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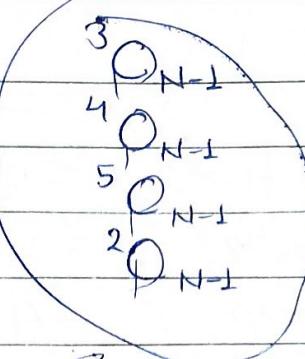
Options combinations Total

4 corners $\rightarrow \frac{3}{4}$

3 mids $\rightarrow \frac{4}{4}$

2 middle $\rightarrow \frac{5}{4}$

1 zeros $\rightarrow \frac{2}{4}$



$4 \times {}^3 P_{N-1}$

$3 \times {}^4 P_{N-1}$

$2 \times {}^5 P_{N-1}$

$1 \times {}^2 P_{N-1}$

	36	$4(3)^{N-1} + 3(4)^{N-1} + 2(5)^{N-1} + 1(2)^{N-1}$
${}^3 C_1$	$12 + 12 + 10 + 2$	$4(3)^2 + 3(4)^2 + 2(5)^2 + 1(2)^2$
${}^3 C_{N-1}$	$12 + 16 + 5 + 2$	$36 + 48 + 50 + 4$
${}^3 C_2$	$4 \times {}^3 C_2 + {}^4 C_2 + 2 {}^5 C_2 + {}^2 C_2$	$4(3)^2 + 3(4)^2 + 2(5)^2 + 1(2)^2$
${}^3 C_1 \times {}^3 C_2$	$12 + 24 + 10 + 1$	$36 + 48 + 50 + 4$
${}^3 C_1 \times {}^3 C_1$	4×7	
${}^3 C_1 \times {}^3 C_1 \times {}^3 C_1$	$12 + 18 + 20 + 1$	36
${}^3 C_1 \times {}^3 C_1 \times {}^3 C_1 \times {}^3 C_1$	$12 + 36 + 120 + 1$	36
${}^3 C_1 \times {}^3 C_1 \times {}^3 C_1 \times {}^3 C_1 \times {}^3 C_1$	$12 + 36 + 120 + 1$	36

	10	138
${}^3 C_1 \times {}^3 C_1 \times {}^3 C_1 \times {}^3 C_1 \times {}^3 C_1$	$5 \times 3 \times 2 \times 1$	2×1
${}^3 C_1 \times {}^3 C_1$	$5 \times 3 \times 2 \times 1 \times 2 \times 1$	2×1
${}^3 C_1 \times {}^3 C_1$	$5 \times 3 \times 2 \times 1 \times 2 \times 1 \times 2 \times 1$	2×1

