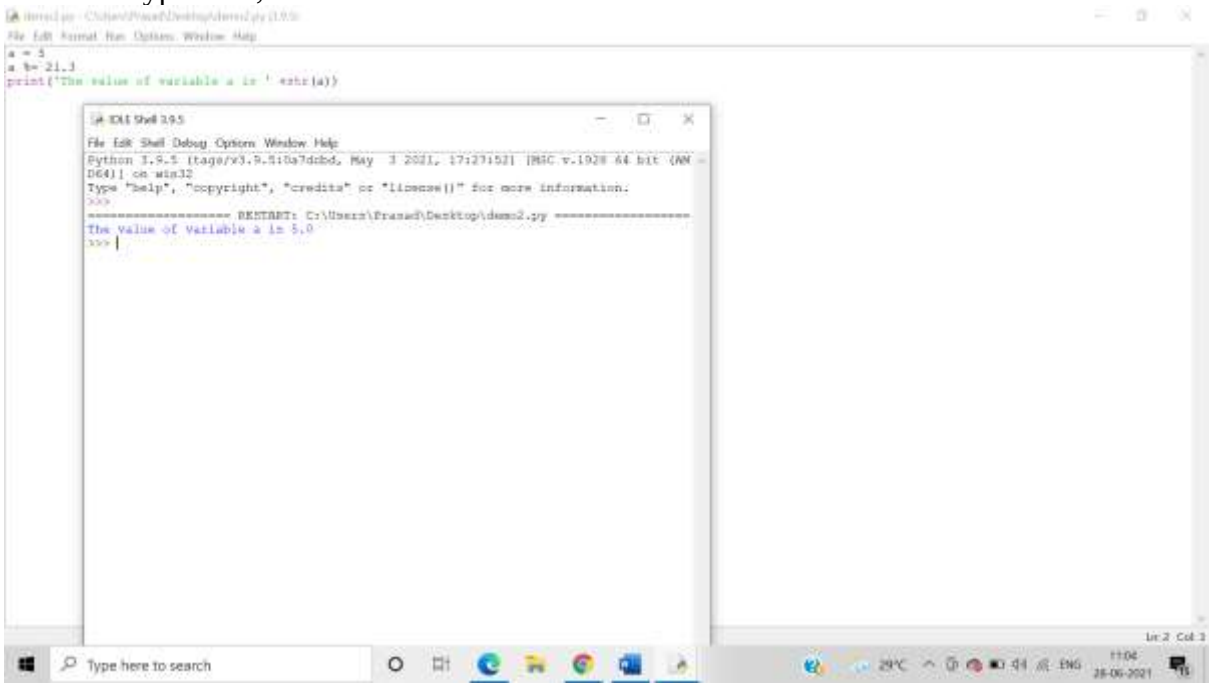
- /=

When we type x/=5, it means x = x / 5.



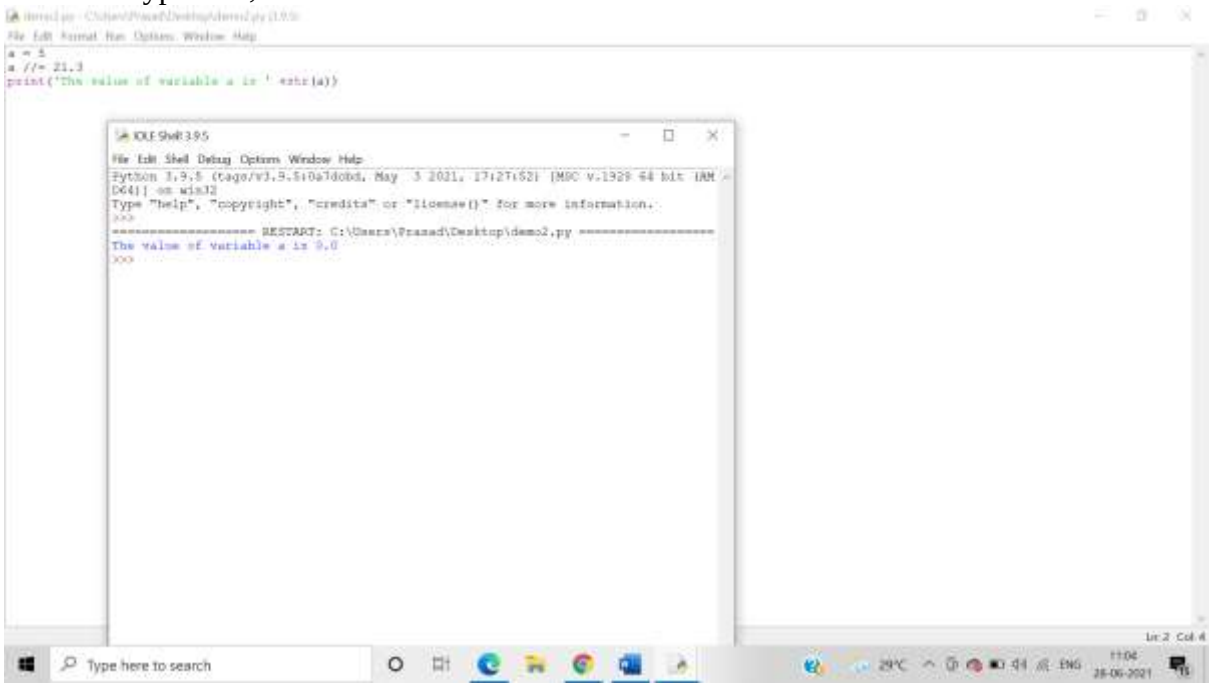
- %=

When we type x%5, it means x = x % 5.



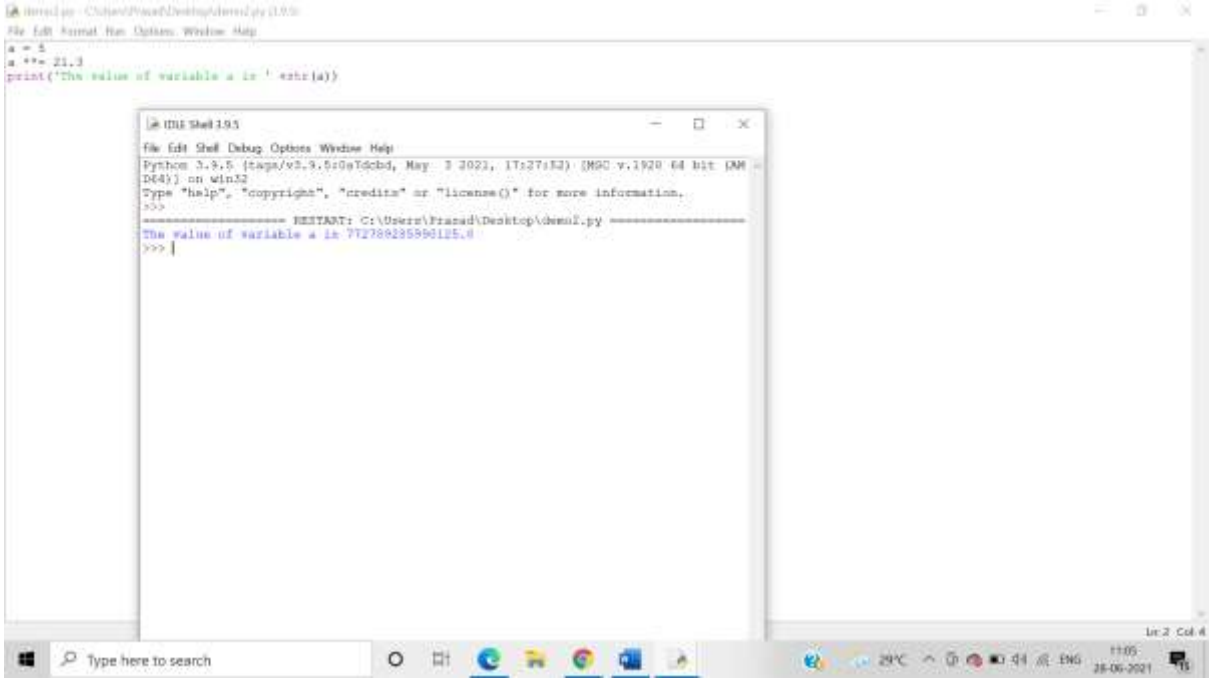
- //=

When we type x//=, it means x = x // 5.



- **=

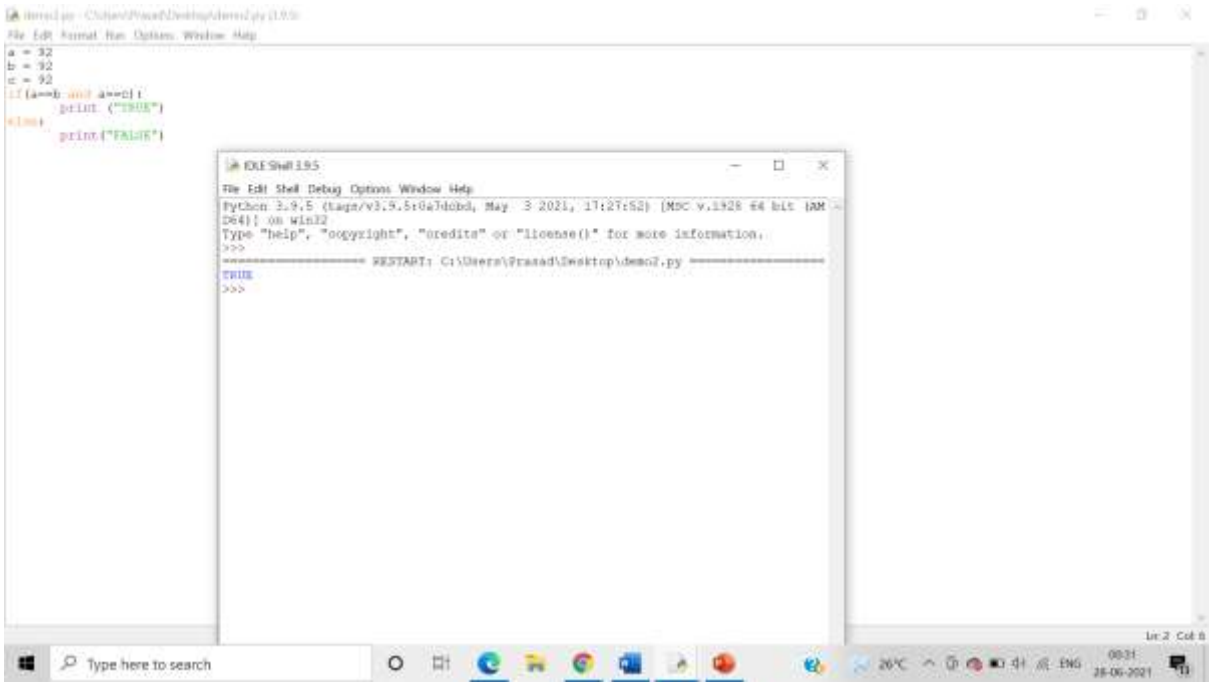
When we type x**=, it means x = x**5



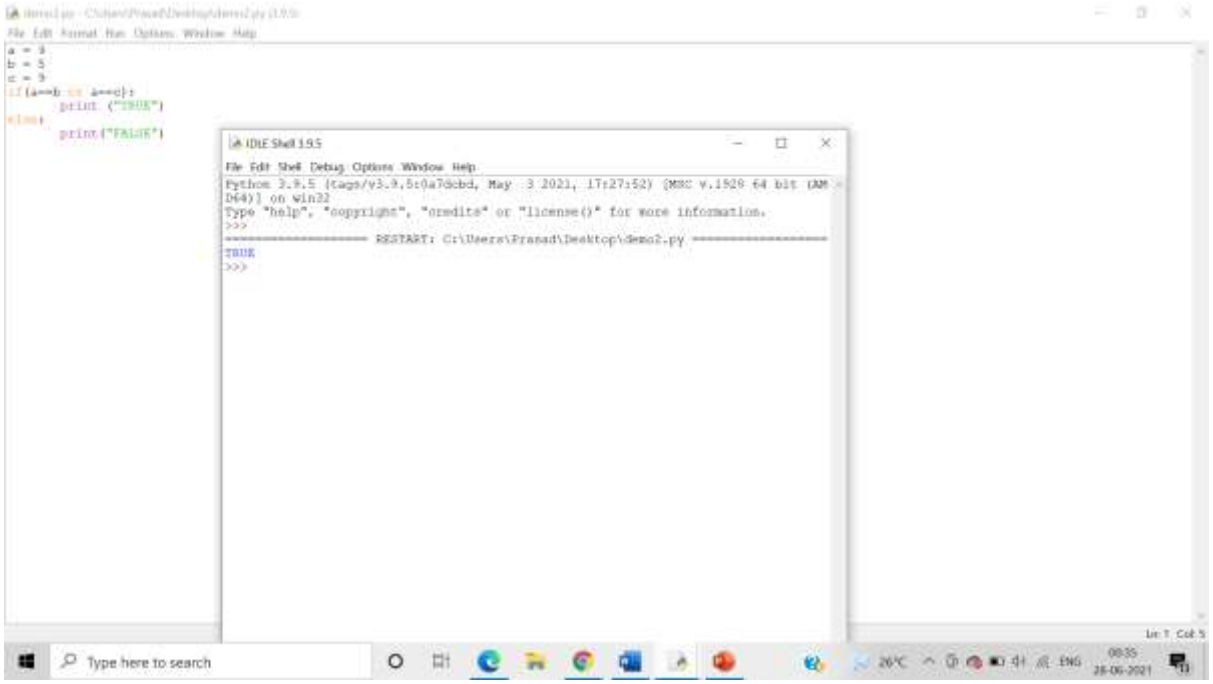
iii. Logical operators

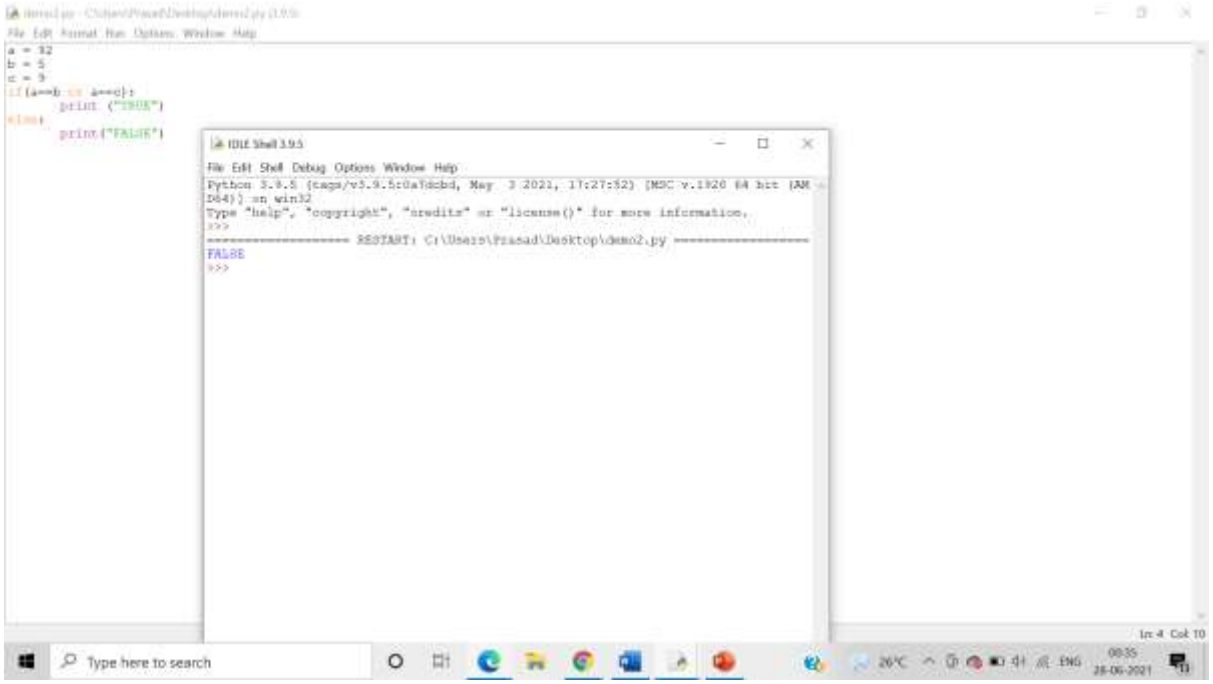
Algorithm: - Logical operators are used on conditional statements (either True or False). They perform **Logical AND, Logical OR** and **Logical NOT** operations. In a Logical AND operator Logical operator returns True if both the operands are True else it returns False. In a Logical OR operator**,** Logical or operator returns True if either of the operands is True. Logical not operator work with the single Boolean value. If the Boolean value is True it returns False and vice-versa.

- AND

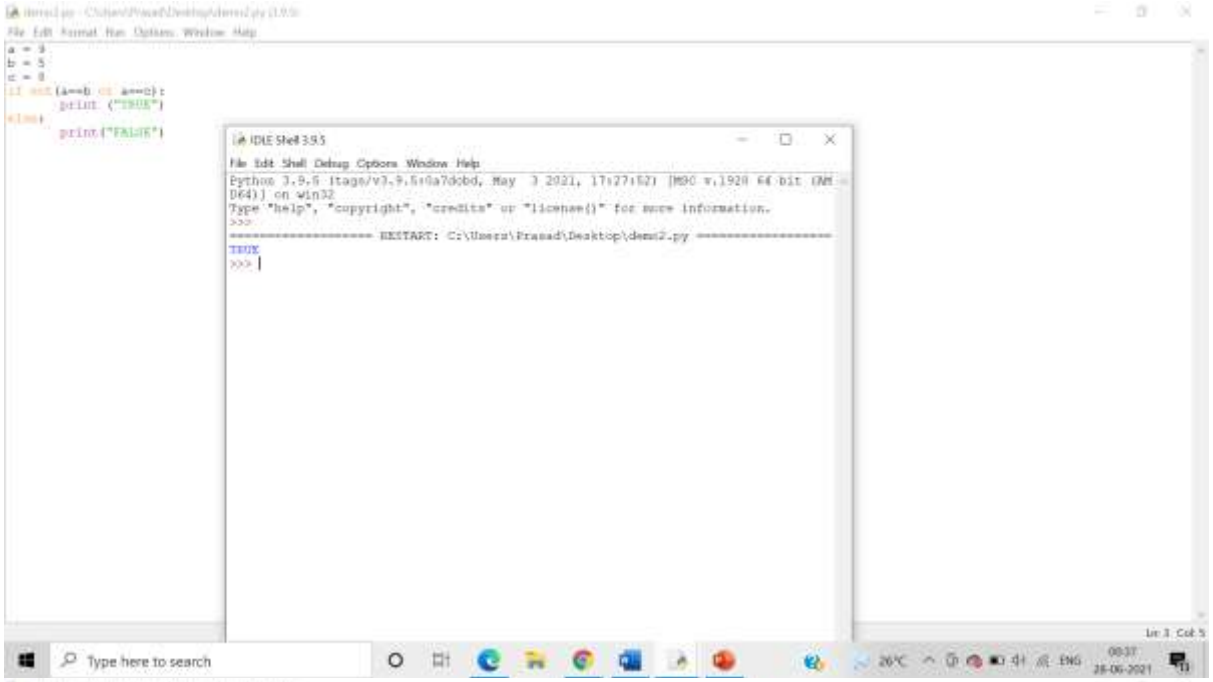


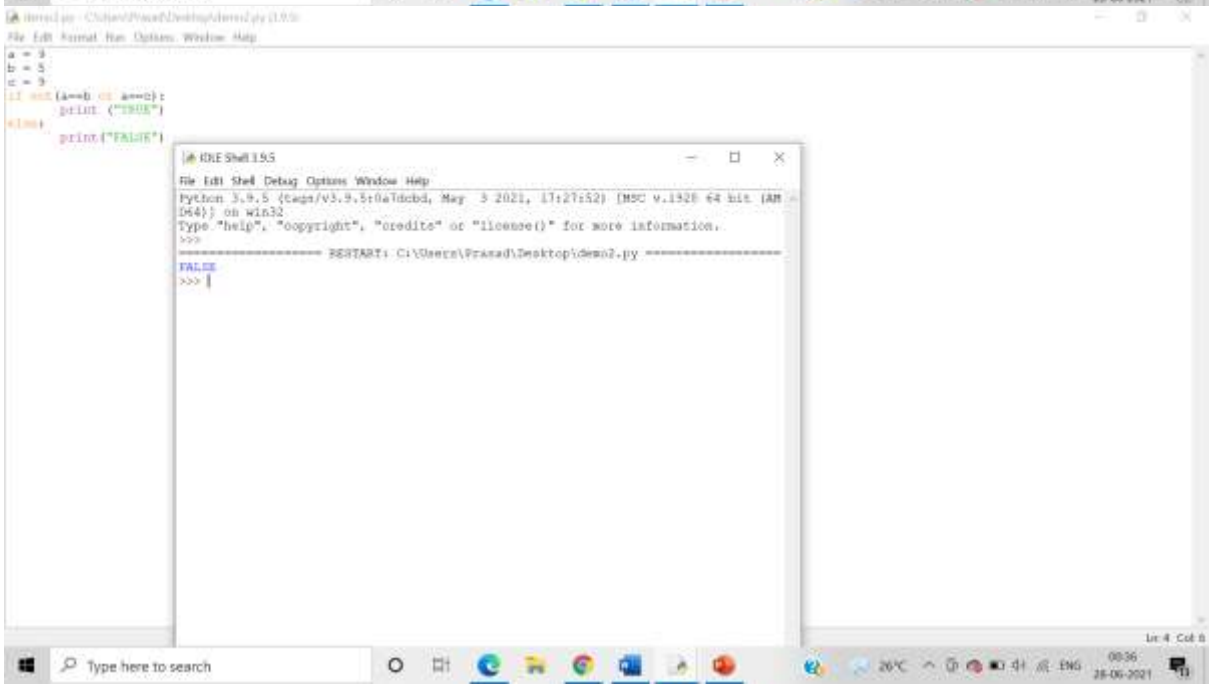
- OR


a = 9
b = 5
c = 9
print ("TRUE")
print("FALSE")
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
TRUE
>>>
Type here to search


a = 32
b = 5
c = 9
print ("TRUE")
print("FALSE")
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
FALSE
>>>
Type here to search

- NOT

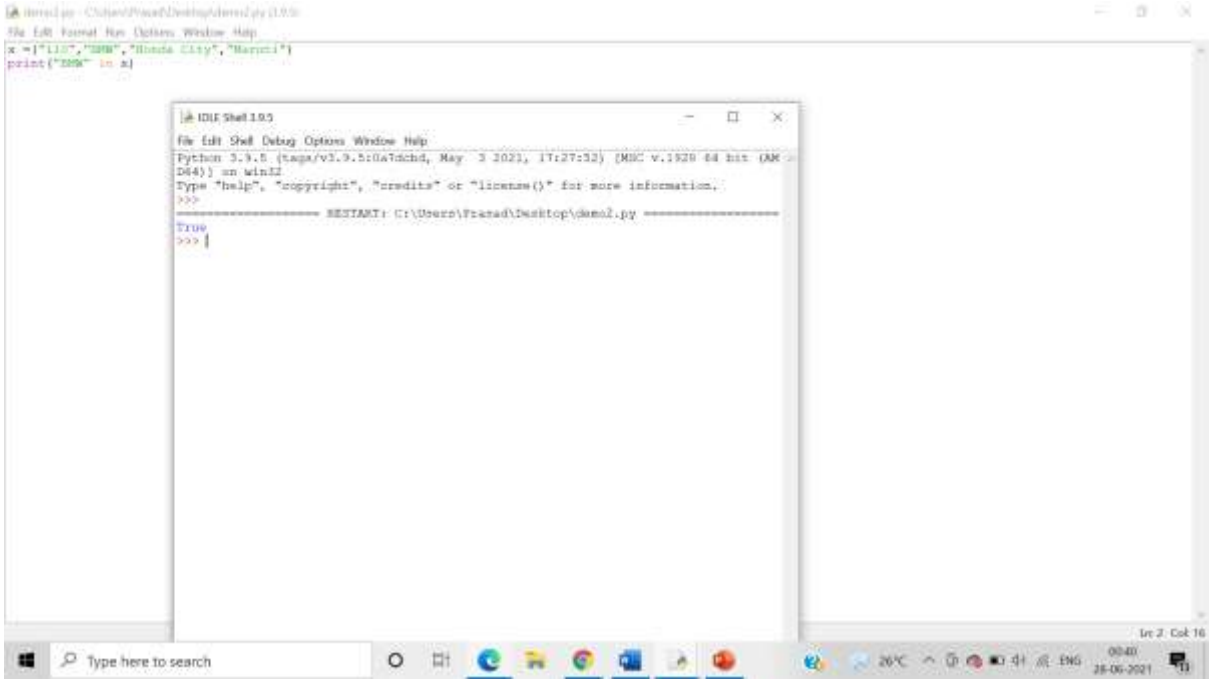

a = 3
b = 5
c = 3
if not(a==b or a==c):
print ("TRUE")
else:
print("FALSE")
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
TRUE
>>>
Type here to search

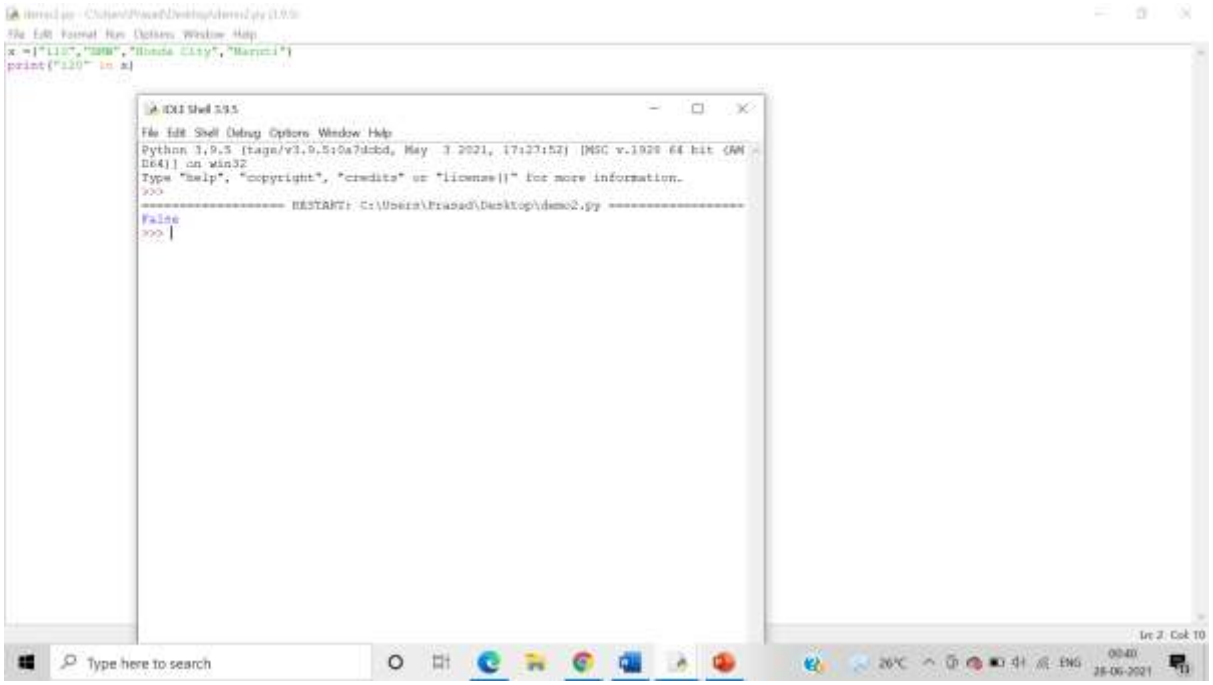

a = 3
b = 5
c = 3
if not(a==b or a==c):
print ("TRUE")
else:
print("FALSE")
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
FALSE
>>>
Type here to search

iv. Membership operators

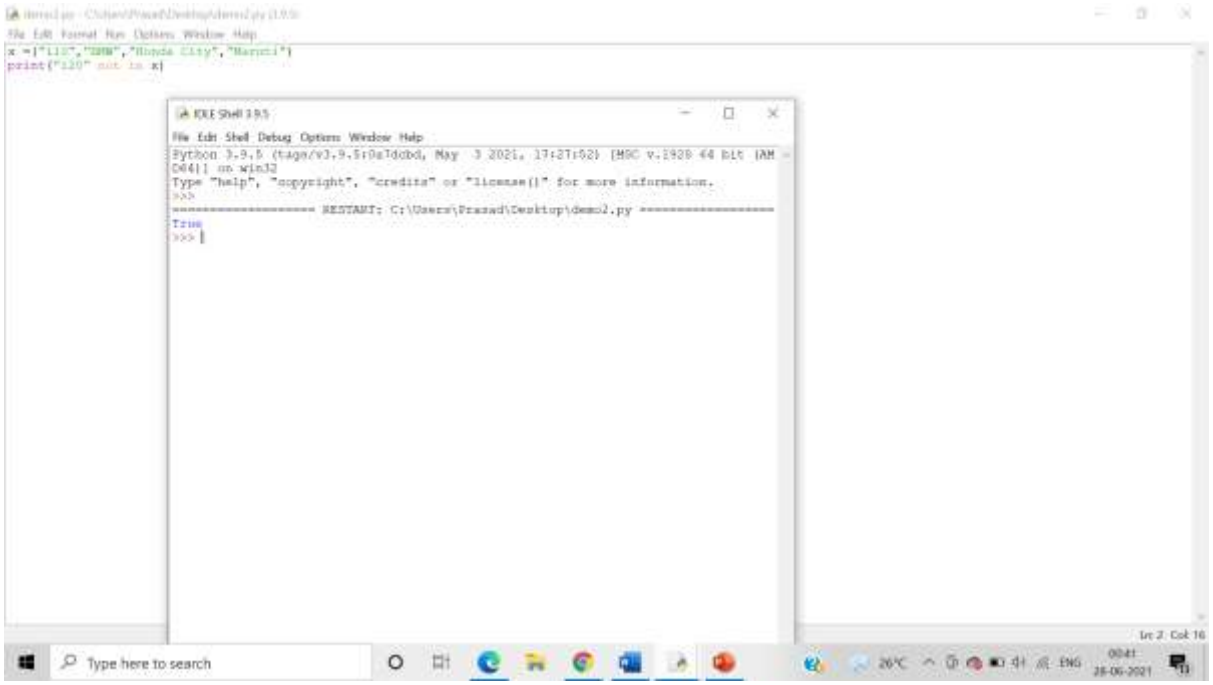
Algorithm: - The ‘in’ operator is used to check if a value exists in a sequence or not. It evaluates to true if it finds a variable in the specified sequence and false otherwise. In a NOT IN membership operator, the output evaluates to true if it does not finds a variable in the specified sequence and false otherwise.

- in



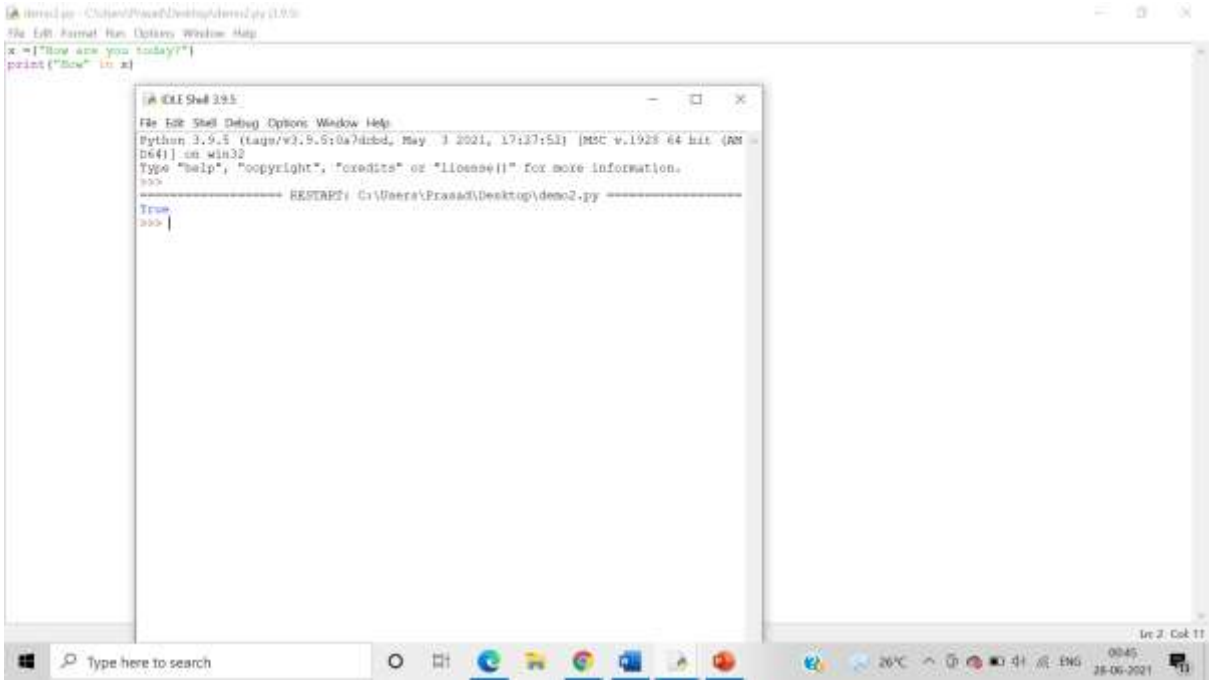


- not in

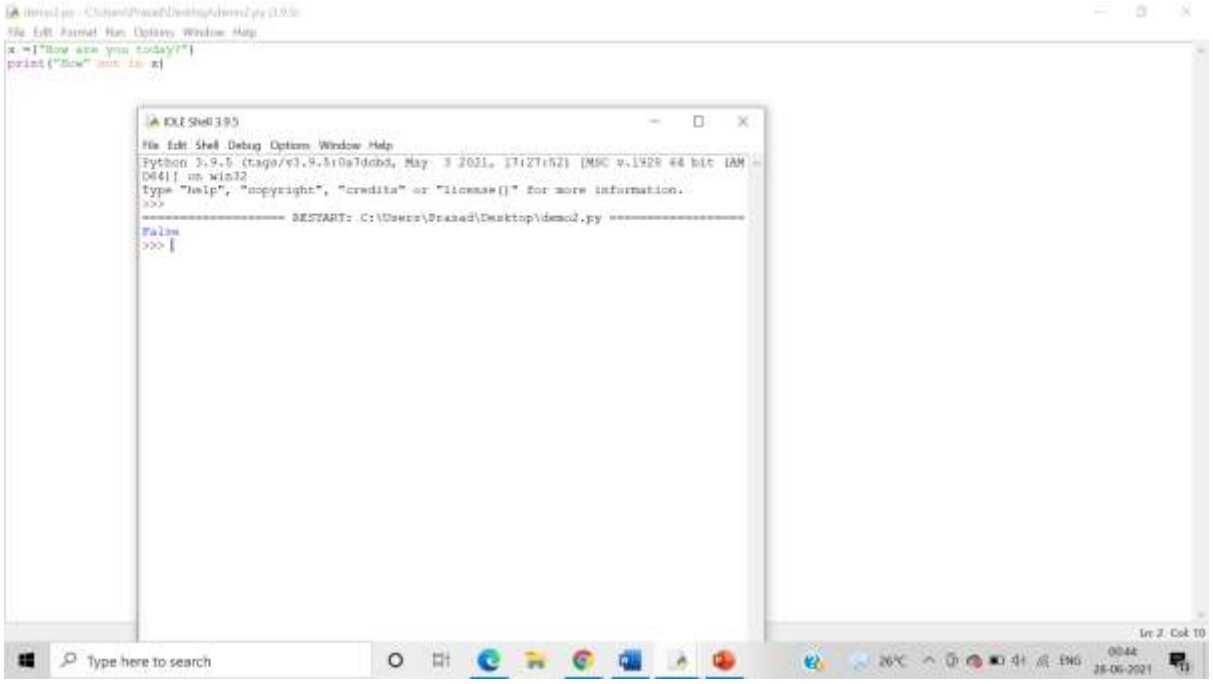


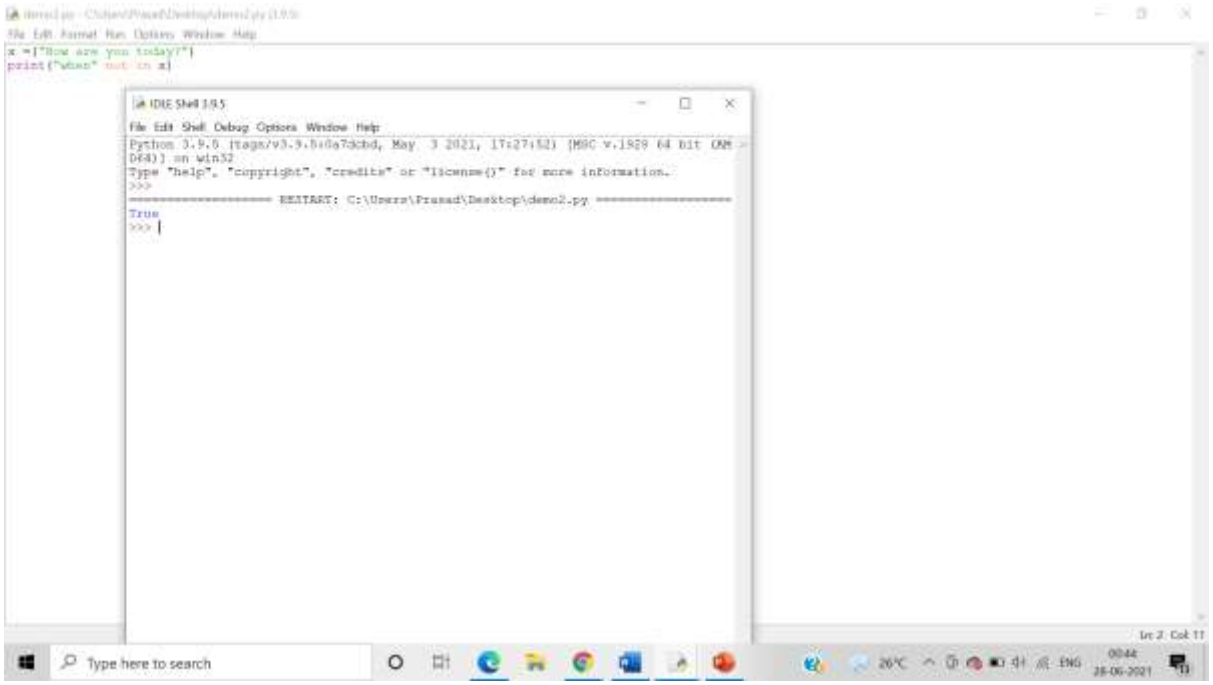
Using strings:

- in



- not in

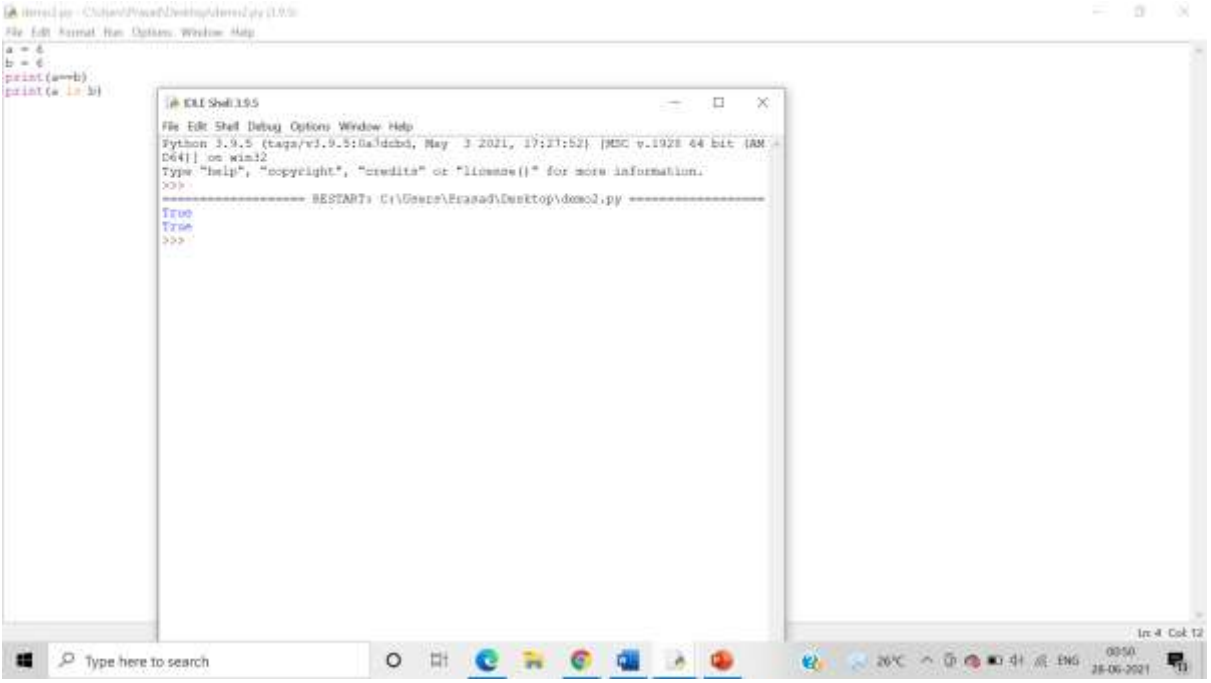

x ="How are you today?"
print("How" not in x)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
False
>>>
Type here to search


x ="How are you today?"
print("when" not in x)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
True
>>>
Type here to search

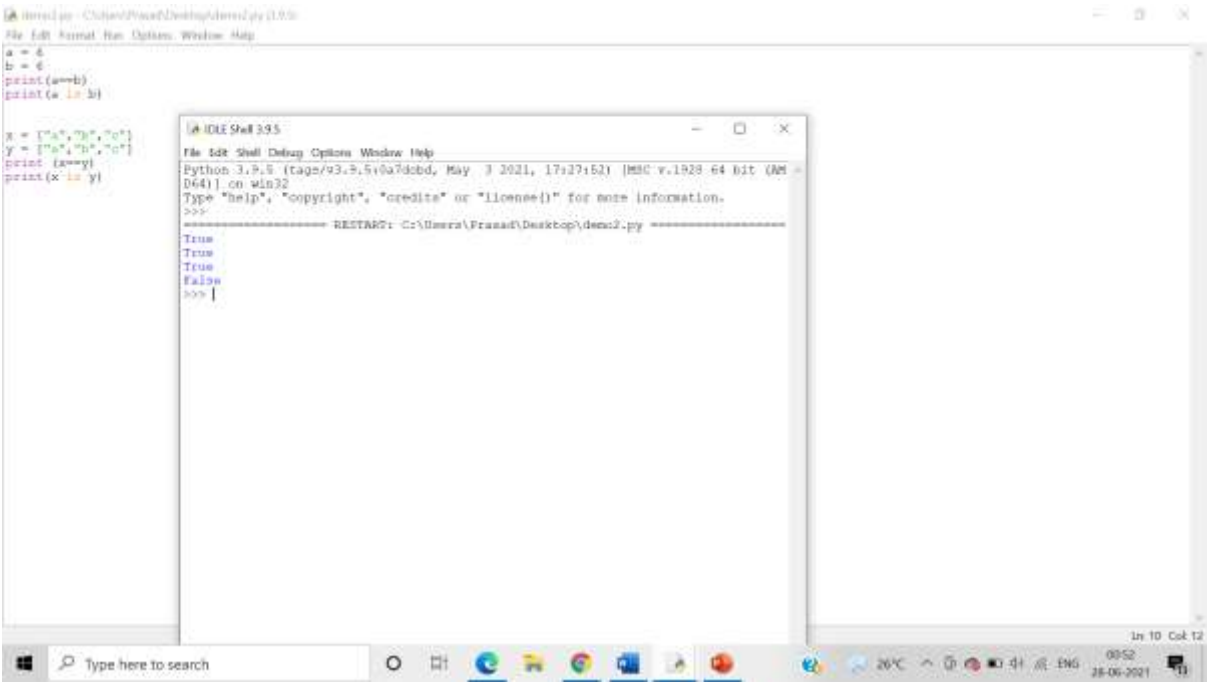
v. Identity operators

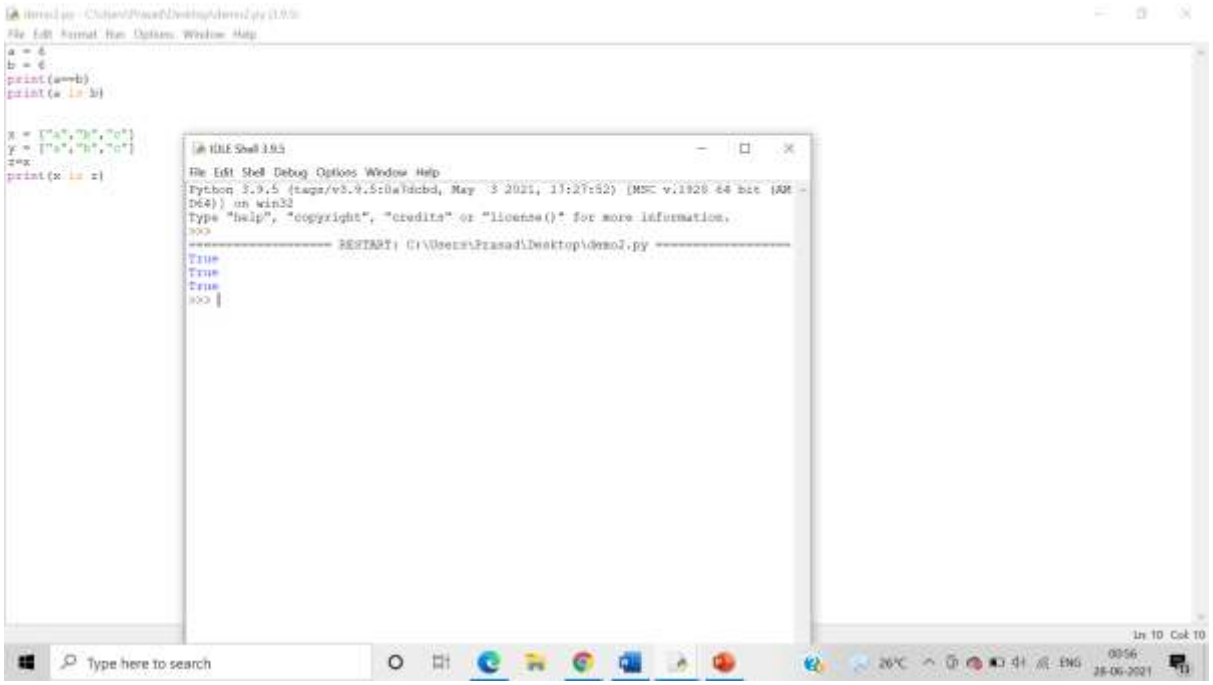
Algorithm: - In Identity operators, the IS Identity operator Evaluates to true if the variables on either side of the operator point to the same object and false otherwise. While, the IS NOT Identity operator evaluates to false if the variables on either side of the operator point to the same object and true otherwise.

- is

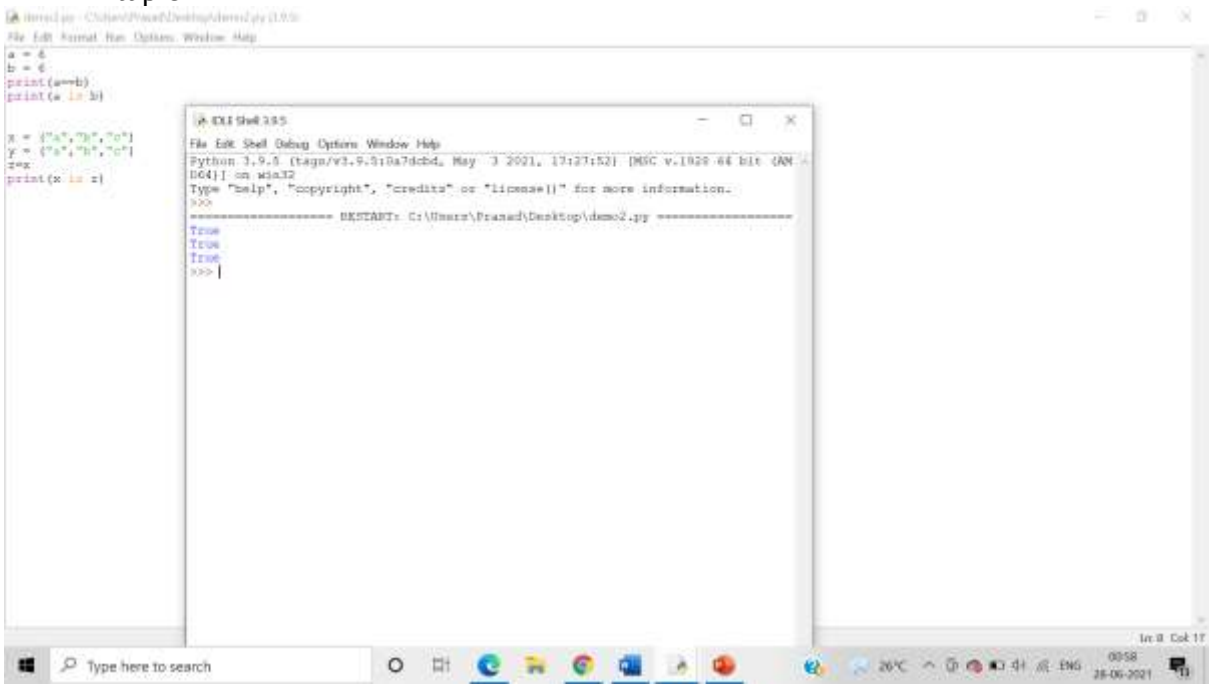


- list

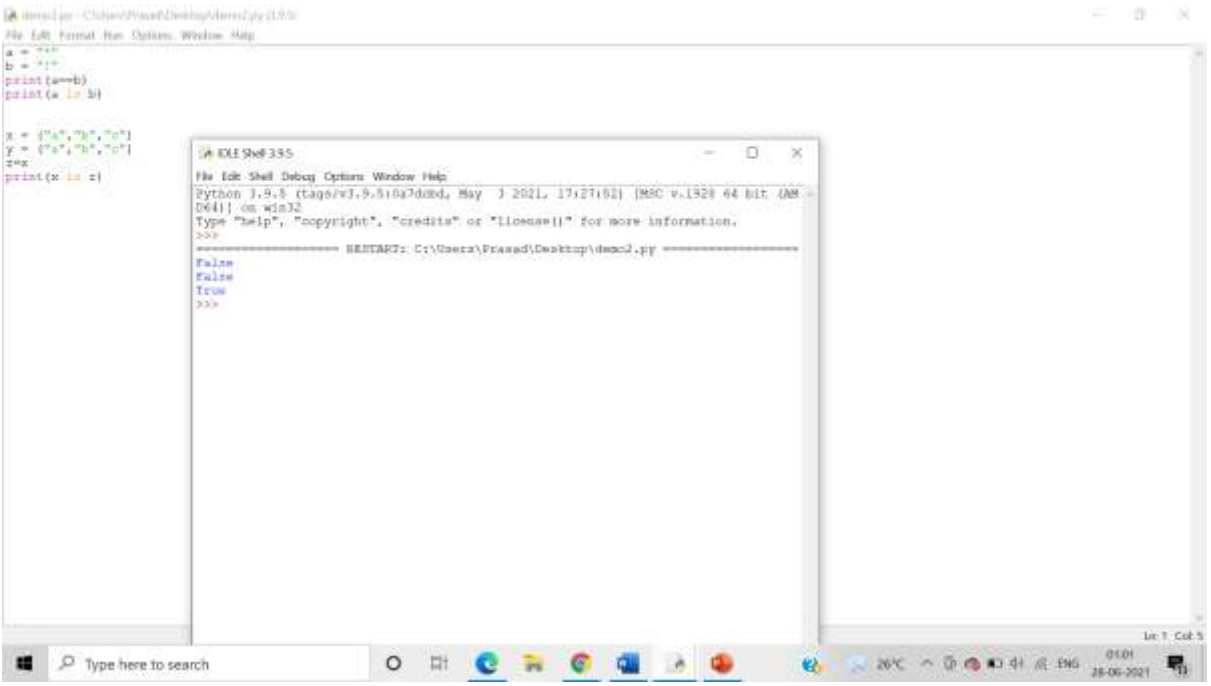



a = 6
b = 6
print(a==b)
print(a is b)
x = ["a","b","c"]
y = ["a","b","c"]
z=x
print(x is z)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
True
True
True
>>>
Type here to search

- tuple


a = 6
b = 6
print(a==b)
print(a is b)
x = ("a","b","c")
y = ("a","b","c")
z=x
print(x is z)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
True
True
True
>>>
Type here to search

- character



- is not

Python for Bioinformatics
Exercise 2
II-Title: Programs demonstrating use of Control structures

1. Write set of programs for demonstrating the usage of following loops and loop controls

i. If

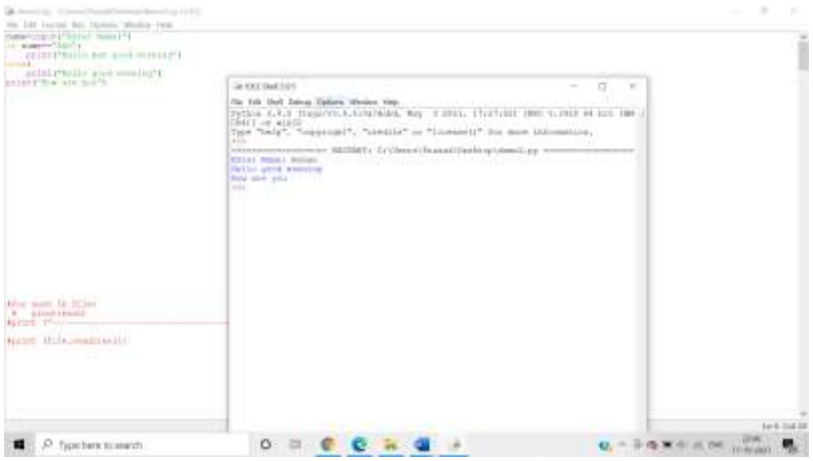
Algorithm: -

1) An if statement consists of a boolean expression followed by one or more statements.

If the condition following the if statement evaluates to True, then the block of code indented inside the if statement gets executed.

2) An if statement can be followed by an optional else statement, which executes when the Boolean expression is FALSE. If an If condition does not evaluates to True, then the block of code indented inside the else condition gets executed.

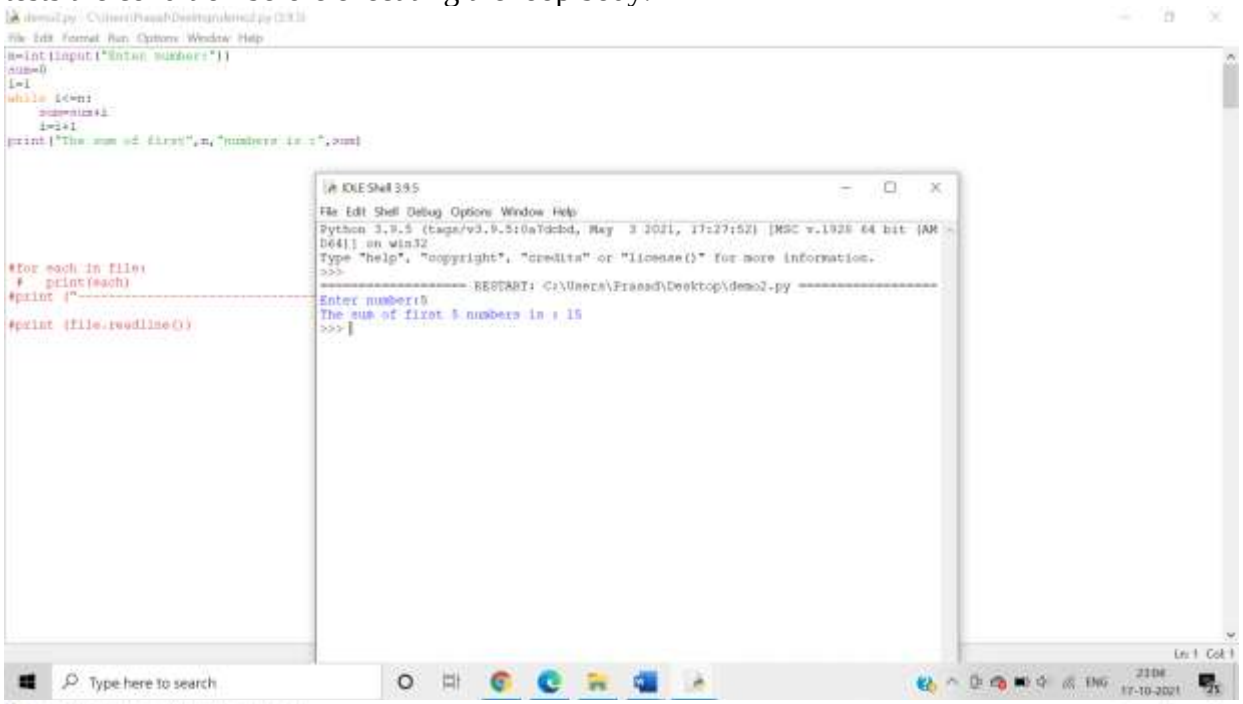
ii. If-else

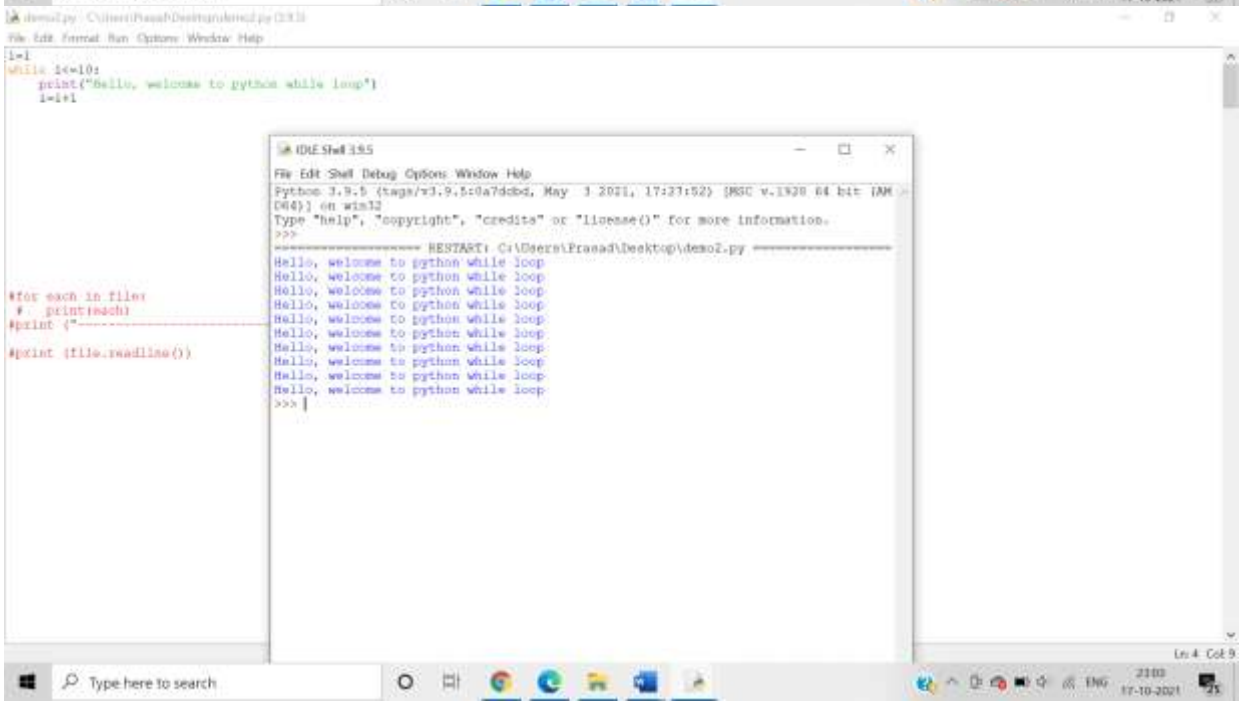


iii. While

Algorithm:-

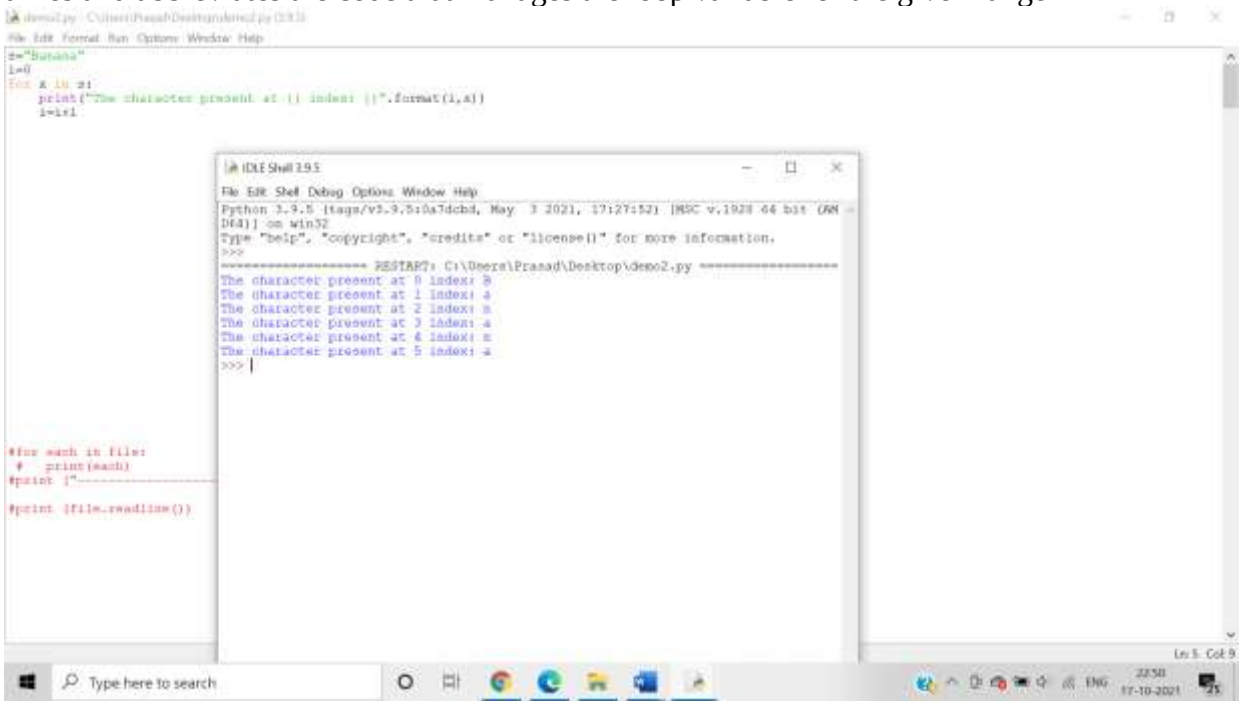
A While loop repeats a statement or group of statements while a given condition is TRUE. It tests the condition before executing the loop body.



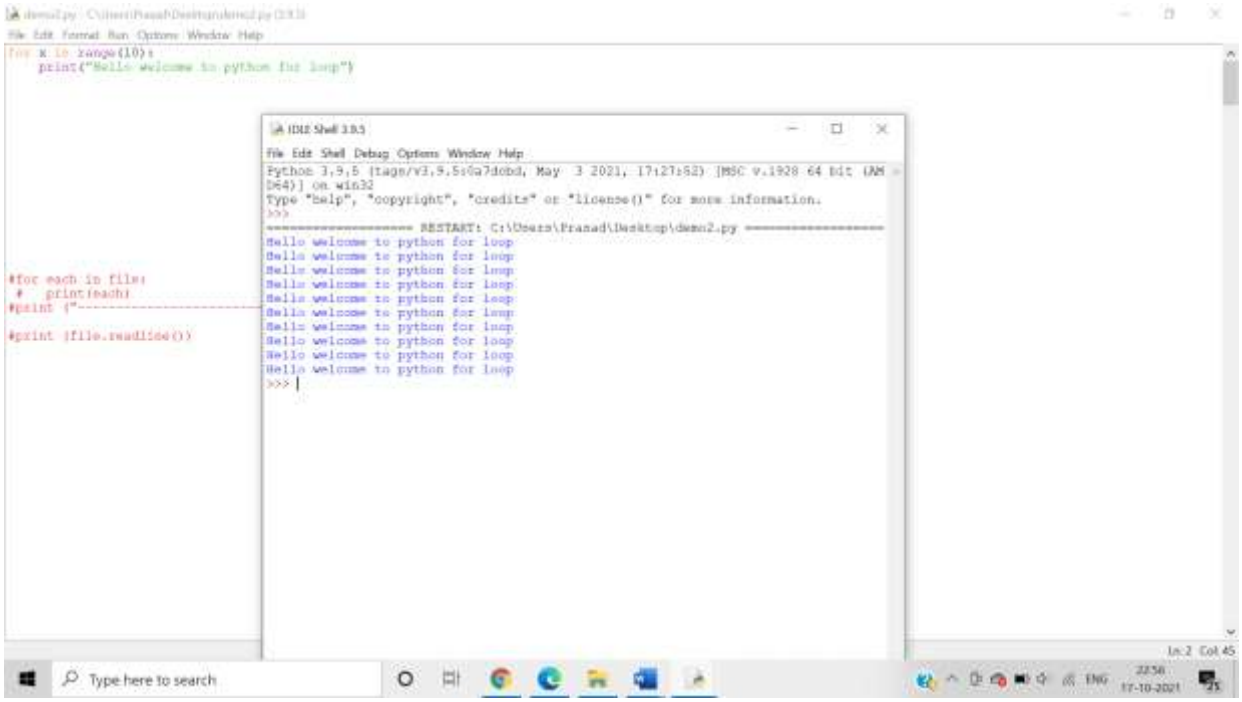


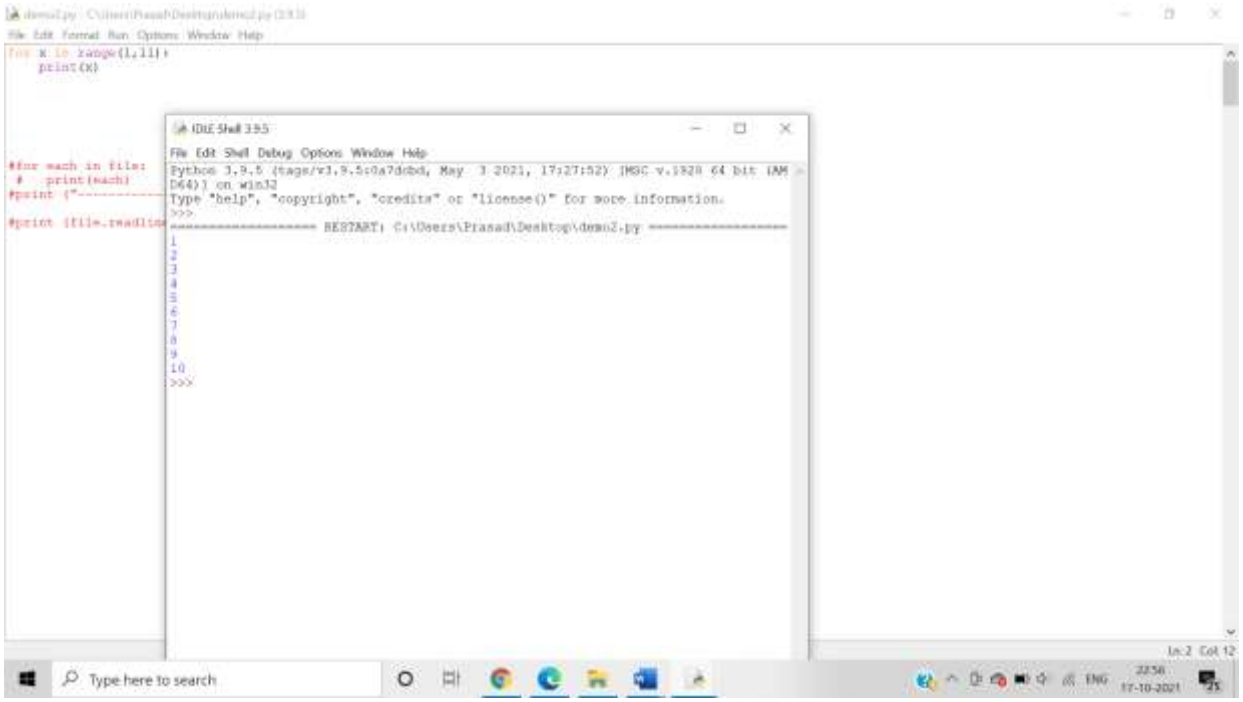
vi. For

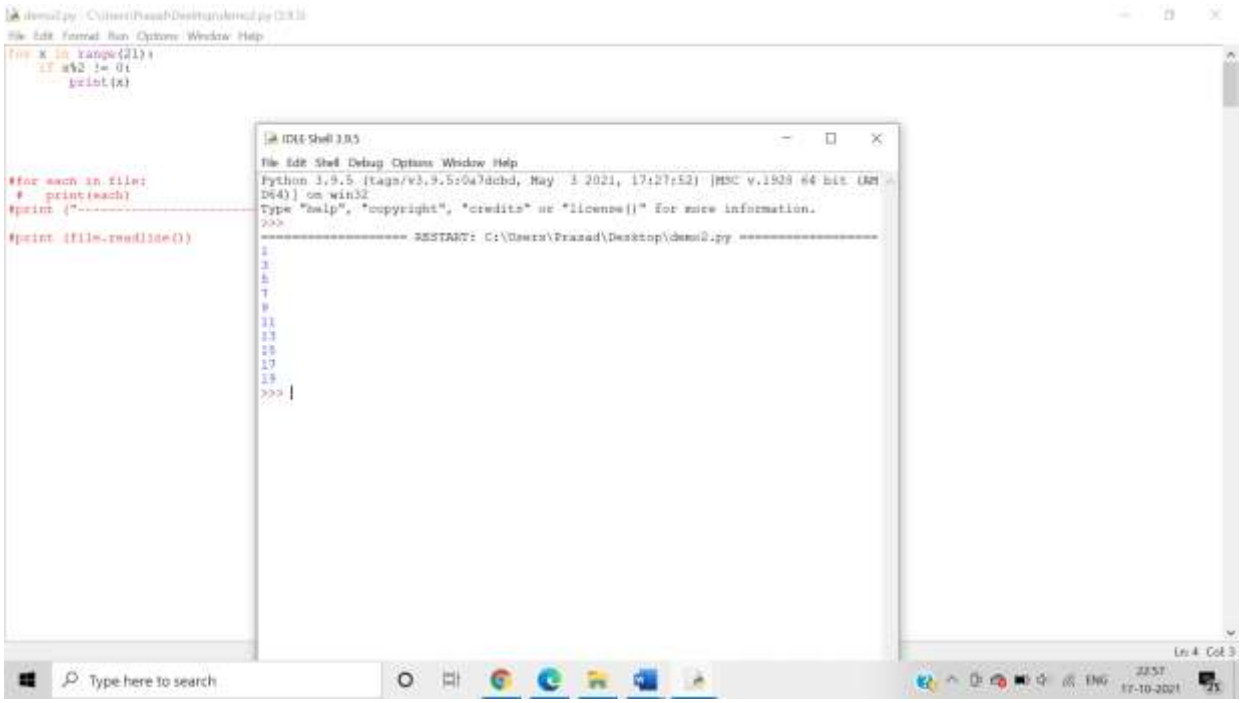
A for loop executes a sequence of statements multiple times and abbreviates the code that manages the loop variable. **A for with range loop** executes a sequence of statements multiple times and abbreviates the code that manages the loop variable for the given range



vii. For with range



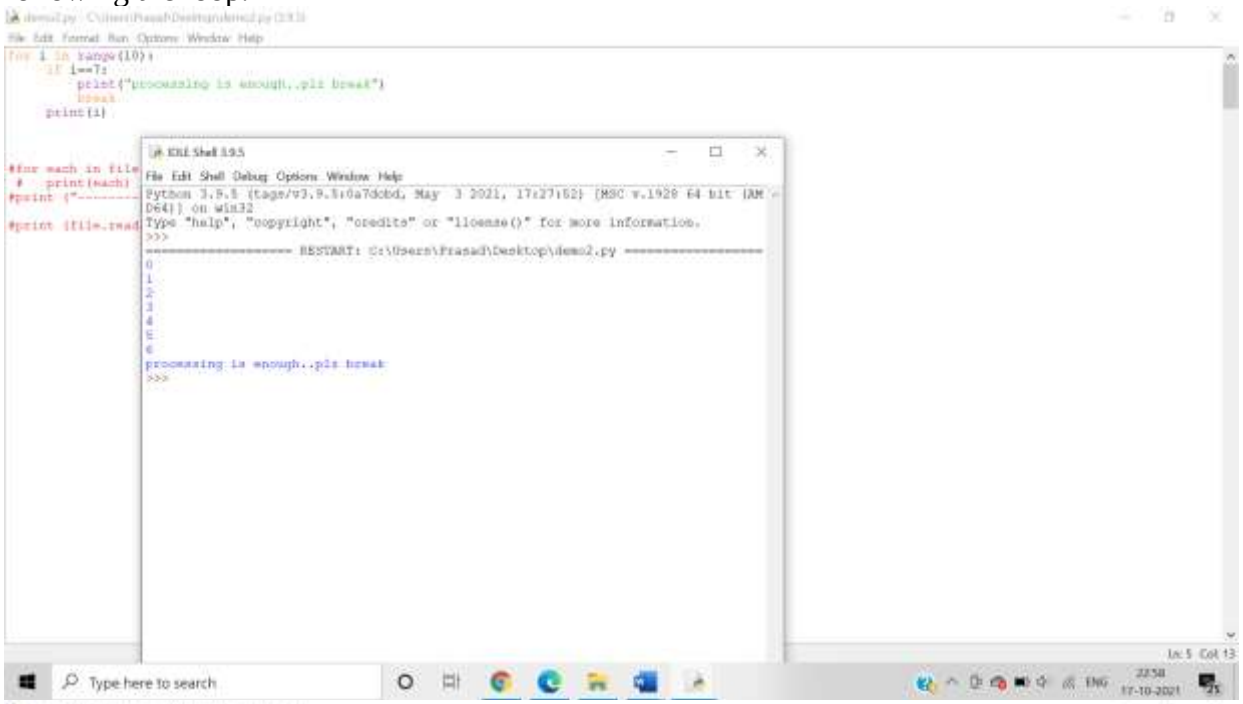

for x in range(1,11):
print(x)
#for each in file:
print(each)
#print ("----------
#print (file.readlin
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
1
2
3
4
5
6
7
8
9
10
>>>
Type here to search
ENG
22:56
17-10-2021

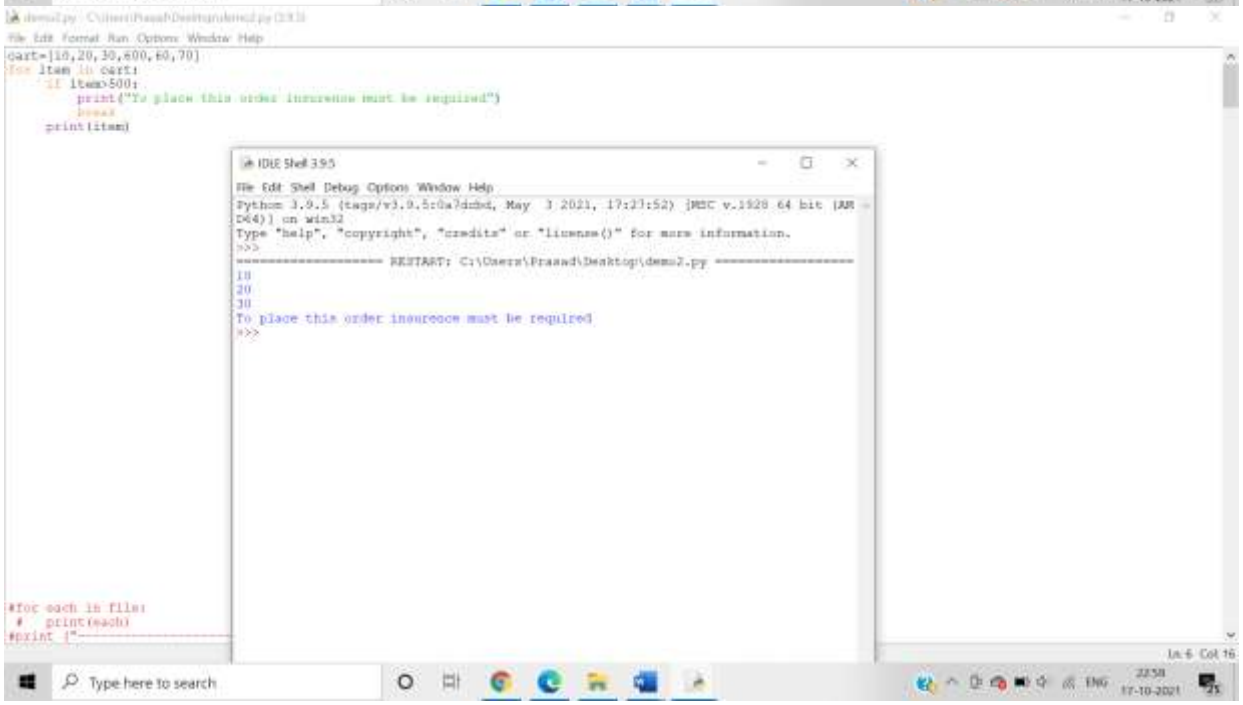

for x in range(21):
if x%2 != 0:
print(x)
#for each in file:
print(each)
#print ("----------
#print (file.readlin())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
1
3
5
7
9
11
13
15
17
19
>>>
Type here to search
ENG
22:57
17-10-2021

vii. Break

Algorithm:-

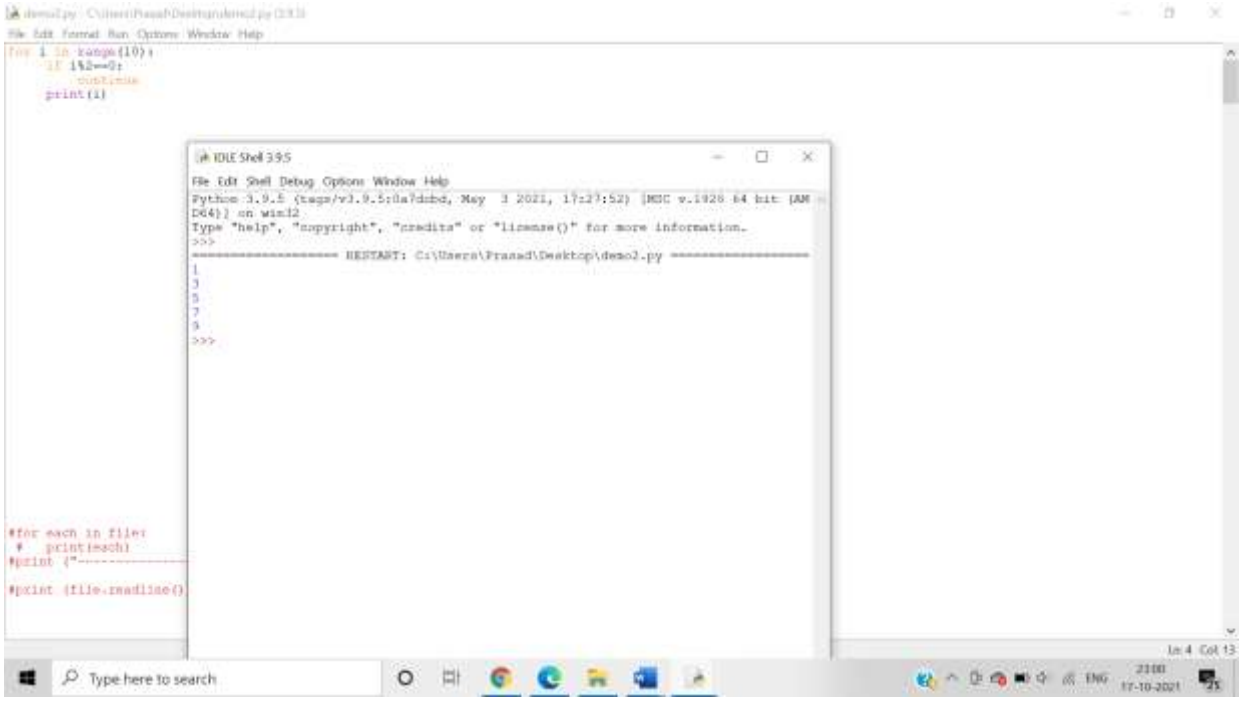
1) Break Terminates the loop statement and transfers execution to the statement immediately following the loop.

