Decision Control And flow Control.

C++, C, Java, Ruby, Python etc $\longrightarrow$ These can

take decision.

(if i got 10 CGPA)

I will buy a scooty

else

" Padhna Padyega "

old pieces of code

→ Recursion bar

condition

False

True

Code

Code

Keyword ──────→ if (condition) { ──→ (True)

_____
_____   } Block of
_____   statements

Keyword ────→ } else {

                                    } Block of
                                      statements
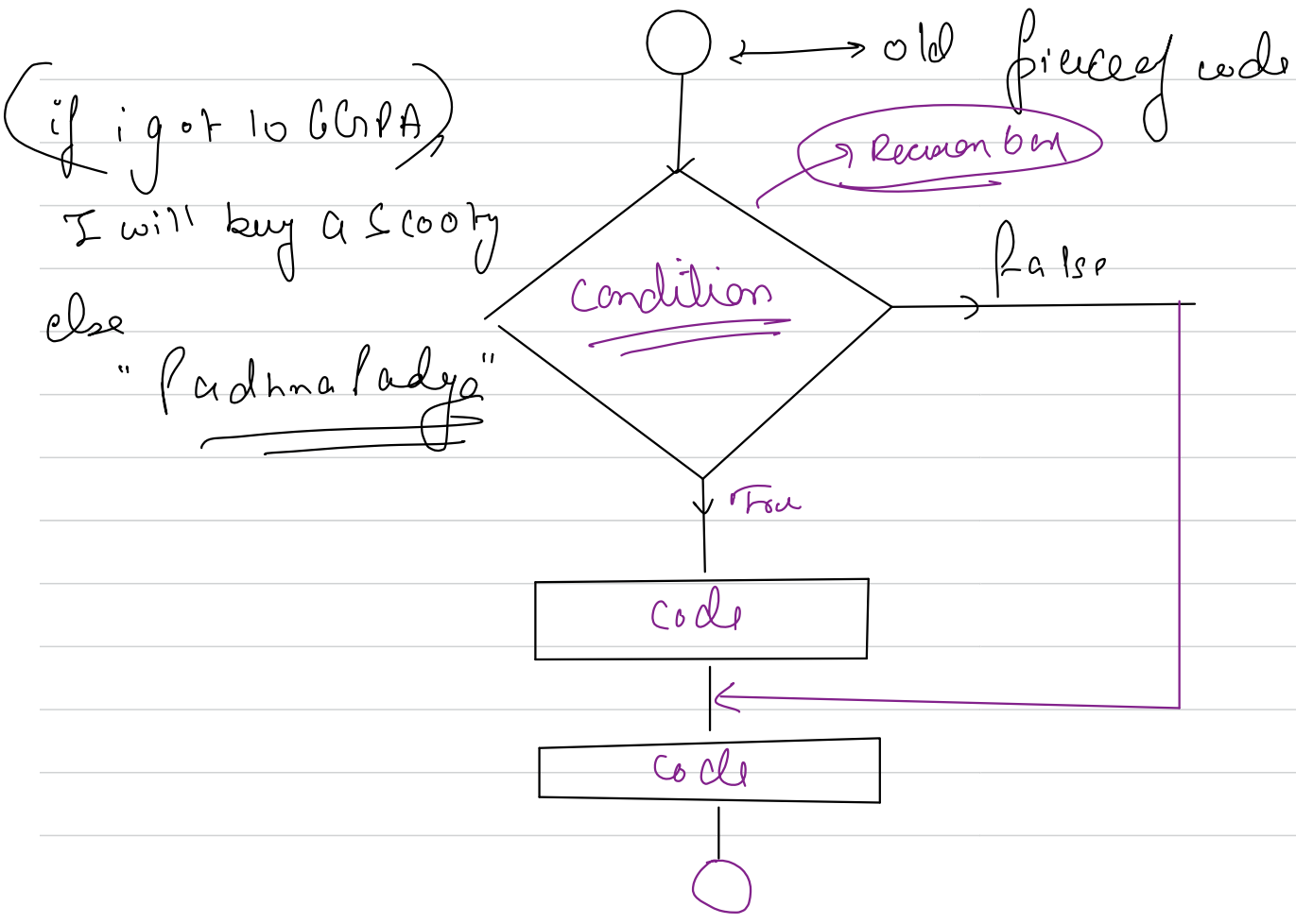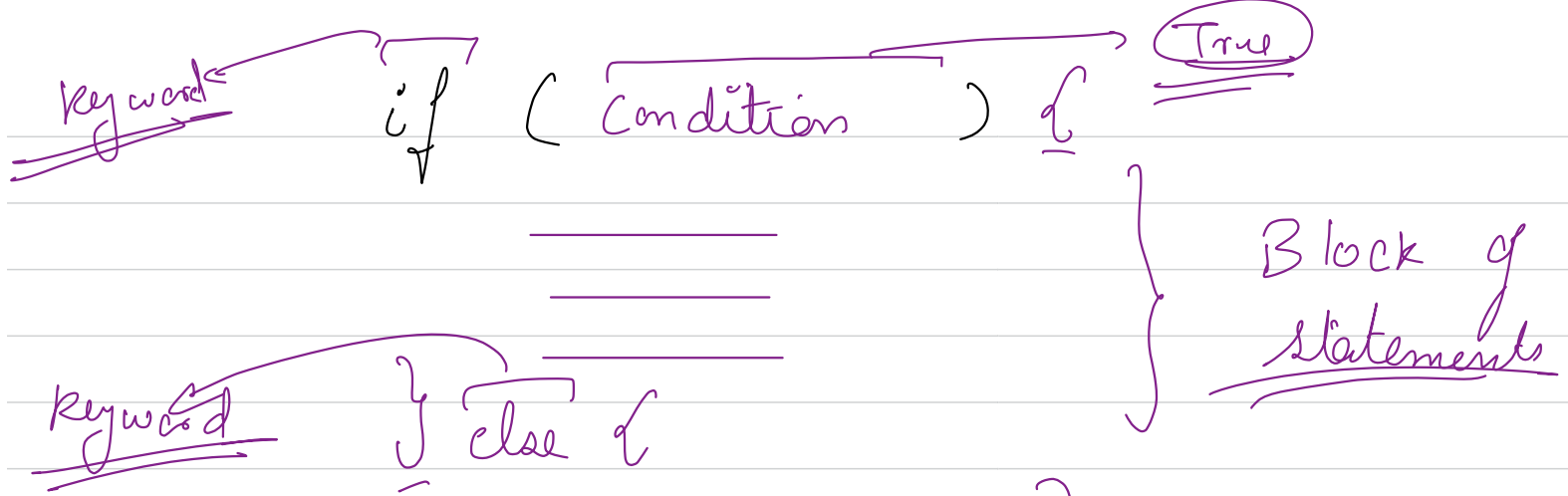
This
block is
executed
when condition in the if
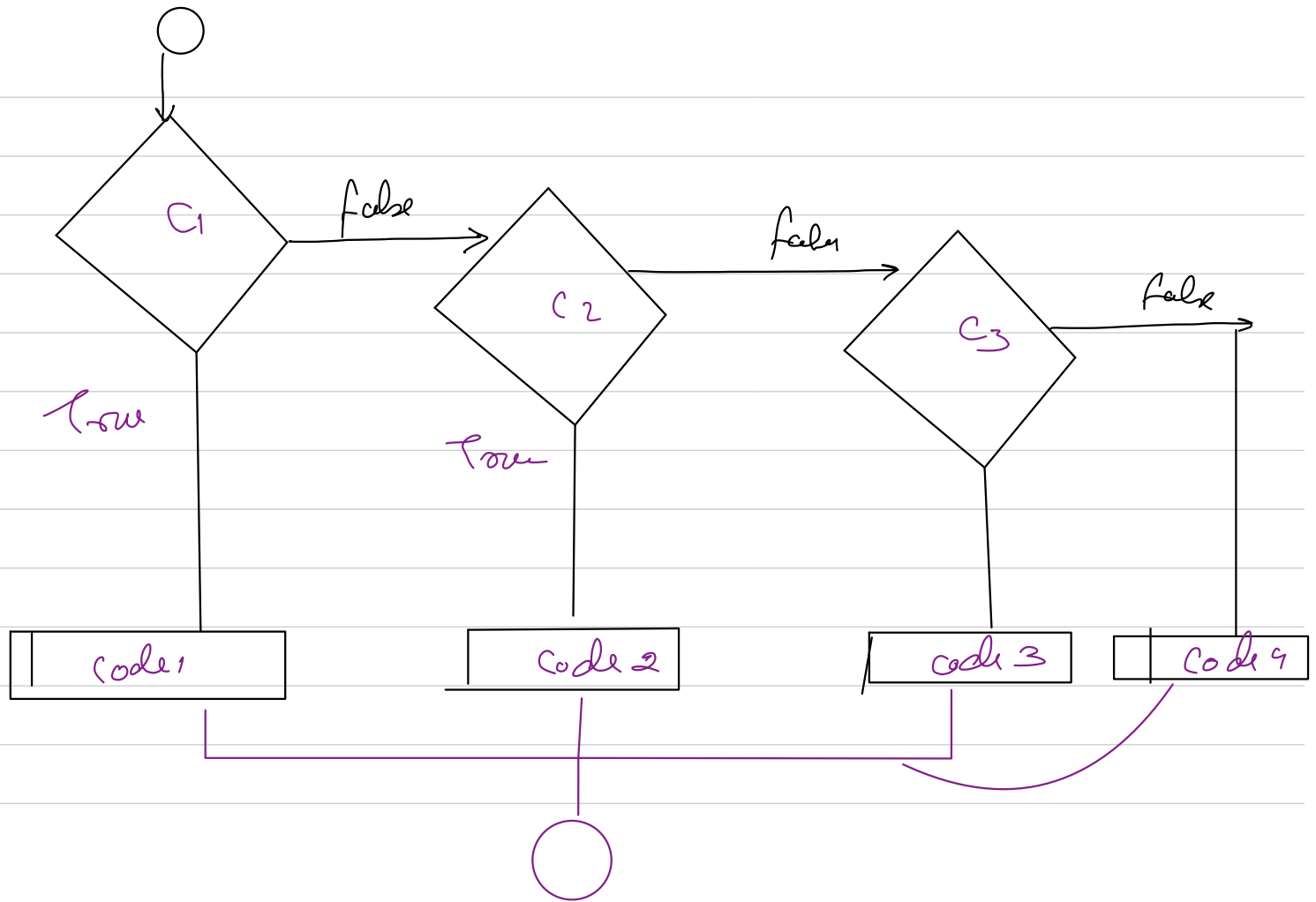is false