3P_2

129
142

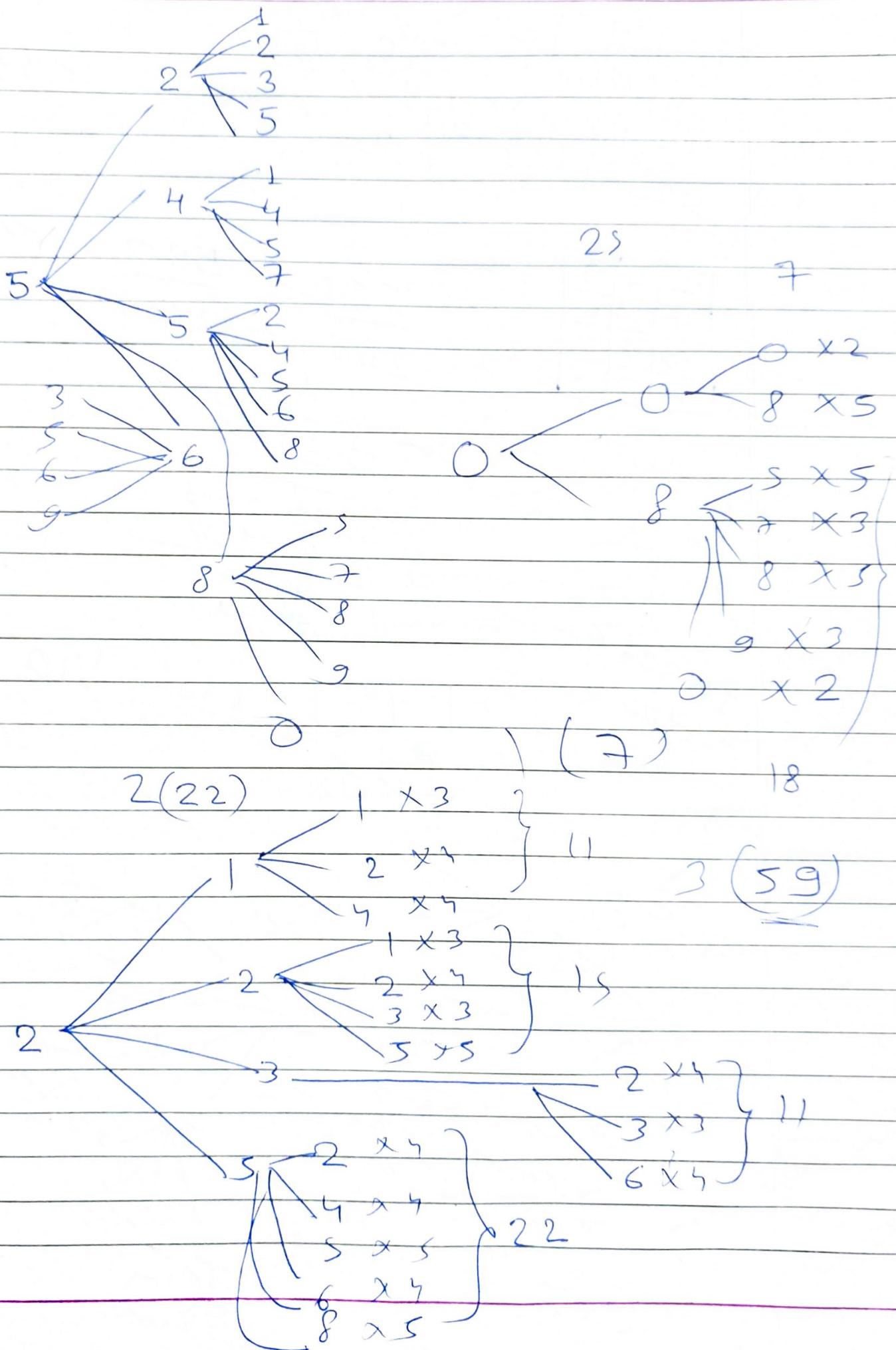
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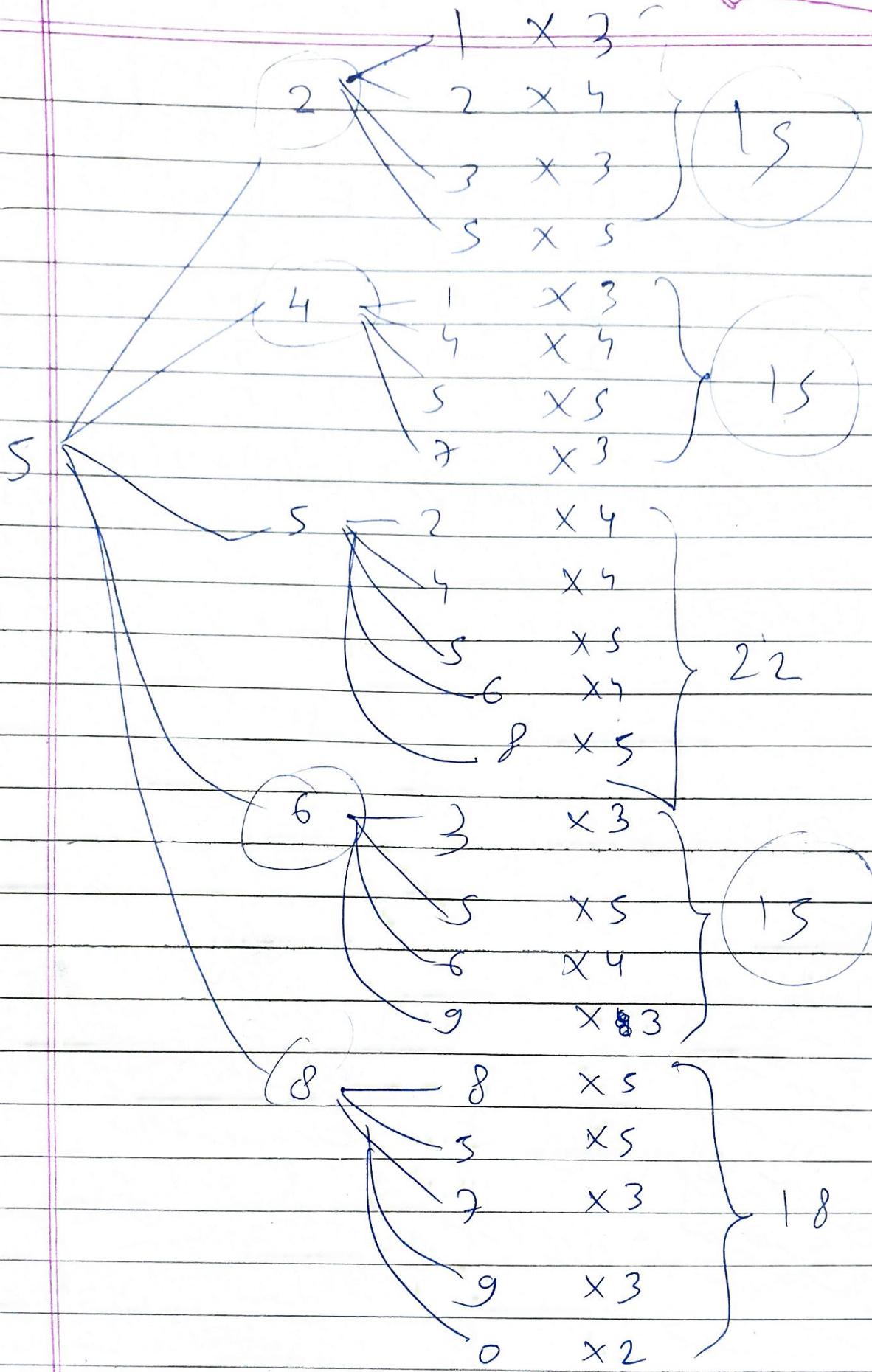
- ① Corners - $4^3 P_2 = 24$
- ② Mids $\rightarrow 4^4 P_2 = 48$
- ③ Middle $\rightarrow 2^5 P_L = 40$
- ④ Zeros $\rightarrow 1^2 P_2 = 2$

