```
for i in range(3):    rows
    for j in range(5):    col
        print(1,end=' ')
    print()
```

```
1 1 1 1 1
1 1 1 1 1
1 1 1 1 1
```

```python
rows = 5
cols = 5
for row in range(rows):
    for col in range(cols):
        print(1,end=' ')
    print()
```

```
    c0 c1 c2 c3 c4
r0  1 1 1 1 1
r1  1 1 1 1 1
r2  1 1 1 1 1
r3  1 1 1 1 1
r4  1 1 1 1 1
```

Col 0   Col 1   Col 2   Col 3   Col 4

Row 0    0    1    1    1    1
Row 1    1    1    1    1    1
Row 2    1    1    2    1    1
Row 3    1    1    1    3    1
Row 4    1    1    1    1    4

```
rows = 5
cols = 5
for row in range(rows):
    for col in range(cols):
        if row == col:
            print(row, end=' ')
        else:
            print(1, end=' ')
    print()
```
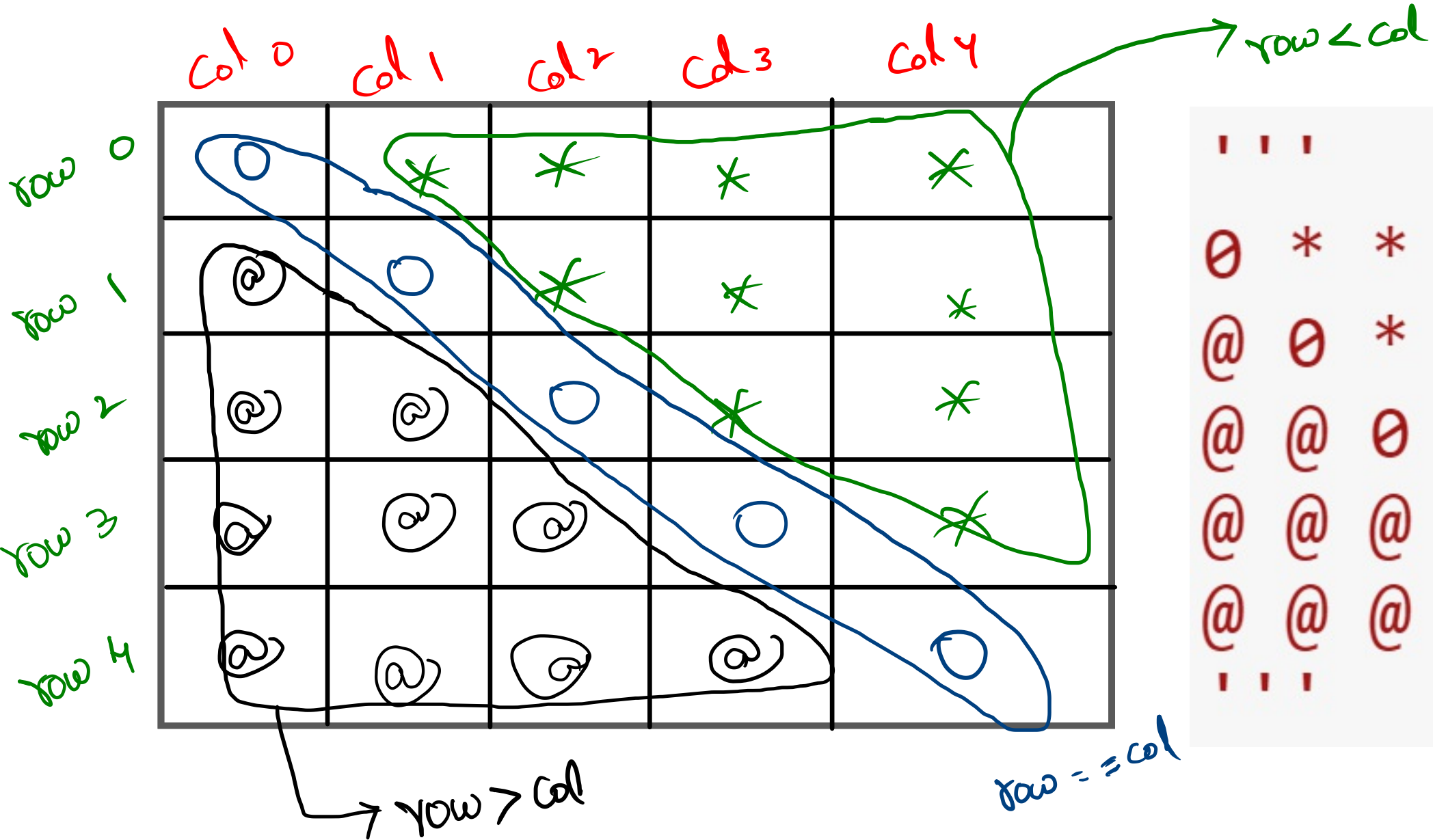
Col 0  Col 1  Col 2  Col 3  Col 4