Q1) Given a number, check if it is divisible by 3 or 5 or both.

$x \Rightarrow 10 \longrightarrow$ divisible by 5

$\qquad 15 \longrightarrow$ divisible by 3, 5

$\qquad 9 \longrightarrow$ divisible by 3

$\qquad 17 \longrightarrow$ Not divisible

Flowchart:

- Start (circle) → C1
- C1 —false→ C2
- C1 —true→ Code1
- C2 —false→ C3
- C2 —true→ Code2
- C3 —false→ Code4
- C3 —true→ Code3
- Code1, Code2, Code3, Code4 → End (circle)

```
if (                    ) {

keyword ← ————————

} else if (_____) {


} else if (            ) {


} else {


}
```

```
→        if (            ) {
             if  (      ) {
                  if (        ) {
             }           ;
        }  else  {

                if      (          ) {
                        if (       | { y
                        else {
                }        {

                if   (              )
        y
                {
```
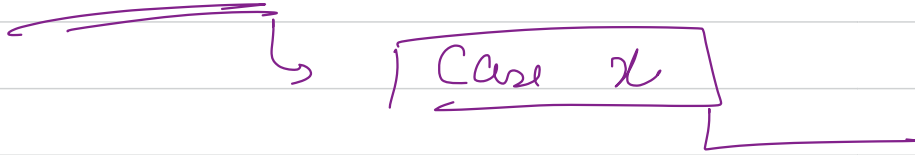
Switch Statement