114

$$\begin{array}{|c|c|}\hline 1 & 1 \\ \hline\end{array} = 4$$

$$\frac{3! \times 4! \times 3!}{2! \times 2! \times 2!} = \frac{3!}{2!} \times \frac{4!}{2!} \times \frac{3!}{2!}$$





C DA

C SM M O

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$$\begin{aligned}
 & 3 + 8 = (1) 3 \\
 & 3 + 5 = (13) 2 \\
 & 6 + 4 = (22) 1
 \end{aligned}$$

	C	SM	M	O	E	sum
4 C	1	2	0	0		3
3 SM	2	1	1	0		4
2 M	0	3	2	0		5
1 O	0	0	1	1		2

4(MO)

$$\begin{aligned}
 & 4(\text{getsum}(3, 1, 2, 0, 0)) + 3(\text{getsum}(3, 2, 1, 1, 0)) + 2(\text{getsum}(3, 0, 3, 2, 0)) \\
 & \downarrow \\
 & 2
 \end{aligned}$$

2(getsum(2, 1, 2, 0, 0))

3, 0, 0, 1, 1

2, 0, 0, 1, 2

3, 4, 5, 2

N=3

C=4

SM=3

M=2

O=1

P, 3 } 11(4
C { 2C - n

C { 2SM - n
H(1) 3 } 15(3)

2C - 3
2SM - 4
HM - 5

SM { 3SM - 4 } 22(2)
else if (N=1, 10)

