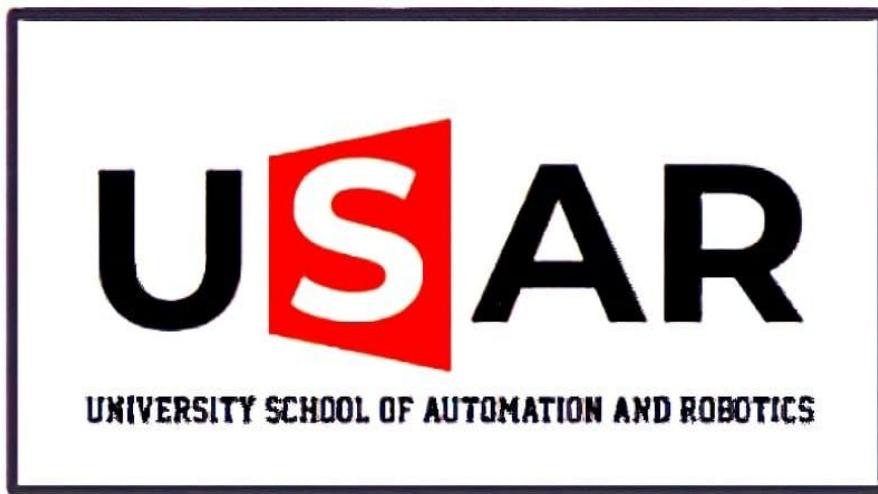


UNIVERSITY SCHOOL OF AUTOMATION AND ROBOTIC



END SEMESTER PRACTICAL FILE B.tech SEMESTER 02

**Submitted to:
Dr. Neetu Narang**

**Submitted by:
Aman Sharma
(09419011721)
Batch: IIOT B2**

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1 Python Program for factorial and fibonacci of a number.

Code :

```
def factorial(num):  
    fact = 1  
    while(num > 1):  
        fact *= num  
        num -= 1  
    return fact
```

```
def fibonacci(num):
    num1 = num2 = 1
    fib = []
    while(num > num1):
        fib.append(num1)
        fib.append(num2)
        num1 += num2
        num2 += num1
    return fib
```

```
if __name__ == '__main__':
    num = int(input("Enter a number: "))
    print('Factorial', factorial(num))
    print('Fibonacci ', fibonacci(num))

def factorial(num):
    fact = 1
    while(num > 1):
        fact *= num
        num -= 1
    return fact

def fibonacci(num):
    num1 = num2 = 1
    fib = []
    while(num > num1):
        fib.append(num1)
        num1 += num2
        num2 += num1
    return fib

if __name__ == '__main__':
    num = int(input("Enter a number: "))
    print('Factorial', factorial(num))
    print('Fibonacci ', fibonacci(num))
```

Result :

```
[aman@lunchspider python]$ python 1.py
Enter a number: 12
Factorial 479001600
Fibonacci  [1, 1, 2, 3, 5, 8]
[aman@lunchspider python]$ █
```

2 Python Program to check Armstrong Number

Code :

```
def armstrong(num : int) -> bool :
    second_num = num
    digit_cube_sum = 0
    while(num != 0):
        digit = num % 10
        num = int(num / 10)
        digit_cube_sum += digit * digit * digit
    return digit_cube_sum == second_num

if __name__ == "__main__":
    print(armstrong(153))
    print(armstrong(152))
```

The screenshot shows a terminal window with the following content:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      100% * 100% CPU 5 RAM 56 Tenda_B956E0 Tuesday, July 12, 2022 12:08:23 8%
1 def armstrong(num : int) -> bool :
2     second_num = num
3     digit_cube_sum = 0
4     while(num != 0):
5         digit = num % 10
6         num = int(num / 10)
7         digit_cube_sum += digit * digit * digit
8     return digit_cube_sum == second_num
9 if __name__ == "__main__":
10    print(armstrong(153))
11    print(armstrong(152))

NORMAL >>> 2.py
12 lines yanked into "+"

[0] 0:vimx* 1:bash- 2:bash          armstrong() < python ↵ 8% 1:1/12 5:5
                                         "2.py (~/MEGAsync/coll" 12:08 12-Jul-22
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      ⚡100% * 100% CPU 17 RAM 56 Tenda_B956E0 Tuesday, July 12, 2022 12:09:10 8%
[aman@lunchspider python]$ python 2.py
True
False
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2:bash           "lunchspider" 12:09 12-Jul-22
```

3 Program to print ASCII Value of a character.

Code:

```
def get_ascii_value(ch : str) -> int:  
    return ord(ch);
```

```
if __name__ == '__main__':
    print(get_ascii_value('A'))
```

```
web code chat movie 5 6 7 8 9 Untitled1 - LibreOfficeWrite... 100% * 100% CPU 6 RAM 59 Tenda_B956E0 Tuesday, July 12, 2022 12:18:21 8%
```

```
1 def get_ascii_value(ch : str) -> int:
2     return ord(ch);
3
4 if __name__ == '__main__':
5     print(get_ascii_value('A'))
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      100% * 100% CPU 11 RAM 59 Tenda_B956E0 Tuesday, July 12, 2022 12:18:38 8%
[aman@lunchspider python]$ python 3.py
65
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2:bash           "lunchspider" 12:18 12-Jul-22
```

4 Python Program to create a function that find largest element in an array

Code:

11

Accepts a list returns the largest object in the list
note all the values in the list must of the same type
.....

```
def largest_num(arr : list) -> object:
```

```
largest = arr[0];
```

```
for i in arr:
```

if(i > largest):

largest =

```
if __name__ == "__main__":  
    main()
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      100% * 100% CPU 14 RAM 59 Tenda_B956E0 Tuesday, July 12, 2022 12:24:03 8%
[aman@lunchspider python]$ python 4.py
5
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2: bash                         "lunchspider" 12:24 12-Jul-22
```

5 Python Program to Split the array and add the first part to the end

Code :

```
def split_patch(arr : list, pivot : int):
    if(pivot < 0 or pivot >= len(arr)):
        print("Wrong pivot!");
        return;
    while(pivot >= 0):
        arr.append(arr[0]);
        arr.pop(0)
        pivot -= 1
```

```
if __name__ == '__main__':
    arr = [1, 2, 3, 4, 5]
    split_patch(arr, 1)
    print(arr)
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      •100% * 100% CPU 14 RAM 56 Tenda_B956E0 Tuesday, July 12, 2022 12:36:48 8%
[aman@lunchspider python]$ python 5.py
[3, 4, 5, 1, 2]
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2:python           "lunchspider" 12:36 12-Jul-22
```

6 Python program to swap two elements in a list

Code :

```
def swap(arr : list, index1 : int, index2 : int):
    temp = arr[index1]
    arr[index1] = arr[index2]
    arr[index2] = temp

if __name__ == "__main__":
    arr = [1,2,3,4,5]
    swap(arr, 0, 1)
    print(arr)
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      100% * 100% CPU 8 RAM 56 Tenda_B956E0 Tuesday, July 12, 2022 12:39:54 8%
[aman@lunchspider python]$ python 6.py
[2, 1, 3, 4, 5]
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2:python          "lunchspider" 12:39 12-Jul-22
```

7 Python program to remove Nth occurrence of the given word

code :

```
def remove_nth_occurrence(data : list, word: str, n : int) -> str:
    occurence = 0
    index = 0
    for i in data:
        if(i == word):
            occurence += 1
        if(occurence == n):
            data.pop(index)
        index += 1

    if __name__ == "__main__":
        data = 'hello hello hell'.split()
        remove_nth_occurrence(data, 'hello', 2)
        print(data)
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...          •100% * 100% CPU 6 RAM 72 Tenda_B956E0 Tuesday, July 12, 2022 20:53 8% 
[aman@lunchspider python]$ python 7.py
['hello', 'hell']
[aman@lunchspider python]$ 

[0] 0:vimx- 1:bash* 2:bash          "lunchspider" 20:53 12-Jul-22
```

8 Remove multiple elements from a list in Python

Code :

```
l1 = [1,2,3,4]
```

```
for i in l1:
    if i % 2 == 0:
        l1.remove(i)
print(l1)
```

Result:

```
[web code chat movie 5 6 7 8 9] aman@lunchspider:~/MEGAsync/co... 100% * 100% CPU 65 RAM 76 Tenda_B956E0 Tuesday, July 12, 2022 20:56 8%
[aman@lunchspider python]$ python 8.py
[1, 3]
[aman@lunchspider python]$
```

9 Remove empty tuples from a list

Code :

```
l1 = [(), 1, 2, 3, ()]
for i in l1:
    if ( i == ()):
        l1.remove(())
print(l1)
```

The screenshot shows a terminal window with the following details:

- Top bar: "web code chat movie 5 6 7 8 9" and "aman@lunchspider:/MEGAsync/co...".
- System status: "100% * 100% CPU 13 RAM 77 Tenda_B956E0 Tuesday, July 12, 2022 20:59 8%".
- Main area:

```
1 l1 = [(), 1, 2, 3, ()]
1 for i in l1:
2     if ( i == ()):
3         l1.remove(())
4 print(l1)
~
```

A blurred image of a person wearing a red and black jacket is visible in the background of the terminal window.
- Bottom status bar:
 - "NORMAL ➡ 9.py" and "5 lines yanked into "+
 - "[0] 0:vimx* 1:bash- 2:bash" and "9.py (-/MEGAsync/coll" 20:59 12-Jul-22".

Result :

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      ⚡100% * 100% CPU 32 RAM 77 Tenda_B956E0 Tuesday, July 12, 2022 20:59 8% 📺
[aman@lunchspider python]$ python 9.py
[1, 2, 3]
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2: bash           "lunchspider" 20:59 12-Jul-22
```

10 Program to print duplicates from a list of integers

Code :

```
def find_duplicates(arr : list):
```

```

d = dict()
for i in arr:
    if(i in d):
        d[i] += 1
    else:
        d[i] = 1
for i in d:
    if(d[i] > 1):
        print(i)

```

```
find_duplicates([1,1,2,2,3,4,5,7,9,1,9])
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      ⚡100% * 100% CPU 25 RAM 76 Tenda_B956E0 Tuesday, July 12, 2022 21:07 8% 🔋
[aman@lunchspider python]$ python 10.py
1
2
9
[aman@lunchspider python]$
```



[0] 0:vimx- 1:bash* 2:bash "lunchspider" 21:07 12-Jul-22

11 Python program to find Cumulative sum of a list

Code:

```
def find_cumulative_sum(arr : list) -> list:  
    cf = []  
    sum = 0  
    for i in arr:  
        sum += i  
        cf.append(sum)  
    return cf  
  
print(find_cumulative_sum([1,2,3,4]))
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      •100% * 100% CPU 8 RAM 74 Tenda_B956E0 Tuesday, July 12, 2022 21:11 8% 📺
[aman@lunchspider python]$ python 11.py
[1, 3, 6, 10]
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2:bash          "lunchspider" 21:11 12-Jul-22
```

12 Python program to check if a string is palindrome or not

Code :

```
def check_pallindrome(val : str) -> bool:  
    loop_till = int(len(val) / 2)  
    for i in range(loop_till):  
        if(val[i] != val[len(val) - 1 - i]):  
            return False  
    return True  
  
print(check_pallindrome('abb'))  
print(check_pallindrome('abbab'))
```

```
web code chat movie 5 6 7 8 9 aman@lunchspider:~/MEGAsync/co... 100% * 100% CPU 12 RAM 74 Tenda_B956E0 Tuesday, July 12, 2022 21:17 8%  
8 def check_pallindrome(val : str) -> bool:  
9     loop_till = int(len(val) / 2)  
10    for i in range(loop_till):  
11        if(val[i] != val[len(val) - 1 - i]):  
12            return False  
13    return True  
14  
15 print(check_pallindrome('abb'))  
16 print(check_pallindrome('abba'))
```

Result :

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      ⚡100% * 100% CPU 16 RAM 74 Tenda_B956E0 Tuesday, July 12, 2022 21:18 8% 🔋
[aman@lunchspider python]$ python 12.py
False
True
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2:python          "lunchspider" 21:18 12-Jul-22
```

13 Python program to split and join a string

Code:

```
string = "hello how are you?"  
split = string.split(' ')  
print(split)  
join = '-'.join(split)  
print(join)
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...          ⚡100% * 100% CPU 19 RAM 73 Tenda_B956E0 Tuesday, July 12, 2022 21:59 8% 🔋
[aman@lunchspider python]$ python 13.py
['hello', 'how', 'are', 'you?']
hello-how-are-you?
[aman@lunchspider python]$
```



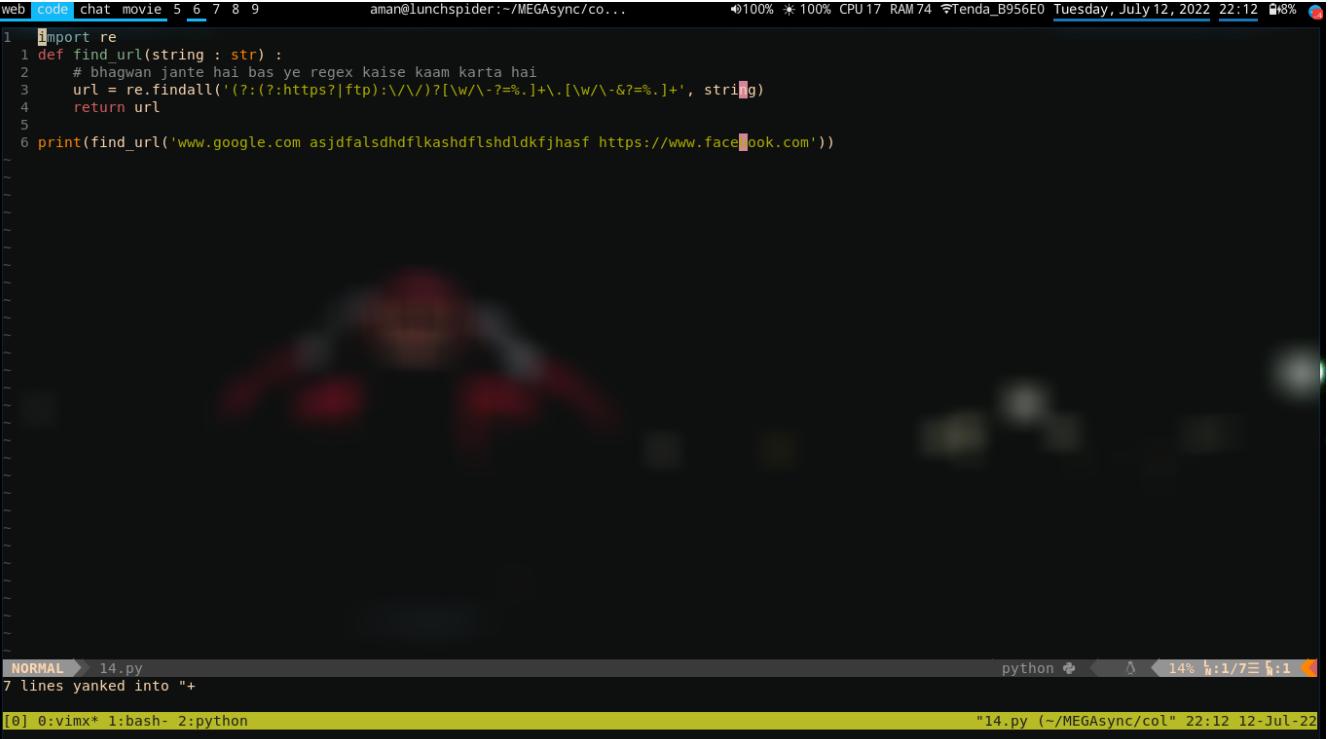
```
[0] 0:vimx- 1:bash* 2:python          "lunchspider" 21:58 12-Jul-22
```

14 Python Program to Check for URL in a String

Code:

```
import re
def find_url(string : str) :
    # bhagwan jante hai bas ye regex kaise kaam karta hai
    url = re.findall('(?:https?|ftp):\/\/?[\w\-\?=\.]+[\.\w\-\&?=\.]+', string)
    return url

print(find_url('www.google.com asjdfalsdhdfkashdfldkfjhasf https://www.facebook.com'))
```



```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      *100% 100% CPU 17 RAM 74 Tenda_B956E0 Tuesday, July 12, 2022 22:12 8%
1 import re
2 def find_url(string : str) :
3     # bhagwan jante hai bas ye regex kaise kaam karta hai
4     url = re.findall('(?:https?|ftp):\/\/?[\w\-\?=\.]+[\.\w\-\&?=\.]+', string)
5     return url
6 print(find_url('www.google.com asjdfalsdhdfkashdfldkfjhasf https://www.facebook.com'))
```

NORMAL ➤ 14.py
7 lines yanked into "+

[0] 0:vimx* 1:bash- 2:python python 14% h:1/7 1:1

"14.py (~/MEGAsync/col" 22:12 12-Jul-22

Result :

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      ⚡100% * 100% CPU 12 RAM 74 Tenda_B956E0 Tuesday, July 12, 2022 22:12 8% 🔋
[aman@lunchspider python]$ python 14.py
['www.google.com', 'https://www.facebook.com']
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2:python           "lunchspider" 22:12 12-Jul-22
```