Case x

Case y

```
Switch ( expression )  {        → Valu

        Case  V1 :
              ____
              ____
              ____
              break

        Case  V2 :
              ____
              ____
              ____
              break

        Case  V3
              ____
              break

        Default :
              break
}
```

while → basic

for → for each → advanced

do while
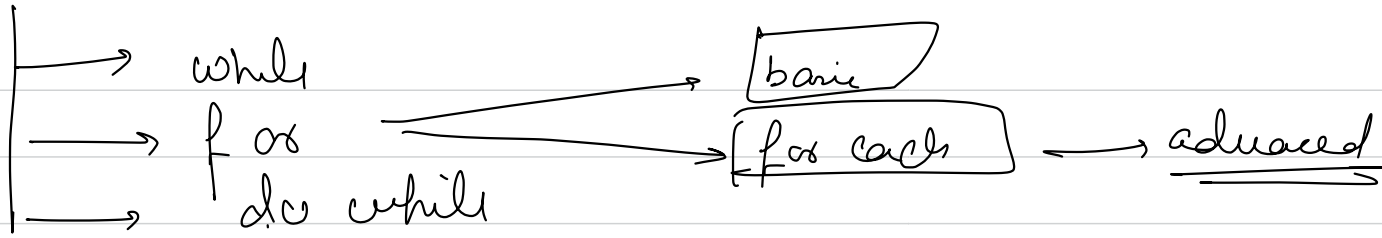
while (condition) {
———
———
———
}

while (   ) {

    while (   ) {

    }

    ———
}

Q. n

```
    *
  *   *
 *   *   *
*   *   *   *
*   *   *   *   *
```
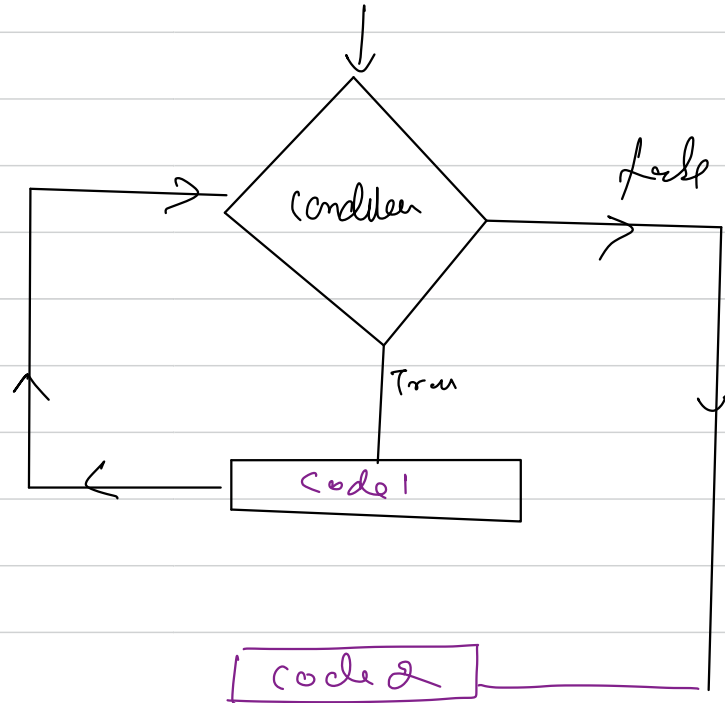
← pattern for $n = 5$