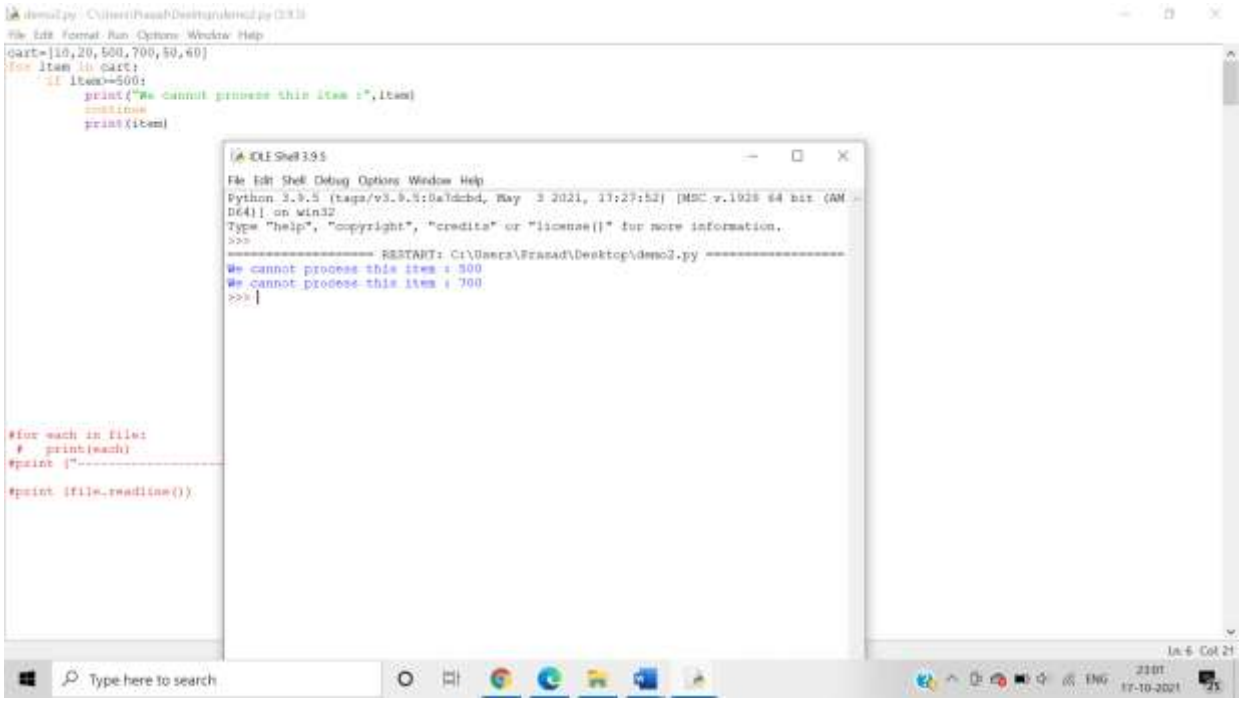




viii. Continue

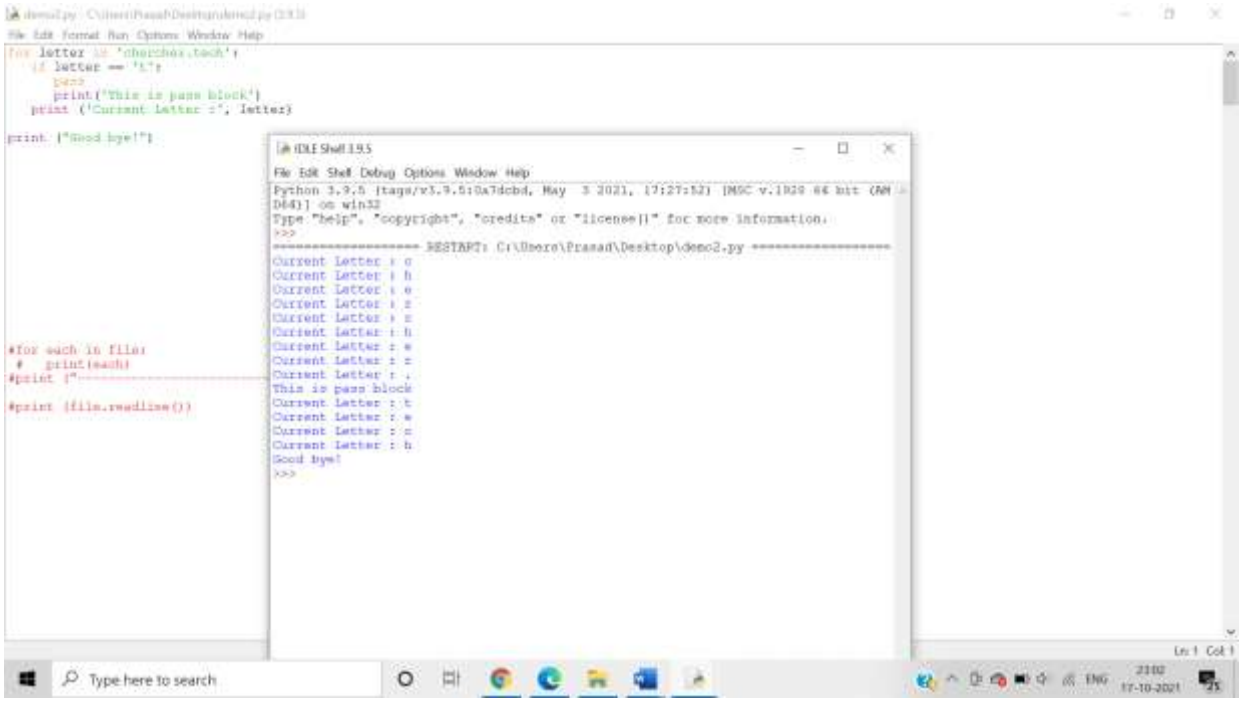
1) Algorithm:- Continue Causes the loop to skip the remainder of its body and immediately retest its condition prior to reiterating.



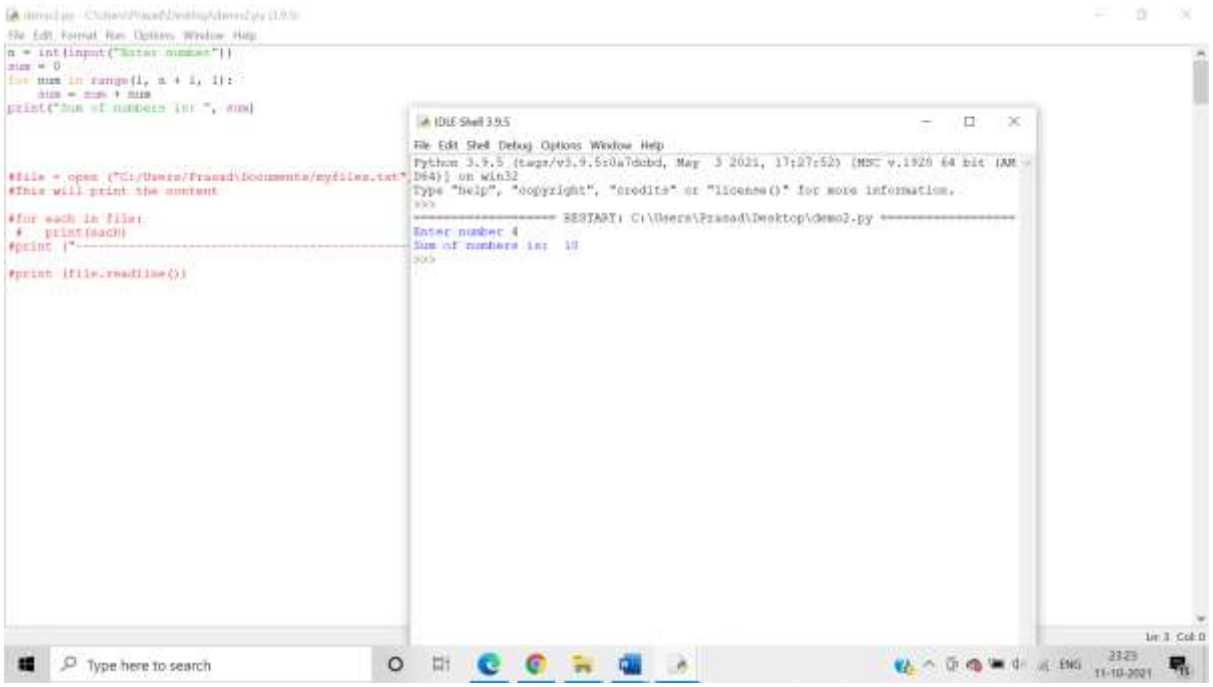


ix. Pass

Algorithm: The pass statement in Python is used when a statement is required syntactically but you do not want any command or code to execute.



2. Accept number from user and calculate the sum of all number between 1 and given number
Algorithm:
Step 1: -Allows a user to enter the number (n) he wishes to calculate the sum and average. The program accepts user input using the input function.
Step 2: -Next, run loop till the entered number using the for loop and range() function.
Step 3: -Next, calculate the sum using a sum = sum + current number formula.
Step 4:-At last, after the loop ends, calculate the average using average = sum / n. n is a number entered by the user.

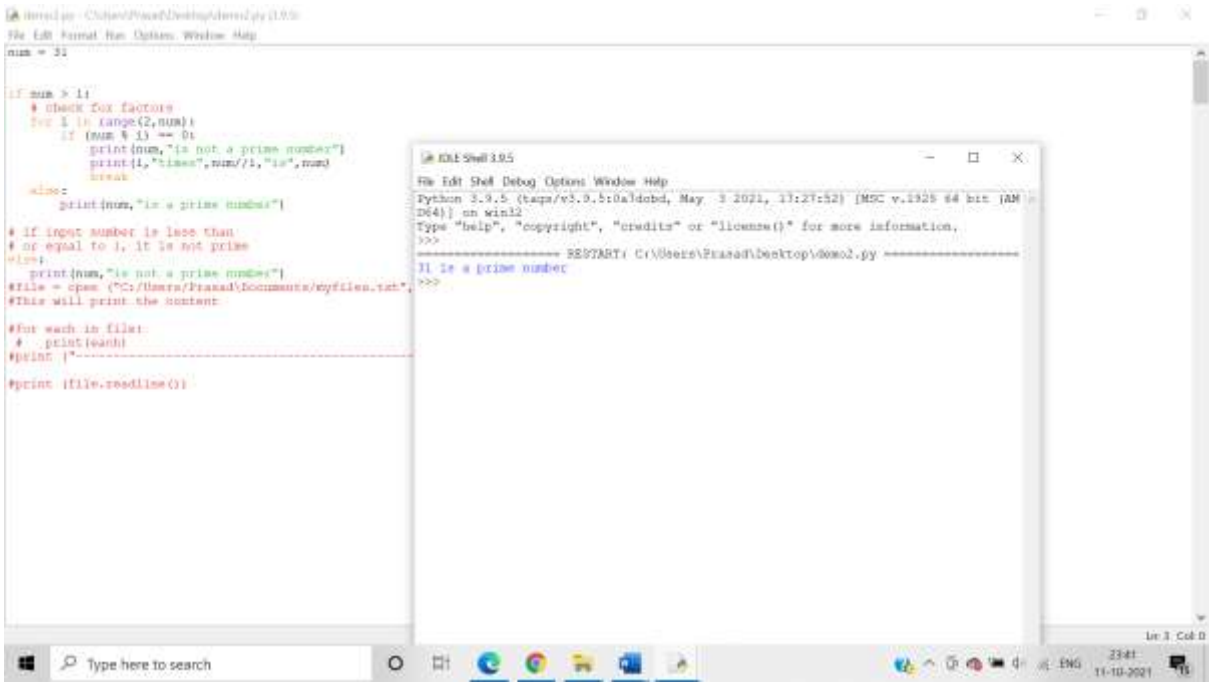


3. Write a Python program which iterates the integers from 1 to 50. For multiples of three print "Hello" instead of the number and for the multiples of five print “Welcome". For numbers which are multiples of both three and five print "Good Morning".

Algorithm: - We make use of a for loop to iterate all the numbers in the range of 1 to 50.
We then use the if and if else loops with conditions where if the number a multiple of 3 then the output prints “Hello” is. When the number is a multiple of 5 the output prints the ord “Welcome” and when the number is the multiple of both 3 and 5 we print “Good Morning:.

4. Write a program to check whether a number is prime or not

Algorithm:-We use a for loop to divide the input number with number ranging from 1 to input num -1 using the remainder operator % in a for loop . If the remainder is zero in any instance then the input number is divisible by other numbers and hence is not a prime number.



5. Write a program to determine whether the number entered is Armstrong or not

Algorithm:-

Step 1:- The user has to enter any number.

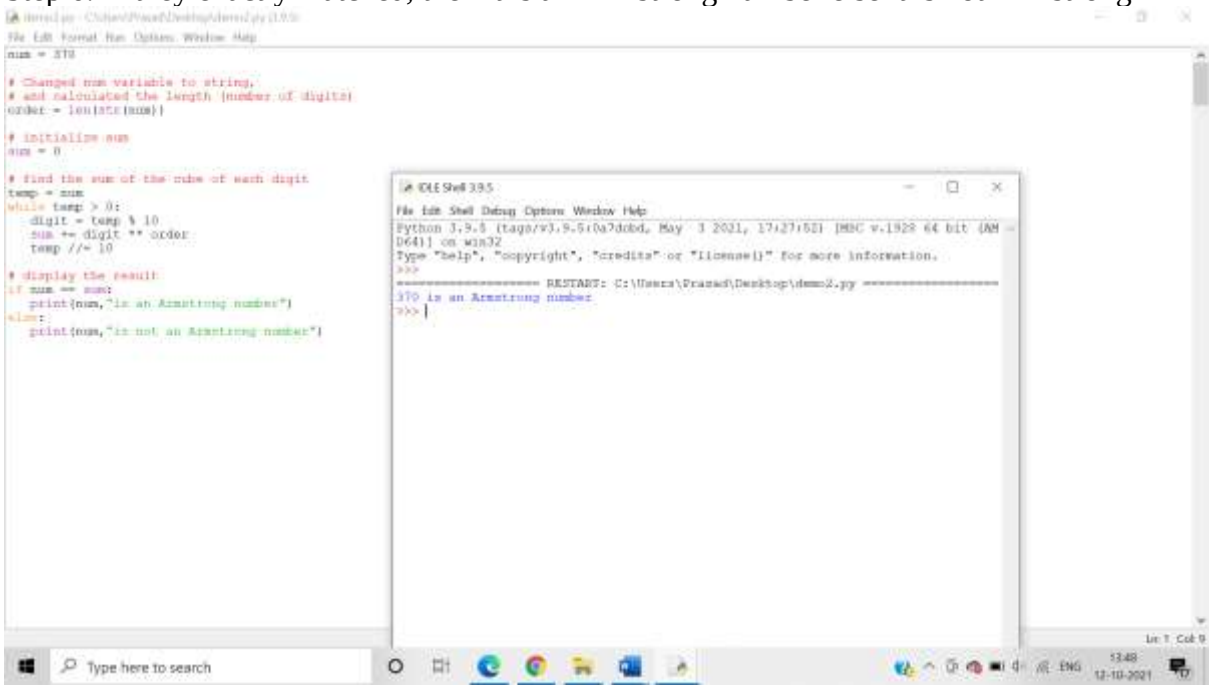
Step 2:- Count the Number of individual digits (For Example, 370 means 3).

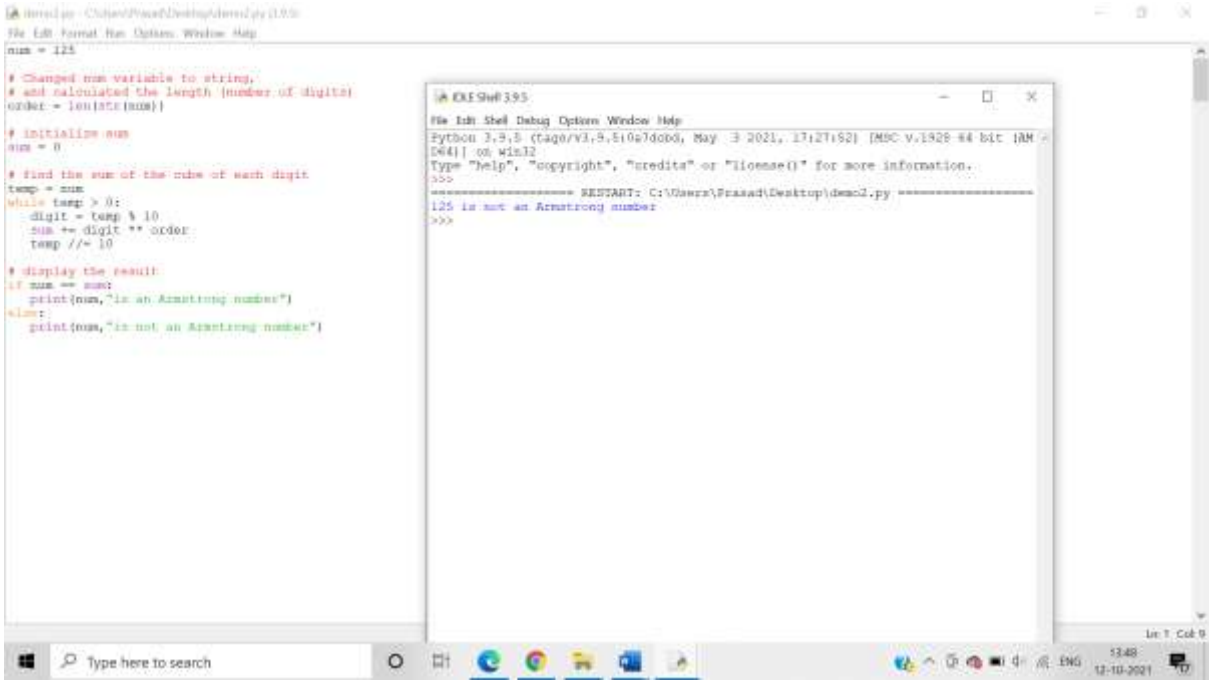
Step 3:- Divide the given number into individual digits (For Example, Divide 370 into 3, 7, and 0).

Step 4:- Calculate the power of n for each individual and add those numbers.

Step 5:- Compare the original value with Sum value.

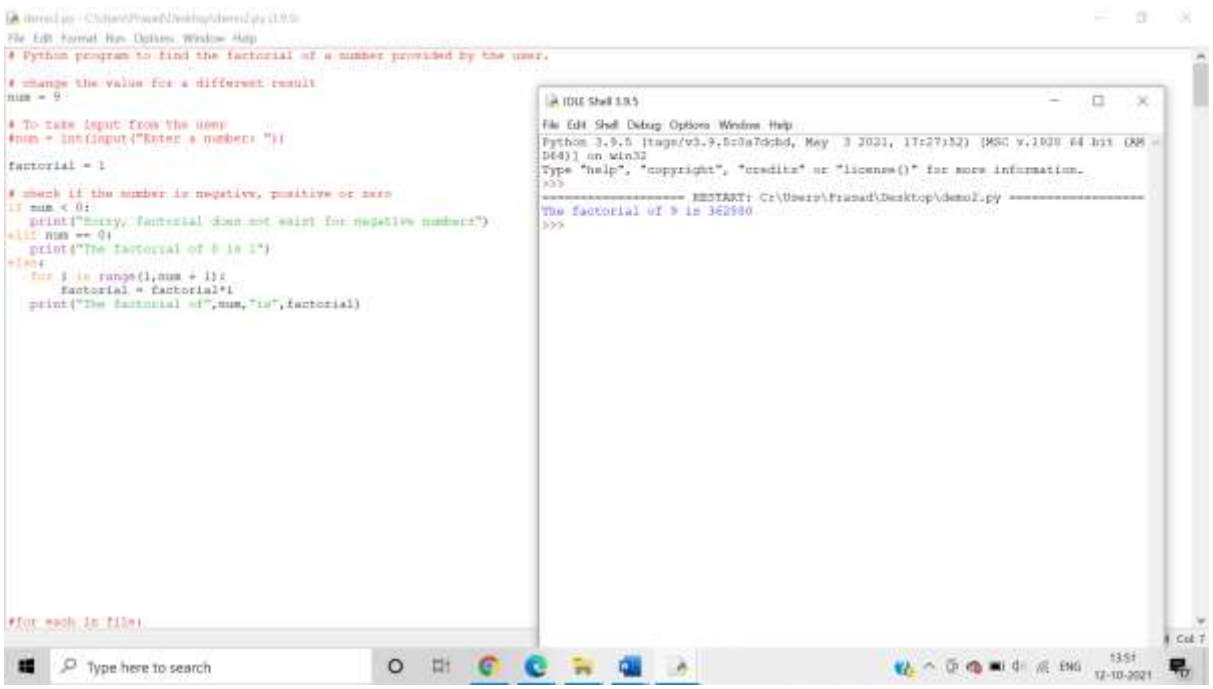
Step 6:-If they exactly matched, then it is an Armstrong number else it is not Armstrong





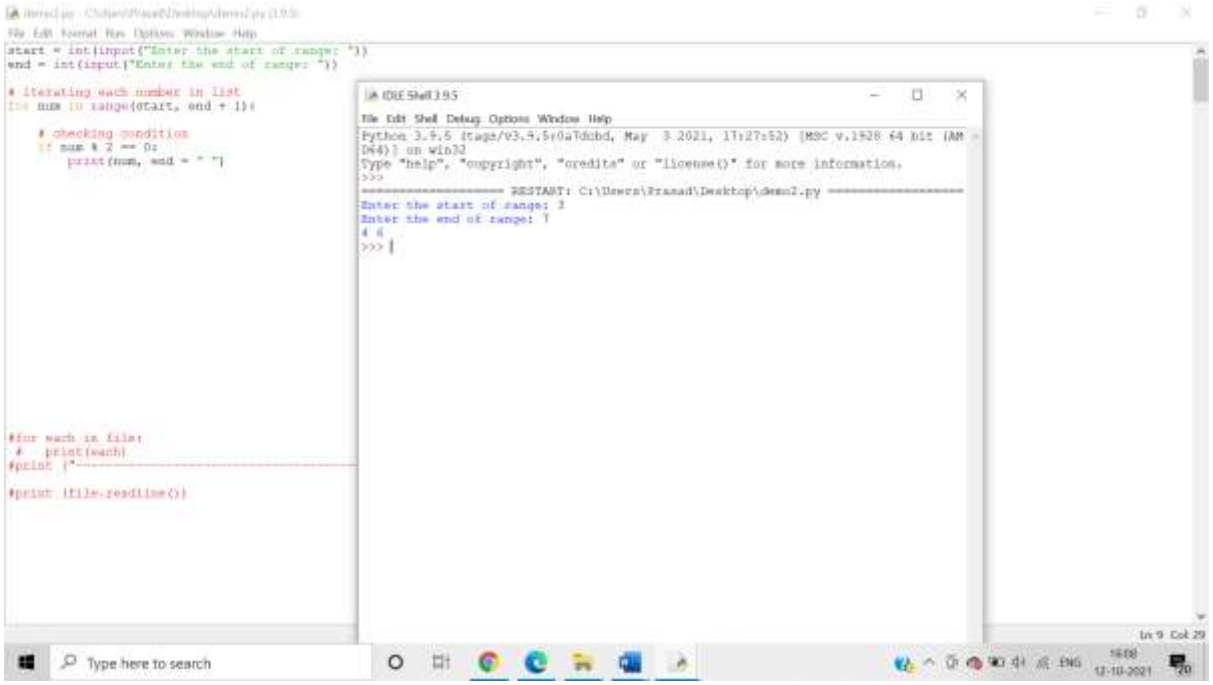
6. Write a program to calculate the factorial of the number entered by the user

Algorithm:- We use recursive method to multiple all the number ranging from the input to 1 .



7. Print all odd and even numbers separately entered in the user defined range

Algorithm:- A number is even if it is perfectly divisible by 2. When the number is divided by 2, we use the remainder operator % to compute the remainder. If the remainder is not zero, the number is odd.



8. Write a program to reverse words in a given String in Python

Algorithm:-

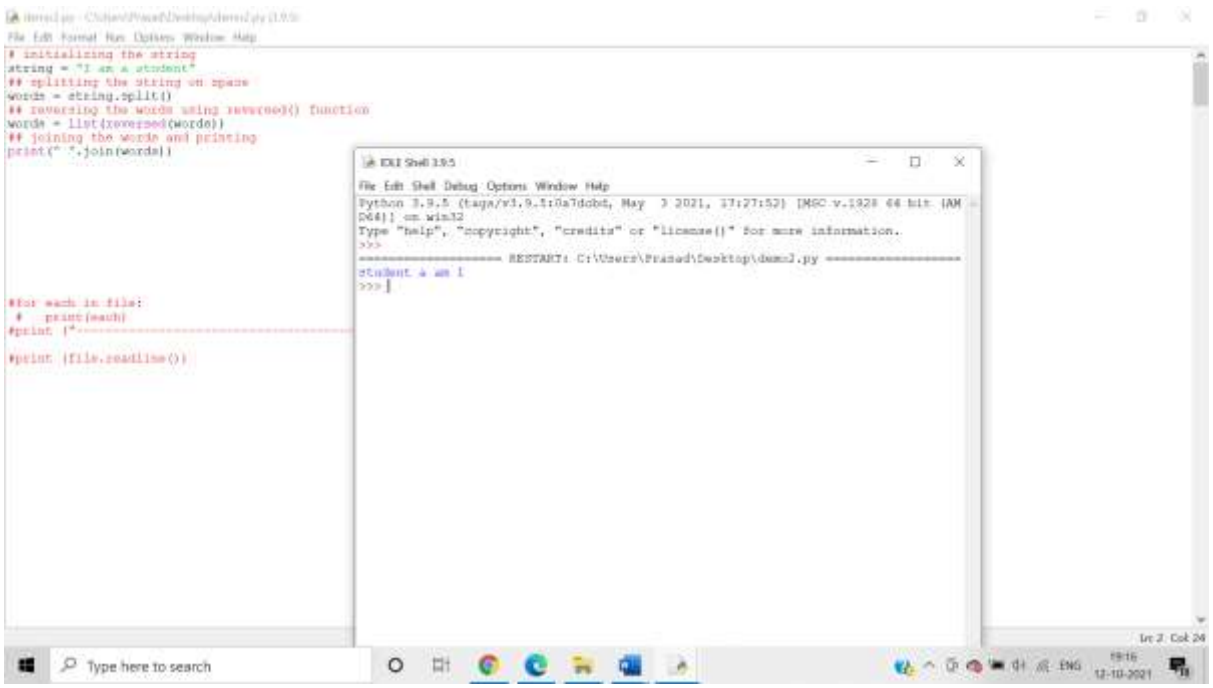
Step 1 Initialize the string.

Step 2 Split the string on space and store the resultant list in a variable called words.

Step 3 Reverse the list words using reversed function.

Step 4 Convert the result to list.

Step 5 Join the words using the join function and print it.



9. Construct the following pattern, using a nested for loop.

```
*
*                                                                   *
*                                   *                               *
*                           *               *                       *
*                   *               *               *               *
*                           *               *                       *
*                                   *                               *
*                                                                   *
*
```

Algorithm:-

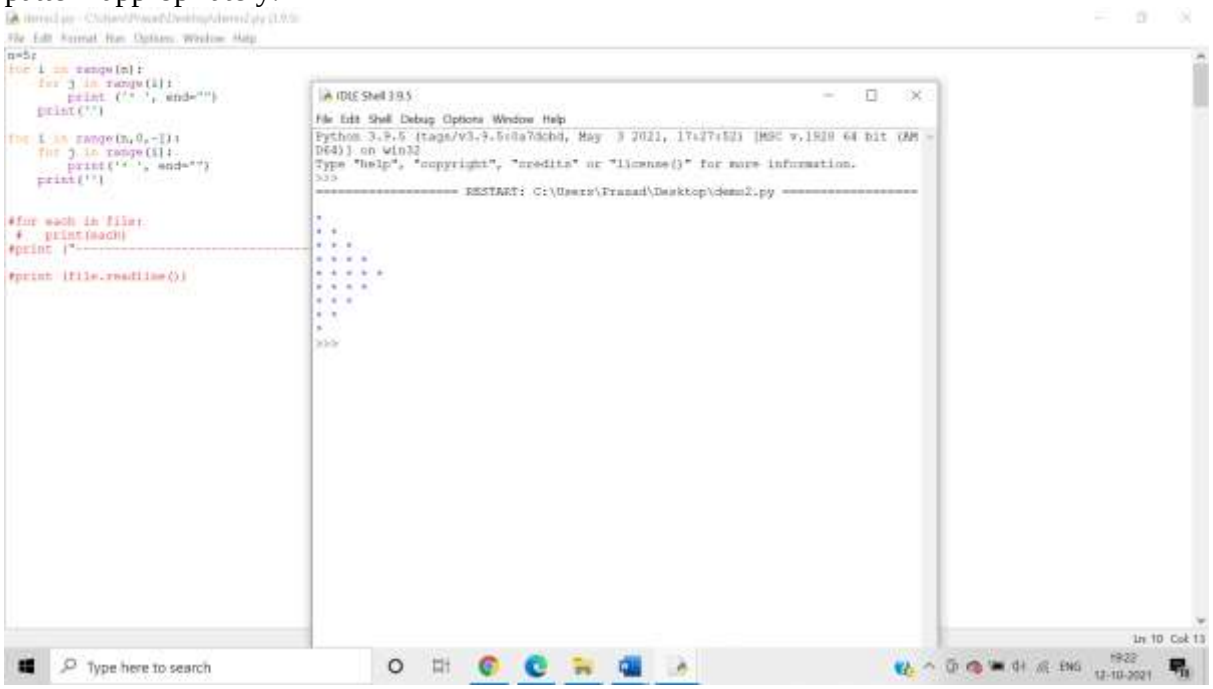
Step 1:- Accept the number of rows from a user using input() function or decide the size of a pattern.

Step 2:- Iterate the number of rows using outer for loop and range() function

Step 3:- Next, the inner loop or nested for loop to handle the number of columns. Inner loop iteration depends on the values of the outer loop.

Step 4:- asterisk in a Pyramidal pattern using the print() function.

Step 5:- Add a new line after each row, i.e. after each iteration of outer for loop so you can display pattern appropriately.



10. Print the following pattern using for loop

5 4 3 2 1
4 3 2 1
3 2 1
2 1
1

Algorithm:-

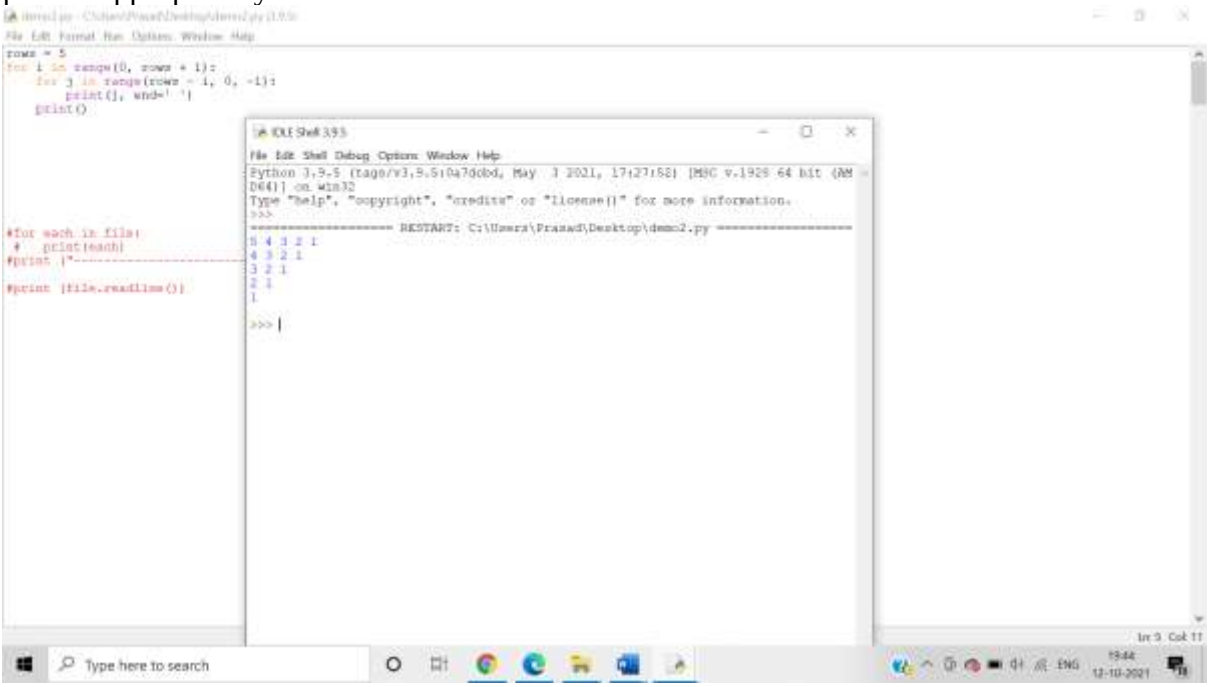
Step 1:- Accept the number of rows from a user using input() function or decide the size of a pattern.

Step 2:- Iterate the number of rows using outer for loop and range() function

Step 3:- Next, the inner loop or nested for loop to handle the number of columns. Inner loop iteration depends on the values of the outer loop.

Step 4:- Print number using the print() function.

Step 5:- Add a new line after each row, i.e. after each iteration of outer for loop so you can display pattern appropriately.

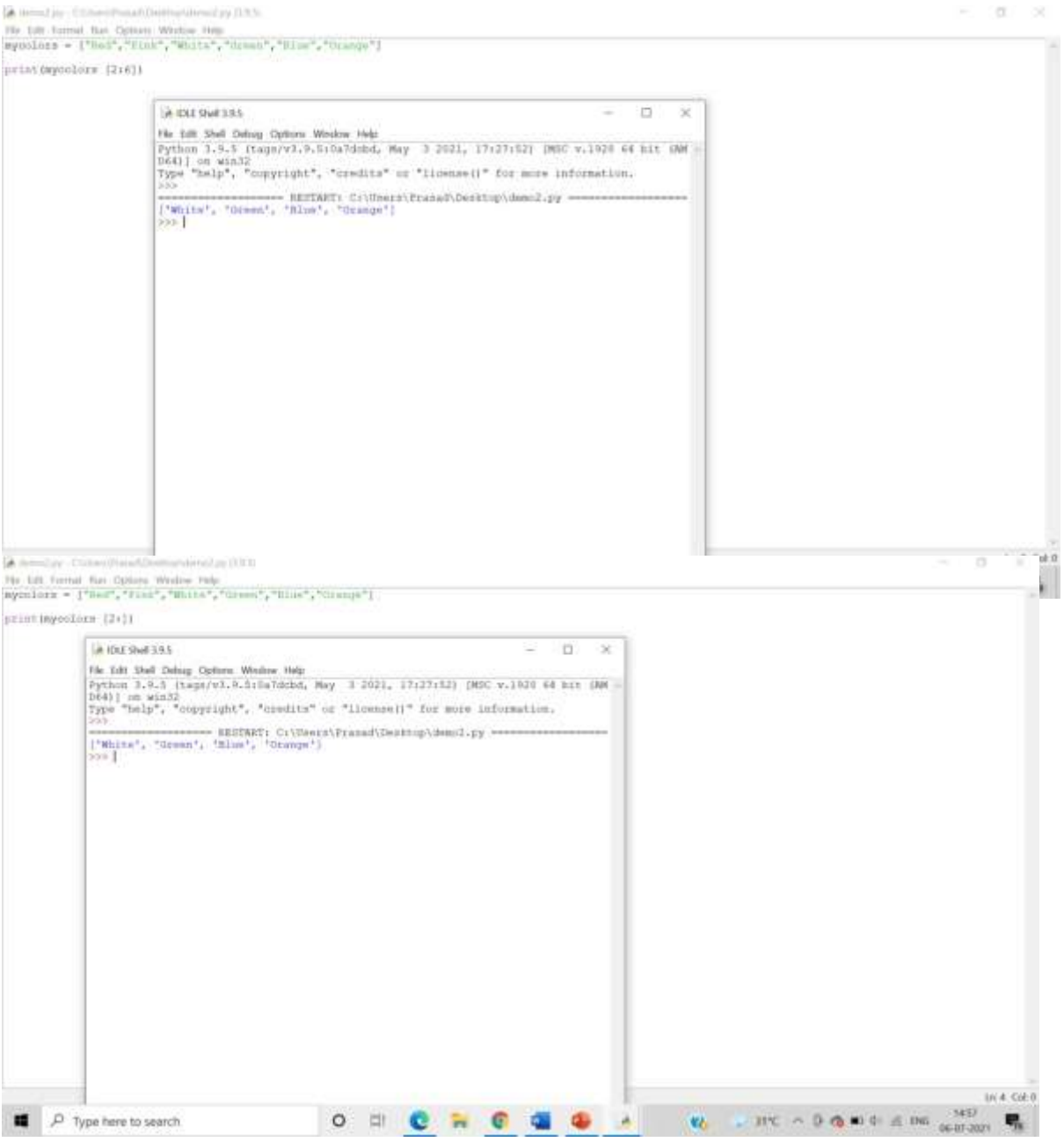


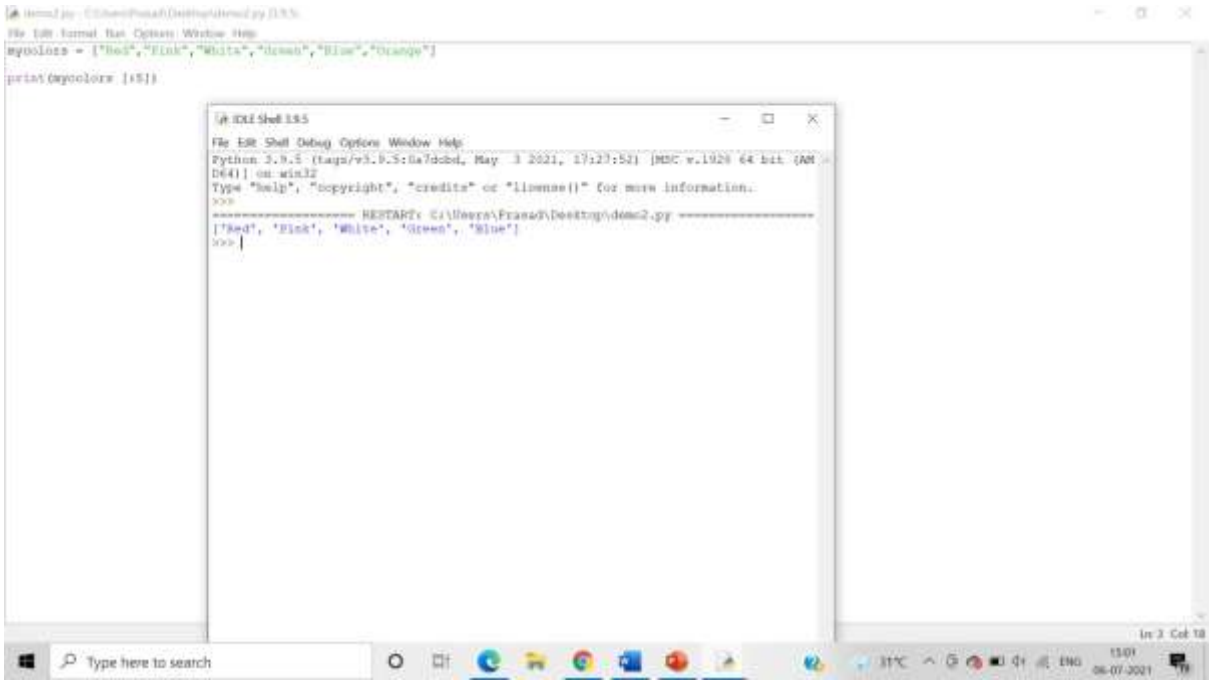
Python for Bioinformatics
Exercise 3
III-Title: Programs demonstrating use of Lists and Tuples

1. Write a program demonstrating declaration, accessing- Indexing and splicing of lists and its elements.

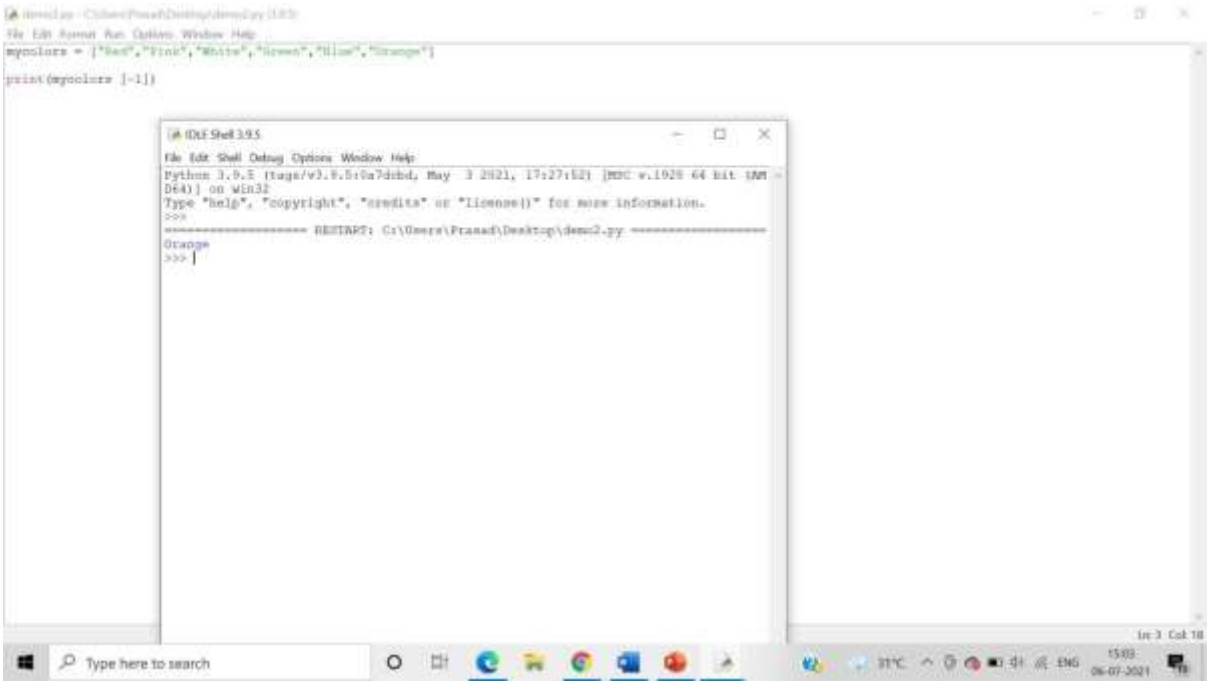
Algorithm:-
Step 1: In python a list is declared by placing all the items (elements) inside square brackets [], separated by commas and assigning it to a variable.
Step 2: The list is accessed by printing the variable to which the list has been assigned to.
Step 3: To access the list items refer to the index number inside the index operator[] (INDEXING) [].
Step 4: To print a subset of values present in lists, input the start and end number of the subset in the index operator []

Answer: Program demonstrating splicing:

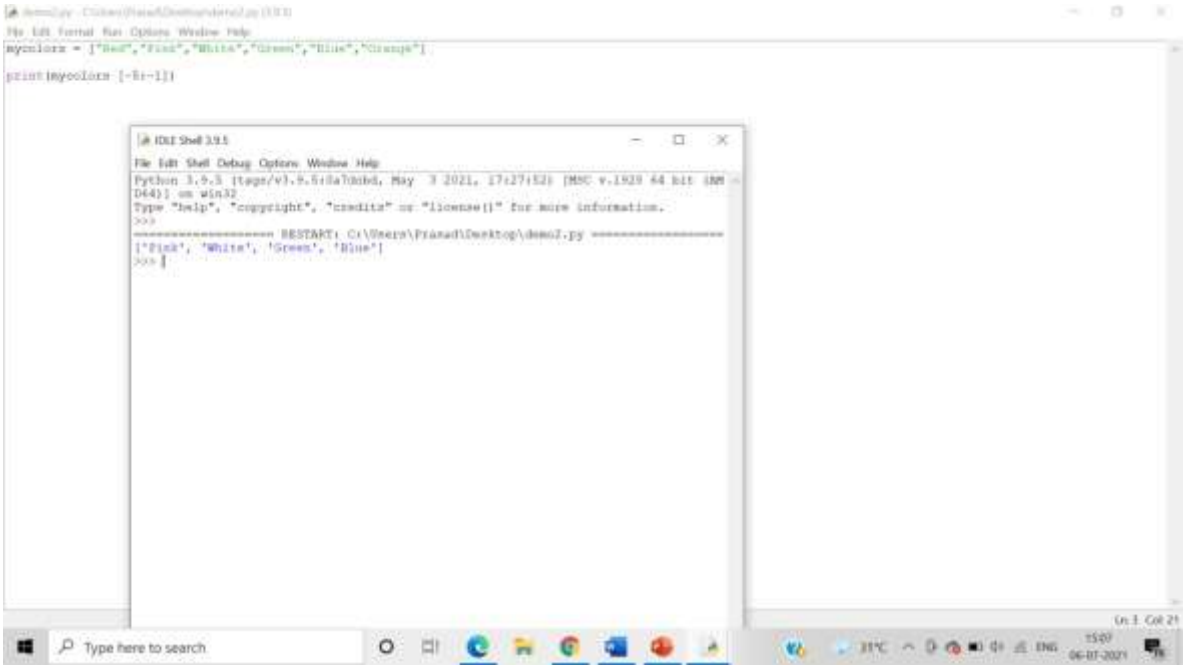




Using negative index:



Splicing using negative index:

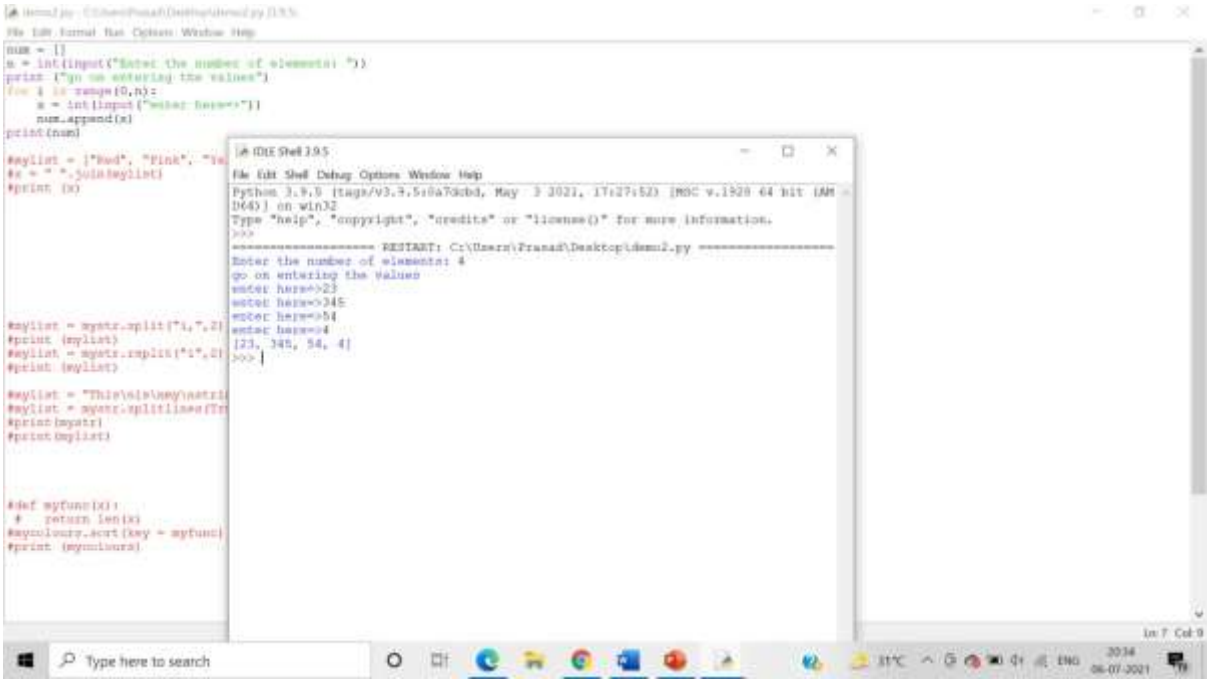


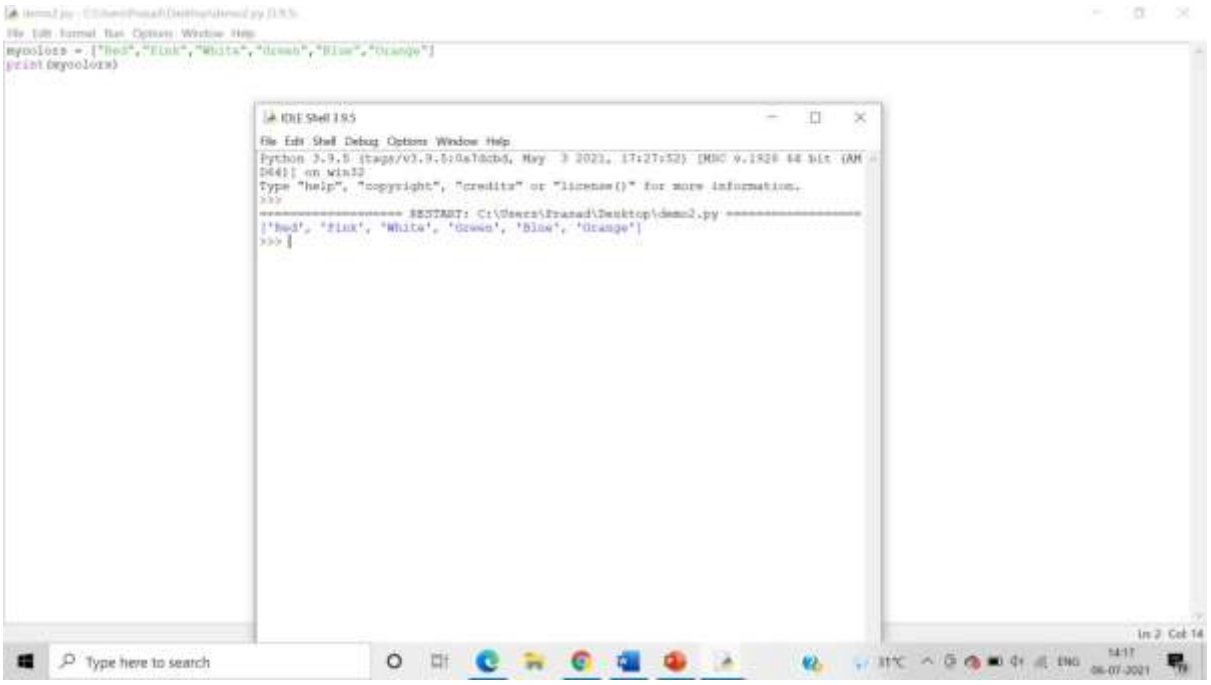
2. Write a program demonstrating input of list elements from the user.

Step 1: Use the input() function to take user input and assign it to a variable

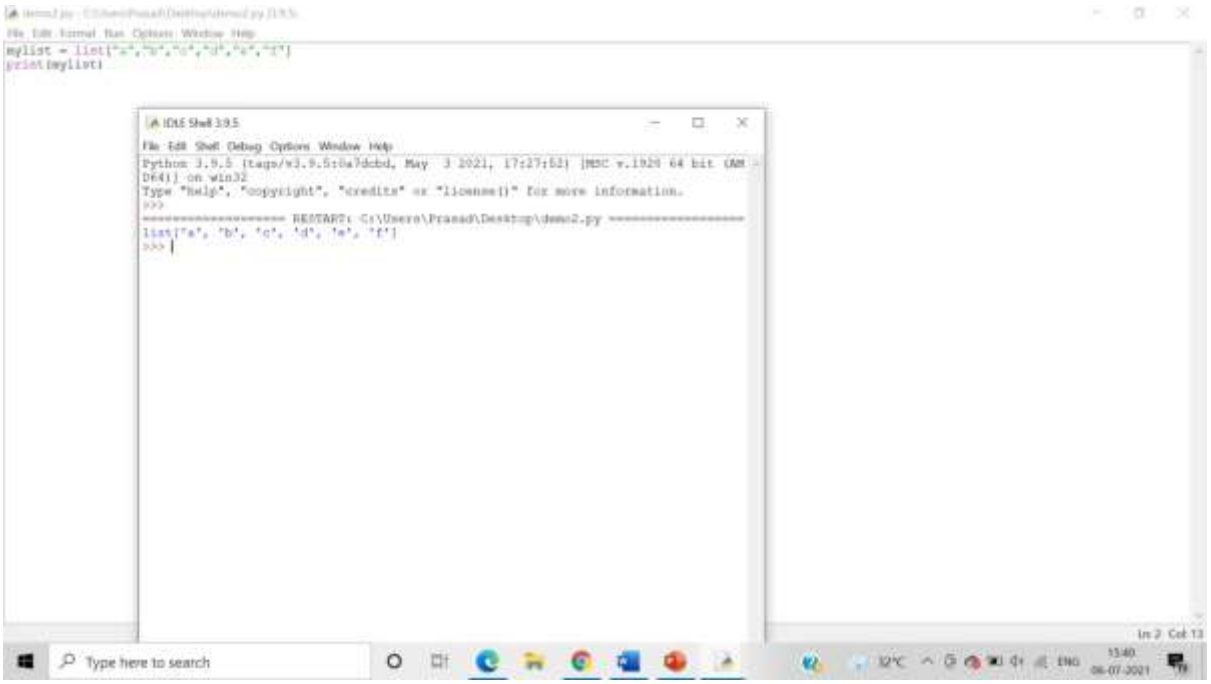
Step 2: Use the split function to split each value in the variable with a "," and assign it a new list variable.

Step 3:Print the list variable

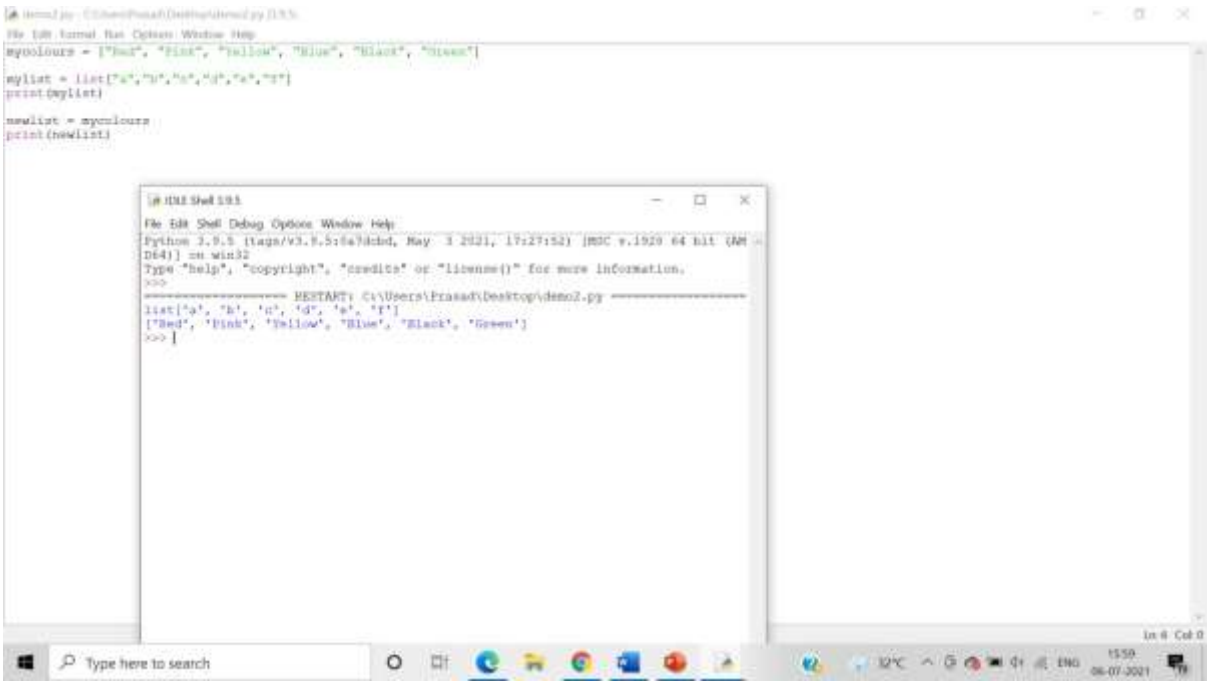




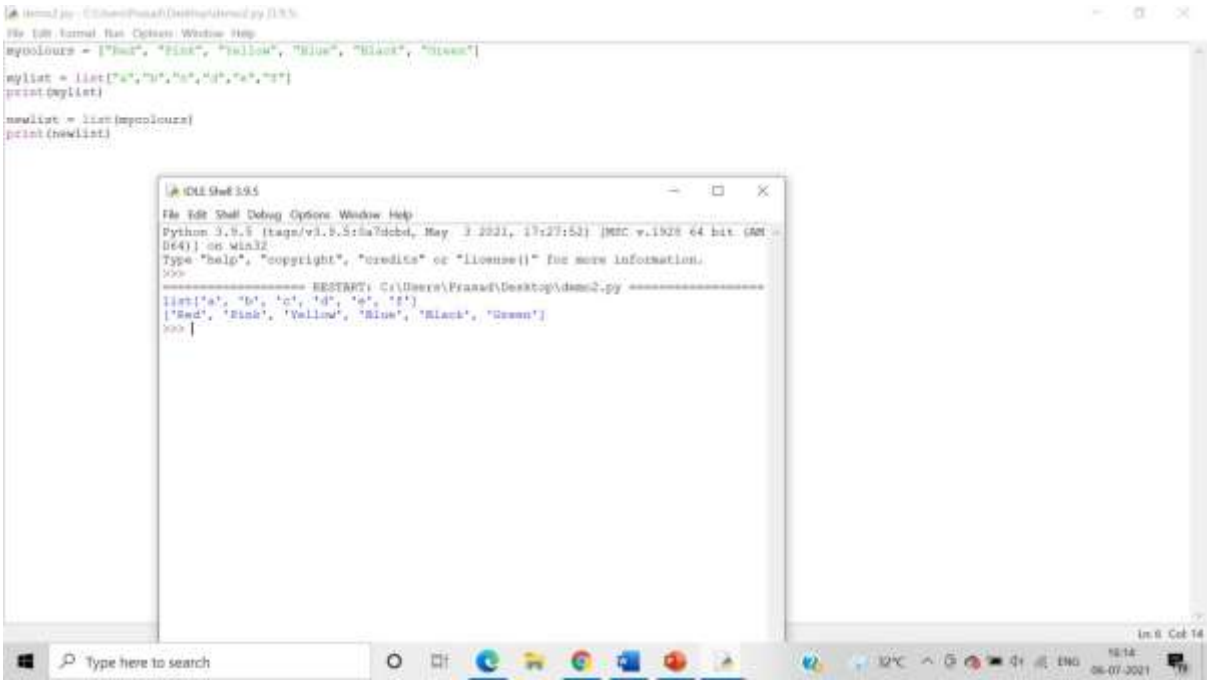
Using list constructor:



Creating copy of list:



Creating copy of list using list constructor:



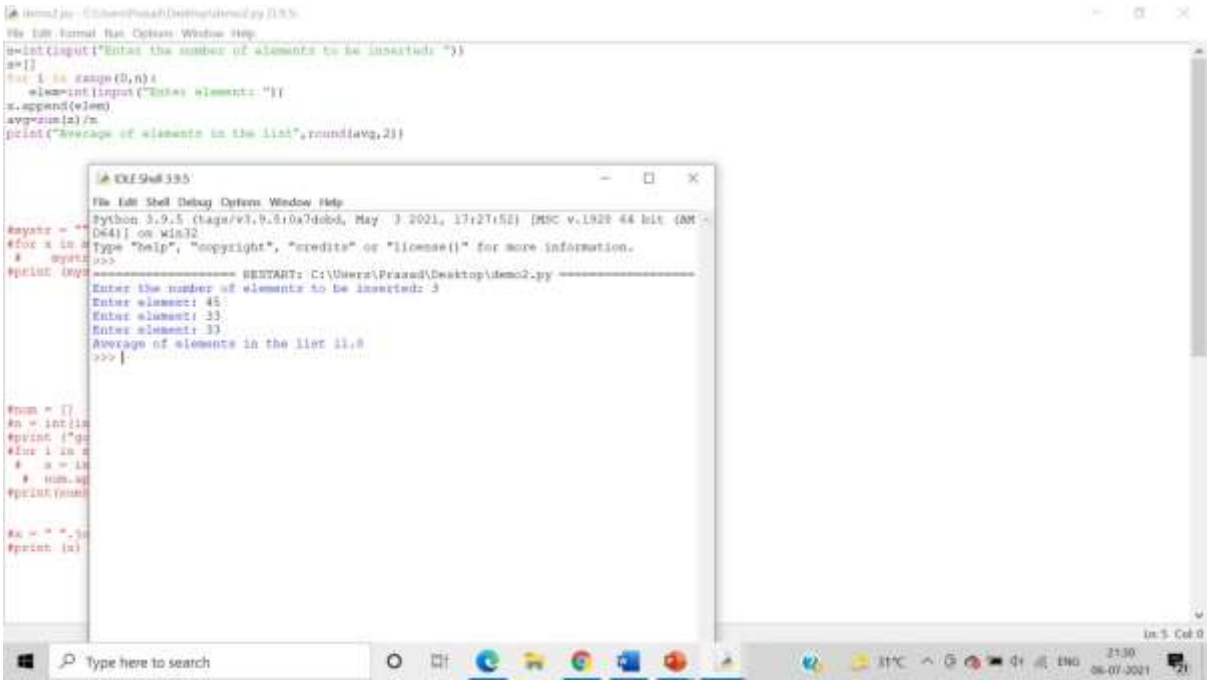
3. Write a program demonstrating printing of list elements using for in and range() function

Algorithm:-

Step 1: Declare a list by assigning it to a variable

Step 2: The range() gives us a sequence of numbers in between the two integers given to it.

Step 3: We can use the in and range() function to print the list elements using a for loop.



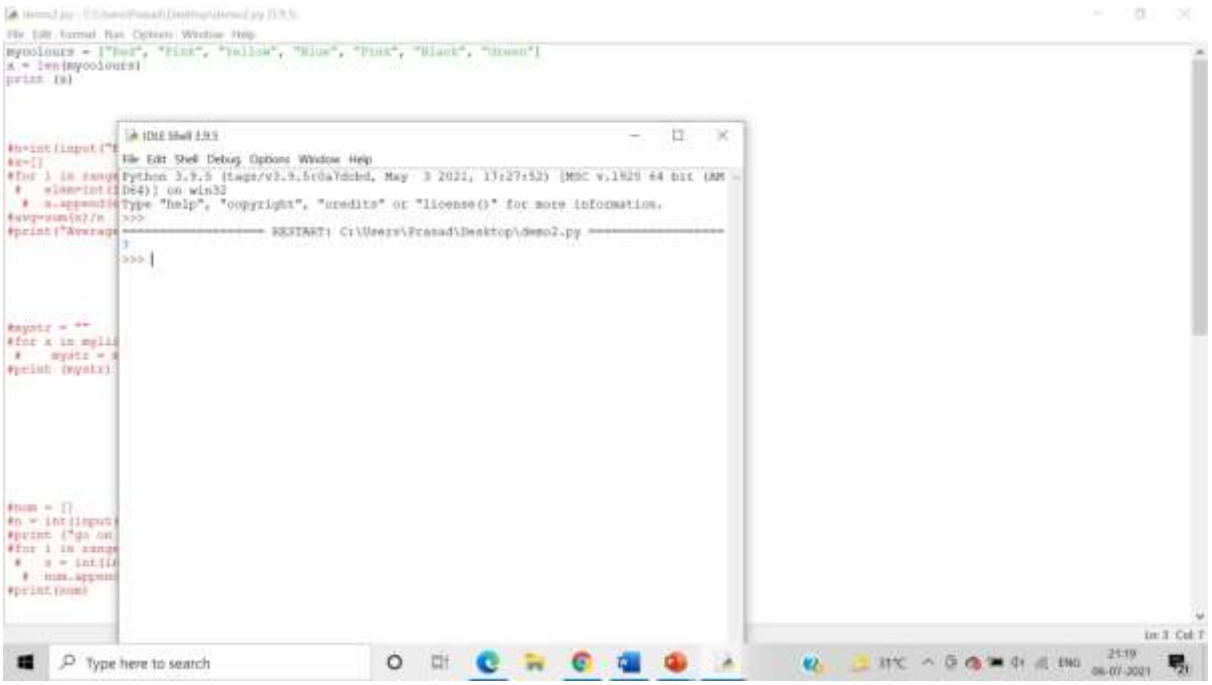
4. Write a program demonstrating len() and del() function.

Algorithm:-

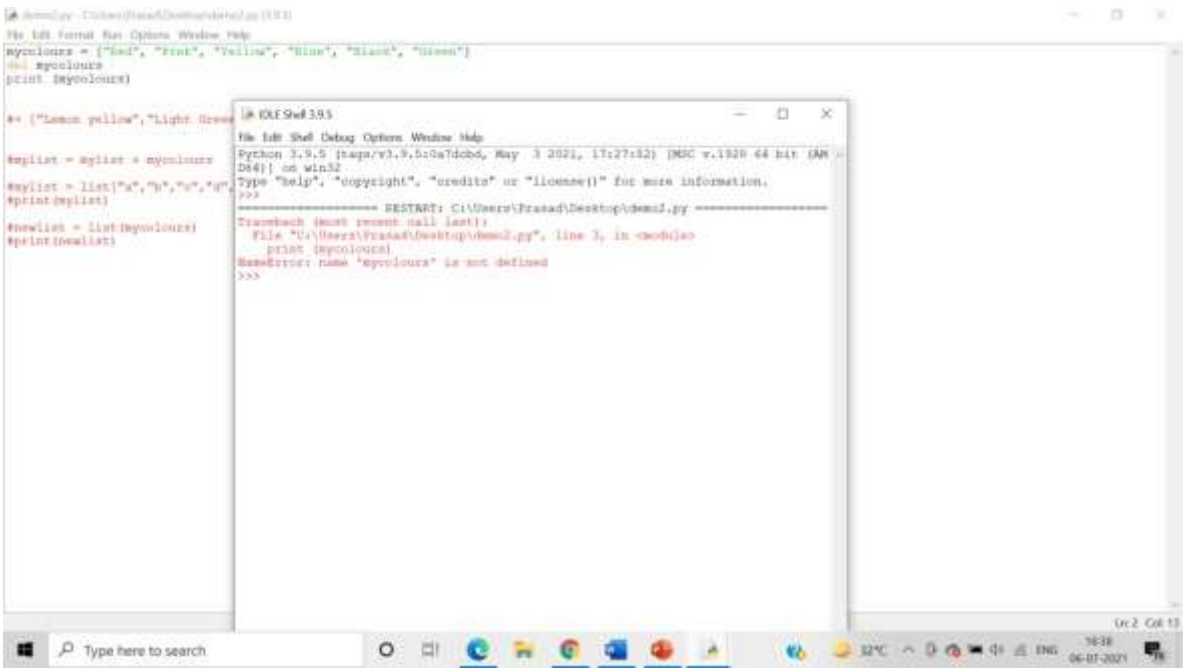
Step 1: The len() function is used to obtain the length of the list

Step 2: The del() function deletes all the elements in range starting from index ‘a’ till ‘b’ mentioned in arguments.

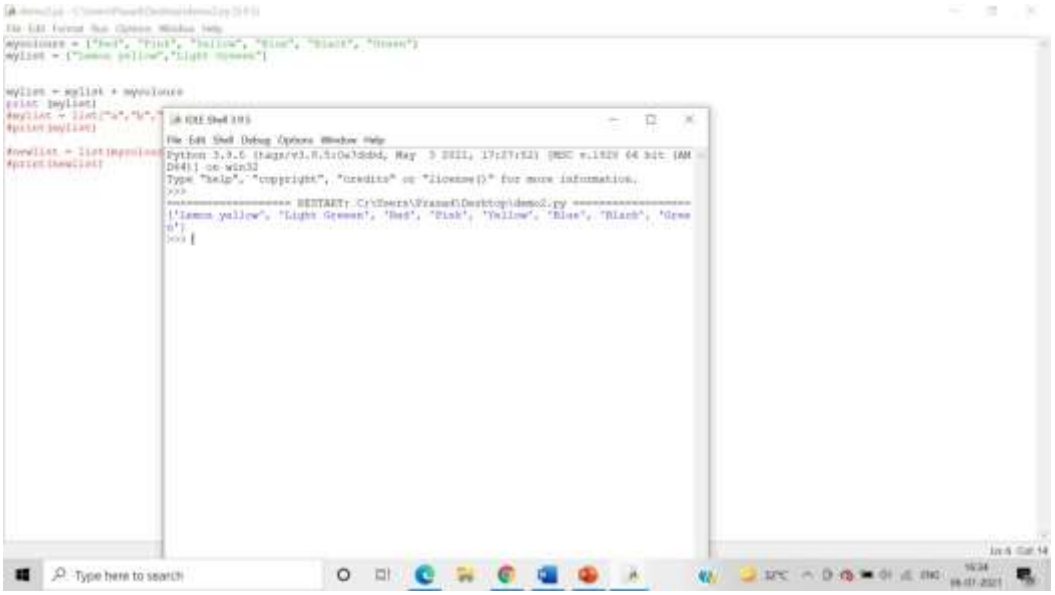
Len()

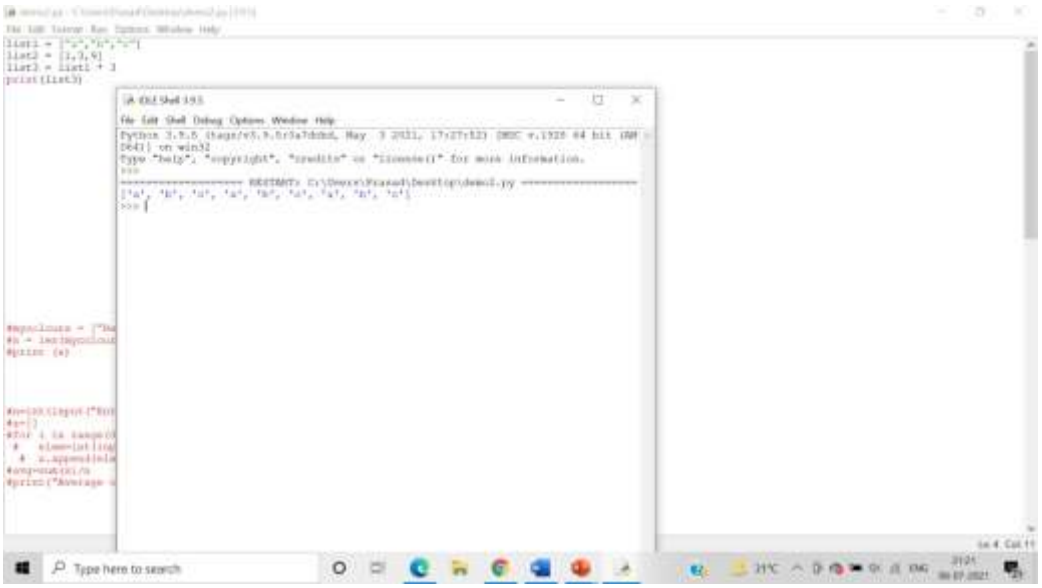


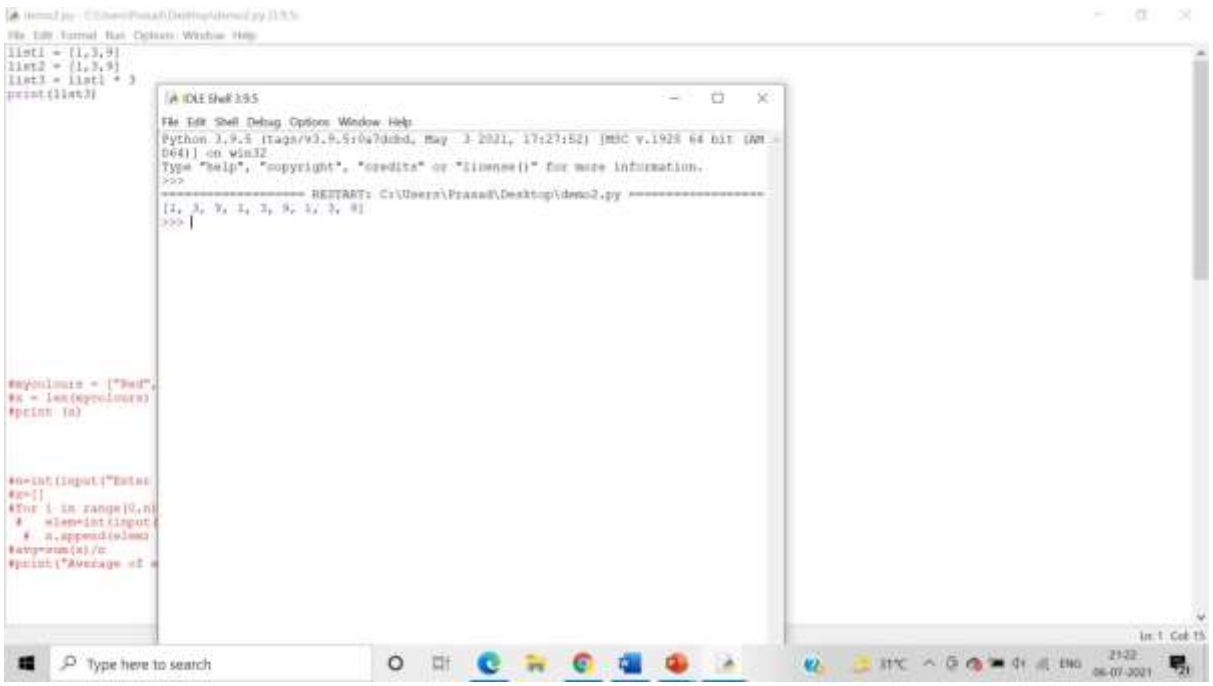
del()



5. Write a program demonstrating usage of '+' and '*' operators on lists Algorithm:-
Step 1: The '+' operator is used to concatenate the 2 lists into a single list.
Step 2: The '*' operator is used to to **multiply the list "n" times**.
Program demonstrating usage of '*' operator:
Code: Program demonstrating usage of '+' operator:






IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
[1, 3, 9, 1, 3, 9, 1, 3, 9]
>>>
Type here to search

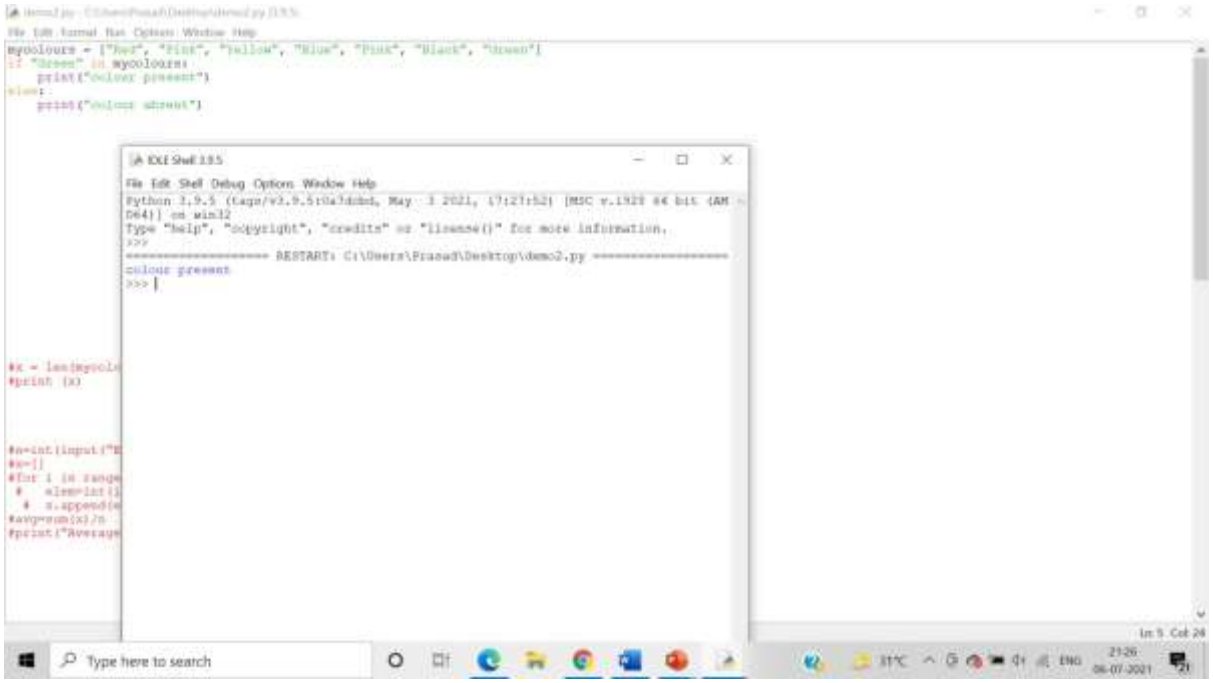
6. Write a program demonstrating “in” and “not in” keywords on lists

Algorithm:-

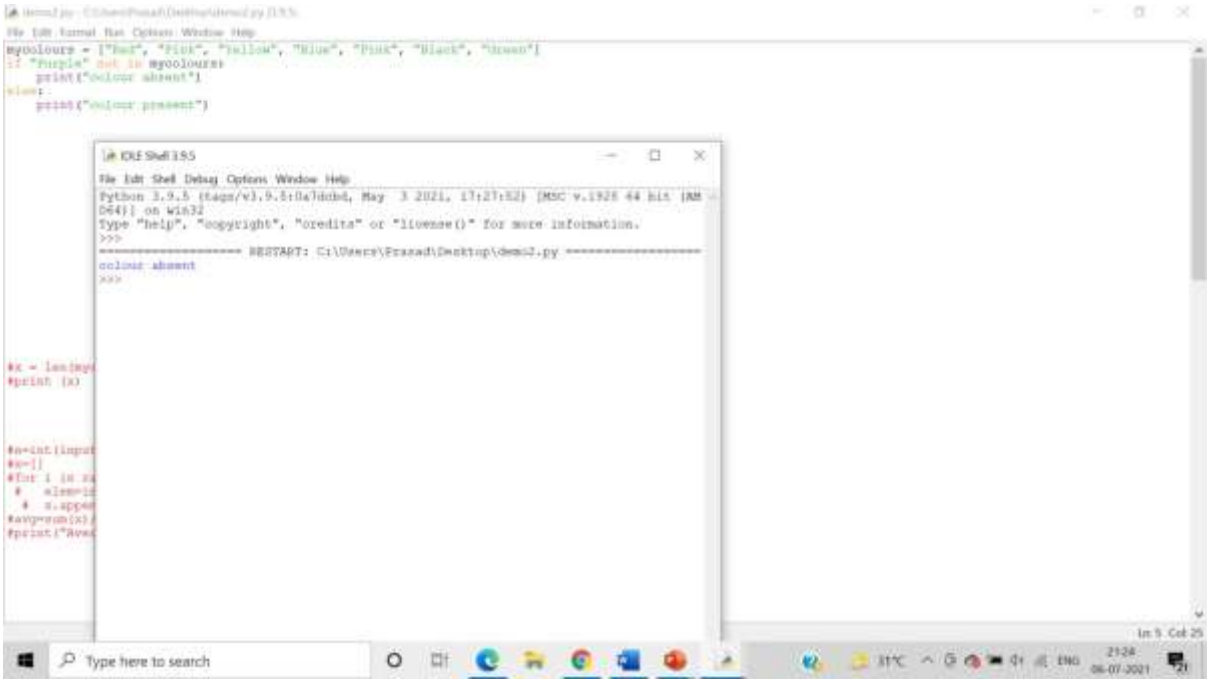
Step 1: - The ‘in’ operator is used to check if an element is present in the list or not. Returns true if element is present in list else returns false.

Step 2: The ‘not in’ operator is used to check if an element is not present in the list or not. Returns true if element is not present in list else returns false.

Answer: Program demonstrating “in” keyword:



Program demonstrating “not in” keyword:



7. Write set of programs for demonstrating the usage of all the different Lists methods along with their variations

Algorithm:-

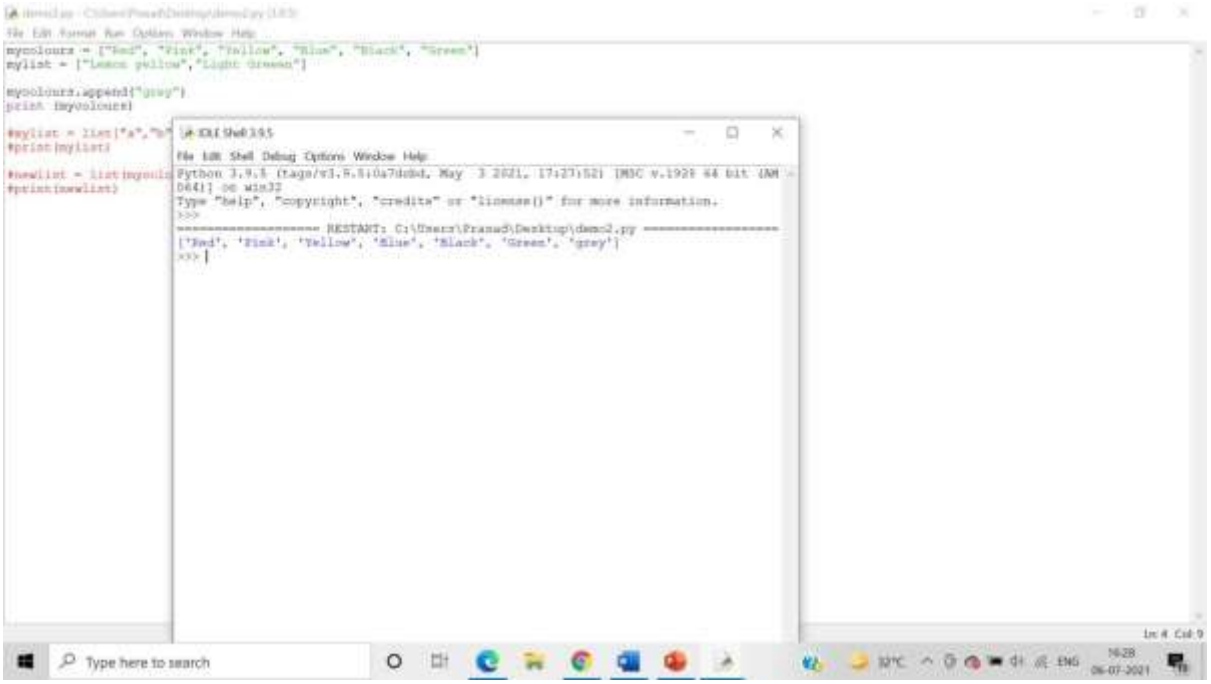
Step 1: The append() function is used to add values to a given list.

Step 2: The clear() function is used to erase all the elements of list. After this operation, list becomes empty.