15 Python program to Sort Python Dictionaries by Key or Value.

Code:

```
def sort_by_keys(dict1 : dict):
    sorted_dt = { key : value for key, value in sorted(dict1.items())}
    print(sorted_dt)

def sort_by_values(dict1 : dict):
    sorted_dt = { key : value for key, value in sorted(dict1.items(), key = lambda item : item[1])}
    print(sorted_dt)

dict1 = { 1 : 12, 4: 123, 2 : 1}

sort_by_keys(dict1)
sort_by_values(dict1)
```

The screenshot shows a terminal window with the following details:

- Terminal title: web code chat movie 5 6 7 8 9
- User: aman@lunchspider:~/MEGAsync/co...
- System status: CPU 30 RAM 78 Tenda_B956E0 Tuesday, July 12, 2022 23:16 8%
- Code content:

```
1 def sort_by_keys(dict1 : dict):
2     sorted_dt = { key : value for key, value in sorted(dict1.items())}
3     print(sorted_dt)
4
5
6 def sort_by_values(dict1 : dict):
7     sorted_dt = { key : value for key, value in sorted(dict1.items(), key = lambda item : item[1])}
8     print(sorted_dt)
9
10 dict1 = { 1 : 12, 4: 123, 2 : 1}
11
12 sort_by_keys(dict1)
13 sort_by_values(dict1)
```
- Bottom status bar:
 - NORMAL ➡ 15.py
 - 14 lines yanked into "+"
 - python 7% h:1/14 \$:1
 - [0] 0:vimx* 1:bash- 2:python "15.py (~/MEGAsync/col" 23:16 12-Jul-22

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...          •100% * 100% CPU 4 RAM 76 Tenda_B956E0 Tuesday, July 12, 2022 23:16 8% 📺
[aman@lunchspider python]$ python 15.py
{1: 12, 2: 1, 4: 123}
{2: 1, 1: 12, 4: 123}
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2:python          "lunchspider" 23:16 12-Jul-22
```

16 Python Program to handle missing keys in Python dictionaries

Code :

```
country_code = {'India' : '0091',  
                'Australia' : '0025',  
                'Nepal' : '00977'}
```

```
# Set a default value for Japan  
country_code.setdefault('Japan', 'Not Present')
```

```
# search dictionary for country code of India  
print(country_code['India'])
```

```
# search dictionary for country code of Japan  
print(country_code['Japan'])
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      ⚡100% * 100% CPU 24 RAM 80 Tenda_B956E0 Tuesday, July 12, 2022 23:21 8% 🔋
[aman@lunchspider python]$ python 16.py
0091
Not Present
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:python* 2:python          "lunchspider" 23:21 12-Jul-22
```

17 Python program to Merge two Dictionaries

Code:

```
def merge(dict1: dict, dict2 : dict) -> dict:  
    return dict1 | dict2
```

```
dict_1 = {1: 'a', 2: 'b'}  
dict_2 = {2: 'c', 4: 'd'}
```

```
print(merge(dict_1, dict_2))
```

```
web code chat movie 5 6 7 8 9 aman@lunchspider:~/MEGAsync/co... 100% * 100% CPU 17 RAM 81 Tenda_B956E0 Tuesday, July 12, 2022 23:24 8%  
1 def merge(dict1: dict, dict2 : dict) -> dict:  
2     return dict1 | dict2  
3  
4 dict_1 = {1: 'a', 2: 'b'}  
5 dict_2 = {2: 'c', 4: 'd'}  
6 print(merge(dict_1, dict_2))
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      100% * 100% CPU 16 RAM 81 Tenda_B956E0 Tuesday, July 12, 2022 23:24 8% 🔋
[aman@lunchspider python]$ python 17.py
{1: 'a', 2: 'c', 4: 'd'}
[aman@lunchspider python]$ █
```

[0] 0:vimx- 1:bash* 2:python "lunchspider" 23:24 12-Jul-22

18 Python program to Check order of character in string using OrderedDict()

Code :

```
# Python code to demonstrate  
# insertion of items in beginning of ordered dict  
from collections import OrderedDict  
  
# initialising ordered_dict  
iniordered_dict = OrderedDict([('aman', '1'), ('nona', '2')])  
  
# inserting items in starting of dict  
iniordered_dict.update({'manjeet':3})  
iniordered_dict.move_to_end('manjeet', last = False)  
  