row < col

Row 0
Row 1
Row 2
Row 3
Row 4

row > col

row == col

```
' ' '
0  *  *  *  *
@  0  *  *  *
@  @  0  *  *
@  @  @  0  *
@  @  @  @  0
' ' '
```

if row == col:
elif row < col:
elif row > col:

```python
rows = 5
cols = 5
for row in range(rows):
    for col in range(cols):
        if row == col:
            print(0,end=' ')
        elif row < col:
            print('*',end=' ')
        elif row > col:
            print('@',end=' ')
    print()
```

|  | c0 | c1 | c2 | c3 | c4 |
|---|---|---|---|---|---|
| r0 | $*$ | $*$ | $*$ | $*$ | $*$ |
| r1 | $*$ |  |  |  | $*$ |
| r2 | $*$ |  |  |  | $*$ |
| r3 | $*$ |  |  |  | $*$ |
| r4 | $*$ | $*$ | $*$ | $*$ | $*$ |

r0 → $*$

r4 → $*$

c0 → $*$

c4 → $*$

|     | C0 | C1 | C2 | C3 | C4 |
| --- | --- | --- | --- | --- | --- |
| r0  | 0  | 0  | 0  | 0  | 0  |
| r1  | 1  |    |    |    | 1  |
| r2  | 2  |    |    |    | 2  |
| r3  | 3  |    |    |    | 3  |
| r4  | 4  | 4  | 4  | 4  | 4  |

|  | c0 | c1 | c2 | c3 | c4 |
|---|---|---|---|---|---|
| r0 | a | b | c | d | e |
| r1 | f |  |  |  | g |
| r2 | h |  |  |  | i |
| r3 | j |  |  |  | k |
| r4 | l | m | n | o | p |

|  | C0 | C1 | C2 | C3 | C4 |
|---|---|---|---|---|---|
| r 0 | 0 | 1 | 2 | 3 | 4 |
| r 1 | 5 |  |  |  | 6 |
| r 2 | 7 |  |  |  | 8 |
| r 3 | 9 |  |  |  | 10 |
| r 4 | 11 | 12 | 13 | 14 | 15 |

Count = 0

Print (Count, end =  ' ' )
Count = Count + 1

s = 'abcdefghijklmnop'

Indices (in red string, handwritten above): 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Count = 15

```
15  14
 p   0
 a b c d e
 f       g
 h       i
 j       k
 l m n o p
 e   d   c   b   a
```

|       |       |       |       |       |
| ----- | ----- | ----- | ----- | ----- |
| a     | b     | c     | d     | e     |
| f     | 1     | 2     | 3     | g     |
| h     | 4     | 5     | 6     | i     |
| j     | 7     | 8     | 9     | k     |
| l     | m     | n     | o     | P     |

index = 0
num = 1

if row==0 or row==4 or col==0 or col==4:
    print(s[index], end=' ')
    index = index + 1

else:
    print(num, end=' ')
    num = num + 1

|     | c0 | c1 | c2 | c3 | c4 | c5 | c6 | c7 | c8 |
|-----|----|----|----|----|----|----|----|----|----|
| r0  | j  |    |    |    |    |    |    |    |    |
| r1  | j  | a  |    |    |    |    |    |    |    |
| r2  | j  | a  | g  |    |    |    |    |    |    |
| r3  | j  | a  | g  | a  |    |    |    |    |    |
| r4  | j  | a  | g  | a  | d  |    |    |    |    |
| r5  | j  | a  | g  | a  | d  | e  |    |    |    |
| r6  | j  | a  | g  | a  | d  | e  | e  |    |    |
| r7  | j  | a  | g  | a  | d  | e  | e  | s  |    |
| r8  | j  | a  | g  | a  | d  | e  | e  | s  | h  |

Column

0 — 1        range(0, 1) ⟶ 0

1 — 2        range(0, 2) ⟶ 0, 1

2 — 3

3 — 4

4 — 5

5 — 6

6 — 7

7 — 8

8 — 9

a b c d a

b c d a b

c d a b c

d a b c d

a b c d a

a b c d e

f i h g q

h f e d i

j c b a k

l m n o p