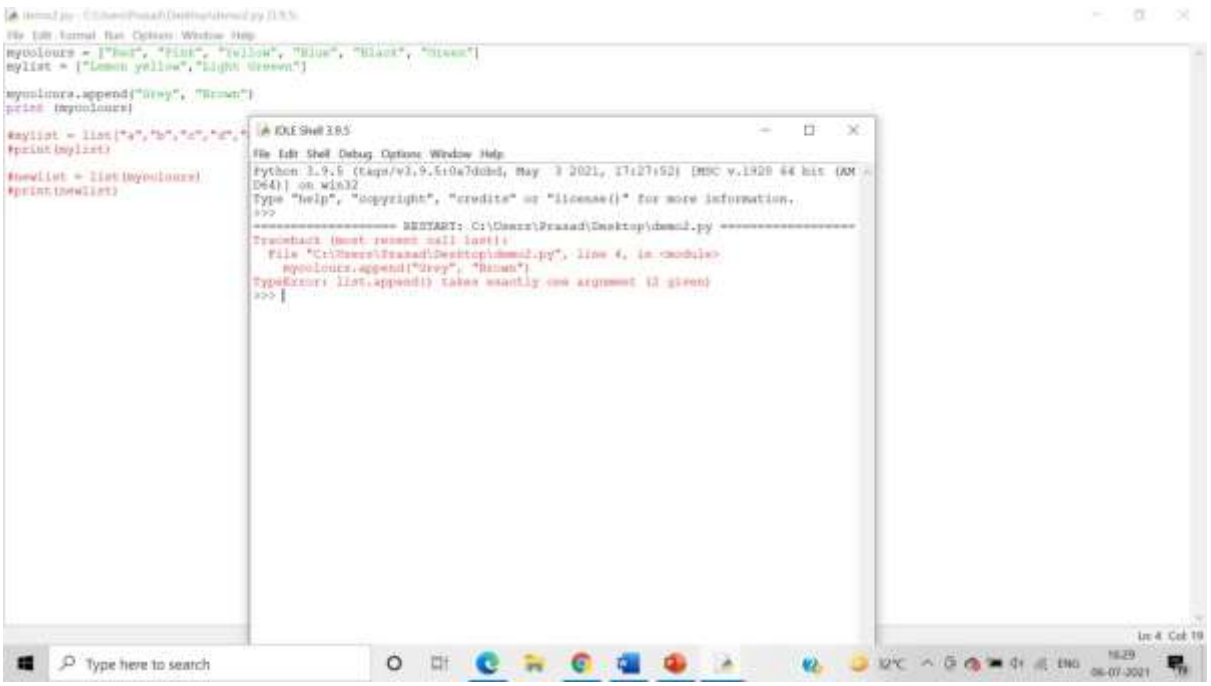
Step 3: The copy() function is used to copy elements in a list and to assign it to a new variable.

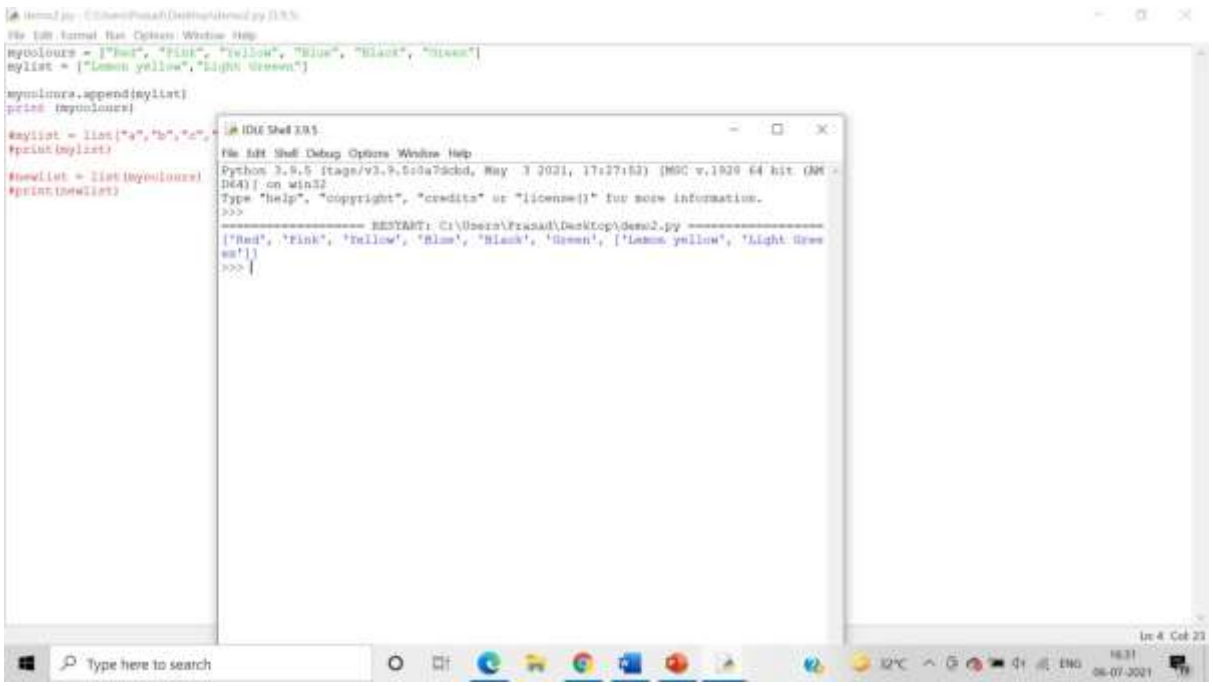
Step 4: The count() function counts the number of occurrences of elements in list.

- Append()

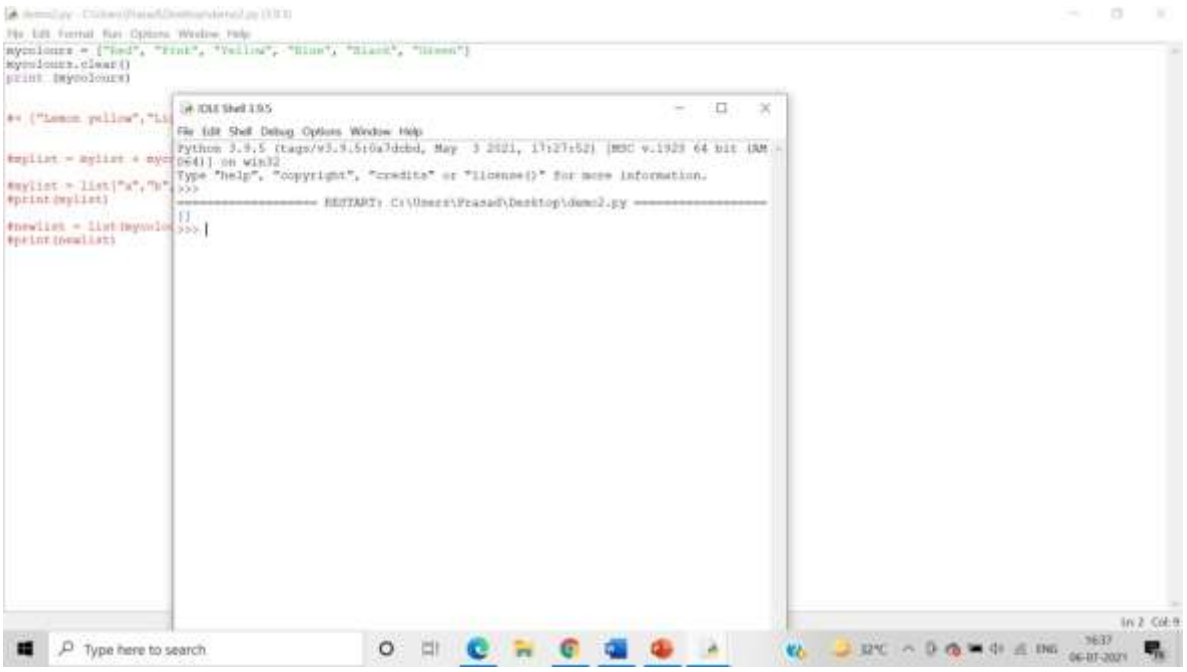


Adding 2 elements:

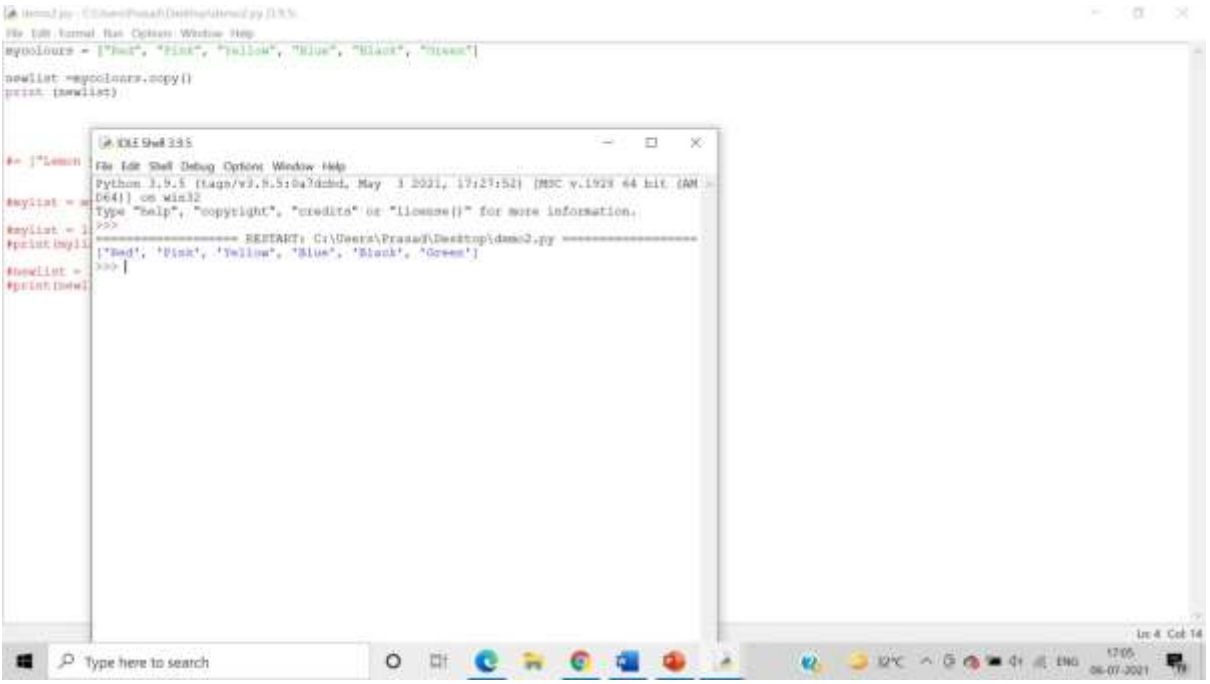



myclours = ["Red", "Pink", "Yellow", "Blue", "Black", "Green"]
mylist = ["Lemon yellow","Light Green"]
myclours.append(mylist)
print (myclours)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
['Red', 'Pink', 'Yellow', 'Blue', 'Black', 'Green', ['Lemon yellow', 'Light Gree
n']]
>>>
Type here to search

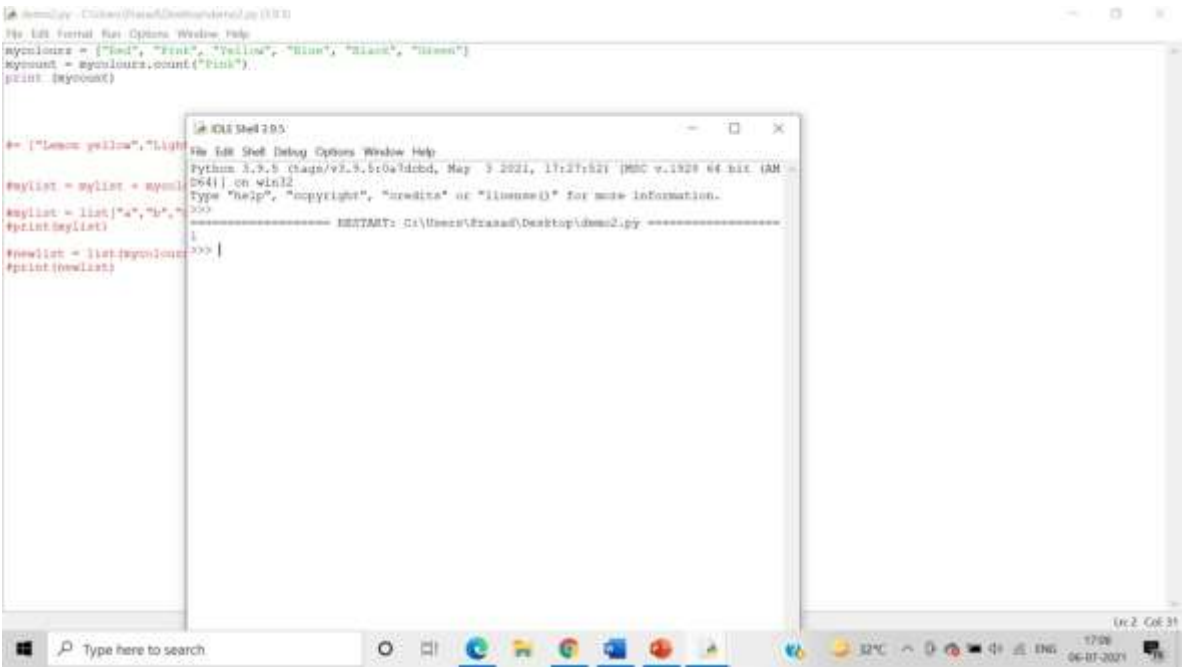
- Clear()

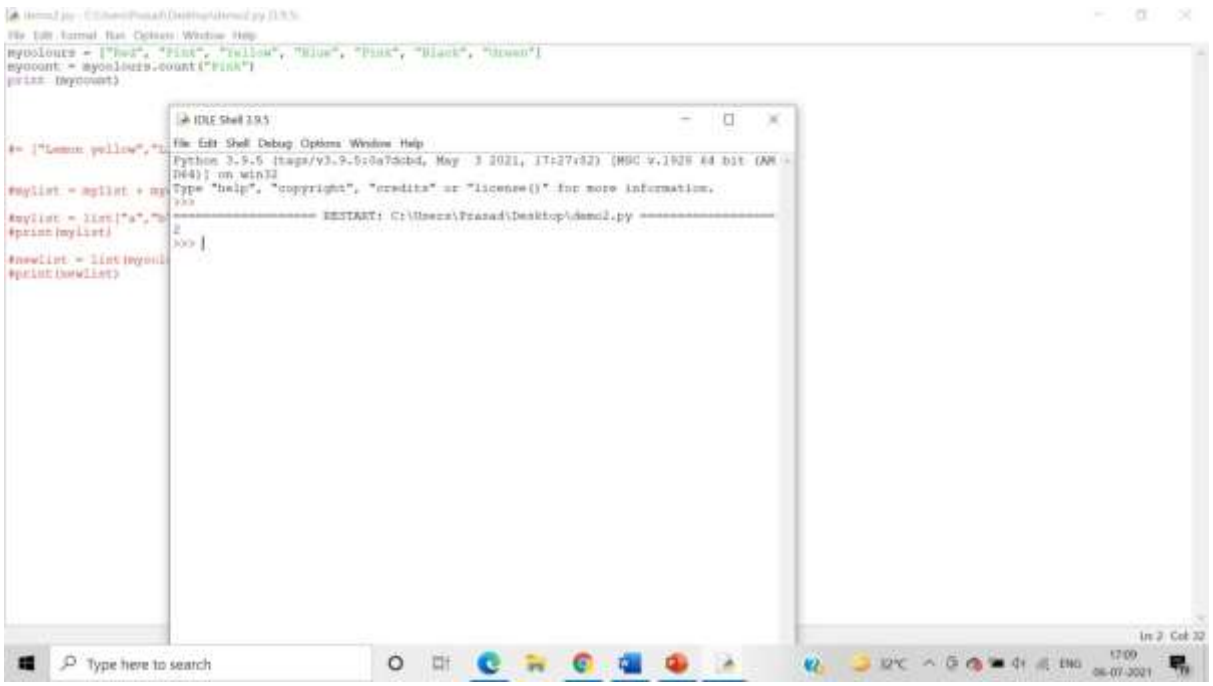

myclours = ["Red", "Pink", "Yellow", "Blue", "Black", "Green"]
myclours.clear()
print (myclours)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
[]
>>>
Type here to search

- Copy()

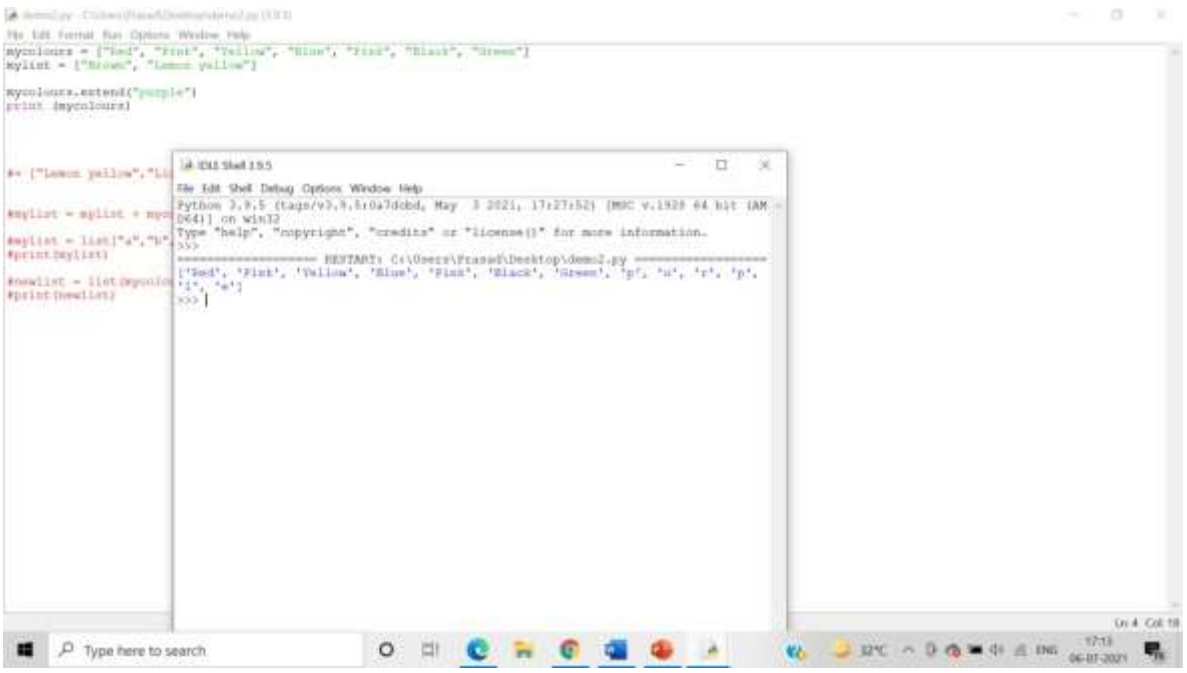

mycolours = ["Red", "Pink", "Yellow", "Blue", "Black", "Green"]
newlist =mycolours.copy()
print (newlist)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
['Red', 'Pink', 'Yellow', 'Blue', 'Black', 'Green']
>>>
Type here to search

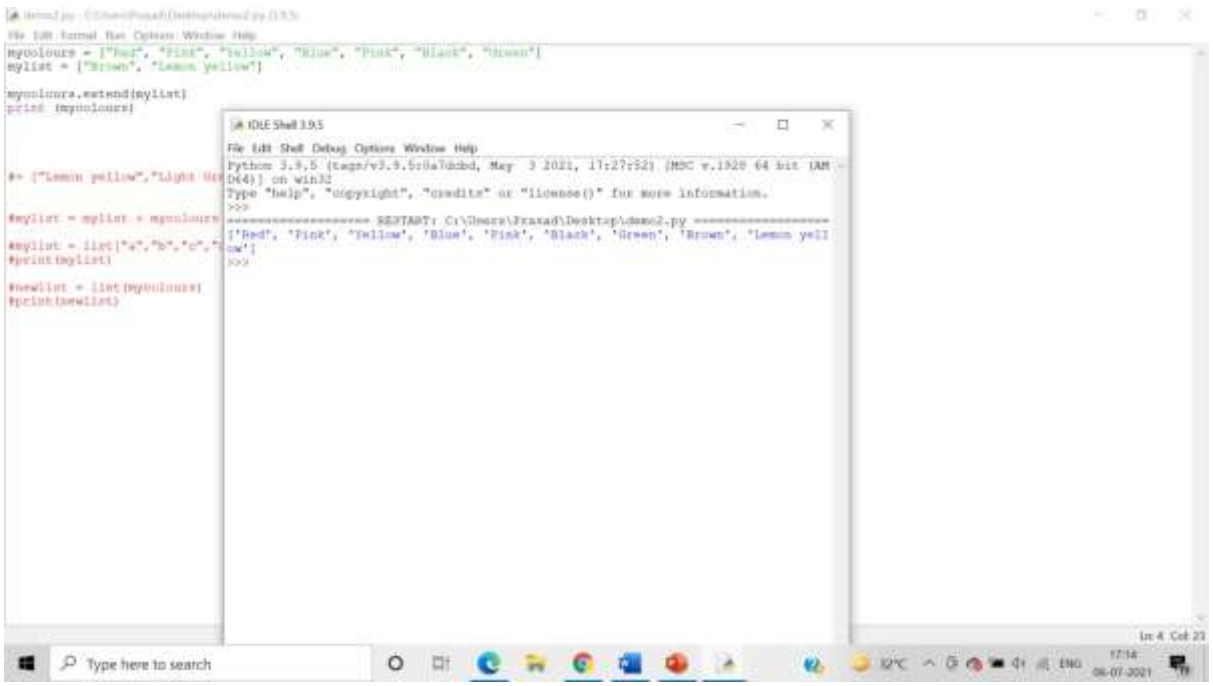
- Count()


mycolours = ["Red", "Pink", "Yellow", "Blue", "Black", "Green"]
mycount = mycolours.count("Pink")
print (mycount)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
1
>>>
Type here to search

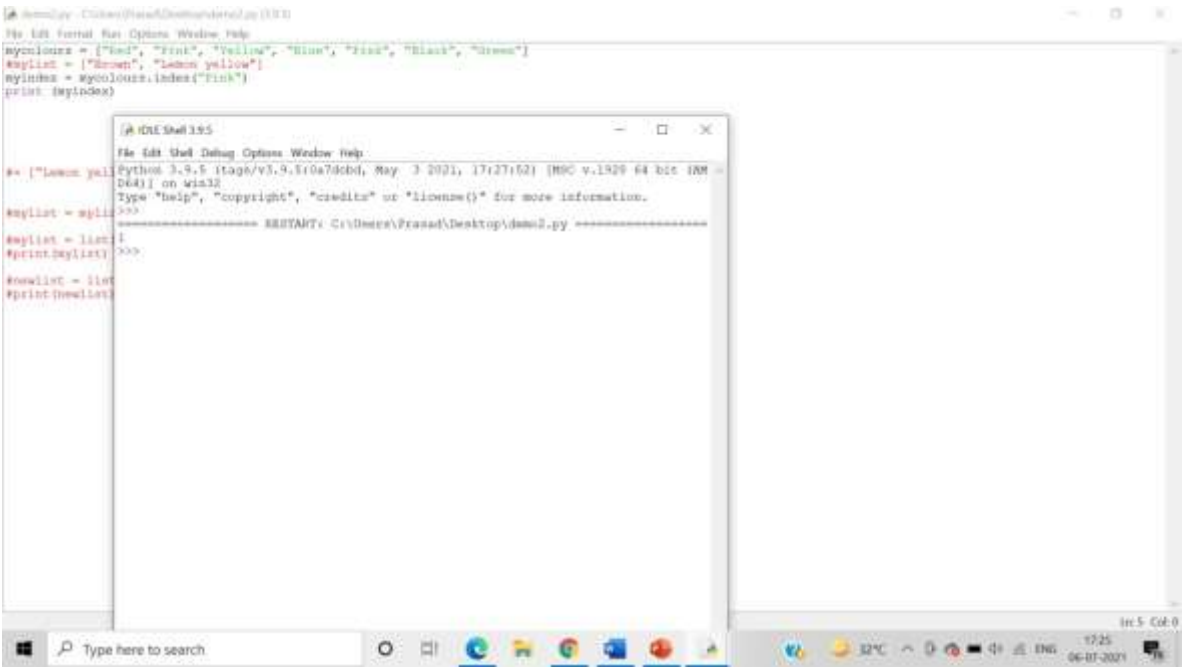

mycolours = ["Red", "Pink", "Yellow", "Blue", "Pink", "Black", "Green"]
mycount = mycolours.count("Pink")
print (mycount)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
2
>>>
Type here to search

- Extend()

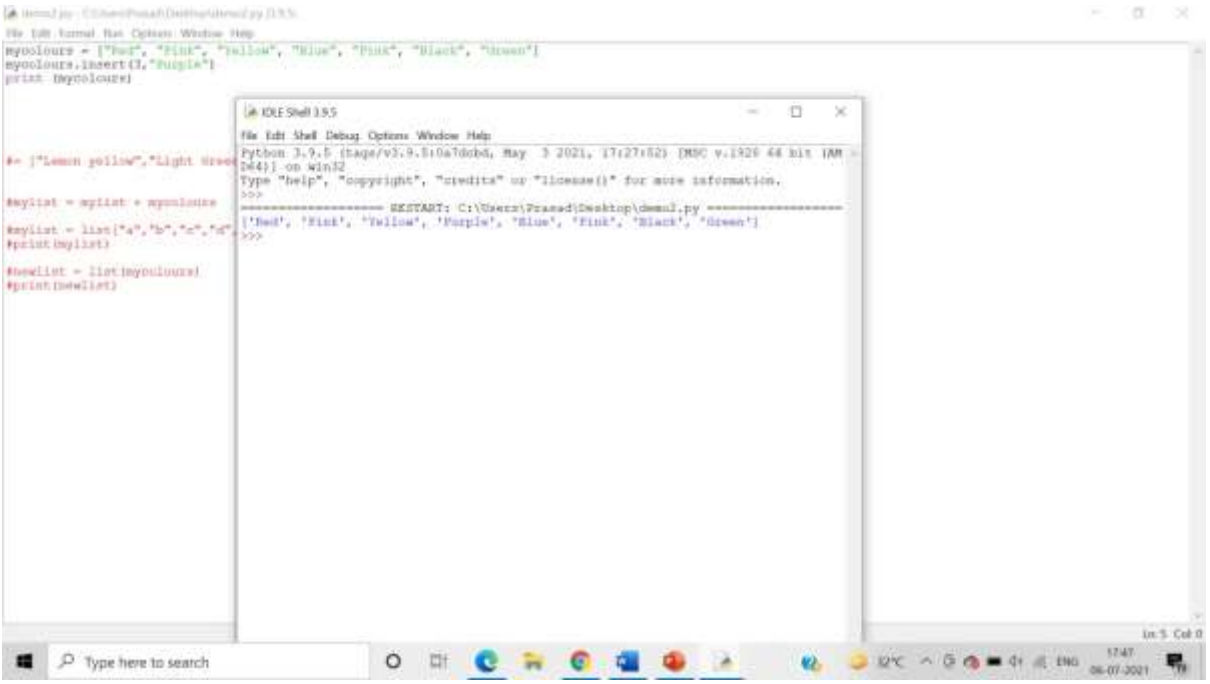

mycolours = ["Red", "Pink", "Yellow", "Blue", "Pink", "Black", "Green"]
mylist = ["Brown", "Lemon yellow"]
mycolours.extend("purple")
print (mycolours)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
['Red', 'Pink', 'Yellow', 'Blue', 'Pink', 'Black', 'Green', 'p', 'u', 'r', 'p',
'l', 'e']
>>>
Type here to search


mycolours = ["Red", "Pink", "Yellow", "Blue", "Pink", "Black", "Green"]
mylist = ["Brown", "Lemon yellow"]
mycolours.extend(mylist)
print (mycolours)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1920 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
['Red', 'Pink', 'Yellow', 'Blue', 'Pink', 'Black', 'Green', 'Brown', 'Lemon yell
ow']
>>>
Type here to search

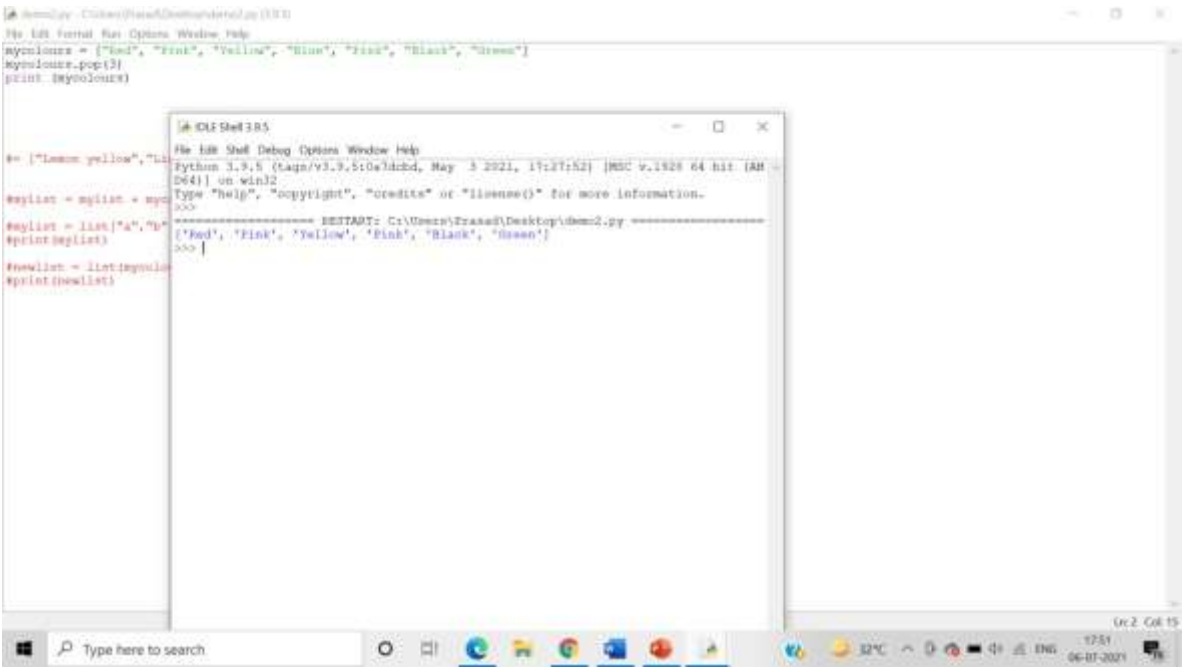
- Index()


mycolours = ["Red", "Pink", "Yellow", "Blue", "Pink", "Black", "Green"]
mylist = ["Brown", "Lemon yellow"]
myindex = mycolours.index("Pink")
print (myindex)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1920 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
1
>>>
Type here to search

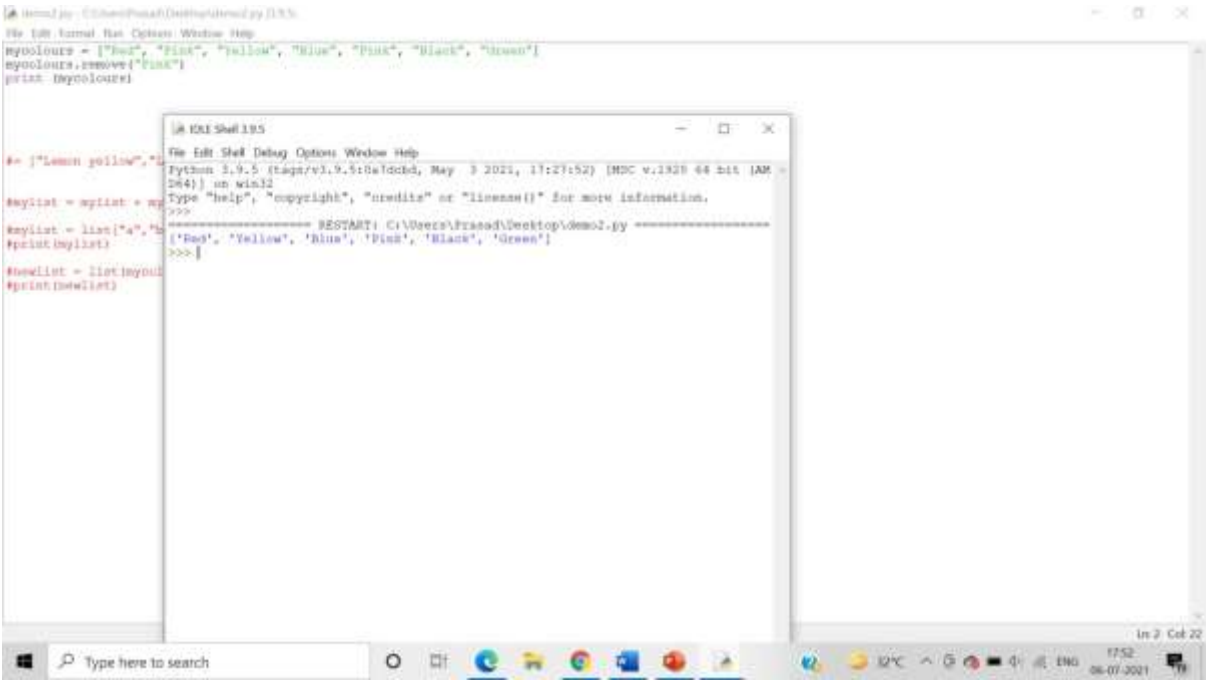
- Insert()


mycolours = ["Red", "Pink", "Yellow", "Blue", "Pink", "Black", "Green"]
mycolours.insert(3,"Purple")
print (mycolours)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
['Red', 'Pink', 'Yellow', 'Purple', 'Blue', 'Pink', 'Black', 'Green']
>>>
Type here to search

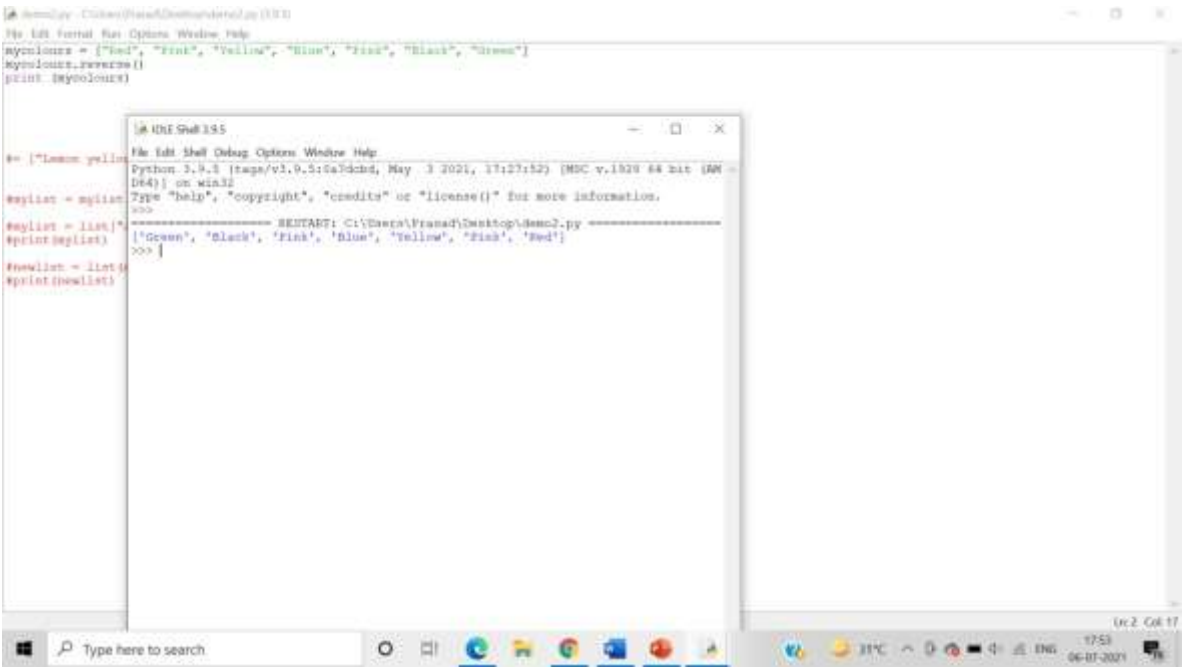
- Pop()


mycolours = ["Red", "Pink", "Yellow", "Blue", "Pink", "Black", "Green"]
mycolours.pop(3)
print (mycolours)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
['Red', 'Pink', 'Yellow', 'Pink', 'Black', 'Green']
>>>
Type here to search

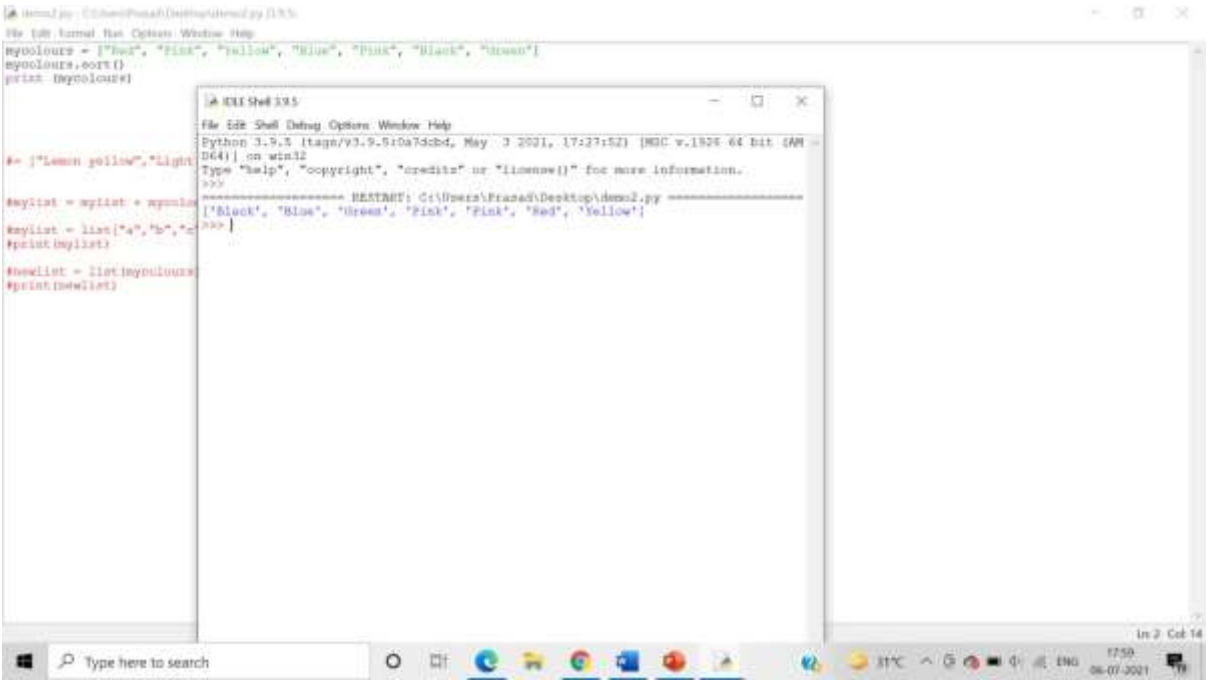
- Remove()



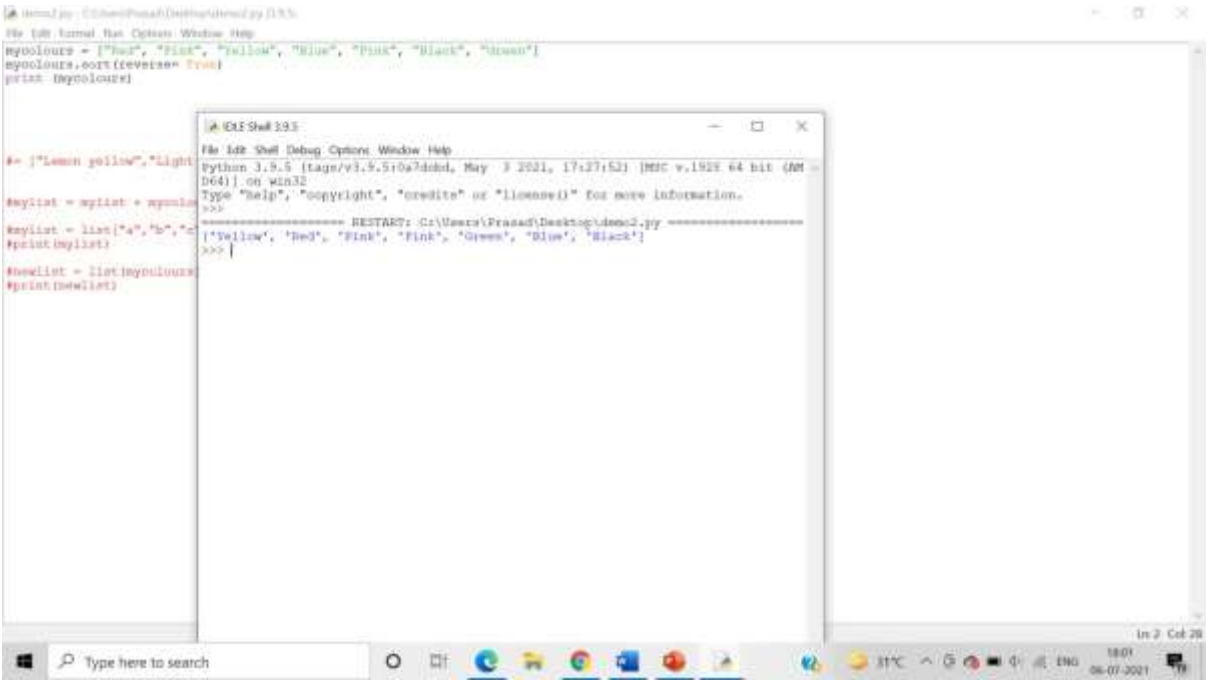
- Reverse()



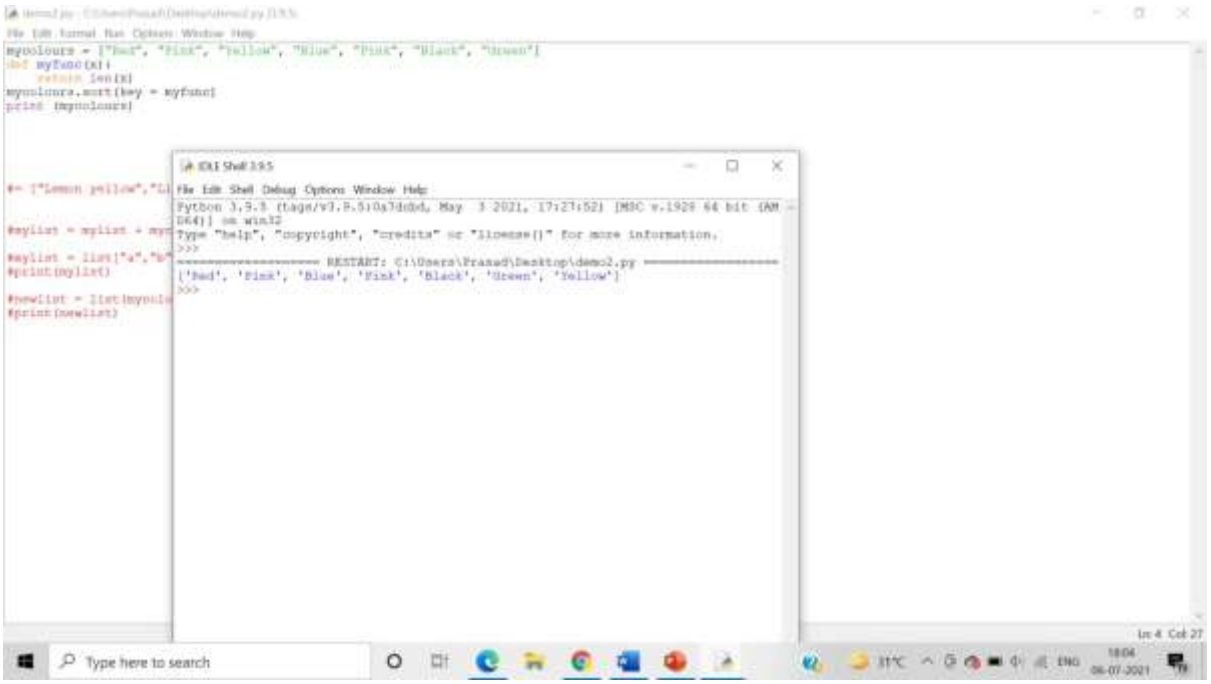
- Sort()



Using reverse parameters:



Declaring a function:



8. Write a program demonstrating conversion of string to list and list to a string

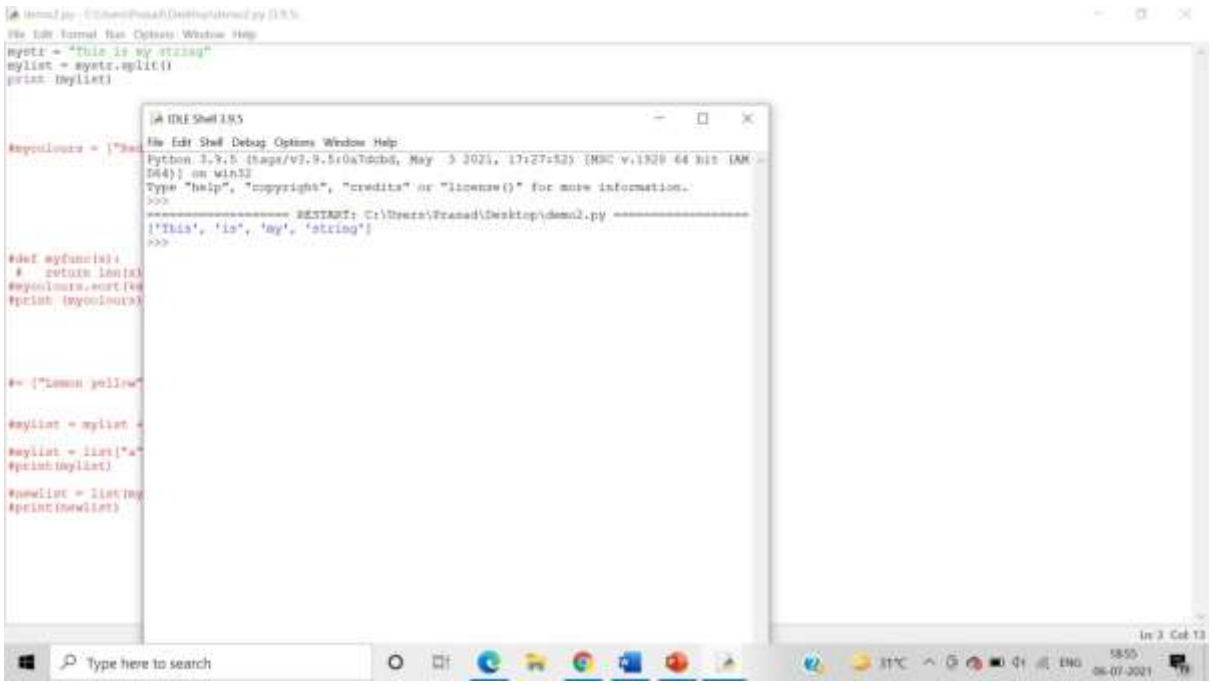
Algorithm:-

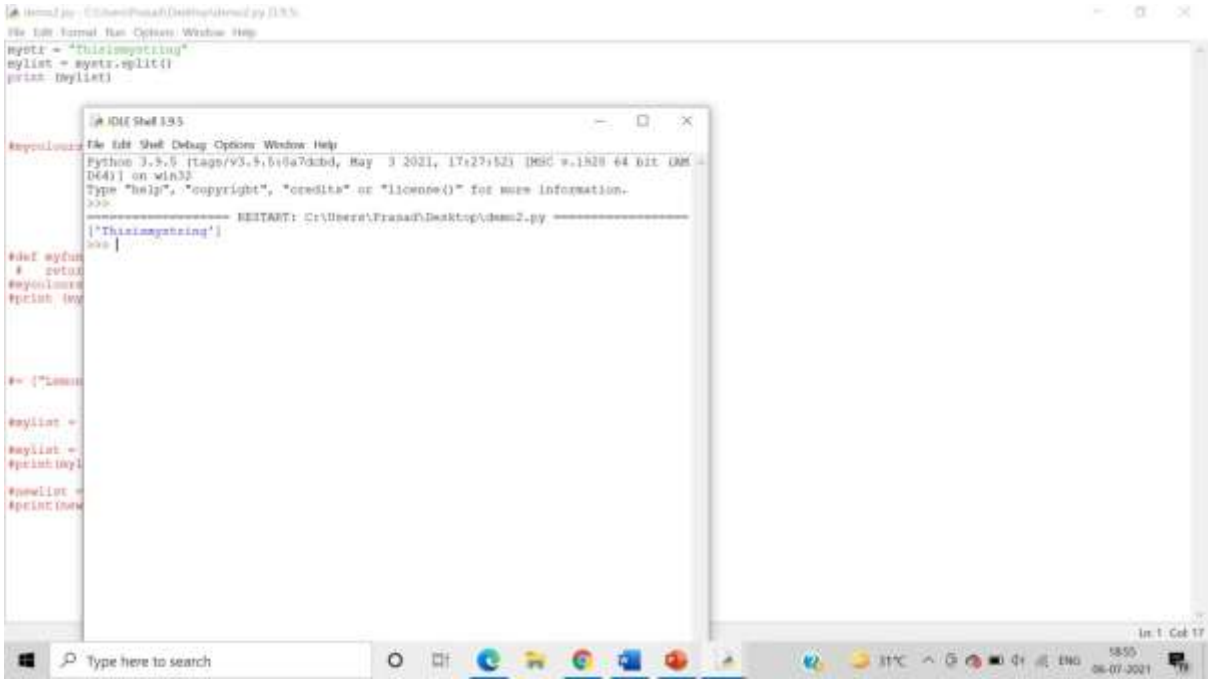
Step 1: We use the list() function to convert a string into a list.

Step 2: We the use the join() function to convert the values present in the list to a single string.

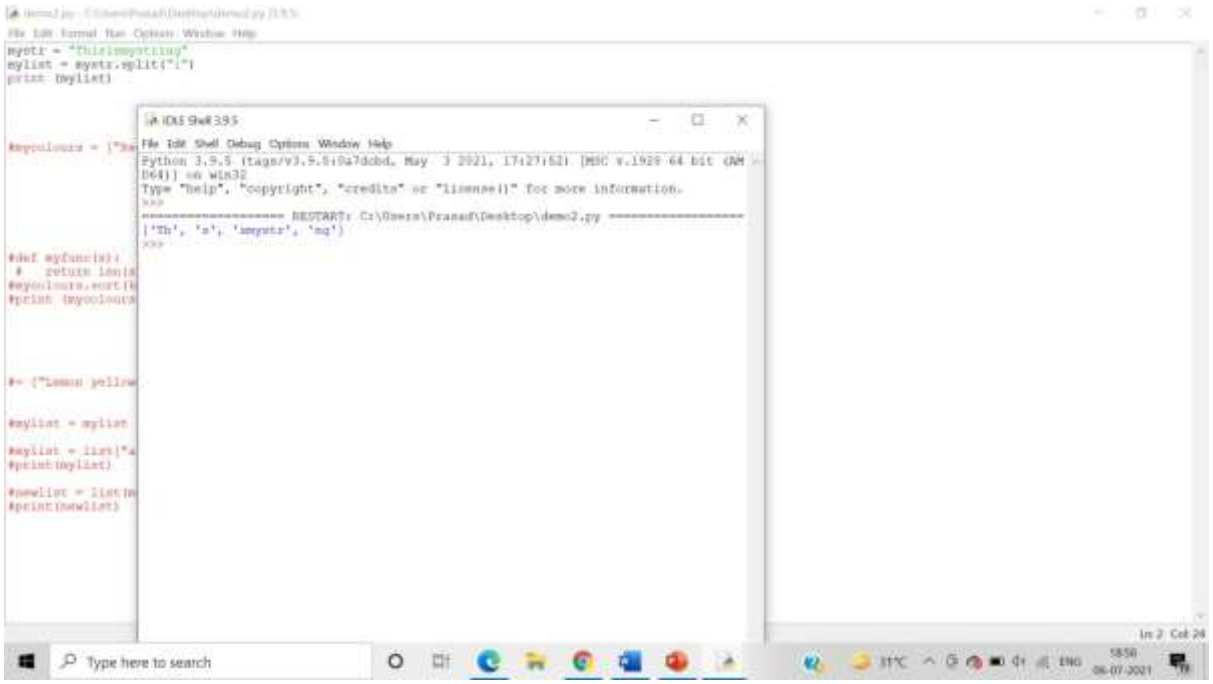
Answer: Program demonstrating conversion of string to list and list to a string: Splitting a string into a list (String Methods) –

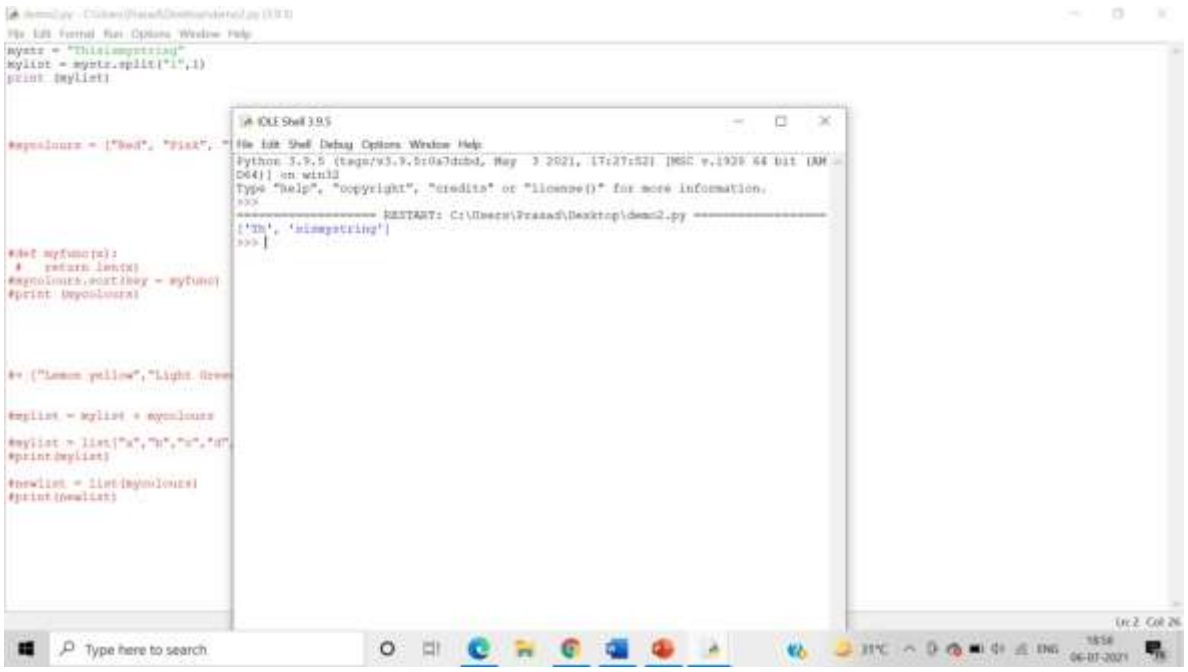
1. split()



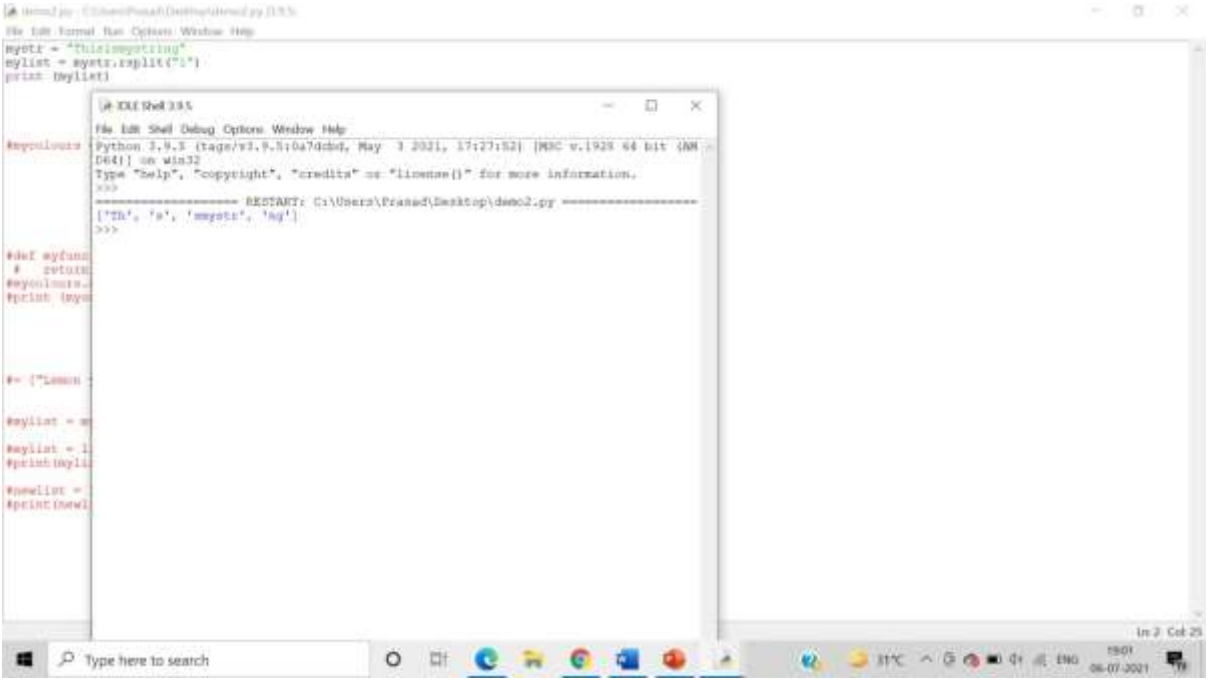


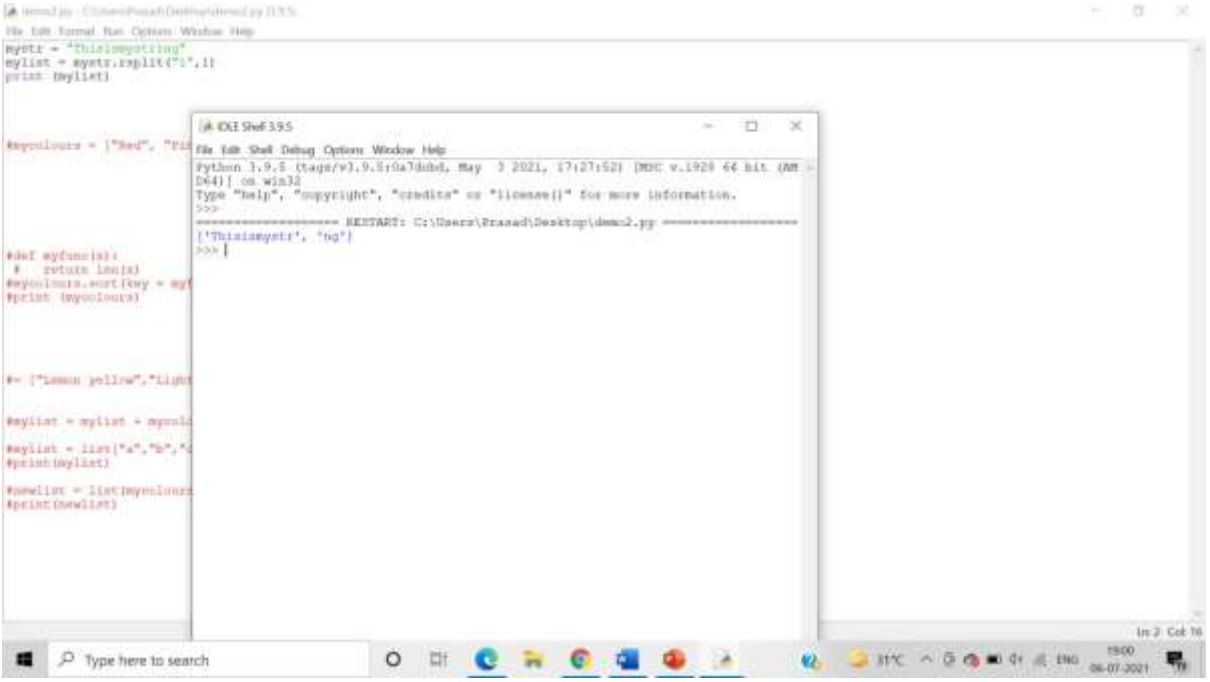
Splitting at the occurrence of “i”

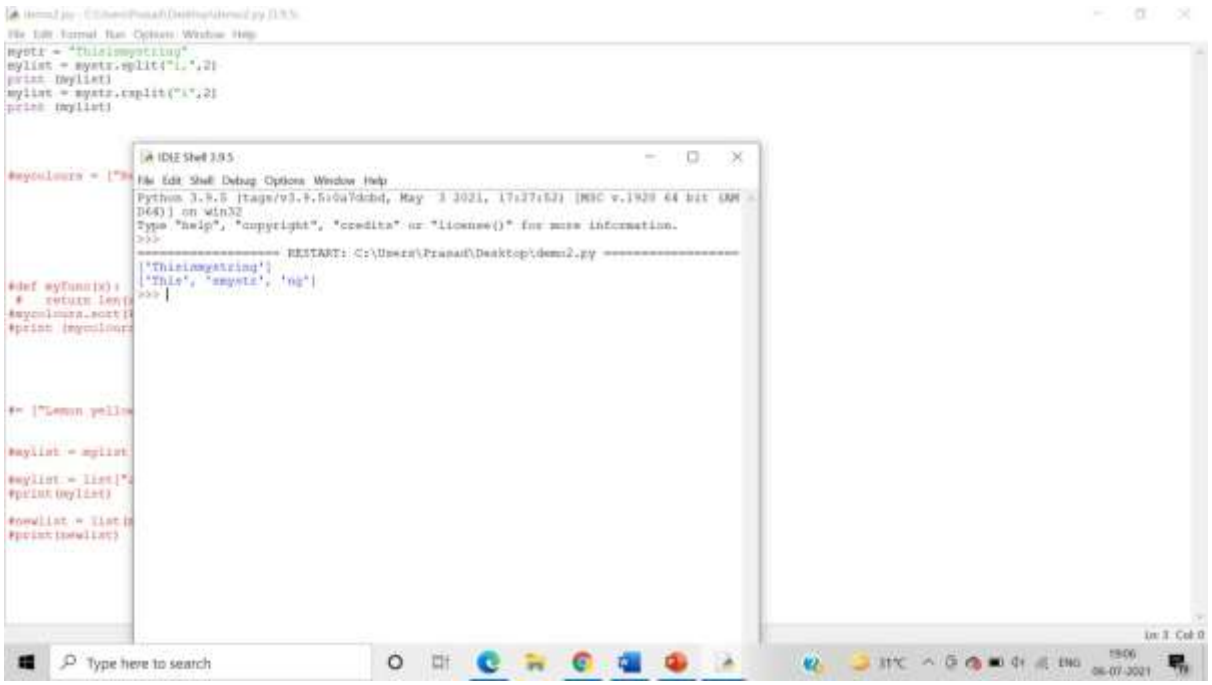




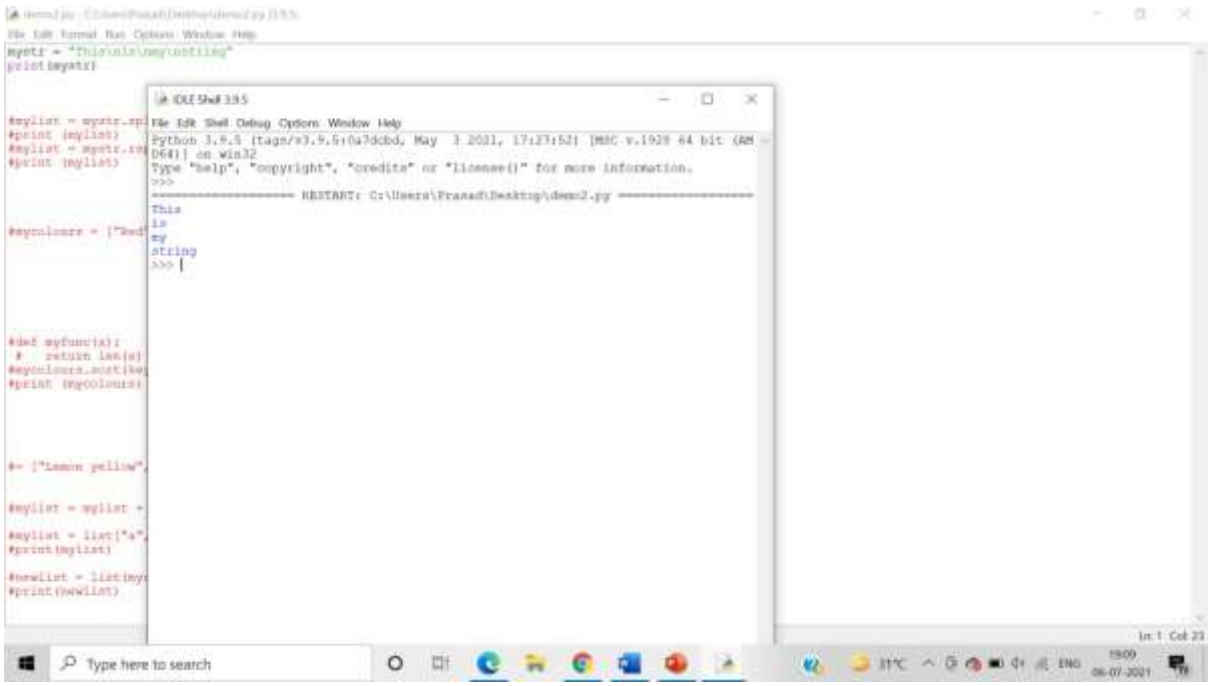
2. rsplit()

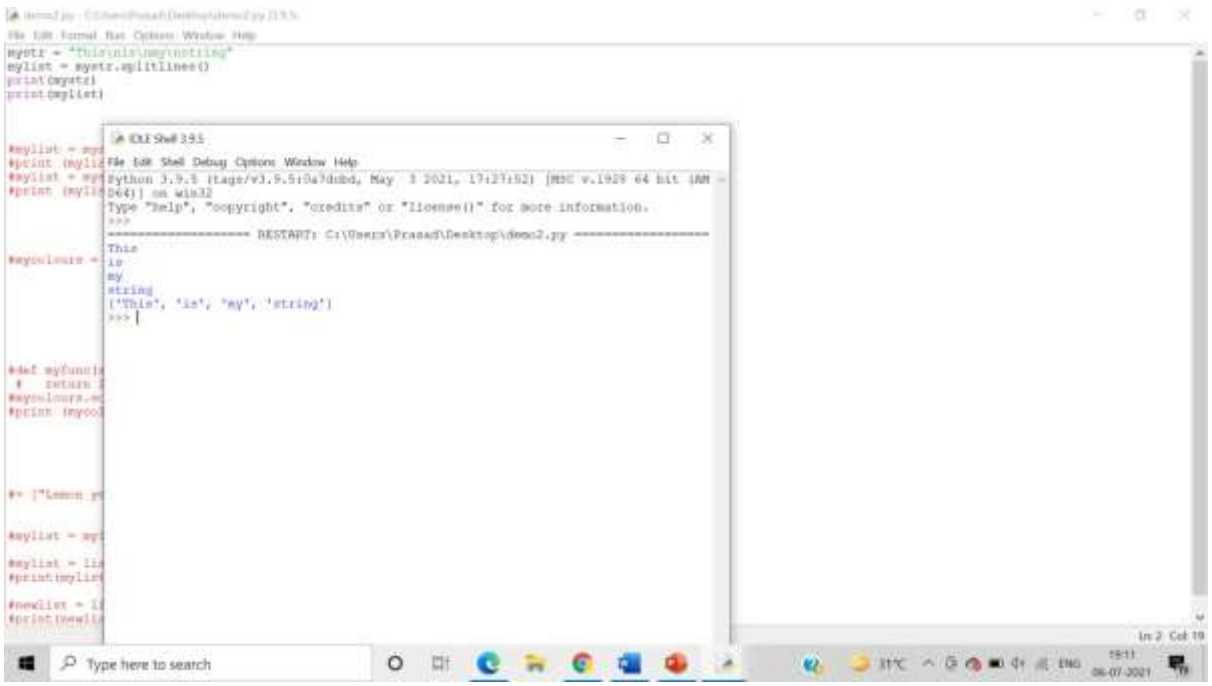

mystr = "Thisismystring"
mylist = mystr.rsplit("i")
print (mylist)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
['Th', 's', 'mystr', 'ng']
>>>
Type here to search

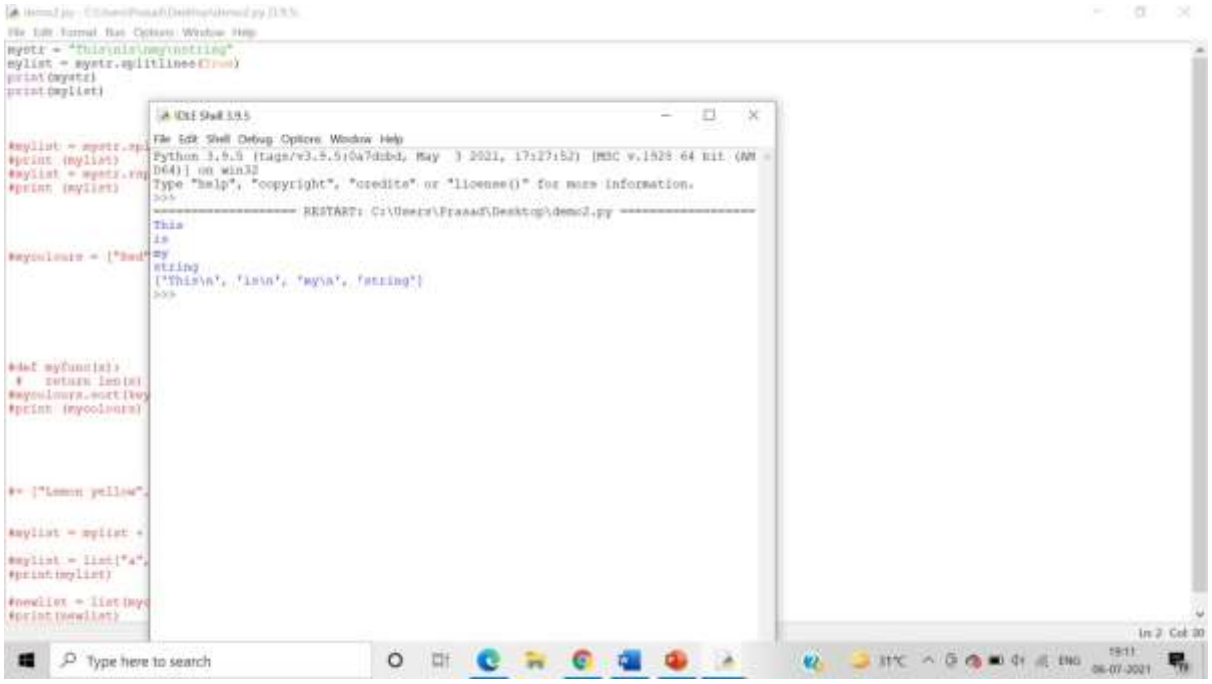

mystr = "Thisismystring"
mylist = mystr.rsplit("i",1)
print (mylist)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
['Thisismystr', 'ng']
>>>
Type here to search



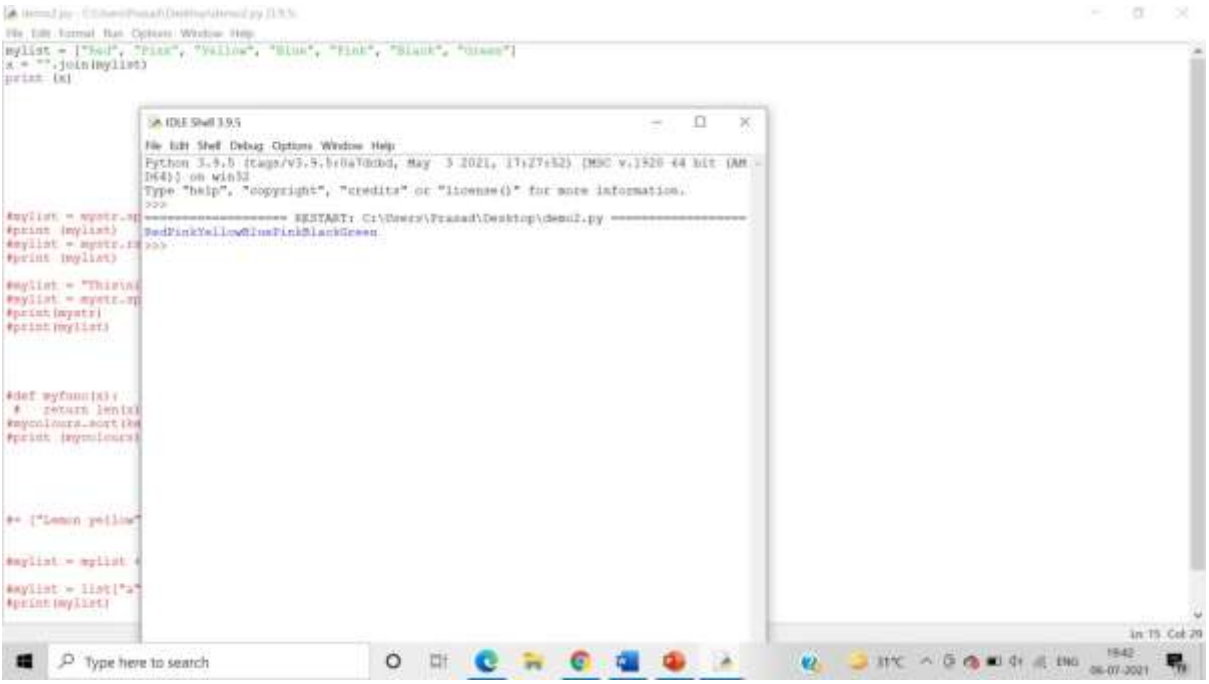
3. splitlines()

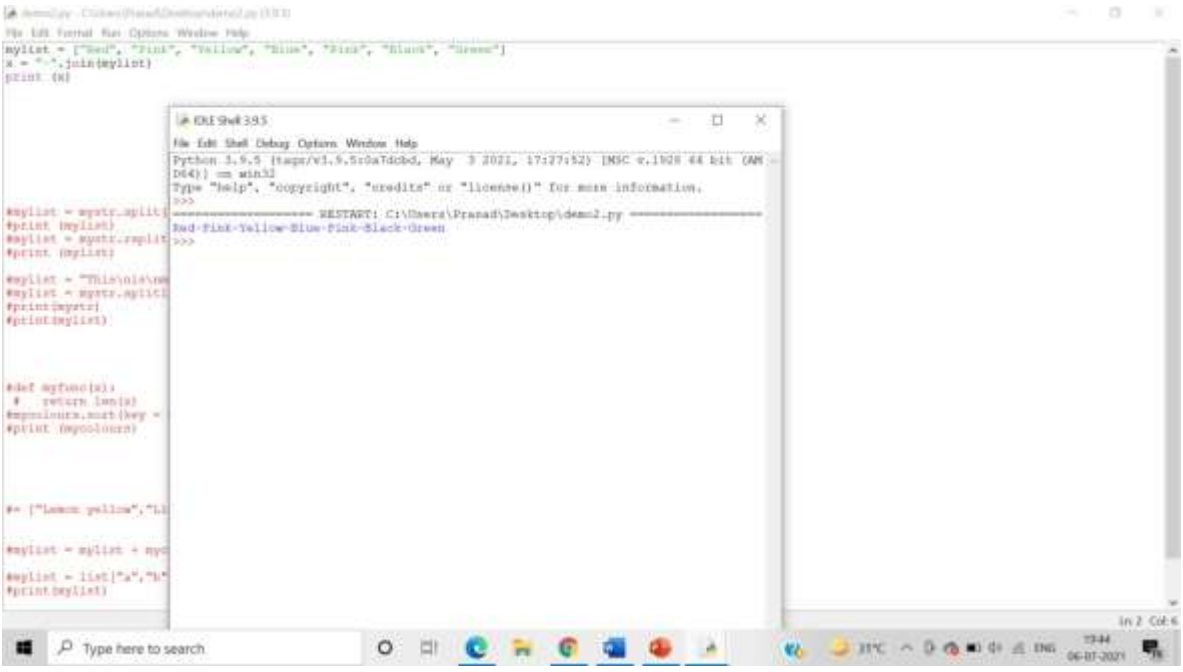


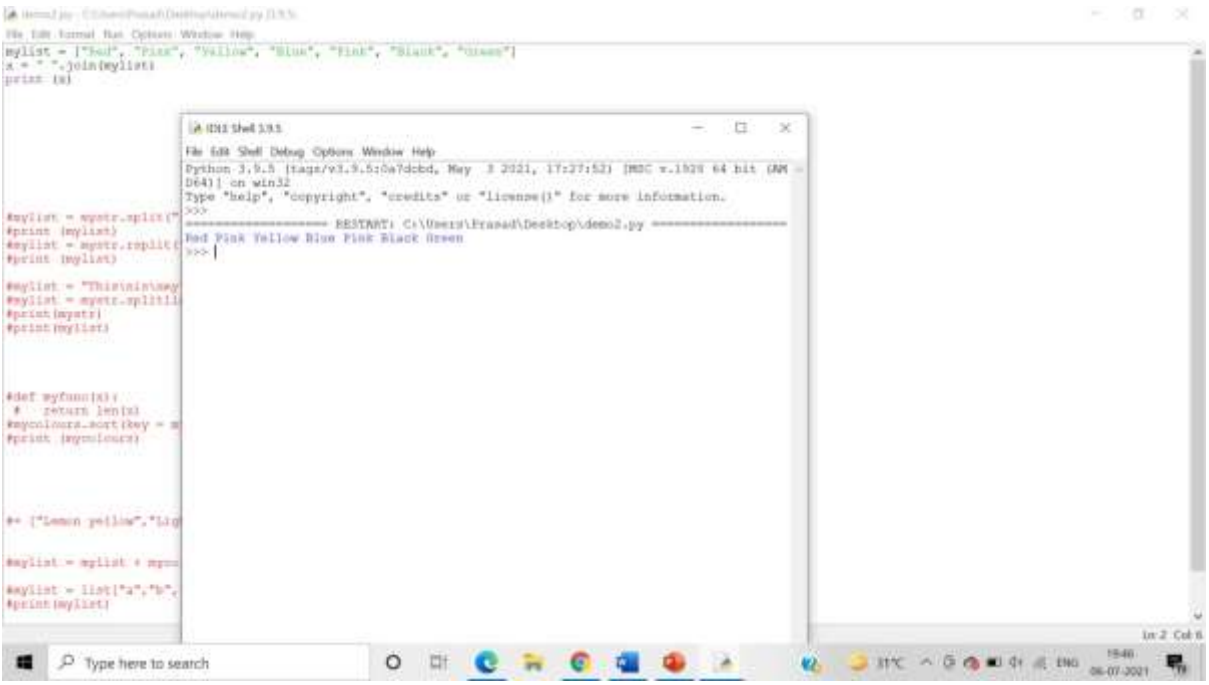

mystr = "This\nis\nmy\nstring"
mylist = mystr.splitlines()
print(mystr)
print(mylist)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
This
is
my
string
['This', 'is', 'my', 'string']
>>>
Type here to search


mystr = "This\nis\nmy\nstring"
mylist = mystr.splitlines(True)
print(mystr)
print(mylist)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
This
is
my
string
['This\n', 'is\n', 'my\n', 'string']
>>>
Type here to search

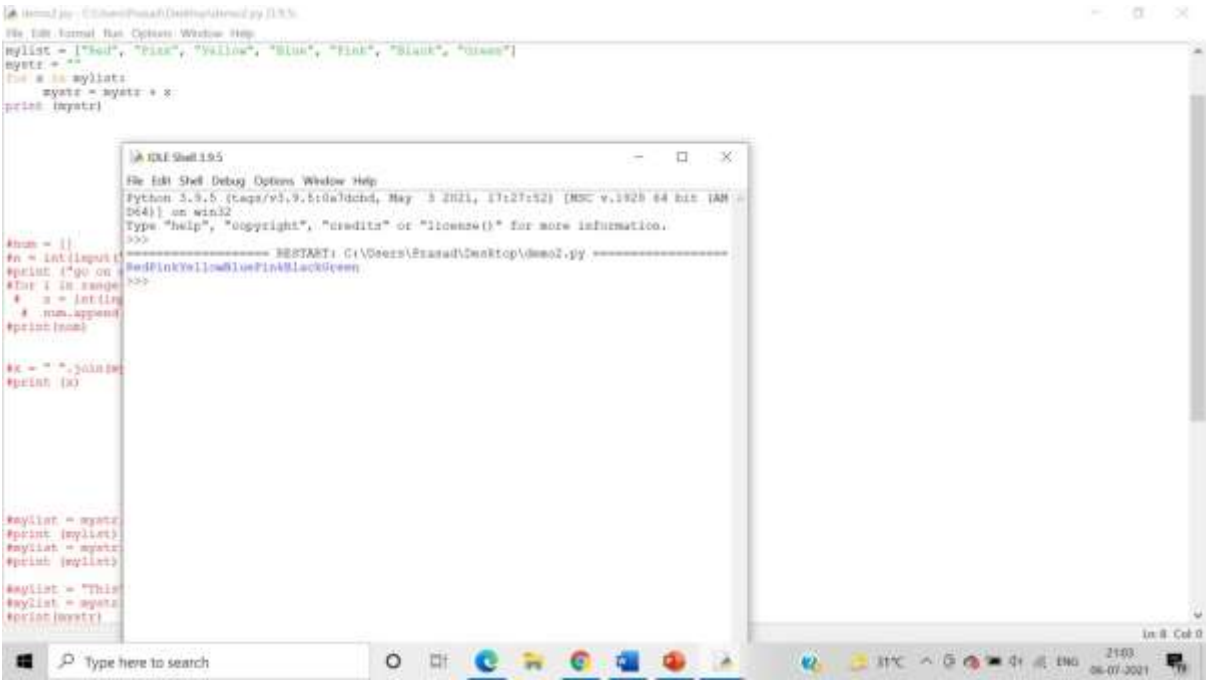
Joining a list into a string –
1. join() – list method






mylist = ["Red", "Pink", "Yellow", "Blue", "Pink", "Black", "Green"]
x = " ".join(mylist)
print (x)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
Red Pink Yellow Blue Pink Black Green
>>>
Type here to search

3. Use ‘for in’


mylist = ["Red", "Pink", "Yellow", "Blue", "Pink", "Black", "Green"]
mystr = ""
for x in mylist:
mystr = mystr + x
print (mystr)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
RedPinkYellowBluePinkBlackGreen
>>>
Type here to search

9. Write a program demonstrating declaration, accessing- Indexing and splicing of tuples and its elements.

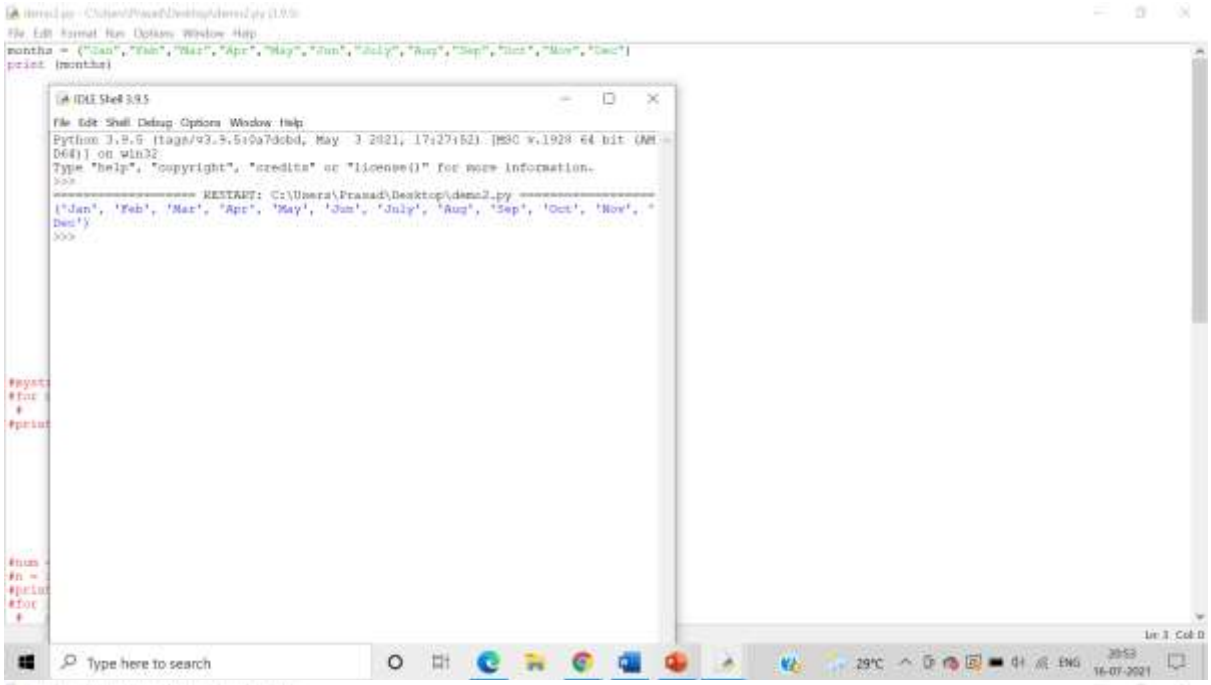
Algorithm:-

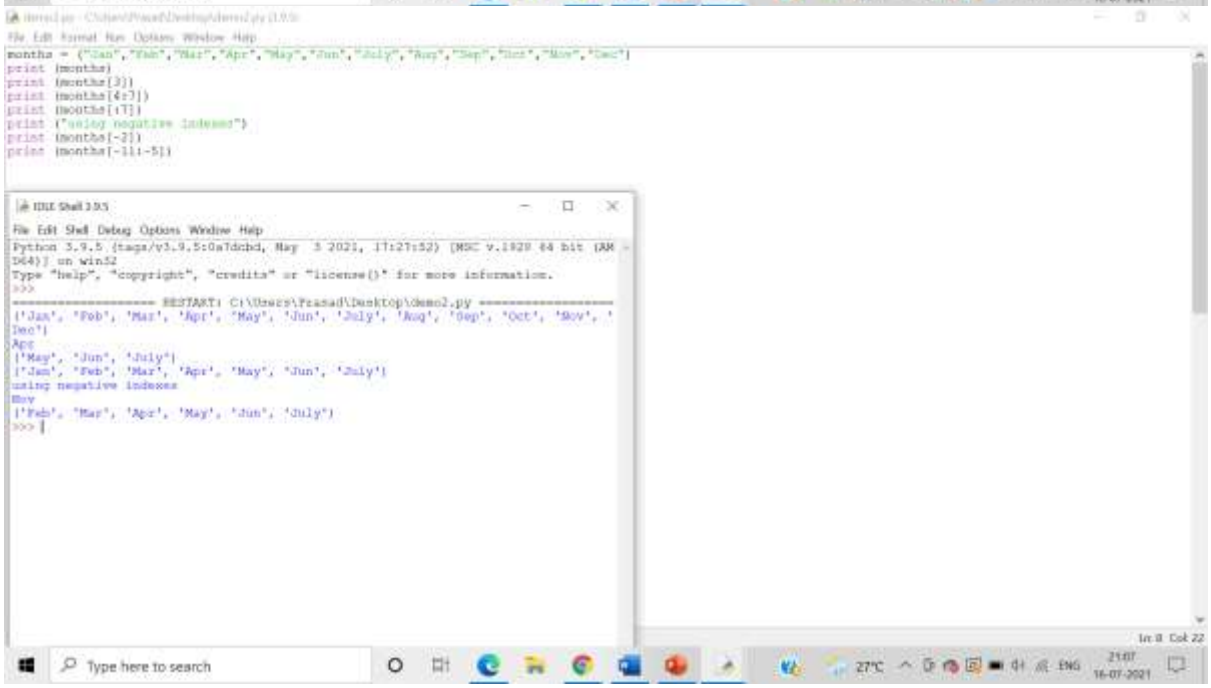
Step 1: A tuple is declared by placing all the items (elements) inside parentheses (), separated by commas and assigning it to a variable.

