```python
# WAP to toggle the string.
'''
st = input('Enter the string: ')
i = 0
out = ''
while i<len(st):
    if 'A'<=st[i]<='Z':
        out += chr(ord(st[i])+32)
    elif 'a'<=st[i]<='z':
        out += chr(ord(st[i])-32)
    else:
        out += st[i]
    i += 1
print(out)'''
```

(handwritten annotations in red)

st = 'PytHoN@ $123'
0 1 2 3 4 5 6 7 8 9 10

st[0] = 'P'   st[6] = '@'
st[1] = 'y'
st[2] = 't'

i<len(st)   'A'<=st[i]<='z'   'a'<=st[i]<='z'   out+=st[i]   i = i+1
0<11: ✓   'A'<=P<=z   a<='y'<='z'   i=0+1=1
               out='p'   out='p'+'Y'
                                 ='pY'   i=1+1=2
1<11: ✓

2<11: ✓   'a'<='t'<='z'   i=2+1=3
                                 out='pY'+T
                                 ='pYt'

i = 6   out='pYThOn'+'@'
                                                   ='pYThOn@'

```python
# WAP to find the sum of all the integers in a list.
'''
l = eval(input('Enter the list: '))
sum = 0
i = 0
while i<len(l):
    if type(l[i]) == int:
        sum += l[i]
    i += 1
print(sum)'''
```

Day-20

For loop:
--- It is self-iterative loop.

Advantage:
- It will allow us to use all the MVDT but in while loop it considers only string, list and tuple.
- No need of initialization and updation.

    Range():
    --- It is used to create a sequence of integers between the given value.
    Syntax:
            range(SV, EV+1,updation)
   range(SV, EV-1,updation)

    ○ If updation == +1
        range(SV, EV+-1)

    ○ If SV==0
        range(EV+-1, updation)

    range(1,10+1)
    range(1, 11)
    list(range(1,11))
    [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
    tuple(range(1,11))
    (1, 2, 3, 4, 5, 6, 7, 8, 9, 10)
    list(range(10,1-1,-1))
    [10, 9, 8, 7, 6, 5, 4, 3, 2, 1]
    list(range(0,10+1,1))
    [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
    list(range(10,0-1,-1))
    [10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0]
    list(range(10,-1,-1))
    [10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0]

for var in collection :

|← →| 1 Tab   Space   S.B

↓ ctol
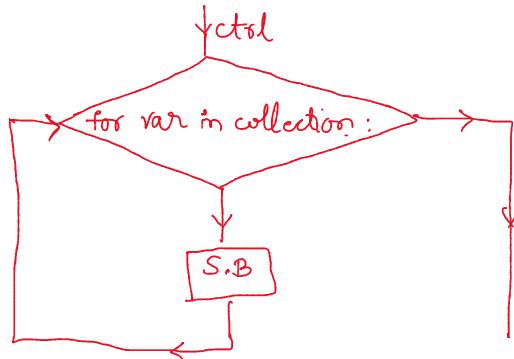
for var in collection :

S.B

Programs:

For loop

Practice programs
'''
for i in [10,2.3,6+7j,78]:
    print(i)'''

'''
for i in (12,34):
    print(i)'''

'''
for i in {17,3.4,78,32}:
    print(i)'''

'''
for i in {'a':10,'b':20,'c':30}:
    print(i)'''

'''
for i in 'sakshi':
    print(i,end=' ')'''

'''
for i in range(1,6):
    print(i) '''

Actual programs of loop programs

WAP to find the length of the collection without using len function.
'''
c = eval(input('Enter the collection: '))
count = 0
for i in c:
    count+=1
print(count)'''

WAP to extract the vowels from the given string.
'''
s = input('Enter the string: ')
out = ''
for i in s:
    if i in 'aeiouAEIOU':
        out += i
print(out)'''

WAP to replace space by and underscore in a given string.
'''
s = input('Enter the string: ')

```
for i in s:
    if i == ' ':
        out += '_'
    else:
        out += i
print(out)'''
```

WAP to check whether the string is palindrome or not without using slicing.
```
'''
s = input('Enter the string: ')
rev = ''
for i in s:
    rev = i + rev
if rev == s:
    print('palindrome')
else:
    print('not palindrome')'''
```