# print result  
print ("Resultant Dictionary : "+str(iniordered_dict))
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...          ⚡100% * 100% CPU 10 RAM 78 Tenda_B956E0 Tuesday, July 12, 2022 23:27 8% 🔋
[aman@lunchspider python]$ python 18.py
Resultant Dictionary : OrderedDict([('manjeet', '3'), ('aman', '1'), ('nona', '2')])
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2:python          "lunchspider" 23:27 12-Jul-22
```

19 Python program to find common elements in three sorted arrays by dictionary intersection

Code :

```
from collections import Counter
```

```
def find_common(arr1 : list, arr2 : list, arr3 : list) -> list:  
    return [key for key in dict(Counter(arr1).items() & Counter(arr2).items() & Counter(arr3).items())]  
  
print(find_common([1,2,3], [1,2,3], [ 1,2,3, 4,5]))
```

```
web code chat movie 5 6 7 8 9 aman@lunchspider:~/MEGAsync/co... 100% * 100% CPU 9 RAM 80 Tenda_B956E0 Tuesday, July 12, 2022 23:38 8%
1 from collections import Counter
2
3 def find_common(arr1 : list, arr2 : list, arr3 : list) -> list:
4     return [key for key in dict(Counter(arr1).items() & Counter(arr2).items() & Counter(arr3).items())]
5
6 print(find_common([1,2,3], [1,2,3], [ 1,2,3, 4,5]))
~
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      ⚡100% * 100% CPU 15 RAM 79 Tenda_B956E0 Tuesday, July 12, 2022 23:38 8% 📺
[aman@lunchspider python]$ python 19.py
[3, 1, 2]
[aman@lunchspider python]$
```



```
[0] 0:vimx- 1:bash* 2:python           "lunchspider" 23:38 12-Jul-22
```

20 Python program to create a class Calculator and by using a constructor initialize values of that class.

b. Create methods for adding, subtracting, multiplying and dividing two numbers

and returning the respective results.

c. Take the two numbers as inputs and create an object for the class passing the

two numbers as parameters to the class.

d. Using the object, call the respective function depending on the choice taken from the user.

Code :

```
class cal():
    def __init__(self, a, b):
        self.a = a;
        self.b = b;

    def mul(self):
        return self.a * self.b

    def add(self):
        return self.a + self.b

    def sub(self):
        return self.a - self.b

    def div(self):
        return self.a / self.b

if __name__ == "__main__":
    c = cal(1,2)
    print(c.add())
    print(c.sub())
    print(c.mul())
    print(c.div())
```

Result:

```
[web code chat movie 5 6 7 8 9] aman@lunchspider:~/MEGAsync/co... 120% * 100% CPU 30 RAM 81 Tenda_B956EO Saturday, July 23, 2022 21:15 8%
[aman@lunchspider python]$ python 20.py
3
-1
2
0.5
[aman@lunchspider python]$
```

21. Write a NumPy program to create an array and compute the sum of all elements, sum of each column and sum of each row.

Code:

```
import numpy as np
```

```
arr = np.array([[1,2,3], [4,5,6], [7,8,9]])
print("Sum of all elements :", arr.sum())
print("Sum of each column :", arr.sum(axis = 0))
print("Sum of each row :", arr.sum(axis = 1))
```

The screenshot shows a terminal window with the following content:

```
web code chat movie 5 6 7 8 9 aman@lunchspider:~/MEGAsync/co...
1 Import numpy as np
2 arr = np.array([[1,2,3], [4,5,6], [7,8,9]])
3 print("Sum of all elements :", arr.sum())
4 print("Sum of each column :", arr.sum(axis = 0))
5 print("Sum of each row :", arr.sum(axis = 1))
6
~
~
```

At the bottom of the terminal, there is a status bar with the following information:

NORMAL ➤ 21.py 7 lines yanked into "+
python 14% 1:1/7≡ 1:1
[0] 0:vimx* 1:bash- "21.py (~/MEGAsync/col" 21:21 23-Jul-22

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...          •120% * 100% CPU 24 RAM 87 Tenda_B956E0 Saturday, July 23, 2022 21:21 8% 📺
[aman@lunchspider python]$ python 21.py
Sum of all elements : 45
Sum of each column : [12 15 18]
Sum of each row : [ 6 15 24]
[aman@lunchspider python]$ █
```



```
[0] 0:vimx- 1:bash*          "lunchspider" 21:21 23-Jul-22
```

22 a. Create 2D numpy array and calculate the sin of each element in array

Code :

```
import numpy as np
from math import sin

arr1 = np.array([[1,2,3], [4,5,6], [7,8,9]])
arr2 = np.array([[1,2,3], [4,5,6], [7,8,9]])

for x in np.nditer(arr1):
    print(sin(x))
```