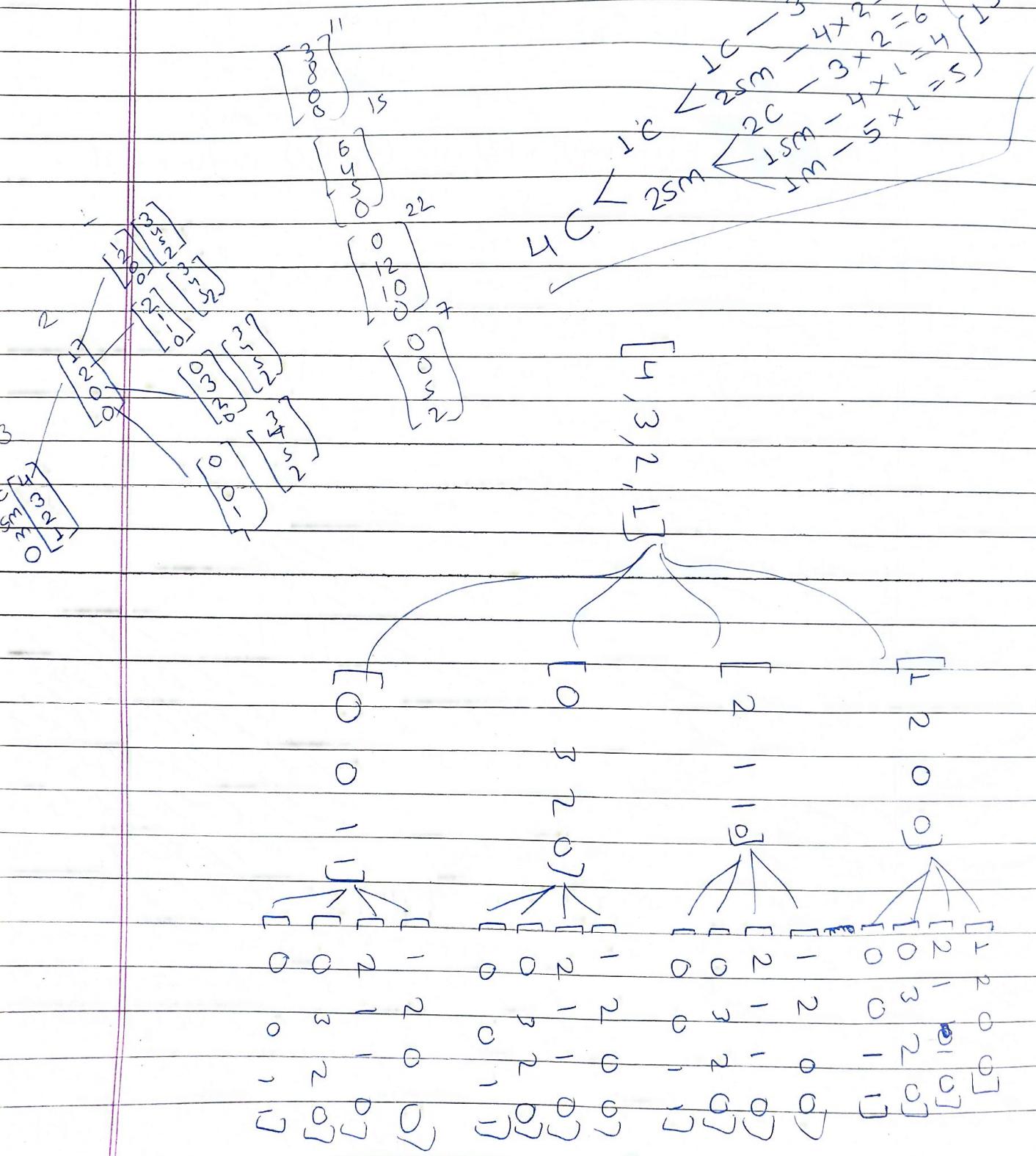
M { 2M - 5 } 7
O { 0 - 2 }

int getsum(N, SM, M, O)
if (N=2)
return C(3) + SM(4) + M(5) + O(6);
else getsum(N-1, SM, M, O);

else
return 4(getsum(N-1, 1, 2, 0, 0))
+ 3(getsum(N-1, 2, 1, 1, 0))
+ 2(getsum(N-1, 0, 3, 2, 0))
+ 1(getsum(N-1, 0, 0, 1, 1))

$$\begin{aligned}
 & N=2 \\
 & 3 = 1+1 \\
 & 3 + 4 + 5 + 2 = 14 \\
 & [1, 2, 0, 0] \\
 & [2, 1, 1, 0] \\
 & [0, 3, 2, 0] \\
 & [0, 0, 1, 1] \\
 & [4, 3, 2, 1] \\
 & \begin{matrix} x & x & x & x \\ 3 & 4 & 5 & 2 \\ 12+12+10+2 \\ = 36 \end{matrix}
 \end{aligned}$$