WAP to remove the duplicates values from the list.
```
'''
l = eval(input('Enter the list: '))
out = []
for i in l:
    if i not in out:
        out += [i]
print(out)'''
```

Day-21

Get the following output.
```
'''
Input : (12,3.4,'hello',2+3j,'python','bye',False)
Output : {'hello': 5, 'python': 6,'bye':3} '''
```

```
'''
t = eval(input('Enter the tuple: '))
out = {}
for i in t:
    if type(i) == str:
        out[i] = len(i)
print(out)'''
```

Get the following output.
```
'''
Input : [12,3.4,'hello',2+3j,'python','bye',False]
Output : {'hello': 'ho', 'python': 'pn','bye':'be'} '''
```

```
'''
l = eval(input('Enter the list: '))
out = {}
for i in l:
    if type(i) == str:
        out[i] = i[0]+i[-1]
print(out)'''
```

Get the following output.
```
'''
Input : 'aPpLe#123'
Output : {'a':'A', 'P':'p', 'p':'P',  'L':'l', 'e':'E'} '''
```

```
'''
s = input('Enter the string: ')
out = {}
for i in s:
    if 'a'<=i<='z':
        out[i] = chr(ord(i)-32)
```

```
    out[i] = chr(ord(i)+32)
print(out) '''
```

Note:
  ○ Split() --- it is used to split each word present in the string
  ○ Join() --- it is used to join/merge the strings present inside the collection.

Get the following output.
'''
Input : 'hai hello bye'
Output : 'iah olleh eyb'   '''

'''
```
s = input('Enter the string: ')
out = []
a = s.split()
for i in a:
    out.append(i[::-1])
print(' '.join(out)) '''
```


$s = $ 'hai hello bye'

$a = s.split()$ ⟹ ['hai', 'hello', 'bye']

for i in a:

  out.append(i[::-1])

print(' '.join(out))

↓

'iah olleh eyb'

out = []
out = ['iah']
out = ['iah', 'olleh']
out = ['iah', 'olleh', 'eyb']

Get the following output.
'''
Input : 'Everyone Loves python'
Output : 'Ee Ls pn'   '''

'''
```
s = input('Enter the string: ')
out = []
a = s.split()
for i in a:
    out.append(i[0]+i[-1])
print(' '.join(out)) '''
```


$s = $ 'abcabacbcbc'   out = ''

Get the following output.
'''
Input : 'abcabacbcbc'
Output : 'a3b4c4'   '''

```
s = input('Enter the string: ')
out = ''
for i in s:
    if i not in out:
        c = s.count(i)
        out += i + str(c)
print(out)
```

for i in s:	if i not in out:	c = s.count(i)	out += i + str(c)
i = a	a not in ' ': ✓	c = 3	= '' + 'a' + '3' out = 'a3'
i = b	b not in 'a3': ✓	c = 4	= 'a3' + 'b' + '4' out = 'a3b4'
i = c	c not in 'a3b4': ✓	c = 4	= 'a3b4' + 'c' + '4' out = 'a3b4c4'
i = a	a not in 'a3b4c4': ✗		

Count() --- It will count the number of occurrence of character in a string.

Get the following output without using count function.
'''
Input : 'abcabacbcbc'
Output : {'a':3,'b':4,'c':4}   '''

```
s = input('Enter the string: ')
out = {}
for i in s:
```

out = {}

$s = $ 'abcabacbcbc'

for i in s	if i not in out: out[i] = 1	else: out[i] += 1	out
i = a	a not in out: ✓ out['a'] = 1		{'a':1}

```
out = {}
for i in s:
    if i not in out:
        out[i] = 1
    else:
        out[i] += 1
print(out)
```

i=a	a not in out: ✓	out['a']=1		{'a':1}
i=b	b not in out: ✓	out['b']=1		{'a':1,'b':1}
i=c	c not in out: ✓	out['c']=1		{'a':1,'b':1,'c':1}
i=a	a not in out: ✗		out['a'] = out['a'] + 1 = 1+1 = 2	{'a':2,'b':1,'c':1}
i=b	b not in out: ✗		out['b'] = out['b'] + 1 = 1+1 = 2	{'a':2,'b':2,'c':1}
i=a	a not in out: ✗		out['a'] = out['a'] + 1 = 2+1 = 3	{'a':3,'b':2,'c':1}

```
# WAP to print all the divisors of a given number.
'''
n = int(input('Enter the number: '))
for i in range(1,n+1):
    if n % i == 0:
        print(i)'''
```
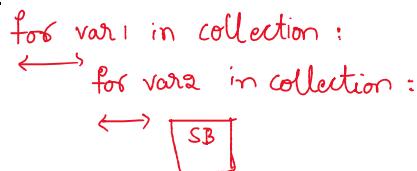
Day - 22:

Nested for loop:
--- It is a phenomenon where we write a for loop inside another for loop.