The screenshot shows a terminal window with the following content:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      •120% * 100% CPU 25 RAM 82 Tenda_B956E0 Saturday, July 23, 2022 21:29 8%
1 import numpy as np
1 from math import sin
2
3 arr1 = np.array([[1,2,3], [4,5,6], [7,8,9]])
4 arr2 = np.array([[1,2,3], [4,5,6], [7,8,9]])
5
6 for x in np.nditer(arr1):
7     print(sin(x))
8
9
10
~
~
```

The terminal window has a dark background with light-colored text. It shows the command line interface with various status indicators at the top and bottom.

Result:

```
[web code chat movie 5 6 7 8 9] aman@lunchspider:~/MEGAsync/co... 120% * 100% CPU 6 RAM 82 Tenda_B956E0 Saturday, July 23, 2022 21:30 8%
[aman@lunchspider python]$ python 22.py
0.8414709848078965
0.9092974268256817
0.1411200080598672
-0.7568024953079282
-0.9589242746631385
-0.27941549819892586
0.6569865987187891
0.9893582466233818
0.4121184852417566
[aman@lunchspider python]$ █
```

22 b. Create two 2D numpy arrays and perform addition and subtraction operation on them

Code :

```
import numpy as np
arr1 = np.array([[1,2,3], [4,5,6], [7,8,9]])
arr2 = np.array([[1,2,3], [4,5,6], [7,8,9]])

print(np.add(arr1, arr2))
print(np.subtract(arr1, arr2))
```

The screenshot shows a terminal window with the following details:

- Top status bar: web code chat movie 5 6 7 8 9 aman@lunchspider:~/MEGAsync/co... 120% * 100% CPU 36 RAM 83 Saturday, July 23, 2022 21:31 8%
- Code area:

```
1 import numpy as np
2 arr1 = np.array([[1,2,3], [4,5,6], [7,8,9]])
3 arr2 = np.array([[1,2,3], [4,5,6], [7,8,9]])
4 print(np.add(arr1, arr2))
5 print(np.subtract(arr1, arr2))
6
7
```
- Bottom status bar: NORMAL 22.py python 12% 1:1/8 1:1
- Bottom message bar: 8 lines yanked into "+"
- Bottom command line: [0] 0:vimx* 1:bash- "22.py (~/MEGAsync/col" 21:31 23-Jul-22

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...          •120% * 100% CPU 12 RAM 83 Tenda_B956E0 Saturday, July 23, 2022 21:31 8% 📺
[aman@lunchspider python]$ python 22.py
[[ 2  4  6]
 [ 8 10 12]
 [14 16 18]]
[[0 0 0]
 [0 0 0]
 [0 0 0]]
[aman@lunchspider python]$ █
```



```
[0] 0:vimx- 1:bash*          "lunchspider" 21:31 23-Jul-22
```

23 Write a Pandas program to convert a dictionary to a Pandas series.

Code :

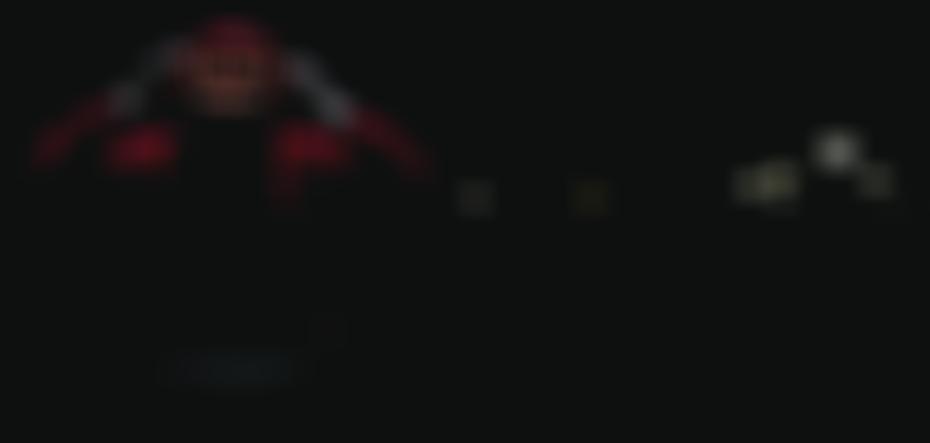
```
import pandas as pd
```

```
d = {'a': 100, 'b': 200, 'c': 300, 'd': 400, 'e': 800}
```

```
series = pd.Series(d)
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...      •120% * 100% CPU 14 RAM 83 Tenda_B956E0 Saturday, July 23, 2022 21:35 8% 📺
[aman@lunchspider python]$ python 23.py
a    100
b    200
c    300
d    400
e    800
dtype: int64
[aman@lunchspider python]$ █
```



```
[0] 0:vimx- 1:bash*                      "lunchspider" 21:35 23-Jul-22
```