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$N = 4$

$P[4] = \{3, 4, 5, 2\}$

$M[4] = \{4, 3, 2, 1\}$

$C[4][4] = \{\{1, 2, 0, 0\},$

$\{2, 1, 1, 0\},$

$\{0, 3, 2, 0\},$

$\{0, 0, 1, 1\}\}$



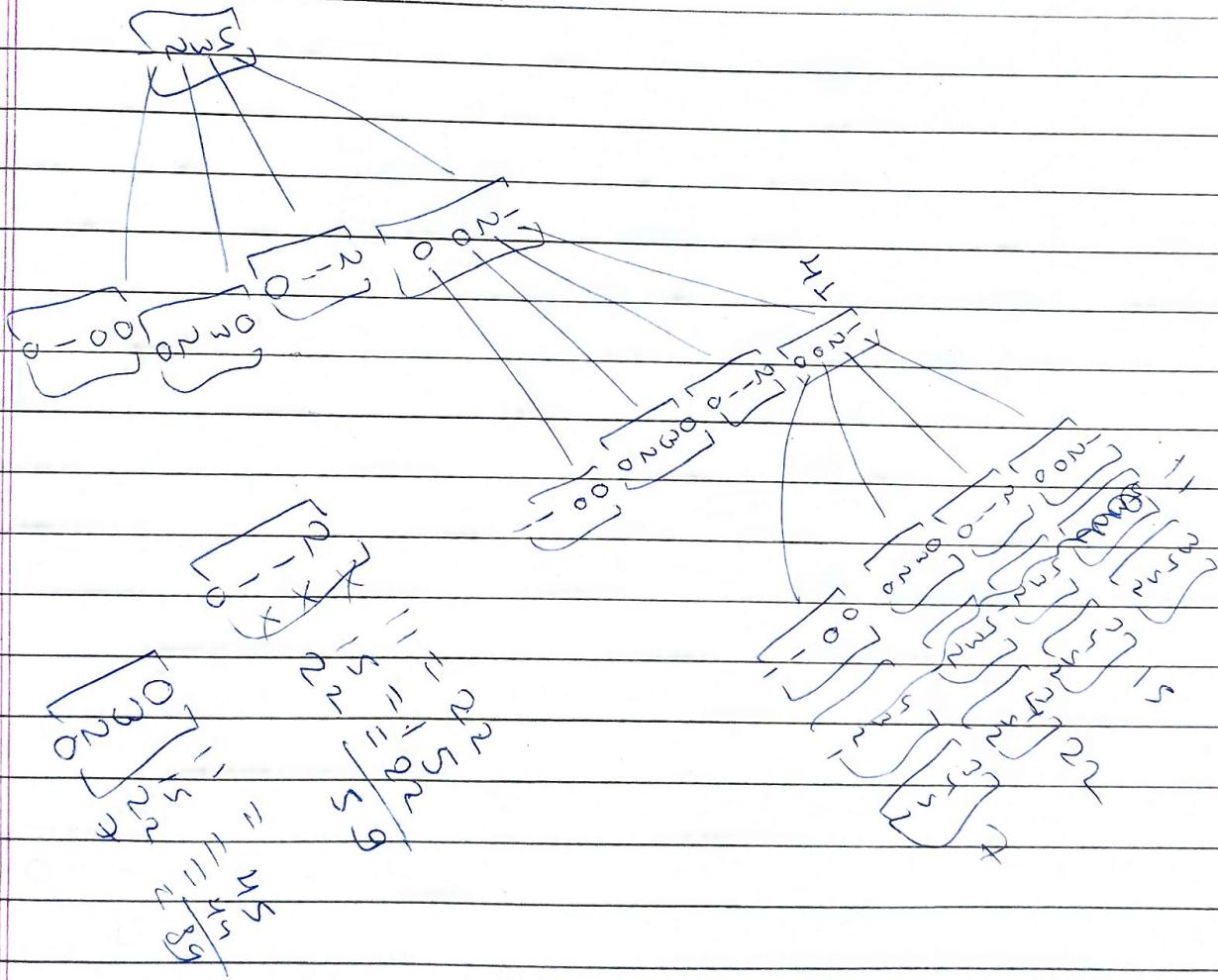
8

while ($N! = 1$)

break

$F = [\text{sum}(F * F1), \text{sum}(F * F2), \text{sum}(F * F3), \text{sum}(F * F4)]$