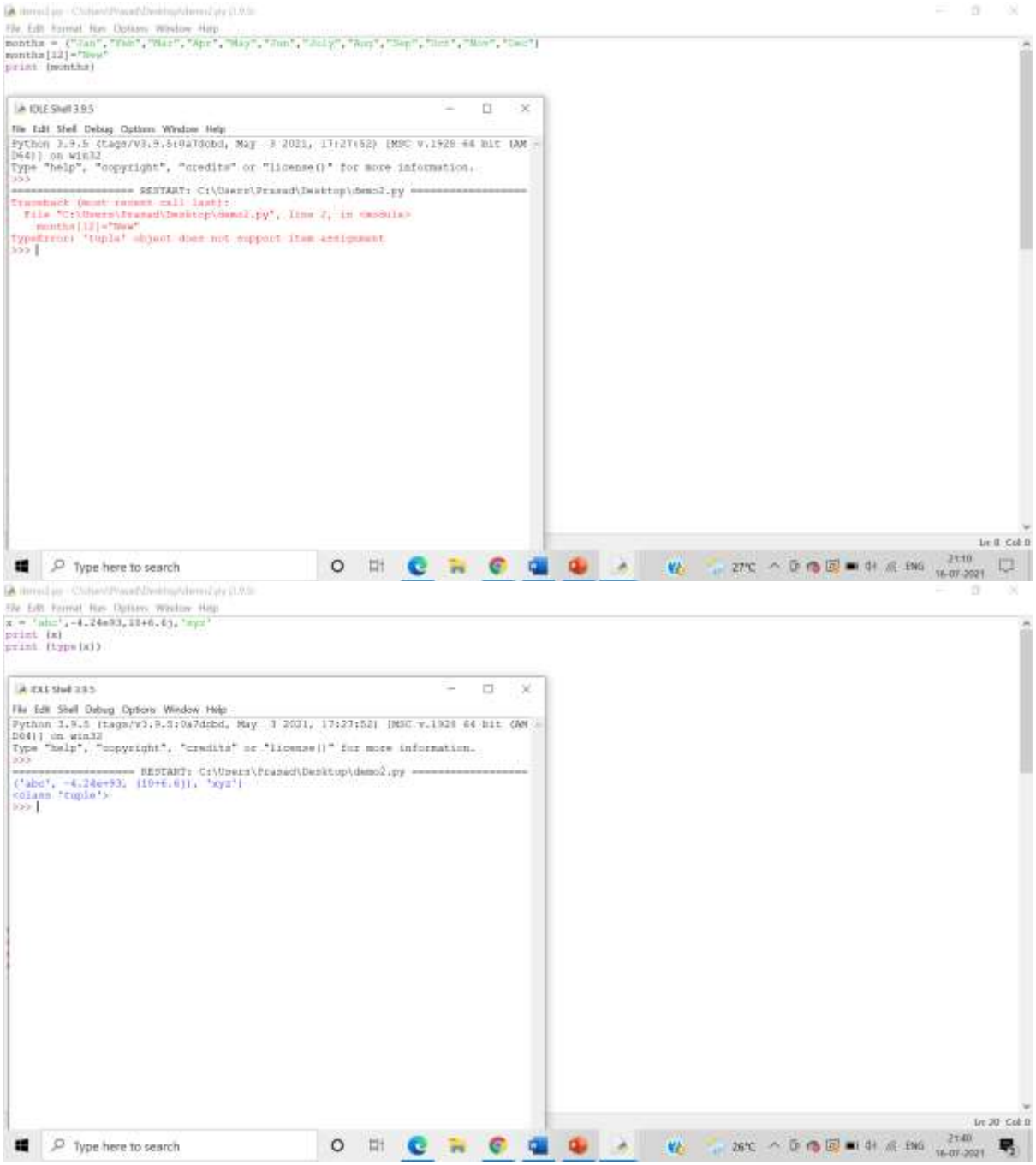
Step 2: To access the tuple items refer to the index number insed the index operator[] (Indexing).

Step 3: By inputting a range of indexes by specifying where to start and where to end the range we can print a subset of the tuple (splicing)

Answer: Program demonstrating declaration, accessing- Indexing and splicing of tuples and its elements:






months = ("Jan","Feb","Mar","Apr","May","Jun","July","Aug","Sep","Oct","Nov","Dec")
months[12]="New"
print (months)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
Traceback (most recent call last):
File "C:\Users\Prasad\Desktop\demo2.py", line 2, in <module>
months[12]="New"
TypeError: 'tuple' object does not support item assignment
>>>
Type here to search
x = 'abc',-4.24e93,18+6.6j,'xyz'
print (x)
print (type(x))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
('abc', -4.24e+93, (18+6.6j), 'xyz')
<class 'tuple'>
>>>
Type here to search

10. Write a program demonstrating input of tuple elements from the user

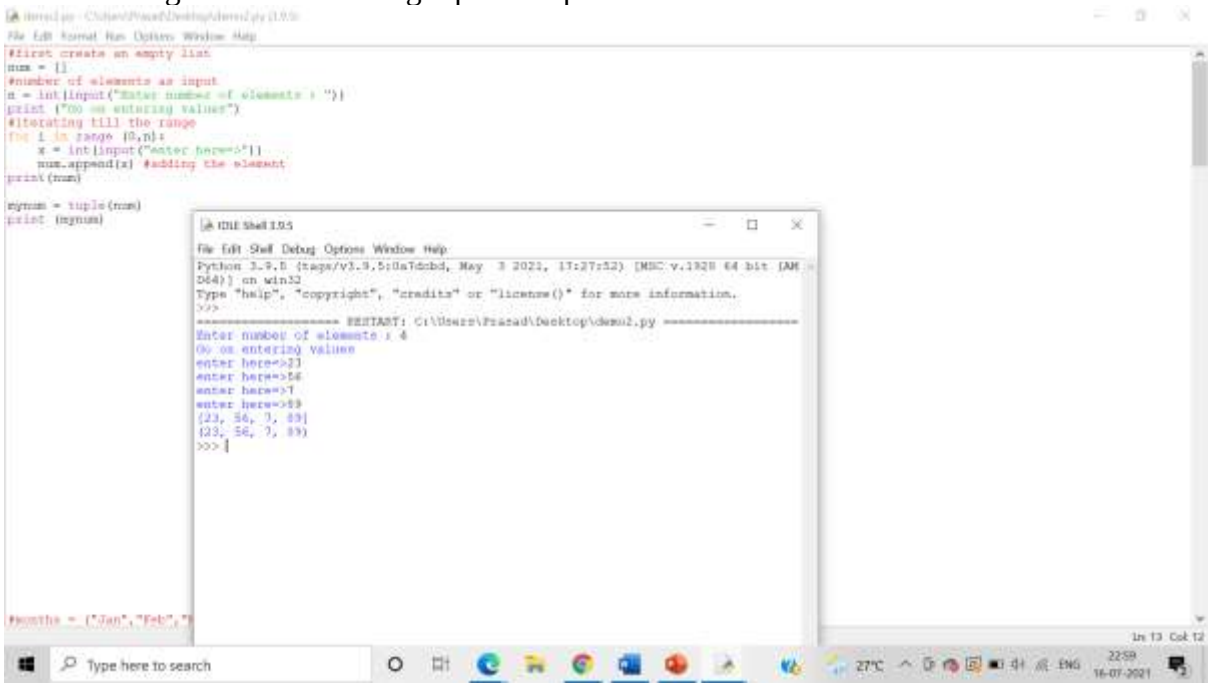
Algorithm:-

Step 1: Use the input() function to take user input and assign it to a variable

Step 2: Use the split function to split each value in the variable with a “,” and assign it a new tuple variable.

Step 3: Print the tuple variable

Answer: Program demonstrating input of tuple elements from the user:



11. Write a program demonstrating printing of tuple elements using for in and range() function

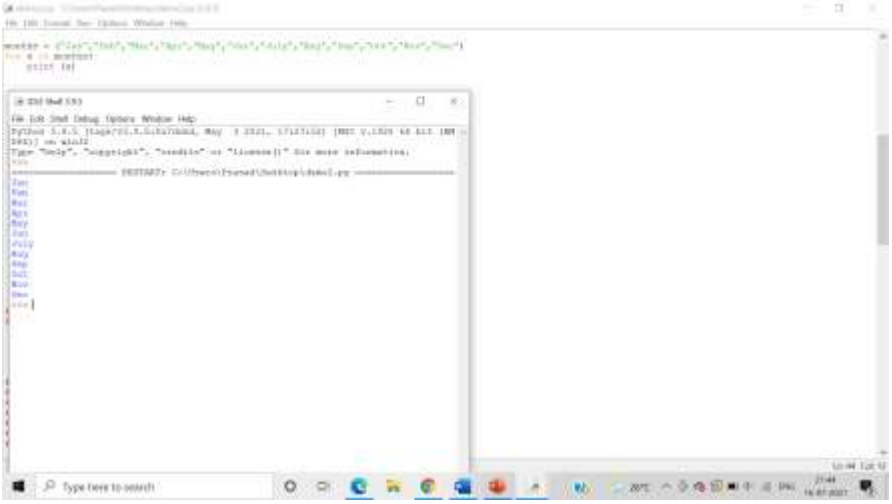
Algorithm:-

Step 1: Declare a tuple by assigning it to a variable

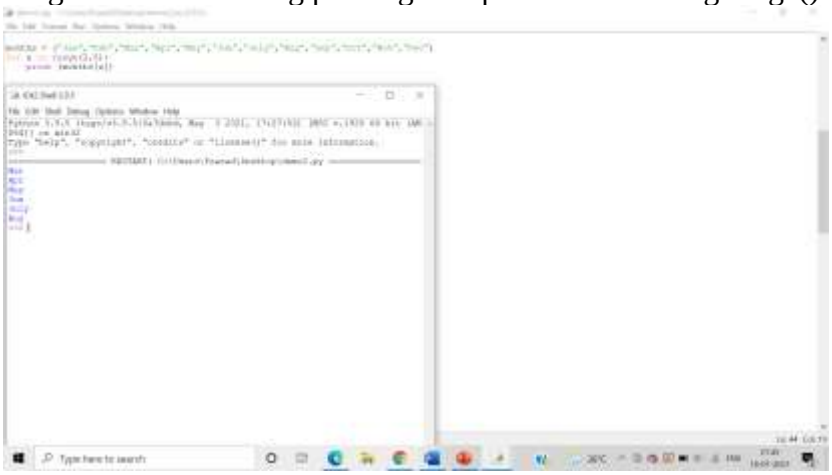
Step 2: The range() gives us a sequence of numbers in between the two integers given to it.

Step 3: We can use the in and range() function to print the tuple elements using a for loop.

Answer: Program demonstrating printing of tuple elements using “for in”:



Program demonstrating printing of tuple elements using range() function:



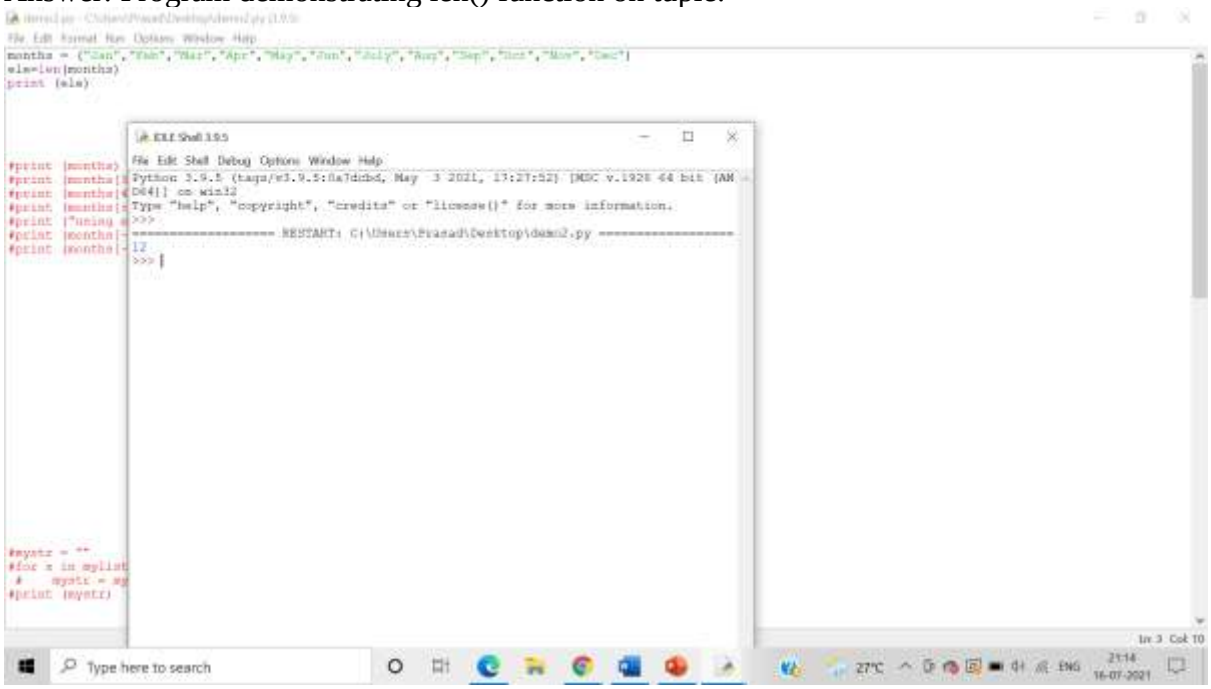
12. Write a program demonstrating len() and del() function on tuple.

Algorithm:-

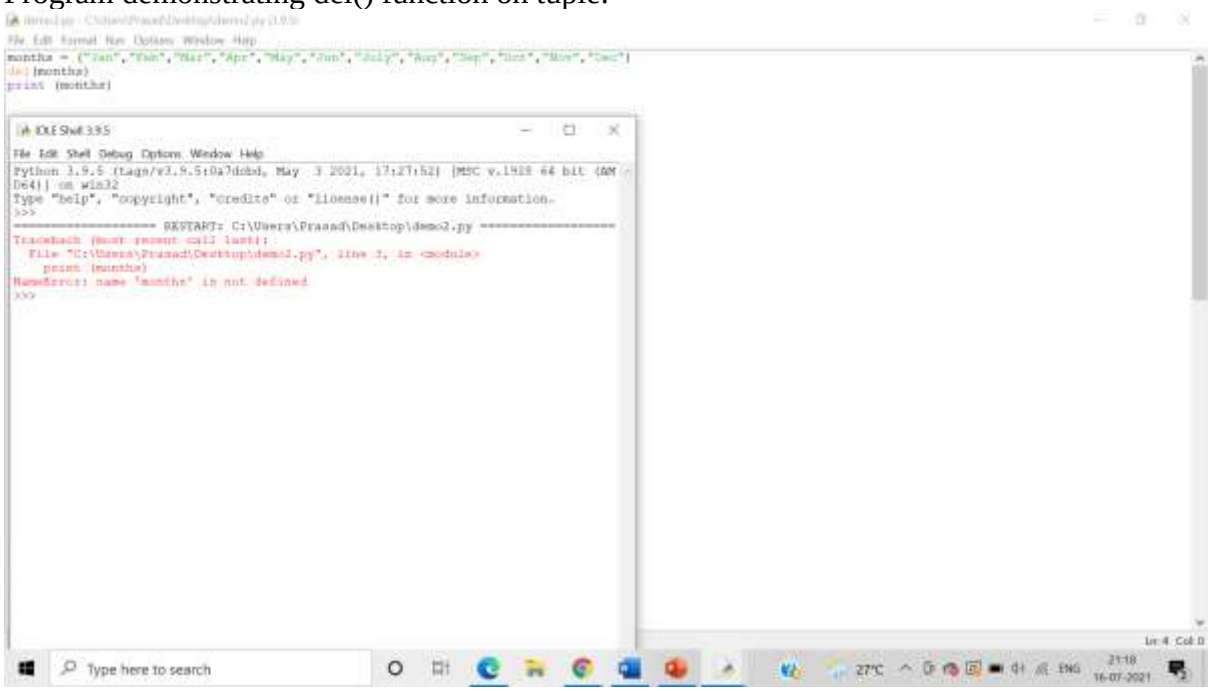
Step 1: The len() function is used to obtain the length of the tuple

Step 2: The del() function **deletes all the elements in range** starting from index ‘a’ till ‘b’ mentioned in arguments.

Answer: Program demonstrating len() function on tuple:



Program demonstrating del() function on tuple:



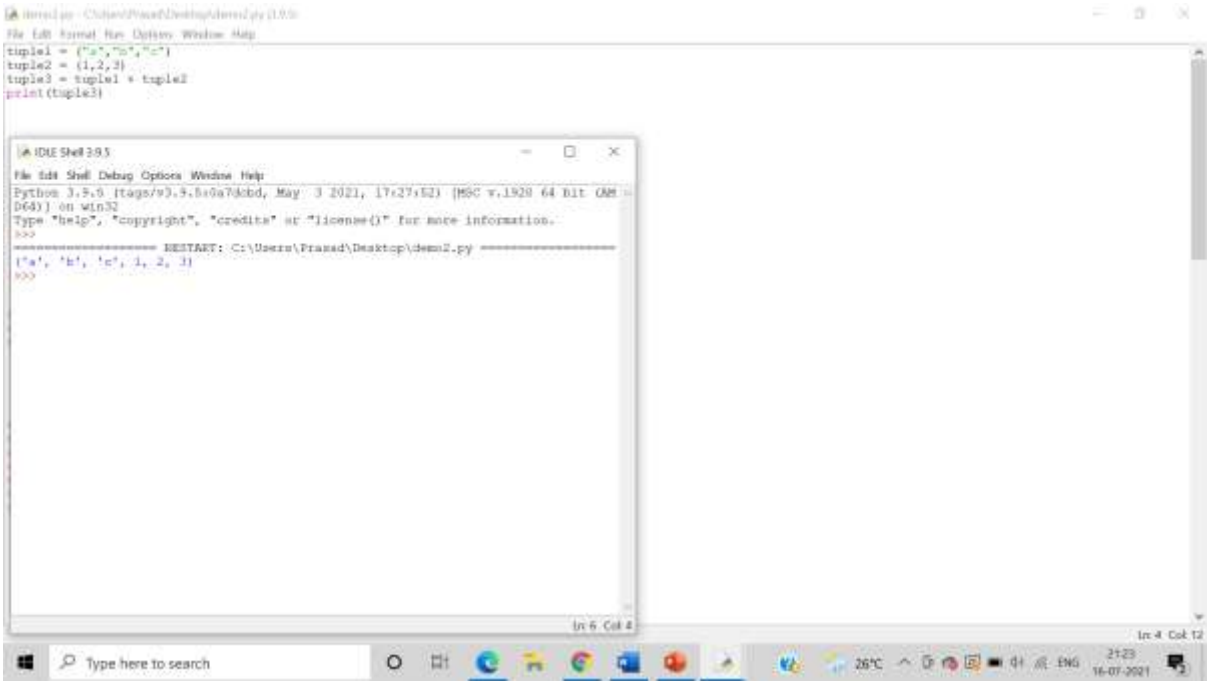
13. Write a program demonstrating usage of '+' and '*' operators on tuple

Algorithm:-

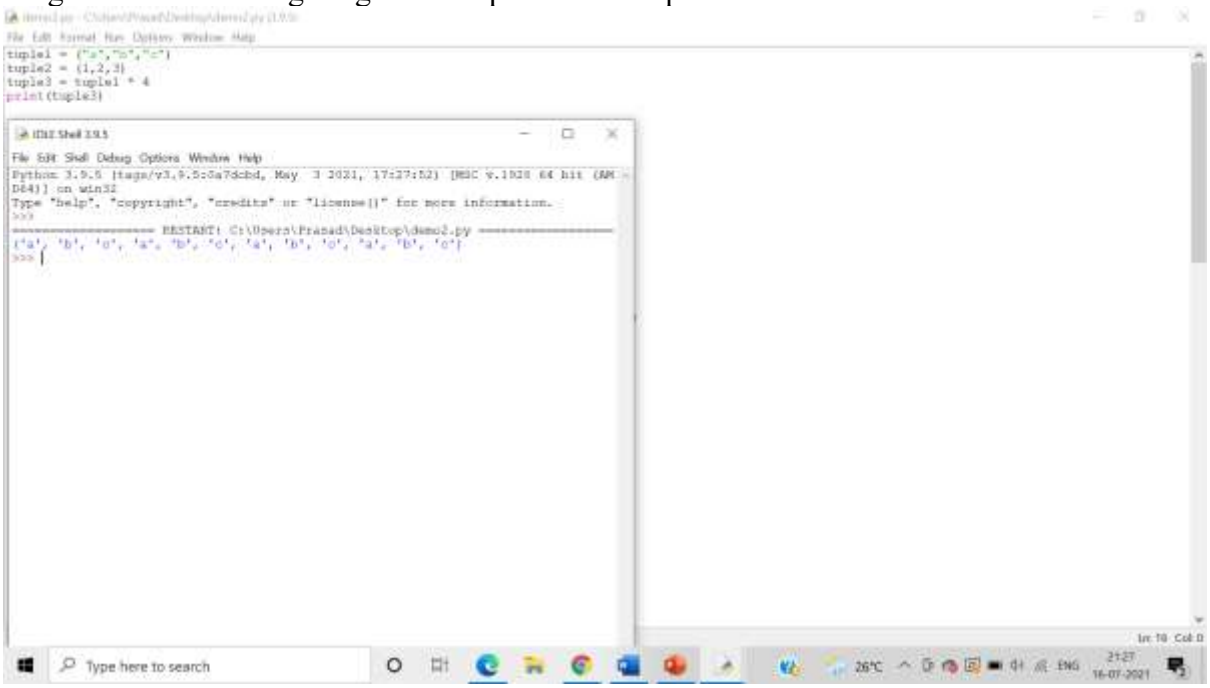
Step 1: The '+' operator is used to concatenate the 2 tuples into a single tuple.

Step 2: The '*' operator is used to to **multiply the tuple "n" times**

Answer: Program demonstrating usage of '+' operators on tuple:



Program demonstrating usage of '*' operators on tuple:



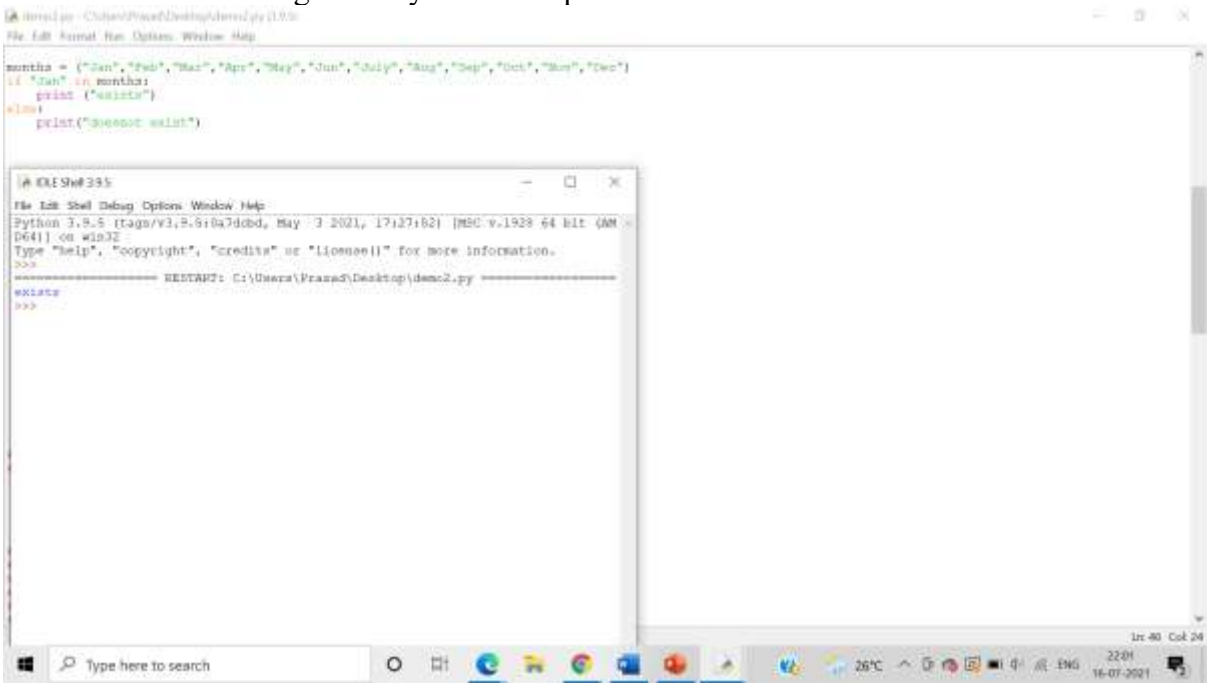
14. Write a program demonstrating “in” and “not in” keywords on tuple

Algorithm:-

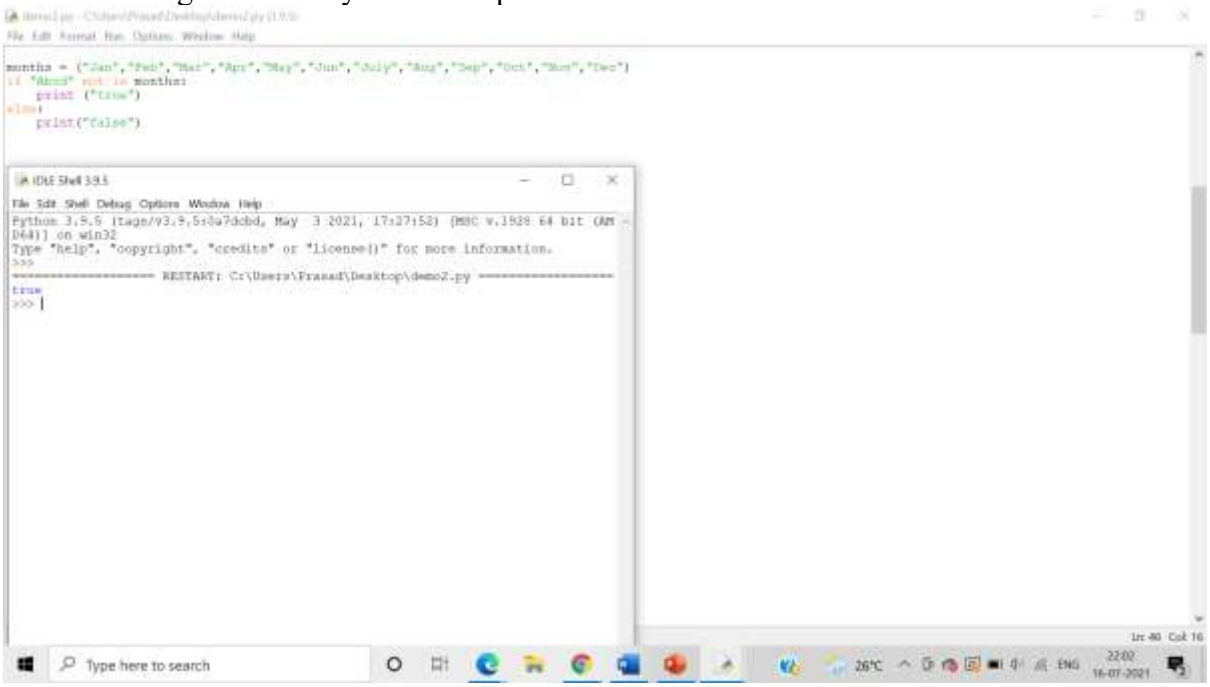
Step 1: - The ‘in’ operator is used to **check if an element is present** in the tuple or not. Returns true if element is present in tuple else returns false.

Step 2: The ‘not in’ operator is used to **check if an element is not present** in the tuple or not. Returns true if element is not present in tuple else returns false.

Answer: Demonstrating “in” keyword on tuple:



Demonstrating “not in” keyword on tuple:



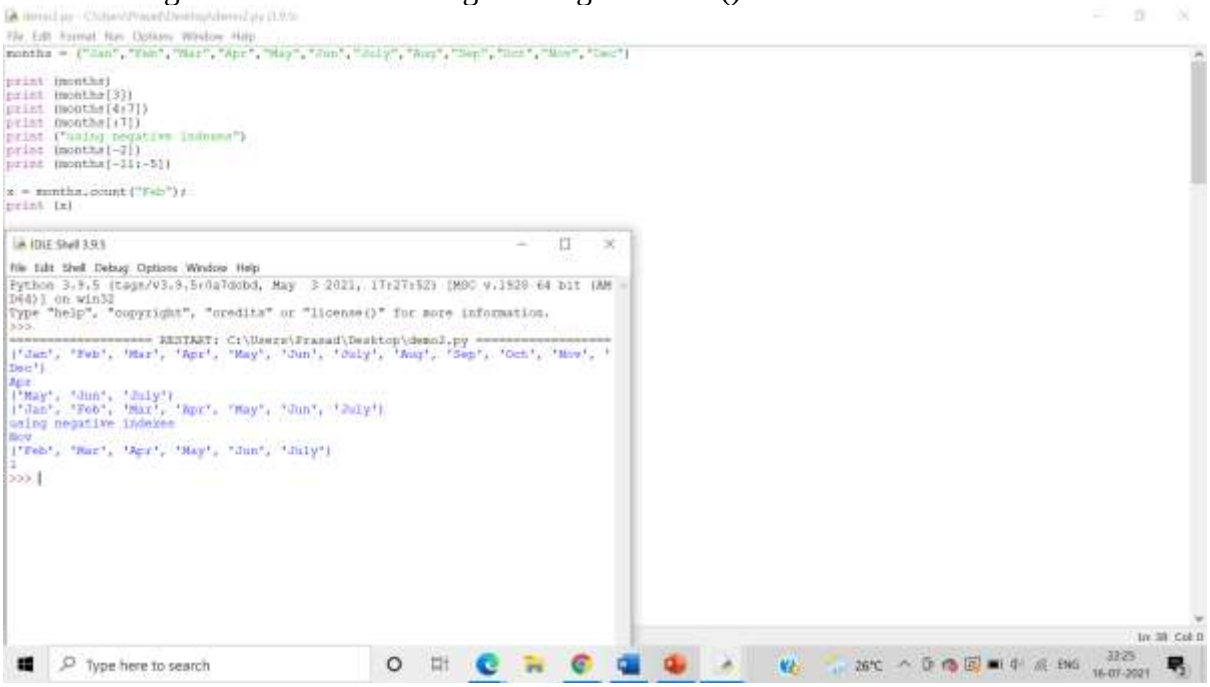
15. Write set of programs for demonstrating the usage of all the different Tuple methods along with their variations

Algorithm:-

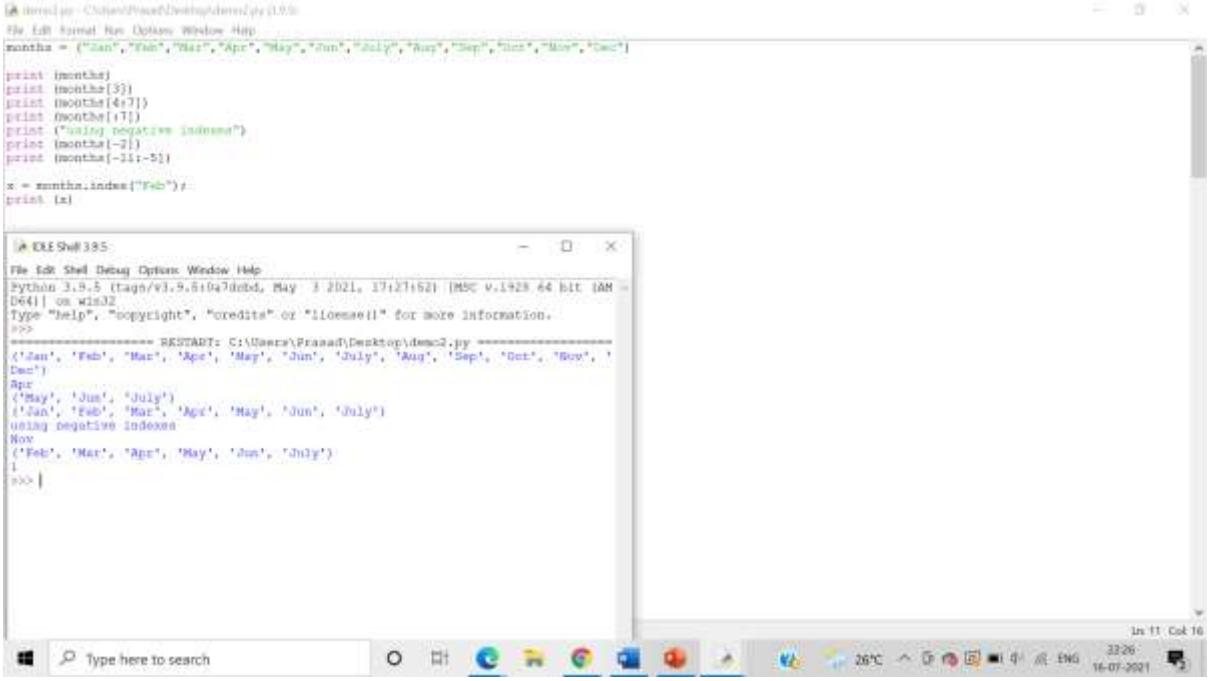
Step 1: The count() method returns the number of times a specified value occurs in a tuple

Step 2: The index () searches the tuple for a specified value and returns the position of where it was found. It raises an exception if item is not found

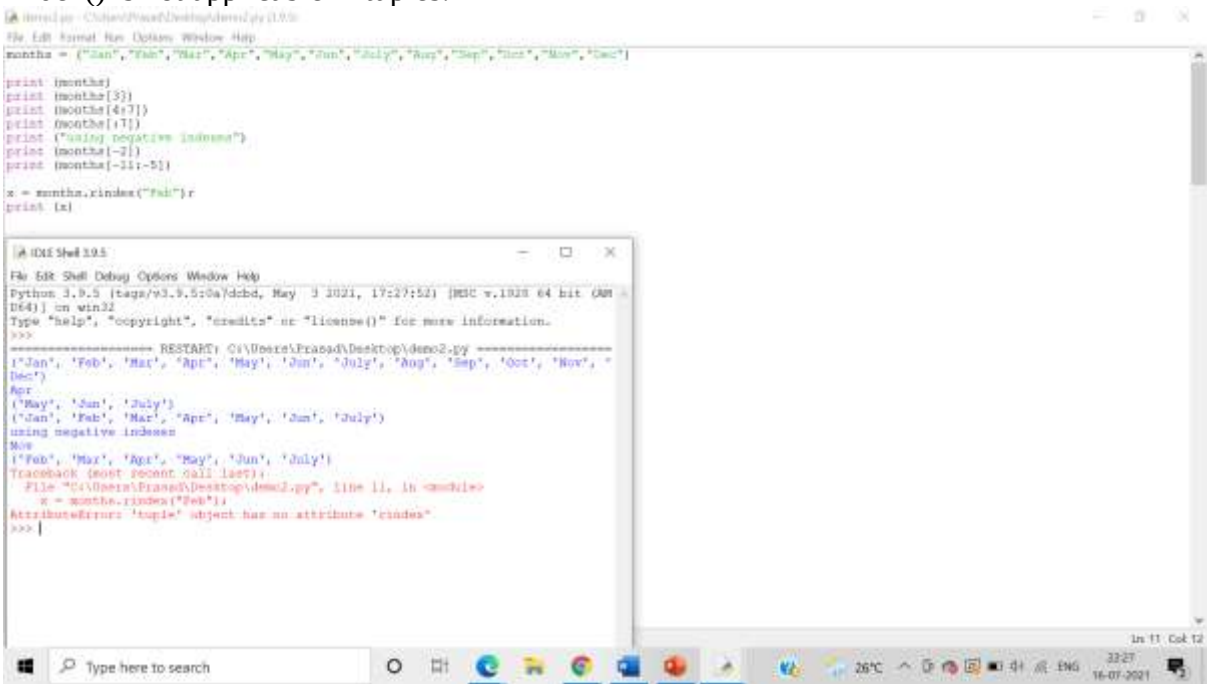
Answer: Programs for demonstrating the usage of count() :



Programs for demonstrating the usage of index() :



rindex() is not applicable in tuples:

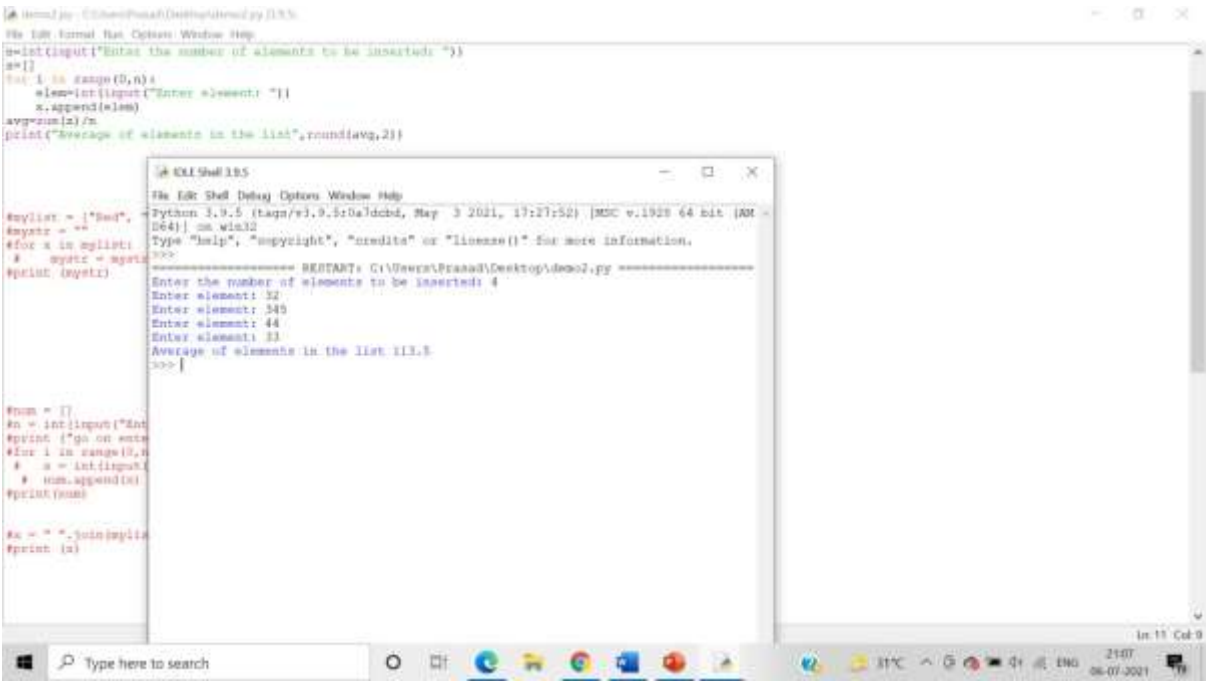


16. Write a Python Program to Calculate the Average of Numbers entered by the user in the user-defined list

Algorithm:-

Step 1: Declare a User defined list and assign it to a variable.

Step 2: For the user defined range use the avg=sum(a)/n formula to calculate the the average of the numbers present in the user defined list.



17. Write a Program to Generate Random Numbers from 1 to 10 and add them in a defined list

Algorithm:-

Step 1: Import random function

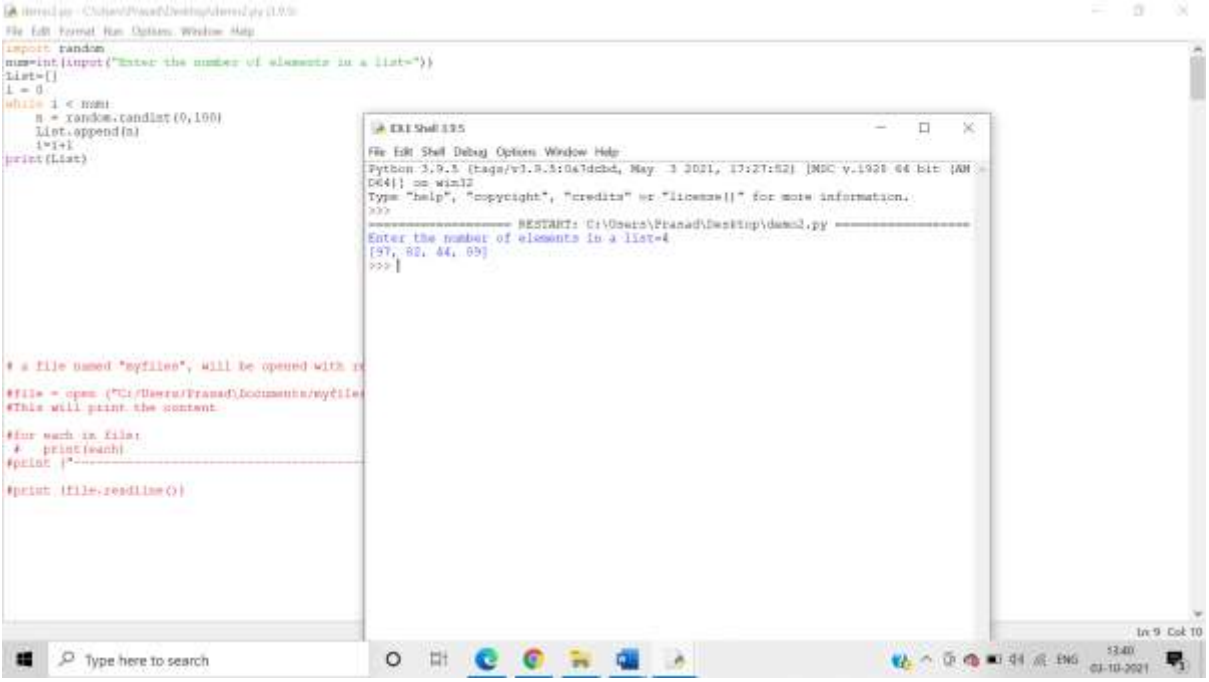
Step 2: Input the range of the list

Step 3: Initialize an empty list

Step 4: Set i=0 and use a while loop where when i<0 the loop executes its task.

Step 5: Using The randint() function to generate random integer and use the append() function to add the integer to the list.

Step6: Print the list.

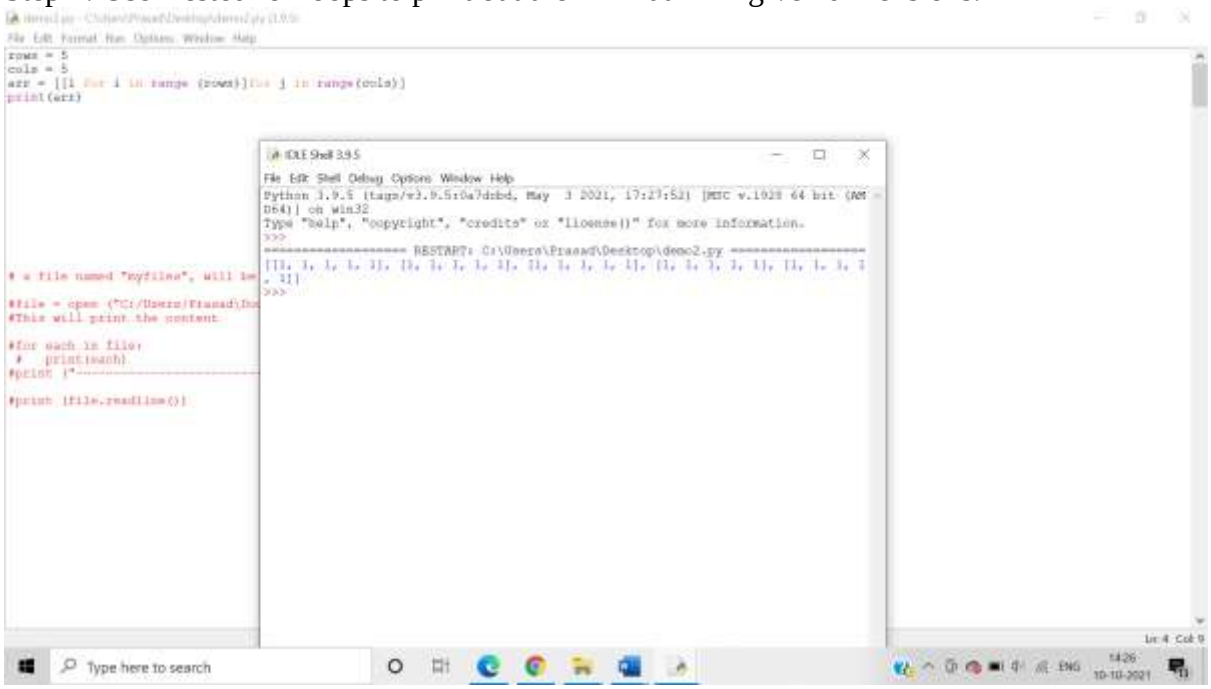


18. Write a program demonstrating a creation of 2D list and print it.

Algorithm:-

Step 1: Intialise the number of rows and columns

Step 2: Use Nested for loops to print out the 2D matrix in given dimensions.



19. Write a program to create a user defined 2D list and print it. Take dimensions from the user.

Algorithm:-

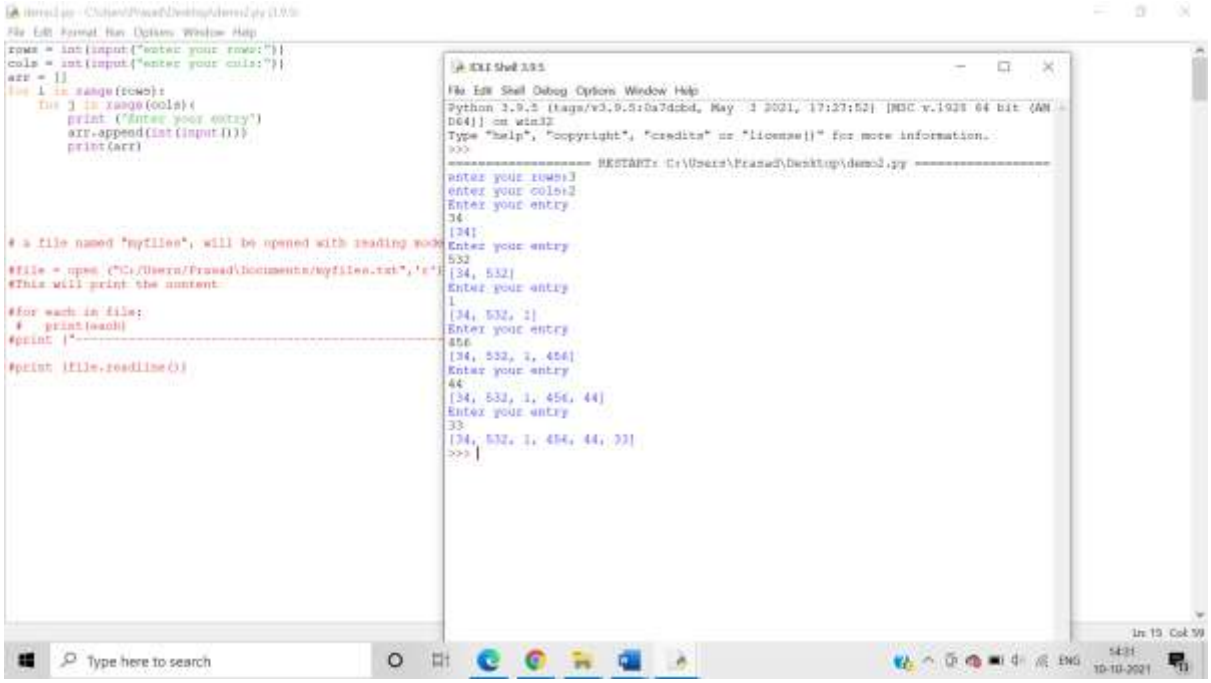
Step 1: Input the number of rows and columns required.

Step 2: Initialize a empty array list

Step 3: Use Nested for loops so as to initialize the matrix to the user defined rows and columns.

Step 4: Input the values of the matrix.

Step 5: Use the append function to append the values to the matrix of user defined rows ad columns.



20. Write a program for addition of two matrices

Algorithm:-

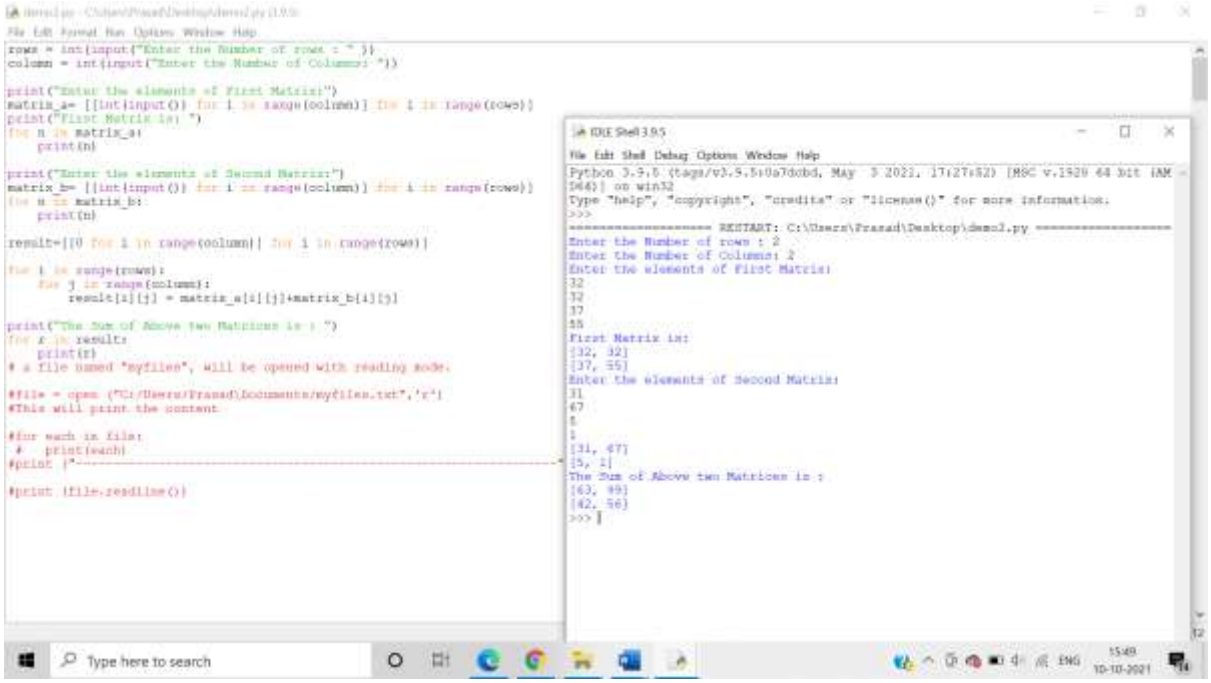
Step 1:Input the number of rows and columns.

Step 2: Initialize 2 empty arrays and a result matrix where all values are 0.

Step 3: Use Nested for loops so as to initialize the matrix's to the user defined rows and columns.

Step 4: Input the values of the 2 matrix's so as to obtain a 3x3 matrix.

Step 5: Use nested for loops and use the index position of each values of both the matrix as to add each value in a given position of a matrix to the corresponding value of the same value in the second matrix.



21. Write a program for subtraction of two matrices

Algorithm:-

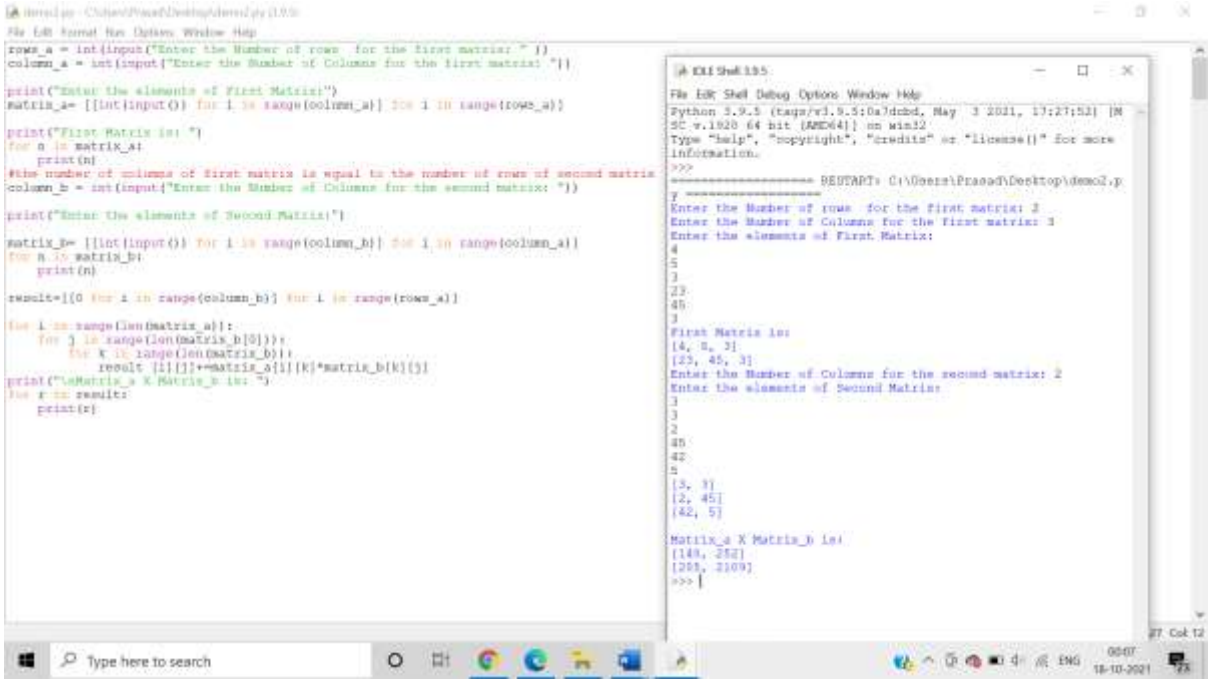
Step 1:Input the number of rows and columns.

Step 2: Initialize 2 empty arrays and a result matrix where all values are 0.

Step 3: Use Nested for loops so as to initialize the matrix's to the user defined rows and columns.

Step 4: Input the values of the 2 matrix's so as to obtain a 3x3 matrix.

Step 5: Use nested for loops and use the index position of each values of both the matrix as to subtract each value in a given position of a matrix to the corresponding value of the same value in the second matrix.



22. Write a program for multiplication of two matrices

Algorithm:-

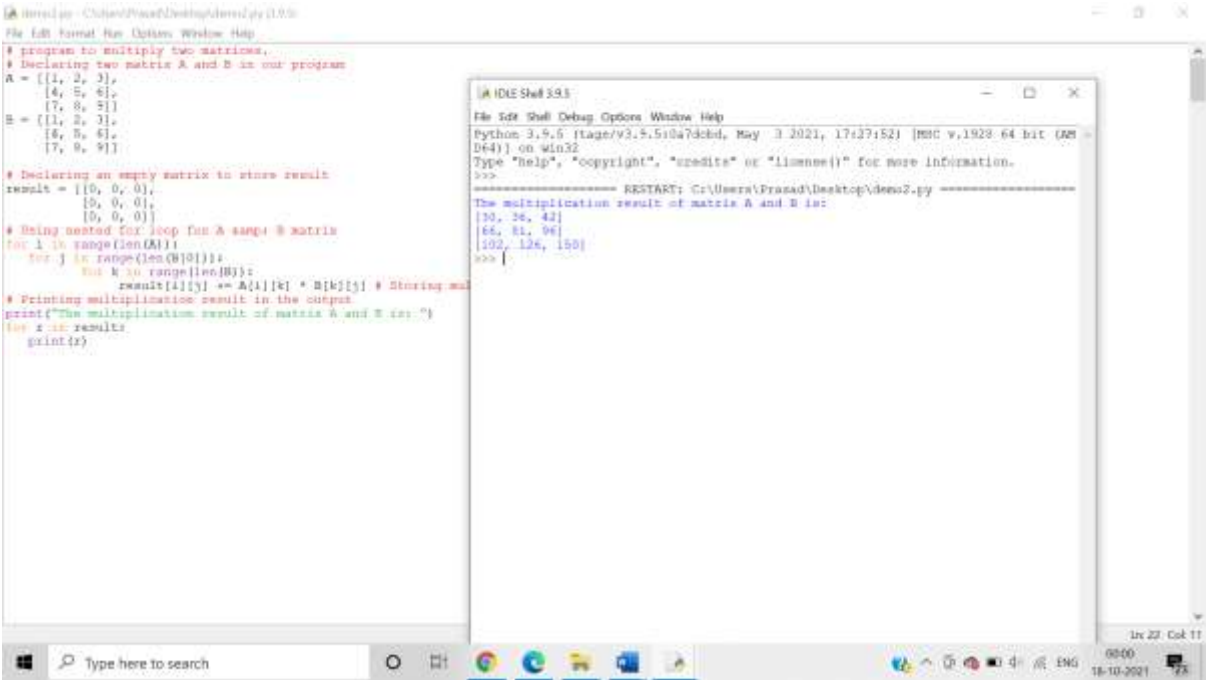
Step 1:Input the number of rows and columns.

Step 2: Initialize 2 empty arrays and a result matrix where all values are 0.

Step 3: Use Nested for loops so as to initialize the matrix's to the user defined rows and columns.

Step 4: Input the values of the 2 matrix's so as to obtain a 3x3 matrix.

Step 5: Use nested for loops and use the index position of each values of both the matrix as to multiply each value in a given position of a matrix to the corresponding value of the same value in the second matrix.



Python for Bioinformatics

Exercise 4

IV-Title: Programs demonstrating use of Sets and Dictionaries

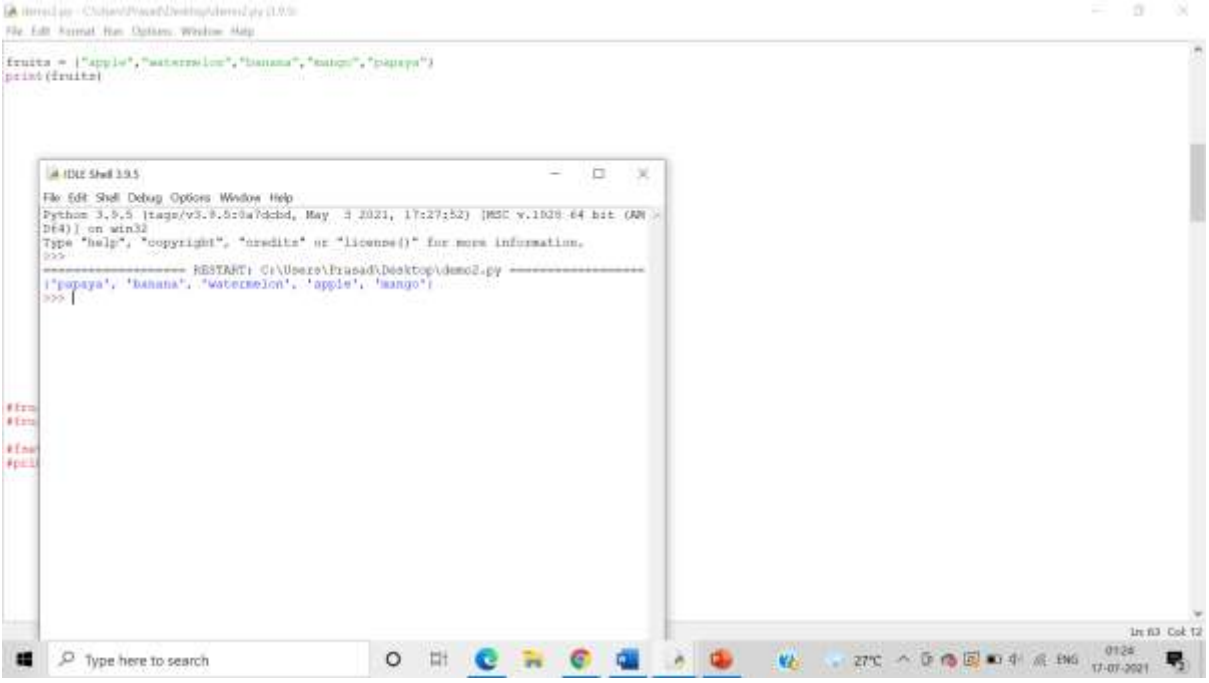
1. Write a program demonstrating declaration and accessing of Sets and its elements.

Algorithm:

Step 1:- A set is created by placing all the items (elements) inside curly braces {}, separated by comma, or by using the built-in set() function.

Step 2:- You can access the set by printing the variable to which the set is assigned.

Answer: Program demonstrating accessing of Sets:



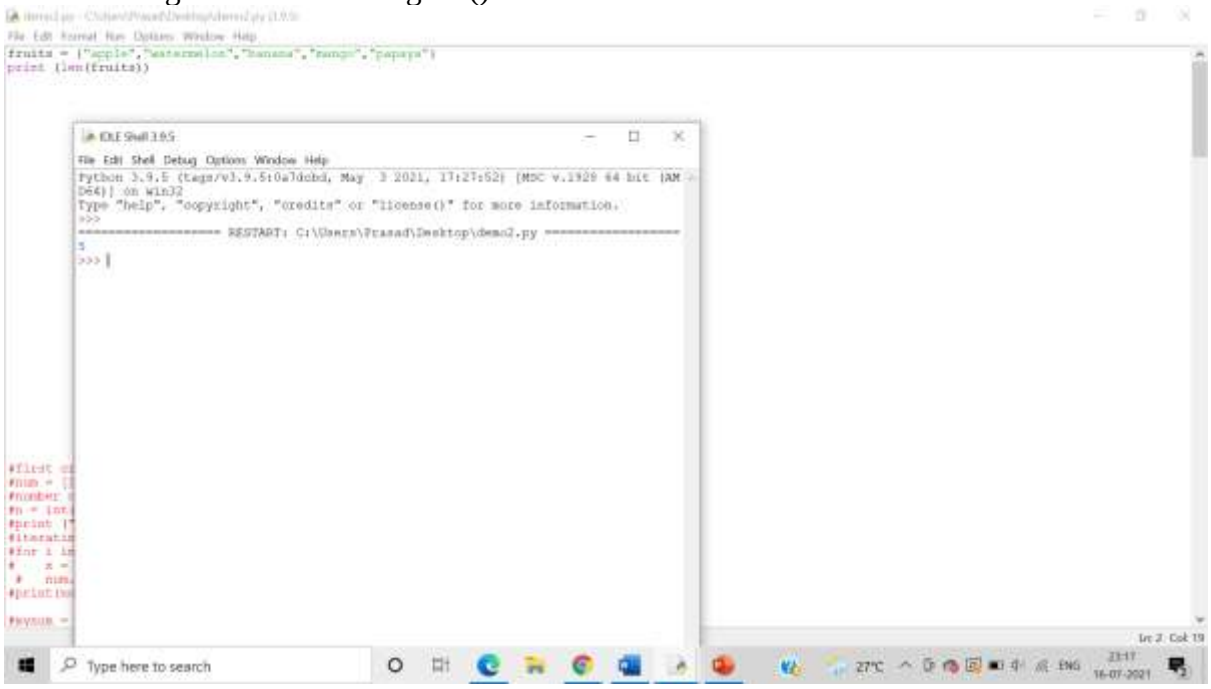
2. Write a program demonstrating len() and del() function on Sets.

Algorithm:

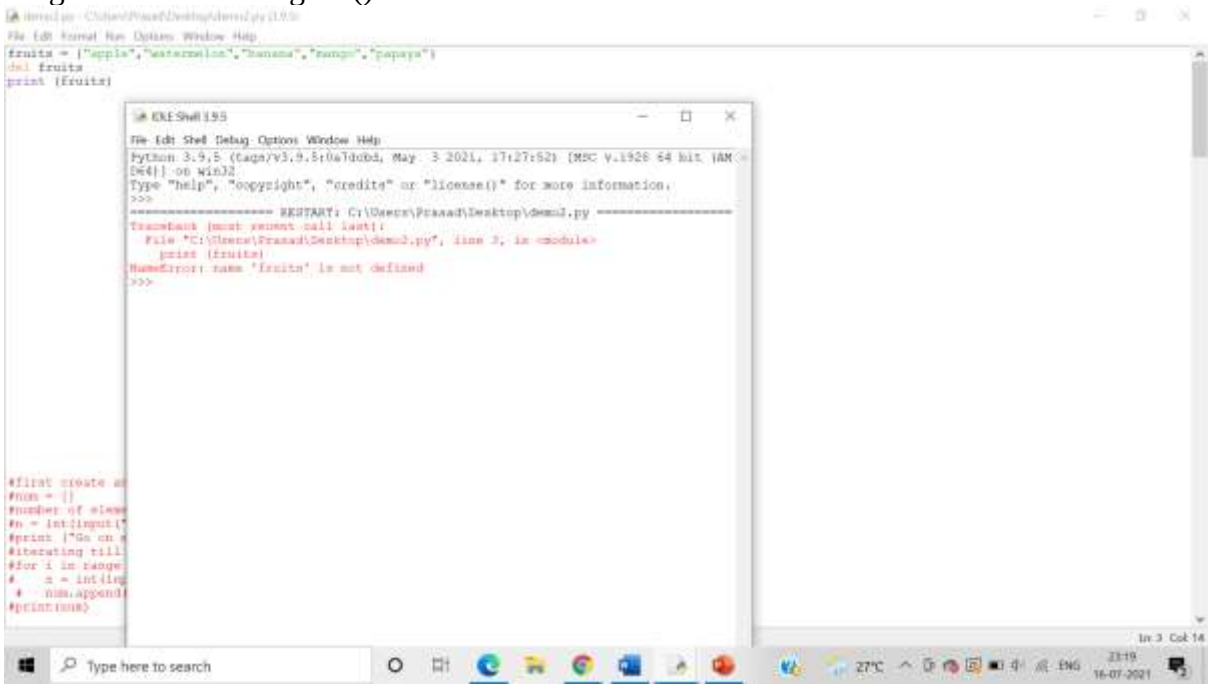
Step 1: The len() function is used to obtain the length of the set.

Step 2: The del() function **deletes all the elements in range** starting from index 'a' till ////////////////'b' mentioned in arguments of the set.

Answer: Program demonstrating len() function on Sets:



Program demonstrating del() function on Sets:



3. Write a program demonstrating input of Set elements from the user
Algorithm:-
Step 1:-Take user input
Step 2:-Use the split() function to split the values stored and assign it to the lists variable/
Step3:- Use the set() function to store the values stored in the lists variable to convert it onto a set, Assign it to a sets variable
Step 4:- Print the sets variable.

Answer: Program for demonstrating input of Set elements from the user

4. Write set of programs for demonstrating the usage of all the different Set methods along with their variations

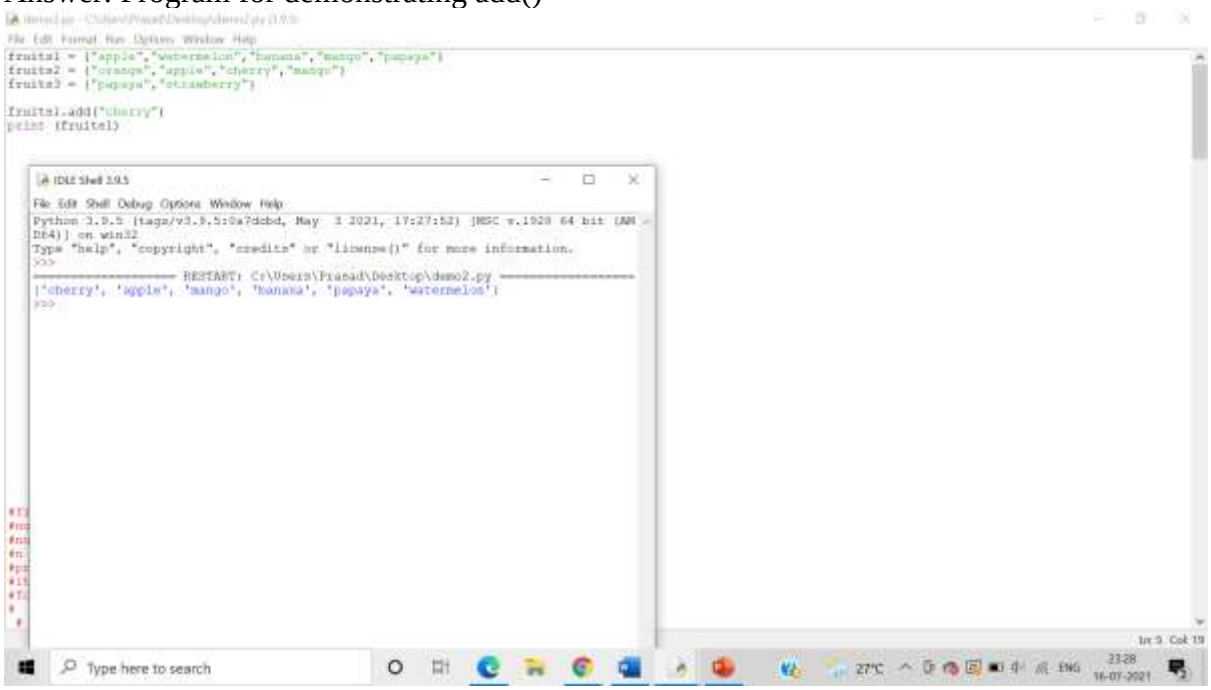
Algorithm:-

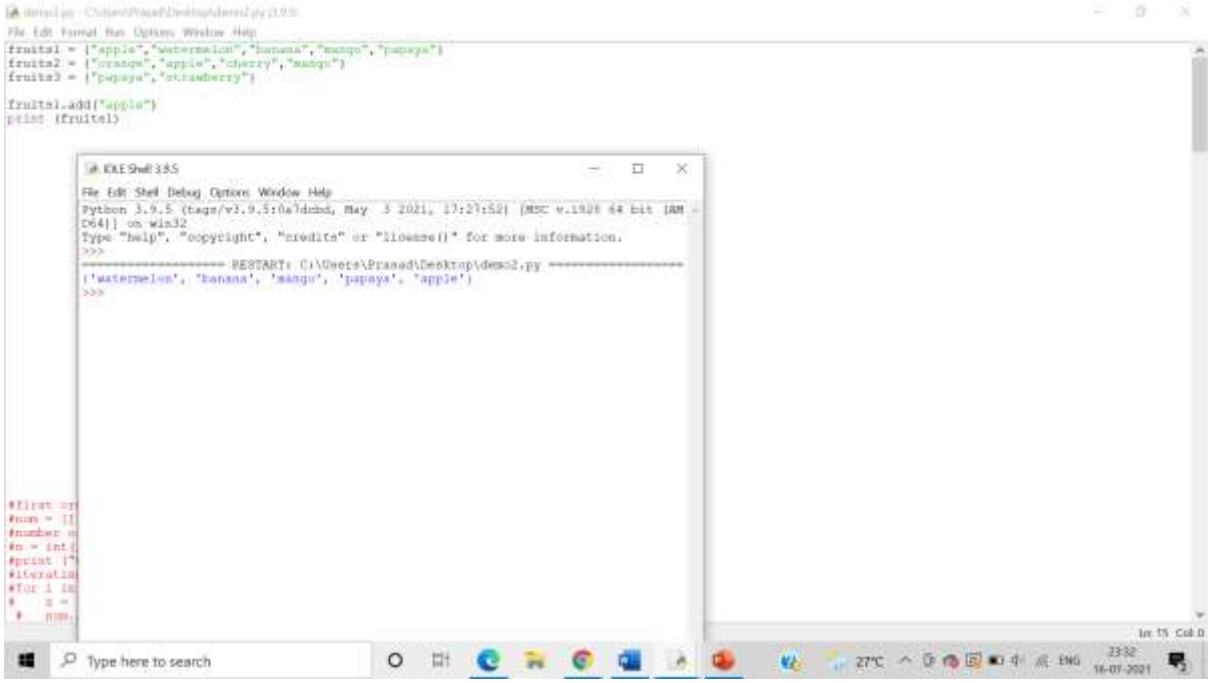
Step 1:- To add one item to a set use the add() method.

Step 2:- The clear() method empties the set

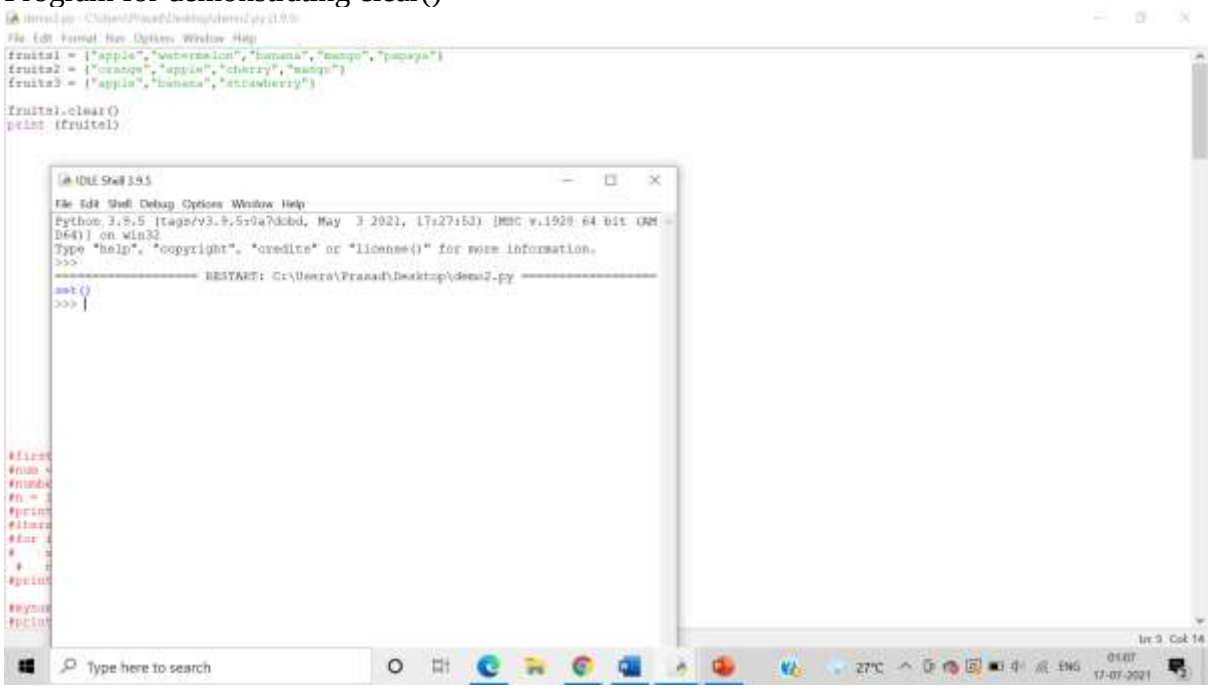
Step3:- The copy() method returns a copy of the set.