Syntax:

for var1 in collection :
    for var2 in collection :
        SB
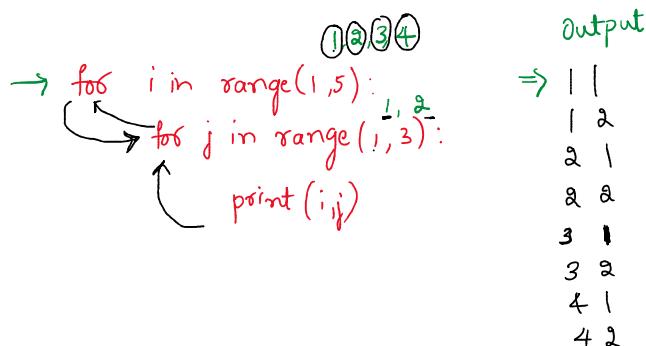
Example:

```
# Nested for loop

for i in range(1,5):
    for j in range(1,3):
        print(i,j)
```

1 2 3 4

→ for i in range(1,5):
    for j in range(1,3):   1, 2
        print(i,j)

Output
⇒ 1 1
1 2
2 1
2 2
3 1
3 2
4 1
4 2

Strong Number: If the number is equal to the sum of the factorial of individual digits, then we can call that number as Strong Number.

145 ⇒ 1! + 4! + 5!
⇒ 1 + 4×3×2×1 + 5×4×3×2×1
⇒ 1 + 24 + 120
⇒ 145
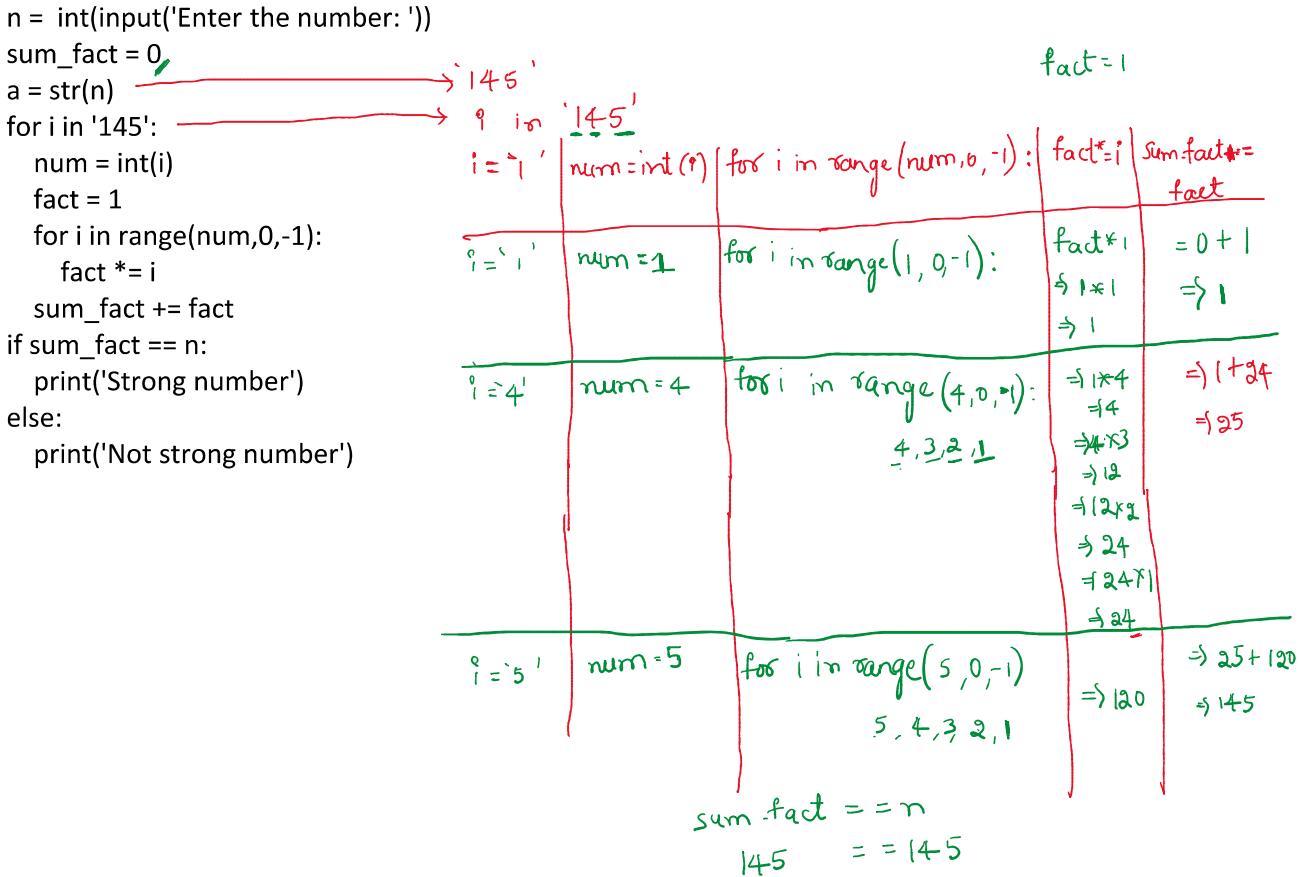
equal