41, 59, 89, 29



0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

	UC	SM	M	LC	E	O	Sum
2	UC ✓	1	2	0	0	0	3
3	SM ✓	2	1	L	0	0	4
1	M ✓	0	3	1	0	1	5
2	LC ✓	0	1	0	1	1	3
1	E ✓	0	0	1	2	1	5
1	O ✓	0	0	0	0	1	2

$$\begin{bmatrix} 1 \\ 2 \\ 2 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} \quad \begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 3 \\ 5 \\ 2 \end{bmatrix} \quad 11$$

36 36

$$\begin{bmatrix} 2 \\ 1 \\ 0 \\ 0 \\ 0 \end{bmatrix} \quad 15$$

138 138

$$* \begin{bmatrix} 530 \\ 532 \end{bmatrix}$$

2046 2062

$$7896 7990$$

30494 30987

$$\begin{bmatrix} 0 \\ 3 \\ 1 \\ 0 \\ 1 \\ 0 \end{bmatrix} \quad 22$$

$$\begin{bmatrix} 0 \\ 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{bmatrix} \quad \begin{bmatrix} 0 \\ 0 \\ 3 \\ 4 \\ 5 \\ 3 \\ 5 \\ 2 \end{bmatrix} \quad 48 12$$

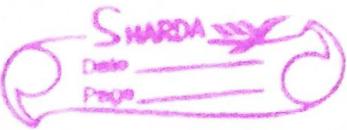
7990
984
30

$$\begin{bmatrix} 0 \\ 0 \\ 1 \\ 2 \\ 1 \\ -1 \end{bmatrix} \quad 18$$

$$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ -1 \end{bmatrix} \quad 7$$

H = 5 16
6 942

2 490
8 1



$$6x + y = 16$$

$$5x + y = 2$$

$$x = 14$$

$$y = 16 - 6(14)$$

$$y = -68$$

$$7(14) - 68$$

$s = "abc"$
for char in s:

10 13

for i in range(10, 20, 3):
 for i in range(0):

(~~for~~)