print the pattern for any

value of n

$i = 1$ *
$i = 2$ * *
$i = 3$ * * *
    4   * * * *
    5   * * * * *

$j <= n$
  $j <= i$
  $j <= i$
  $j <= i$
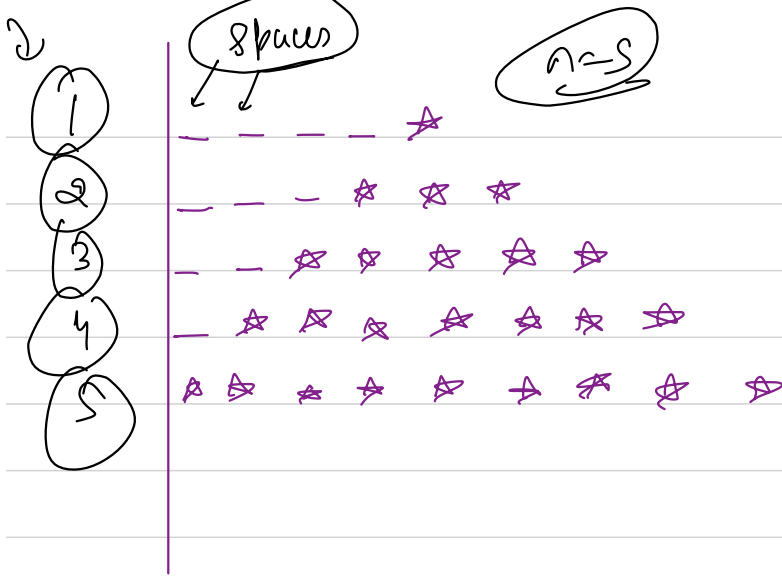
n~S

	spaces	stars
1	4 spaces	1 star
2	3 spaces	3 star
3	2 space	5 star
4	1 space	7 star
5	0 space	9 star

i^{th} line $\longrightarrow$ spaces $\rightarrow (n-i)$

i^{th} line $\longrightarrow$ stars $\rightarrow \boxed{2*i - 1}$

$$n = 5$$

$$2 \times n - 1$$

) row = 5

→ 6

→ 7
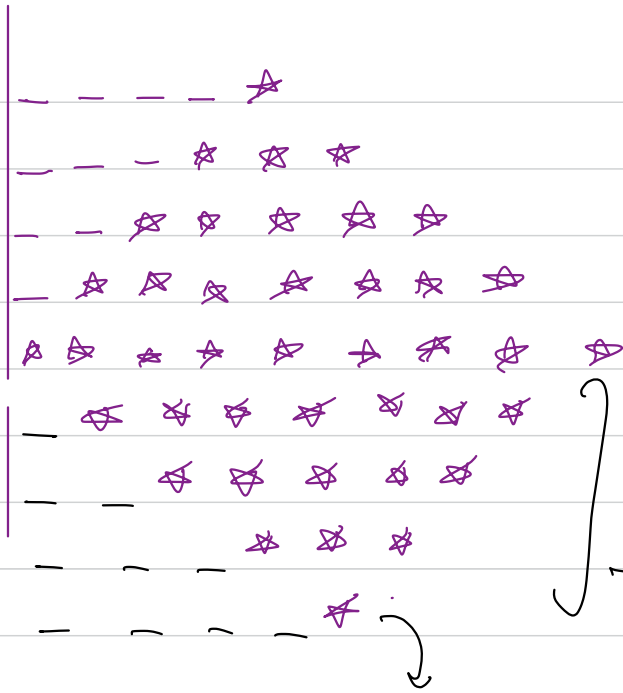
→ 8

→ 9

$$2 \times (2n - row) - 1$$

space → row - 1

```
initialise
while( condition ) {
    ___
    ___          } statements
    ___
    ___
    incrementor

}

for ( initialise ; condition ; incrementor ) {
    ___
    ___      } block of
}                statements
```

print first 10 natural number.

```cpp
for(int i=1 ; i<= 10; i++){
    cout<< i << "\n";
}
```
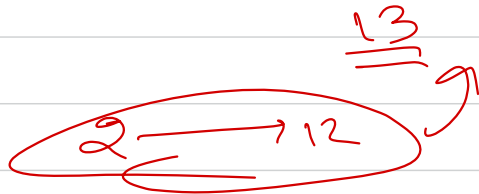
↳ Given a number, check if it is prime or not ?_?