Answer: Program for demonstrating add()

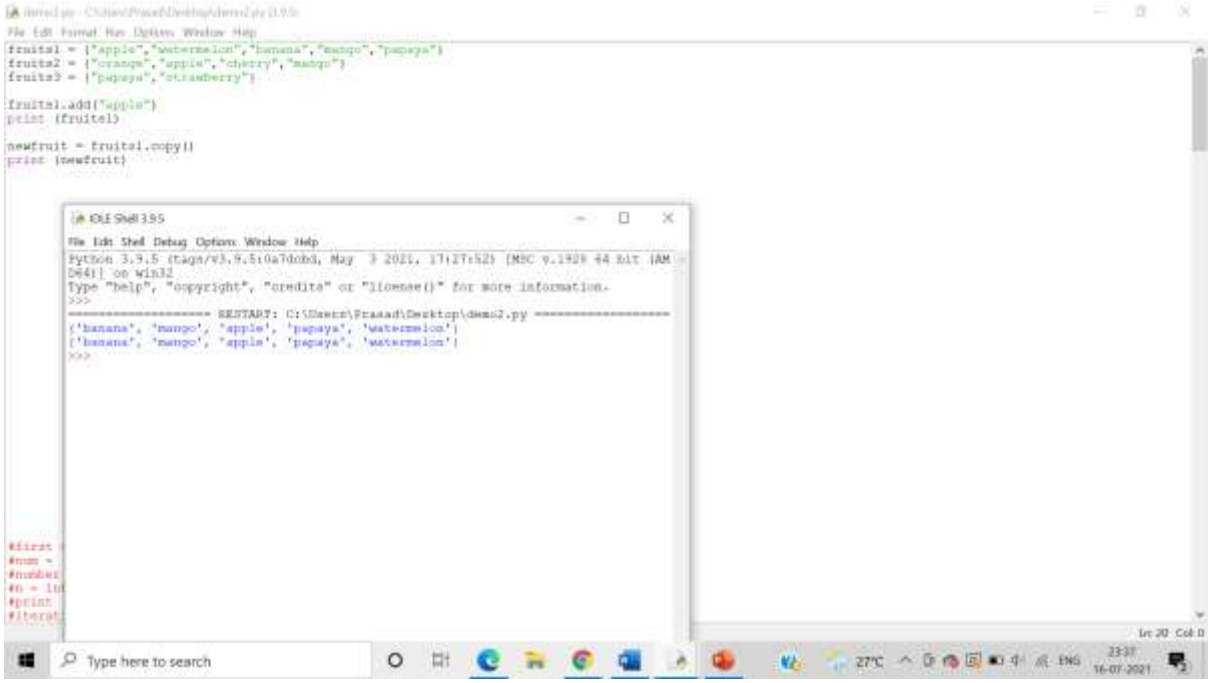




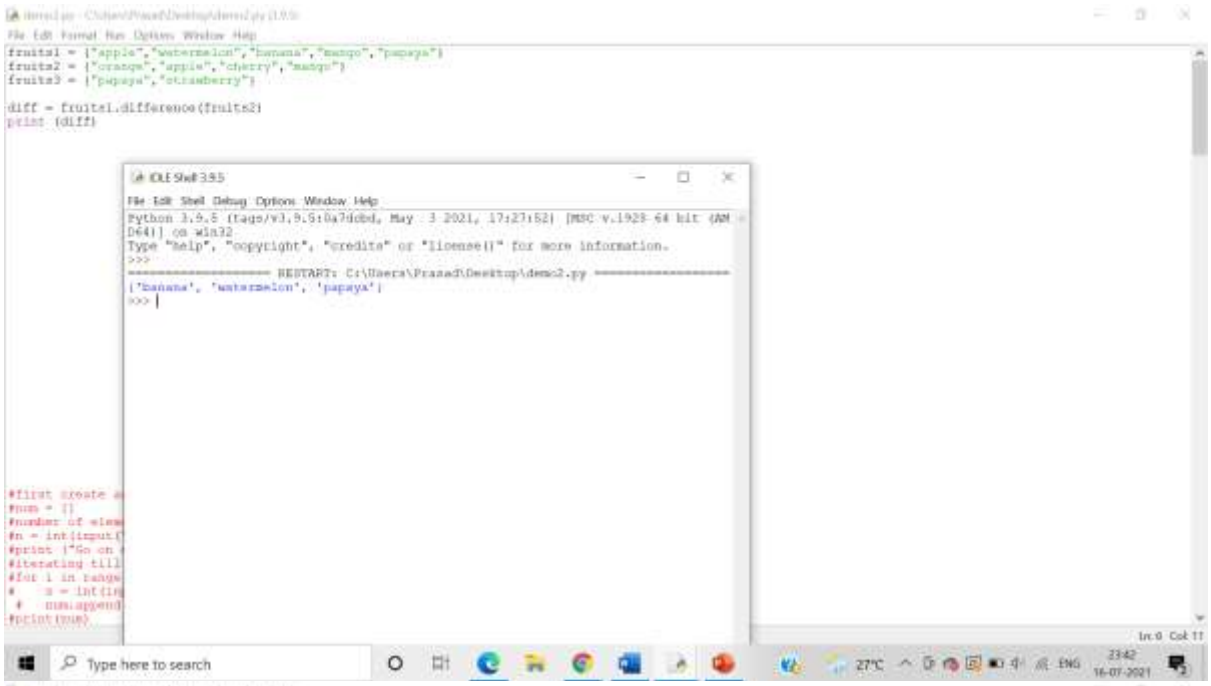
Program for demonstrating clear()

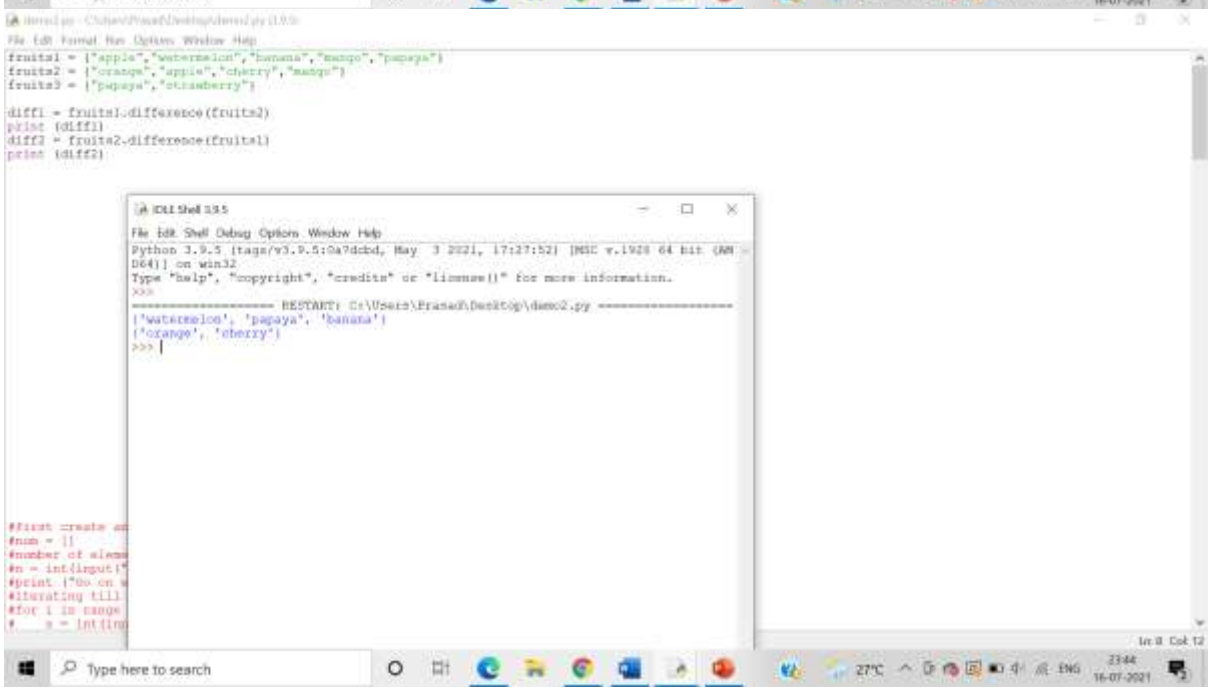


Program for demonstrating copy()

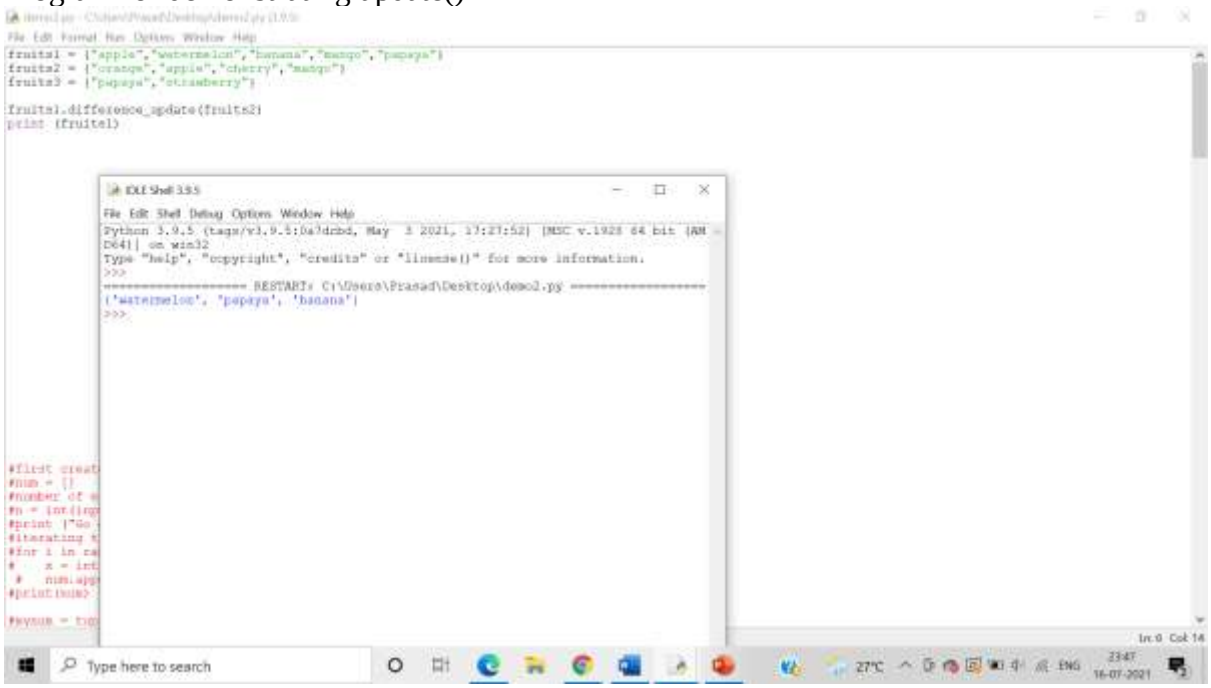


Program for demonstrating difference()
Algorithm:-
Step 1:-Diference() method returns a set containing the difference between two or more sets.
Step 2:-Diference_update() removes the items in this set that are also included in another, specified set.
Step3:- Discard() method removes the specified item.

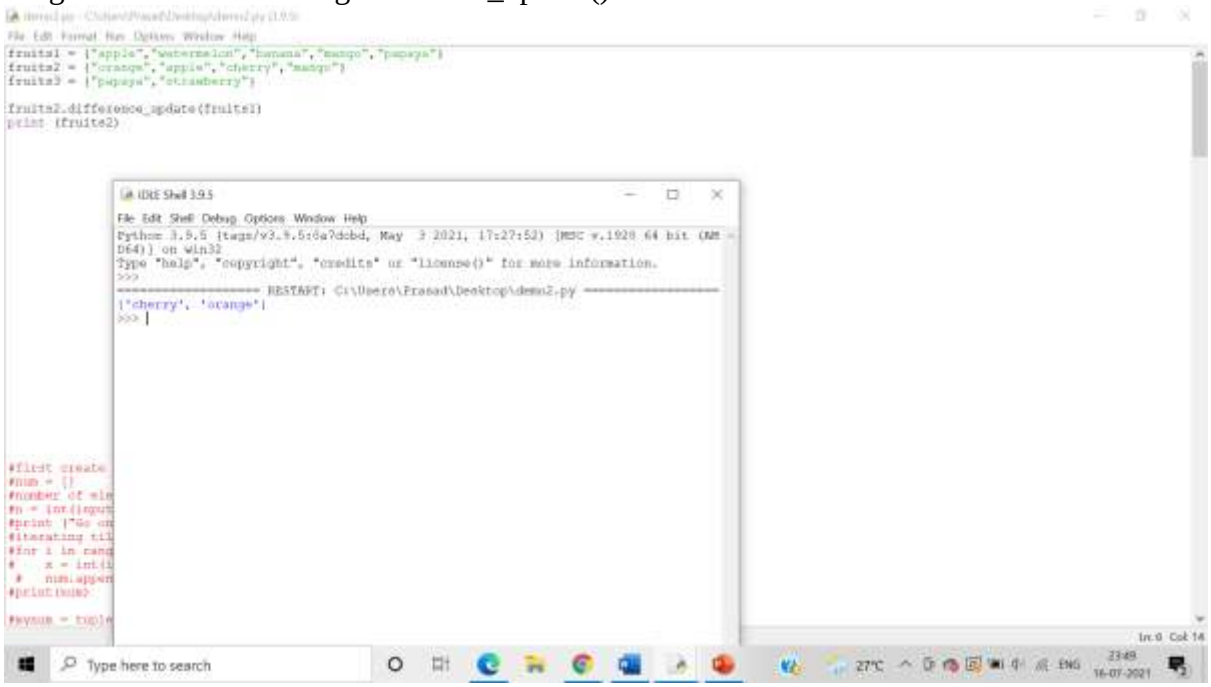




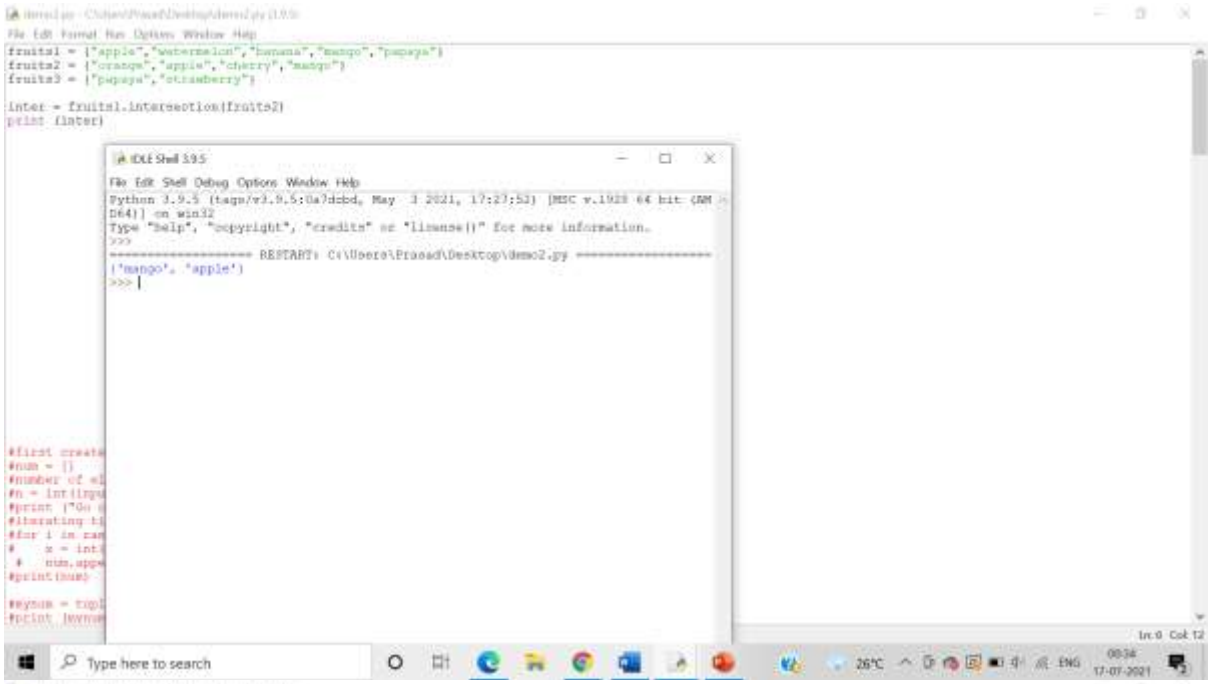
Program for demonstrating update()

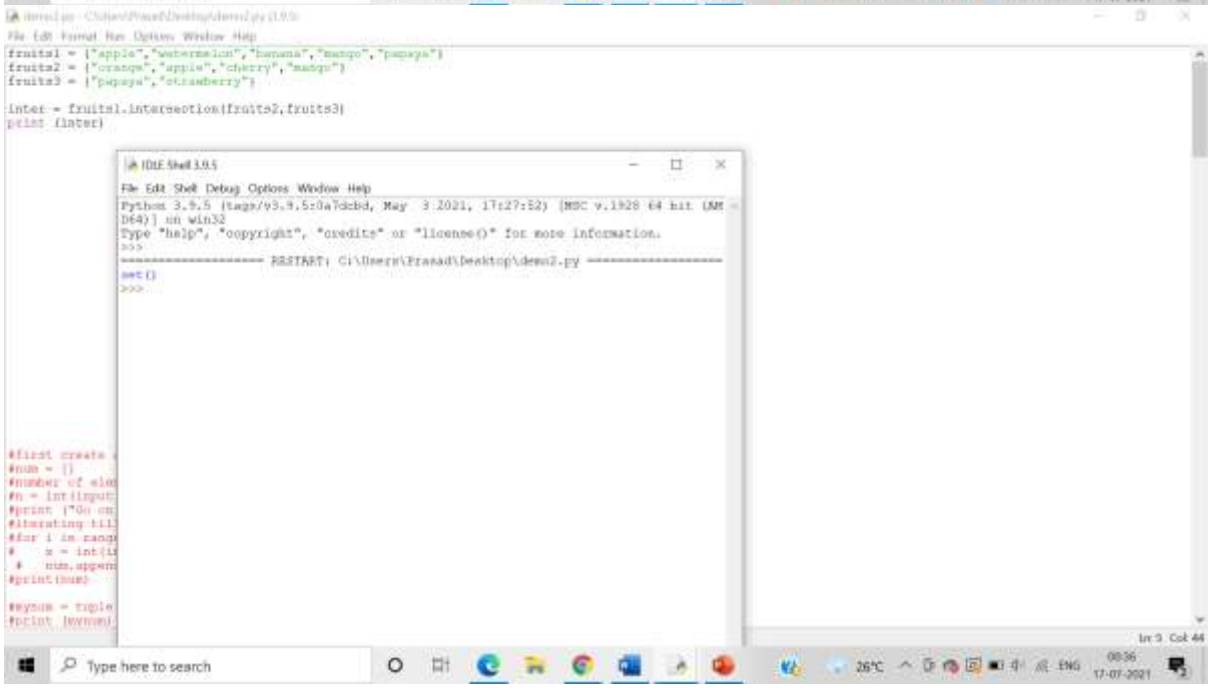


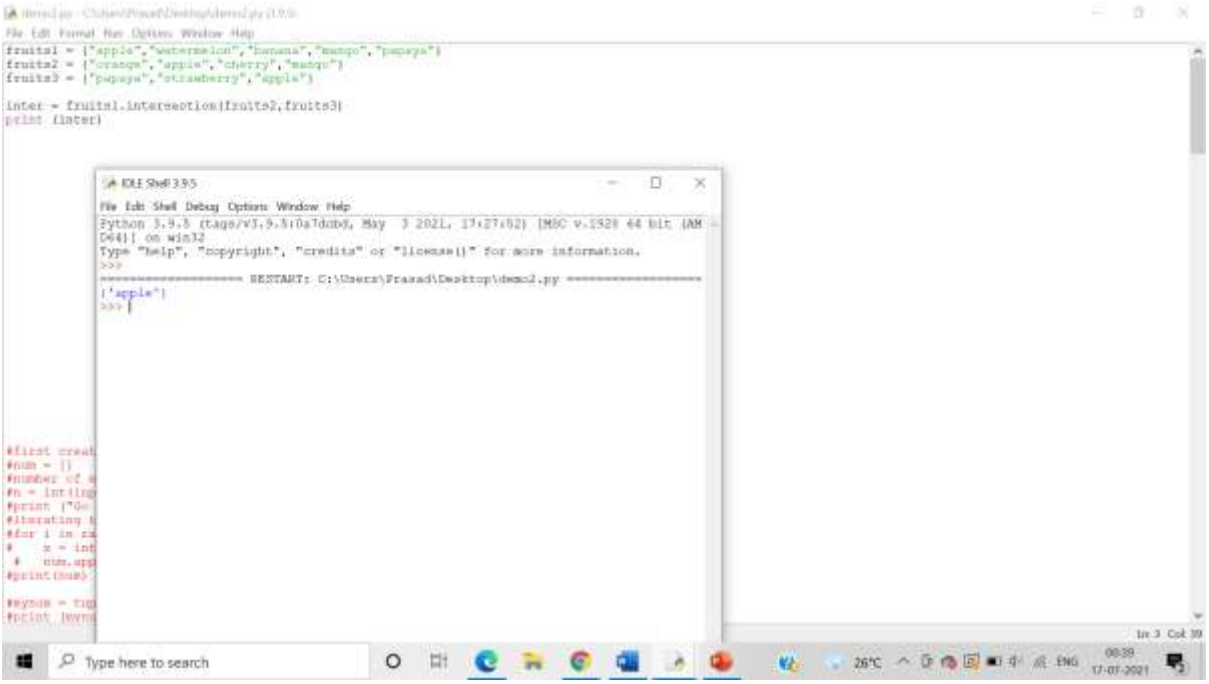
Program for demonstrating difference_update()



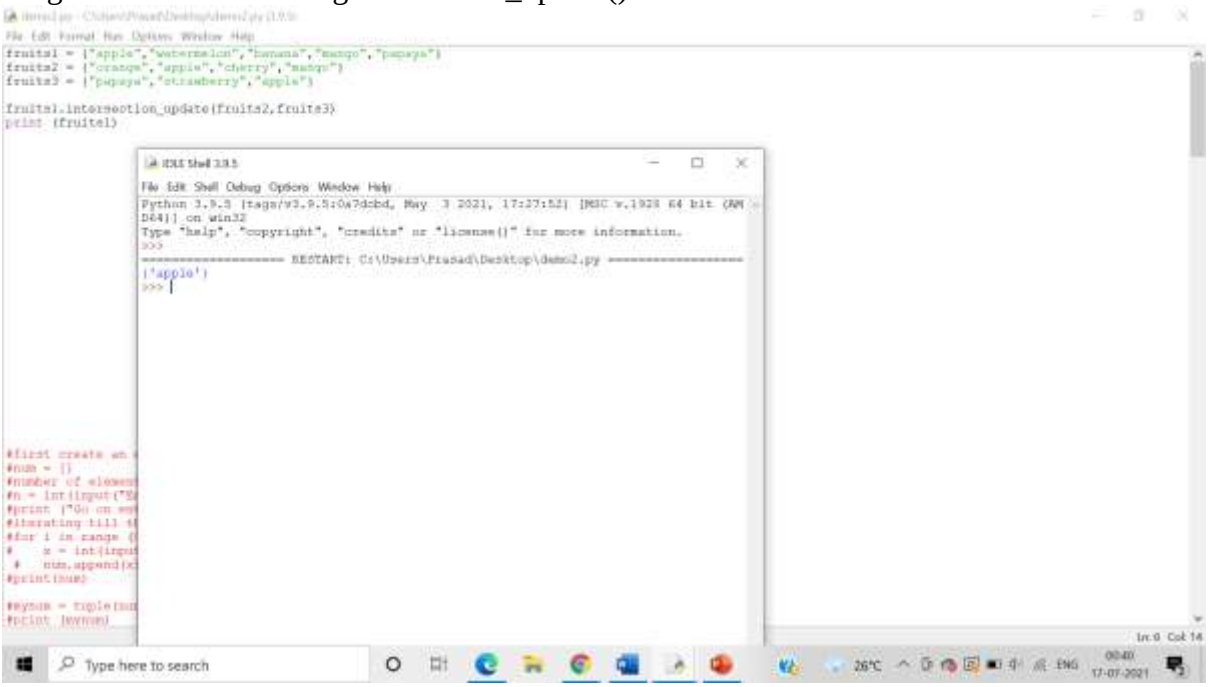
Program for demonstrating intersection()
Algorithm:-
Step 1:- intersection() method returns a set, that is the intersection of two other sets
Step 2:- intersection_update() method removes the items in this set that are not present in other, specified set.
Step3:- isdisjoint() method returns whether two sets have a intersection or not.



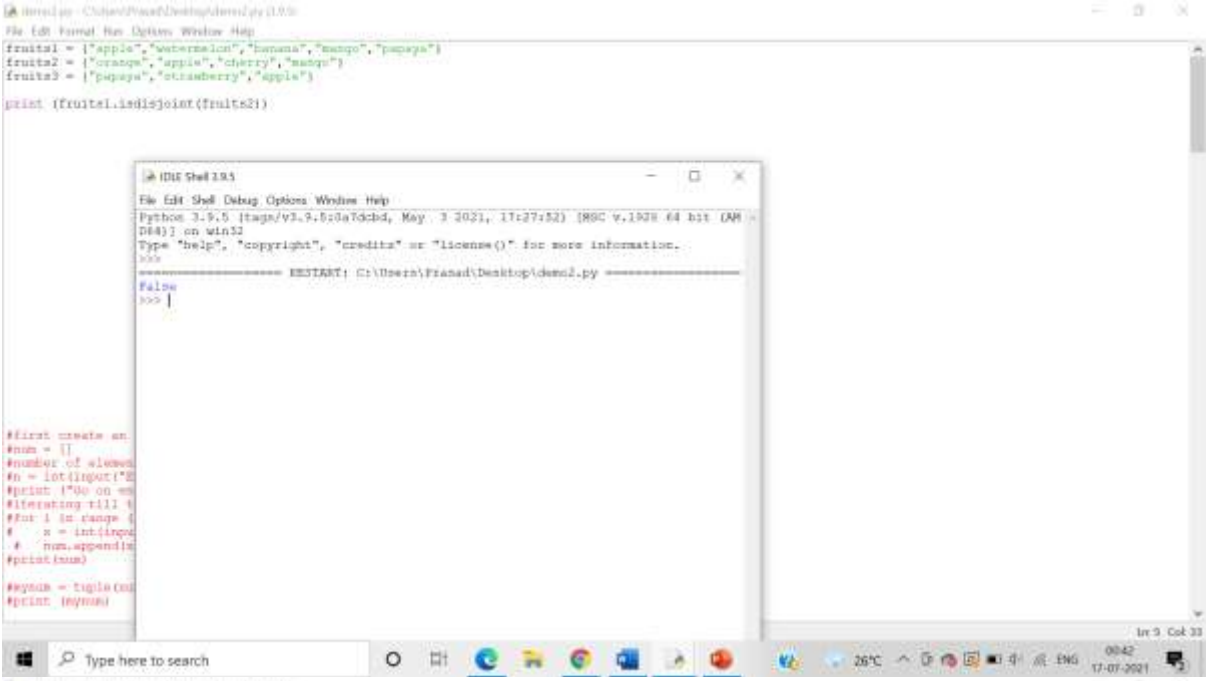


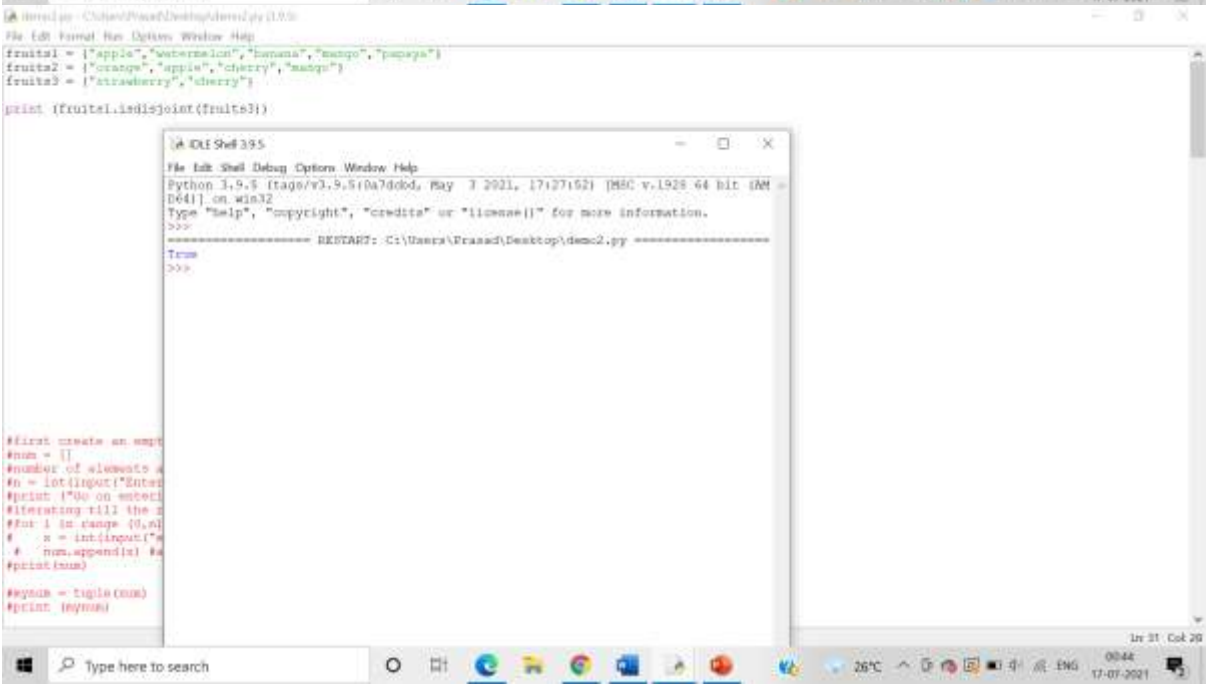


Program for demonstrating intersection_update()

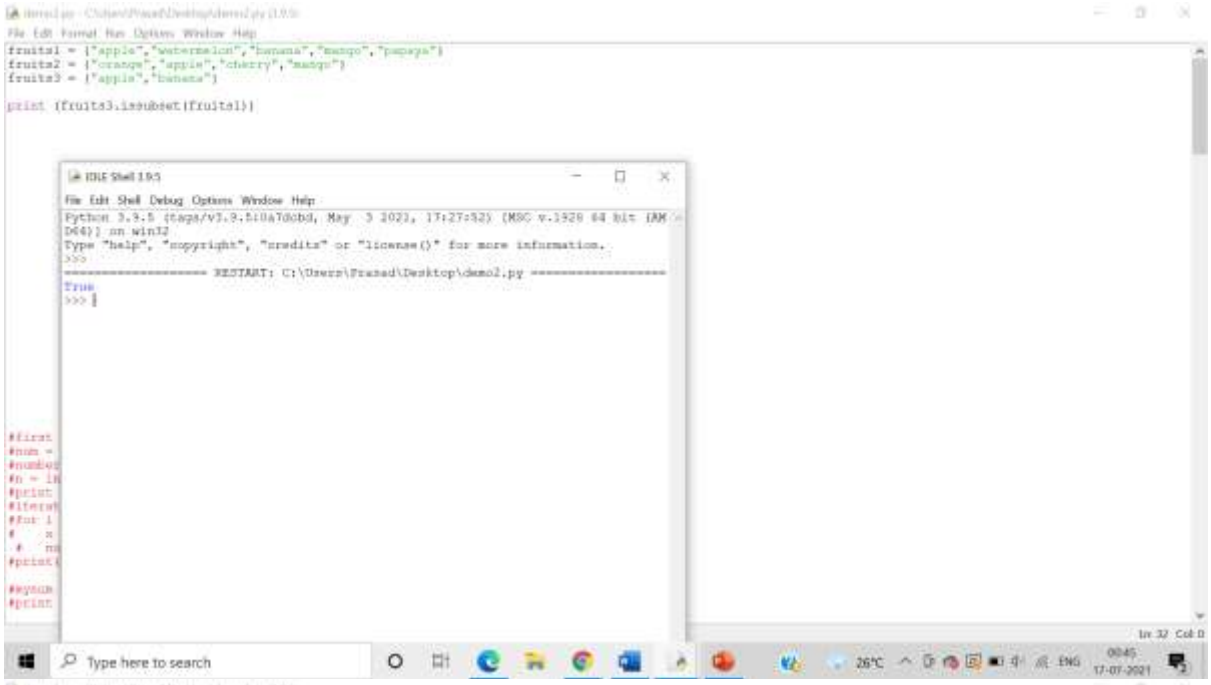


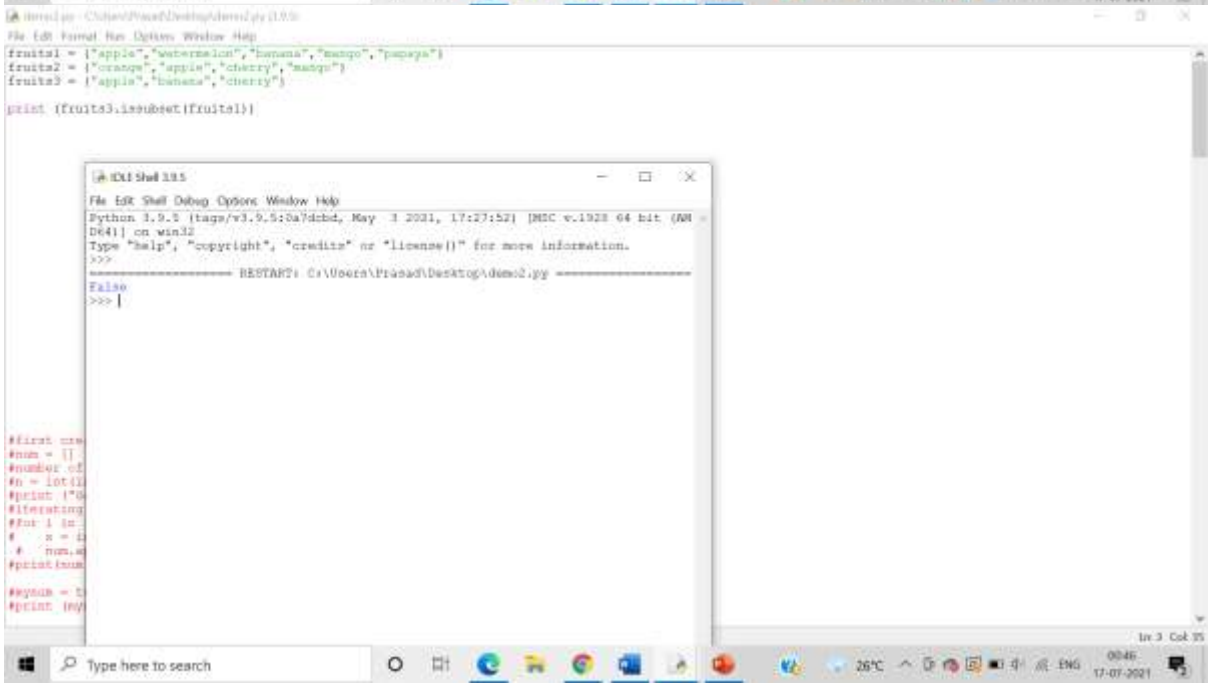
Program for demonstrating isdisjoint()



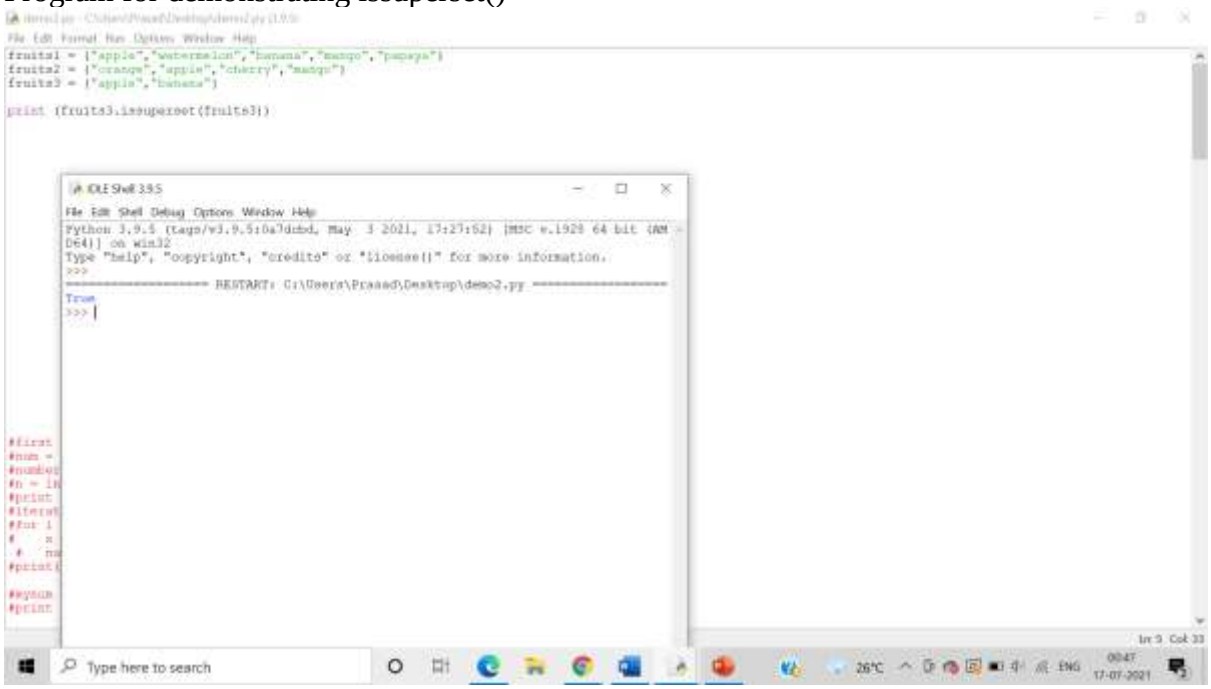


Program for demonstrating issubset()
Algorithm:-
Step 1:- issubset() methods returns whether another set contains this set or not.
Step 2:- issuperset() method returns whether this set contains another set or not.
Step3:- pop() method removes an element from the set.
Step 4:- remove() method removes the specified element.





Program for demonstrating issuperset()



Program for demonstrating symmertic_difference()

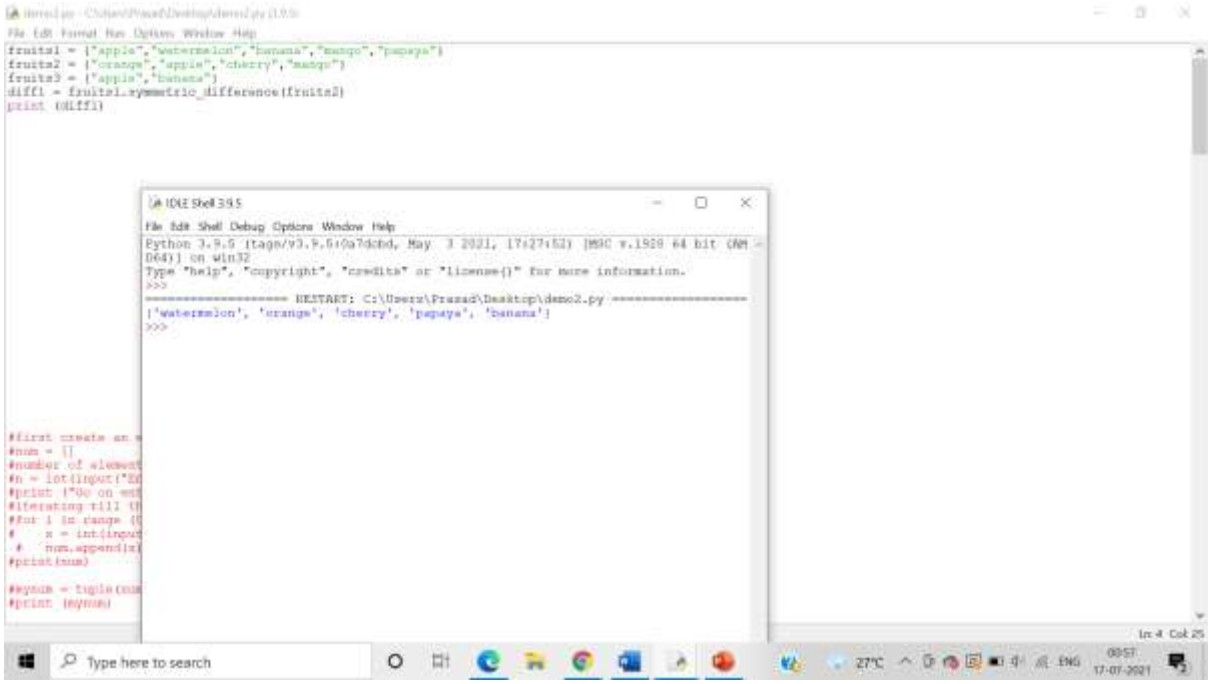
Algorithm:-

Step 1:- symmetric_difference() method returns a set with the symmetric differences of two sets.

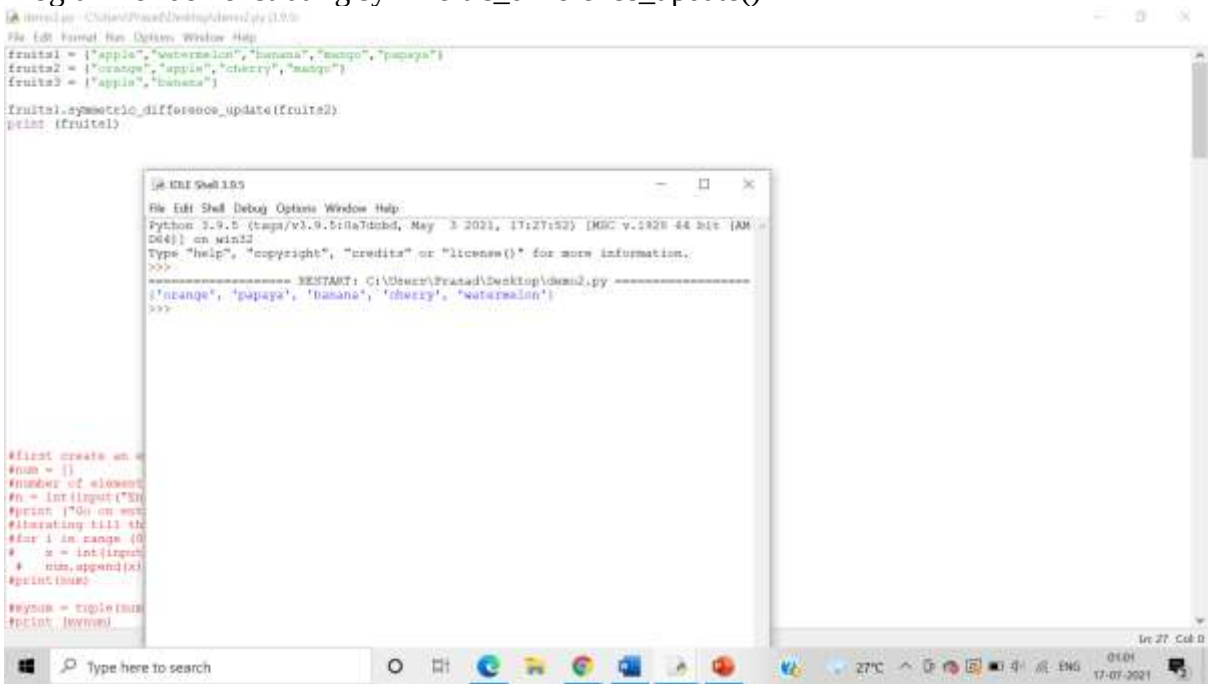
Step 2:- symmetric_difference_update() method inserts the symmetric differences from this set and another.

Step3:- union() method return a set containing the union of sets .

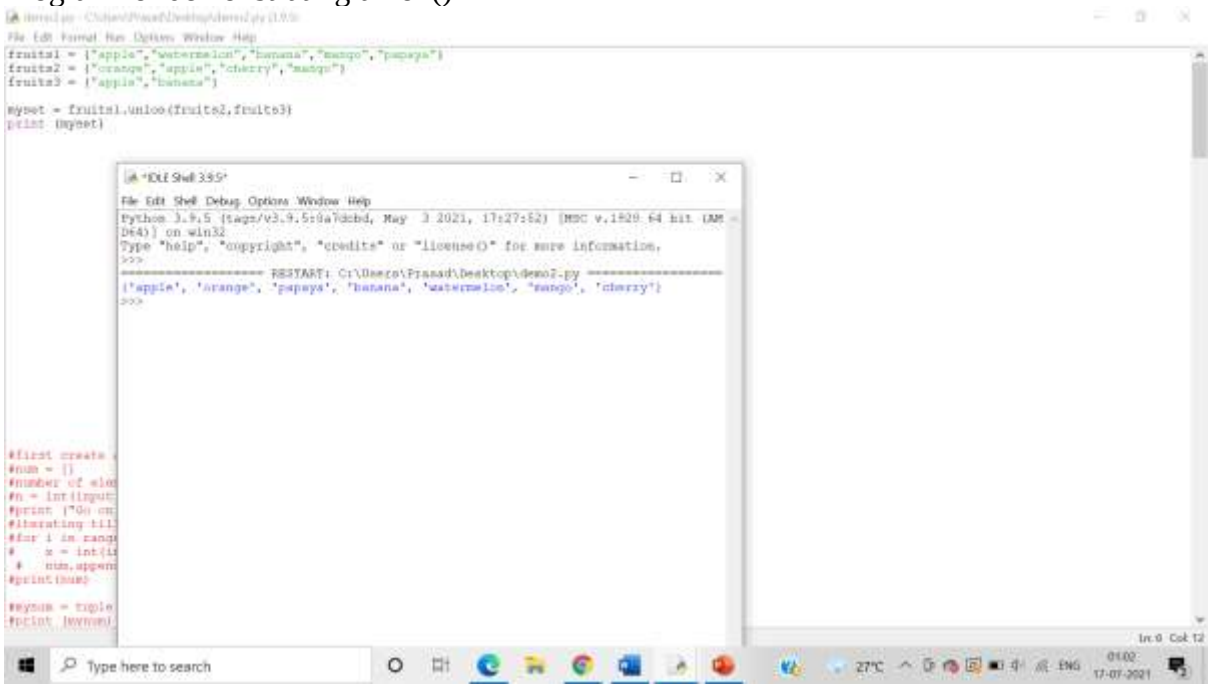
Step 4:-update() method update the set with the union of this set and others.



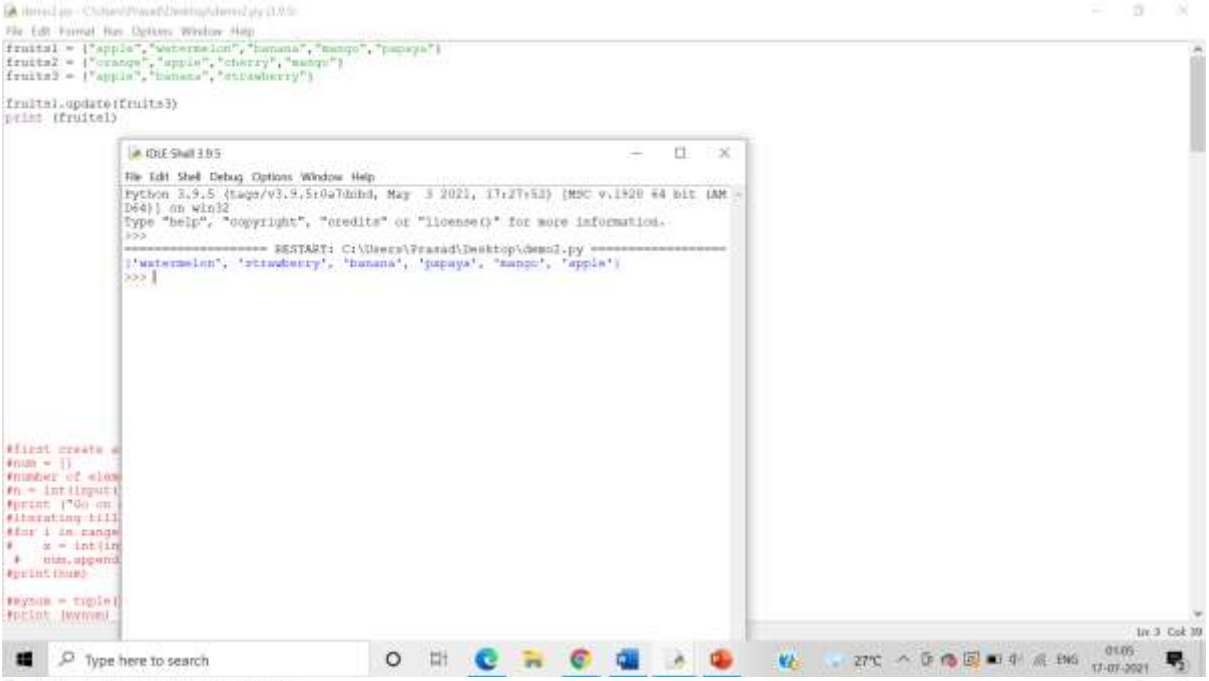
Program for demonstrating symmertic_difference_update()

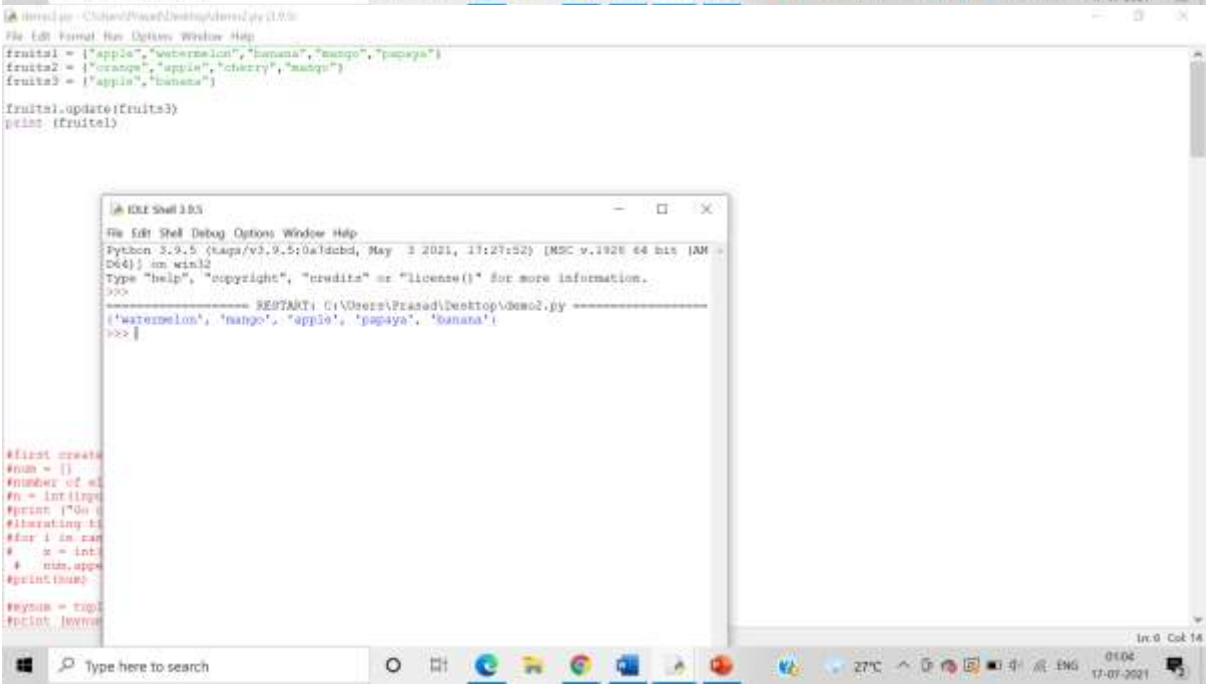


Program for demonstrating union()



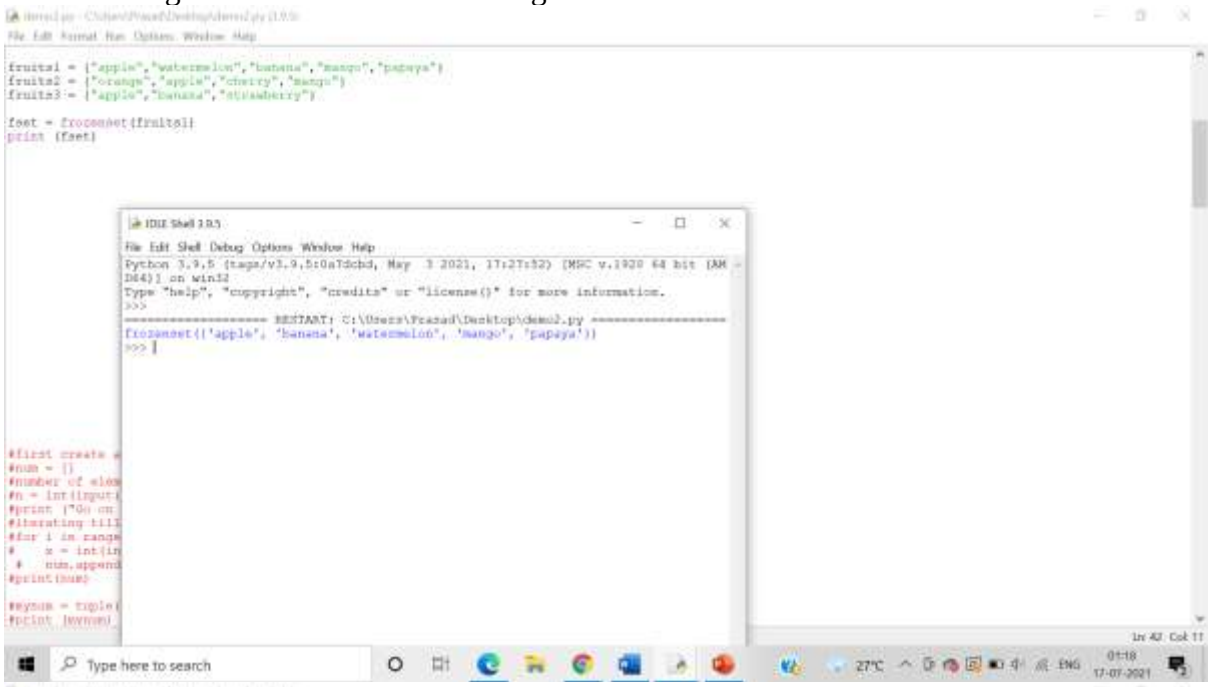
Program for demonstrating update()

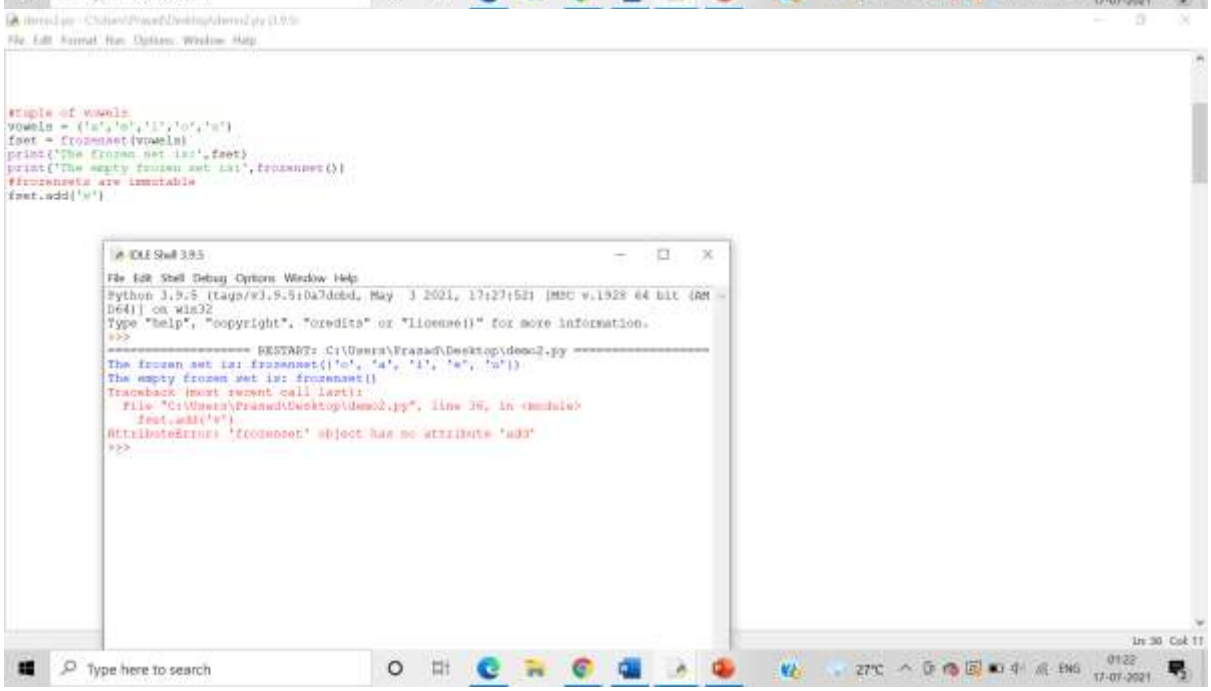




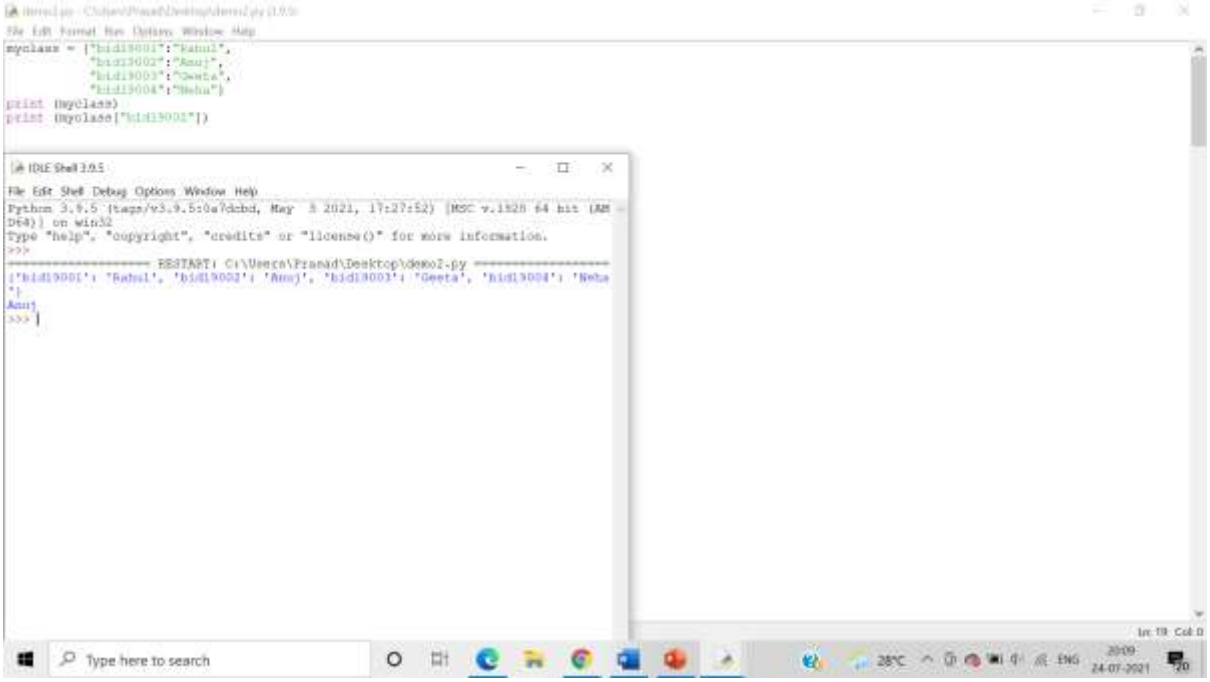
5. Demonstrate declaration and usage of frozen sets
Algorithm:-
Step 1:- A set is created by placing all the items (elements) inside curly braces {}, separated by comma, or by using the built-in set() function.
Step 2:- A frozen set is created by using the frozenset() method.
Step3:- If no parameters are passed, it returns an empty frozenset.

Answer: Program for declaration and usage of frozen sets





6. Write a program demonstrating declaration and accessing dictionaries and its elements.
Algorithm:-
Step 1:- A set is created by placing all the items (elements) inside curly braces {}, separated by comma, or by using the built-in set() function. You can declare a set by assigning it to a variable.
Step 2:-You can access the set by using the key in a square bracket '[]'.
Answer: Program demonstrating accessing dictionaries and its elements:



7. Write a program demonstrating looping through the dictionaries, printing keys and values separately and together

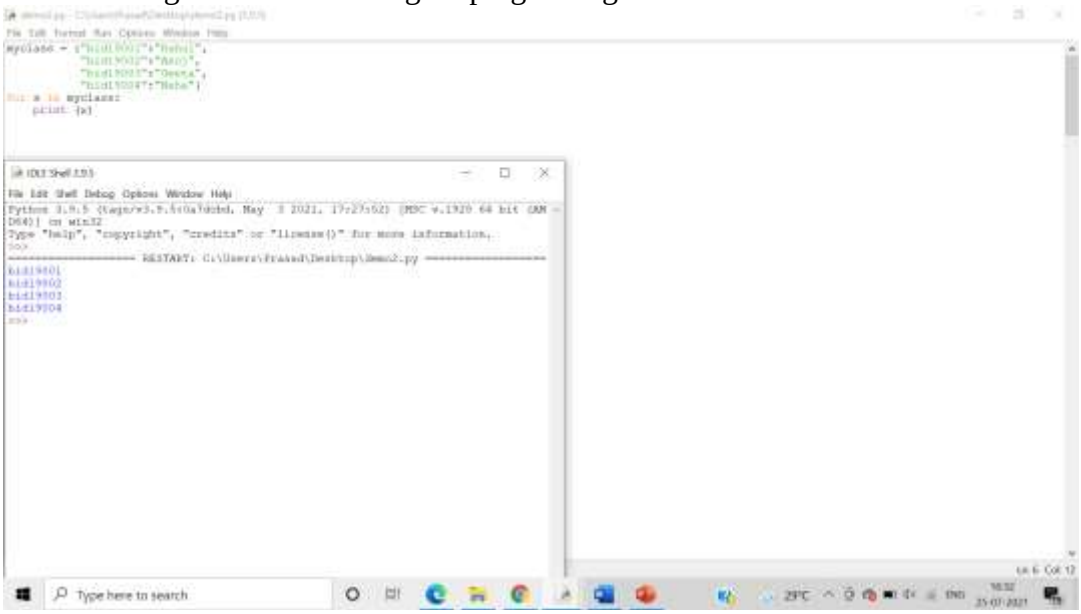
Algorithm:-

Step 1:- Using a for loop where x is a key in a set, we can print keys separately by printing ‘x’.

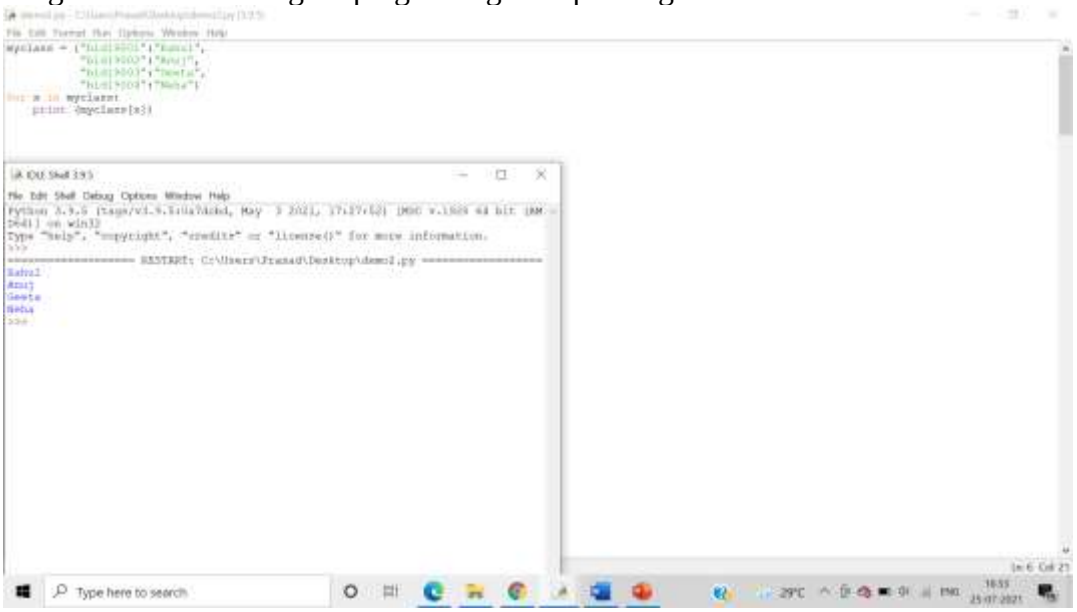
Step 2:- Using a for loop where y is a key in a set, we can print the values separately by printing ‘days[y]’ which will print the value assigned to the key ‘y’.

Step3:- Using a for loop where z is a key in a set, we can print keys and values together by printing ‘z’ which will print the keys and days[‘z’],which will print the value assigned to the key ‘z’.

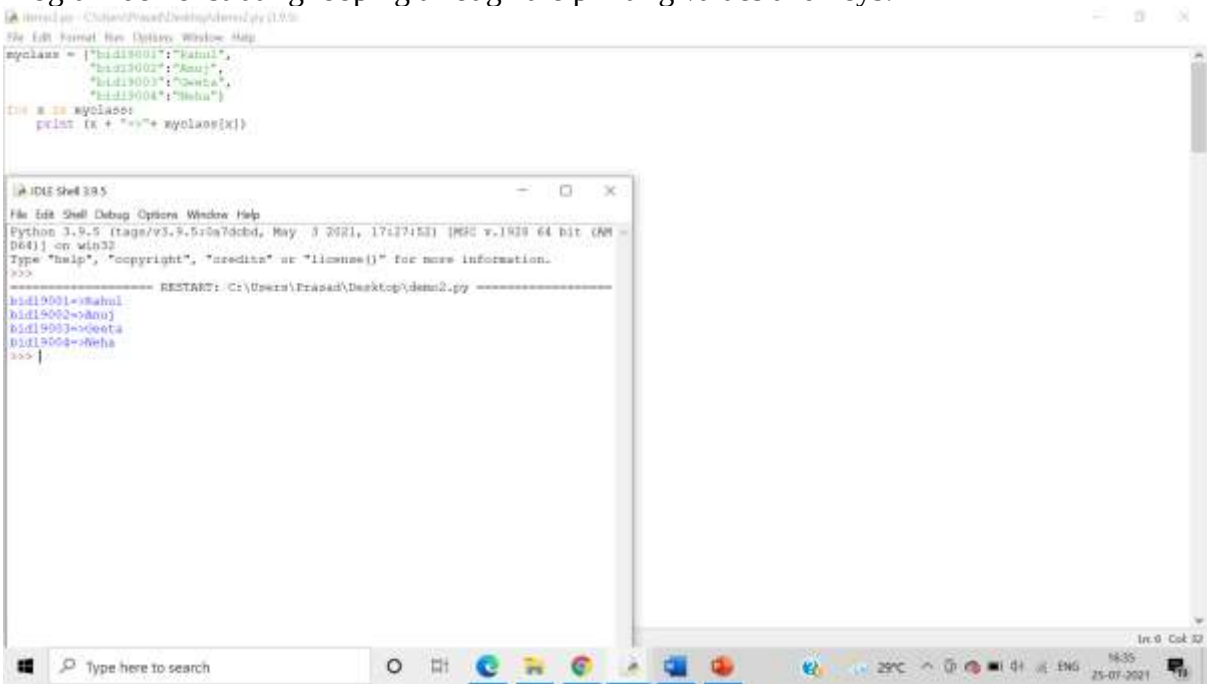
Answer: Program demonstrating looping through the dictionaries



Program demonstrating looping through the printing values:

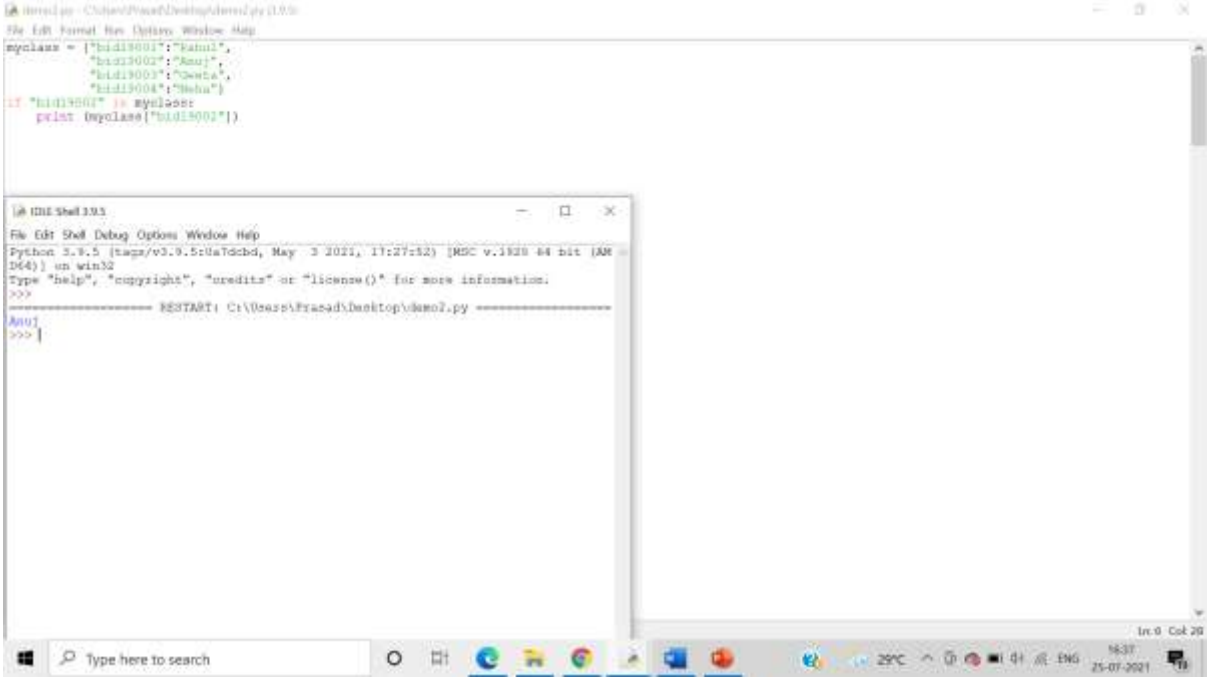


Program demonstrating looping through the printing values and keys:

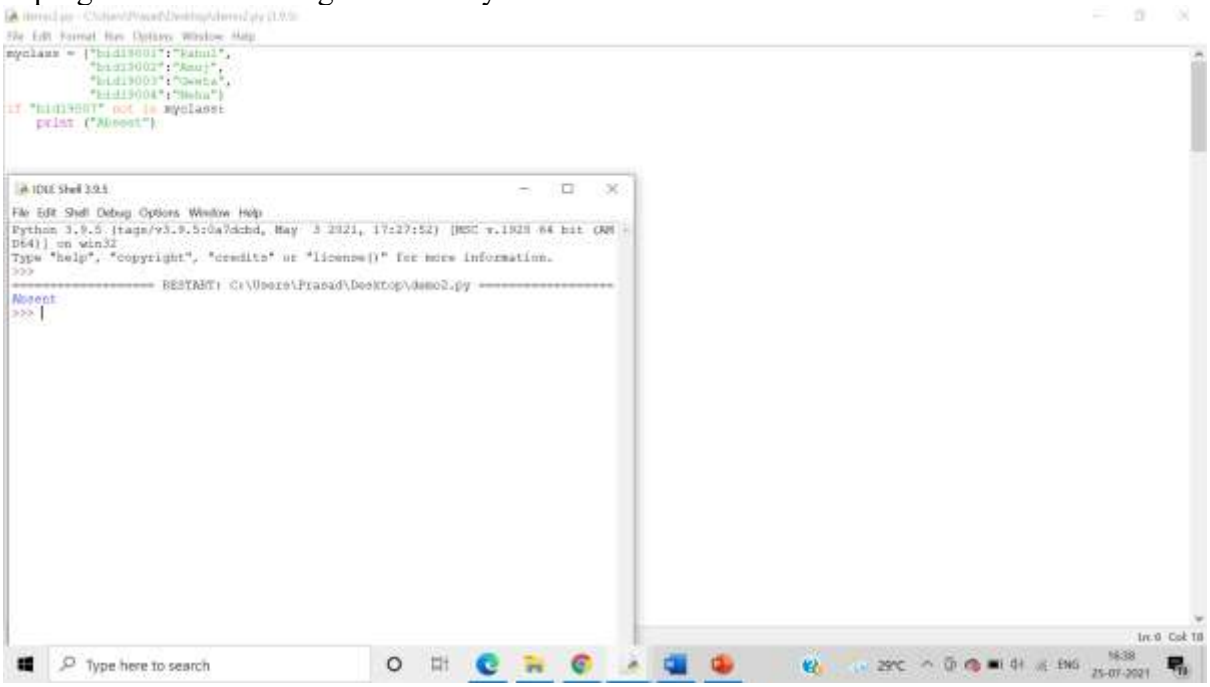


8. Write a program demonstrating “in” and “not in” keywords on Dictionaries
Algorithm:-
Step 1: - The ‘in’ operator is used to **check if an element is present** in the dictionary or n not. Returns true if element is present in dictionary else returns false.
Step 2: The ‘not in’ operator is used to **check if an element is not present** in the dictionary or not. Returns true if element is not present in dictionary else returns false.

Answer: A program demonstrating “in” keyword on Dictionaries:



A program demonstrating “not in” keyword on Dictionaries



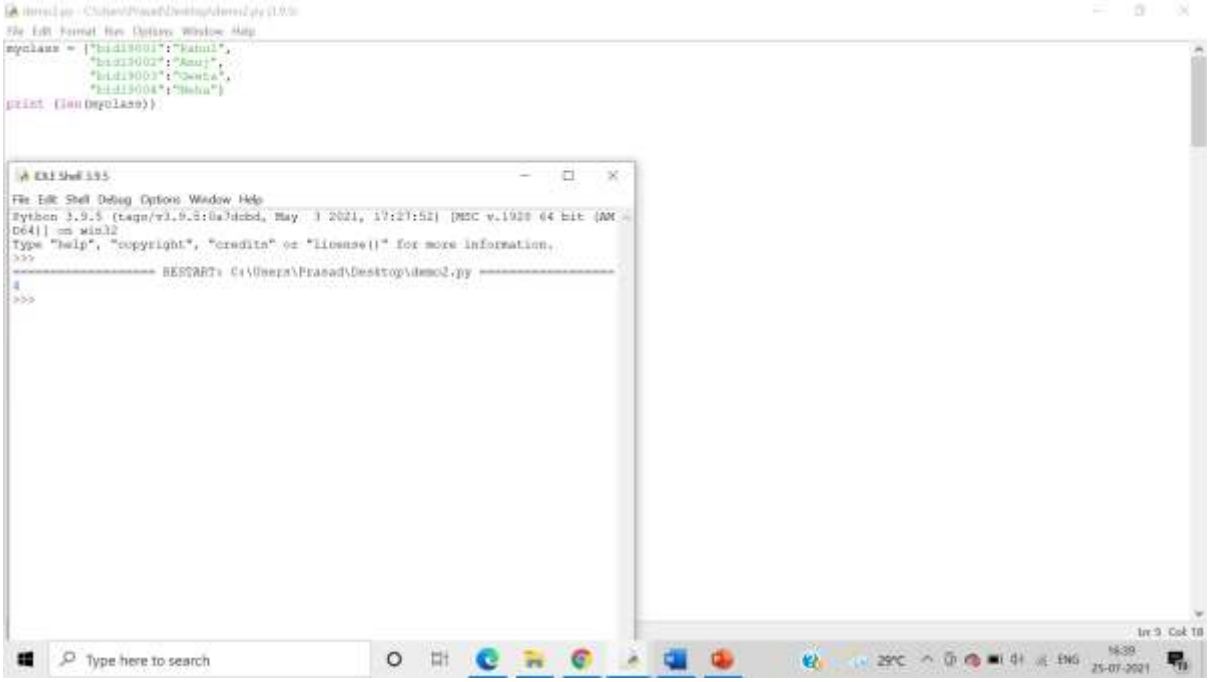
9.Write a program demonstrating len() and del() function on Dictionaries.

Algorithm:-

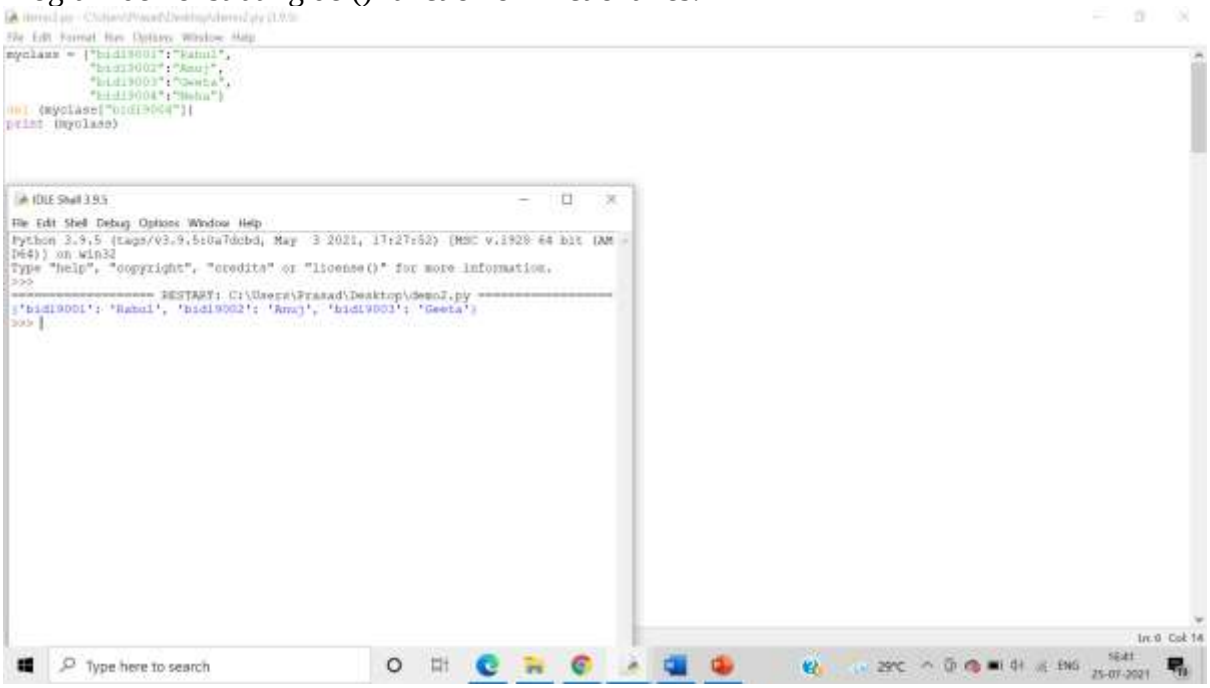
Step 1: The len() function is used to obtain the length of the ldictionary

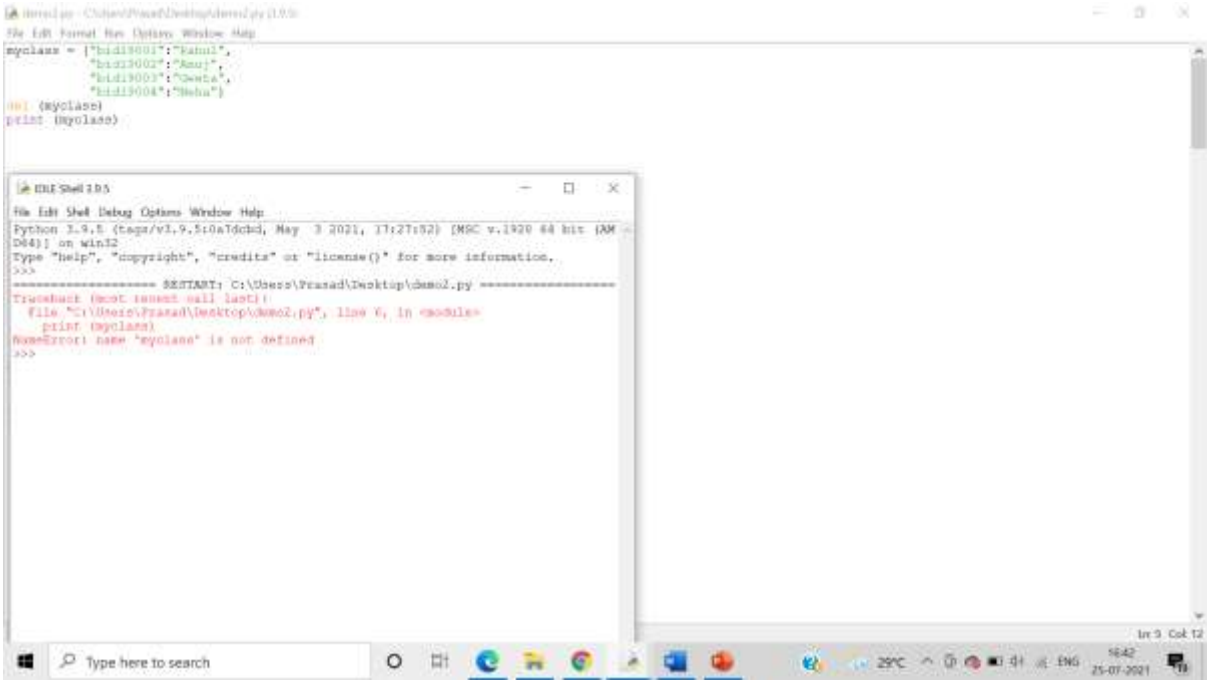
Step 2: The del() function **deletes all the elements in range** starting from index 'a' till /////'b' mentioned in arguments.