2	3	6
1	4	4
2	4	8
1	5	
2	3	
1	3	
2	2	

$$N=L \Rightarrow 10$$

$$N=2 \Rightarrow$$

.	.	.
.	.	.
X	.	X

I

F

2	UC	[3]	6			
3	SM	4	12	N=2	N=3	
1	M	5	5			
2	LC	3	6	36		138
1	E	5	5			
1	O	2	2			

$$N=2$$

$$N=3$$

	UC	SM	M	LC	E	O	sum
UC	1	2	0	0	0	0	3
SM	2	1	1	0	0	0	4
M	0	3	1	0	1	0	5
LC	0	1	0	1	1	0	3
E	0	0	1	2	1	0	5
O	0	6	0	0	1	1	2

I	F		
11	2	1	2
15	3	0	4
22	1	0	5
12	2	0	3
18	1	1	4
7	1	1	5

$$11$$

$$4+3+5$$

$$5+6+5+2$$

$$22+48+22+24$$

$$+18+7$$

$$= 138$$

2	3
1	4
1	5
6	3
0	5

$$15$$

0	3
3	4
1	5
0	3
1	5

$$15$$

✓ 1	✓ 2	✓ 3
UC 41	UM 59	UC 41
✓ 4 60 SM 59	✓ 5 85 M 59	✓ 6 60 SM 59
✓ 7 45	✓ 8 71 E 71	✓ 9 45 LC 45
X 0	O 25	X

$$1 \rightarrow 1, 2, 4 = 3$$

$$2 \rightarrow 1, 2, 3, 5 = 4$$

$$3 \rightarrow 2, 3, 6 = 3$$

$$4 \rightarrow 1, 4, 5, 7 = 4$$

$$5 \rightarrow 2, 4, 5, 6, 8 = 5$$

$$6 \rightarrow 3, 5, 6, 9 = 4$$

$$7 \rightarrow 4, 7, 8 = 3$$

$$8 \rightarrow 5, 7, 8, 9, 0 = 5$$

$$9 \rightarrow 6, 8, 9 = 3$$

$$O \rightarrow O, 8 = 2$$

(1) Total = $82 + 177 + 85 + 71 + 90 + 25 = 530$ 532

$$1 \leftarrow \begin{matrix} 1-3 \\ 2-4 \\ 4-4 \end{matrix} \} 11 \quad \left\{ \begin{array}{l} 41 \times 2 = 82 \\ (1, 3) \end{array} \right.$$

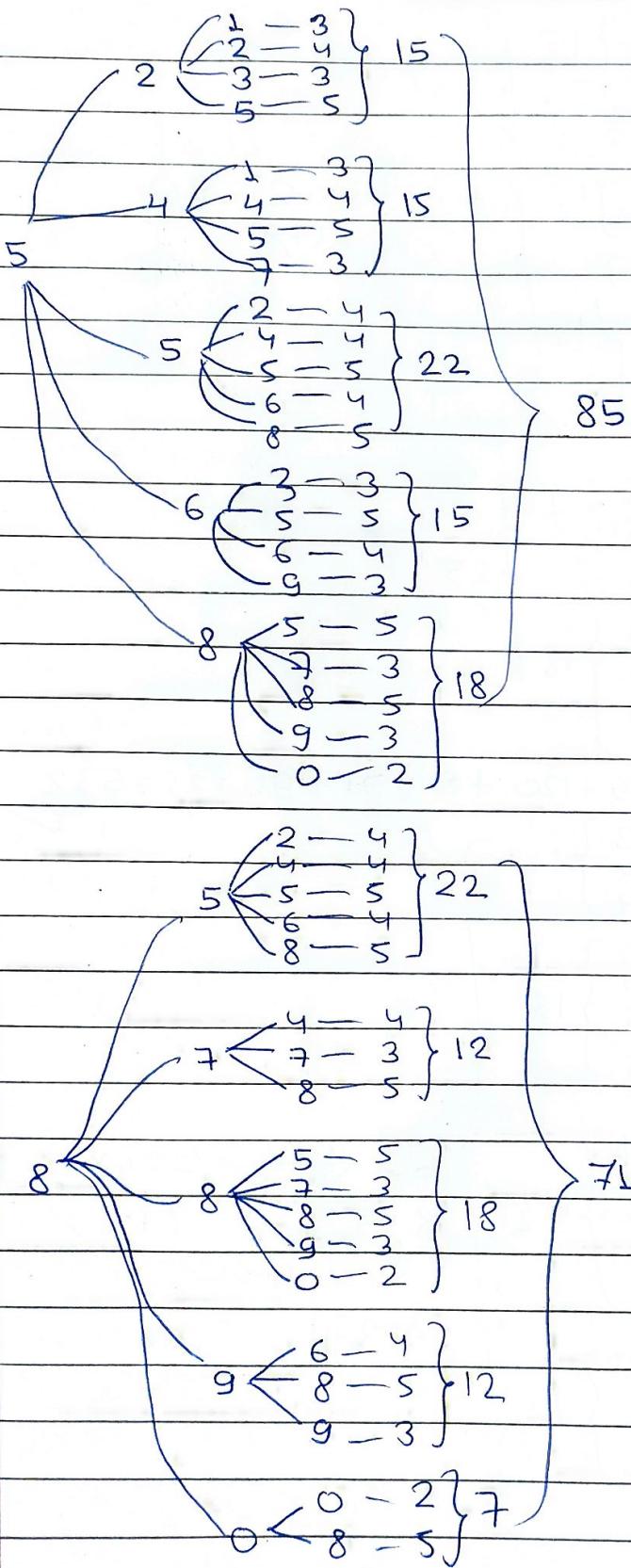
$$2 \leftarrow \begin{matrix} 1-3 \\ 2-4 \\ 3-4 \\ 5-5 \end{matrix} \} 15 \quad \left\{ \begin{array}{l} 41 \times 2 = 82 \\ (1, 3) \end{array} \right.$$