1st for loop ⇒ extract individual digits

2nd for loop ⇒ finding factorial

```
# WAP to check whether the number is strong number or not.

n = int(input('Enter the number: '))
```

```python
n =  int(input('Enter the number: '))
sum_fact = 0
a = str(n)
for i in '145':
    num = int(i)
    fact = 1
    for i in range(num,0,-1):
        fact *= i
    sum_fact += fact
if sum_fact == n:
    print('Strong number')
else:
    print('Not strong number')
```

Handwritten trace notes:

`145` → `9 in '145'` `fact = 1`

i = '1'	num = int(i)	for i in range(num,0,-1):	fact*=i	sum_fact += fact
i='1'	num=1	for i in range(1,0,-1):	fact*1 → 1*1 → 1	= 0+1 → 1
i=4	num=4	for i in range(4,0,-1): 4,3,2,1	→1*4 =4 →4*3 →12 →12*2 →24 →24*1 →24	→1+24 →25
i='5'	num=5	for i in range(5,0,-1) 5,4,3,2,1	→120	→25+120 →145

sum_fact == n
145 == 145

```python
# Get the following output.
'''
Input : [12, 'program',4+2j, False,'holiday']
Output : {'program' : 'oa', 'holiday' : 'oia'} '''


'''
l = eval(input('Enter the list: '))
out = {}
for i in l:
    if type(i) == str:
        vow = ''
        for j in i:
            if j in 'AEIOUaeiou':
                vow += j
        out[i] = vow
print(out)  '''

#Assignment
# Get the following output.
'''
Input : [12, 'program',4+2j, False,'holiday']
Output : {'program' : 'prgrm', 'holiday' : 'hldy'} '''


#Assignment
# Get the following output.
'''
Input : [12, 'program',4+2j, False,'holiday']
Output : {'program' : 'PROGRAM', 'holiday' : 'HOLIDAY'} '''
```