Answer: Program demonstrating len() function on Dictionaries:



Program demonstrating del() function on Dictionaries:




File Edit Format Run Options Window Help
myclass = {"bid19001":"Rahul",
"bid19002":"Raaj",
"bid19003":"Sweta",
"bid19004":"Neha"}
del (myclass)
print (myclass)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
Traceback (most recent call last):
File "C:\Users\Prasad\Desktop\demo2.py", line 6, in <module>
print (myclass)
NameError: name 'myclass' is not defined
>>>
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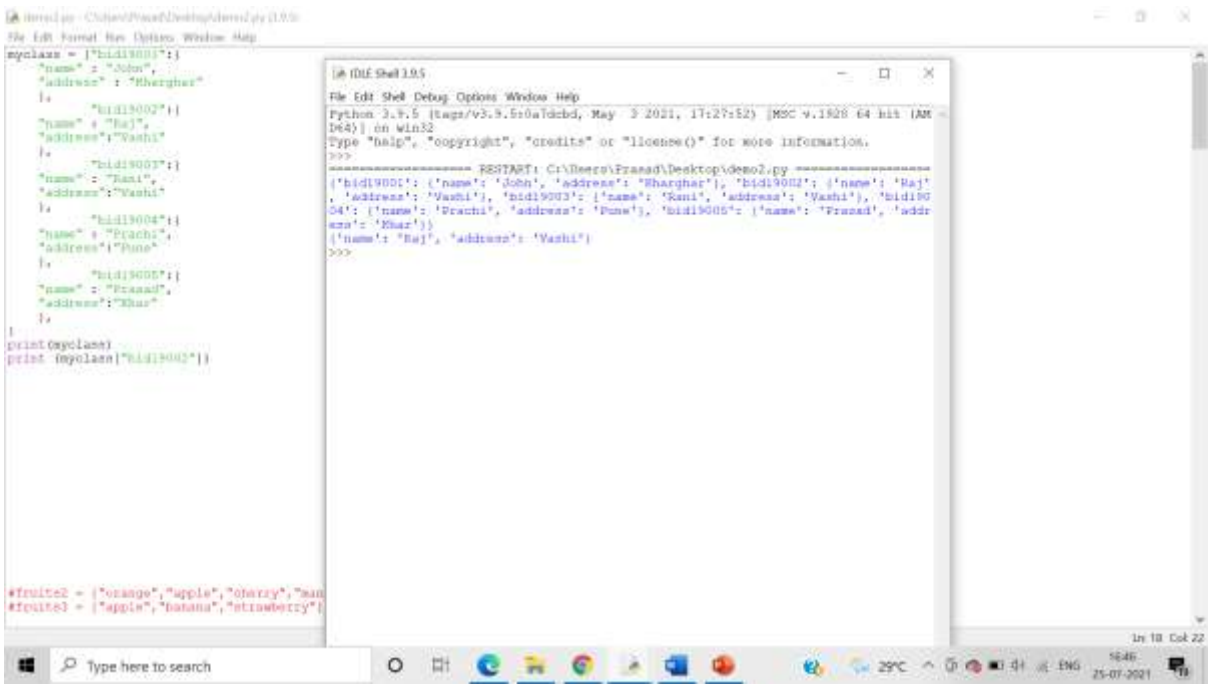
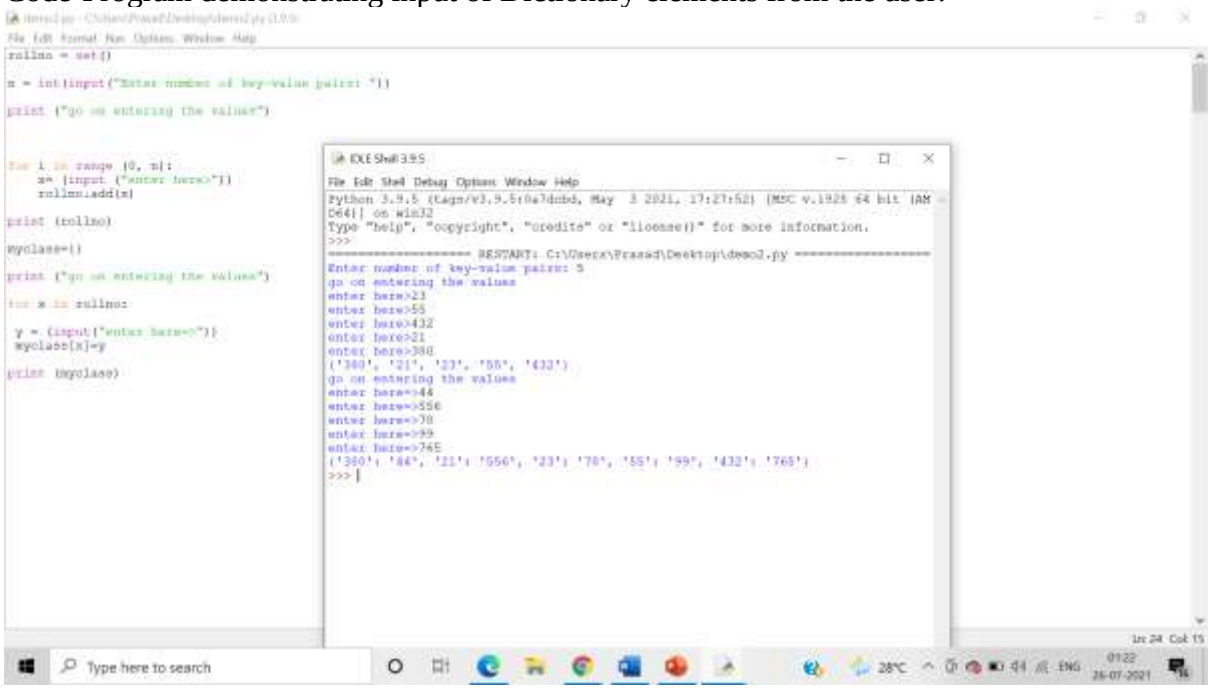
10.Write a program demonstrating Nested Dictionaries
Algorithm:-
Step 1:- In Python, a nested dictionary is a dictionary inside a dictionary. It's a collection of dictionaries into one single dictionary.
Step 2:-Here each key in a dictionary has its own dictionary

Answer: Program demonstrating Nested Dictionaries:



11. Write a program demonstrating input of Dictionary elements from the user
Algorithm:
Step 1:- Take user input for number of elements in the dictionary as well that of both the keys and values in a for loop.
Step 2:- We initialize a empty dictionary to which we can then add the values of both the keys and values using the update() function
Code-Program demonstrating input of Dictionary elements from the user:-



12. Write set of programs for demonstrating the usage of all the different dictionary methods along with their variations

Answer: Programs for demonstrating

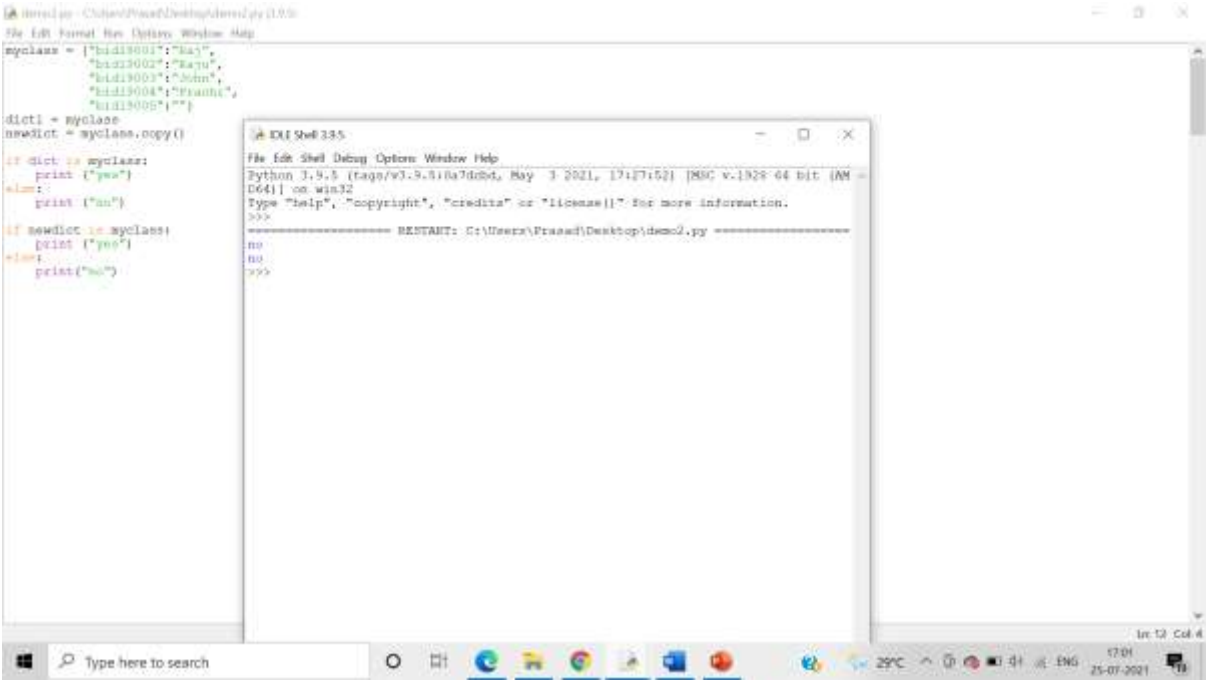
Algorithm:-

Step 1:- The clear() method empties the dictionary.

Step 2:- The copy() method returns a copy of the dictionary.

clear()

copy()



fromkeys()

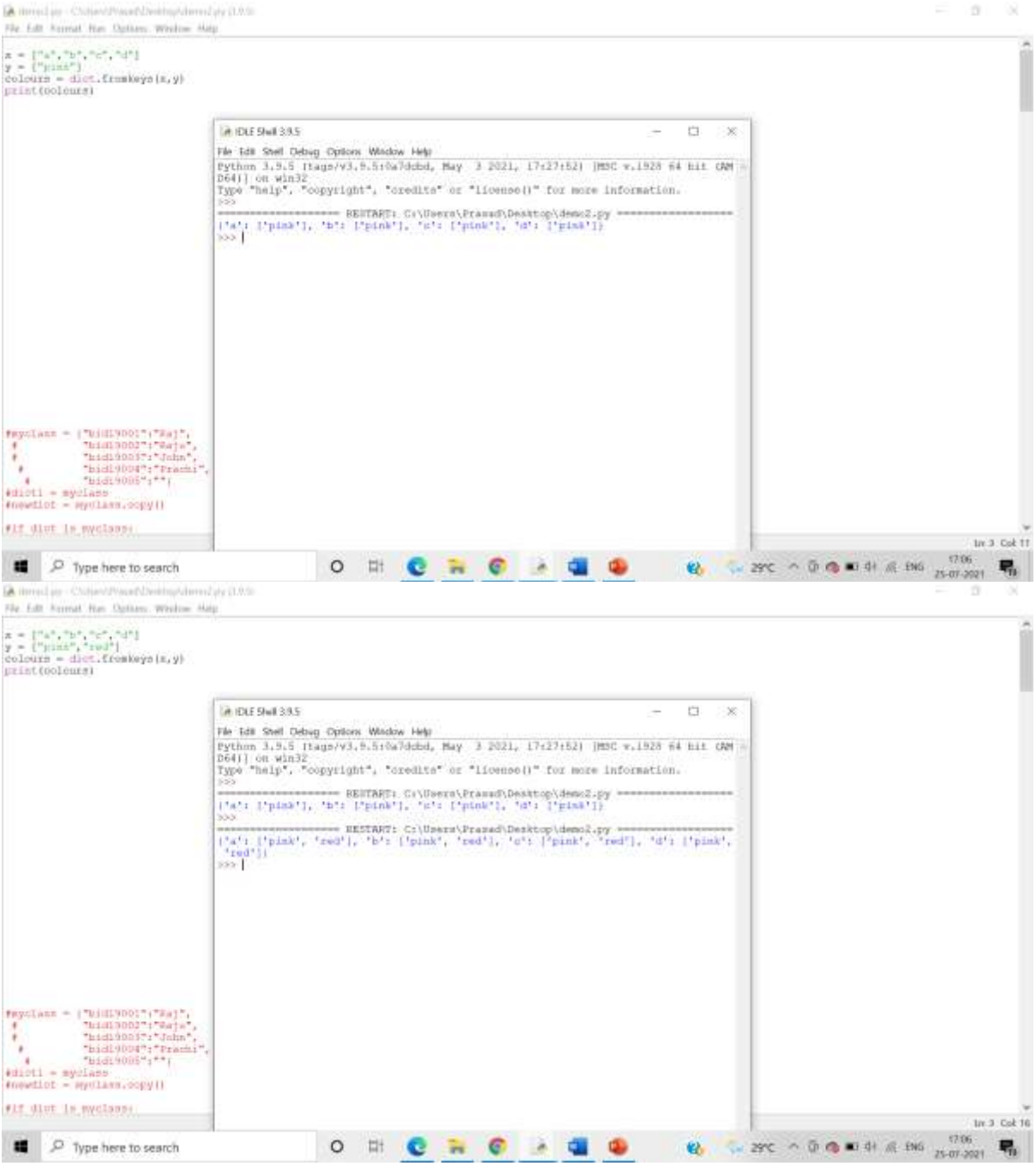
Algorithm:-

Step 1:- fromkeys() returns a dictionary with the specified keys and value

Step 2:- get() returns the value of the specified key

Step 3:- items() returns a list containing a tuple for each key value pair

Step 4:- keys() returns a list containing the dictionary's keys


x = ["a","b","c","d"]
y = ["pink"]
colours = dict.fromkeys(x,y)
print(colours)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
{'a': ['pink'], 'b': ['pink'], 'c': ['pink'], 'd': ['pink']}
>>>
#myclass = {"bid19001":"Raj",
"bid19002":"Raje",
"bid19003":"John",
"bid19004":"Prachi",
"bid19005":""}
#dict1 = myclass
#newdict = myclass.copy()
#if dict is myclass:
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x = ["a","b","c","d"]
y = ["pink","red"]
colours = dict.fromkeys(x,y)
print(colours)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
{'a': ['pink'], 'b': ['pink'], 'c': ['pink'], 'd': ['pink']}
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
{'a': ['pink', 'red'], 'b': ['pink', 'red'], 'c': ['pink', 'red'], 'd': ['pink',
'red']}
>>>
#myclass = {"bid19001":"Raj",
"bid19002":"Raje",
"bid19003":"John",
"bid19004":"Prachi",
"bid19005":""}
#dict1 = myclass
#newdict = myclass.copy()
#if dict is myclass:
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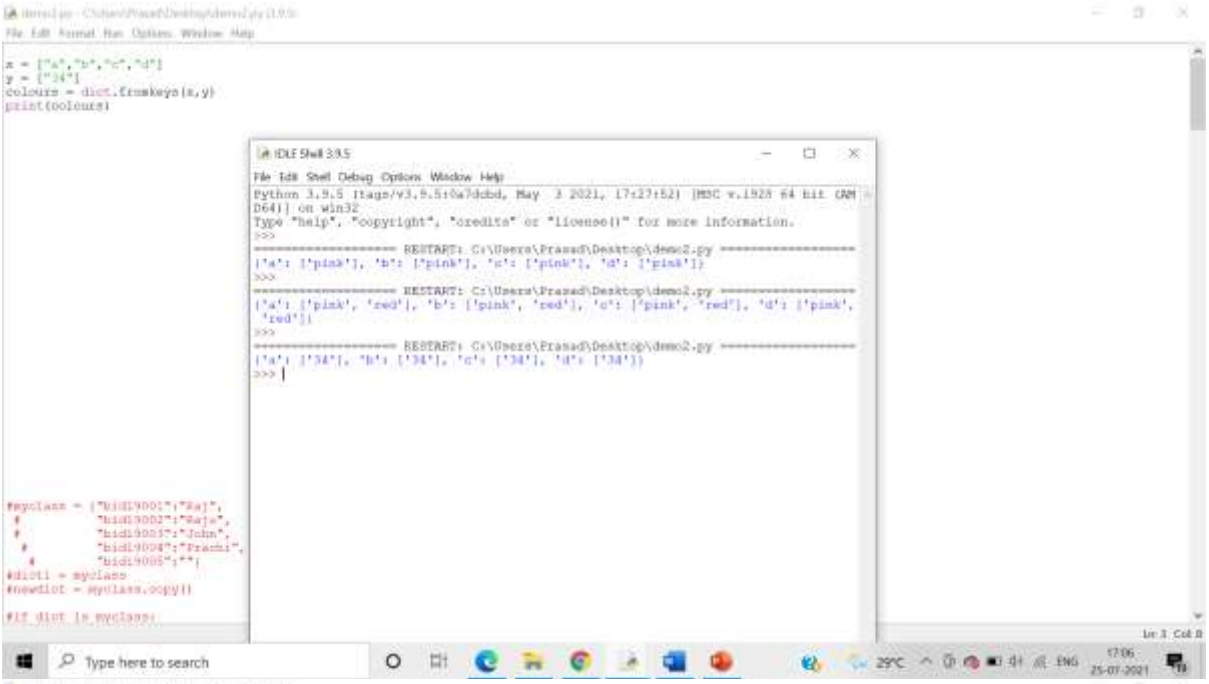
x = ["a","b","c","d"]
y = ["34"]
colours = dict.fromkeys(x,y)
print(colours)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
{'a': ['pink'], 'b': ['pink'], 'c': ['pink'], 'd': ['pink']}
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
{'a': ['pink', 'red'], 'b': ['pink', 'red'], 'c': ['pink', 'red'], 'd': ['pink',
'red']}
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
{'a': ['34'], 'b': ['34'], 'c': ['34'], 'd': ['34']}
>>>
#myclass = {"bid19001":"Raj",
"bid19002":"Raje",
"bid19003":"John",
"bid19004":"Prachi",
"bid19005":""}
#dict1 = myclass
#newdict = myclass.copy()
#if dict is myclass:
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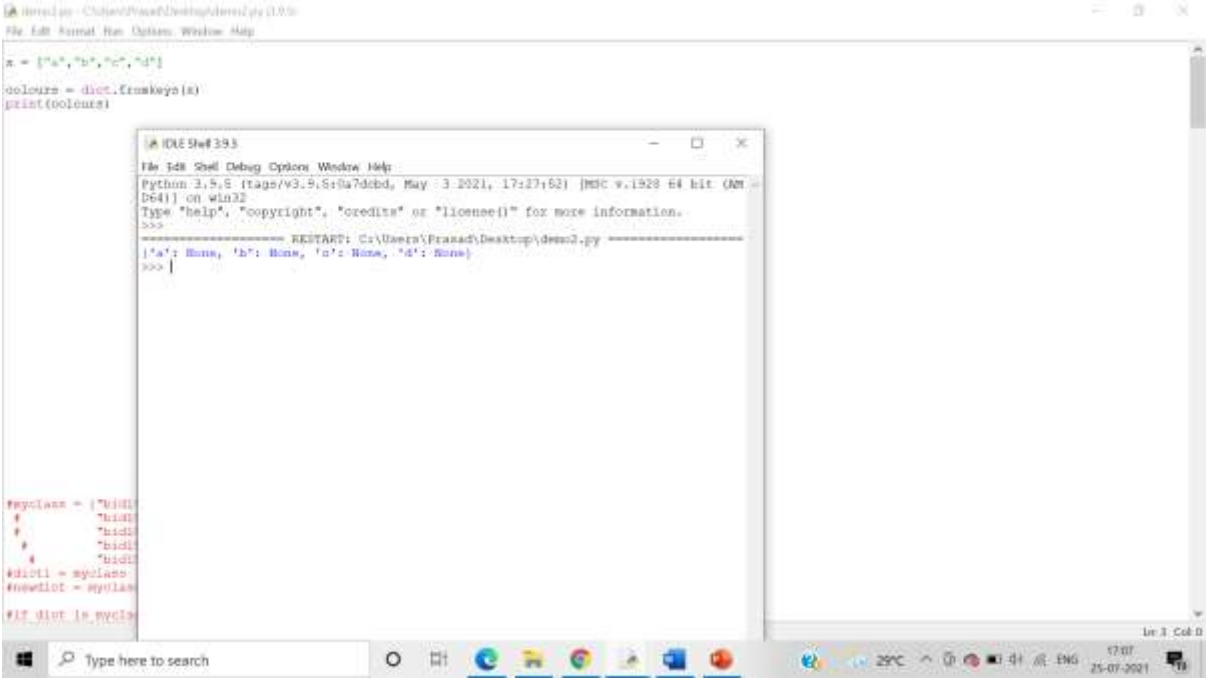
x = ["a","b","c","d"]
colours = dict.fromkeys(x)
print(colours)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
{'a': None, 'b': None, 'c': None, 'd': None}
>>>
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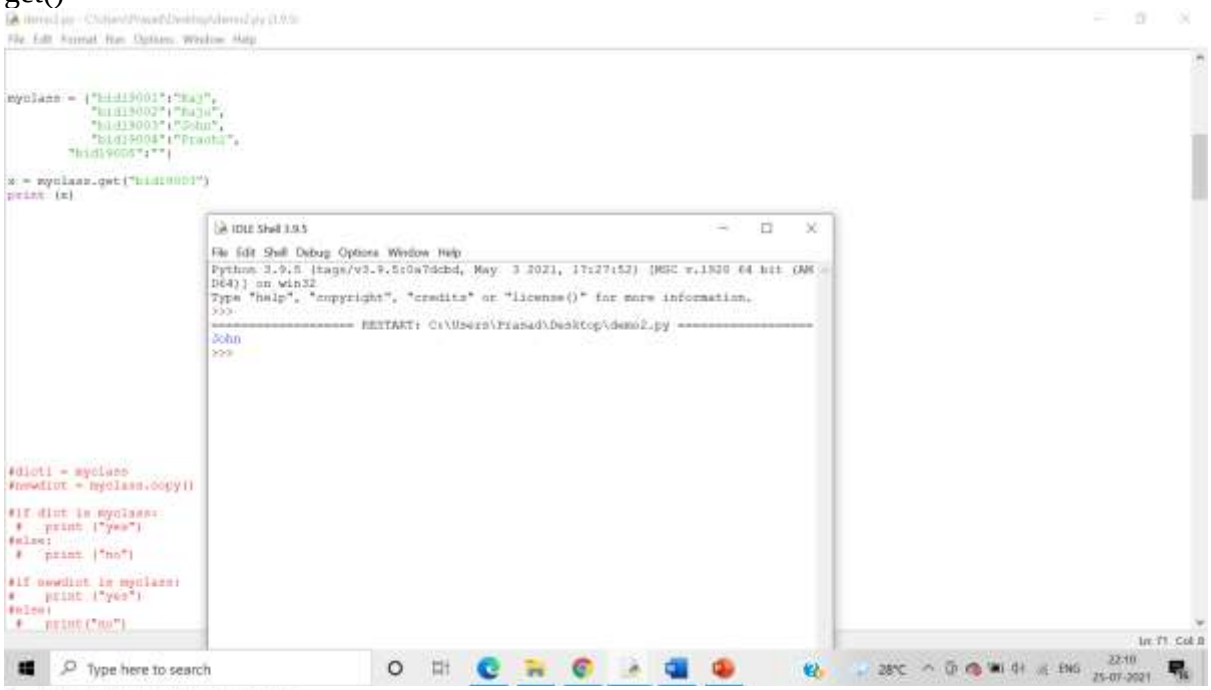
get()


myclass = {"bid19001":"Raj",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Prashu",
"bid19005":""}
x = myclass.get("bid19003")
print (x)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
John
>>>
#dict1 = myclass
#newdict = myclass.copy()
#if dict is myclass:
print ("yes")
#else:
print ("no")
#if newdict is myclass:
print ("yes")
#else:
print("no")
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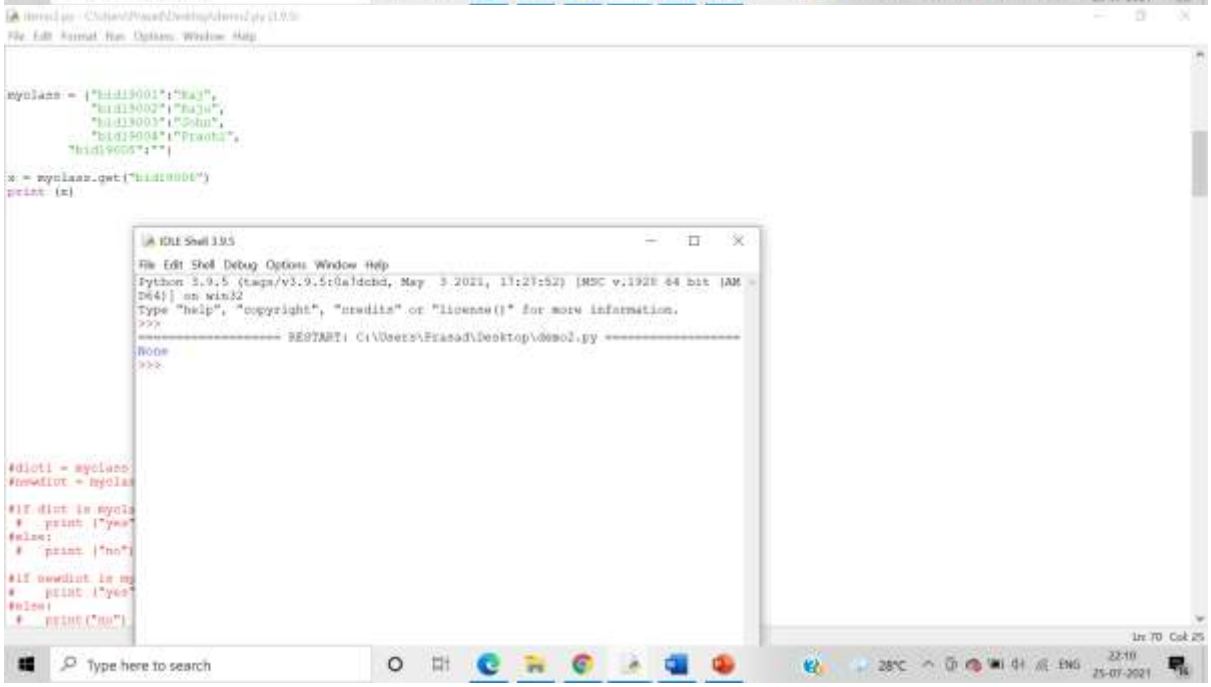
myclass = {"bid19001":"Raj",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Prashu",
"bid19005":""}
x = myclass.get("bid19004")
print (x)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
None
>>>
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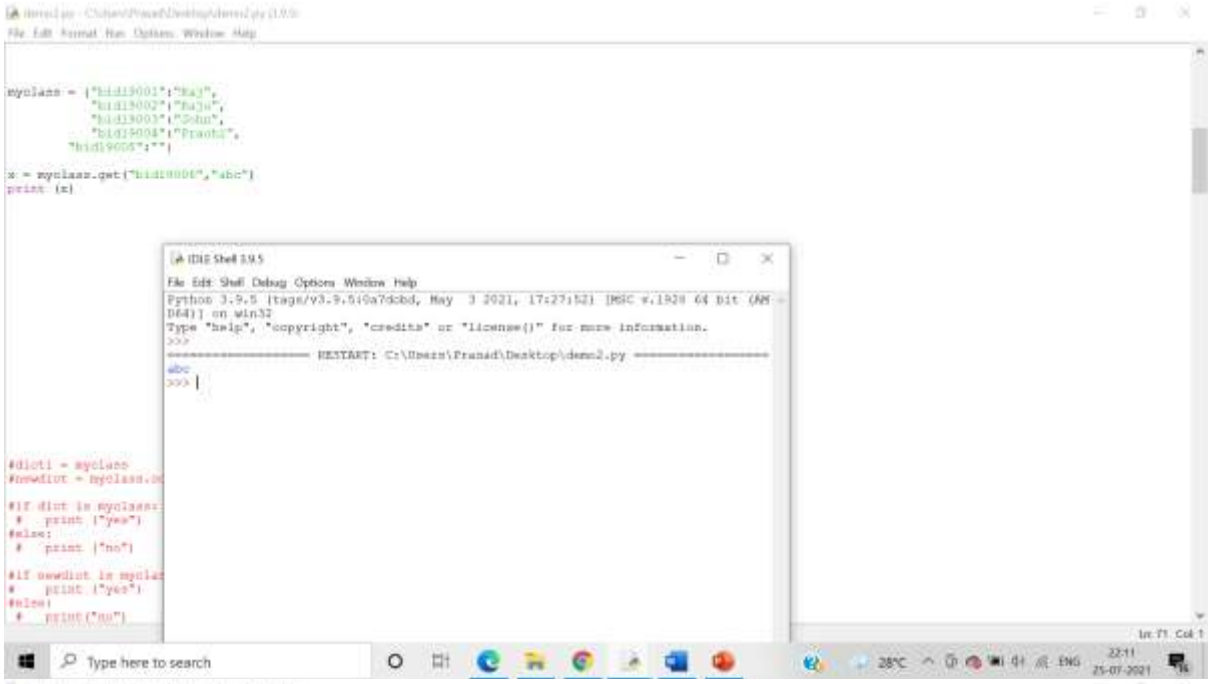
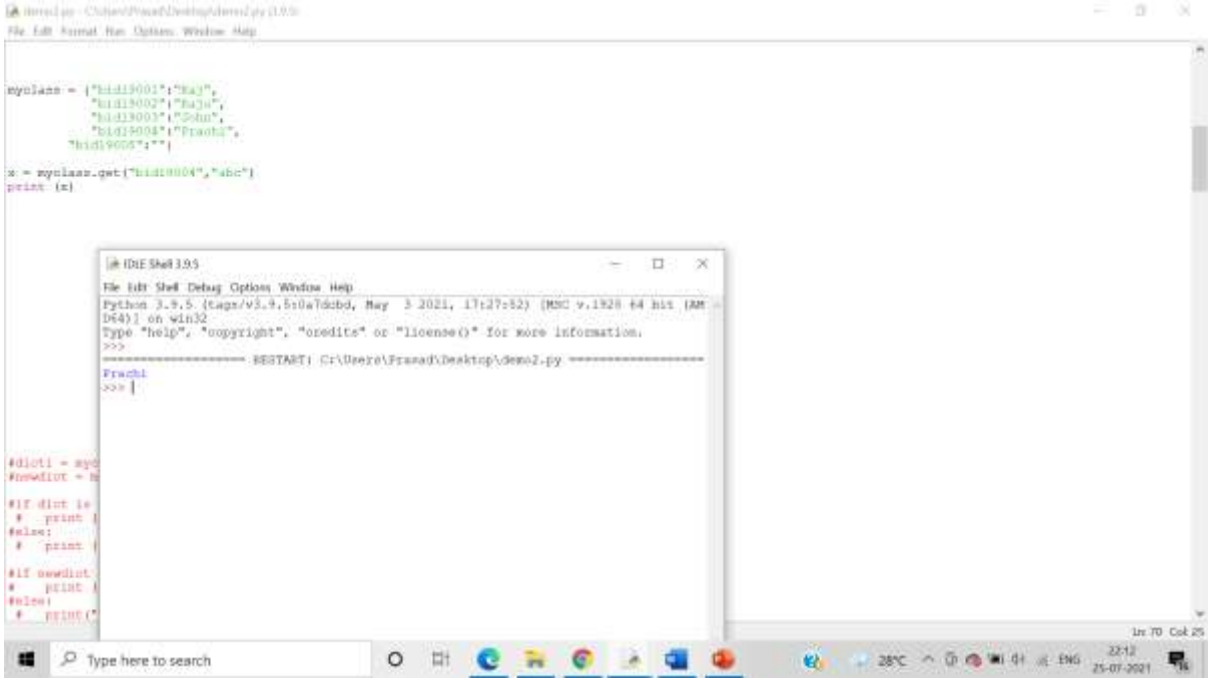

myclass = {"bid19001":"Raj",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Prachi",
"bid19005":""}
x = myclass.get("bid19004","abc")
print (x)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
abc
>>>
Type here to search


myclass = {"bid19001":"Raj",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Prachi",
"bid19005":""}
x = myclass.get("bid19004","abc")
print (x)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
Prachi
>>>
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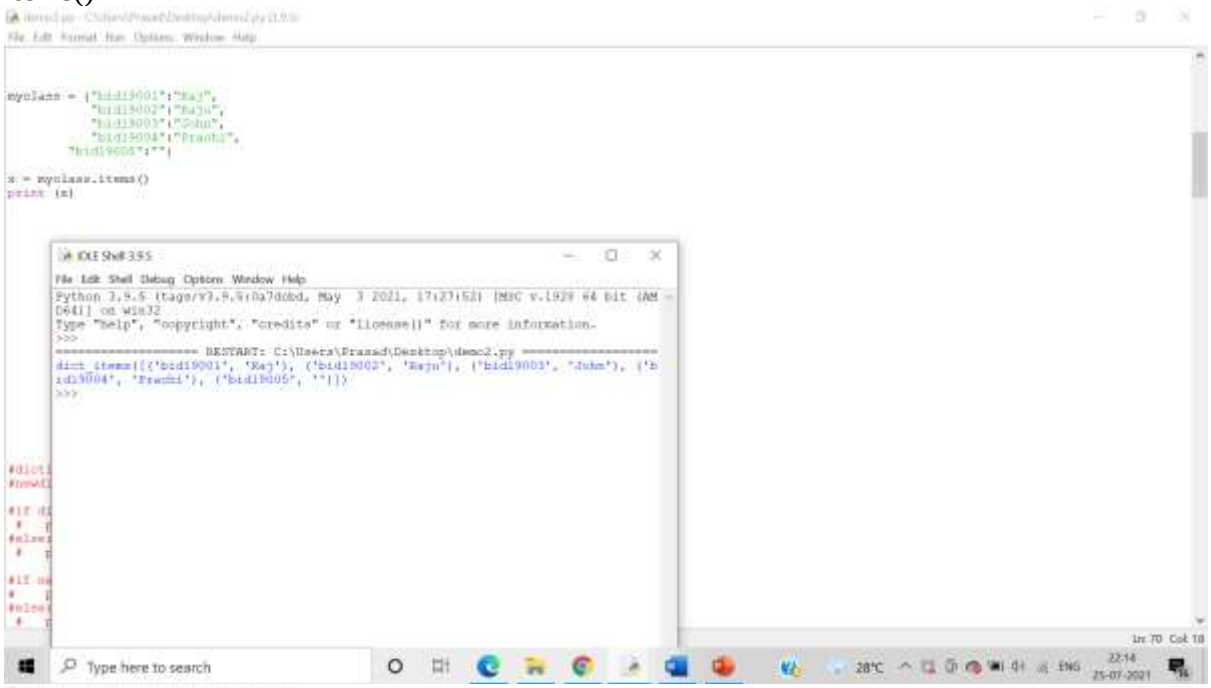
items()


myclass = {"bid19001":"Raj",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Prachi",
"bid19005":""}
x = myclass.items()
print (x)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
dict_items([('bid19001', 'Raj'), ('bid19002', 'Raju'), ('bid19003', 'John'), ('b
id19004', 'Prachi'), ('bid19005', '')])
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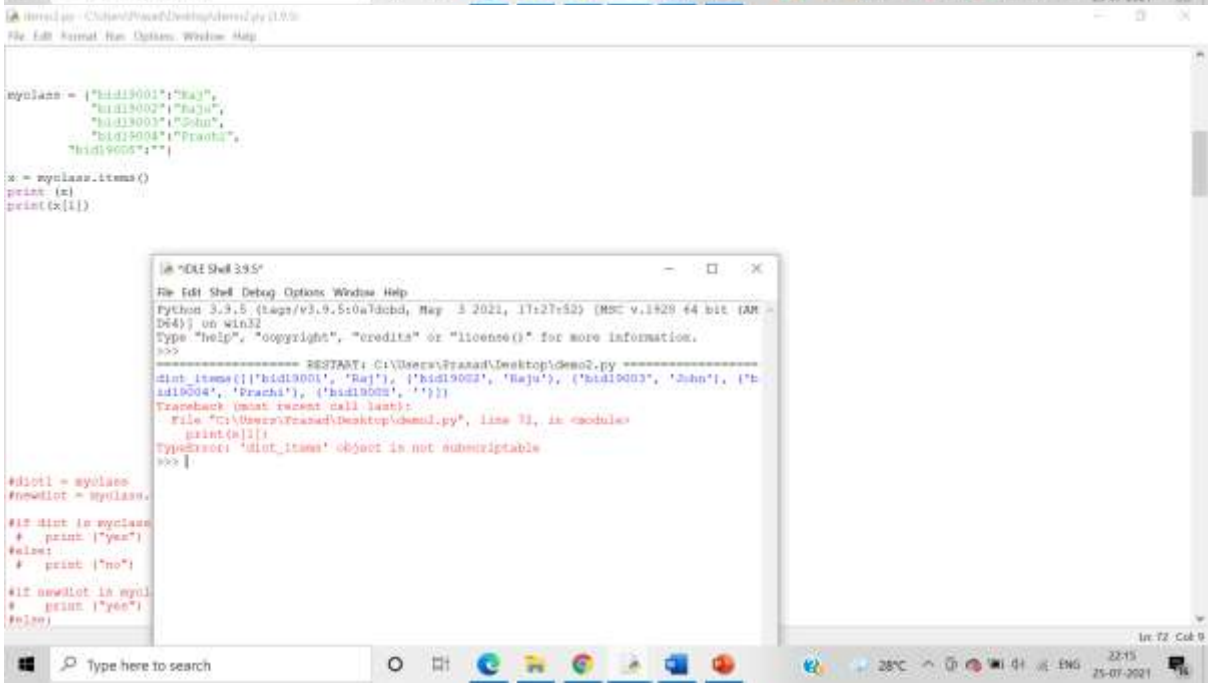
myclass = {"bid19001":"Raj",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Prachi",
"bid19005":""}
x = myclass.items()
print (x)
print(x[1])
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
dict_items([('bid19001', 'Raj'), ('bid19002', 'Raju'), ('bid19003', 'John'), ('b
id19004', 'Prachi'), ('bid19005', '')])
Traceback (most recent call last):
File "C:\Users\Prasad\Desktop\demo2.py", line 33, in <module>
print(x[1])
TypeError: 'dict_items' object is not subscriptable
>>>
Type here to search
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ENG
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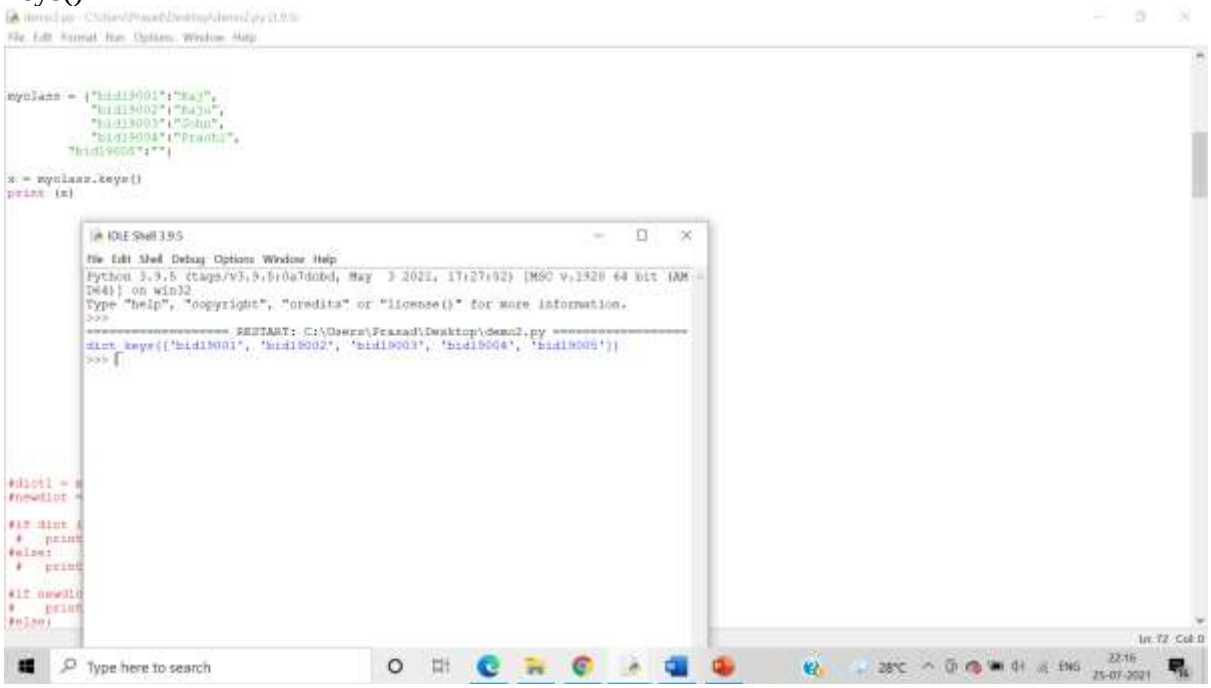
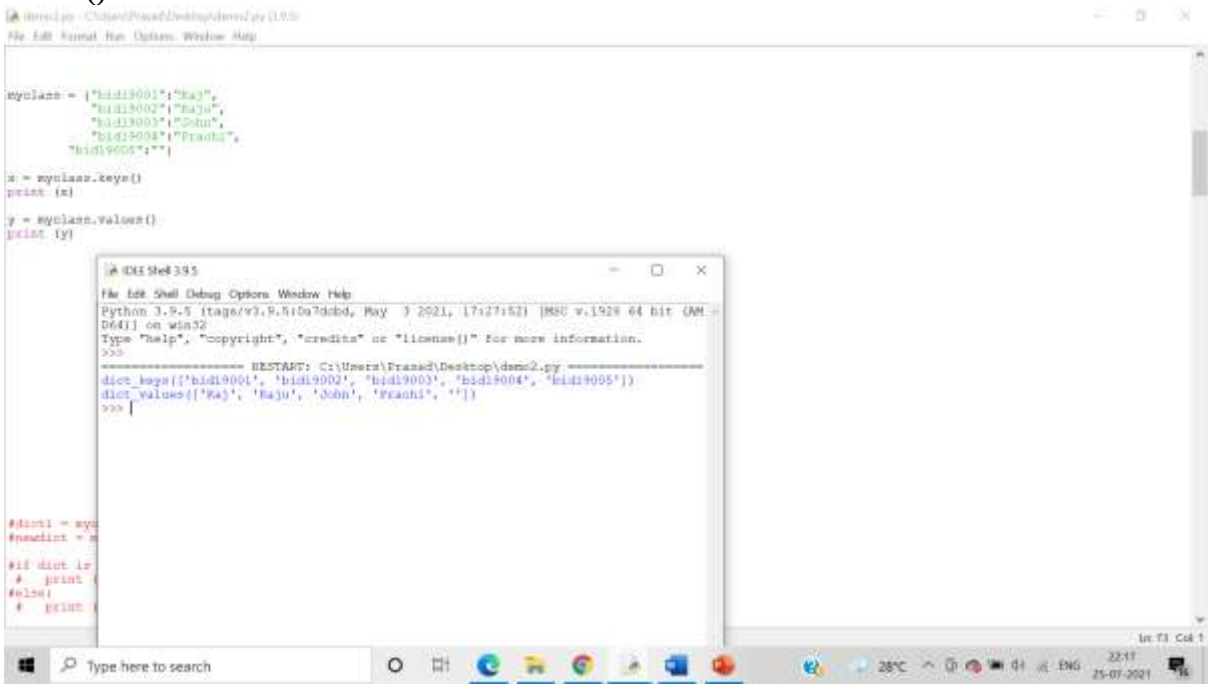
25-07-2021

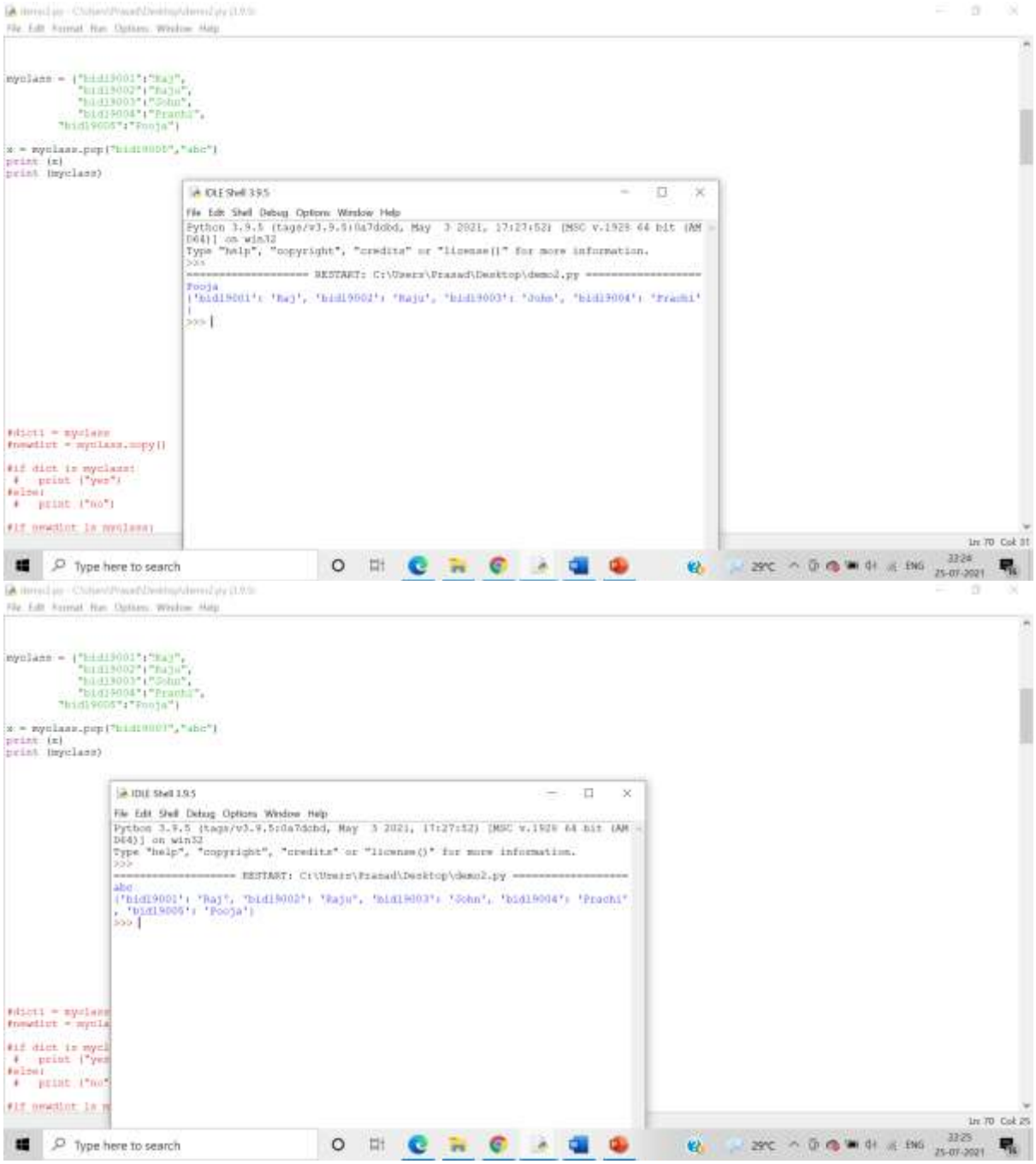
keys()


myclass = {"bid19001":"Raj",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Prashi",
"bid19005":""}
x = myclass.keys()
print (x)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
dict_keys(['bid19001', 'bid19002', 'bid19003', 'bid19004', 'bid19005'])
>>>
Type here to search

values()

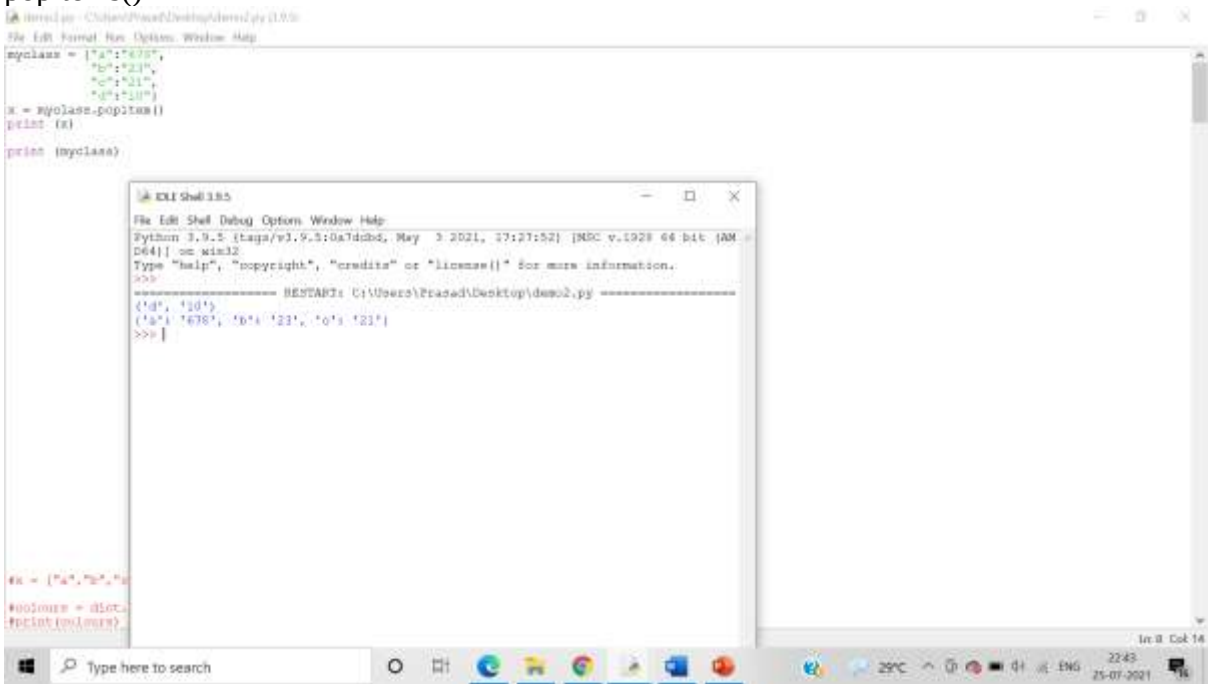

myclass = {"bid19001":"Raj",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Prashi",
"bid19005":""}
x = myclass.keys()
print (x)
y = myclass.values()
print (y)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
dict_keys(['bid19001', 'bid19002', 'bid19003', 'bid19004', 'bid19005'])
dict_values(['Raj', 'Raju', 'John', 'Prashi', ''])
>>>
Type here to search

pop()
Algorithm:-
Step 1:- pop() removes the element with the specified key.
Step 2:- popitem() removes the last inserted key-value pair
Step 3:-setdefault() returns the value of the specified key. If the key does not exist: insert the key, with the specified value

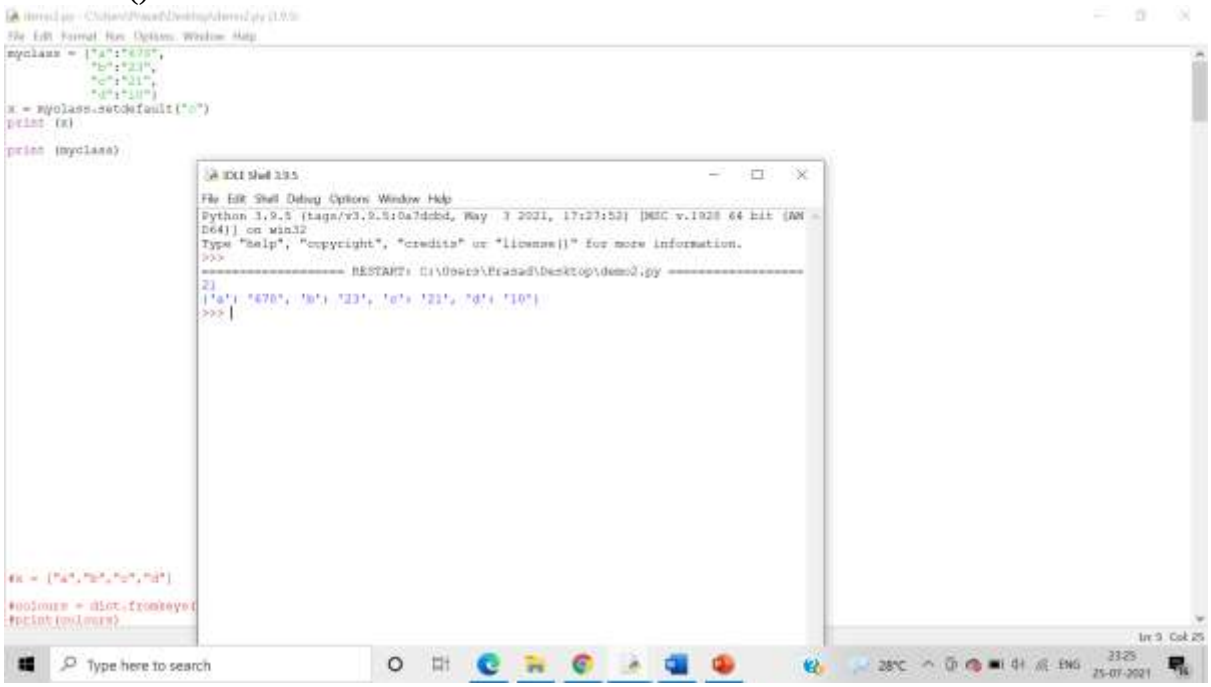

myclass = {"bid19001":"Raj",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Prachi",
"bid19005":"Pooja"}
x = myclass.pop("bid19005","abc")
print (x)
print (myclass)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
Pooja
{'bid19001': 'Raj', 'bid19002': 'Raju', 'bid19003': 'John', 'bid19004': 'Prachi'
}
>>>
#dict1 = myclass
#newdict = myclass.copy()
#if dict is myclass:
print ("yes")
#else:
print ("no")
#if newdict is myclass:
Type here to search
29°C
ENG
22:24
25-07-2021

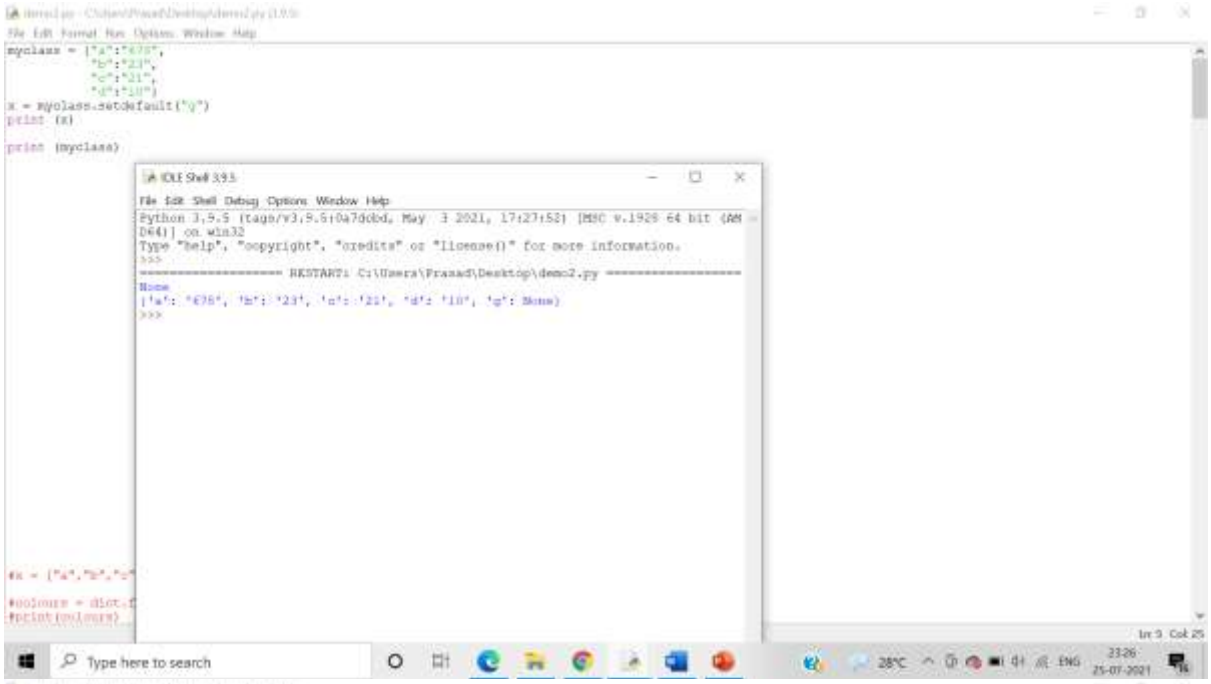
myclass = {"bid19001":"Raj",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Prachi",
"bid19005":"Pooja"}
x = myclass.pop("bid19005","abc")
print (x)
print (myclass)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
abc
{'bid19001': 'Raj', 'bid19002': 'Raju', 'bid19003': 'John', 'bid19004': 'Prachi'
, 'bid19005': 'Pooja'}
>>>
#dict1 = myclass
#if dict is myc
print ("yes
#else:
print ("no"
#if newdict is m
Type here to search
29°C
ENG
22:25
25-07-2021

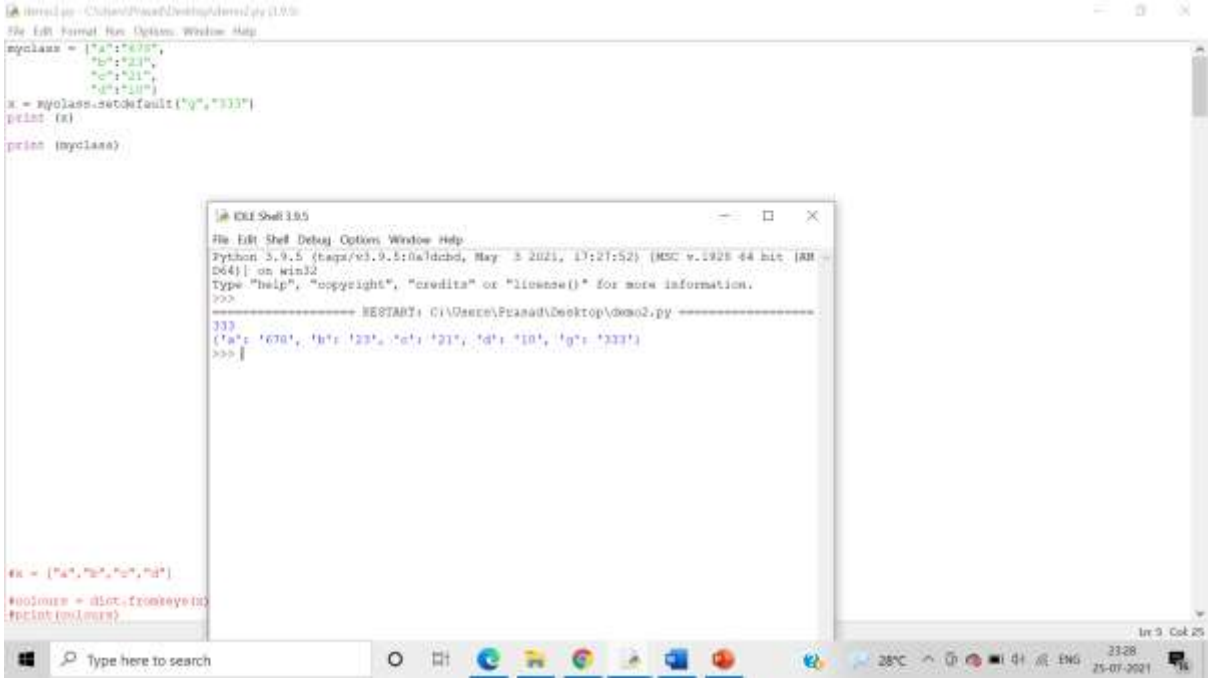
popitems()



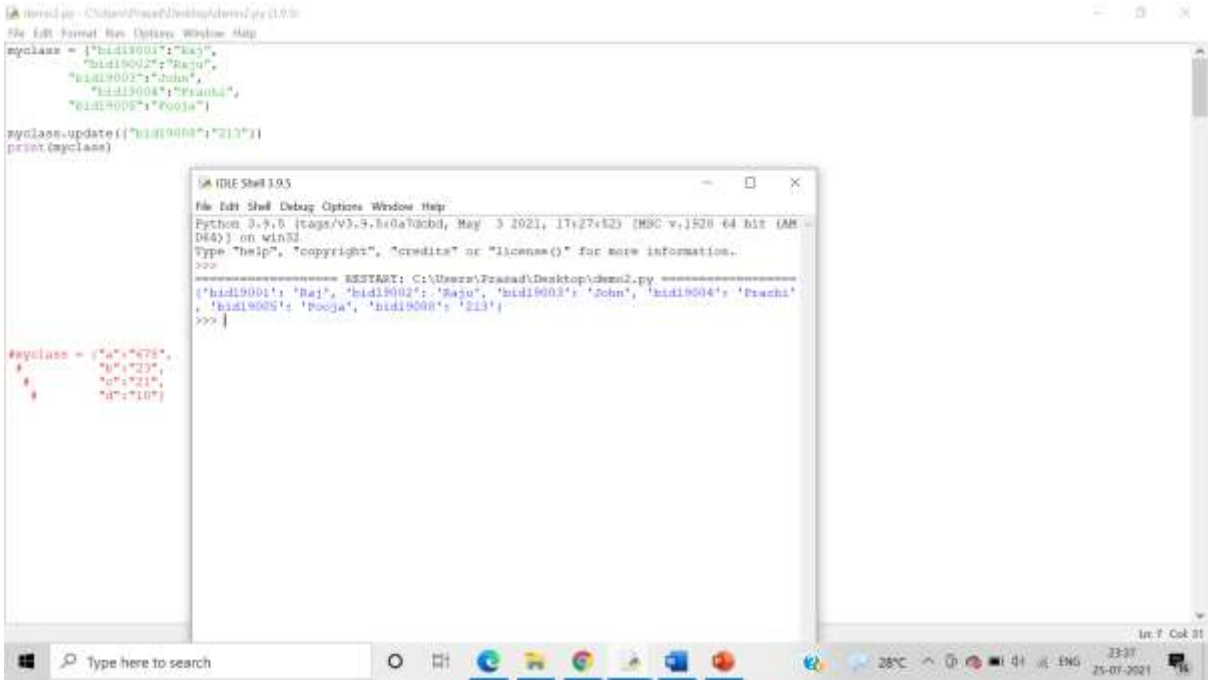
setdefault()




myclass = {"a":"670",
"b":"23",
"c":"21",
"d":"10"}
x = myclass.setdefault("g")
print (x)
print (myclass)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
None
{'a': '670', 'b': '23', 'c': '21', 'd': '10', 'g': None}
>>>
Type here to search


myclass = {"a":"670",
"b":"23",
"c":"21",
"d":"10"}
x = myclass.setdefault("g","333")
print (x)
print (myclass)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
333
{'a': '670', 'b': '23', 'c': '21', 'd': '10', 'g': '333'}
>>>
Type here to search

update()
Algorithm:-
Step 1:- update() updates the dictionary with the specified key-value pairs
Step 2:-values() returns a list of all the values in the dictionary

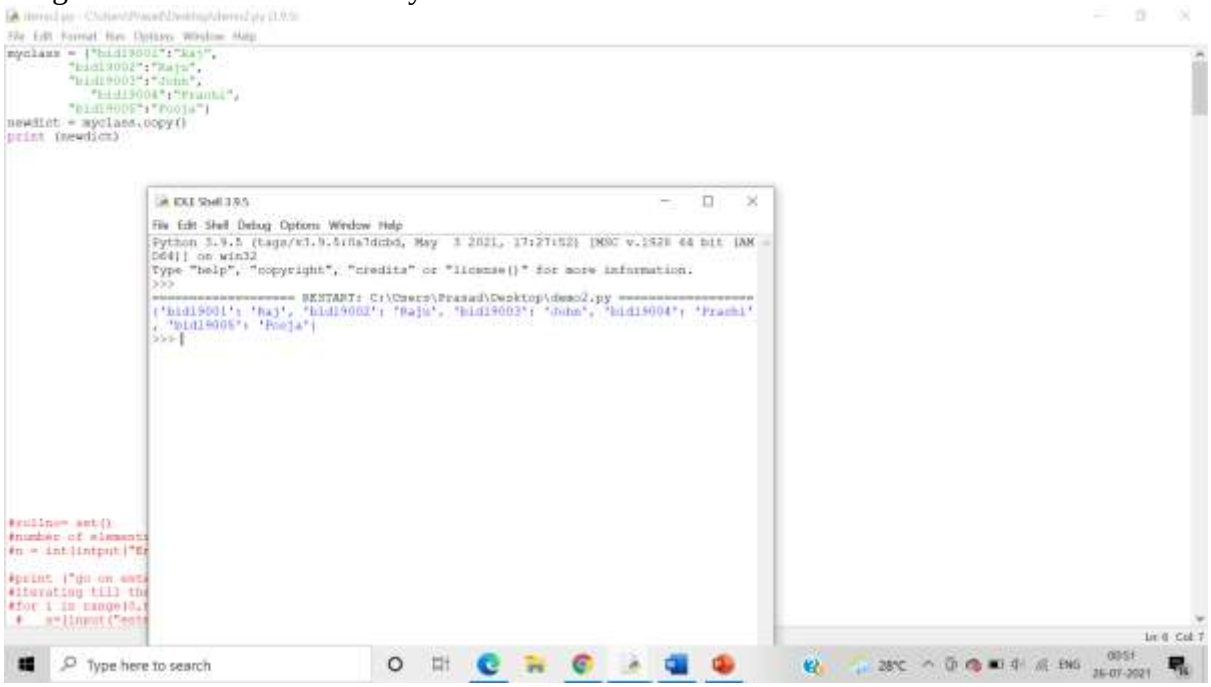

myclass = {"bid19001":"Raj",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Prachi",
"bid19005":"Pooja")
myclass.update({"bid19008":"213"})
print(myclass)
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.6 (tags/v3.9.6:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
{'bid19001': 'Raj', 'bid19002': 'Raju', 'bid19003': 'John', 'bid19004': 'Prachi'
, 'bid19005': 'Pooja', 'bid19008': '213'}
>>>
#myclass = {"a":"475",
"b":"23",
"c":"21",
"d":"10"}
Ln: 7 Col: 31
Type here to search
28°C
ENG
23:37
25-07-2021

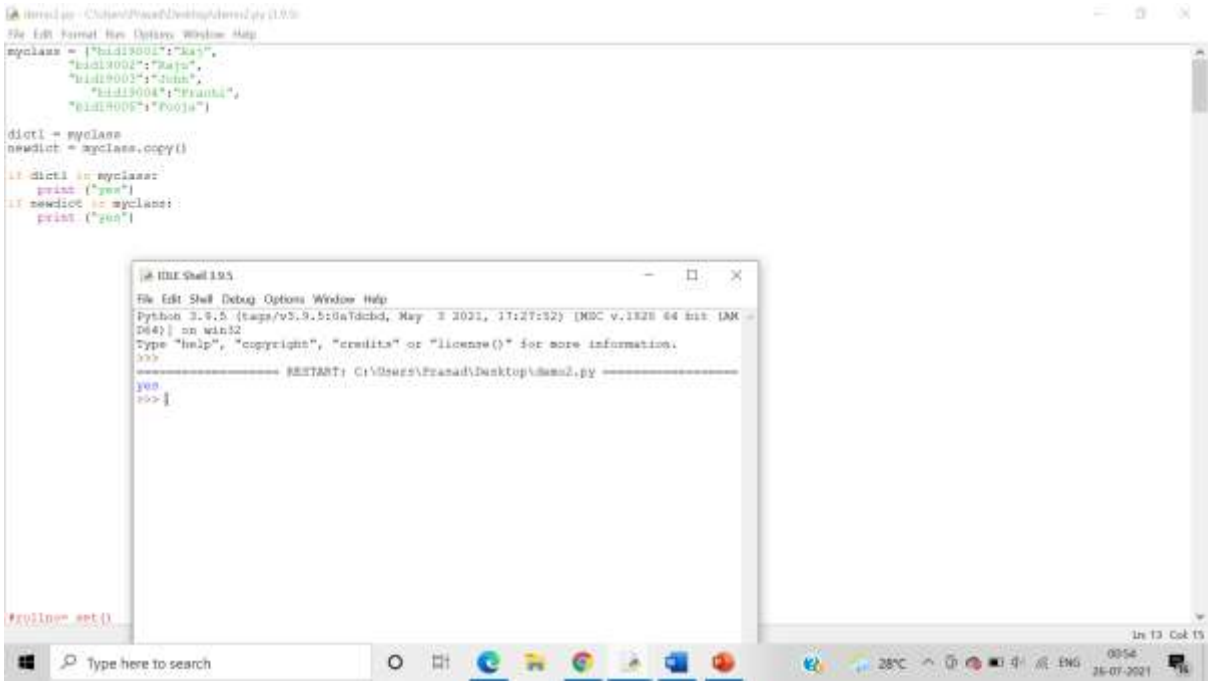
13. Demonstrate the usage of copy method

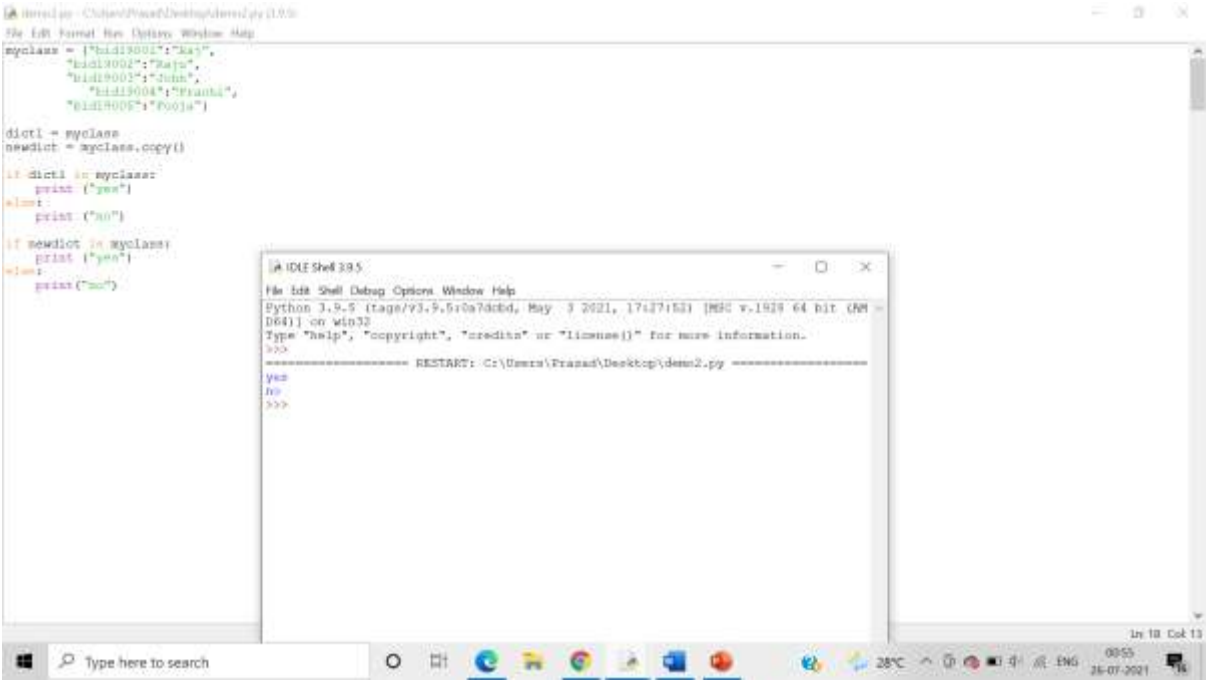
Algorithm:-

Step 1:-We create a dictionary and declare it.

Step 2:-We can then use copy() function to copy the keys and values In the first dictionary and assign it to the second dictionary.






myclass = {"bid19001":"Ravi",
"bid19002":"Raju",
"bid19003":"John",
"bid19004":"Pranshi",
"bid19005":"Pooja"}
dictl = myclass
newdict = myclass.copy()
if dictl in myclass:
print ("yes")
else:
print ("no")
if newdict in myclass:
print ("yes")
else:
print("no")
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1929 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
yes
no
>>>
Type here to search
28°C
ENG
00:55
26-07-2021

14. Write a program to merge two dictionaries.

Algorithm:-

Step 1:-We create a merge function where The first dictionary gets update with the elements of the second dictionary using the update() method which updates the dictionary with th\specified key-value pairs

Step 2:- We then use this function to merge 2 dictionaries.

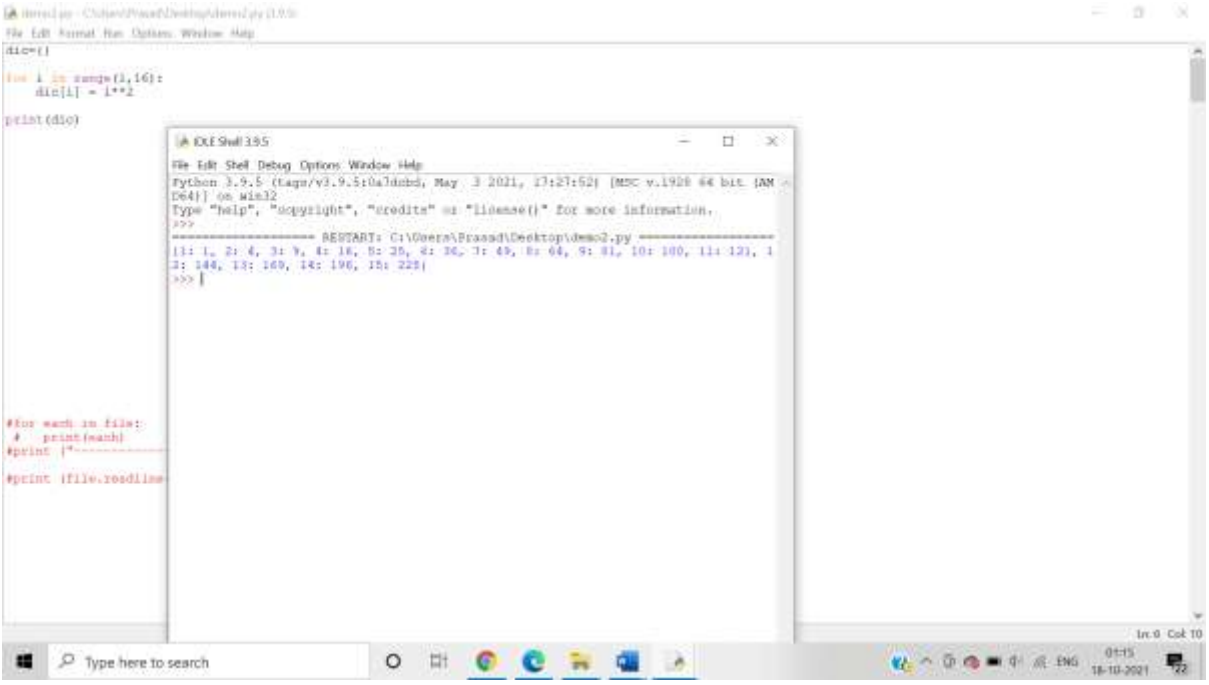
15. Write a program to sort the elements of a dictionary in two ways - i) according to keys and ii) according to values

16. Write a Python script to print a dictionary where the keys are numbers between 1 and 15 (both included) and the values are square of keys.

Algorithm:-

Step 1:- Create an empty dictionary.

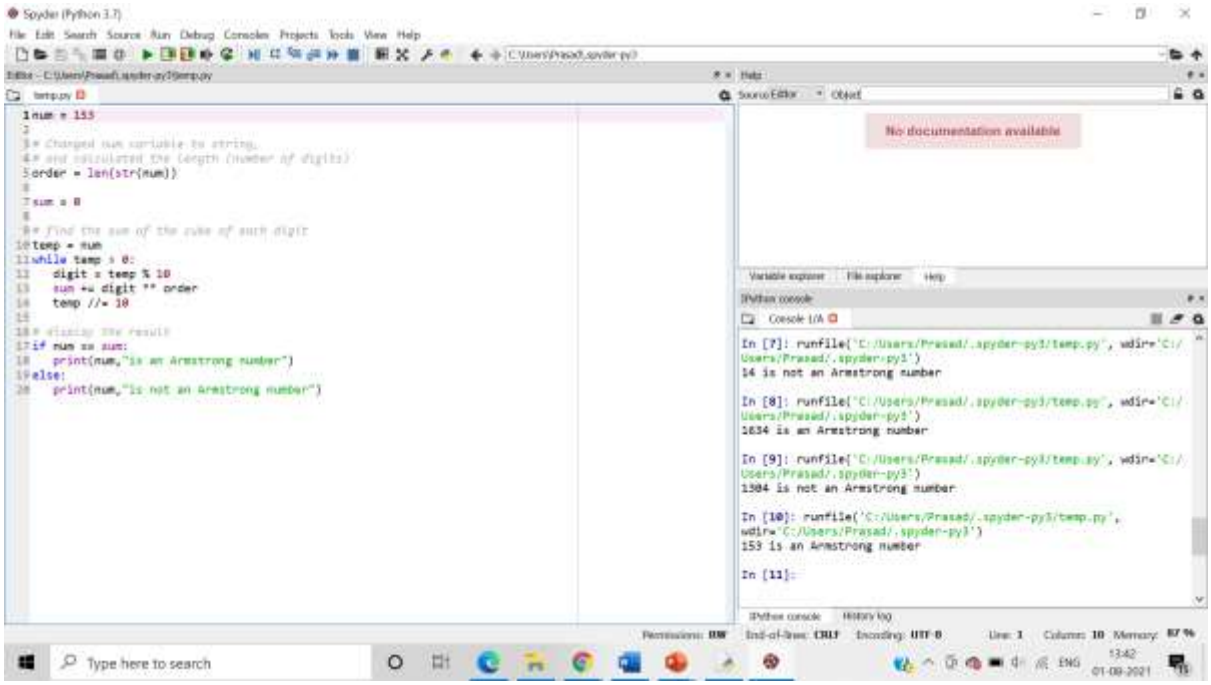
Step 2:- Using a for loop assign the keys and values to the empty dictionary where each \\\\\\\value is the square of the key using the range() function.



Python for Bioinformatics
Exercise 5
V-Title: Programs demonstrating implementation of Functions

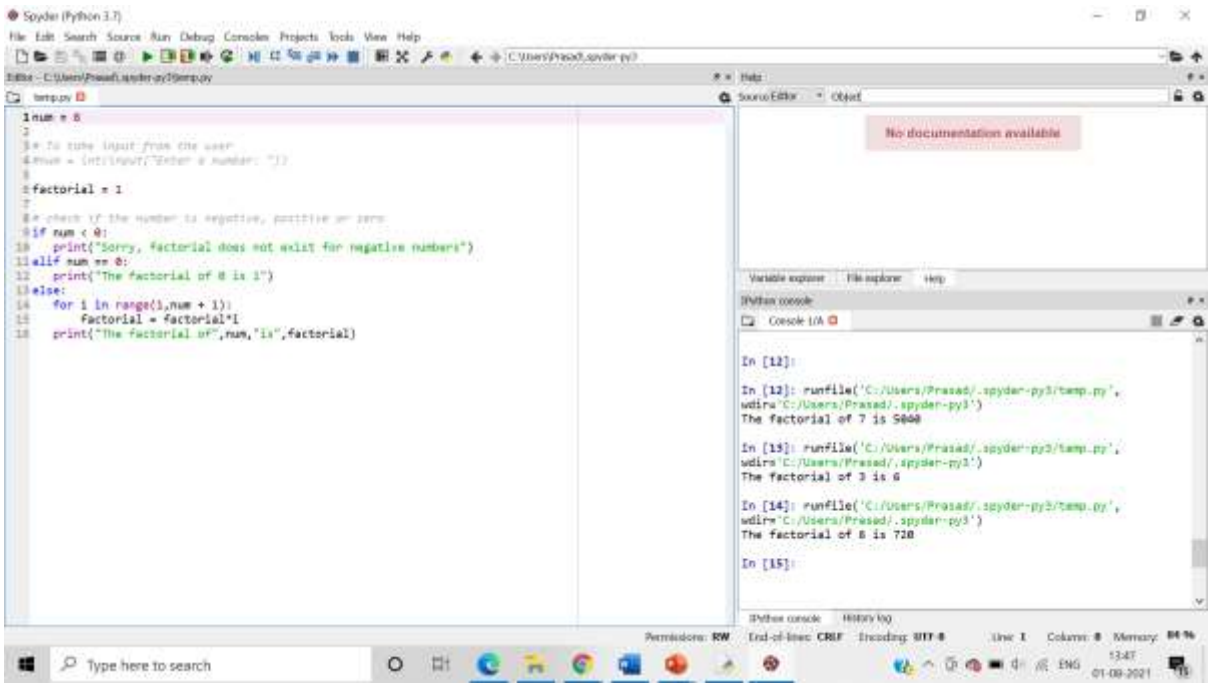
1. Write a program to determine whether the number entered is Armstrong or not (should not be restricted to no. of digits)

Algorithm:-
Step 1:- The user has to enter any number.
Step 2:- Count the Number of individual digits (For Example, 370 means 3).
Step 3:- Divide the given number into individual digits (For Example, Divide 370 into 3, 7, and 0).
Step 4:- Calculate the power of n for each individual and add those numbers.
Step 5:- Compare the original value with Sum value.
Step 6:-If they exactly matched, then it is an Armstrong number else it is not Armstrong



2. Write a program to calculate the factorial of the number entered by the user (function recursion)

Algorithm:- We use recursive method to multiple all the number ranging from the input to 1 .



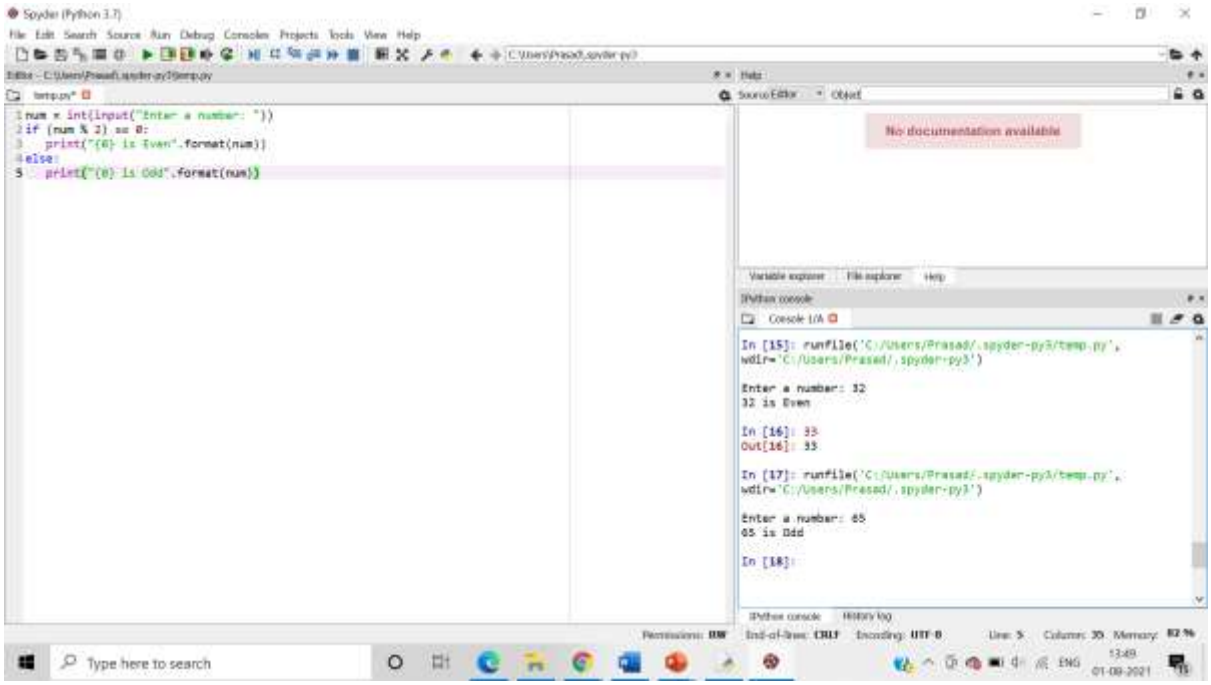
3. Print all odd and even numbers separately entered in the user defined range (Use Lambda function)

Algorithm:-

Step 1:-Take user input.