24. Write a Pandas program to convert a NumPy array to a Pandas series.

Code :

```
import numpy as np
import pandas as pd

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

series = pd.Series(arr)

print(series)
```

The screenshot shows a terminal window with the following details:

- Tab bar: web, code (highlighted), movie, 5, 6, 7, 8, 9
- User: aman@lunchspider:~/MEGAsync/co...
- System status: 120% CPU 18 RAM 86 Tenda_B956E0 Saturday, July 23, 2022 21:38 8%
- Code area:

```
1 import numpy as np
1 import pandas as pd
2
3 arr = np.array([1,2,3,4])
4
5 series = pd.Series(arr)
6
7 print(series)
~
```
- Bottom status bar:
 - NORMAL ◀ 24.py
 - 8 lines yanked into "+"
 - python ↵ 12% ↵ 1/1/8≡ 1:1 ↵
 - [0] 0:vimx* 1:bash- "24.py (~/MEGAsync/col" 21:38 23-Jul-22

Result:

```
[web code chat movie 5 6 7 8 9] aman@lunchspider:~/MEGAsync/co... 120% * 100% CPU 13 RAM 85 Tenda_B956E0 Saturday, July 23, 2022 21:38 8%
[aman@lunchspider python]$ python 24.py
0    1
1    2
2    3
3    4
dtype: int64
[aman@lunchspider python]$ 
```

25 Write a Pandas program to create and display a DataFrame from a specified dictionary data which has the index labels

Code :

```
import pandas as pd
import numpy as np

exam_data = {
    'name': ['Anisha', 'Dimple', 'Karan', 'John', 'Emily', 'Michael', 'Matthew', 'Luvika', 'Kent', 'James'],
    'score': [17.5, 9, 12.5, np.nan, 9, 30, 18.5, np.nan, 8, 19],
    'attempts': [1, 1, 2, 3, 2, 2, 1, 3, 2, 1],
    'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']
}
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']

df = pd.DataFrame(exam_data, index = labels)

print(df)
```

The screenshot shows a terminal window with the following details:

- Terminal title: web code chat movie 5 6 7 8 9
- User: aman@lunchspider:~/MEGAsync/co...
- Date/Time: Saturday, July 23, 2022 21:45
- System status: 120% CPU 60 RAM 89 Tenda_B956E0
- Code area:

```
1 import pandas as pd
2 import numpy as np
3 exam_data = {
4     'name': ['Anisha', 'Dimple', 'Karan', 'John', 'Emily', 'Michael', 'Matthew', 'Luvika', 'Kent', 'James'],
5     'score': [17.5, 9, 12.5, np.nan, 9, 30, 18.5, np.nan, 8, 19],
6     'attempts': [1, 1, 2, 3, 2, 2, 1, 3, 2, 1],
7     'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']
8 }
9 labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']
10 df = pd.DataFrame(exam_data, index = labels)
11
12
13 print(df)
14
```
- Output area:

```
NORMAL ◆ 25.py
15 lines yanked into "+"
[0] 0:vimx* 1:bash-
"25.py (~/MEGAsync/co" 21:45 23-Jul-22
```

Result:

```
web code chat movie 5 6 7 8 9          aman@lunchspider:~/MEGAsync/co...          •120% * 100% CPU 17 RAM 88 Tenda_B956E0 Saturday, July 23, 2022 21:45 8% 📺
[aman@lunchspider python]$ python 25.py
      name  score  attempts qualify
a  Anisha   17.5        1     yes
b  Dimple    9.0        1     no
c  Karan    12.5        2     yes
d  John     NaN        3     no
e  Emily    9.0        2     no
f  Michael   30.0        2     yes
g  Matthew   18.5        1     yes
h  Luvika   NaN        3     no
i  Kenth     8.0        2     no
j  James    19.0        1     yes
[aman@lunchspider python]$ █
```



```
[0] 0:vimx- 1:python*          "lunchspider" 21:45 23-Jul-22
```