$$\begin{matrix} 1-3 \\ 2-4 \\ 4-4 \end{matrix} \} 11 \quad \left\{ \begin{array}{l} 59 \times 3 = 177 \\ (2, 4, 6) \end{array} \right.$$

$$2 \leftarrow \begin{matrix} 1-3 \\ 2-4 \\ 3-3 \\ 5-5 \end{matrix} \} 15 \quad \left\{ \begin{array}{l} 59 \times 3 = 177 \\ (2, 4, 6) \end{array} \right.$$

$$3 \leftarrow \begin{matrix} 2-4 \\ 3-3 \\ 6-4 \end{matrix} \} 11 \quad \left\{ \begin{array}{l} 59 \times 3 = 177 \\ (2, 4, 6) \end{array} \right.$$

$$5 \leftarrow \begin{matrix} 2-4 \\ 4-4 \\ 5-5 \\ 6-4 \\ 8-5 \end{matrix} \} 22 \quad \left\{ \begin{array}{l} 59 \times 3 = 177 \\ (2, 4, 6) \end{array} \right.$$



$$\begin{array}{c}
 4 \left(\begin{array}{l} 1-3 \\ 4-4 \\ 5-5 \\ 7-3 \end{array} \right) 15 \\
 7 \left(\begin{array}{l} 4-4 \\ 7-3 \\ 8-5 \end{array} \right) 12 \\
 8 \left(\begin{array}{l} 5-5 \\ 7-3 \\ 8-5 \\ 9-3 \\ 0-2 \end{array} \right) 18
 \end{array}
 \quad 45 \times 2 = 90 \\
 (7, 9)$$

$$\begin{array}{c}
 0 \left(\begin{array}{l} 0-2 \\ 8-5 \end{array} \right) 7 \\
 8 \left(\begin{array}{l} 5-5 \\ 7-3 \\ 8-5 \\ 9-3 \\ 0-2 \end{array} \right) 18
 \end{array}
 \quad 25$$

$$\text{Total} = 82 + 59 + 120 + 85 + 71 + 90 + 25 = 532$$

(2)

$$\begin{array}{c}
 1 \left(\begin{array}{l} 1-3 \\ 2-4 \\ 4-4 \end{array} \right) 11 \\
 4 \left(\begin{array}{l} 1-3 \\ 4-4 \\ 5-5 \\ 7-3 \end{array} \right) 15 \\
 5 \left(\begin{array}{l} 2-4 \\ 4-4 \\ 5-5 \\ 6-4 \\ 8-5 \end{array} \right) 22 \\
 7 \left(\begin{array}{l} 4-4 \\ 7-3 \\ 8-5 \end{array} \right) 12
 \end{array}$$

60 ← error of
 $\times 2$
 $(4, 6) = 120$
 $2 \rightarrow 59$

(1)

The New Table:-

	UC	UM	SM	M	LC	E	O	Sum
2 UC	1	1	1	0	0	0	0	3
1 UM	2	1	0	1	0	0	0	4
2 SM	1	0	1	1	1	0	0	4
1 M	0	1	2	0	0	1	0	4
2 LC	0	0	1	0	1	1	0	5
1 E	0	0	0	1	2	1	1	3
1 O	0	0	0	0	0	1	1	2

```
1 def pro(F,FT):
2     return
3     [F[0]*FT[0],F[1]*FT[1],F[2]*FT[2],F[3]*FT
4     [3],F[4]*FT[4],F[5]*FT[5],F[6]*FT[6]]
5 def NOC(N):
6     if(N==1):
7         return 10
8     F=[3,4,4,5,3,5,2]
9     I=[2,1,2,1,2,1,1]
10    F1=[1,1,1,0,0,0,0]
11    F2=[2,1,0,1,0,0,0]
12    F3=[1,0,1,1,1,0,0]
13    F4=[0,1,2,1,0,1,0]
14    F5=[0,0,1,0,1,1,0]
15    F6=[0,0,0,1,2,1,1]
16    F7=[0,0,0,0,0,1,1]
17    for i in range(1,N-1):
18        F=[sum(pro(F,F1)),sum(pro(F,F2)),sum(pro(
19        F,F3)),sum(pro(F,F4)),sum(pro(F,F5)),sum(
20        pro(F,F6)),sum(pro(F,F7))]
```