Step 2:- If user input i.e. num%2 is equal to 0 then the num is even

Step 3:-if num%2 is not equal to 0 then it is odd.



4. Write a program to create grade calculator using dictionaries -

(Creating a dictionary which consists of the student roll no, assignment marks (4 subjects), midterm exam marks (4 subjects), final exam marks (4 subjects) and their practical results (2 subjects). Calculate the aggregate, their percentage and grades accordingly and display. Calculate the average percentage and grade of the entire class

Pooja = { "rollno": "BID10015",
"assignment" : [8,10,7,9],
"midterm" : [24,26,28, 25],
"theory" : [45,50,43,47],
"lab" : [44, 45]
}

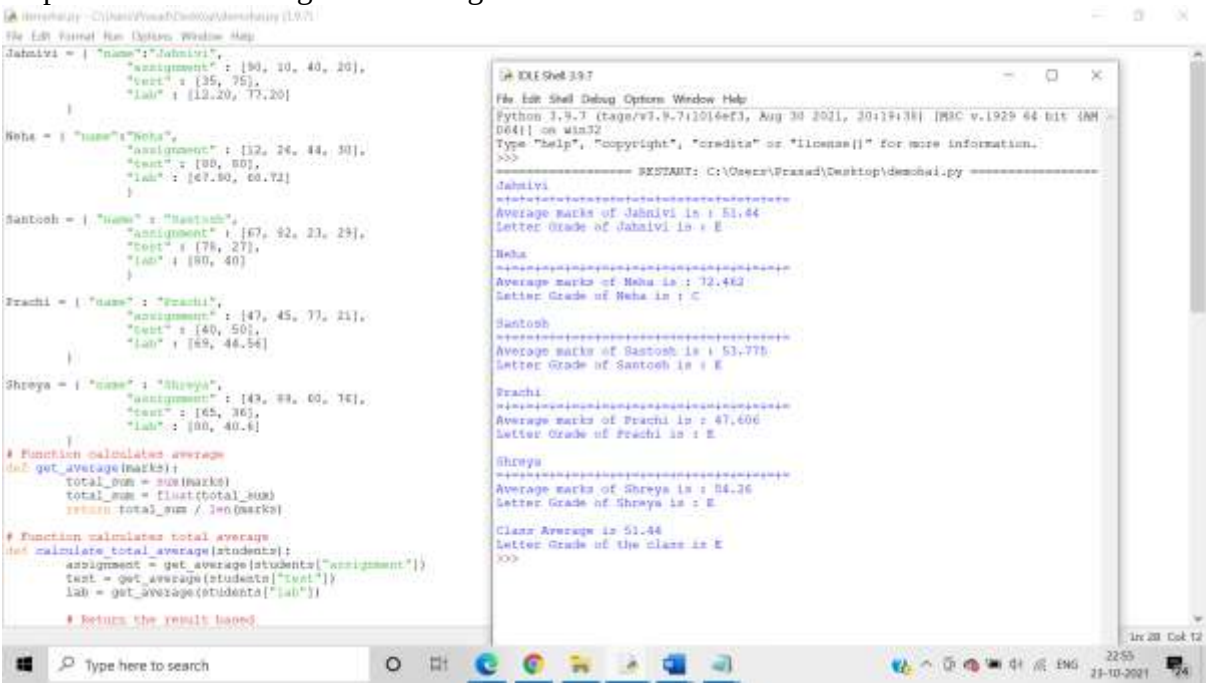
Algorithm:-

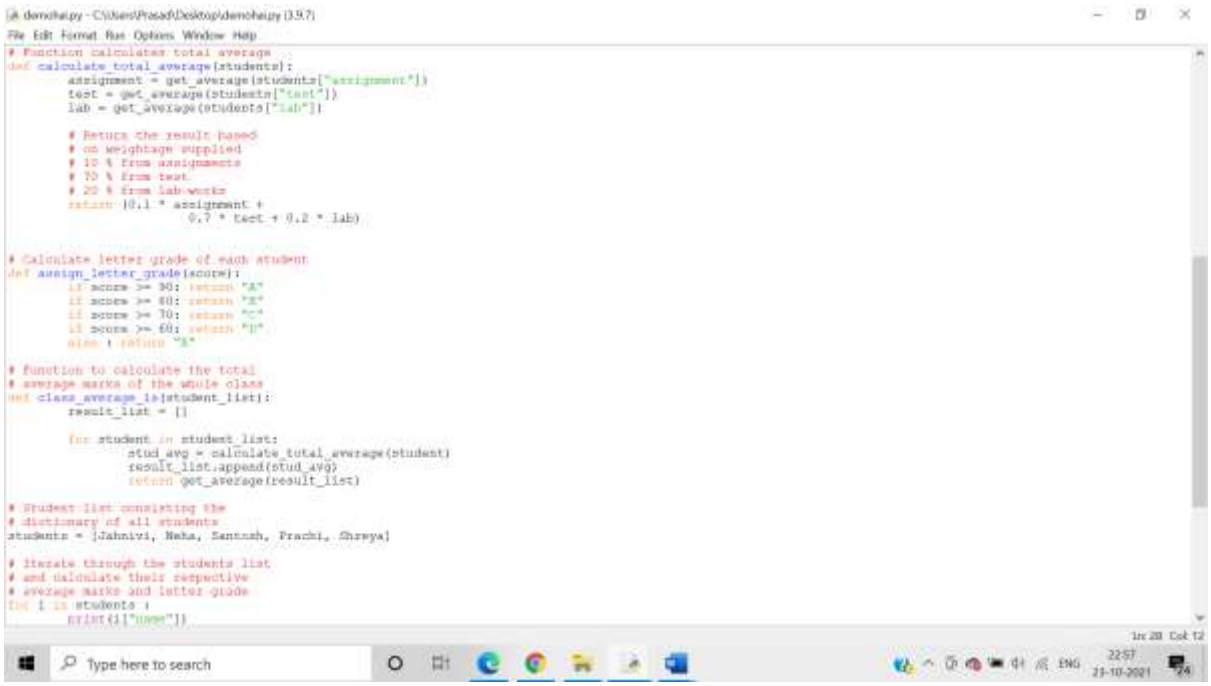
Step 1:- Creating a dictionary which consists of the student roll no, assignment marks, midterm exam marks, final exam ma and their practical results.

Step 2:- Create a program that calculates the aggregate, their percentage and grades accordingly.

Step 3:- Create a program that also calculate the average percentage and grade of the entire class

Step 4:- Print the average as well as grade of all the students




demohai.py - C:\Users\Prasad\Desktop\demohai.py (3.9.7)
File Edit Format Run Options Window Help
# Function calculates total average
def calculate_total_average(students):
assignment = get_average(students["assignment"])
test = get_average(students["test"])
lab = get_average(students["lab"])
# Returns the result based
# on weightage supplied
# 10 % from assignments
# 70 % from test
# 20 % from lab works
return (0.1 * assignment +
0.7 * test + 0.2 * lab)
# Calculate letter grade of each student
def assign_letter_grade(score):
if score >= 90: return "A"
if score >= 80: return "B"
if score >= 70: return "C"
if score >= 60: return "D"
else : return "E"
# function to calculate the total
# average marks of the whole class
def class_average_is(student_list):
result_list = []
for student in student_list:
stud_avg = calculate_total_average(student)
result_list.append(stud_avg)
return get_average(result_list)
# Student list consisting the
# dictionary of all students
students = [Jahnvi, Neha, Santosh, Prachi, Shreya]
# Iterate through the students list
# and calculate their respective
# average marks and letter grade
for i in students :
print(i["name"])
Ln: 28 Col: 12
Type here to search
ENG
22:57
23-10-2021

5. Write a program to calculate Molecular weight of the peptide sequence submitted by the user. Subtract the weight of water molecules.

Algorithm:-

Step 1:-Create a dictionary consisting of the molecular weight of all the amino acids.

Step 2:- Create a if loop where it will print the values of the key that matches with the input amino acid and adds the values (M.W of the amino acid) to an empty list.

Step 3:-Find the sum of all values in the list and apply the formula to get the melcular weight of the peptide sequence.

Step 4:- formula =Sum of the M.W of all the amino acids - the length of peptide sequence minus 1 into 18 g/mol (mol of waters)

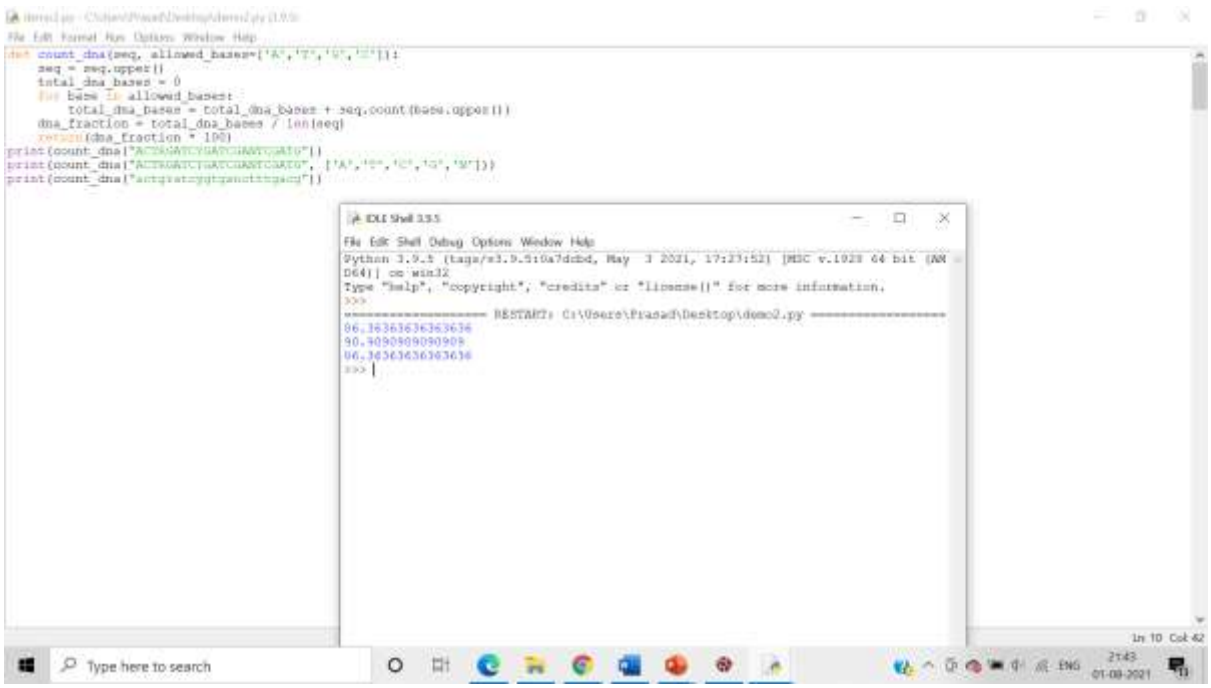
6. Write a program to calculate the frequency of bases in the DNA sequence submitted by the user

Algorithm:-

Step 1:-Initialize the counts of A, C, G, T to 0 and take user input.

Step 2:-Create if loop's where if the base of the DNA sequence matches with either A, C, G, T, then their count gets incremented.

Step 3:- Print the final count of all the bases in the DNA sequence.



6. Write a program to perform 1st frame translation of a dna sequence into a protein sequence.

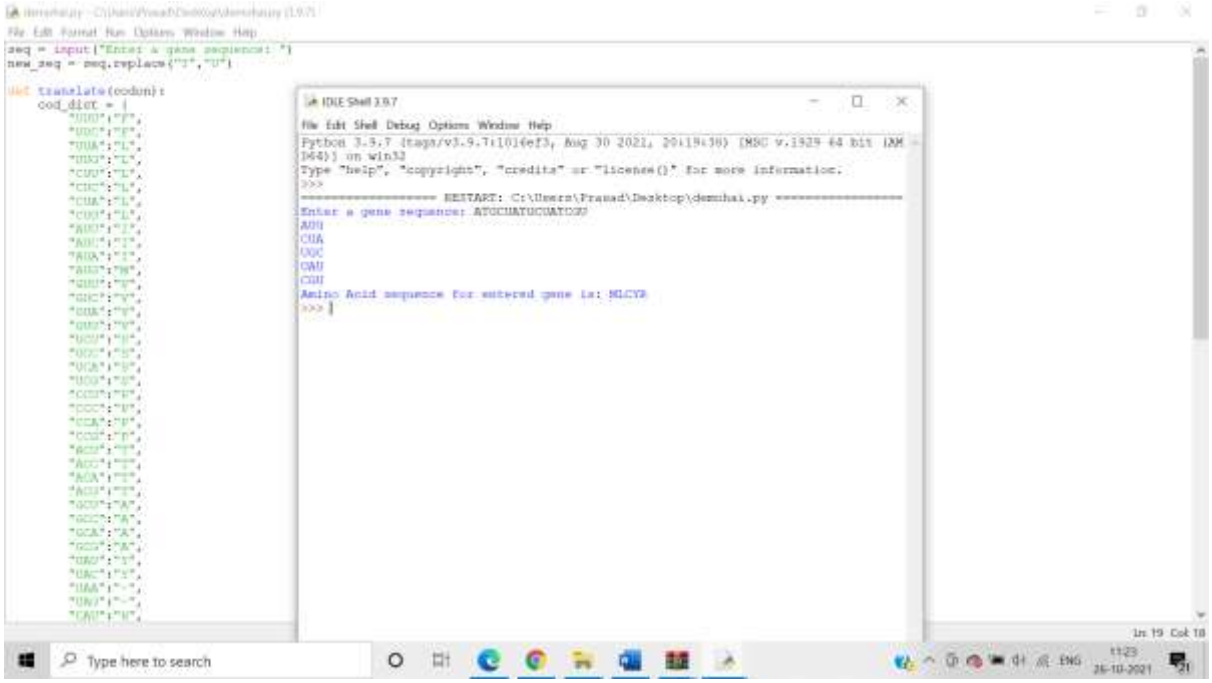
Algorithm:-

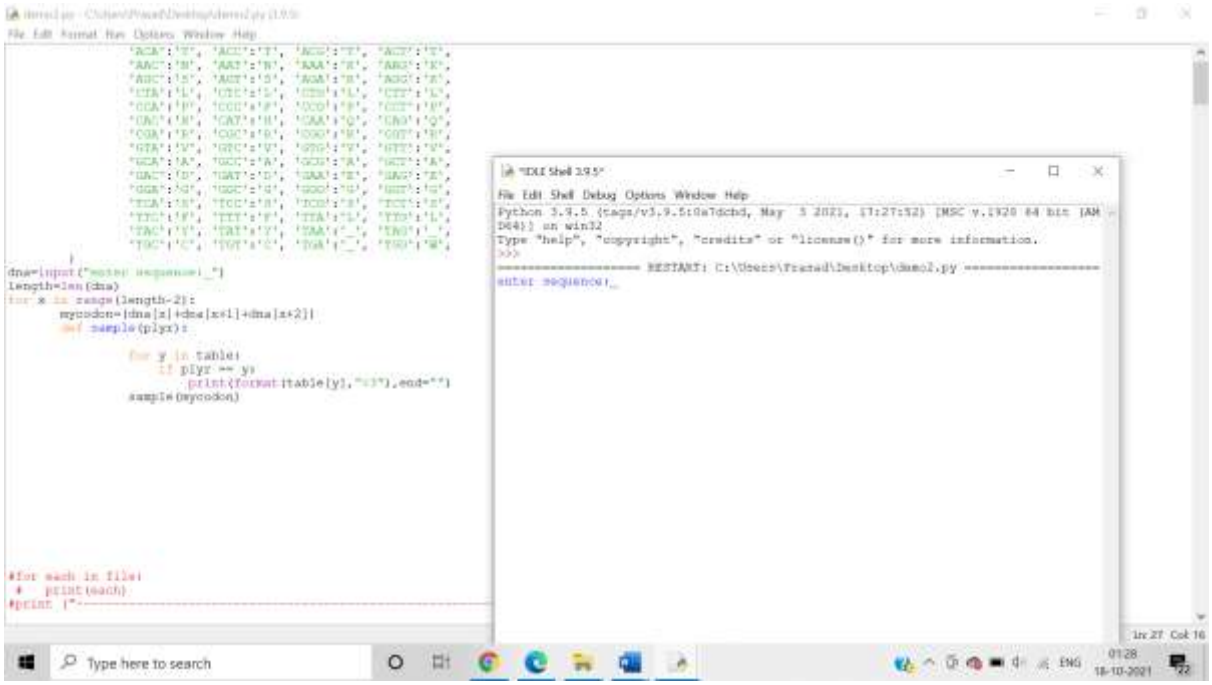
Step 1:- Create a dictionary consisting of all the codon sequences and their corresponding amino acids.

Step 2:-Create a for loop with range(length of the sequence -2) so as to get the proper reading frame.

Step 3:- If the codon sequence matches with the appropriate key in the dictionary then print the corresponding value of that key.

Step 4:- Print the protein sequence of DNA sequence.





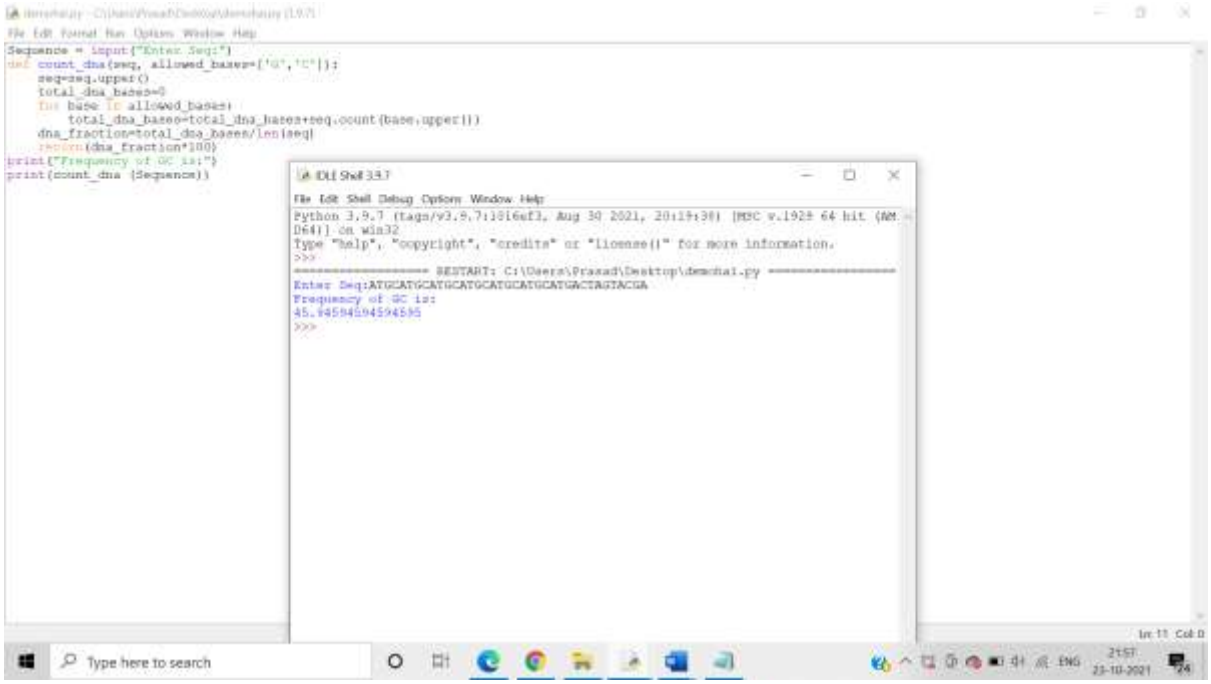
Python for Bioinformatics
Exercise 6
VI: Programs demonstrating use of modules

1. Create a package incorporating a module for calculating GC percentage of the nucleotide sequence, a module for translating the nucleotide sequence and a module for calculation of Molecular Weight of the generated peptide sequence

Algorithm:-
Main File:-
Step 1:-Create 2 modules for calculating GC percentage module along with calculation of Molecular Weight of peptide sequence.
Step 2:-Import both the modules in the main file.
Step 3:- Take user input for their choice of function to execute.
Step 4:- If user input is 1 use the gc_percentage() function from the imported modules.
Step 5:- If user input is 2 use the mol_wt() function from the imported modules.

GC percentage module:-
Step 1:-In the GC percentage module, you initialize the count of G and C to 0.
Step 2:-Create an if loop where when the sequence has either G or C the count increases by 1.
Step 3:- Calculate the sum of the counts of both the G and C and then divide it by the length of the sequence so as to calculate the percentage of the gc in the sequence.

Mol wt module:-
Step 1:-Create a dictionary consisting of the molecular weight of all the amino acids.
Step 2:- Create a if loop where it will print the values of the key that matches with the input amino acid and adds the values (M.W of the amino acid) to an empty list.
Step 3:-Find the sum of all values in the list and apply the formula to get the melcular weight of the peptide sequence.
Step 4:- formula =Sum of the M.W of all the amino acids - the length of peptide sequence minus 1 into 18 g/mol (mol of waters)




```
print('press 1 if you want to calculate gc percentage')
print('\n')
print('press 2 if you want to calculate mol.wt')
print('\n')
x=input("Select your function: ")
if x=='1':
  print('you Have selected function 1 --> calculate gc percentage')
  from python_packages import gcper
if x=='2':
  g=print('you Have selected function 2 --> calculate mol.wt')
  from python_packages import molwt
```

```
def gc_percentage(x):

    A=0
    C=0
    G=0
    T=0
    for i in x:
      if i=='A':
        A=A+1
      if i=='C':
        C=C+1
      if i=='G':
        G=G+1
      if i=='T':
        T=T+1
    for f in x:
      if f!='A':
        if f!='C':
          if f!='G':
            if f!='T':
              print(str(f) + ' is not a valid base hence the sequence is wrong')

        break

    print(((C+G)/len(x))*100)

gc_percentage(input('Enter your sequence: '))
```

```
def molwt(y):
    mol_wt={   #Dictionary consisting of M.W of the amino acids
    'A':89.09,
    'C':121.16,
    'E':147.13,
    'F':165.19,
    'D':133.10,
    'G':75.07,
    'H':155.16,
    'I':131.18,
    'K':146.19,
    'L':131.18,
    'M':149.21,
    'N':132.12,
    'P':115.13,
    'Q':146.15,
    'R':174.20,
    'S':105.09,
    'T':119.12,
    'V':117.15,
    'W':204.23,
    'Y':181.19,
    }
    (

    )
    values=[]
    seq=y

    def checkpep(seq):
        for x in mol_wt:
            if seq == x:
              wt=mol_wt[x]      #will print the values of the key that matches with the input amino acid
              values.append(wt) #adds the values (M.W of the amino acid) to an empty list

    for x in seq:
      checkpep(x)
    print(values)
    total=0
    checkpep(x)
    for x in seq:
      checkpep(x)
    print(values)
    total=0
    checkpep(x)
    for ele in range(0, (len(values)-1)):
        total = total + values[ele]
        #to find the sum of all the values in the list
     #formula =Sum of the M.W of all the amino acids - the length of peptide sequence minus 1 into 18 g/mol (mol of waters)

    final_value= total-((len(seq)-1)*18)
    print(final_value)

molwt(input('Enter your sequence: '))
```

```
press 1 if you want to calculate gc percentage


press 2 if you want to calculate mol.wt


Select your function: 1
you Have selected function 1 --> calculate gc percentage
Enter your sequence: ACGATA
33.33333333333333
>>>
```

```
press 1 if you want to calculate gc percentage


press 2 if you want to calculate mol.wt


Select your function: 2
you Have selected function 2 --> calculate mol.wt
Enter your sequence: ADF
[89.09, 133.1, 165.19]
351.38
>>>
```

Python and Bio-Python

Practical no: 7

Practical Solving:

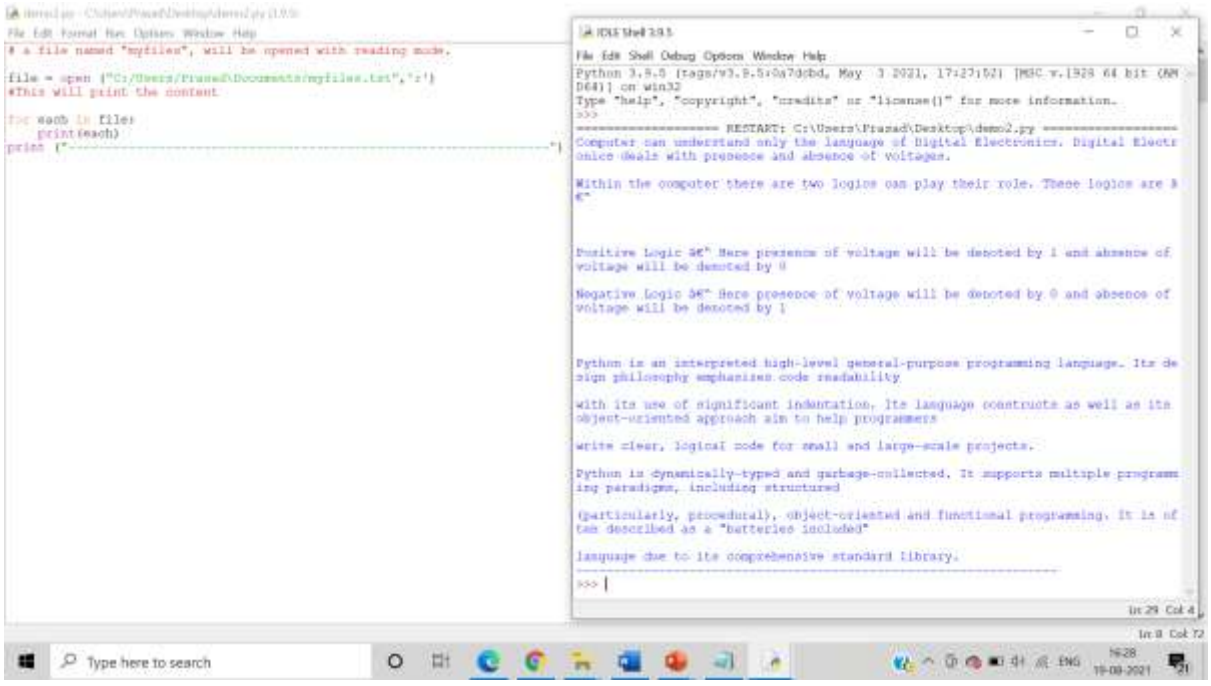
Perform the following questions using functions:

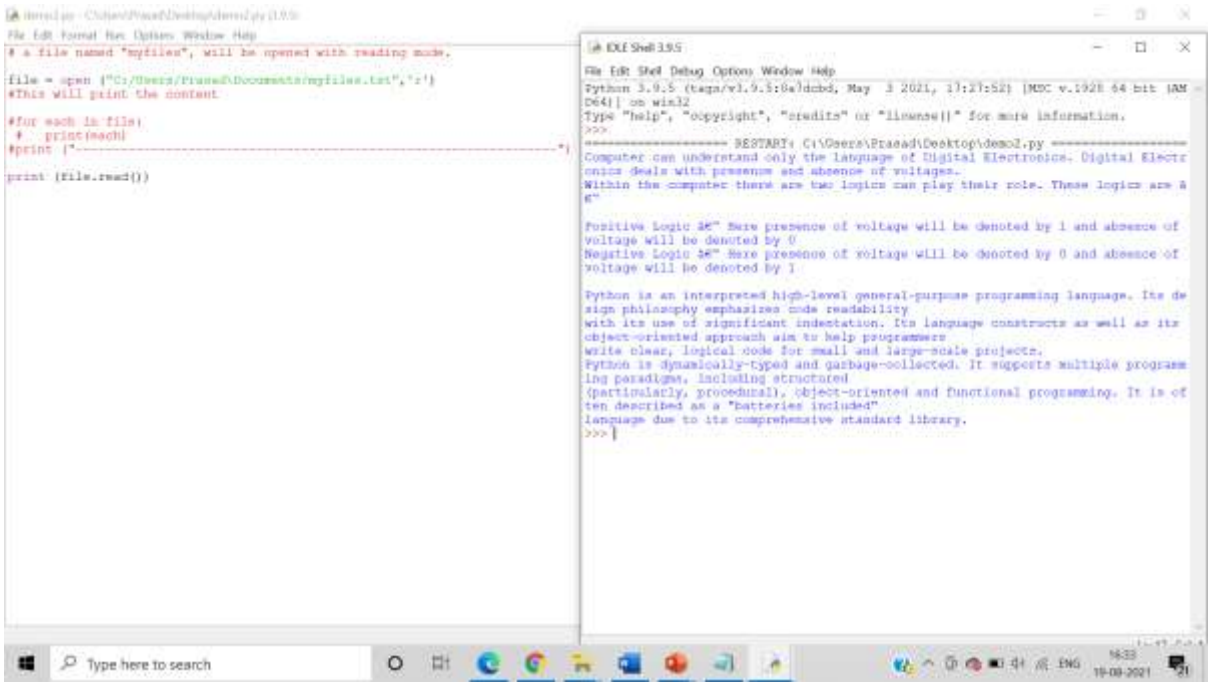
1. Open a file and print the contents of the file on the screen

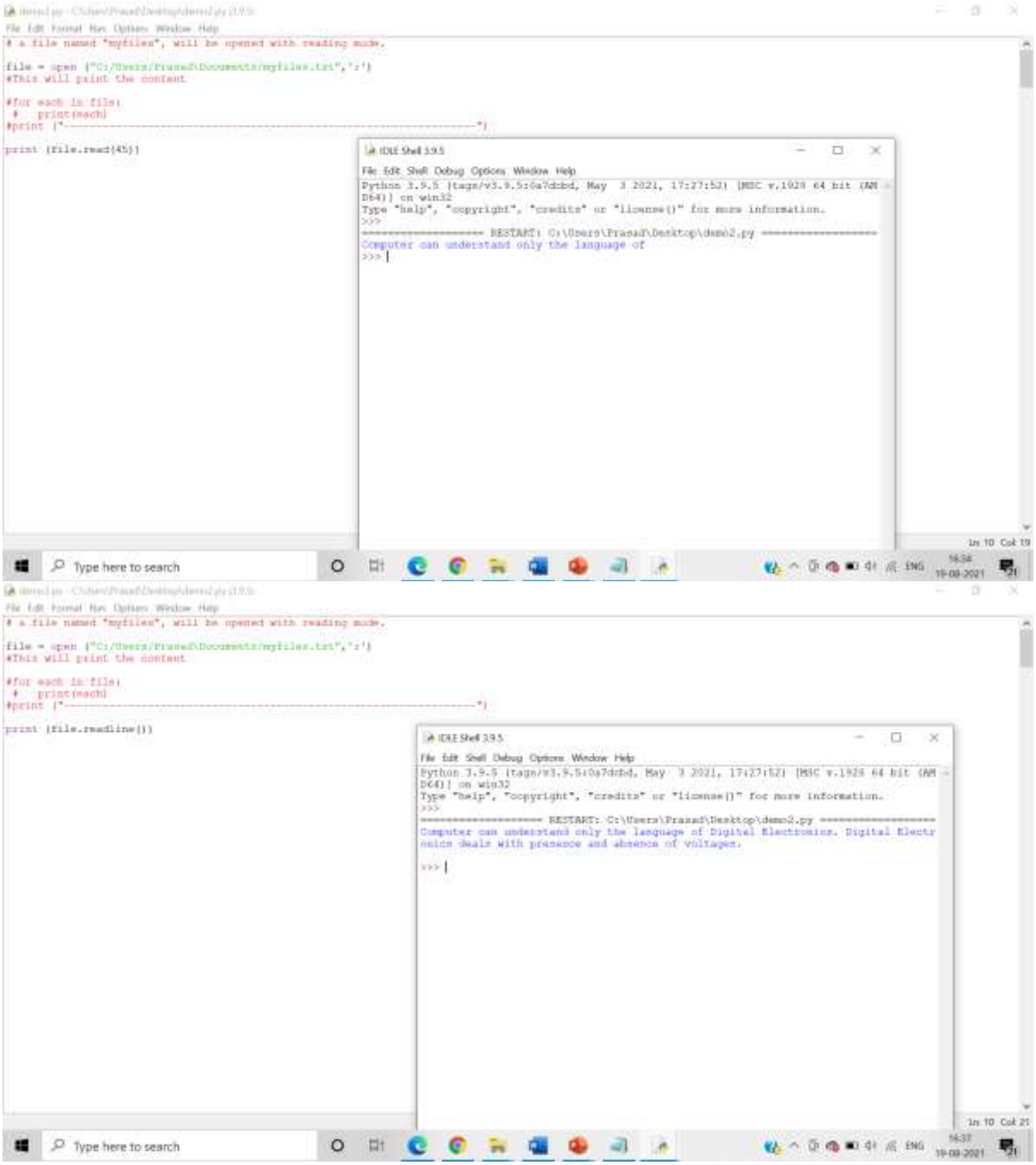
Algorithm:-

Step 1:- Open a file using the open() function where you enter the file location in the brackets.

Step 2:-use the .read() function to read the contents of the file and to print them in the console.






demo2.py - C:\Users\Prasad\Desktop\demo2.py (3.9.5)
File Edit Format Run Options Window Help
# a file named "myfiles", will be opened with reading mode.
file = open ("C:/Users/Prasad\Documents/myfiles.txt",'r')
#This will print the content
#for each in file:
print(each)
#print ("---")
print (file.read(45))
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
Computer can understand only the language of
>>>
Ln: 10 Col: 19
Type here to search
ENG
16:36
19-08-2021

demo2.py - C:\Users\Prasad\Desktop\demo2.py (3.9.5)
File Edit Format Run Options Window Help
# a file named "myfiles", will be opened with reading mode.
file = open ("C:/Users/Prasad\Documents/myfiles.txt",'r')
#This will print the content
#for each in file:
print(each)
#print ("---")
print (file.readline())
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
Computer can understand only the language of Digital Electronics. Digital Electr
onics deals with presence and absence of voltages.
>>>
Ln: 10 Col: 21
Type here to search
ENG
16:37
19-08-2021

2. Write a Python program to append text to a file and display the text

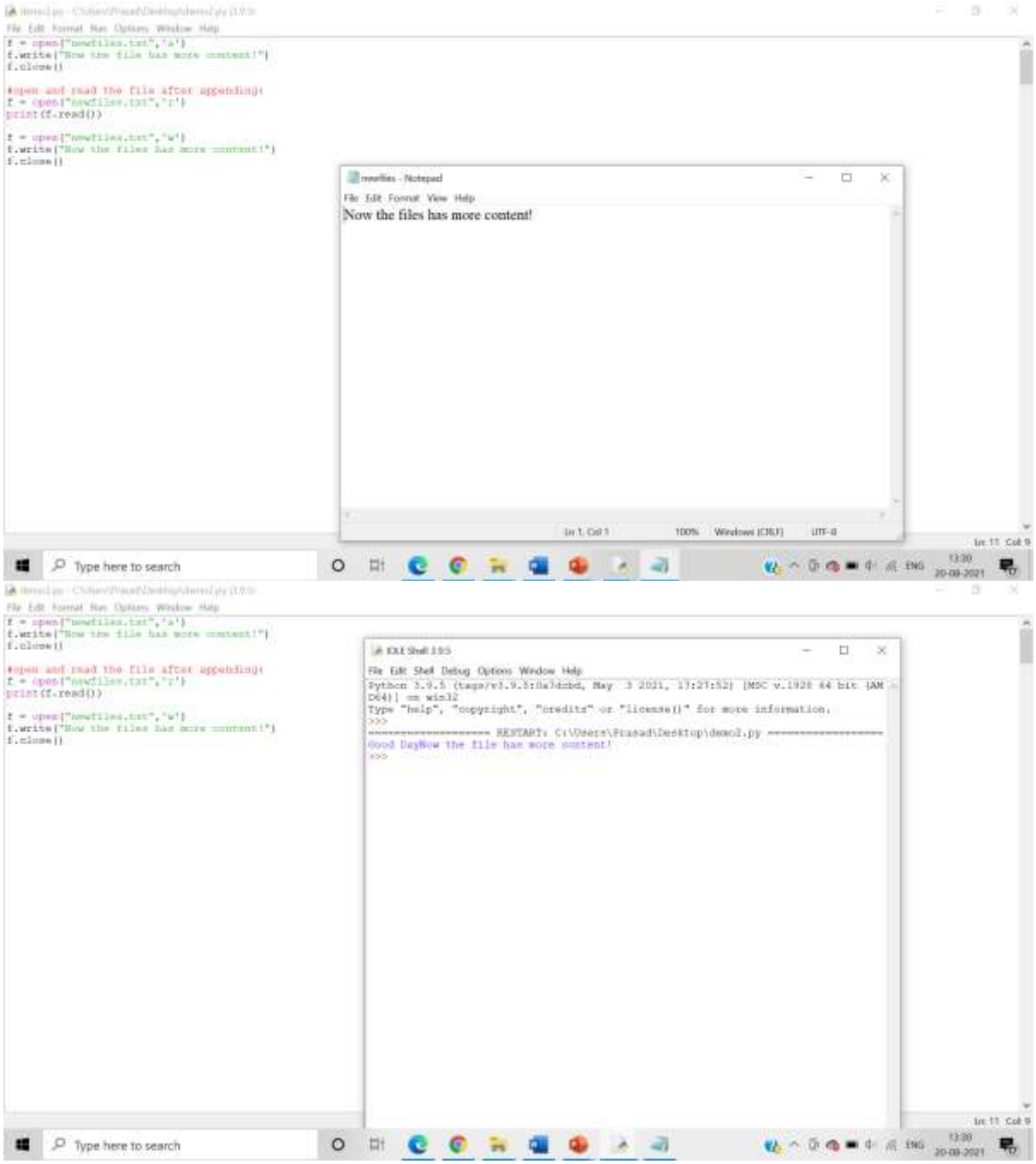
Algorithm:-

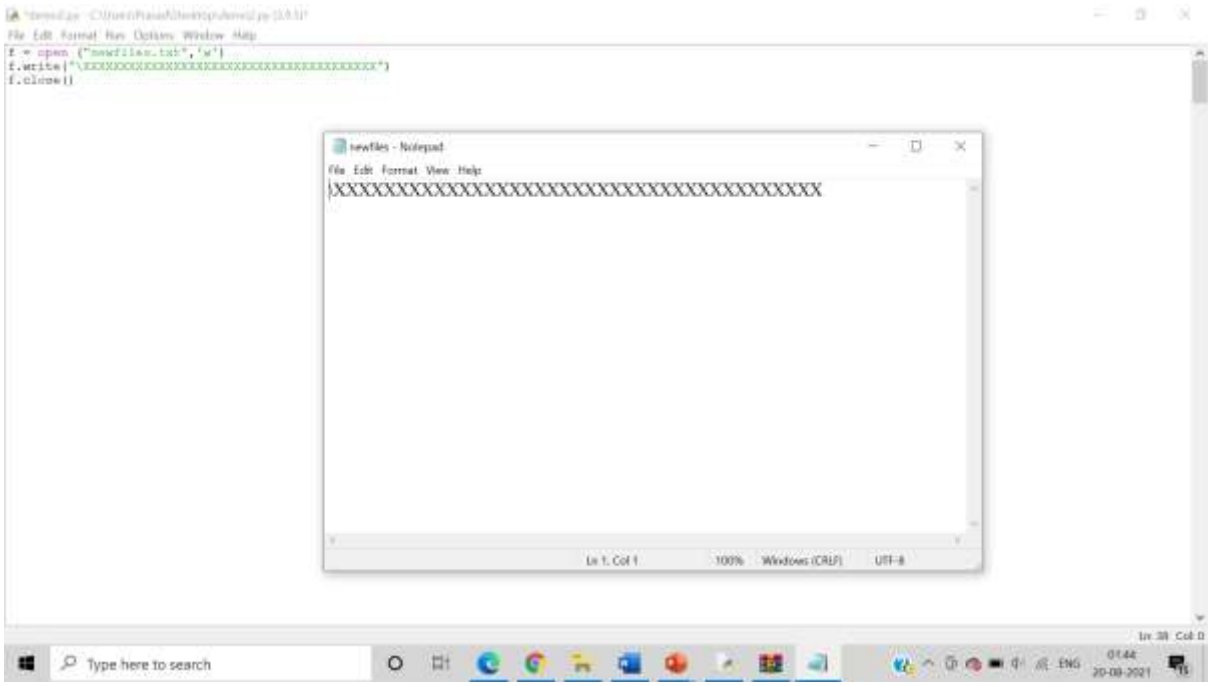
Step 1:- Open a file using the open() function where you enter the file location in the brackets. Use ‘r’ in the brackets to read the file

Step 2:-use the .read() function to read the contents of the file and to print them in the console.

Step 3:- Open the second file using the open() function where you enter the file location in the brackets. Use ‘a’ in the brackets to append text to the file

Step 4:- Use .close() to close the file.




File Edit Format Run Options Window Help
f = open ("newfiles.txt",'w')
f.write("\XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX")
f.close()
newfiles - Notepad
File Edit Format View Help
\XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Ln 1, Col 1
100%
Windows (CRLF)
UTF-8
Ln: 38 Col: 0
Type here to search
ENG
01:44
20-08-2021

3. Write a program asking for user details and print those details onto a file

Algorithm:-

Step 1:- Open a file using the open() function where you enter the file location in the brackets. Use ‘x’ in the brackets where x is open for exclusive creation, failing if the file already exists

Step 2:- Use the input() function to take user input.

Step 3:- Then use the with open method to open the text file as output use the .write() function to add the user input to the text file.

Step 4:- Use the .read() function to read the file.

4. Write a program to copy contents of one file to another

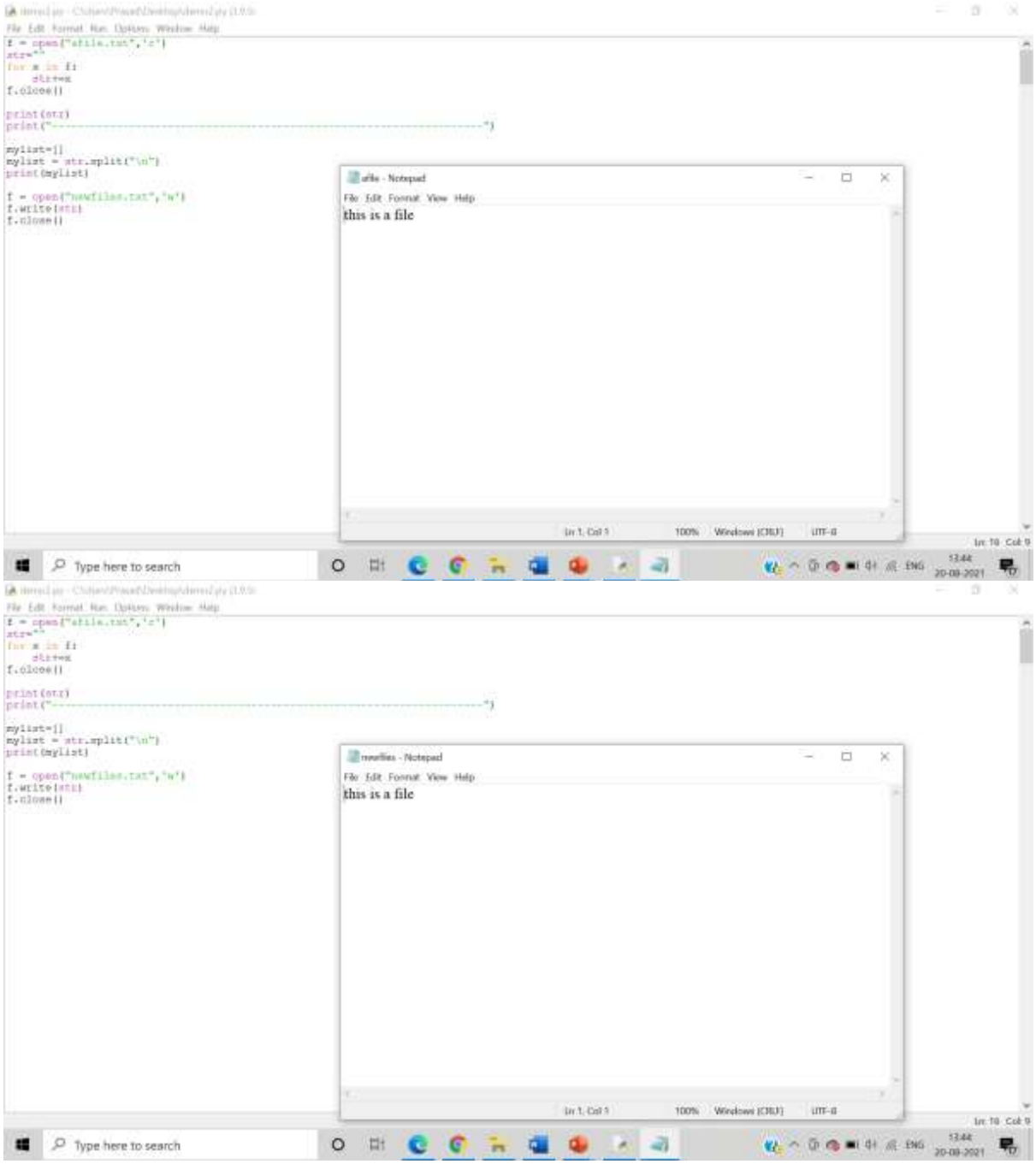
Algorithm:-

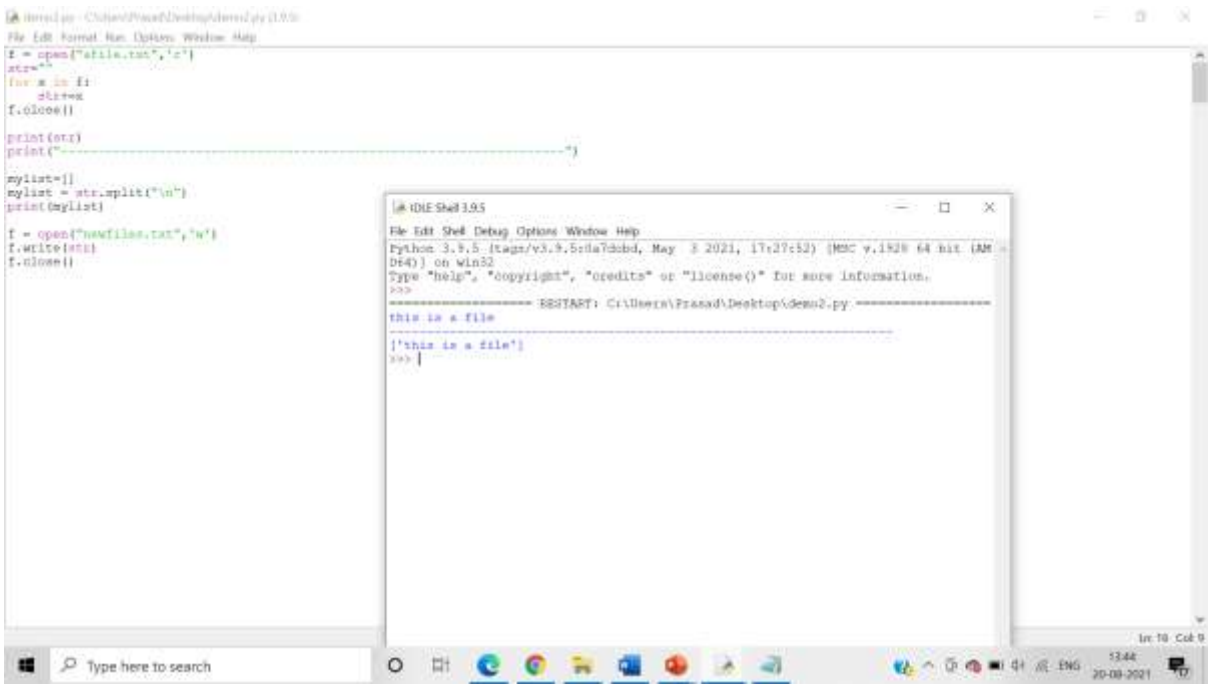
Step 1:- Open a file using the open() function where you enter the file location in the brackets. Use ‘r+’ to open a disk file for updating

Step 2:-

Step 3:- Then use the with open method to open the text file as output use the .write() function to add the user input to the text file.

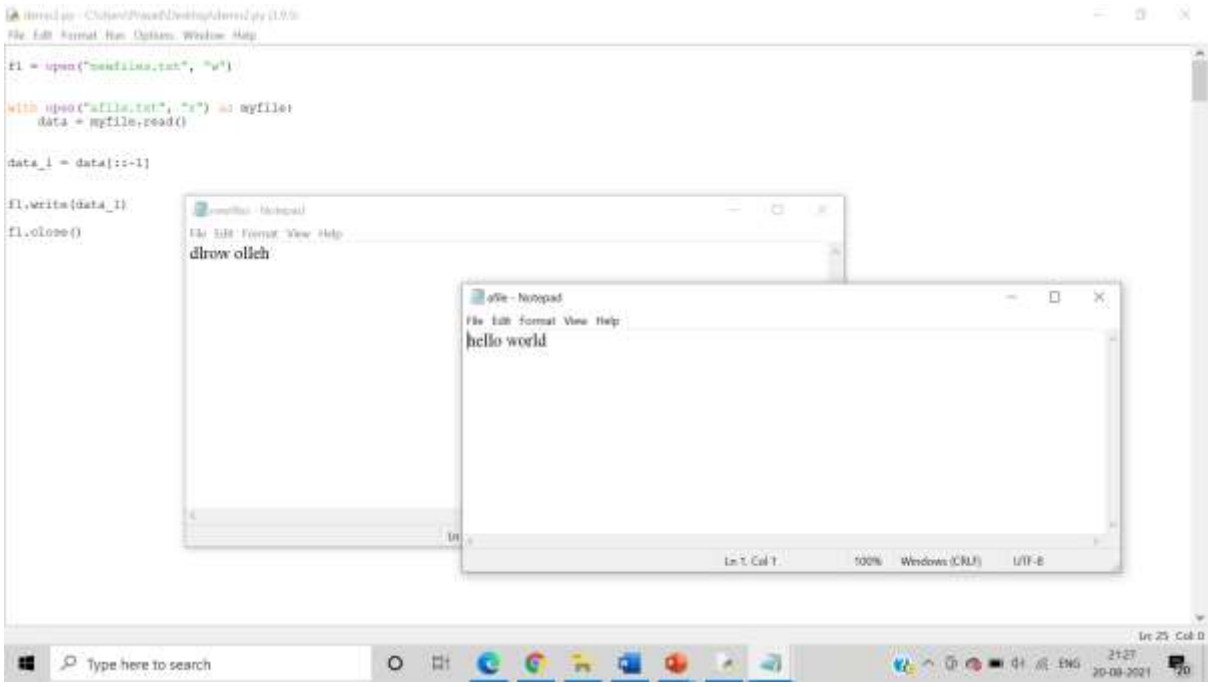
Step 4:- Use the .read() function to read the file.




File Edit Format Run Options Window Help
f = open("afile.txt",'r')
str=""
for x in f:
str+=x
f.close()
print(str)
print("----------")
mylist=[]
mylist = str.split("\n")
print(mylist)
f = open("newfiles.txt","w")
f.write(str)
f.close()
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
Python 3.9.5 (tags/v3.9.5:0a7dcbd, May 3 2021, 17:27:52) [MSC v.1928 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demo2.py ==========
this is a file

['this is a file']
>>>
Type here to search
ENG
13:44
20-08-2021

5. Write a program to reverse the content of a file and store it in another file (apply full reversing : “hello world” => “dlrow olleh” and words reversing : “hello world” – “world hello”)
Algorithm:-
Step 1: Start.
Step 2: Open the files.
Step 3: Access the elements of the file in reverse and write them in thefile.
Step 4: Open the file in read mode.
Step 5: Close the file.
Step 6: So far we have reversed the entire string.
Step 7: To reverse only the alphabets in the strings, we will have to split the string.
Step 8: reverse() returns an iterator that accesses the given sequence in the reverse order.
Step 9: Write this in the file.
Step 10: Open the file in read mode.
Step 11: Close the file.
Step 12: Stop.



Python and Bio-Python

Assignment 9

Programs demonstrating use of Randomization in Python

1. Demonstrate mixing of lists elements and generate a funny story

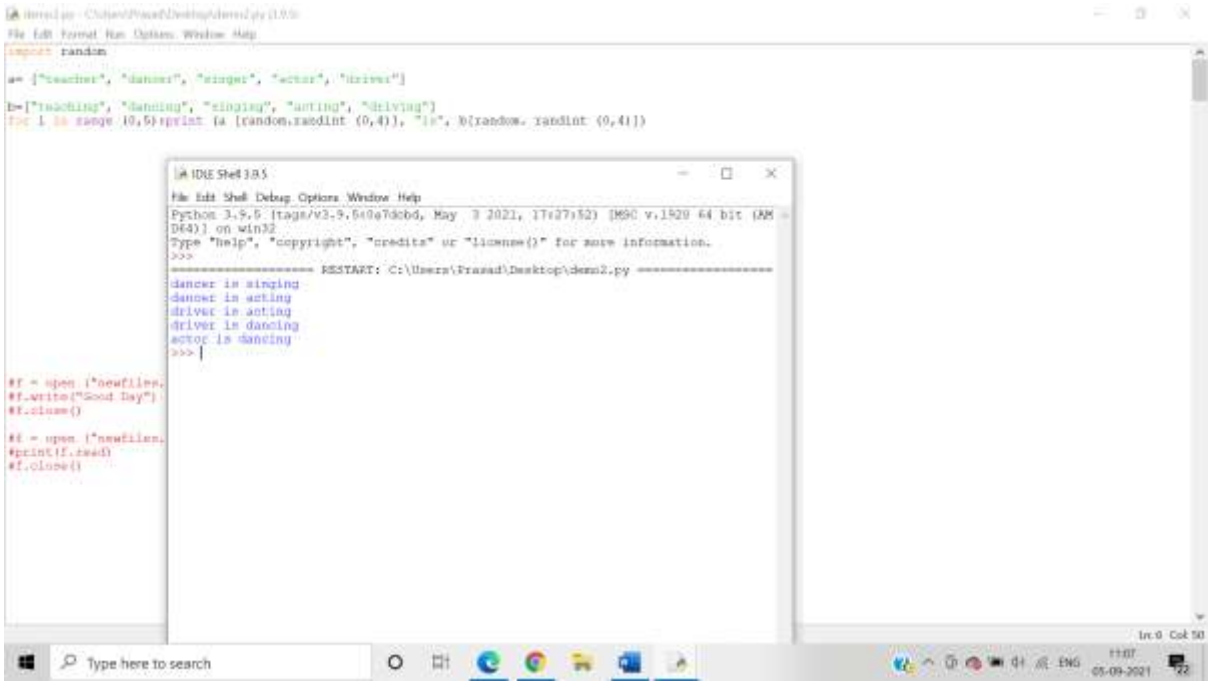
Algorithm:-

Step 1:-Import the random function.

Step 2:-Create 2 lists ‘a’ and ‘b’.

Step 3:-We then use list indexing where the index value is randomly generated using the randint() function.

Step 4:- We then use the for loop to print multiple funny stories.



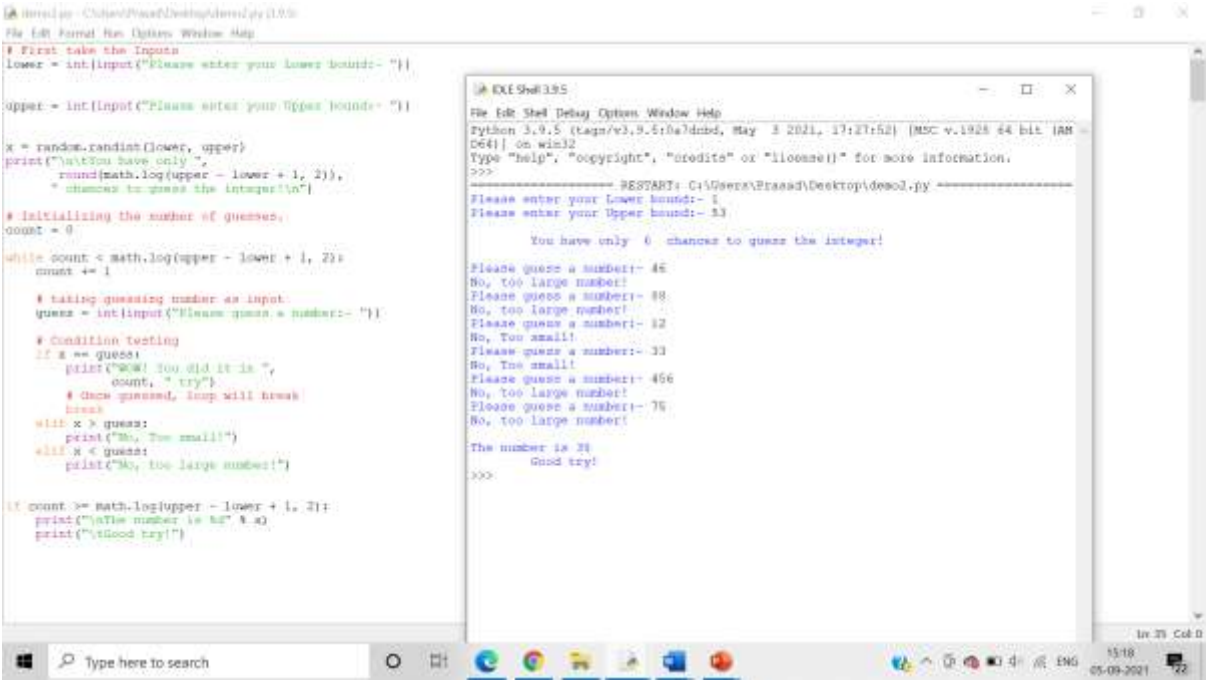
2. Write a program to create a “Guess the Number” game

Algorithm:-

Step 1:-Import the random function and use the randint() function to generate random numbers which are then assigned to the number variable.

Step 2:-Create multiple if else conditions where if the user input matches with the random number assigned to the number variable then the loop exits and the game is won.

Step 3:-In case the user input doesn’t match then if loop condition the code runs the next loop condition until the chances are exhausted.



3. Write a program to perform insertion, substitution and deletion mutation in a user entered DNA string

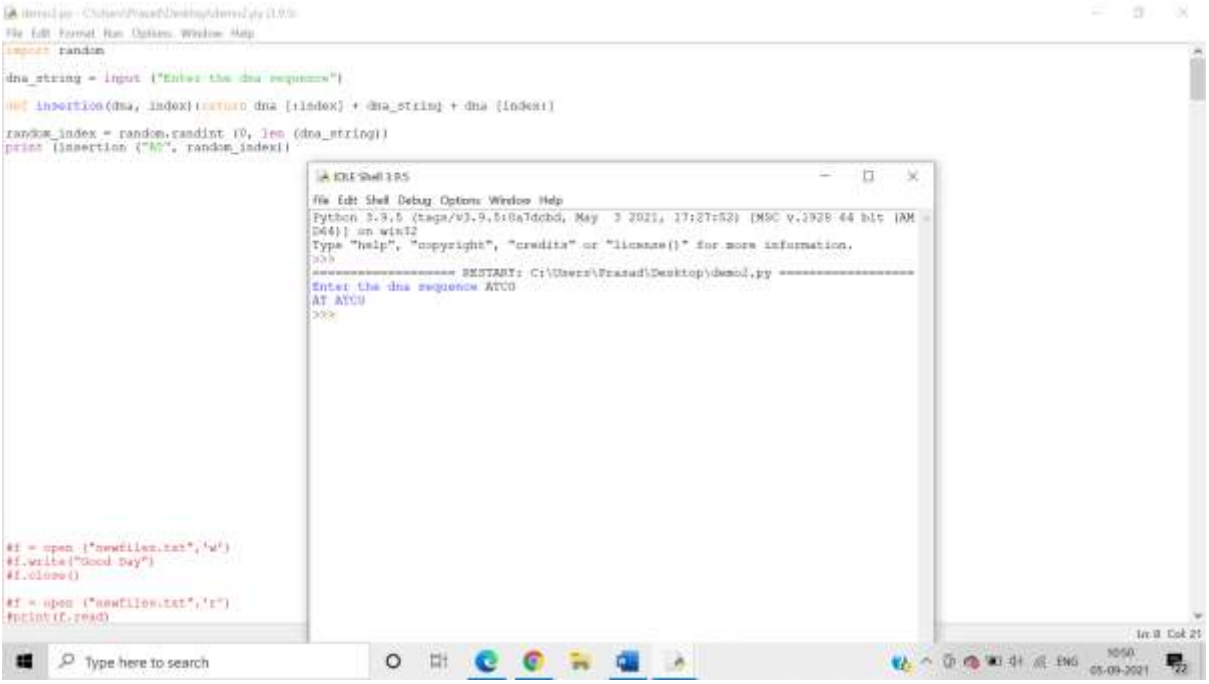
Algorithm:-

Step 1:-User input is given for the type of function the user wants to perform.

Step 2:-Import the random function.

Step 3:-Create multiple if-else loops for the multiple functions.

Step 4:-we use the choice() and randint() function to perform insertion, substitution and deletion mutations randomly in a random position in the user given input sequence.



Python and Bio-Python

Assignment 10

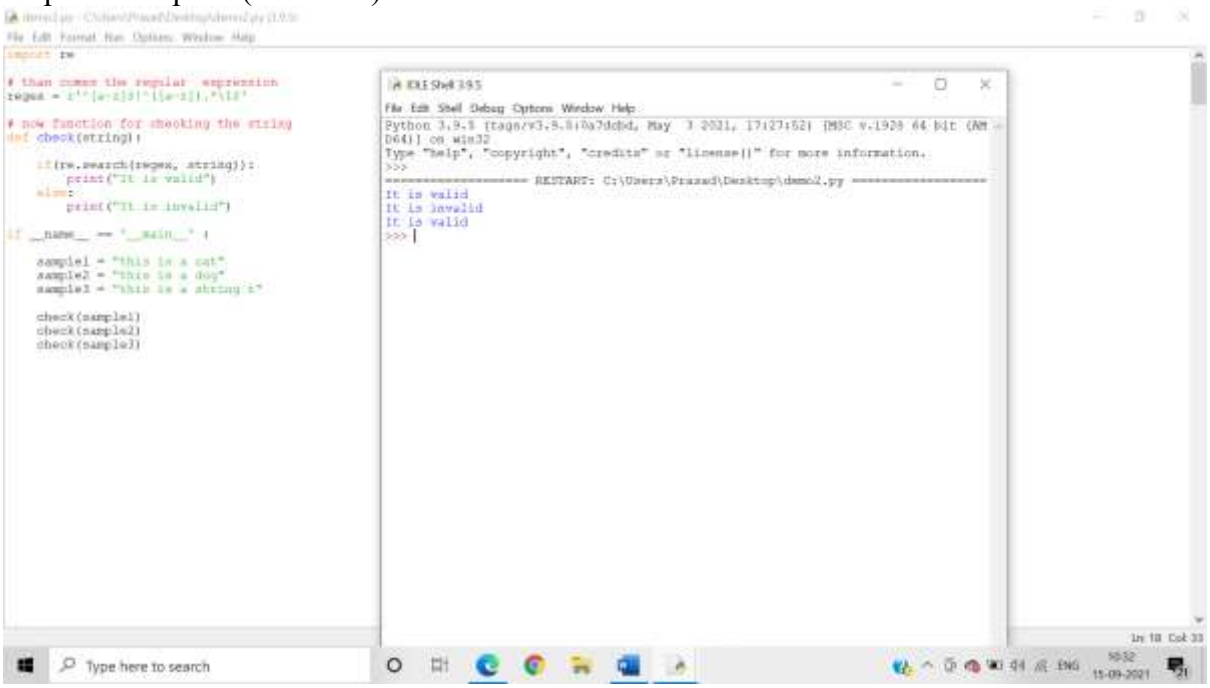
Practical Solving:

Perform the following questions using regular expressions

1. Check whether a string starts and ends with the same character or not

Algorithm:-

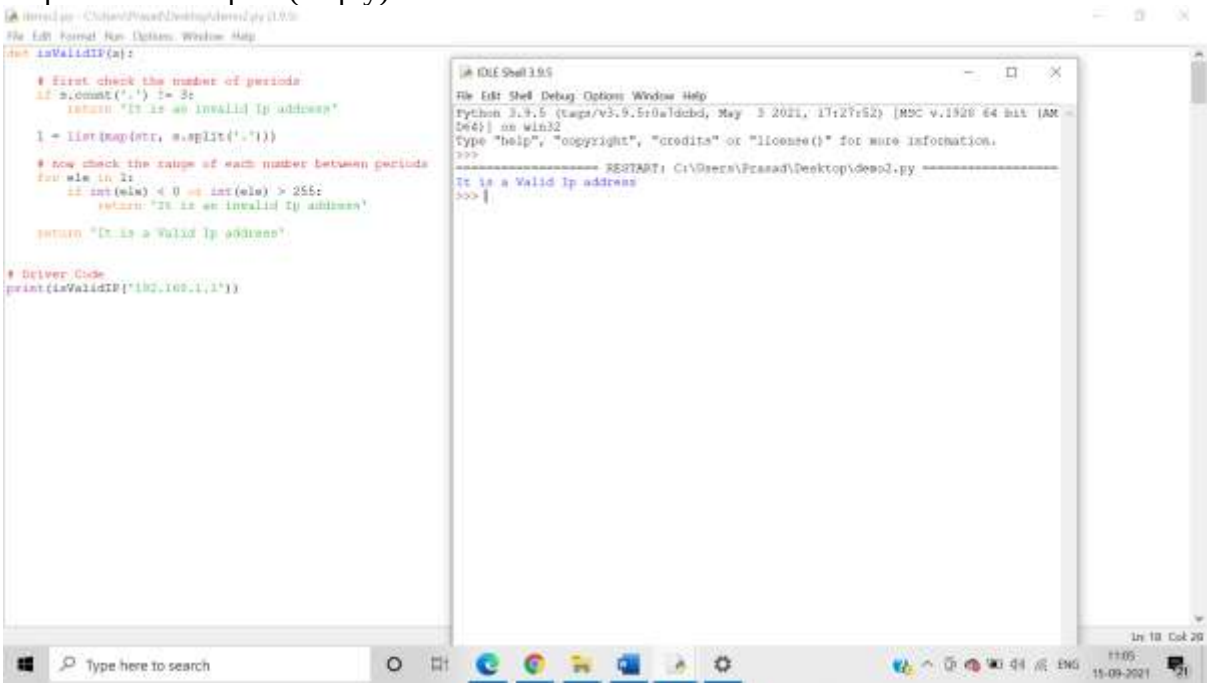
Step 1: Import the re module
Step 2: Define the regex pattern
Step 3: Check the pre-defined inputs for the pattern
Step 4: IF the pattern exists : print (“Valid”)
Step 5: Else: print (“Invalid”)

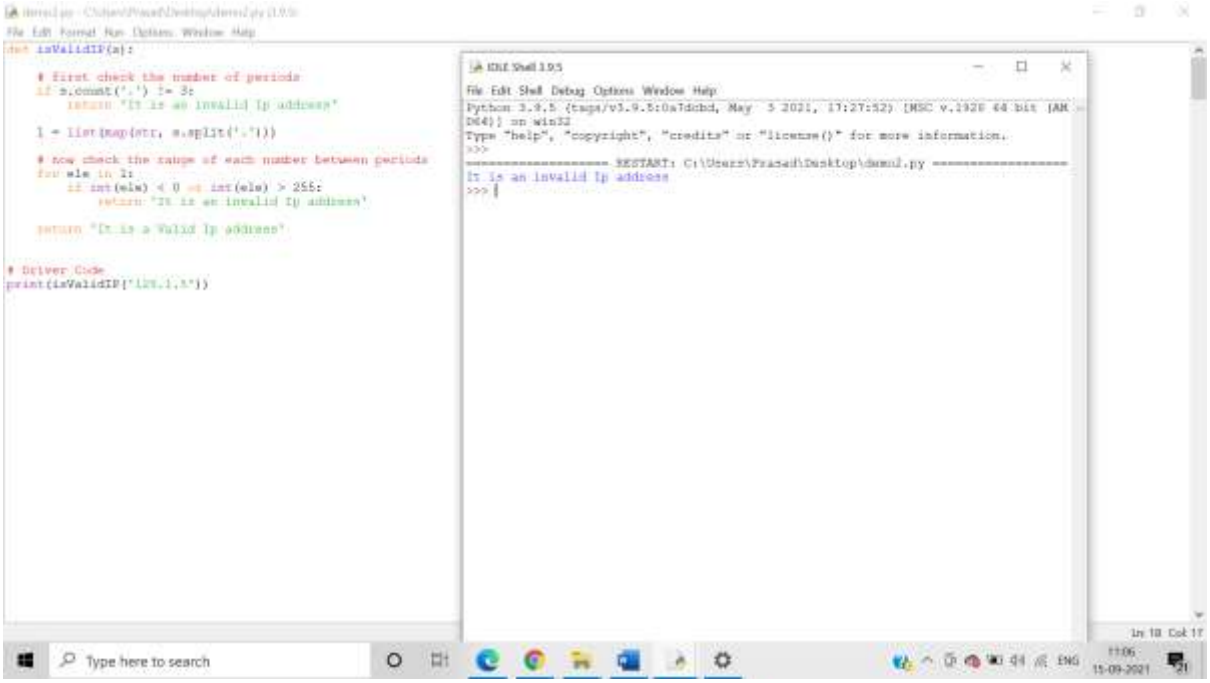


2. Write a program to Extract IP address from file using Python

Algorithm:-

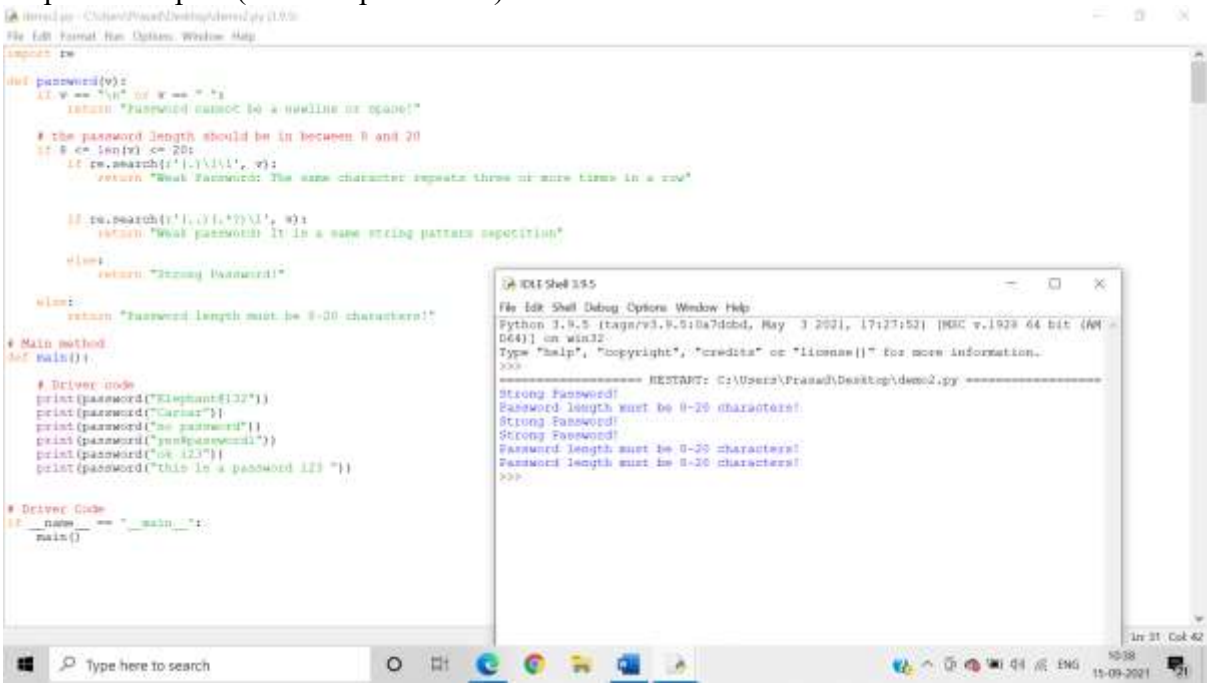
Step 1: import re
Step 2: open the .txt file
Step 3: Define the regex pattern for an ip address
Step 4: Search for pattern within the file
Step 5: if found : print(empty)





3. Write a program to Categorize Password as Strong or Weak using Regex in Python
Algorithm:-

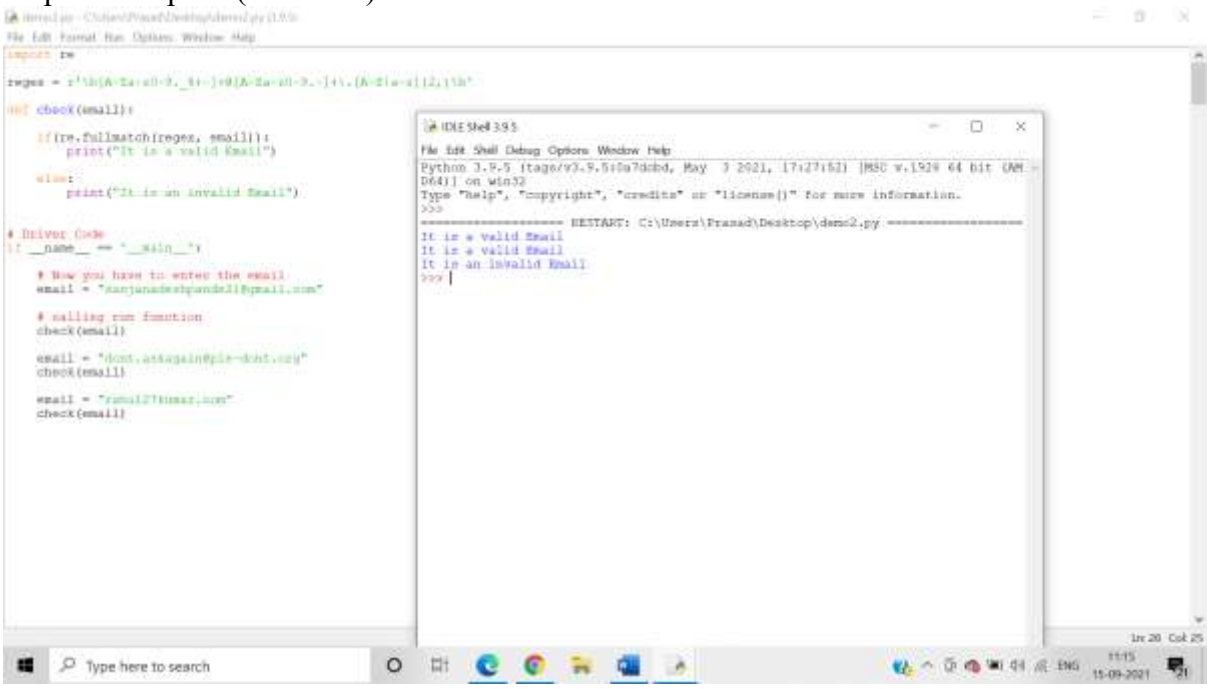
Step 1: Import re
Step 2: Check the length of password
Step 3: if length >=8:
Step 4: Check for special characters, capital letters,small letters ,numbers within the input
Step 5: if all of the above are present: print("your password is strong")
Step 6: else : print("your password is weak")
Step 7: else : print("Invalid password")



4. Write a program to validate an Email address entered by the user

Algorithm:-

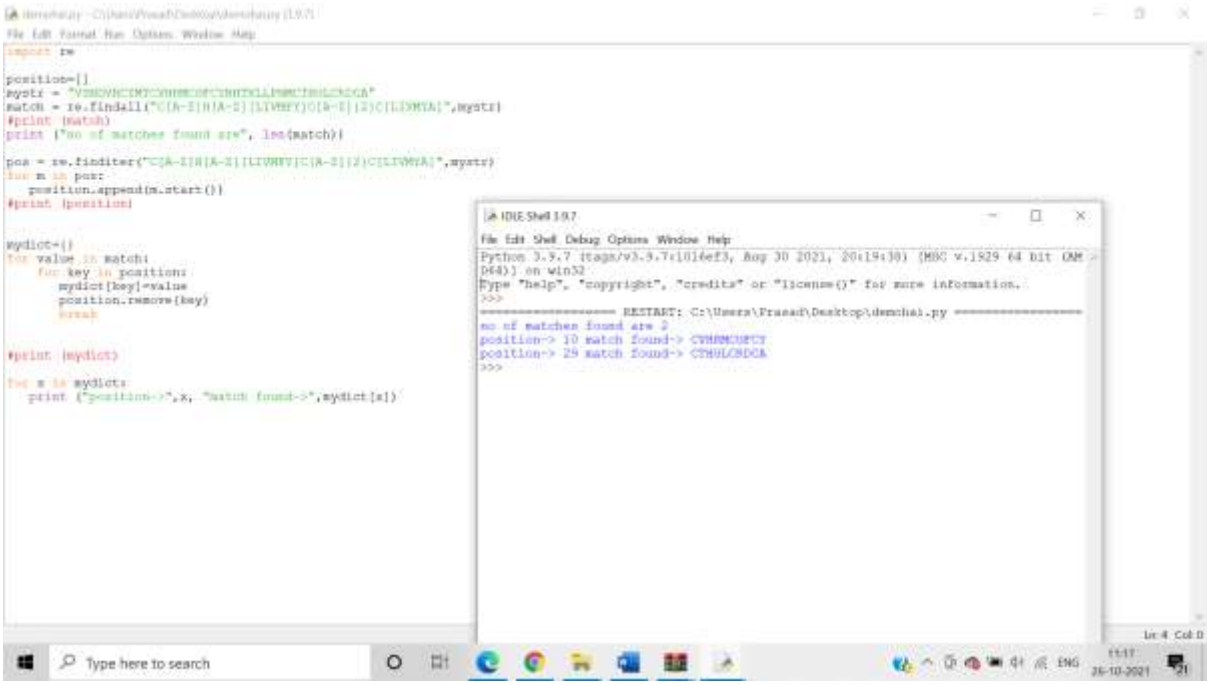
Step 1: Import re
Step 2: Take user defined input
Step 3: Define the regex pattern
Step 4: if (input==regex pattern): print("valid email id")
Step 5: else: print ("Invalid")

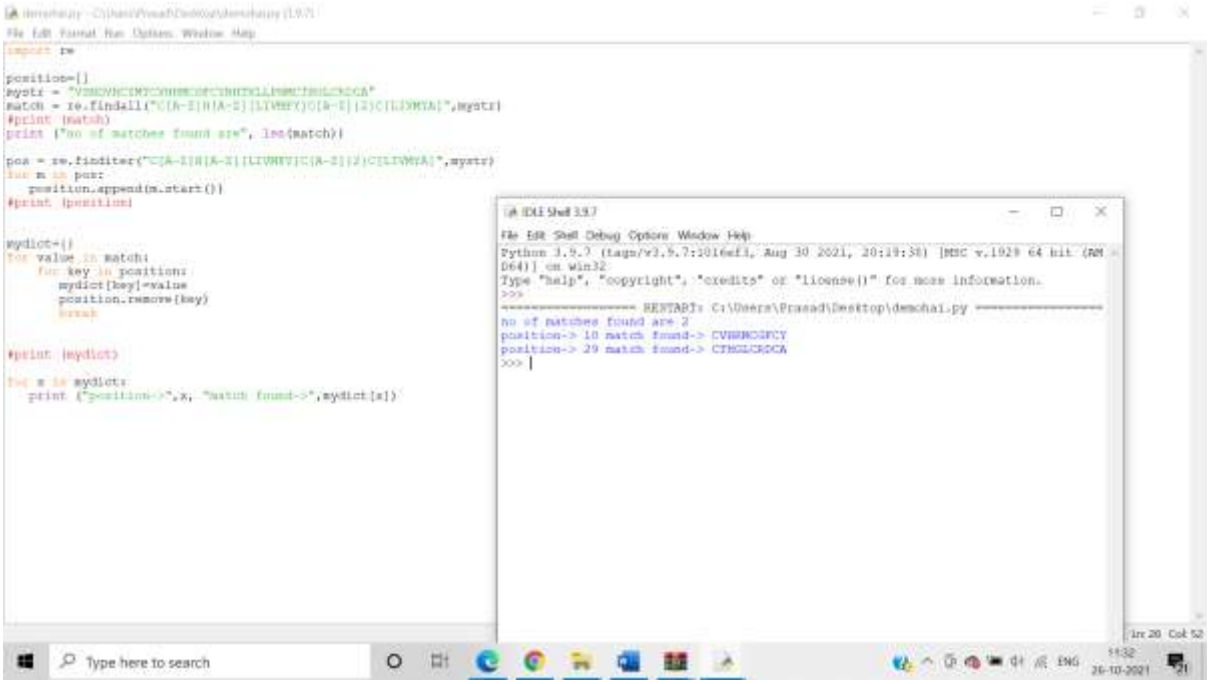


5. Write a program to identify no of motifs and their positions in a protein sequence entered by the user. Print the motifs present along with count and positions.(5 motifs)

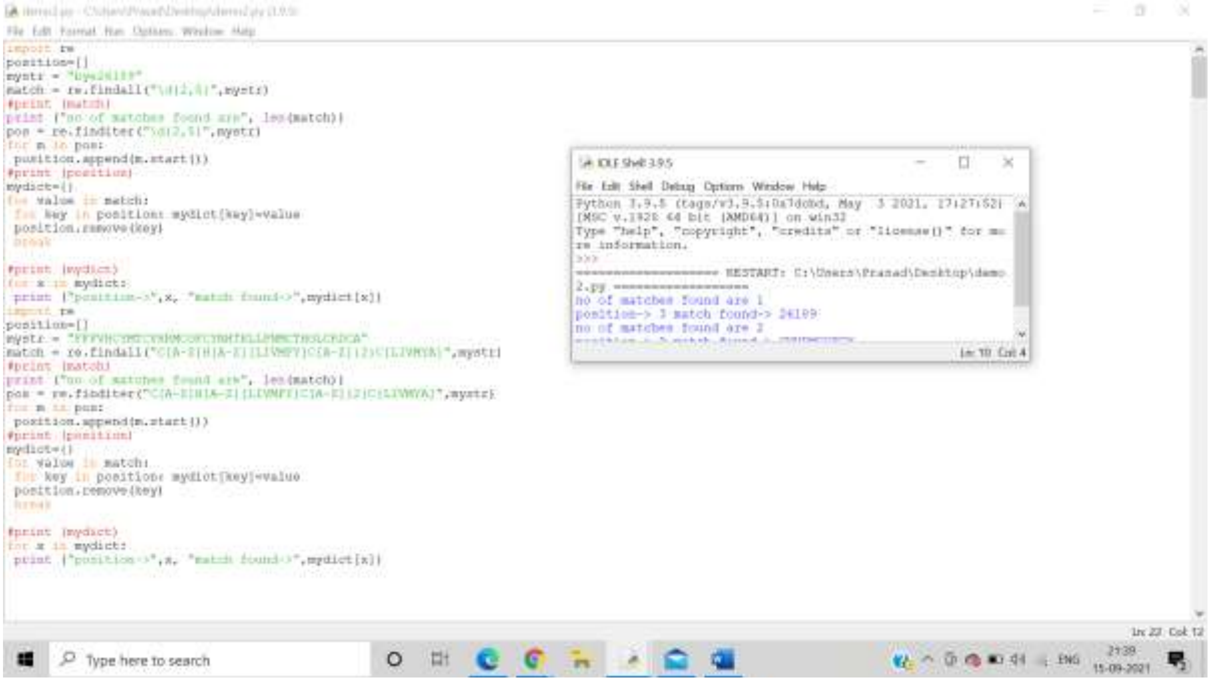
Algorithm:

Step 1: import re
Step 2: define the regex pattern
Step 3: initialize x = True
Step 4: result1 = re.findall(pattern,sequence)
Step 5: result2 = refinditer(pattern,sequence)
Step 6: initialize b = 0
Step 7: for x in result2: print("Motif position = and motif sequence = ")
Step 8: b = b+1
Step 9: calculate the total no of results using len()




File Edit Format Run Options Window Help
import re
position=[]
mystr = "VCVBMCGFCYCTHGLCRDCA"
match = re.findall("C[A-Z][H|A-Z][LIVMFY]C[A-Z]{2}C[LIVMYA]",mystr)
#print (match)
print ("no of matches found are", len(match))
pos = re.finditer("C[A-Z][H|A-Z][LIVMFY]C[A-Z]{2}C[LIVMYA]",mystr)
for m in pos:
position.append(m.start())
#print (position)
mydict={}
for value in match:
for key in position:
mydict[key]=value
position.remove(key)
break
#print (mydict)
for x in mydict:
print ("position->",x, "match found->",mydict[x])
IDLE Shell 3.9.7
File Edit Shell Debug Options Window Help
Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demchai.py ==========
no of matches found are 2
position-> 10 match found-> CVBMCGFCY
position-> 29 match found-> CTHGLCRDCA
>>>
Ln: 20 Col: 52
Type here to search
ENG
11:32
26-10-2021

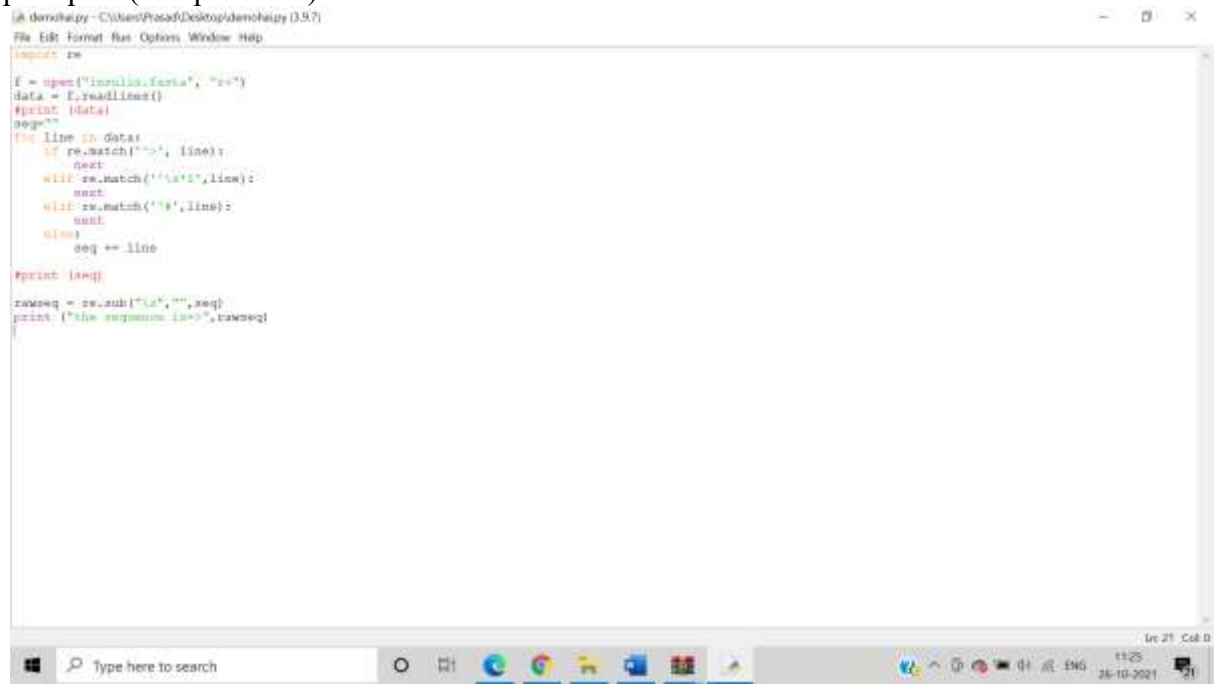

File Edit Format Run Options Window Help
import re
position=[]
mystr = "hello789hnbj2234vjja67hgg78894aaaa7789756"
match = re.findall("\d{2,3}",mystr)
#print (match)
print ("no of matches found are", len(match))
pos = re.finditer("\d{2,5}",mystr)
for m in pos:
position.append(m.start())
#print (position)
mydict={}
for value in match:
for key in position:
mydict[key]=value
position.remove(key)
break
#print (mydict)
for x in mydict:
print ("position->",x, "match found->",mydict[x])
IDLE Shell 3.9.7
File Edit Shell Debug Options Window Help
Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Prasad\Desktop\demchai.py ==========
no of matches found are 6
position-> 5 match found-> 789
position-> 12 match found-> 2234
position-> 20 match found-> 67
position-> 25 match found-> 78899
position-> 33 match found-> 67789
position-> 39 match found-> 756
>>>
Ln: 27 Col: 0
Type here to search
ENG
11:18
26-10-2021


File Edit Format Run Options Window Help
import re
position=[]
match = re.findall("\d{2,5}",mystr)
#print (match)
print ("no of matches found are", len(match))
pos = re.finditer("\d{2,5}",mystr)
for m in pos:
position.append(m.start())
#print (position)
mydict={}
for value in match:
for key in position: mydict[key]=value
position.remove(key)
break
#print (mydict)
for x in mydict:
print ("position->",x, "match found->",mydict[x])
import re
position=[]
#print (match)
print ("no of matches found are", len(match))
for m in pos:
position.append(m.start())
#print (position)
mydict={}
for value in match:
for key in position: mydict[key]=value
position.remove(key)
break
#print (mydict)
for x in mydict:
print ("position->",x, "match found->",mydict[x])
IDLE Shell 3.9.5
File Edit Shell Debug Options Window Help
re information.
>>>
no of matches found are 1
position-> 3 match found-> 26189
no of matches found are 2
Type here to search

6. Write a program that parses a fasta sequence file (use file handling) and print the raw sequence onto the console. Also parse the accession Id and print it.