Patterns:
--- Using Nested for loop to print some unique structure or pattern.

```python
# Pattern
'''
* * *

for i in range(1,4):
    print('*',end = ' ') '''



'''
* * *
* * *
* * *

for i in range(1,4):
    for j in range(1,4):
        print('*',end = ' ')
    print() '''


'''
* * *
* * *
* * *
* * *
* * *

for i in range(1,6):
    for j in range(1,4):
        print('*',end = ' ')
    print()'''


'''
* * * * *
* * * * *

for i in range(1,3):
    for j in range(1,6):
        print('*',end = ' ')
    print() '''
```
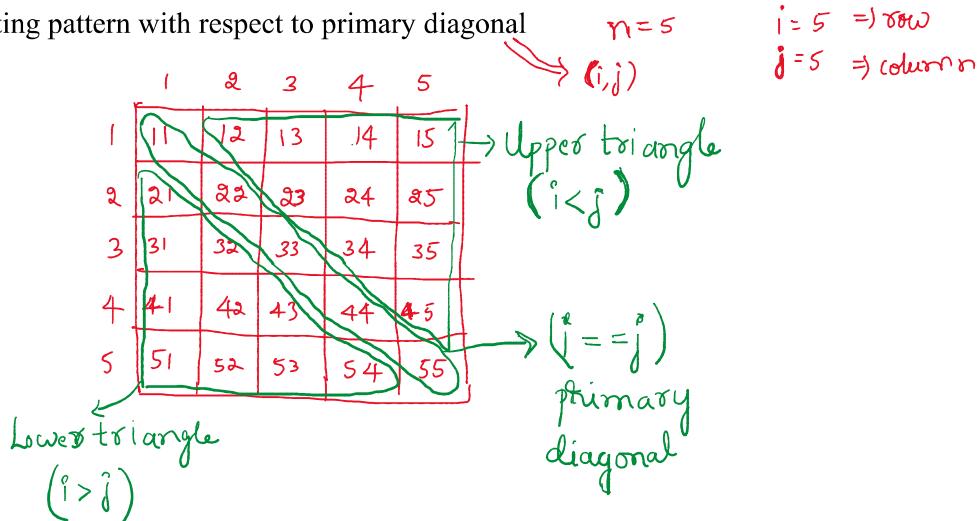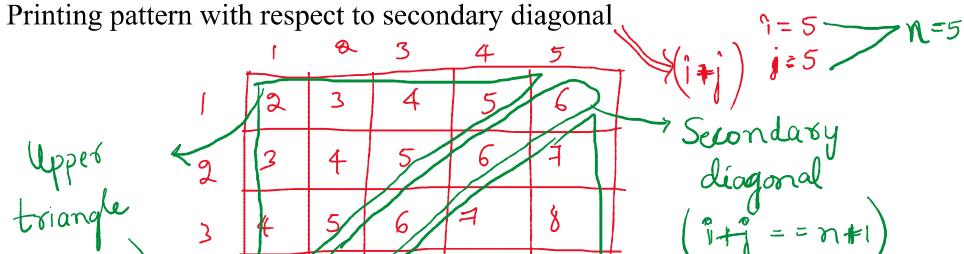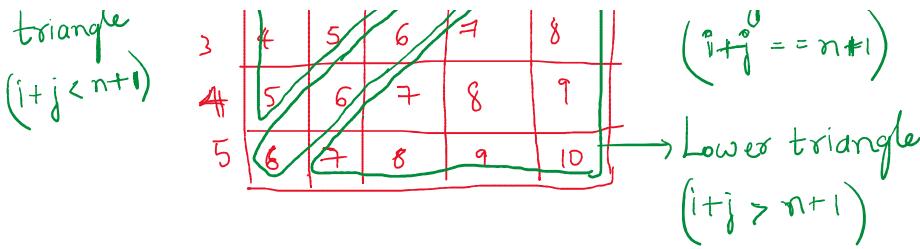
- Printing pattern with respect to primary diagonal

Printing pattern with respect to secondary diagonal

triangle
$(i+j < n+1)$

$\begin{array}{ccccccc} 3 & 4 & 5 & 6 & 7 & 8 \\ 4 & 5 & 6 & 7 & 8 & 9 \\ 5 & 6 & 7 & 8 & 9 & 10 \end{array}$