↳ $x = 10$ → No

     $x = 5$ → Yes

(2) ————————→ (n-1)

    any no. in the abv range divides x.
         then x is composite.
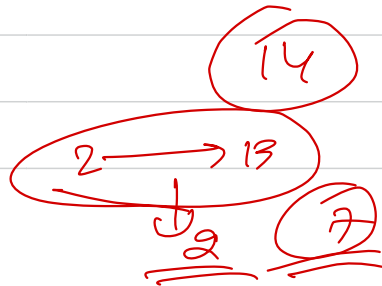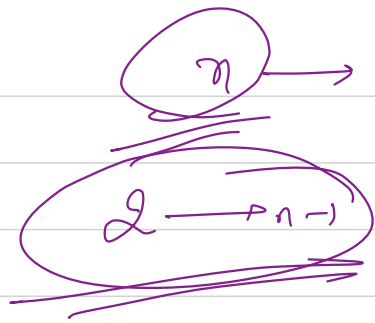
13

2 —→ 12

14

2 —→ 13
↓
2

7

n $\longrightarrow$ prime / or not prime

$2 \longrightarrow n-1$ approx n iterations

$$
\left.
\begin{array}{l}
1 \times 36 \\
2 \times 18 \\
3 \times 12 \\
4 \times 9 \\
\end{array}
\right\}
$$

sqrt $\longrightarrow$ 6×6

$$
\left.
\begin{array}{l}
9 \times 4 \\
12 \times 3 \\
18 \times 2 \\
36 \times 1 \\
\end{array}
\right\}
$$

repeated

36

$\sqrt{36}$

54

$\rightarrow$

1×54
2×27
3×18
6×9
9×6

$\sqrt{54}$

$7\ldots$

8

$N \longrightarrow$ niterahõ

$\sqrt{N}$ Citerahõ
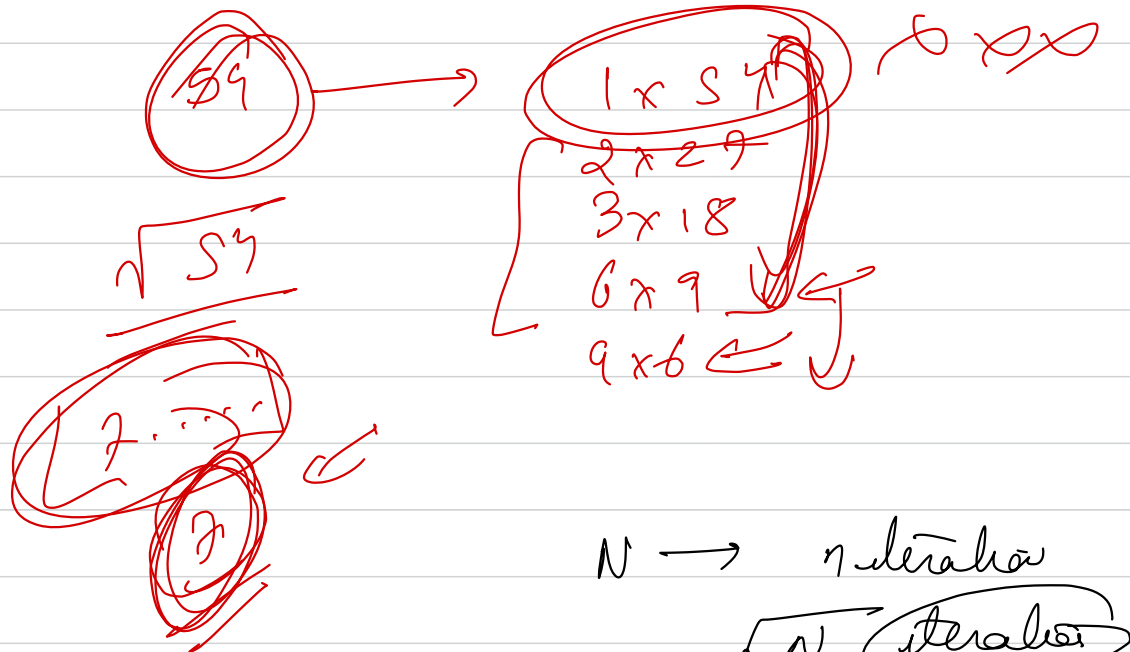
You will be given
a no. S.

an → S=1 and = 5

S=0 → 1

(0, 2)

(-1,1)

(0,1)

(1,1)

(-2,0)   (-1,0)   (1,0)   (2,0)

S→0 →1
S→1 → 5
S→2 → 13
S→3 → 25

(-1,-1)

(0,-1)   (1,-1)