Algorithm:

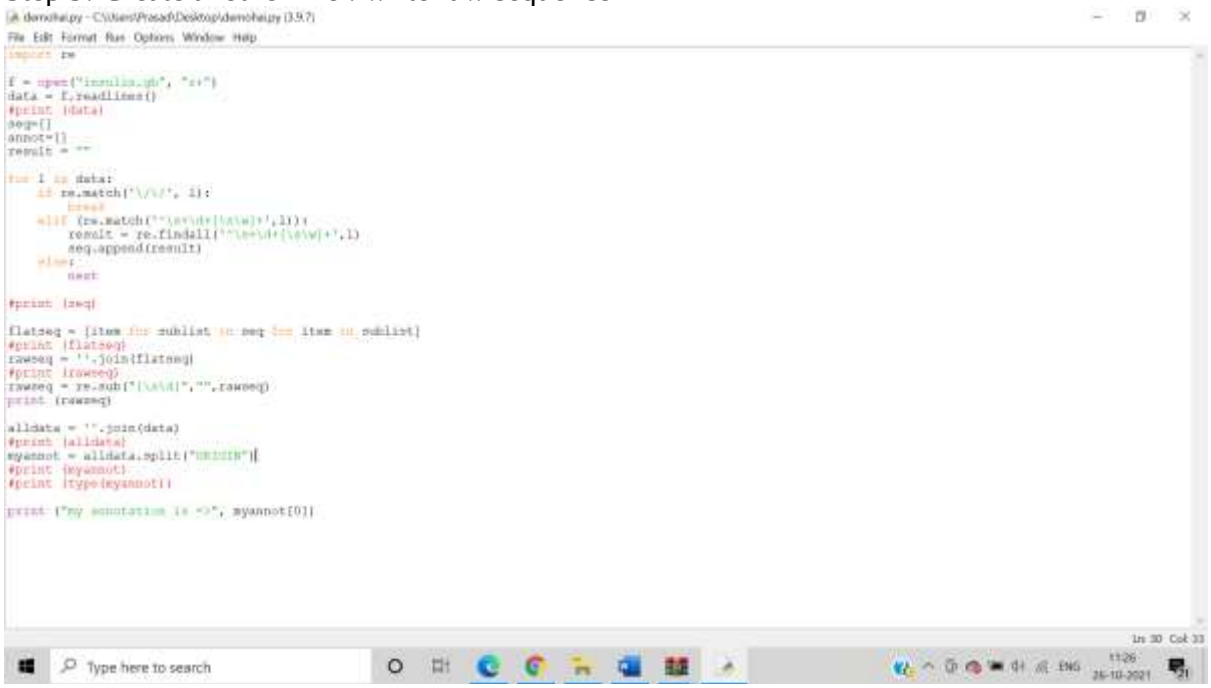
Step 1: import re
Step 2: open the fasta file
Step 3: read the fasta file
Step 4: create an empty string seq
Step 5: for l in data :
Step 6: if the characters == any special symbol : skip
Step 7: else : seq += l
Step 8: print("Sequence=")



7. Write a program that parses a genbank sequence file (use file handling) and print the annotation in one file and raw sequence in another file.

Algorithm:

Step 1: import re
Step 2: open your .gb file
Step 3: readfile
Step 4: create empty seq set
Step 5: create empty string result
Step 6: search for the annotation and sequence pattern within the file
Step 7: if found :
Step 8: create a new file : write annotated seq
Step 9: Create another file : write raw sequence



8. Write a program that parses helix or sheet regions from the PDB file and print onto the console

Algorithm:

Step 1: import re

Step 2: open your .pdb file

Step 3: readfile

Step 4: create empty seq set

Step 5: create empty string result

Step 6: search for the annotation and sequence pattern within the file

Step 7: if found :

Step 8: print("x")

CODE:-

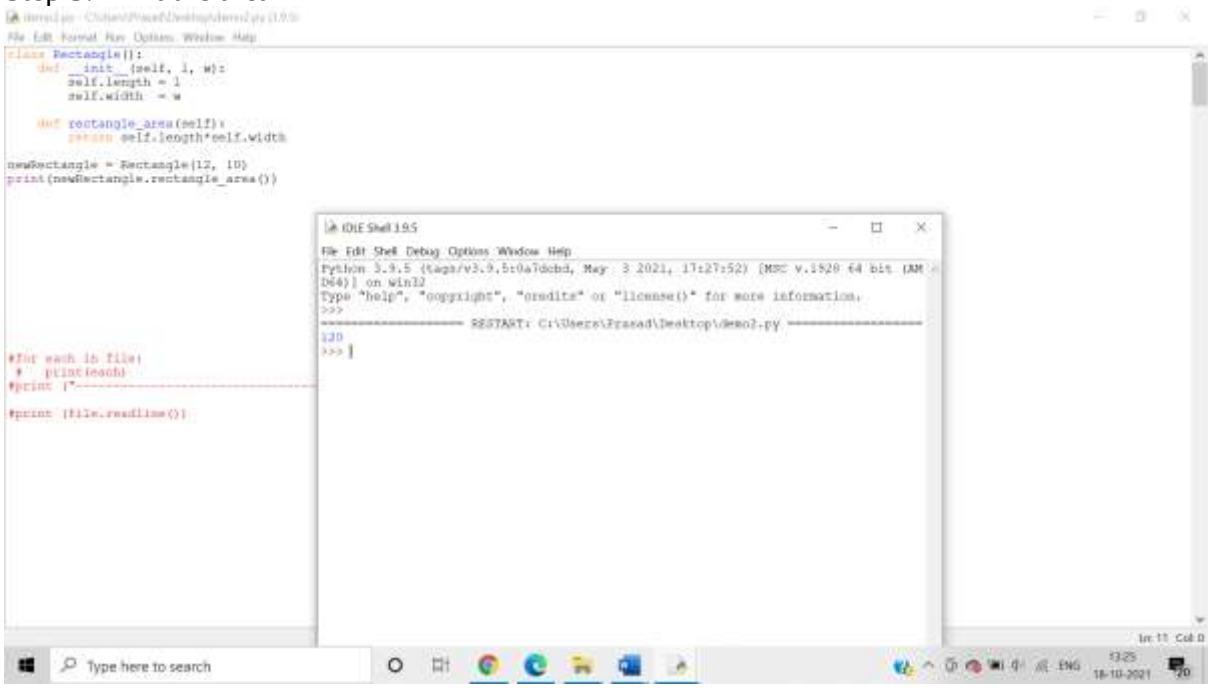
Python for Bioinformatics

Exercise 10

X: Title – Programs demonstrating Object Oriented Programming in Python

1. Create a class named Rectangle constructed by a length and width and a method which will compute the area of a rectangle. Show its implementation on IDLE

Algorithm:
Step 1: Create a class and using a constructor initialize values of that class.
Step 2: Create a method called as area and return the area of the class.
Step 3: Create an object for the class.
Step 4: Using the object, call the method area() with the parameters as the length and breadth
Step 5: Print the area



2. Create a class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle. Implement it in another python script that takes input from the user and also asks the choice of calculation to the user.

Algorithm:

Step 1: Create a class and using a constructor initialize values of that class.
Step 2: Create a method called as area and return the area of the class.
Step 3: Create a method called perimeter and return the perimeter of the class
Step 4: Create an object for the class.
Step 5: Using the object, call the method area() with the parameters as the length and breadth
Step 6: Print the area and perimeter

Code:-

```
from circle_class import circle
circ=circle(input("enter your radius:- "))
print("The choices of calculations are:-")
print("1.Area of a circle")
print("2.Perimeter of a circle")
choice=int(input("Select your option :- "))
if choice==1:
    print(circ.area())
if choice==2:
    print((circ.perimeter()))
```

Output:-

```
enter your radius:- 2
The choices of calculations are:-
1.Area of a circle
2.Perimeter of a circle
Select your option :- 1
The area of circle is 12
>>>
enter your radius:- 2
The choices of calculations are:-
1.Area of a circle
2.Perimeter of a circle
Select your option :- 2
The perimeter of circle is 12
>>>
```

3. Create a class named studentinfo that has information of students roll no and name and has a method with welcome message for each student. Create a sub class named studentsubject that implements class studentinfo and has information about rollno and marks of four subjects. It has a method that calculates percentage of each student and displays the grade. (Single Inheritance)

Algorithm:

Step 1: Create a class studentinfo and using a constructor initialize values of that class.
Step 2: Create a method called as _init_ and return the _init_
Step 3: Create an object for the class.
Step 4: Create a method called as msg and return the msg
Step 5: Create an object for the class.
Step 6: Create a class student subject and using a constructor initialize values of that class.
Step 7: Create a method called as init and return the _init_
Step 8: Create an object for the class.
Step 9: Create a method called as percentage and return the percentage
Step 10: Create an object for the class.
Step 11: Using the object, call the method _init_() with the parameters as name, roll_no,marks,percentage
Step 12: Print (result)

```
from studentQ3 import studentinfo
from studentQ3 import studentsubject
stud1=studentsubject("John Lenon",1,92,82,72,62)
stud2=studentsubject("Ringo star",2,78,67,56,76)
stud3=studentsubject("Paul McCartney",3,87,67,98,67)
stud4=studentsubject("George harrison",4,65,87,98,89)

print(stud1.welcome())
print(stud1.percent())
print(stud1.grade())
print('\n')
print(stud2.welcome())
print(stud2.percent())
print(stud2.grade())
print('\n')
print(stud3.welcome())
print(stud3.percent())
print(stud3.grade())
print('\n')
print(stud4.welcome())
print(stud4.percent())
print(stud4.grade())
```

```
class studentinfo:
    def __init__(self,name,rno):
        self.name=name
        self.rno=rno

    def welcome(self):
        return "Welcome {} ,your Roll.no is {}".format(self.name, self.rno)

class studentsubject(studentinfo):
    def __init__(self,name,rno,sub1,sub2,sub3,sub4):
        studentinfo.__init__(self,name,rno)
        self.sub1=sub1
        self.sub2=sub2
        self.sub3=sub3
        self.sub4=sub4

    def percent(self):
        return ("the percentage is {}".format((self.sub1 +self.sub2 + self.sub3 + self.sub4)/ 4))
    def grade (self):
        marks=((self.sub1 +self.sub2 + self.sub3 + self.sub4))
        if marks>300:
            return("grade:- A")

        elif marks>250:
            return("grade:-B")

        elif marks>250:
            return("grade:-B")

        elif marks>200:
            return("grade:-C")

        elif marks>150:
            return("grade:-D")

        else:
            return("grade:-F")
```

Output:-

```
Welcome John Lenon ,your Roll.no is 1
the percentage is 77.0
grade:- A


Welcome Ringo star ,your Roll.no is 2
the percentage is 69.25
grade:-B


Welcome Paul McCartney ,your Roll.no is 3
the percentage is 79.75
grade:- A


Welcome George harrison ,your Roll.no is 4
the percentage is 84.75
grade:- A
```

4. Create a class named studentinfo1 that has information of students roll no and name and has a method with welcome message for each student. Create another class studentinfo2 that has info on rollno and marks of four subjects with a method calculating the aggregate and displaying it. Create a sub class that implements both of these classes and has information on practical marks of 2 subjects along with a method that calculates the percentage and displays the grade for each student. (Multiple Inheritance)

Algorithm:

Step 1: Create a class studentinfo1 and using a constructor initialize values of that class.
Step 2: Create a method called as _init_ and return the _init_
Step 3: Create an object for the class.
Step 4: Create a method called as msg and return the msg
Step 5: Create an object for the class.
Step 6: Create a class studentinfo2 and using a constructor initialize values of that class.
Step 7: Create a method called as init and return the _init_
Step 8: Create an object for the class.
Step 9: Create a method called as percentage and return the percentage
Step10: Create an object for the class.
Step11: Using the object, call the method _init_() with the parameters as name, roll_no,marks,percentage
Step12: Print (result)

```
from studentQ4 import subclss
studl=subclss("John Lenon",1,92,82,72,62,43,65)
stud2=subclss("Ringo star",2,78,67,56,76,56,65)
stud3=subclss("Paul McCartney",3,87,67,98,67,76,67)
stud4=subclss("George harrison",4,65,87,98,89,87,77)

print(studl.welcome())
print(studl.aggregate())
print(studl.percent())
print(studl.grade())
print('\n')
print(stud2.welcome())
print(stud2.aggregate())
print(stud2.percent())
print(stud2.grade())
print('\n')
print(stud3.welcome())
print(stud3.aggregate())
print(stud3.percent())
print(stud3.grade())
print('\n')
print(stud4.welcome())
print(stud4.aggregate())
print(stud4.percent())
print(stud4.grade())
```

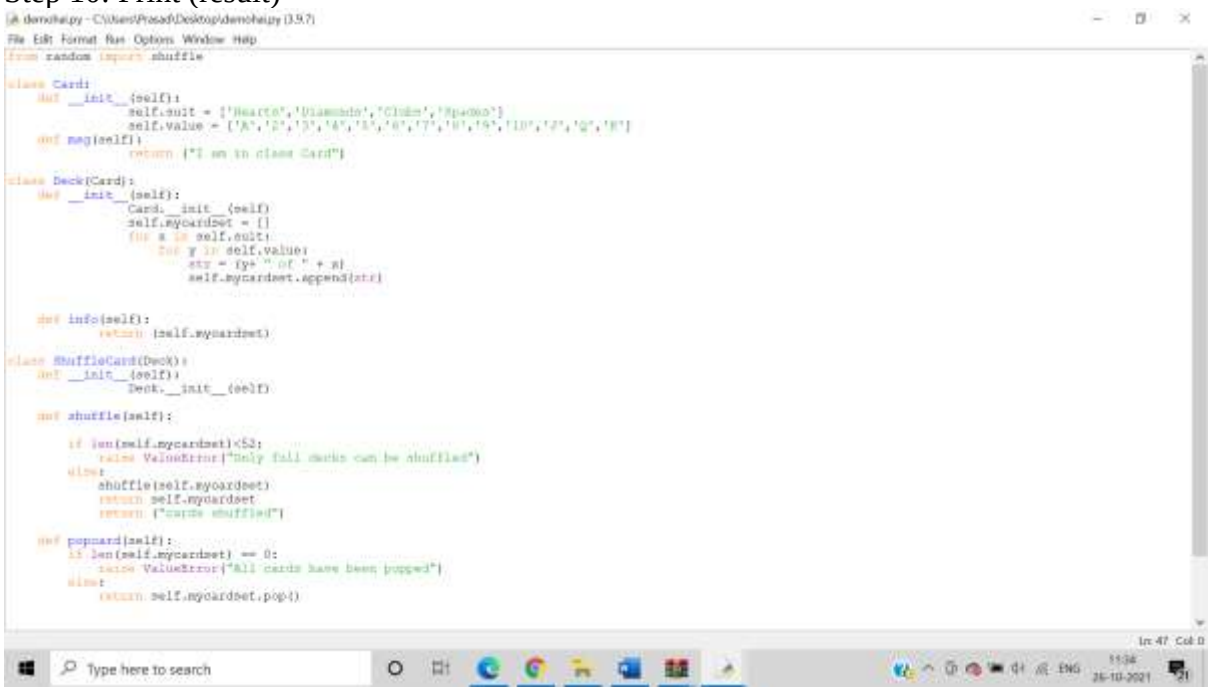
```
            return("grade:-C")

        elif marks>210:
            return("grade:-D")

        else:
            return("grade:-F")
```

```
Welcome John Lenon ,your Roll.no is 1
the aggregate is 308
the percentage is 69.33333333333333
grade:-C


Welcome Ringo star ,your Roll.no is 2
the aggregate is 277
the percentage is 66.33333333333333
grade:-C


Welcome Paul McCartney ,your Roll.no is 3
the aggregate is 319
the percentage is 77.0
grade:-B


Welcome George harrison ,your Roll.no is 4
the aggregate is 339
the percentage is 83.83333333333333
grade:-B
>>>
```

5. Create a class named “Card” storing information on Deck of cards – suite and their values.suite = ['Hearts','Diamonds','Clubs','Spades'] value = ['A','2','3','4','5','6','7','8','9','10','J','Q','K']. Create another class Deck that is implementing the class Card and having a method that displays the Suite and Deck in systematic order for all four suites. Also stores the values in a new list – mycardset.(Data should appear as – “A of Hearts, 2 of Hearts……A of Diamond……..”). Create another class shufflecards that implements the Deck class. It will have method that checks whether mycardset is full (no of cards is full in the set), if yes then it shuffles and return the shuffled set if no then returns an error. Once the set is shuffled write another method that will pop up a random card every time the method executes (Multilevel Inheritance)

Algorithm:

Step 1: Create a class card and using a constructor initialize values of that class.
Step 2: Create a class shufflecard and using a constructor initialize values of that class.
Step 3: Create a method called as _init_ and return the _init_
Step 4: Create an object for the class.
Step 5: Create a method called as shuffle and return shuffle
Step 6: Create an object for the class.
Step 7: Create a method called as pop and return pop
Step 8: Create an object for the class.
Step 9: Using the object, call the method _init_() with the parameters as suites and values
Step 10: Print (result)



```
['A of Hearts', '2 of Hearts', '3 of Hearts', '4 of Hearts', '5 of Hearts', '6 of Heart
s', '7 of Hearts', '8 of Hearts', '9 of Hearts', '10 of Hearts', 'J of Hearts', 'Q of H
earts', 'K of Hearts', 'A of Diamonds', '2 of Diamonds', '3 of Diamonds', '4 of Diamond
s', '5 of Diamonds', '6 of Diamonds', '7 of Diamonds', '8 of Diamonds', '9 of Diamonds'
, '10 of Diamonds', 'J of Diamonds', 'Q of Diamonds', 'K of Diamonds', 'A of Clubs', '2
of Clubs', '3 of Clubs', '4 of Clubs', '5 of Clubs', '6 of Clubs', '7 of Clubs', '8 of
Clubs', '9 of Clubs', '10 of Clubs', 'J of Clubs', 'Q of Clubs', 'K of Clubs', 'A of Sp
ades', '2 of Spades', '3 of Spades', '4 of Spades', '5 of Spades', '6 of Spades', '7 of
Spades', '8 of Spades', '9 of Spades', '10 of Spades', 'J of Spades', 'Q of Spades', 'K
of Spades']


Card popped is K of Spades


Card popped is Q of Spades


Card popped is 2 of Clubs
>>>
```

6. Create a class named shapes constructed by radius of circle and length and width of rectangle and separate methods for calculating the area of circle and rectangle. Create subclass1 that implements shapes and is constructed by length and breadth information of ellipse. This class has method to calculate perimeter of circle and perimeter of ellipse. . Create subclass2 that implements shapes and constructed by bases, height and sides of trapezoid. It has methods to calculate perimeter of rectangle and trapezoid. (Hierarchical Inheritance)

Algorithm:

Step 1: Create a class shapes and using a constructor initialize values of that class.
Step 2: Create a method called as _init_ and return the _init_
Step 3: Create an object for the class.
Step 4: Create a method called as area_rect and return area_rect
Step 5: Create an object for the class.
Step 6: Create a method called as area_circ and return area_circ
Step 7: Create an object for the class.
Step 8: Create a class subclass1 and using a constructor initialize the values of that class
Step 9: Create a method called as _init_ and return the _init_
Step 10: Create an object for the class.
Step 11: Create a method called as perimeter_circle and return perimeter_circle
Step 12: Create an object for the class.
Step 13: Create a method called as perimeter_ellipse and return perimeter_ellipse
Step 14: Create an object for the class.
Step 15: Create a class subclass2 and using a constructor initialize the values of that class
Step 16: Create a method called as _init_ and return the _init_
Step 17: Create an object for the class.
Step 18: Create a method called as perimeter_rectangle and return perimeter_rectangle
Step 19: Create an object for the class.
Step 20: Create a method called as perimeter_trap and return perimeter_trap
Step 21: Create an object for the class.
Step 22: from shape import shape
Step 23: from shape import subclass1
Step 24: from shape import subclass2
Step 25: Using the object, call the method _init_() with the parameters as suites and values
Step 26: Print (result)

```
from shapesclass import shapes
from shapesclass import subclass1
from shapesclass import subclass2

shape1=shapes(2,3,4)
print(shape1.area_rect())
print(shape1.area_circ())
print('\n')
shape2=subclass1(2,2,3,6,7)
print(shape2.perimeter_circle())
print(shape2.perimeter_ellipse())
print('\n')
shape3=subclass2(2,3,4,5,6,7,8)
print(shape3.perimeter_rect())
print(shape3.perimeter_trap())
```

```
The area of rectangle is is 12
The area of circle is 12.56


The perimeter of circle is 12.56
The perimeter of ellipse is 133


The perimeter of circle is 24.0
The perimeter of ellipse is 26
>>>
```

Python for Bioinformatics

Exercise 11

Title: Programs demonstrating usage of CGI Python

1. Create a web page for Students portal seeking information about name, roll no, sex, favorite book, participation in extracurricular activities and any other information (include all form elements). Ask students to enter marks of 4 theory and 2 practical subjects, incorporate the grade calculator program and display the grade of respective students along with other information.

Algorithm:

Step 1: Start and initialize Xammp and start Apache.

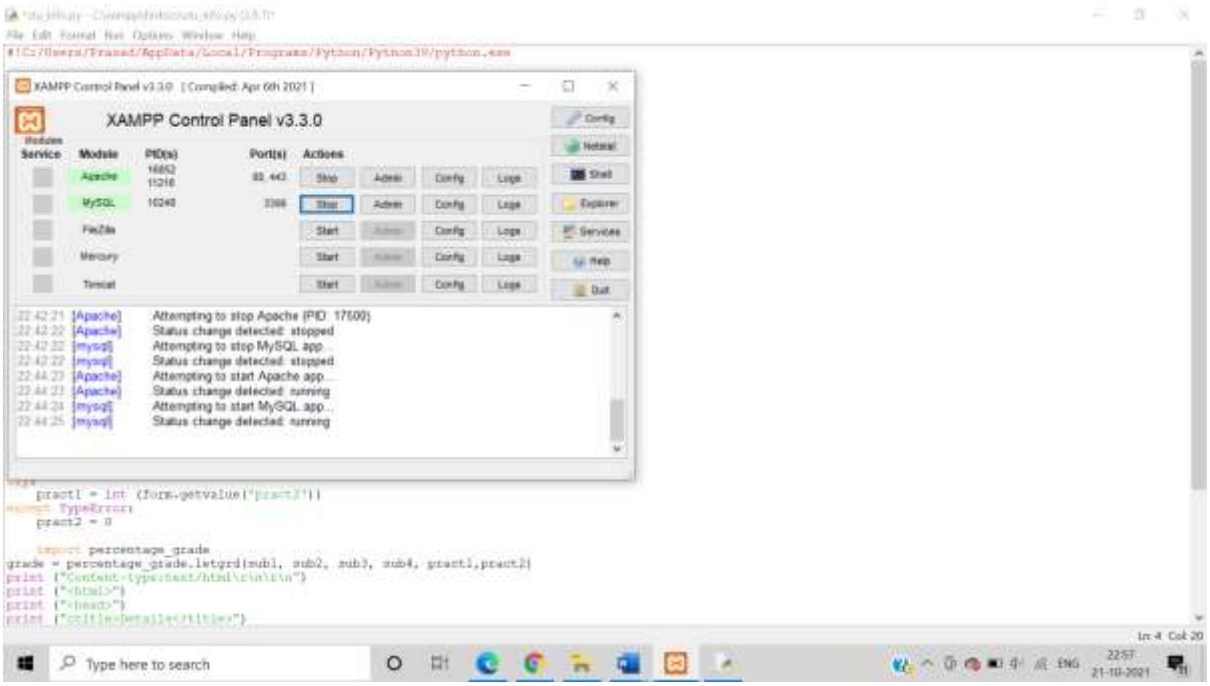
Step 2: Open the html file for the student's portal which asks for the input in the browser.

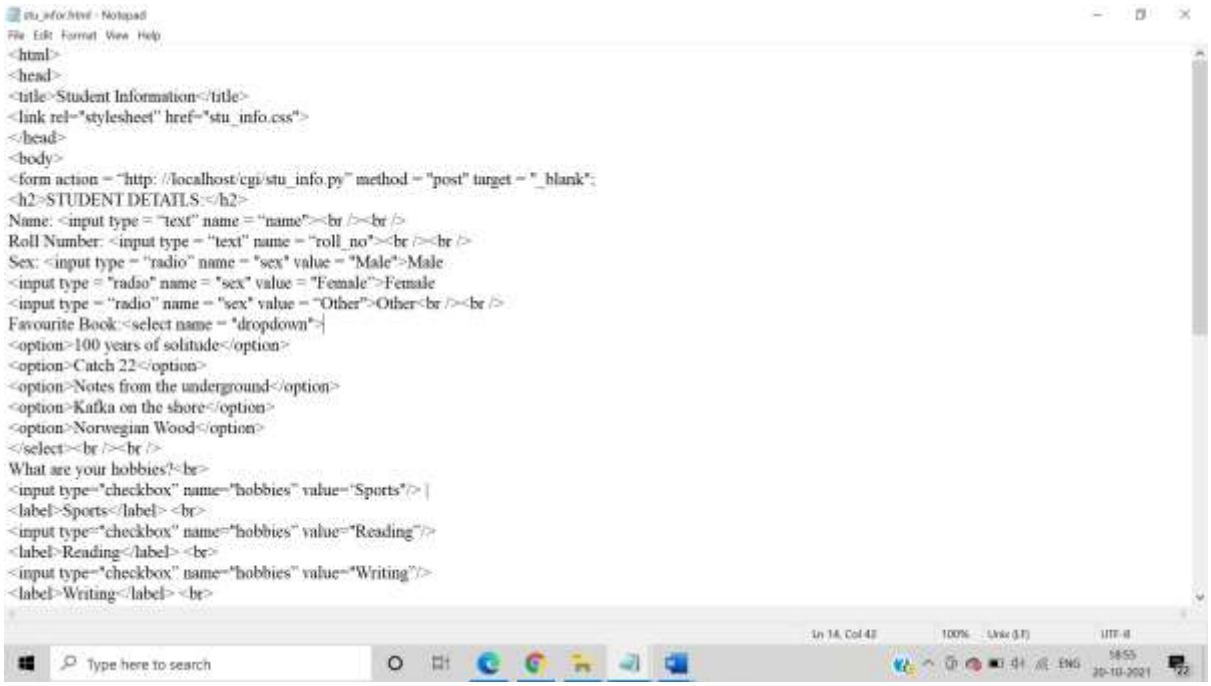
Step 3: Give the directory of the python file for the form action in the html file. Set the method to post.

Step 4: In the python file set the directory of the python at the top of the code.

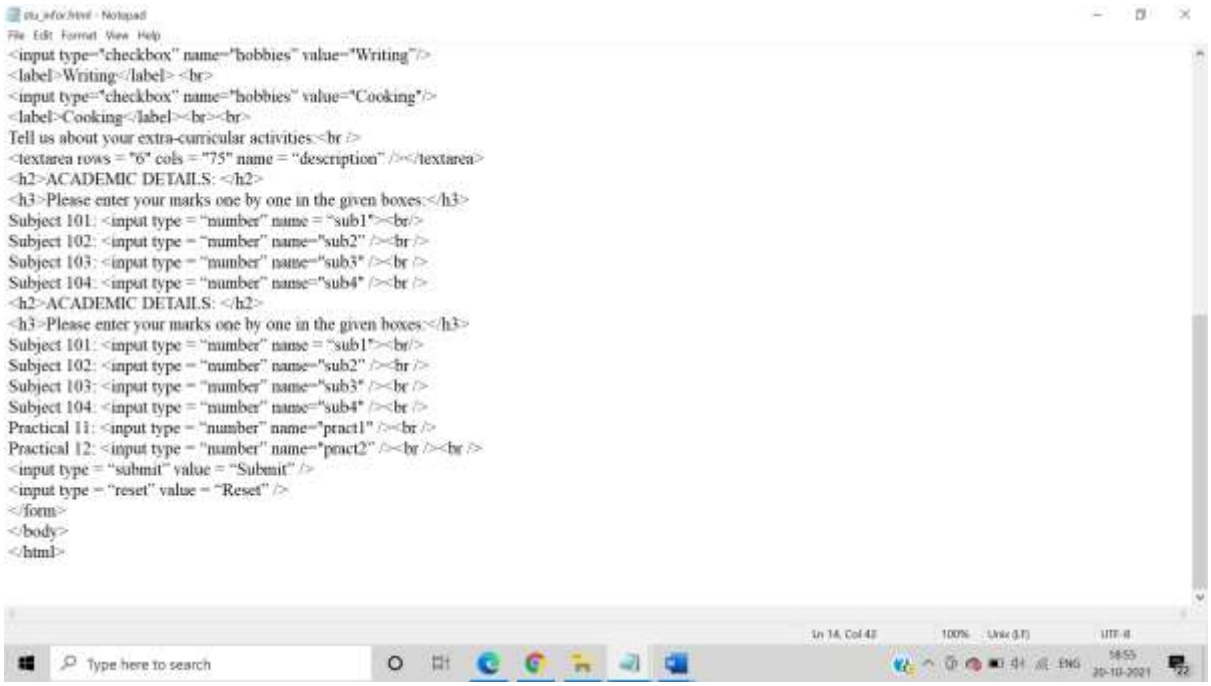
Step 5: Save both the html and python file in the htdocs folder in the directory for xammp.

Step 6: Give the input for the students information in the html file and submit.

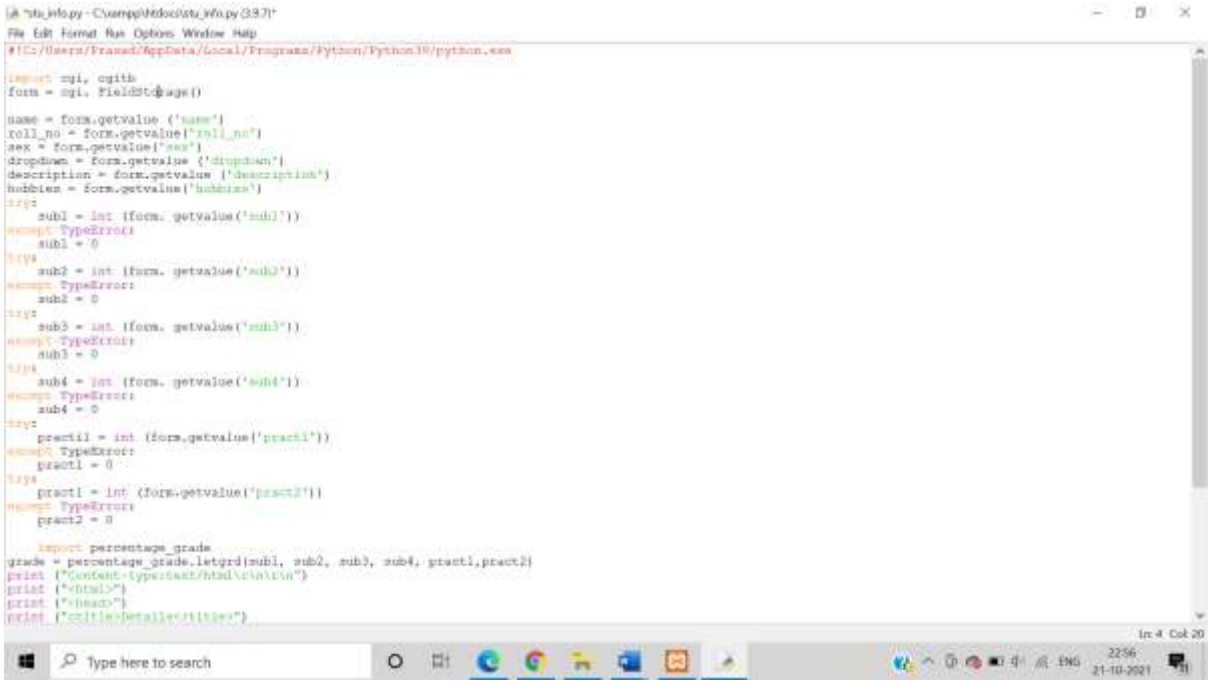




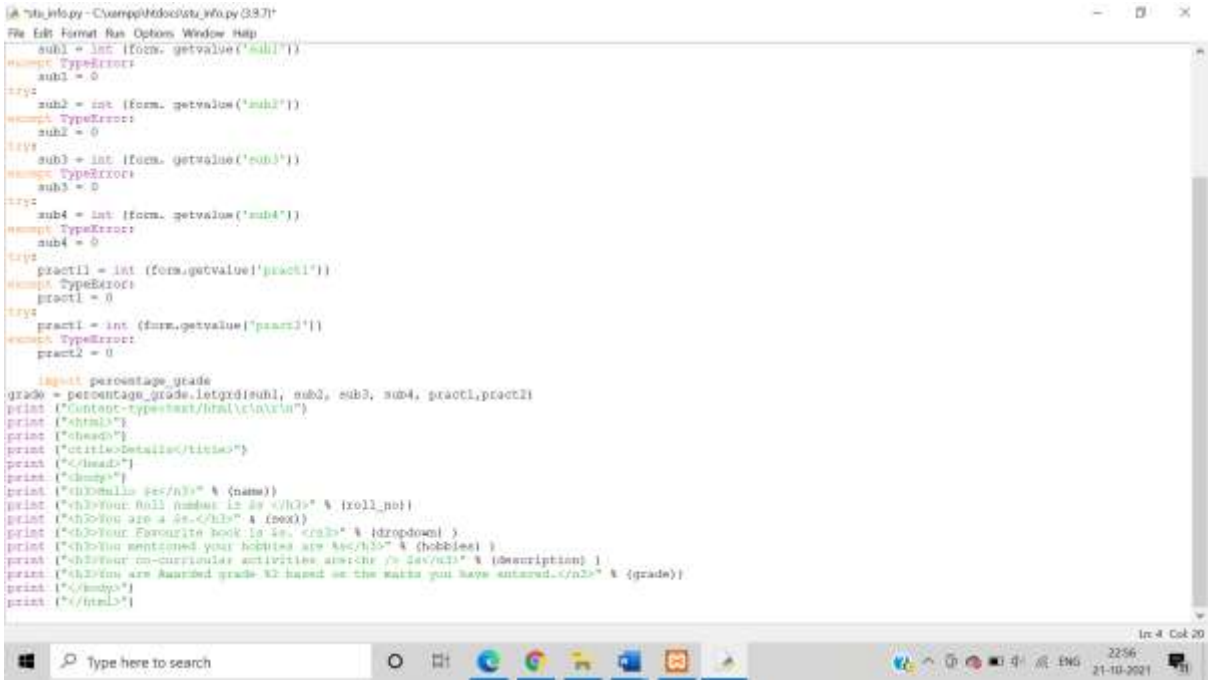
```
<html>
<head>
<title>Student Information</title>
<link rel="stylesheet" href="stu_info.css">
</head>
<body>
<form action = "http: //localhost/cgi/stu_info.py" method = "post" target = "_blank";
<h2>STUDENT DETAILS:</h2>
Name: <input type = "text" name = "name"><br /><br />
Roll Number: <input type = "text" name = "roll_no"><br /><br />
Sex: <input type = "radio" name = "sex" value = "Male">Male
<input type = "radso" name = "sex" value = "Female">Female
<input type = "radio" name = "sex" value = "Other">Other<br /><br />
Favourite Book:<select name = "dropdown">
<option>100 years of solitude</option>
<option>Catch 22</option>
<option>Notes from the underground</option>
<option>Kafka on the shore</option>
<option>Norwegian Wood</option>
</select><br /><br />
What are your hobbies?<br>
<input type="checkbox" name="hobbies" value="Sports"/>
<label>Sports</label> <br>
<input type="checkbox" name="hobbies" value="Reading"/>
<label>Reading</label> <br>
<input type="checkbox" name="hobbies" value="Writing"/>
<label>Writing</label> <br>
```



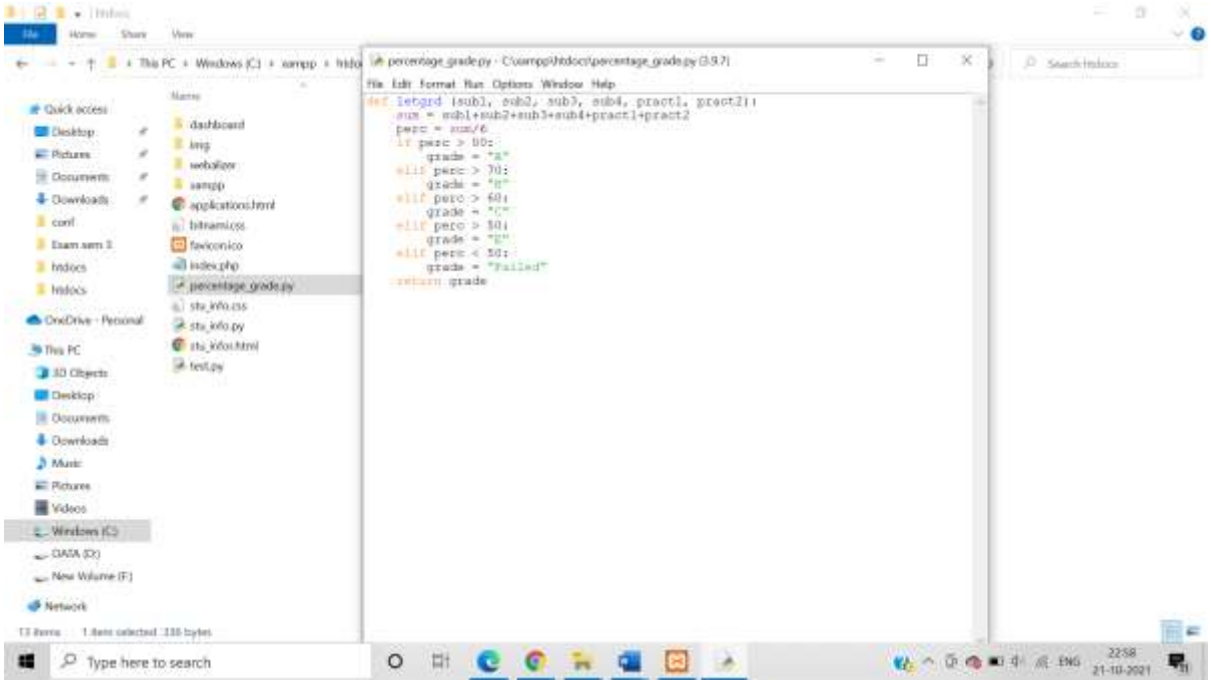
```
<input type="checkbox" name="hobbies" value="Writing"/>
<label>Writing</label> <br>
<input type="checkbox" name="hobbies" value="Cooking"/>
<label>Cooking</label><br><br>
Tell us about your extra-curricular activities:<br />
<textarea rows = "6" cols = "75" name = "description" /></textarea>
<h2>ACADEMIC DETAILS: </h2>
<h3>Please enter your marks one by one in the given boxes:</h3>
Subject 101: <input type = "number" name = "sub1"><br/>
Subject 102: <input type = "number" name="sub2" /><br />
Subject 103: <input type = "number" name="sub3" /><br />
Subject 104: <input type = "number" name="sub4" /><br />
<h2>ACADEMIC DETAILS: </h2>
<h3>Please enter your marks one by one in the given boxes:</h3>
Subject 101: <input type = "number" name = "sub1"><br/>
Subject 102: <input type = "number" name="sub2" /><br />
Subject 103: <input type = "number" name="sub3" /><br />
Subject 104: <input type = "number" name="sub4" /><br />
Practical 11: <input type = "number" name="pract1" /><br />
Practical 12: <input type = "number" name="pract2" /><br /><br />
<input type = "submit" value = "Submit" />
<input type = "reset" value = "Reset" />
</form>
</body>
</html>
```



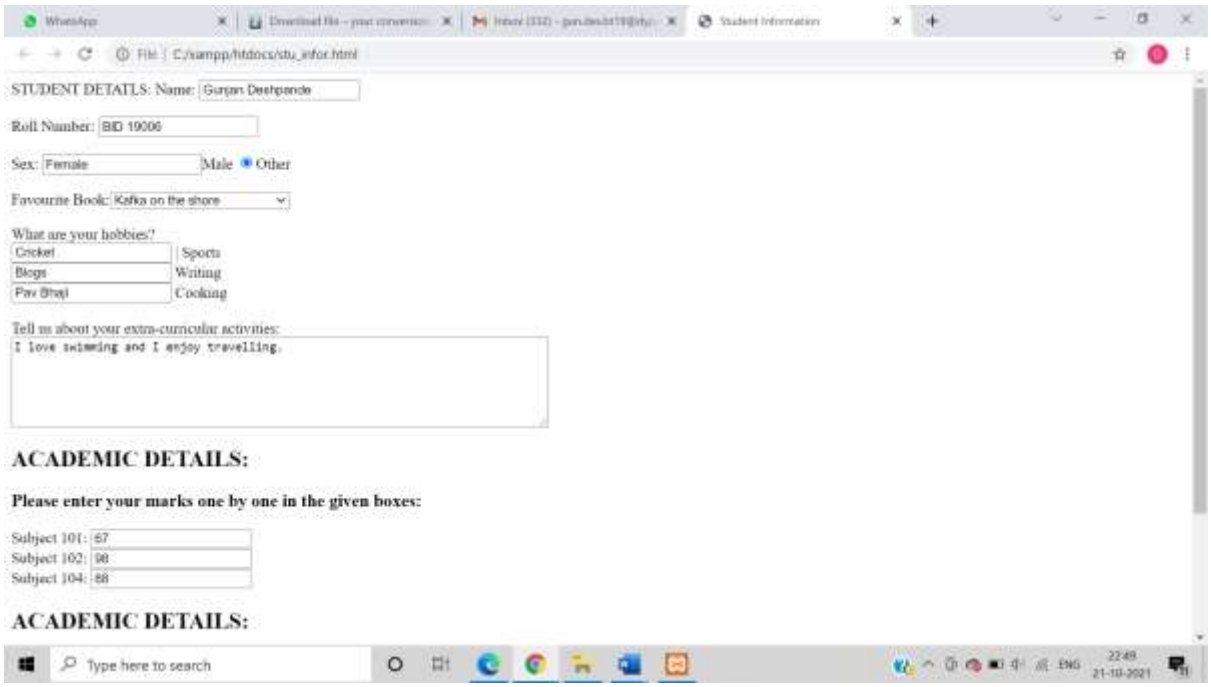
```
#!C:/Users/Prasad/AppData/Local/Programs/Python/Python39/python.exe

import cgi, cgitb
form = cgi. FieldStorage()

name = form.getvalue ('name')
roll_no = form.getvalue('roll_no')
sex = form.getvalue('sex')
dropdown = form.getvalue ('dropdown')
description = form.getvalue ('description')
hobbies = form.getvalue('hobbies')
try:
    sub1 = int (form. getvalue('sub1'))
except TypeError:
    sub1 = 0
try:
    sub2 = int (form. getvalue('sub2'))
except TypeError:
    sub2 = 0
try:
    sub3 = int (form. getvalue('sub3'))
except TypeError:
    sub3 = 0
try:
    sub4 = int (form. getvalue('sub4'))
except TypeError:
    sub4 = 0
try:
    pract1 = int (form.getvalue('pract1'))
except TypeError:
    pract1 = 0
try:
    pract1 = int (form.getvalue('pract2'))
except TypeError:
    pract2 = 0

    import percentage_grade
grade = percentage_grade.letgrd(sub1, sub2, sub3, sub4, pract1,pract2)
print ("Content-type:text/html\r\n\r\n")
print ("<html>")
print ("<head>")
print ("<title>Details</title>")
```

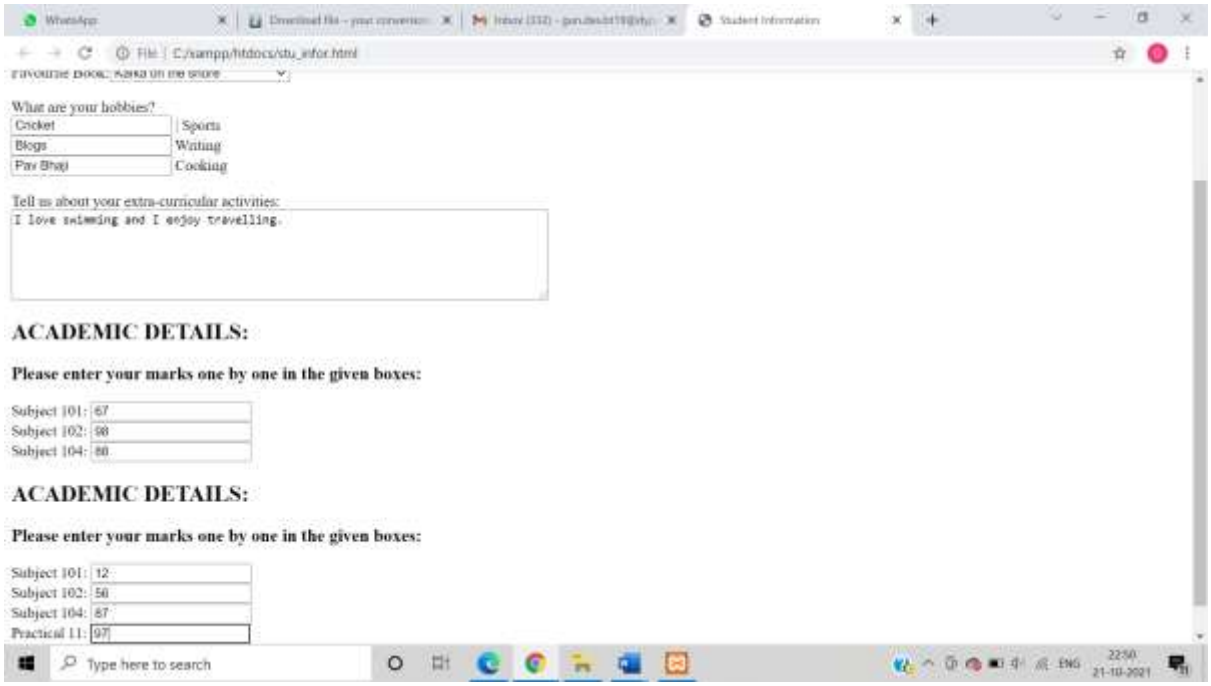



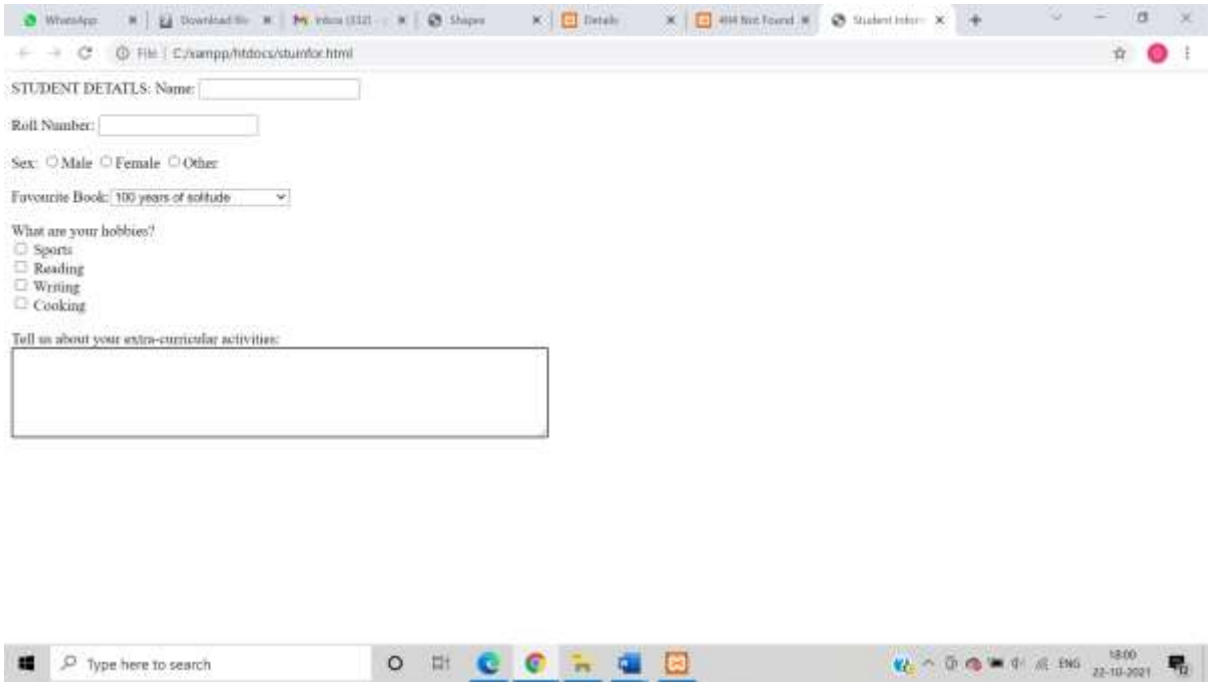
```
    sub1 = int (form. getvalue('sub1'))
except TypeError:
    sub1 = 0
try:
    sub2 = int (form. getvalue('sub2'))
except TypeError:
    sub2 = 0
try:
    sub3 = int (form. getvalue('sub3'))
except TypeError:
    sub3 = 0
try:
    sub4 = int (form. getvalue('sub4'))
except TypeError:
    sub4 = 0
try:
    pract1 = int (form.getvalue('pract1'))
except TypeError:
    pract1 = 0
try:
    pract1 = int (form.getvalue('pract2'))
except TypeError:
    pract2 = 0

    import percentage_grade
grade = percentage_grade.letgrd(sub1, sub2, sub3, sub4, pract1,pract2)
print ("Content-type:text/html\r\n\r\n")
print ("<html>")
print ("<head>")
print ("<title>Details</title>")
print ("</head>")
print ("<body>")
print ("<h1>Hello %s</h1>" % (name))
print ("<h3>Your Roll Number is %s </h3>" % (roll_no))
print ("<h3>You are a %s.</h3>" % (sex))
print ("<h3>Your Favourite book is %s. </h3>" % (dropdown) )
print ("<h3>You mentioned your hobbies are %s</h3>" % (hobbies) )
print ("<h3>Your co-curricular activities are:<br /> %s</h3>" % (description) )
print ("<h3>You are Awarded grade %s based on the marks you have entered.</h3>" % (grade))
print ("</body>")
print ("</html>")
```


percentage_grade.py - C:\xampp\htdocs\percentage_grade.py (3.9.7)
File Edit Format Run Options Window Help
def letgrd (sub1, sub2, sub3, sub4, pract1, pract2):
sum = sub1+sub2+sub3+sub4+pract1+pract2
perc = sum/6
if perc > 80:
grade = "A"
elif perc > 70:
grade = "B"
elif perc > 60:
grade = "C"
elif perc > 50:
grade = "D"
elif perc < 50:
grade = "Failed"
return grade
Type here to search

Output:


STUDENT DETAILS: Name: Gunjan Deshpande
Roll Number: BID 19006
Sex: Female Male Other
Favourite Book: Kafka on the shore
What are your hobbies?
Cricket Sports
Blogs Writing
Pav Bhaji Cooking
Tell us about your extra-curricular activities:
I love swimming and I enjoy travelling.
ACADEMIC DETAILS:
Please enter your marks one by one in the given boxes:
Subject 101: 67
Subject 102: 98
Subject 104: 88
ACADEMIC DETAILS:
Type here to search


C:/xampp/htdocs/stu_infor.html
What are your hobbies?
Cricket
Sports
Blogs
Writing
Pav Bhaji
Cooking
Tell us about your extra-curricular activities:
I love swimming and I enjoy travelling.
ACADEMIC DETAILS:
Please enter your marks one by one in the given boxes:
Subject 101: 67
Subject 102: 98
Subject 104: 80
ACADEMIC DETAILS:
Please enter your marks one by one in the given boxes:
Subject 101: 12
Subject 102: 56
Subject 104: 87
Practical 11: 97
Type here to search


C:/xampp/htdocs/stuinfor.html
STUDENT DETAILS: Name:
Roll Number:
Sex: Male Female Other
Favourite Book: 100 years of solitude
What are your hobbies?
Sports
Reading
Writing
Cooking
Tell us about your extra-curricular activities:
Type here to search

2. Create a web page that calculates areas of 2D and 3D shapes. Give choices to the users and perform calculation as per user's selection. Make use of form elements and images.

Algorithm:

Step 1: Start and initialize Xammp and start Apache.

Step 2: Open the html file for the shapes which asks for the input in the browser.

Step 3: Give the directory of the python file for the form action in the html file. Set the method to post.

Step 4: In the python file set the directory of the python at the top of the code.

Step 5: Save both the html and python file in the htdocs folder in the directory for xammp along with the module files.

Step 6: Give the input for the in the html file and submit.

3. Create a fancy & creative web page for BMI Calculator giving various choices and options to users.

Algorithm:

Step 1: Start and initialize Xammp and start Apache.

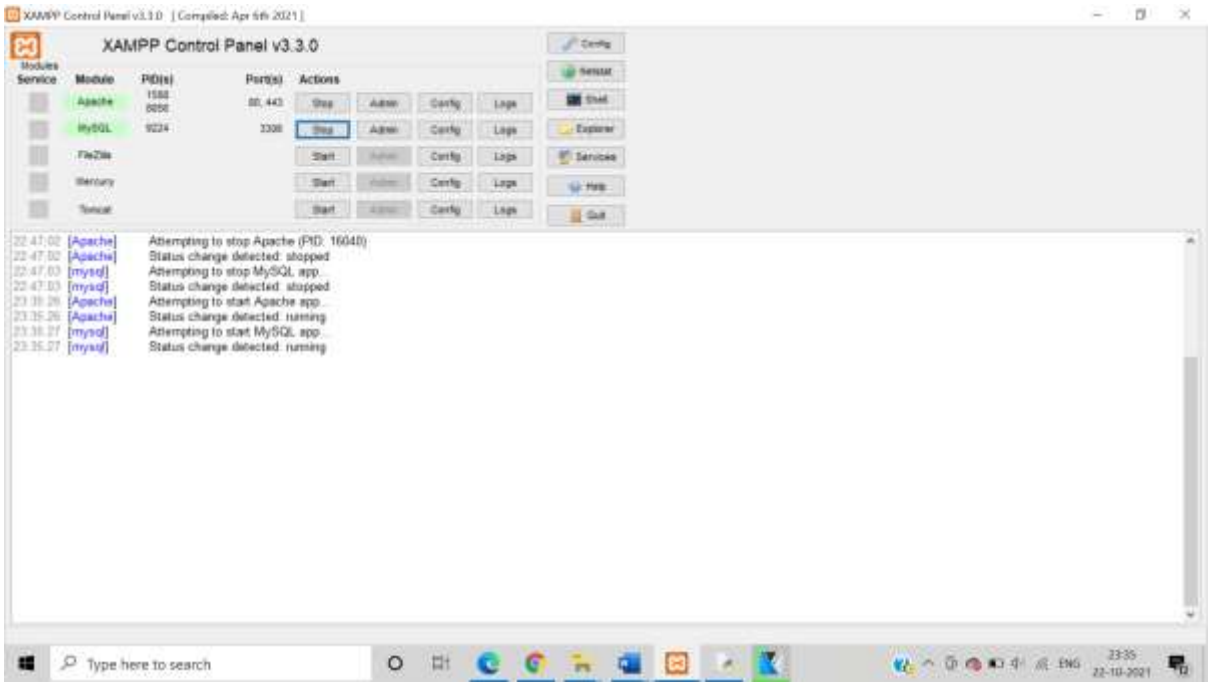
Step 2: Open the html file for the BMI which asks for the input in the browser.

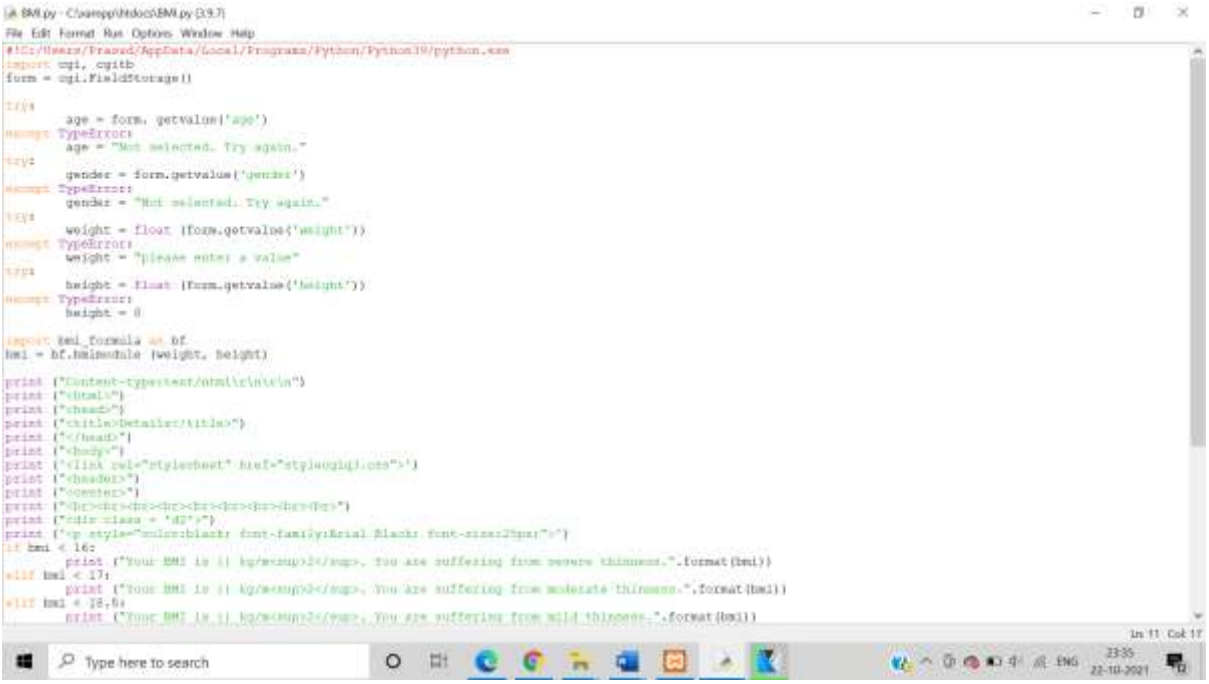
Step 3: Give the directory of the python file for the form action in the html file. Set the method to post.

Step 4: In the python file set the directory of the python at the top of the code.

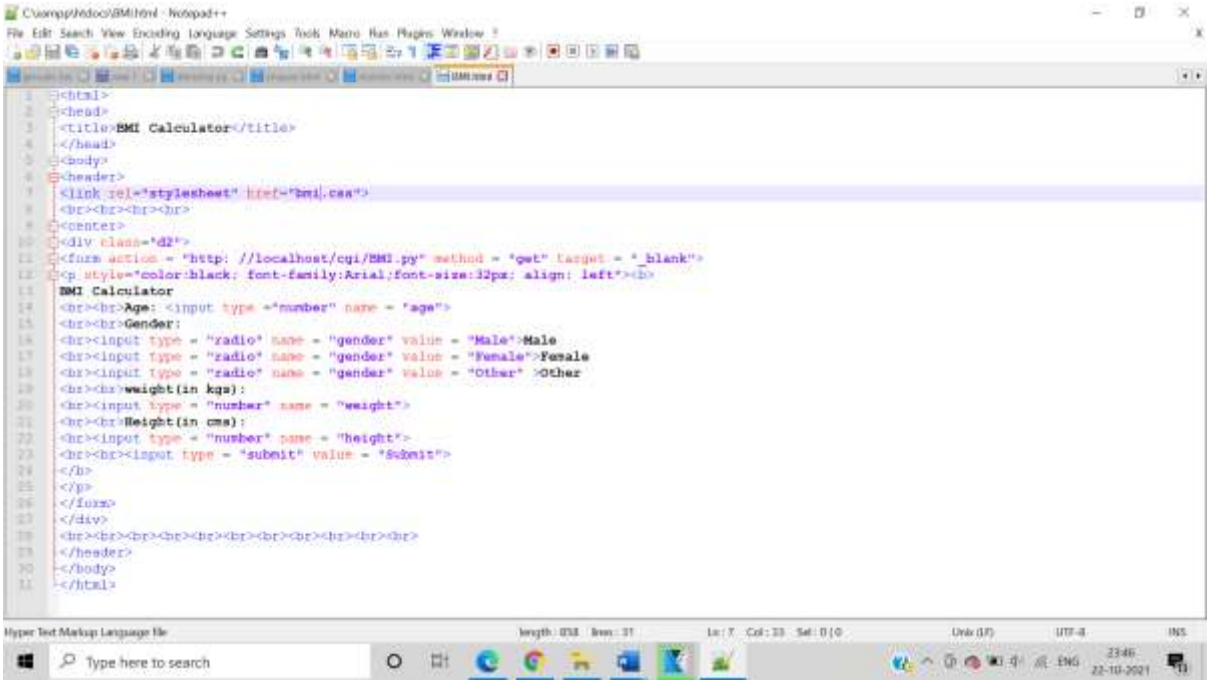
Step 5: Save both the html and python file in the htdocs folder in the directory for xammp.

Step 6: Give the input for the BMI in the html file and submit.

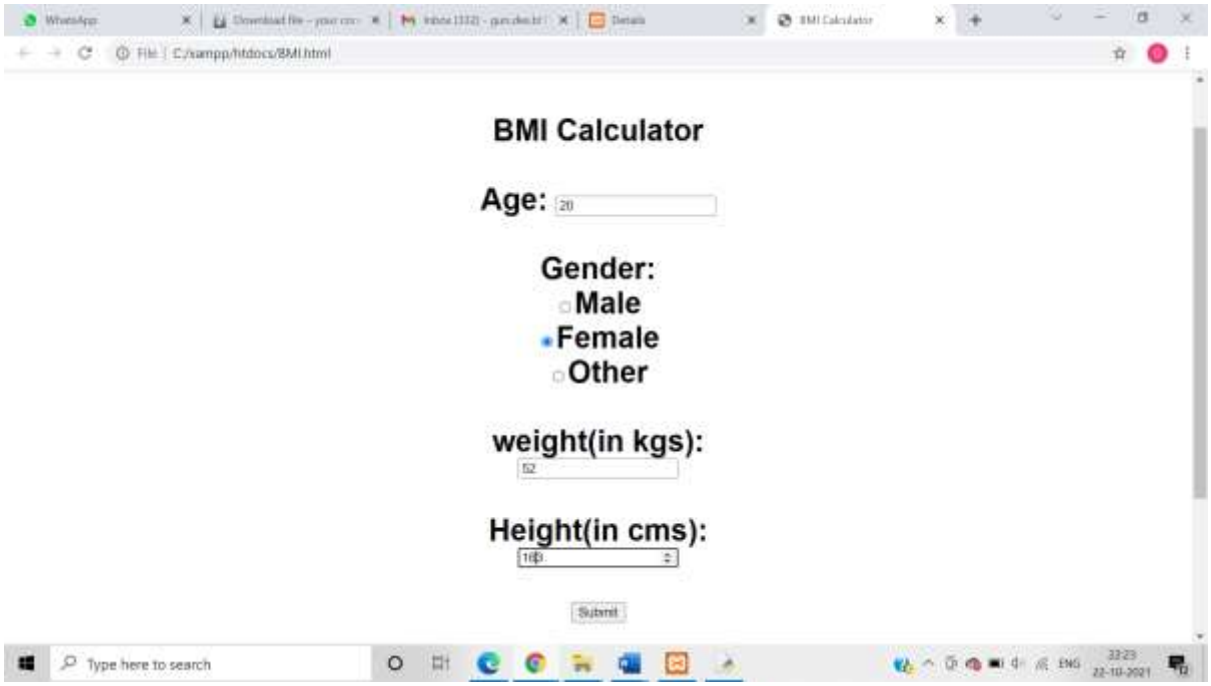




```
#!C:/Users/Prasad/AppData/Local/Programs/Python/Python39/python.exe
import cgi, cgitb
form = cgi.FieldStorage()

try:
    age = form. getvalue('age')
except TypeError:
    age = "Not selected. Try again."
try:
    gender = form.getvalue('gender')
except TypeError:
    gender = "Not selected. Try again."
try:
    weight = float (form.getvalue('weight'))
except TypeError:
    weight = "please enter a value"
try:
    height = float (form.getvalue('height'))
except TypeError:
    height = 0

import bmi_formula as bf
bmi = bf.bmimodule (weight, height)

print ("Content-type:text/html\r\n\r\n")
print ("<html>")
print ("<head>")
print ("<title>Details</title>")
print ("</head>")
print ("<body>")
print ('<link rel="stylesheet" href="stylesqlqj.css">')
print ("<header>")
print ("<center>")
print ("<br><br><br><br><br><br><br><br><br>")
print ("<div class = 'd2'>")
print ("<p style="color:black; font-family:Arial Black; font-size:25px;">')
if bmi < 16:
    print ("Your BMI is {} kg/m<sup>2</sup>. You are suffering from severe thinness.".format(bmi))
elif bmi < 17:
    print ("Your BMI is {} kg/m<sup>2</sup>. You are suffering from moderate thinness.".format(bmi))
elif bmi < 18.5:
    print ("Your BMI is {} kg/m<sup>2</sup>. You are suffering from mild thinness.".format(bmi))
```



```
<html>
<head>
<title>BMI Calculator</title>
</head>
<body>
<header>
<link rel="stylesheet" href="bmi.css">
<br><br><br><br>
<center>
<div class="d2">
<form action = "http: //localhost/cgi/BMI.py" method = "get" target = "_blank">
<p style="color:black; font-family:Arial;font-size:32px; align: left"><b>
BMI Calculator
<br><br>Age: <input type ="number" name = "age">
<br><br>Gender:
<br><input type = "radio" name = "gender" value = "Male">Male
<br><input type = "radio" name = "gender" value = "Female">Female
<br><input type = "radio" name = "gender" value = "Other" >Other
<br><br>Weight(in kgs):
<br><input type = "number" name = "weight">
<br><br>Height(in cms):
<br><input type = "number" name = "height">
<br><br><input type = "submit" value = "Submit">
</b>
</p>
</form>
</div>
<br><br><br><br><br><br><br><br><br><br><br>
</header>
</body>
</html>
```


BMI Calculator
Age: 20
Gender:
Male
Female
Other
weight(in kgs):
52
Height(in cms):
160
Submit
Type here to search

Python for Bioinformatics
Exercise 12
Title – Programs demonstrating usage of DBI Python

1. Create a Database named MyDB, create a table having student's information with fields roll no, name, email id and marks of 4 subjects. Insert about 10 rows in the table. Calculate percentage of each student and create another table having roll no and percentage of all students

Algorithm:
Step 1: Start and initialize Xammp and start Apache and mysql.
Step 2: Give the directory of the python file for the form action in the html file. Set the method to post.
Step 3: Import the Mysql connector and enter the host, username and password
Step 4: Using CREATE DATABASE and SHOW DATABASE create and show the database.
Step 5: Run a python file which asks for input and inserts the information into the database.
Step 6: Save the python files in the htdocs folder in the directory for xammp.
Step 7: Go to the phpmyadmin page and see the info and output.

2. Create a Web page for a Departmental Store that takes input of list of items from the client. Link it to a python script that calculates the cost of items and stores the information of client name, order id and price in a table.

Algorithm:

Step 1: Start and initialize Xammp and start Apache and mysql.
Step 2: Give the directory of the python file for the form action in the html file. Set the method to post.
Step 3: Import the Mysql connector and enter the host, username and password
Step 4: Using CREATE DATABASE and SHOW DATABASE create and show the database.
Step 5: Run a python file which asks for input and inserts the information into the database.
Step 6: Save the python files in the htdocs folder in the directory for xammp.
Step 7: Go to the phpmyadmin page and see the info and output.

3. Create a Web page that takes an input of a protein sequence from the user. Link it to a python script that parses the sequence and the accession id separately, also calculates the molecular weight of the sequence. Store the information of accession id, sequence, sequence length and molecular weight in a table

Algorithm:

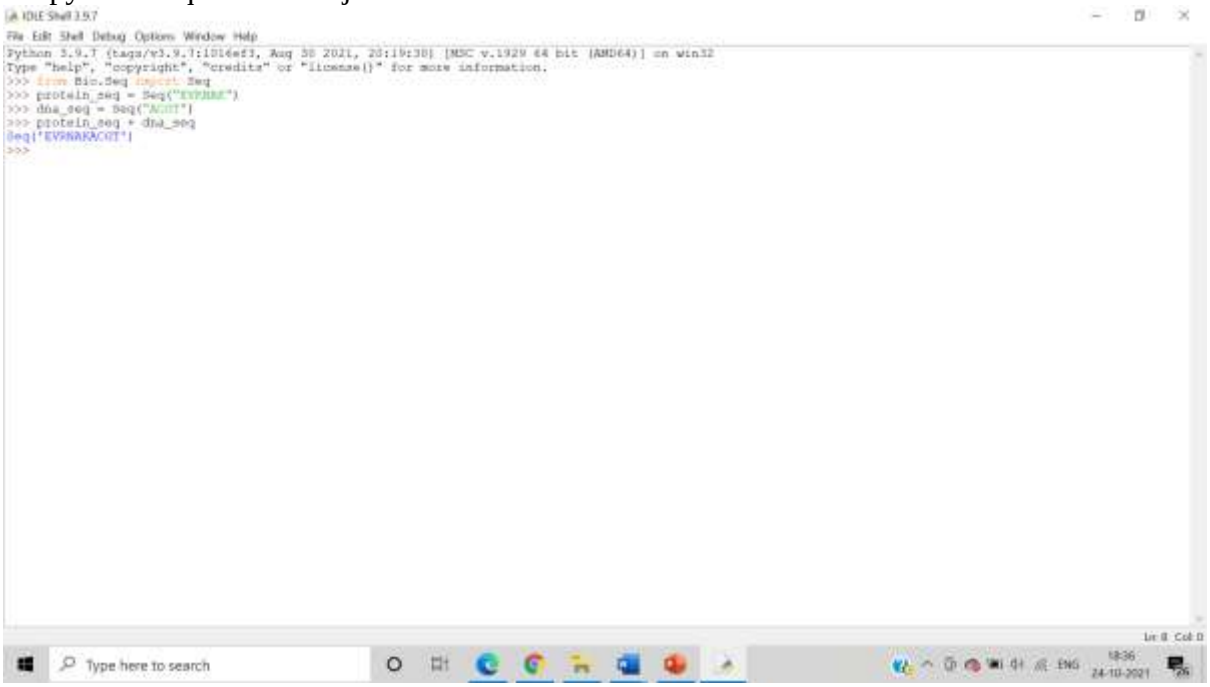
Step 1: Start and initialize Xammp and start Apache and mysql.
Step 2: Give the directory of the python file for the form action in the html file. Set the method to post.
Step 3: Import the Mysql connector and enter the host, username and password
Step 4: Using CREATE DATABASE and SHOW DATABASE create and show the database.
Step 5: Run a python file which asks for input and inserts the information into the database.
Step 6: Save the python files in the htdocs folder in the directory for xammp.
Step 7: Go to the phpmyadmin page and see the info and output

Python for Bioinformatics
Exercise 13
XIII: Title – Programs demonstrating usage of BIOPYTHON Modules

1. Write any three programs demonstrating the usage of Biopython Modules

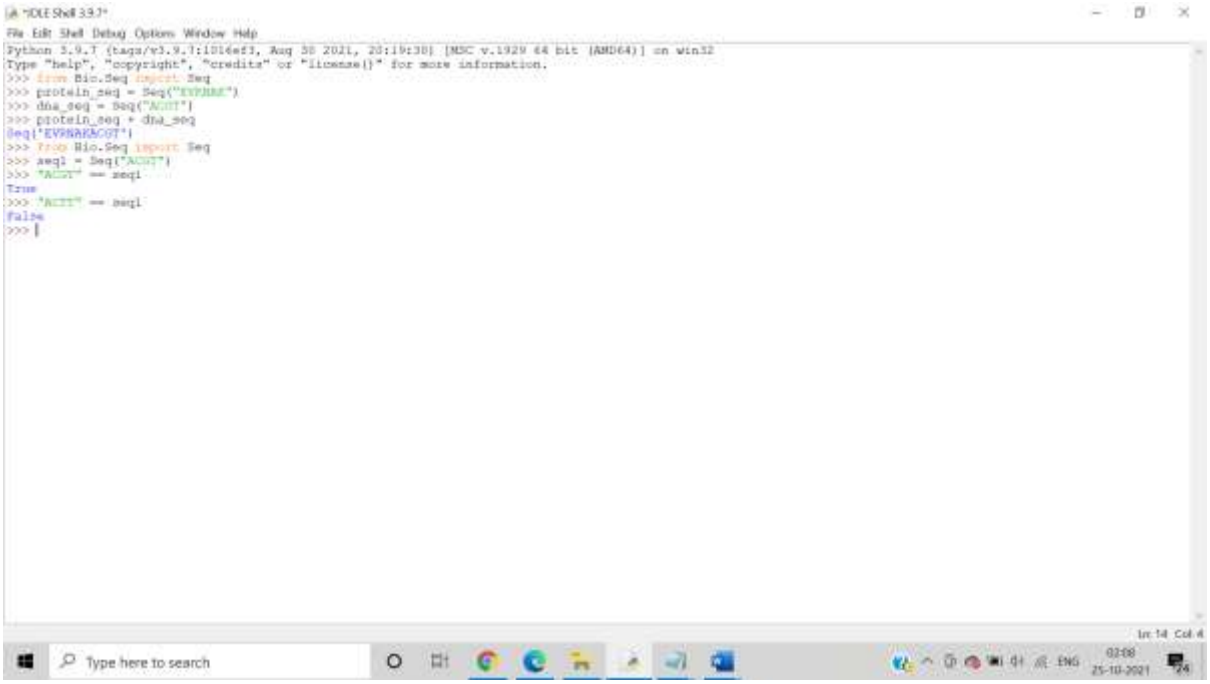
A. Concatenating or adding sequences.

Algorithm:- You may often have many sequences to add together, Like Python strings, Biopython Seq also has a .join method.



B. Comparing Seq objects.

Algorithm:- Sequence comparison is actually a very complicated topic, and there I is no easy way to decide if two sequences are equal. The basic problem is the m m meaning of the letters in a sequence are context dependent - the letter "A" could be part of a DNA, RNA or protein sequence. Biopython can track the molecule type, s so comparing two Seq objects could mean considering this too.



C. Slicing a sequence.

Algorithm:- 'Seq' objects follow the usual indexing conventions for Python strings, with the first element of the sequence numbered 0. Also like a Python string, you can do slices with a start, stop and *stride* (the step size, which defaults to one).