$(i+j == n+1)$

→ Lower triangle
$(i+j > n+1)$

Patterns:

```
'''
*
 *
  *
   *
    *
'''

n = int(input('Enter the number: '))
for i in range(1,n+1):
    for j in range(1,n+1):
        if i == j:
            print('*', end = ' ')
        else:
            print(' ', end = ' ')
    print()

'''
@
* @
* * @
* * * @
* * * * @
'''

n = int(input('Enter the number: '))
for i in range(1,n+1):
    for j in range(1,n+1):
        if i == j:
            print('@', end = ' ')
        elif i > j:
            print('*', end = ' ')
        else:
            print(' ', end = ' ')
    print()

'''
# # # # $
# # # $ &
# # $ & &
# $ & & &
$ & & & &
'''

n = int(input('Enter the number: '))
for i in range(1,n+1):
    for j in range(1,n+1):
        if i+j == n+1:
            print('$', end = ' ')
        elif i+j > n+1:
            print('&', end = ' ')
        elif i+j < n+1:
            print('#', end = ' ')
```

```python
    print()

'''
* * * * *
*       *
*       *
*       *
* * * * *
'''
n = int(input('Enter the num: '))
for i in range(1,n+1):
    for j in range(1,n+1):
        if i == 1 or j == 1 or i == n or j ==n:
            print('*',end = ' ')
        else:
            print(' ',end = ' ')
    print()

'''
1 0 0 0 0
0 1 0 0 0
0 0 1 0 0
0 0 0 1 0
0 0 0 0 1
'''
n = int(input('Enter the num: '))
for i in range(1,n+1):
    for j in range(1,n+1):
        if i ==j:
            print('1',end = ' ')
        else:
            print('0',end = ' ')
    print()

'''



*       *
 *     *
    *
 *     *
*       *
'''
n = int(input('Enter the num: '))
for i in range(1,n+1):
    for j in range(1,n+1):
        if i == j or i+j == n+1:
            print('*',end = ' ')
        else:
            print(' ',end = ' ')
    print()


'''
* * * * *
*       *
*       *
*       *
* * * * *
'''
n = int(input('Enter the num: '))
for i in range(1,n+1):
    for j in range(1,n+1):
        if i == 1 or j==1 or i==n or j==n:
            print('*',end = ' ')
        else:
            print(' ',end = ' ')
```

```
'''
   *
   *
* * * * *
   *
   *
'''
n = int(input('Enter the num: '))
for i in range(1,n+1):
   for j in range(1,n+1):
      if i == n//2+1 or j == n//2+1:
         print('*',end = ' ')
      else:
         print(' ',end = ' ')
   print()


'''
* * * * * * * * *
* *    *    * *
*  *  *  *  *
*    * * *    *
* * * * * * * * *
*    * * *    *
*  *  *  *  *
* *    *    * *
* * * * * * * * *

'''
n = int(input('Enter the num: '))
for i in range(1,n+1):
   for j in range(1,n+1):
      if i==1 or j==1 or i==n or j==n or i==j or i+j==n+1 or i==n//2+1 or j==n//2+1:
         print('*',end = ' ')
      else:
         print(' ',end = ' ')
   print()
```

Day-23

```
'''
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5

n = int(input('Enter the number: '))
for i in range(1,n+1):
   for j in range(1,n+1):
      print(j,end = ' ')
   print()
'''
```

n=5

(1,2,3,4,5) → row

(1,2,3,4,5) → column

end = 'n'


```
'''
1 1 1 1 1
2 2 2 2 2
3 3 3 3 3
4 4 4 4 4
5 5 5 5 5

n = int(input('Enter the number: '))
```

```python
    for j in range(1,n+1):
        print(i,end = ' ')
    print()  '''


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

n = int(input('Enter the number: '))
for i in range(1,n+1):
    for j in range(1,n+1):
        if i == j or i > j:
            print(j,end = ' ')
        else:
            print(' ',end = ' ')
    print()

'''
23
23 24
23 24 25
23 24 25 26
23 24 25 26 27
'''
```

n=5

```python
n = int(input('Enter the number: '))
for i in range(1,n+1):    (1,2,3,4,5)
    k = 23
    for j in range(1,n+1):(1,2,3,4,5)
        if i == j or i > j:
            print(k,end = ' ')
            k += 1
        else:
            print(' ',end = ' ')
    print()
```

	1	2	3	4	5
1	23				
2	23	24			
3	23	24	25		
4	23	24	25	26	
5	23	24	25	26	27

```
'''
        5
       5 4
      5 4 3
     5 4 3 2
    5 4 3 2 1
'''

n = int(input('Enter the number: '))
for i in range(1,n+1):
    k = 5
    for j in range(1,n+1):
        if i+j == n+1 or i+j > n+1:
            print(k,end = ' ')
            k -= 1
        else:
            print(' ',end = ' ')
    print()

    '''
        5
       5 4
      5 4 3
     5 4 3 2
```