(0,-2)
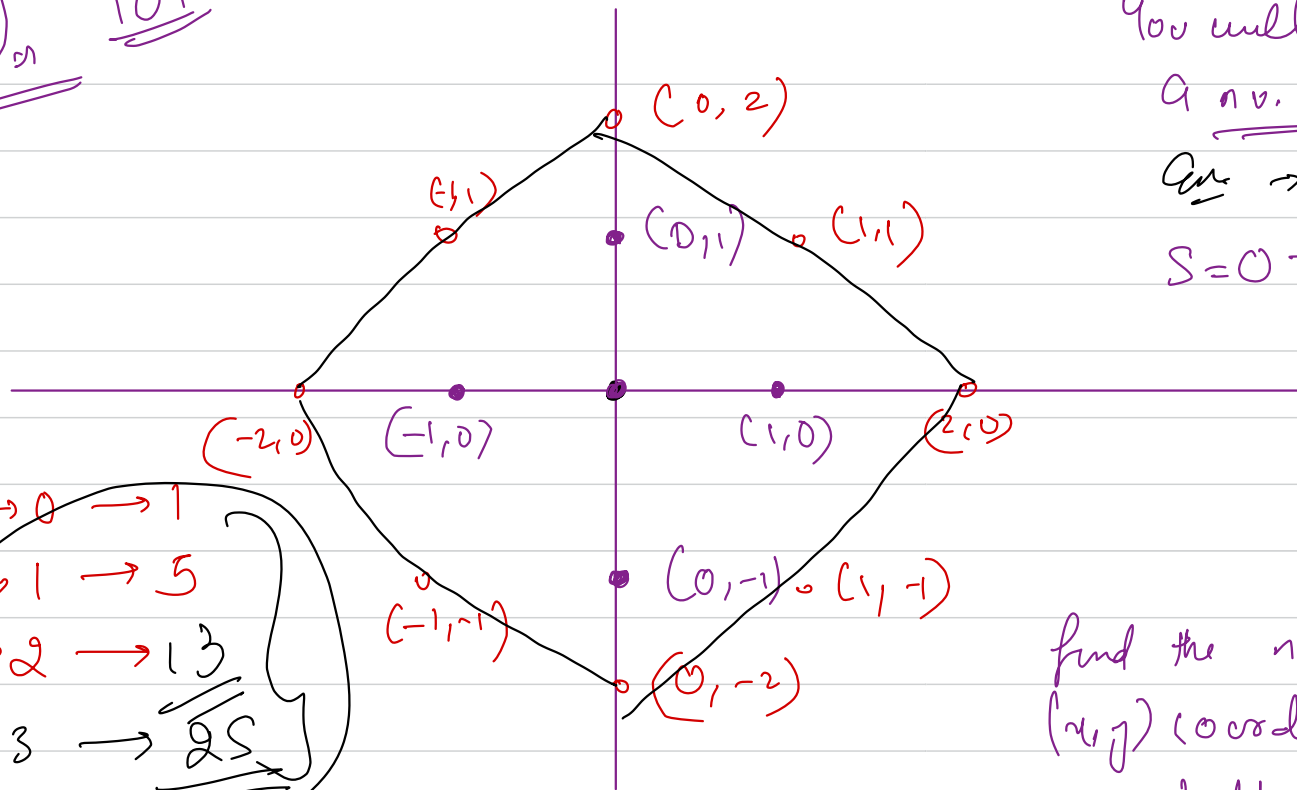
find the no. of integer
(x, y) coordinates, with
manhattan distance
from origin atleast
S.

$$f(P_1, P_2) = |P_1.x - P_2.x| + |P_2.y - P_2.y|$$

$S = n$ (A.P.)

1	4	8	12	16
$n=0$	$n=1$	$n=2$	$n=3$	$n=4$
$\downarrow$	8	13	25	41
1				

$n=3$

$$n = \;\longrightarrow\; 1 + 4\left(1 + 2 + 3 \cdots \cdots n\right)$$

$$\Rightarrow\; 1 + 4\,(n)(n+1)$$

$$\Rightarrow\; 1 + 2n(n+1)$$

$1 + 2(3)(3+1)$

$1 + 6 \times 4$

$\Rightarrow 25$